Public Review Draft | September 2015

Highlander Hall Demolition Project
Initial Study/
Mitigated Negative Declaration

Prepared for:

University of California - Riverside

Prepared by:

Michael Baker International

PUBLIC REVIEW DRAFT

INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION

Highlander Hall Demolition Project

LEAD AGENCY:

University of California, Riverside
1223 University Avenue, Suite 200
Riverside, California 92507
Contact: Ms. Tricia Thrasher
951.827.1484

PREPARED BY:

Michael Baker International
14725 Alton Parkway
Irvine, California 92718
Contact: Mr. Eddie Torres, INCE
949.472.3505

September 2015

JN 144698

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1.0 INTRODUCTION

The proposed Highlander Hall Demolition Project (the project) involves the demolition of the existing Highlander Hall office buildings and Human Resources Building and the grading and paving of a new surface parking lot area. Following a preliminary review of the proposed project, the University of California, Riverside (UCR) has determined that the proposed improvements constitute a "project" that is subject to the California Environmental Quality Act (CEQA).

1.1 CONTEXT OF ENVIRONMENTAL REVIEW

The project site is located west of the Interstate 215 (I-215)/State Route 60 (SR-60) freeway on the south side of University Avenue at the UCR campus. UCR's *2005 Long Range Development Plan* (LRDP) and accompanying *2005 Long Range Development Plan Environmental Impact Report* (LRDP EIR) (State Clearinghouse Number 2005041164), and the 2005 LRDP Amendment 2 and LRDP EIR Amendment 2 (SCH #2010111034) (2011) are the guiding documents for the physical growth of the campus, were approved and certified by the Board of Regents at their November 17, 2005 and November 28, 2011 meetings, respectively. The LRDP has undergone several amendments and associated environmental compliance documentation, including the following (refer to Section 1.4, *Incorporation by Reference*, for a detailed discussion of each of these environmental analyses):

- *2005 Long Range Development Plan* (LRDP), dated November 2005;
- *2005 Long Range Development Plan Environmental Impact Report* (LRDP EIR), dated November 2005 (SCH 2005041164);
- *2005 Long Range Development Plan Amendment 2* (LRDP Amendment 2), dated November 2011;
- *2005 Long Range Development Plan Amendment 2 Final Environmental Impact Report* (LRDP Amendment 2 EIR), dated October 2011 (SCH 20101110334);
- *2005 Long Range Development Plan Amendment 3* (LRDP Amendment 3); and
- *Addendum No. 1 to the 2005 UC Riverside Long Range Development Plan Environmental Impact Report* (LRDP Amendment 3 Addendum), dated August 2013.

Per CEQA Guidelines Section 15152, the environmental analysis for the proposed project is tiered from the LRDP EIR, certified by the University of California Board of Regents (The Regents) in November 2005, as augmented, revised and supplemented by the LRDP Amendment 2 EIR, certified by The Regents on November 28, 2011.

1.2 CEQA DOCUMENT TIERING

The Public Resources Code and the CEQA Guidelines discuss the use of "tiering" environmental impact reports by lead agencies. Public Resources Code Section 21068.5 defines "tiering" as:

> *The coverage of general matters and environmental effects in an environmental impact report prepared for a policy, plan, program or ordinance followed by narrower or site-specific environmental impact reports which incorporate by reference the discussion in any prior environmental impact report and which concentrate on the environmental effects which: (a) are capable of being mitigated, or (b) were not analyzed as significant effects on the environment in the prior environmental impact report.*

Tiering is further discussed in Public Resources Code Section 21094, as follows:

(a)(1) *Where a prior environmental impact report has been prepared and certified for a program, plan, policy, or ordinance, the lead agency for a later project that meets the requirements of this section shall examine significant effects of the later project upon the environment by using a tiered environmental impact report, except that the report on the later project is not required to examine those effects that the lead agency determines were either of the following:*

(A) *Mitigated or avoided pursuant to paragraph (1) of subdivision (a) of Section 21081 as a result of the prior environmental impact report.*

(B) *Examined at a sufficient level of detail in the prior environmental impact report to enable those effects to be mitigated or avoided by site-specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project.*

(b) *This section applies only to a later project that the lead agency determines is all of the following:*

(1) *Consistent with the program, plan, policy, or ordinance for which an environmental impact report has been prepared and certified.*
(2) *Consistent with applicable local land use plans and zoning of the city, county, or city and county in which the later project would be located.*
(3) *Not subject to Section 21166.*

(c) *For purposes of compliance with this section, an initial study shall be prepared to assist the lead agency in making the determinations required by this section. The initial study shall analyze whether the later project may cause significant effects on the environment that were not examined in the prior environmental impact report.*

(d) *All public agencies that propose to carry out or approve the later project may utilize the prior environmental impact report and the environmental impact report on the later project to fulfill the requirements of Section 21081.*

(f) *When tiering is used pursuant to this section, an environmental impact report prepared for a later project shall refer to the prior environmental impact report and state where a copy of the prior environmental impact report may be examined.*

Tiering is a method to CEQA analyses that allow a Lead Agency to focus on the issues that are ripe for decision and exclude from consideration issues already decided or not yet ready for decisions (CEQA Guidelines Section 15152 and 15385). According to CEQA Guidelines Section 15152 (a), “tiering” is defined as:

> *Tiering refers to using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project.*

According to CEQA Guidelines Section 15385: *"Tiering is appropriate when the sequence of EIRs is (a) from a general plan, policy, or program EIR to a program, plan, or policy EIR of a lesser scope or to a site-specific EIR ..."*

The concept of tiering anticipates a multi-tiered approach to preparing EIRs. The first-tier EIR covers general issues in a broader program-oriented analysis, including important program resource and mitigation commitments required to be implemented at the project-level. Subsequent tiers incorporate by reference the general discussions from the broader document, concentrating on the issues specific to the proposed action being evaluated (CEQA Guidelines Section 15152).

When an EIR has been prepared and certified for a program or plan consistent with CEQA requirements, a Lead Agency, should, for a later project pursuant to or consistent with the program or plan, concentrate on the environmental effects that were not examined as significant effects on the environment in the prior EIR; refer to Public Resources Code Section 21068.5. In those situations where a programmatic document does not specifically address and analyze the impacts and mitigation measures necessary for a project-level action, the project-level environmental review can be streamlined by tiering from the program-level documents. Agencies are encouraged to tier their CEQA analysis to avoid repetition of issues and to focus on the issues for decision at each level of review. Subsequent CEQA compliance involves either the preparation of a further EIR (subsequent or supplemental) or a further Negative Declaration.

Pursuant to CEQA Guidelines Section 15152, for purposes of tiering, significant environmental effects have been "adequately addressed" if the Lead Agency determines that the significant environmental effects:

- Have been mitigated or avoided as a result of the prior EIR and adopted findings in connection with that prior EIR; or

- Have been examined at a sufficient level of detail in the prior EIR to enable those effects to be mitigated or avoided by site-specific revisions, the imposition of conditions, or by other means with the approval of the later project.

This Initial Study is tiered from the 2005 UCR LRDP EIR, as augmented and updated by the 2005 LRDP Amendment 2 EIR (2011). As discussed above, under CEQA Guidelines Section 15152, tiering is appropriate when the sequence of analysis follows from an EIR prepared for a general plan, policy, or program to an EIR of lesser scope, or to a site-specific EIR. Under CEQA, the LRDP EIR is considered the first tier document and the LRDP Amendment 2 EIR and LRDP EIR Addendum are considered the second tier documents. This project-level Initial Study will identify impacts that were adequately analyzed in the previously certified environmental documentation. While subsequent analyses can rely on previous tier analyses, it also has the obligation to discuss any changed circumstances or new information that might alter the previous analyses.

1.3 TIERED INITIAL STUDY

Consistent with the Public Resource Code and CEQA Guidelines (refer to <u>Section 1.2</u>, above), the LRDP EIR (2005), LRDP Amendment 2 EIR (2011), and LRDP Amendment 3 Addendum (2013) are incorporated into the analysis and utilized to focus the discussion on new effects which had not been considered in the previous documents or effects that may be more significant than what was previously analyzed. While potentially significant impacts may be identified in the tiered Initial Study requiring further analysis, ultimately those impacts may be found less than significant with or without mitigation measures, project changes, or alternatives to the project. In addition, adopted LRDP mitigation measures may require site specific studies for certain topical areas. Following completion of the tiered Initial Study, UCR will make a formal determination as to whether the project may or may not have potentially significant and unmitigatable environmental impacts. A determination that a project's impacts were adequately addressed in the programmatic document and/or that a project will have less than significant effects, or impacts that could be reduced to less than significant levels with mitigation, would result in the preparation of a Negative Declaration or a Mitigated Negative Declaration. A determination that a project may have new or more severe significant unavoidable impacts on the environment would require the preparation of a further EIR to evaluate issues identified in this tiered Initial Study.

As indicated in Section 3.3, *Lead Agency Determination*, UCR has determined that the proposed project would not result in any potentially significant impacts that cannot be mitigated to less than significant levels or are not sufficiently addressed by the LRDP EIR, as augmented and updated by the LRDP Amendment 2 EIR and LRDP Amendment 3 Addendum. The project would not result in any new potentially significant impacts. Therefore, the preparation of a Mitigated Negative Declaration is appropriate.

Based on the analysis in this tiered Initial Study, the proposed project does not involve new or more significant impacts than those analyzed in the LRDP EIR, as augmented and updated by the LRDP Amendment 2 EIR and LRDP Amendment 3 Addendum, and none of the conditions described in CEQA or the CEQA Guidelines calling for the preparation of a subsequent or supplemental EIR have occurred.

The tiered Initial Study will undergo a 30-day public review period. During this review, comments by the public and responsible agencies on the project relative to environmental issues may be submitted to UCR Capital Planning, located at 1223 University Avenue, Suite 240, Riverside, California 92507-7209. UCR will review and consider all comments as a part of the project's environmental analysis, as required in Section 15082 of the CEQA Guidelines, as amended. The comments received with regard to this Initial Study will be included in the project environmental document, for consideration by UCR.

1.4 INCORPORATION BY REFERENCE

The references outlined below were utilized during preparation of this Initial Study. The documents are available for review at the UCR Capital Planning, located at 1223 University Avenue, Suite 240, Riverside, California 92507-7209.

- *2005 Long Range Development Plan* (November 2005). The *2005 Long Range Development Plan* (LRDP), approved in November 2005, is UCR's guiding document for the physical growth of the campus. This plan is a physical development and land use plan to meet the academic and institutional objectives for UCR. This plan is not a commitment to specific projects, or to a particular implementation schedule. It is, rather, a general guide that discusses future land use patterns and development of facilities, roads, open space, and infrastructure.

- *2005 Long Range Development Plan Environmental Impact Report* (November 2005). The *2005 Long Range Development Plan Environmental Impact Report* (LRDP EIR), certified in November 2005, accompanies the LRDP and comprises a detailed discussion of the UCR campus and the potential environmental effects of implementing the planned campus growth. The LRDP EIR also presents mitigation measures for all significant unavoidable impacts to the environment as well as alternatives to the proposed LRDP. The LRDP EIR determined that implementation of the proposed LRDP would result in the following significant and unavoidable impacts:

- Agricultural Resources
  - The conversion of approximately 125 acres of Prime Farmland to nonagricultural uses.
  - Cumulatively considerable contribution to the regional trend of loss of farmland.
- Air Quality
  - Construction impacts resulting from peak daily emissions of NO_X.
  - Operational impacts resulting from peak daily emissions of VOC, NO_X, and PM_{10}.
  - Cumulatively considerable increase of criteria pollutant emissions for which the South Coast Air Basin is in nonattainment.
- Biological Resources
  - Cumulatively considerable loss of special status species and habitat.
- Cultural Resources
  - Potential demolition of historic or potentially historic structures.
- Noise
  - Construction impacts resulting from groundborne vibration or groundborne noise levels.
  - Construction impacts resulting from an increase in on-campus ambient noise levels.
  - Construction impacts resulting from an increase in off-campus ambient noise levels.
- Traffic and Circulation
  - Operational impacts resulting from an exceedance of the applicable LOS criteria for vehicle trips at up to 10 intersections during the a.m. and/or p.m. peak hour.
  - Construction impacts resulting from construction vehicle trips.
  - Operational impacts resulting from exceedance of established service levels on roadways designated by the Riverside County Congestion Management Program.
  - Cumulatively considerable increases in traffic volumes on streets and highways in the project vicinity.

- *2005 Long Range Development Plan Amendment 2* (November 2011). In 2008, the Regents approved a medical school program for UCR. The *2005 Long Range Development Plan Amendment 2* (LRDP Amendment 2) is primarily an amendment to the LRDP Land Use map to provide a site for the new School of Medicine (SOM) on the West Campus north of Martin Luther King, Jr. Boulevard and east of Iowa Avenue. The new SOM currently uses existing and new buildings on the East Campus until additional facilities and infrastructure are needed and can be constructed on the West Campus.

  In addition to identifying a site for the SOM, Amendment 2 relocates two West Campus academic core parking structures and removes one parking structure. The removed parking spaces would be relocated within the three remaining structures (all adjacent to the I-215/SR-60 freeway). Amendment 2 reconfigures the major West Campus open space from The Grove concept to the Gage Canal Mall. Additional minor changes to the

Land Use Map redistributes land uses previously located on the medical school site and updates map changes that have occurred since the LRDP was approved in 2005.

- *2005 Long Range Development Plan Amendment 2 Final Environmental Impact Report* (October 2011). The *2005 Long Range Development Plan Amendment 2 Final Environmental Impact Report* (LRDP Amendment 2 EIR), dated October 2011, evaluated the potentially significant environmental effects of the LRDP Amendment 2.

  This EIR is a supplement to the LRDP EIR in that it provides an analysis of only those likely environmental effects of the LRDP analyzed in the LRDP EIR that would change as a result of the proposed land use map changes, additional building space, and the extension of the LRDP horizon year. Those impacts that would not change as a result of the proposed Amendment 2 are not reevaluated. The effects of campus growth under the amended LRDP related to greenhouse gas (GHG) emissions, which were not previously analyzed in the LRDP EIR, are evaluated in this EIR and determined to be less than significant.

  Similar to the analysis in the LRDP EIR, this supplemental EIR also presents a programmatic analysis of the environmental impacts of campus development under the LRDP as amended by the LRDP Amendment 2. The LRDP Amendment 2 EIR (2011) determined that implementation of the proposed LRDP Amendment 2 would result in the following significant and unavoidable impacts:

  - Agricultural Resources
    - The conversion of approximately 37.3 acres of Prime Farmland to nonagricultural uses.
    - Cumulative contribution to regional trend of loss of farmland.
  - Air Quality
    - Construction emissions that violate an air quality standard or contribute substantially to an existing or projected air quality violation.
    - Operational emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation.
    - Conflict with or obstruct implementation of the applicable air quality plan.
  - Noise
    - Substantial temporary impacts associated with the generation and exposure of persons on campus to excessive groundborne vibration or groundborne noise levels.
    - Substantial temporary or periodic increases in ambient noise levels at locations on campus.
    - Substantial temporary or periodic increases in ambient noise levels at off-campus locations.
  - Transportation and Traffic
    - Degradation of intersection levels of service under 2020 conditions.
    - Degradation of intersection levels of service under existing conditions.
    - The generation of construction-related vehicle trips, which could temporarily impact traffic conditions along roadway segments and at individual intersections.
    - Exceedance of established service levels on roadways designated by the Riverside County Congestion Management Program under 2020 conditions.

  - Exceed of established service levels on roadways designated by the Riverside County Congestion Management Program under existing conditions.

- *2005 LRDP Amendment 3* (2013). In 2013, the Regents approved Amendment 3 which is an amendment to the LRDP Land Use map to provide for a Campus Infrastructure Overlay land use and apply it to a 12-acre site on the West Campus. The land use is a temporary, 20-year, land use designation to allow for the siting and development of a solar farm, while preserving the underlying existing LRDP land use designations for the future. It should be noted that this report was utilized for background information purposes only as this amendment (along with Amendment 1) is for a specific site within the campus boundaries which is not related to the Highlander Hall site.

- *Addendum No. 1 to the 2005 UC Riverside Long Range Development Plan Environmental Impact Report* (August 2013). The *Addendum No. 1 to the 2005 UC Riverside Long Range Development Plan Environmental Impact Report* (LRDP Amendment 3 Addendum), certified in August 2013, was prepared to satisfy the CEQA requirements for the LRDP Amendment 3. Section 15164(a) of the CEQA Guidelines states that "The lead agency or responsible agency shall prepare an addendum to a previously certified EIR if some changes or additions are necessary but none of the conditions described in Section 15162 calling for preparation of a subsequent EIR have occurred." Construction and operation of the LRDP Amendment 3 to include the proposed Campus Infrastructure Overlay land use designation would not trigger any of the conditions necessitating preparation of a subsequent or supplemental EIR or negative declaration; further, only some minor changes or additions to the LRDP EIR, as updated and augmented by the LRDP Amendment 2 EIR, were necessary. The LRDP Amendment 3 Addendum determined that the LRDP Amendment 3 would not have a substantial adverse effect on the environment and would not change the nature or increase the magnitude of potential impacts or the conclusions previously identified in the LRDP Amendment 2 EIR.

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2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND SETTING

PROJECT LOCATION

The approximate three-acre project site is located on the University of California, Riverside campus (UCR), west of downtown City of Riverside and east of Interstate 215 (I-215)/State Route 60 (SR-60), in Riverside County, California; refer to Exhibit 2-1, *Regional Vicinity*, and Exhibit 2-2, *Site Vicinity*. The site is specifically located at the southwest corner of University Avenue and I-215/SR-60, at 1150 and 1160 University Avenue (Assessor's Parcel Numbers [APNs] 253-050-007 and -006, respectively).

EXISTING CONDITIONS

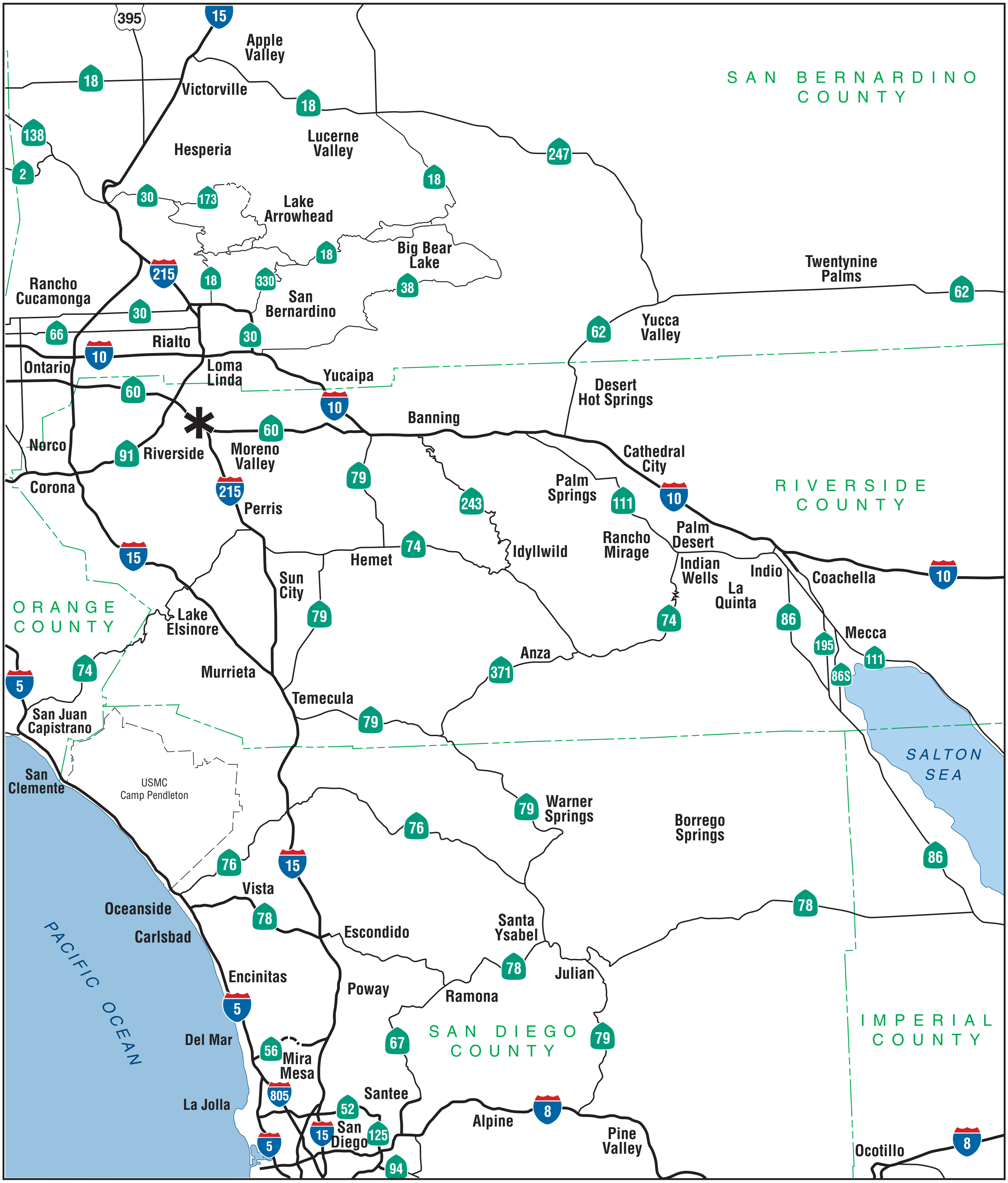
The project site is currently developed with two vacant office buildings (Highlander Hall) totaling 61,251 square feet and a recently fire-damaged office building (Human Resources Building) totaling 8,242 square feet; refer to Exhibit 2-3, *Aerial Photograph*, Exhibit 2-4a, *On-Site Photographs*, and Exhibit 2-4b, *Off-Site Photographs*. The former Highlander Hall included offices and 96 parking spaces. The Human Resources Building, prior to a recent fire, included offices, a tutorial room, and a conference room. Existing ornamental landscaping, including large trees, are present on-site. Existing on-site parking spaces (which comprise a portion of Parking Lot 50) are currently being used by staff, employees, and students of UCR. Staff working in the Human Resources Building, their customers, and some employees with offices in University Village (to the north of the project site) utilize Parking Lot 50 at the project site. Students attending classes on the main campus also use Parking Lot 50. Full access to the project site is available via the University Village intersection at University Avenue. Additional access is available from the south from Everton Place, through the adjacent surface parking lot. A restricted right-turn exit only driveway to University Avenue also exists on-site.

Table 2-1, *Surrounding Land Uses*, describes the surrounding land uses.

Table 2-1
Surrounding Land Uses

Direction	LRDP Land Use Designation	City of Riverside General Plan Designation	City of Riverside Zoning	Existing Land Use
North*	--	MU-U	CR	Commercial (Mobil Service Station)
	--	MU-U	CR	Commercial (University Village)
	--	--	--	I-215/SR-60
West	Academic	PF	CR	UCR Extension Center
South	Academic Open Space	PF	PF[1]	Vacant – Surface Parking Lot
East	Open Space	PF	CR	Gage Canal
	Academic Parking	PF	CR	Caltrans Maintenance Station

Notes: LRDP = Long Range Development Plan; CR = Commercial Retail Zone; PF = Public Facilities/Institutional; PF[1] = Public Facilities Zone; MU-U = Mixed Use Urban; * = located within the City of Riverside



- Project Site

NOT TO SCALE

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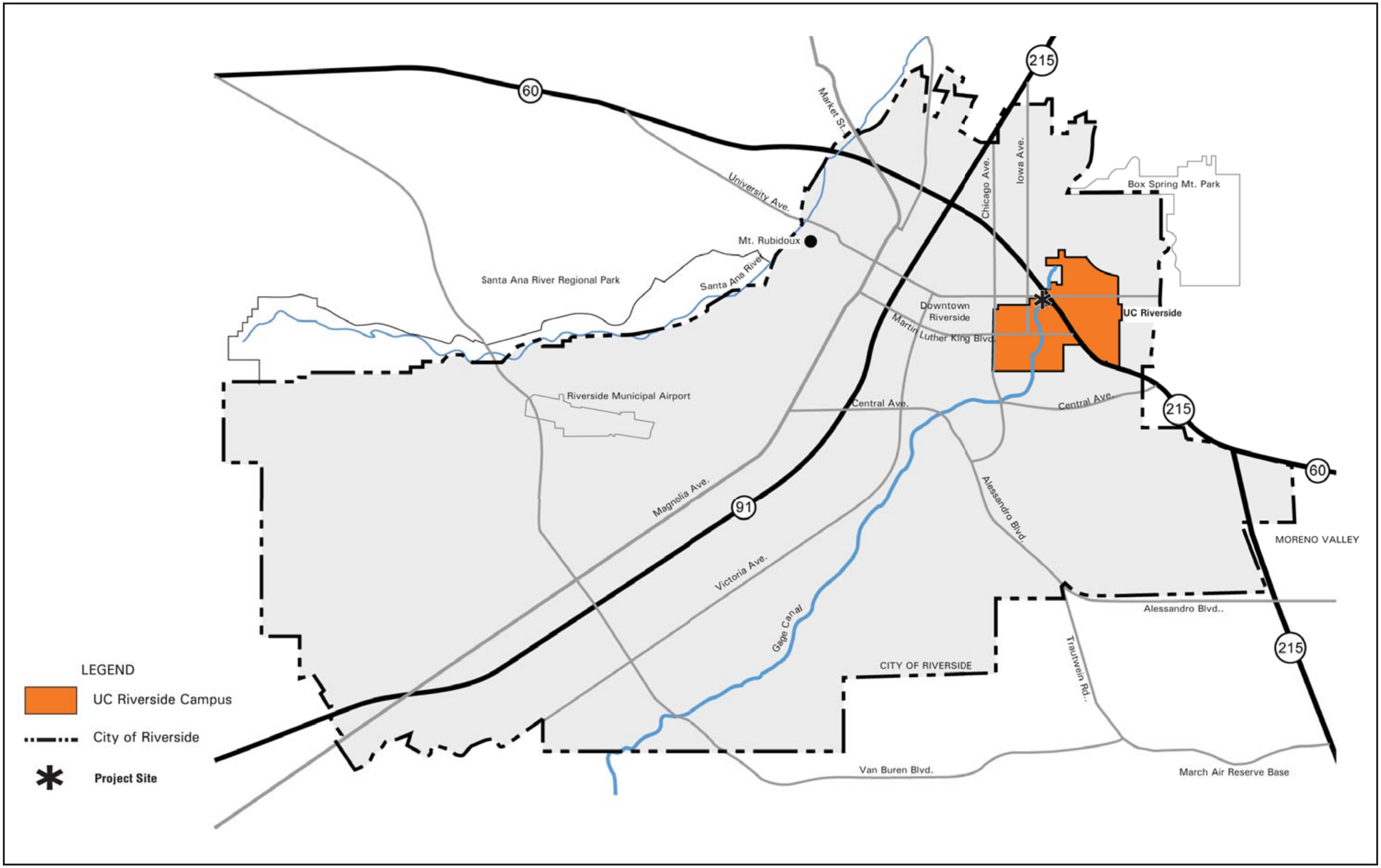
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Regional Vicinity

Exhibit 2-1



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HIGHLANDER HALL DEMOLITION PROJECT
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Site Vicinity

Exhibit 2-2

Source: Google Earth, 2015.
- Project Site

HIGHLANDER HALL DEMOLITION PROJECT
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Aerial Photograph

Exhibit 2-3

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View of existing on-site office uses (Highlander Hall).

View of existing on-site offices at Highlander Hall.

View of existing on-site surface parking located in the northern portion of the project site.

View of on-site office building and surface parking lot in the southern portion of the project site.

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HIGHLANDER HALL DEMOLITION PROJECT
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

On-Site Photographs

Exhibit 2-4a

View of University Village, located to the northwest of the project site.

View of commercial uses (Mobile Service Station) located to the north of the project site.

View of the Caltrans Maintenance Station located to the southeast of the project site.

View of the UCR Extenstion Center located to the west of the project site.

View of the Gage Canal located to the east of the project site.

View of UCR surface parking lot located to the south of the project site.

HIGHLANDER HALL DEMOLITION PROJECT
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Off-Site Photographs

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Exhibit 2-4b

UCR LONG RANGE DEVELOPMENT PLAN

Under the *2005 UCR Long Range Development Plan* (LRDP) Amendment 2, the land use designation for the project site is primarily designated "Academic", with some designated "Open Space" along the Gage Canal. Surface parking is a permitted use within the Academic land use designation as it does not preclude the future development of the site for academic uses.

Although the University is not subject to local jurisdictional land use regulations, it can be noted that the *City of Riverside General Plan 2025* (Riverside General Plan) *Land Use Map* designates the project site as Public Facilities/Institutional (PF) and the existing City of Riverside zoning is PF (Public Facilities Zone).

2.2 PROPOSED PROJECT

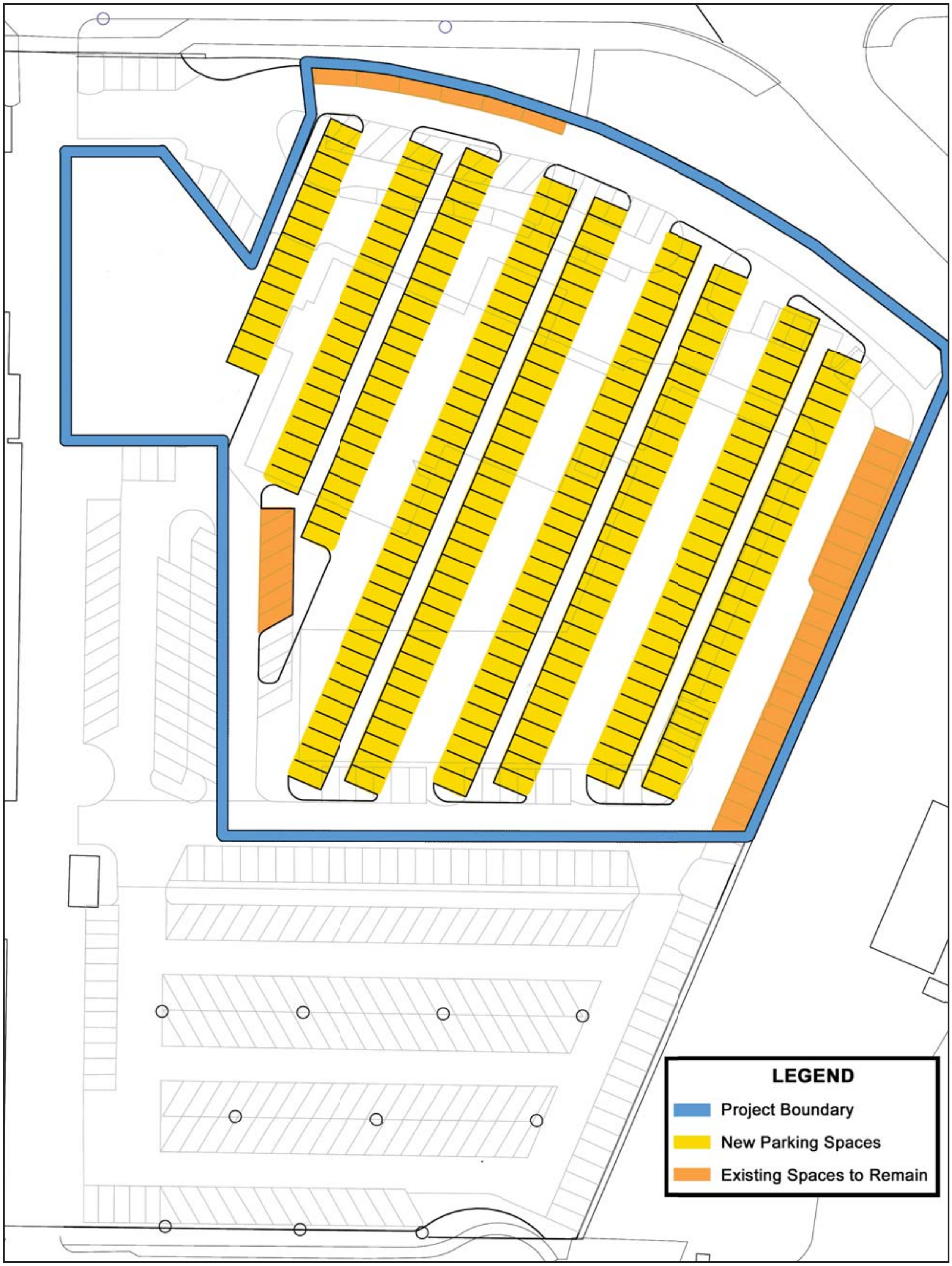
BACKGROUND AND HISTORY

The on-site Highlander Hall structures were originally constructed and served as a hotel. Upon purchase by UCR in 1989, the structures were converted to office use for UCR administrative and academic departments. Following acquisition by UCR, the buildings were partially seismically retrofitted to address known concerns. Subsequent seismic evaluations under new seismic codes have determined that all the structures have an assigned seismic rating of "POOR". In addition to the seismic concerns, other general life safety and Americans with Disabilities Act (ADA) accessibility issues have rendered the complex unusable in its current condition. UCR determined that the most cost effective approach to addressing the seismic and life safety issues was to vacate and demolish the buildings. Considering the need to demolish Highlander Hall, UCR has determined that additional surface parking for existing student, faculty, and staff displaced from other parking areas on campus could be added to this location.

In addition to the Highlander Hall site, in February 2015, a fire occurred in the adjacent Human Resources Building. A fire damage and structural evaluation is currently underway by UCR in order to determine final disposition of this structure. As a worst-case scenario, the demolition of the Human Resources Building is considered as part of the proposed project.

PROJECT CHARACTERISTICS

The proposed project involves the demolition of 61,251 square feet of existing office uses in the Highlander Hall structures and 8,242 square feet of existing office uses in the Human Resources Building. Upon completion of demolition, the project proposes to construct additional surface parking within a reconfiguration of the existing Parking Lot 50. As described in Table 2-2, *Proposed Parking Spaces*, and Exhibit 2-5, *Preliminary Parking Lot Layout*, of the existing 96 on-site parking spaces, 36 would remain on-site and approximately 255 new parking spaces would be constructed, for a proposed 291 parking spaces (or a new net 195 parking spaces) on-site.



NOT TO SCALE

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Preliminary Parking Lot Layout

Exhibit 2-5

Table 2-2
Proposed Parking Spaces

Condition	Parking Spaces
Existing Condition	
	96
Proposed Condition	
Existing-to-Remain	36
New	255
Total Proposed	**291**
Total New Net	**195**

The proposed project would include new lighting standards and blue light security fixtures in the new surface parking lot. The reconfigured parking lot would include associated landscaping and required stormwater runoff control. The Human Resources Building site is proposed to be landscaped after demolition. The required stormwater runoff controls could include vegetative swales between proposed parking aisles collecting and treating the area directly adjacent to each swale for the purposes of water quality. These swales would be regularly maintained (mowed) as needed.

PROJECT PHASING AND CONSTRUCTION

The project is proposed to be constructed in two phases, with building demolition as the initial phase to commence in August 2015 and be completed in October 2015. The second phase consists of grading, utilities installation, landscaping, and paving of the parking lot to commence in fall 2015 and be completed in approximately three months.

2.3 DISCRETIONARY ACTIONS

The University of California is the Lead Agency under CEQA and has discretionary authority over the proposed project. The project would be subject to the following approvals, including, but not limited to:

- Budget Approval;
- Adoption of a Final Mitigated Negative Declaration; and
- Project Design Approval.

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3.0 INITIAL STUDY CHECKLIST

3.1 BACKGROUND

1. Project Title:

Highlander Hall Demolition Project

2. Lead Agency Name and Address:

University of California, Riverside
Capital Asset Strategies - Capital Planning
1223 University Avenue, Suite 240
Riverside, California 92507-7209

3. Contact Person and Phone Number:

Ms. Tricia D. Thrasher
Principal Environmental Planner
951.827.1484

4. Project Location:

The project site is located on the University of California, Riverside, west of downtown City of Riverside and east of Interstate 215 (I-215)/State Route 60 (SR-60), in Riverside County, California. The site is specifically located at the southwest corner of University Avenue and I-215/SR-60, at 1150 and 1160 University Avenue (Assessor's Parcel Numbers [APN] 253-050-007 and -006, respectively).

5. Project Sponsor's Name and Address:

Ms. Tricia D. Thrasher
University of California, Riverside
Capital Planning
1223 University Avenue, Suite 240
Riverside, California 92507-7209

6. General Plan Designation:

Under the *2005 UCR Long Range Development Plan* (LRDP), Amendment 2, the land use designation for the project site is primarily designated "Academic", with some designated "Open Space" along the Gage Canal. Surface parking is a permitted use within the Academic land use designation as it does not preclude the future development of the site for academic uses.

Although the University is not subject to local jurisdictional land use regulations, it can be noted that the *City of Riverside General Plan 2025* (Riverside General Plan) *Land Use Map* designates the project site as Public Facilities/Institutional (PF).

7. Zoning:

Although the University is not subject to local jurisdictional land use regulations, it can be noted that the existing City of Riverside zoning is PF (Public Facilities Zone).

8. Description of the Project:

Refer to Section 2.2, *Proposed Project*.

9.	**Surrounding Land Uses and Setting:** The project site is surrounded by commercial, open space, light industrial, and institutional uses. Refer to Section 2.1, *Project Location and Setting*.
10.	**Other public agencies whose approval is required (e.g., permits, financing approval or participation agreement):** No other public agencies have discretionary approval. Refer to Section 2.3, *Discretionary Actions*.

3.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "New Potentially Significant Impact" or "New Mitigation Required" as indicated by the checklist on the following pages.

	Aesthetics		Land Use and Planning
	Agriculture and Forest Resources		Mineral Resources
	Air Quality		Noise
	Biological Resources		Population and Housing
	Cultural Resources		Public Services
	Geology and Soils		Recreation
	Greenhouse Gas Emissions		Transportation/Traffic
	Hazards and Hazardous Materials		Utilities & Service Systems
	Hydrology and Water Quality		Mandatory Findings of Significance

3.3 LEAD AGENCY DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project WOULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	____
I find that although the proposed project could have a significant effect on the environment, the project impacts were adequately addressed in an earlier document or there will not be a significant effect in this case because revisions in the project have been made or project-specific mitigation measures have been proposed that will avoid or reduce any potential significant effects to a less than significant level and recommend that a MITIGATED NEGATIVE DECLARATION be prepared.	✓
I find that the proposed project MAY have a significant effect on the environment and recommend that an ENVIRONMENTAL IMPACT REPORT be prepared.	____

Signature	University of California, Riverside Agency
Tricia D. Thrasher, ASLA, LEED AP Principal Environmental Planner	September 17, 2015 Date

3.4 EVALUATION OF ENVIRONMENTAL IMPACTS

This section analyzes the potential environmental impacts associated with the proposed project. The issue areas evaluated in this Initial Study include:

- Aesthetics
- Agriculture and Forest Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities and Service Systems

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the *CEQA Guidelines*, as amended, and used by the University of California, Riverside, in its environmental review process. For the preliminary environmental assessment undertaken as part of this Initial Study's preparation, a determination that there is a potential for significant effects indicates the need to more fully analyze the development's impacts and to identify mitigation.

The University of California, Riverside has defined the column headings in the Initial Study checklist as follows:

A. **"Potentially Significant Impact"** is appropriate if there is substantial evidence that the project's effect may be significant even with the incorporation of Planning Strategies (PSs), Programs and Practices (PPs), and Mitigation Measures (MMs) identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR. If there are one or more "Potentially Significant Impacts" a project EIR will be prepared.

B. **"Project Impact Adequately Addressed in LRDP EIR"** applies where the potential impacts of the proposed project were adequately addressed in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR and the PSs, PPs, and MMs identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable MMs identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR are incorporated into the project as proposed. The impact analysis in this document summarizes and cross references (including section/page numbers) the relevant analysis in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR.

C. **"Less Than Significant With Project-Level Mitigation Incorporated"** applies where the incorporation of project-specific mitigation measures will reduce an effect from "Potentially Significant Impact" to a "Less Than Significant Impact". All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.

D. **"Less Than Significant Impact"** applies where the proposed project will not result in any significant effects. The effects may or may not have been discussed in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR. The project impact is less than significant without the incorporation of UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR or project-level mitigation.

E. **"No Impact"** applies where the proposed project would not result in any impact in the category or the category does not apply. "No Impact" answers need to be adequately supported by the information sources cited, which show that the impact does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

4.0 ENVIRONMENTAL ANALYSIS

The following is a discussion of potential project impacts as identified in the Initial Study.

4.1 AESTHETICS

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?					✓
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?					✓
c. Substantially degrade the existing visual character or quality of the site and its surroundings?		✓			
d. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?		✓			

a) *Have a substantial adverse effect on a scenic vista?*

No Impact. The LRDP EIR identified view locations and defined scenic vistas. In the vicinity of the UCR campus, the Box Springs Mountains are the most prominent visual feature from many locations. Thus, the LRDP EIR considered sweeping panoramic views of the Box Springs Mountains from publicly accessible viewpoints (i.e., roads or public gathering places such as Carillon Mall or the Lower Intramural Fields). The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Programs and Practices, the LRDP would not have a substantial adverse effect on a scenic vista. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not have a substantial adverse effect on a scenic vista. Impacts in this regard were determined to be less than significant.

Implementation of the proposed project would result in the demolition of the former Highlander Hall and paving of a surface parking lot. No view blockage to any visual resources would occur as a result of the proposed project. Project implementation would not block scenic vistas and no impact would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that no impacts would result in this regard, as no State scenic highways are located in the vicinity of the UCR campus.

Currently, there are no State scenic highways located near the project site or within the vicinity of the UCR campus.[1] Therefore, project implementation would not damage scenic resources within a State scenic highway. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Substantially degrade the existing visual character or quality of the site and its surroundings?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP and LRDP Amendment 2 would not substantially degrade the visual character or quality of the UCR campus or the immediate surrounding area with implementation of the relevant LRDP Planning Strategies and Programs and Practices. Impacts in this regard were determined to be less than significant.

Short-Term Construction

Proposed demolition activities and surface paving would occur over approximately five months. All staging would occur within the existing Parking Lot 50. During this time construction activities would be visible from institutional users, motorists, bicyclists, and pedestrians. Impacts in this regard would be temporary in nature and would cease upon project completion. Therefore, it is concluded that short-term project construction would not substantially degrade the existing visual character or quality of the site and its surroundings.

Long-Term Operations

The project site is located within a developed area of the UCR campus. The property is relatively flat, ranging in elevation from approximately 1,022 feet above mean sea level (msl) to 1,030 feet above msl. The project site is currently developed with the former Highlander Hall, Human

[1] California Department of Transportation website, http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm, accessed February 23, 2015.

Resources Building, and portions of Parking Lot 50. Existing ornamental landscaping is present on-site, including mature ornamental trees. Existing on-site vehicle access driveways are also present along University Avenue and Everton Place. Surrounding land uses consist of commercial uses to the north, open space and light industrial uses to the east, and institutional uses to the south and west.

Construction of the proposed project would not degrade the visual character of the site or its surroundings. The project would be consistent with the developed nature of the area. The existing on-site structures would be removed and a re-surfaced parking lot would be constructed; refer to Exhibit 2-5, *Preliminary Parking Lot Layout*. New landscaping and security lighting would be installed, consistent with existing campus standards.

The proposed project would maintain existing landscape buffers along the I-215/SR-60 freeway (as required by Planning Strategy [PS] Open Space 4 of the LRDP EIR). The project would also be required to relocate, where feasible, any mature "specimen" trees that would be removed as a result of construction activities (Programs and Practices [PP] 4.1-2[b] of the LRDP EIR). With implementation of the LRDP Planning Strategies and Programs and Practices, implementation of the proposed project would not degrade the existing visual character or quality of the site and its surroundings. No new or different impacts would result compared to that considered in the previously certified environmental documentation. Impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies:

PS Open Space 4 — Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.

Applicable LRDP EIR Programs and Practices:

PP 4.1-2(b) — The campus shall continue to relocate, where feasible, mature "specimen" trees that would be removed as a result of construction activities on the campus.
(This is identical to Land Use PP 4.9-1(c).)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR identified that development under the LRDP could create new sources of light or glare in the campus area or vicinity that would adversely affect day or nighttime views from adjacent land uses. With the implementation of the relevant LRDP Planning Strategies, Programs and Practices, and Mitigation Measures, this potentially significant impact would be reduced to less than significant levels.

The LRDP Amendment 2 EIR determined that the impact of the proposed land use changes related to light and glare for the LRDP Amendment 2 would not exceed the significance conclusion reached in the LRDP EIR and would similarly be reduced to a less than significant level with the implementation of mitigation measures previously adopted by the University in conjunction with its adoption of the LRDP.

Currently, nighttime lighting from the existing Parking Lot 50 is being emitted from the project site. Areas surrounding the project site are urbanized and contain various sources of light and glare as a result of institutional, commercial, and light industrial uses and associated parking lots. Specifically, light and glare in the project area is generated from the light emanating from building interiors, exterior security lighting, and street lighting associated with the adjacent properties. Light and glare caused by vehicle headlights entering and exiting the project site at the existing driveways along University Avenue and Everton Place are currently being emitted as well.

The proposed project is not anticipated to require nighttime construction. Thus, no nighttime lighting would be required. Upon completion of construction of the surface parking lot, sources of lighting would be similar to the existing condition. Lighting from headlights at the proposed ingress/egress would be similar to the existing condition. No surrounding land uses sensitive to new lighting sources adjoin the project site. Further, the LRDP Planning Strategy (PS Open Space 4), Program and Practice (PP 4.1-1) and Mitigation Measure (MM 4.1-3[b]) would be required to be implemented by the proposed project. The project would be required to generally comply with the Campus Design Guidelines, including appropriate site lighting design. All outdoor lighting would be directed to the specific location intended for illumination (e.g., roads or walkways, etc.) to prevent stray light spillover. In addition, all fixtures on elevated light standards in the parking lot would be shielded to reduce glare. Thus, with implementation of LRDP EIR Planning Strategies, Programs and Practices, and Mitigation Measures, impacts would be reduced to less than significant levels and no new or different impacts would result.

Applicable LRDP EIR Planning Strategies: Refer to PS Open Space 4.

Applicable LRDP EIR Programs and Practices:

PP 4.1-1 The campus shall provide design architects with the Campus Design Guidelines and instructions to implement the guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design.

Applicable LRDP EIR Mitigation Measures:

MM 4.1-3(b) All outdoor lighting on campus resulting from new development shall be directed to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) to prevent stray light spillover onto adjacent residential areas. In addition, all fixtures on elevated light standards in parking lots, parking structures, and athletic fields shall be shielded to reduce glare. Lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.
(LRDP EIR)

Project-Specific Mitigation Measures: No mitigation measures are required.

4.2 AGRICULTURE AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In Determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided by the California Air Resources Board. Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?					✓
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?					✓
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 122220(g)), timberland as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?					✓
d. Result in the loss of forest land or conversion of forest land to non-forest use?					✓
e. Involve other changes in the existing environment, which due to their location or nature, could result in conversion of Farmland to non-agricultural use or forest land to non-forest use?					✓

a) ***Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?***

No Impact. The LRDP EIR identified a total of 481.7 acres of Prime Farmland and Farmland of Statewide Importance located on the UCR campus. It was determined that implementation of the LRDP would result in conversion of approximately 125 acres of Prime Farmland into nonagricultural uses on the West Campus through development of new academic, support, housing, parking, and recreational uses. Impacts in this regard were determined to be significant and unavoidable.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would convert approximately 37.3 acres of Prime Farmland into nonagricultural uses. Impacts in this regard were determined to be significant and unavoidable.
Project implementation involves demolition of the existing on-site structures and paving of additional surface parking. Therefore, project implementation would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Conflict with existing zoning for agricultural use, or a Williamson Act contract?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that no impacts would occur in this regard, as no portion of the UCR campus is specifically zoned for agricultural use, or is under a Williamson Act contract.

Currently, no portion of the UCR campus is zoned for agricultural use, or is under a Williamson Act contract. Therefore, project implementation would not conflict with existing zoning for agricultural use, or a Williamson Act contract. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 122220(g)), timberland as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?***

No Impact. Forest land and timberland were not addressed in the LRDP EIR or the LRDP Amendment 2 EIR.

Currently, no portion of the UCR campus, including this project site, is zoned for forest land, timberland, or timberland production. Therefore, project implementation would not conflict with existing zoning for forest lands (as defined in Public Resources Code Section 122220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]). No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Result in the loss of forest land or conversion of forest land to non-forest use?***

No Impact. Forest land was not addressed in the LRDP EIR or the LRDP Amendment 2 EIR.

Currently, the project site does not include forest land. Project implementation would not result in the loss of forest land or conversion of forest land to non-forest use. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***Involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use?***

No Impact. Refer to Response 4.2(a) through 4.2(d). Project implementation involves demolition of the existing on-site structures and paving of additional surface parking. Therefore, project implementation would not involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?		✓			
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		✓			
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		✓			
d. Expose sensitive receptors to substantial pollutant concentrations?				✓	
e. Create objectionable odors affecting a substantial number of people?				✓	

a) *Conflict with or obstruct implementation of the applicable Air Quality Management Plan or Congestion Management Plan?*

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that implementation of the LRDP would neither conflict with nor obstruct implementation of the *2003 Air Quality Management Plan* (2003 AQMP) with implementation of identified LRDP Planning Strategies, and a Program and Practice. Impacts in this regard were concluded to be less than significant.

The LRDP Amendment 2 EIR determined that development of LRDP Amendment 2 was not foreseen at the time that the 2007 AQMP was prepared. Therefore, the land uses and associated growth projections were not included in the *2007 Air Quality Management Plan* (2007 AQMP) projections for employment and population growth or in the Southern California Association of Governments (SCAG) growth projections. Implementation of identified LRDP Planning Strategies, and a Program and Practice, as well as a Mitigation Measure would minimize the impact from potential inconsistencies with the 2007 AQMP. However, as campus development under LRDP Amendment 2 could conflict with the region's air quality plan, impacts were determined to remain significant and unavoidable.

The proposed project is located within the South Coast Air Basin (Basin), which is governed by the South Coast Air Quality Management District (SCAQMD). On December 7, 2012, the SCAQMD Governing Board approved the *2012 Air Quality Management Plan* (2012 AQMP), which outlines its strategies for meeting the National Ambient Air Quality Standards (NAAQS) for fine particulate matter ($PM_{2.5}$) and ozone (O_3). According to the SCAQMD's 2012 AQMP, two main criteria must be addressed.

Criterion 1:

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis for a project include forecasts of project emissions in relation to contributing to air quality violations and delay of attainment.

a) *Would the project result in an increase in the frequency or severity of existing air quality violations?*

Since the consistency criteria identified under the first criterion pertain to pollutant concentrations, rather than to total regional emissions, an analysis of a project's pollutant emissions relative to localized pollutant concentrations is used as the basis for evaluating project consistency. As discussed in Response 4.3(d), below, localized concentrations of carbon monoxide (CO), nitrogen oxides (NO_X), and fugitive dust (PM_{10} and $PM_{2.5}$) would be less than significant during project operations. Therefore, the proposed project would not result in an increase in the frequency or severity of existing air quality violations. Because reactive organic gases (ROGs) are not a criteria pollutant, there is no ambient standard or localized threshold for ROGs. Due to the role ROG plays in ozone formation, it is classified as a precursor pollutant and only a regional emissions threshold has been established.

b) *Would the project cause or contribute to new air quality violations?*

As discussed in Response 4.3(b), operations of the proposed project would result in nominal emissions that would be below the SCAQMD operational thresholds. Therefore, the proposed project would not have the potential to cause or affect a violation of the ambient air quality standards.

c) *Would the project delay timely attainment of air quality standards or the interim emissions reductions specified in the AQMP?*

The proposed project would result in less than significant impacts with regard to localized concentrations during project operations. As such, the proposed project would not delay the timely attainment of air quality standards or 2012 AQMP emissions reductions.

Criterion 2:

With respect to the second criterion for determining consistency with SCAQMD and SCAG air quality policies, it is important to recognize that air quality planning within the Basin focuses on attainment of ambient air quality standards at the earliest feasible date. Projections for achieving air quality goals are based on assumptions regarding population, housing, and growth trends. Thus, the SCAQMD's second criterion for determining project consistency focuses on whether or not the proposed project exceeds the assumptions utilized in preparing the forecasts presented in the 2012 AQMP. Determining whether or not a project exceeds the assumptions reflected in the 2012 AQMP involves the evaluation of the three criteria outlined below. The following discussion provides an analysis of each of these criteria.

a) *Would the project be consistent with the population, housing, and employment growth projections utilized in the preparation of the AQMP?*

In the case of the 2012 AQMP, four sources of data form the basis for the projections of air pollutant emissions: the *2005 UCR Long Range Development Plan* (LRDP), the *City of*

Riverside General Plan 2025 (Riverside General Plan), SCAG's *Growth Management* Chapter of the *Regional Comprehensive Plan* (RCP), and SCAG's *2012-2035 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). The RTP/SCS also provides socioeconomic forecast projections of regional population growth.

The project involves the construction of additional surface parking within a reconfiguration of the existing Parking Lot 50. Under the LRDP, as amended, the land use designation for the project site is primarily designated "Academic", with some designated "Open Space" along the Gage Canal. Surface parking is a permitted use within the Academic land use designation. Although not subject to local jurisdictional land use regulations, the Riverside General Plan Land Use Map designates the project site as Public Facilities/Institutional (PF) and the existing City of Riverside zoning is PF (Public Facilities Zone).

The proposed project is considered consistent with the LRDP and the Riverside General Plan, as the project does not involve any uses that would increase population beyond that considered in the LRDP and the Riverside General Plan and, therefore, would not affect campus-wide and City-wide plans for population growth at the project site. Thus, the proposed project is consistent with the types, intensity, and patterns of land use envisioned for the site vicinity in the RCPG. The population, housing, and employment forecasts, which are adopted by SCAG's Regional Council, are based on the local plans and policies applicable to the City; these are used by SCAG in all phases of implementation and review. Additionally, as the SCAQMD has incorporated these same projections into the 2012 AQMP, it can be concluded that the proposed project would be consistent with the projections.

b) *Would the project implement all feasible air quality mitigation measures?*

The proposed project would result in less than significant air quality impacts. Compliance with all feasible emission reduction measures identified by the SCAQMD would be required as identified in Response 4.3(b). As such, the proposed project would meet this 2012 AQMP consistency criterion.

c) *Would the project be consistent with the land use planning strategies set forth in the AQMP?*

The proposed project would result in less than significant air quality impacts and would implement LRDP policies. Compliance with emission reduction measures identified by the SCAQMD would be required as identified in Response 4.3(b) and 4.3(c). In addition, the project proposes a parking lot to serve existing uses and does not propose structures that would change the overall character of the project site. As such, the proposed project meets this AQMP consistency criterion.

In conclusion, the determination of 2012 AQMP consistency is primarily concerned with the long-term influence of a project on air quality in the Basin. The proposed project would not result in a long-term impact on the region's ability to meet State and Federal air quality standards. Also, the proposed project would be consistent with the goals and policies of the 2012 AQMP for control of fugitive dust. LRDP Amendment 2 EIR Mitigation Measure (MM 4.3-6) would be required for the proposed project, ensuring implementation of LRDP Amendment 2 EIR MM 4.3-1 and MM 4.3-2b, which are designed to reduce construction and operation emissions. In addition, the proposed project would provide bicycle parking and implement parking management measures (as required by LRDP Planning Strategies [PS] Transportation 5 and PS Transportation 6). With implementation of the LRDP Planning Strategies and Mitigation Measure, the proposed project would be consistent with SCAQMD and SCAG's goals and policies and is considered consistent with the 2012 AQMP. No new or different impacts would result and impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies:

PS Transportation 5 Provide bicycle parking at convenient locations.

PS Transportation 6 Implement parking management measures that may include:

- Restricted permit availability.
- Restricted permit mobility.
- Differential permit pricing.

Applicable LRDP EIR Programs and Practices:

PP 4.3-2(a) Construction contract specifications shall include the following:

(i) Compliance with all SCAQMD rules and regulations
(ii) Maintenance programs to assure vehicles remain in good operating condition
(iii) Avoid unnecessary idling of construction vehicles and equipment
(iv) Use of alternative fuel construction vehicles
(v) Provision of electrical power to the site, to eliminate the need for on-site generators

PP 4.3-2(b) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).

(ii) Replace ground cover in disturbed areas as quickly as possible.

(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.

(iv) Water active grading sites at least twice daily.

(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period.

(vi) All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least 2 feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.

(vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.

(ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.

(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

Applicable LRDP EIR Mitigation Measures:

MM 4.3-1a For each construction project on the campus, the project contractor will implement Programs and Practices 4.3-2(a) and 4.3-2(b). In addition, the following PM_{10} and $PM_{2.5}$ control measure shall be implemented for each construction project:

- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance.

(LRDP Amendment 2 EIR)

MM 4.3-1b For each construction project on the campus, the University shall require that the project include a construction emissions control plan that includes a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used for an aggregate of 40 or more hours during any portion of the construction project. During construction activity, the contractor shall utilize CARB certified equipment or better for all on-site construction equipment according to the following schedule:

- January 1, 2011 to December 31, 2011: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 2 off-road emissions standards. In addition, all construction equipment shall be outfitted with the BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 2 or Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- January 1, 2012 to December 31, 2014: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 3 off-road emissions standards. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- Post January 1, 2015: All off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- A copy of each unit's certified specification, BACT documentation and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit or equipment.

- Encourage construction contractors to apply for AQMD 'SOON" funds. Incentives could be provided for those construction contractors who apply for AQMD "SOON" funds. The "SOON" program provides funds to accelerate clean-up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/implementation/soonprogram.htm.

The contractor shall also implement the following measures during construction:

- Prohibit vehicle and engine idling in excess of 5 minutes and ensure that all off-road equipment is compliant with the California Air Resources Board's (CARB) in-use off-road diesel vehicle regulation and SCAQMD Rule 2449.

- Configure construction parking to minimize traffic interference.

- Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.

- Provide dedicated turn lanes for movement of construction trucks and equipment on and off site.

- Schedule construction activities that affect traffic flow on the arterial system to off-peak hour to the extent practicable.

- Improve traffic flow by signal synchronization, and ensure that all vehicles and equipment will be properly tuned and maintained according to manufacturers' specifications.

- Use diesel-powered construction vehicles and equipment that operate on low-NOx fuel where possible.

- Reroute construction trucks away from congested streets or sensitive receptor areas.

- Maintain and tune all vehicles and equipment according to manufacturers' specifications.

(LRDP Amendment 2 EIR)

MM 4.3-1c To minimize VOC emissions from the painting/finishing phase, for each construction project on the campus, the project contractor will implement the following VOC control measures:

- Construct or build with materials that do not require painting, or use pre-painted construction materials.
- If appropriate materials are not available or are cost-prohibitive, use low VOC-content materials more stringent than required under SCAQMD Rule 113.

(LRDP Amendment 2 EIR)

MM 4.3-2b UCR shall continue to participate in greenhouse gas (GHG) reduction programs such as the American College and University Presidents' Climate Commitment (ACUPCC) and shall adhere to the UC Policy on Sustainable Practices. The measures adopted by UCR are presented in Tables 4.16-9 and 4.16-10 in Section 4.16 Greenhouse Gas Emissions of the 2005 LRDP Amendment 2 EIR. While these measures are typically targeted at GHG emissions, many act to reduce energy consumption and vehicle use on campus and would consequently also reduce air pollutant emissions from both area and mobile sources. In accordance with the ACUPCC and the UC Policy on Sustainable Practices and through implementation of its Climate Action Plan, UCR shall commit to reducing GHG emissions to 1990 levels by 2020, which would require significant reductions (on the order of 70 percent) from these sources in terms of GHG and therefore reductions in other air pollutants as well.
(LRDP Amendment 2 EIR)

MM 4.3-6 The University will implement Mitigation Measure 4.3-1 which is designed to reduce construction emissions. It will also implement Mitigation Measure 4.3-2b which will reduce air pollutant emissions resulting from traffic and energy consumption during campus operations.
(LRDP Amendment 2 EIR)

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Violate any air quality standard or contribute substantially to an existing or projected air quality violation?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that implementation of the LRDP would generate emissions during the construction of the new campus buildings and parking lots/structures. Due to the construction time frame and the normal day-to-day variability in construction activities, it was difficult, if not impossible, to precisely quantify the daily emissions associated with each phase of the proposed construction activities. The LRDP EIR concluded that implementation of recommended LRDP Programs and Practices and Mitigation Measures, construction related air quality impacts would be minimized, but would not reduce the net increase in peak construction activities to below the SCAQMD thresholds of significance. Implementation of the LRDP would result in construction emissions that exceed the NO_X threshold, resulting in a significant and unavoidable impact.

The LRDP EIR determined that implementation of the LRDP would generate daily operational campus emissions associated with stationary sources for space and water heating, landscape maintenance activities, and use of consumer products. With the implementation of the relevant LRDP Planning Strategies, and Programs and Practices, the net increase in daily UCR campus emissions associated with the LRDP would exceed the SCAQMD thresholds of significance for VOC, NO_X, and PM_{10}, resulting in a significant and unavoidable impact.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would result in a significant and unavoidable impact, as construction emissions would exceed the VOC, NOx, PM_{10} and $PM_{2.5}$ thresholds even after implementation of Programs and Practices and Mitigation Measure. The LRDP Amendment 2 EIR concluded that the operations of new facilities associated with LRDP Amendment 2 would result in emissions over the SCAQMD thresholds of significance for VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$. Even though specific reductions in air pollutant emissions would result from the implementation of the LRDP Program and Practices, these measures could not be quantified. While impacts would be substantially reduced after mitigation, the LRDP Amendment 2 EIR concluded that the impact from operational emissions would remain significant and unavoidable.

Short-Term Emissions

Construction related activities would generate short-term air quality impacts. Construction equipment would include tractors, loaders, backhoes, concrete/industrial saw, excavators, rubber tired dozers, cement and mortar mixers, paver, paving equipment, and rollers. Exhaust emission factors for typical diesel-powered heavy equipment are based on the California Emissions Estimator Model (CalEEMod) program defaults. Variables factored into estimating the total construction emissions include the level of activity, length of construction period, number of pieces and types of equipment in use, site characteristics, weather conditions, number of construction personnel, and the amount of materials to be transported on- or off-site. Refer to Appendix 8.1, *Air Quality/Greenhouse Gas Data*, for the CalEEMod modeling outputs and results. Table 4.3-1, *Construction Related Emissions*, presents the anticipated daily short-term construction emissions.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust emissions that may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project area. Fugitive dust emissions are associated with land clearing, ground excavation, cut-and-fill, and truck travel on unpaved roadways (including demolition). Fugitive dust emissions vary substantially from day to day, depending on the level of activity, specific operations, and weather conditions. Fugitive dust from grading, excavation, and paving is expected to be short-term and would cease upon project completion. Additionally, most of this material is inert silicates, rather than the complex organic particulates released from combustion sources, which are more harmful to health.

Table 4.3-1
Construction Related Emissions

Emissions Source	Pollutant (pounds/day)[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Year 1						
Unmitigated Emissions	4.70	50.36	38.46	0.05	4.02	2.58
Mitigated Emissions[2,3]	4.70	50.36	38.46	0.05	3.24	2.46
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***
Year 2						
Unmitigated Emissions	2.02	18.46	13.76	0.02	1.33	1.08
Mitigated Emissions[2,3]	2.02	18.46	13.76	0.02	1.28	1.07
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***

Notes:
1. Emissions were calculated using CalEEMod, as recommended by the SCAQMD.
2. As depicted in this table, the mitigation reduction credits for the proposed project are negligible. However, compliance with SCAQMD rules would still be required. The reduction/credits for construction emission mitigations are based on mitigation included in the CalEEMod model and as typically required by the SCAQMD through Rule 403. The mitigation includes the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; cover stock piles with tarps; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.
3. Refer to Appendix 8.1, *Air Quality/Greenhouse Gas Data*, for assumptions used in this analysis.

Dust (larger than 10 microns) generated by such activities usually becomes more of a local nuisance than a serious health problem. Of particular health concern is the amount of PM_{10} (particulate matter smaller than 10 microns) generated as a part of fugitive dust emissions. PM_{10} poses a serious health hazard alone or in combination with other pollutants. $PM_{2.5}$ (particulate matter 2.5 microns in diameter or less) is mostly produced by mechanical processes. These include automobile tire wear, industrial processes such as cutting and grinding, and re-suspension of particles from the ground or road surfaces by wind and human activities such as construction or agriculture. $PM_{2.5}$ is mostly derived from combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and sulfur oxides (SO_X) combining with ammonia. $PM_{2.5}$ components from material in the earth's crust, such as dust, are also present, with the amount varying in different locations.

Compliance with LRDP Programs and Practices PP 4.3-2(a) and PP 4.3-2(b) would implement dust control techniques (i.e., daily watering), limitations on construction hours, and adherence to all SCAQMD rules and regulations including Rules 402 and 403 (which require watering of inactive and perimeter areas, track out requirements, etc.), to reduce PM_{10} and $PM_{2.5}$ concentrations. As depicted in Table 4.3-1, total PM_{10} and $PM_{2.5}$ emissions would not exceed the SCAQMD thresholds during construction. Therefore, impacts would be less than significant.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project site, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials to/from the site. As presented in Table

4.3-1, construction equipment and worker vehicle exhaust emissions would be below the established SCAQMD thresholds. Therefore, air quality impacts from equipment and vehicle exhaust emission would be less than significant.

ROG Emissions

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. As shown in Table 4.3-1, ROG emissions would be below SCAQMD thresholds and impacts remain at less than significant levels.

Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board (CARB) in 1986.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. According to the Department of Conservation Division of Mines and Geology, *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos Report*, dated August 2000, serpentinite and ultramafic rocks are not known to occur within the project area. Thus, there would be no impact in this regard.

Total Daily Construction Emissions

In accordance with the SCAQMD Guidelines, CalEEMod was utilized to model construction emissions for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. CalEEMod allows the user to input mitigation measures such as watering the construction area to limit fugitive dust. Mitigation measures that were input into CalEEMod allow for certain reduction credits and result in a decrease of pollutant emissions. Reduction credits are based upon studies developed by CARB, SCAQMD, and other air quality management districts throughout California, and were programmed within CalEEMod. As indicated in Table 4.3-1, CalEEMod calculates the reduction associated with recommended mitigation measures.

As indicated in Table 4.3-1, impacts would be less than significant for all criteria pollutants during construction. Implementation of standard SCAQMD measures (required by LRDP Programs and Practices PP 4.3-2[a] and PP 4.3-2[b]) would further reduce these emissions. Construction related air emissions would be less than significant.

Long-Term Emissions

Long-term air quality impacts would consist of mobile source emissions generated from project-related traffic and from stationary source emissions generated directly from natural gas. The proposed project would construct additional surface parking within a reconfiguration of the existing Parking Lot 50.

The project would not generate any new vehicle trips, as the project would only redistribute 1,020 daily trips to accommodate the existing parking demand from displaced parking supply resulting from the removal of existing parking spaces currently located on the main campus areas and would not result in any permanent or long-term air emissions. Additionally, the proposed project would not generate any stationary source emissions. Therefore, the project would not result in any new operational emissions. Impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: Refer to PP 4.3-2(a) and PP 4.3-2(b).

PP 4.3-2(c) The UCR shall continue to implement SCAQMD Rule 1403—Asbestos when demolishing existing buildings on the campus.

Applicable LRDP EIR Mitigation Measures:

MM 4.3-2 Programs and Practices 4.3-2(a), (b), and (c), or their equivalent, shall be included in construction contract specifications. The contract specifications shall require the use of low NO_X diesel fuel and construction equipment to the extent that it is readily available at the time of development.
(LRDP EIR)

MM 4.3-3 To reduce energy consumption and areawide emission of criteria pollutants, the campus shall annually inspect and enforce an emissions reduction control strategy, which may include, where feasible, the following:

Design

- Provide electric vehicle charging systems at convenient location in campus parking facilities.

(LRDP EIR)

Project-Specific Mitigation Measures: No additional mitigation measures are required.

c) ***Result in a cumulatively considerable net increase of any criteria pollutant for which the air basin is nonattainment under an applicable Federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that implementation of the LRDP would generate a cumulatively considerable net increase in daily construction-related and operational campus emissions that contribute to an existing or projected air quality exceedance. Although implementation of LRDP Programs and Practices and Mitigation Measures ensure that construction related air quality impacts are minimized and the number of motor vehicle trips and area source emissions are reduced to the maximum extent feasible, they would not reduce the net increase in daily construction-related and operational emissions to below the SCAQMD thresholds of significance. Impacts were determined to be significant and unavoidable.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2 would result in a cumulatively considerable net increase of a criteria pollutant for which the region is nonattainment under SCAQMD air quality standards. Implementation of the recommended LRDP Mitigation Measure would ensure that the number of motor vehicle trips and area source emissions are reduced to the maximum extent feasible. Therefore, with mitigation, development under the LRDP Amendment 2 was concluded to have a less than significant cumulative impact related to increase of criteria air pollutants in the region.

With respect to the proposed project's construction-related air quality emissions and cumulative Basin-wide conditions, the SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the 2012 AQMP pursuant to Federal Clean Air Act (FCAA) mandates. As such, the proposed project would comply with SCAQMD Rule 403 requirements, and implement all feasible mitigation measures (LRDP PP 4.3-1 and PP 4.3-2[a] through PP 4.3-2[c] as well as the LRDP EIR MM 4.3-2 and MM 4.3-3). Rule 403 requires that fugitive dust be controlled with the best available control measures in order to reduce dust so that it does not remain visible in the atmosphere beyond the property line of the proposed project. In addition, the proposed project would comply with adopted 2012 AQMP emissions control measures. Per SCAQMD rules and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements (i.e., Rule 403 compliance, the implementation of all feasible mitigation measures, and compliance with adopted 2012 AQMP emissions control measures) would also be imposed on construction projects throughout the Basin, which would include related projects. Thus, with implementation of LRDP Programs and Practices and LRDP EIR Mitigation Measures, impacts would be reduced to less than significant levels and no new or different impacts would result.

As discussed previously, the proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. Emission reduction technology, strategies, and plans are constantly being developed. As a result, the proposed project would not contribute a cumulatively considerable net increase of any nonattainment criteria pollutant. No new or different impacts would occur from the proposed project. Cumulative operational impacts associated with implementation of the proposed project would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: Refer to PP 4.3-1, PP 4.3-2(a) through PP 4.3-2(c).

Applicable LRDP EIR Mitigation Measures: Refer to MM 4.3-2 and MM 4.3-3.

Project-Specific Mitigation Measures: No additional mitigation measures are required.

d) ***Expose sensitive receptors to substantial pollutant concentrations?***

Less Then Significant Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, LRDP Amendment 2, and LRDP Amendment 3 would not result in the emission of toxic air contaminants (TAC) and CO at levels that would expose sensitive receptors to substantial pollutant concentrations. Impacts in this regard were determined to be less than significant.

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis. Sensitive receptors near the project site include institutional uses, approximately 25 meters west of the project site.

Localized Significance Thresholds

LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized air quality impacts. The SCAQMD provides the LST screening lookup tables for one, two, and five acre projects emitting CO, NO_X, $PM_{2.5}$, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors. The project is located within Sensitive Receptor Area (SRA) 23, Metropolitan Riverside County.

Based on the SCAQMD guidance on applying CalEEMod to LSTs, the project would disturb approximately three acres of land per day. Therefore, the LST thresholds for two acres were conservatively utilized for the construction LST analysis. As the nearest sensitive uses are approximately 25 meters to the project site, the LST value for 25 meters was utilized. Table 4.3-2, *Localized Significance of Construction Emissions*, shows the localized unmitigated and mitigated construction-related emissions. It is noted that an operational LST analysis was not prepared, as the project would not result in operational emissions. The localized emissions presented in Table 4.3-2 are less than those in Table 4.3-1, as localized emissions include only on-site emissions (i.e., from construction equipment and fugitive dust), and do not include off-site emissions (i.e., from hauling activities). As seen in Table 4.3-2, the unmitigated and mitigated on-site emissions would not exceed the LSTs for SRA 23.

Carbon Monoxide Hotspots

CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels (i.e., adversely affecting residents, school children, hospital patients, the elderly, etc.).

The SCAQMD requires a quantified assessment of CO hotspots when a project increases the volume-to-capacity ratio (also called the intersection capacity utilization) by 0.02 (two percent) for any intersection with an existing level of service LOS D or worse. Because traffic congestion is highest at intersections where vehicles queue and are subject to reduced speeds, these hot spots are typically produced at intersections.

Table 4.3-2
Localized Significance of Construction Emissions

Source	Pollutant (pounds/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Construction				
Year 1				
Total Unmitigated On-Site Emissions[1]	48.36	36.07	3.72	2.48
Total Mitigated On-Site Emissions[1]	48.36	36.07	2.99	2.37
Localized Significance Threshold[3]	213	883	7	4
Thresholds Exceeded?	***No***	***No***	***No***	***No***
Year 2				
Total Unmitigated On-Site Emissions[2]	18.34	12.56	1.11	1.02
Total Mitigated On-Site Emissions[2]	18.34	12.56	1.11	1.02
Localized Significance Threshold[3]	213	883	7	4
Thresholds Exceeded?	***No***	***No***	***No***	***No***

Notes:
1. For construction Year 1, the demolition phase emissions are presented as the worst case scenario.
2. For construction Year 2, the paving phase emissions are presented as the worst case scenario.
3. The Localized Significance Threshold was determined using Appendix C of the SCAQMD *Final Localized Significant Threshold Methodology* guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the anticipated daily acreage disturbance for construction (approximately 3 acres; therefore the 2-acre threshold was used), the total acreage for operational (uses the 2-acre threshold), the distance to sensitive receptors, and the source receptor area (SRA 23).

The UCR campus is located in the Basin, which is designated as an attainment/maintenance area for the Federal CO standards and an attainment area for State standards. There has been a decline in CO emissions even though vehicle miles traveled on U.S. urban and rural roads have increased. On-road mobile source CO emissions have declined 24 percent between 1989 and 1998, despite a 23 percent rise in motor vehicle miles traveled over the same 10 years. California trends have been consistent with national trends; CO emissions declined 20 percent in California from 1985 through 1997 while vehicle miles traveled increased 18 percent in the 1990s. Three major control programs have contributed to the reduced per-vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection/maintenance programs.

A detailed CO analysis was conducted in the *Federal Attainment Plan for Carbon Monoxide* (CO Plan) for the SCAQMD's *2003 Air Quality Management Plan*. It should be noted that the 2003 *Air Quality Management Plan* is the most recent AQMP that addresses CO concentrations because the Basin was re-designated as attainment/maintenance in 2007. The locations selected for microscale modeling in the CO Plan are worst-case intersections in the Basin, and would likely experience the highest CO concentrations. Thus, CO analysis within the CO Plan is utilized in a comparison to the proposed project, since it represents a worst-case scenario with heavy traffic volumes within the Basin.

Of these locations, the Wilshire Boulevard/Veteran Avenue intersection in Los Angeles experienced the highest CO concentration (4.6 parts per million [ppm]), which is well below the 35-ppm 1-hour CO Federal standard. The Wilshire Boulevard/Veteran Avenue intersection is one of the most congested intersections in Southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day. As the CO hotspots were not experienced at the Wilshire Boulevard/Veteran Avenue intersection, it can be reasonably inferred that CO hotspots would not be experienced at any intersections within the UCR campus near the project site due to the low volume of traffic (no new trips with an approximate redistribution of 1,020 daily trips) that would occur as a result of project implementation. Impacts would be less than significant in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No additional mitigation measures are required.

e) ***Create objectionable odors affecting a substantial number of people?***

Less Than Significant Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that no impacts would result in this regard, as no significant sources of odors are located in the vicinity of the UCR campus. Impacts were determined to be less than significant.

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being associated with odors.

Construction activity associated with the project may generate detectable odors from heavy-duty equipment exhaust. Construction related odors would be short-term in nature and cease upon project completion. Any impacts to existing adjacent land uses would be short-term, as previously noted, and are considered less than significant given the project size. Therefore, project implementation would not create objectionable odors. Less than significant impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No additional mitigation measures are required.

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4.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?					✓
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?					✓
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?					✓
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		✓			
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		✓			
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?					✓

a) ***Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in both direct and indirect impacts on special status plants. With the implementation of LRDP Planning

Strategies, continued implementation of LRDP Programs and Practices, and LRDP EIR Mitigation Measures, this potentially significant impact to special-status species would be reduced to less than significant levels.

The LRDP Amendment 2 EIR concluded that implementation of LRDP Amendment 2 would not have any potentially significant impacts on biological resources, and would not change the significance of any impacts identified in the LRDP EIR.

The project site is fully developed and located within an urbanized area. The project involves demolition of the existing on-site structures and the paving for additional surface parking. No endangered, rare, threatened, or special status plant species (or associated habitats) or wildlife species designated by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), or California Native Plant Society (CNPS) are known to occur on-site. Project implementation would not result in a substantial adverse effect, either directly or through habitat modifications, on any sensitive species. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would affect the riparian habitat located in the area south of South Campus Drive, which provides critical habitat for the California gnatcatcher. However, implementation of LRDP Planning Strategies and continued implementation of LRDP Programs and Practices would minimize impacts to riparian areas. In addition, implementation of LRDP EIR Mitigation Measures would further reduce any potential impact. The LRDP EIR determined that with incorporation of recommended mitigation measures the impact from campus development under the LRDP to riparian habitats would be less than significant.

The LRDP Amendment 2 EIR did not evaluate riparian habitats or other sensitive natural communities as implementation of LRDP Amendment 2 would not have any potentially significant impacts on biological resources, and would not change the significance of any impacts identified in the LRDP EIR.

There is no riparian habitat or other sensitive natural communities present on the project site. Project implementation would not significantly impact any riparian habitat or other sensitive natural community. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, costal, etc.) through direct removal, filling, hydrological interruption, or other means?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in adverse effects to federally protected wetlands. However, the continued implementation of LRDP Planning Strategies and LRDP Programs and Practices would minimize impacts to federally protected wetlands. In addition, implementation of LRDP EIR Mitigation Measures would require UCR to conduct a wetland delineation on any impact area, restore, or enhance any affected wetland or riparian habitat, and include United State Army Corps of Engineers approved measures. The LRDP EIR concluded that with incorporation of mitigation measures, impacts from campus development under the LRDP to federally protected wetlands would be less than significant.

The LRDP Amendment 2 EIR did not evaluate federally protected wetlands as implementation of LRDP Amendment 2 would not have any potentially significant impacts on biological resources, and would not change the significance of any impacts identified in the LRDP EIR.

The project site consists of developed land. There are no federally protected wetlands present on the project site. Project implementation would not impact federally protected wetlands through direct removal, filling, hydrological interruption, or other means. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that implementation of the LRDP would result in a significant effect to wildlife corridors, such as on-campus arroyos and migratory birds and raptors. However, continued implementation of LRDP Planning Strategies and Programs and Practices would minimize impacts to wildlife corridors and migratory birds. In addition, implementation of LRDP EIR Mitigation Measures would require surveys for nesting special status avian species if any trees are to be removed during the nesting months. If an active nest is discovered, a buffer zone would be established. The LRDP EIR concluded that with incorporation of mitigation measures, impacts from campus development under the LRDP to wildlife corridors and migratory birds would be less than significant.

The LRDP Amendment 2 EIR did not evaluate migratory wildlife as implementation of LRDP Amendment 2 would not have any potentially significant impacts on biological resources, and would not change the significance of any impacts identified in the LRDP EIR.

No identified wildlife corridors or native wildlife nurseries occur within the boundaries of the project site. The project site is fully urbanized and occupied by commercial uses. In addition, the project site is surrounded by urban uses on all four sides; therefore, the site does not function as a wildlife movement corridor. There are mature trees throughout the project site, which could provide nesting habitat for migratory birds. The LRDP EIR Mitigation Measures (MM 4.4-4[a] and MM 4.4-4[b]) described above would be implemented to reduce any potential impacts to nesting bird species to a less than significant level. No new or different impacts would occur from the proposed project.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures:

MM 4.4-4(a) Prior to the onset of construction activities that would result in the removal of mature trees that would occur between March and mid-August, surveys for nesting special status avian species and raptors shall be conducted on the affected portion of the campus following USFWS and/or CDFG (now CDFW) guidelines. If no active avian nests are identified on or within 250 feet of the construction site, no further mitigation is necessary.
(LRDP EIR)

MM 4.4-4(b) If active nests for avian species of concern or raptor nests are found within the construction footprint or a 250-foot buffer zone, exterior construction activities shall be delayed within the construction footprint and buffer zone until the young have fledged or appropriate mitigation measures responding to the specific situation have been developed and implemented in consultation with USFWS and CDFG (now CDFW).
(LRDP EIR)

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that campus development under the LRDP would be consistent with local policies or ordinance protecting biological resources. LRDP Planning Strategies would minimize any conflict with local policies or ordinances protecting biological resources.

The project site is fully urbanized and occupied by the existing Highlander Hall, Human Resources Building, and a portion of Parking Lot 50. In addition, the project site is surrounded by urban uses on all four sides. There are mature trees throughout the project site. The project would comply with LRDP Planning Strategy (PS Conservation 1), which would protect natural resources, including mature trees determined to be in good health by a qualified arborist, to the extent feasible. With implementation of the LRDP Planning Strategy, potential impacts to mature trees and potential conflicts with local policies or ordinances protecting biological resources would be reduced to less than significant levels. No new or different impacts would occur from the proposed project.

Applicable LRDP EIR Planning Strategies:

PS Conservation 1	Protect natural resources, including native habitat; remnant arroyos, and mature trees, identified as in good health as determined by a qualified arborist, to the extent feasible. *(LRDP EIR)*

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

f) ***Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that a portion of UCR is within the Multiple Species Habitat Conservation Plan (MSHCP) adopted by the County of Riverside in 2003. However, development under LRDP and LRDP Amendment 2 would not include any portion of UCR identified for conservation. With implementation of relevant LRDP Planning Strategies, impacts from conflicting with the provisions of any Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or approved local, regional, or State habitat conservation plan would be less than significant.

According to CDFW NCCP Plan Summary – Western Riverside Multi-Species Habitat Conservation Plan[1], the proposed project is located within a HCP or NCCP. A portion of UCR is included in the MSHCP, but is not identified for conservation. No other approved local, regional, or State habitat conversation plans apply to the site. Thus, no impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

[1] California Department of Fish and Wildlife, *NCCP Plan Summary – Western Riverside Multi-Species Habitat Conservation Plan,* https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans/Riverside, accessed May 15, 2015.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines §15064.5?					✓
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines §15064.5?					✓
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓			
d. Disturb any human remains, including those interred outside of formal cemeteries?		✓			

a) *Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?*

No Impact. The LRDP EIR concluded that implementation of the LRDP could result in the modification of structures that have been designated as eligible or potentially eligible to the National Register of Historic Place (NRHP) or California Register of Historical Resources (CRHR). The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Mitigation Measures, potentially adverse impacts to historic resources would be reduced. However, the demolition of a historic structure cannot be mitigated to a less than significant level as demolition irrevocably reduces the historic significance of the resource. The LRDP EIR determined that the implementation of the LRDP could result in a significant and unavoidable impact to historic structures.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2 would not have any potentially significant impacts on cultural resources, and would not change the significance of any impacts identified in the LRDP EIR.

The proposed project would not result in a substantial adverse change in the significance of a historical resource. The project site is currently comprised of the former Highlander Hall and Human Resources Building. The former Highlander Hall has an assigned seismic rating of "POOR" and the Human Resources Building experienced significant fire damage in February of 2015. The proposed project would demolish the existing structures and construct additional surface parking. The existing on-site structures are not listed as potentially historic structures[1] nor are they associated with significant events, important persons, or distinctive characteristics of a type, period, or method of construction; representing the work of an important creative individual; or do not possess high artistic values. Thus, project implementation would not cause a substantial adverse change in the significance of a historical resource.

[1] Figure 4.5-1, *Potentially Historic Structures on the UCR Campus*, of the LRDP EIR.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topic area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?***

No Impact. The LRDP EIR concluded that development of the UCR campus under the LRDP has the potential to inadvertently unearth and damage previously unknown archaeological resources that were not previously identified by UCR. Implementation of LRDP Planning Strategies and Programs and Practices would reduce these impacts to archaeological resources to less than significant levels.

The LRDP Amendment 2 EIR did not evaluate archeological resources as implementation of LRDP Amendment 2 would not have any potentially significant impacts on cultural resources, and would not change the significance of any impacts identified in the LRDP EIR.

The project site exists within a highly developed area and has been completely disturbed as a result of the development of the existing on-site structures and surface parking lot. Therefore, the proposed project presents a low potential for encountering unknown, intact, archaeological resources. Further, the proposed project would only involve the demolition of existing structures and paving for additional surface parking. Grading activities, other than minor earthwork prior to paving, would not be required. Minor earthwork would occur. Thus, implementation of the proposed project is not anticipated to disturb unknown archeological resources within the project site. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that construction activities associated with implementation of the LRDP could result in damage to or the destruction of previously unknown paleontological resources. The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Program and Practice, this impact would be reduced to less than significant levels.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2 would not have any potentially significant impacts on paleontological resources, and would not change the significance of any impacts identified in the LRDP EIR.

As discussed in Response 4.5(b), the site exists within a highly developed area and the project site has been completely disturbed as a result of the existing on-site structures. Thus, the proposed project presents a low potential for encountering unknown, intact, paleontological resources. Further, the proposed project would only involve the demolition of existing structures and paving for additional surface parking. Grading activities, other than minor earthwork prior to paving, would not be required. Minor earthwork would occur. Thus, in order to ensure unknown resources are not impacted, LRDP Program and Practice (PP) 4.5-4 is required in the event that such resources are discovered during construction activities. With implementation of the LRDP Program and Practice, the proposed project would result in less than significant impacts pertaining to unknown paleontological resources within the project site and no new or different impacts would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.5-4 Construction specifications shall require that if a paleontological resource is uncovered during construction activities:

- (i) A qualified paleontologist shall determine the significance of the find.
- (ii) The campus shall make an effort to preserve the find intact through feasible project design measures.
- (iii) If it cannot be preserved intact, then the University shall retain a qualified non-University paleontologist to design and implement a treatment plan to document and evaluate the data and/or preserve appropriate scientific samples.
- (iv) The paleontologist shall prepare a report of the results of the study, following accepted professional practice.
- (v) Copies of the report shall be submitted to the University and the Riverside County Museum.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Disturb any human remains, including those interred outside of formal cemeteries?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that construction activities associated with implementation of the LRDP could result in the disturbance of human remains. The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Program and Practice, this impact would be reduced to less than significant levels.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2 would not have any potentially significant impacts pertaining to the disturbance of human remains, and would not change the significance of any impacts identified in the LRDP EIR.

Given the fully developed condition of the site, the potential for project implementation to disturb any human remains is remote. Additionally, no conditions exist that suggest human remains are likely to be found on the project site. Human remains, including those interred outside of formal cemeteries, are not anticipated to be encountered during earth removal or disturbance activities. However, if human remains are found, those remains would be required to conduct proper treatment, in accordance with applicable laws. State of California Public Resources Health and Safety Code Sections 7050.5 to 7055 describe the general provisions for human remains. Specifically, Health and Safety Code Section 7050.5 describes the requirements if any human remains are accidentally discovered during excavation of a site. As required by State law, the requirements and procedures set forth in Section 5097.98 of the California Public Resources Code would be implemented, including notification of the County Coroner, notification of the Native American Heritage Commission (NAHC) and consultation with the individual identified by the NAHC to be the "most likely descendant." If human remains are found during excavation, excavation must stop in the vicinity of the find and any area that is reasonably suspected to overlay adjacent remains until the County coroner has been called out, and the remains have been investigated and appropriate recommendations have been made for the treatment and disposition of the remains. The project would be required to ensure compliance with State law, detailing the appropriate actions necessary in the event human remains are encountered (as required by PP 4.5-5). With implementation of the LRDP Program and Practice, impacts in this regard would be reduced to less than significant levels.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.5-5 In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected and the University immediately shall notify the Riverside County Coroner of the find and comply with the provisions of P.R.C. Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.
(LRDP EIR)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.6 GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.					✓
2) Strong seismic ground shaking?					✓
3) Seismic-related ground failure, including liquefaction?					✓
4) Landslides?					✓
b. Result in substantial soil erosion or the loss of topsoil?		✓			
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?					✓
d. Be located on expansive soil, as defined in Table 18-1-B of the California Building Code (2001), creating substantial risks to life or property?					✓
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?					✓

a) *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*

1) *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*

No Impact. The LRDP EIR concluded that the UCR campus is not located within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act of 1994, and no known active or potentially active faults traverse the campus. The UCR campus would not be subject to a substantial risk of fault (ground surface) ruptures because ground rupture occurrences are generally limited to the location of faults, and no active or potentially active faults are known on the campus. The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Programs and Practices, the LRDP would not expose people or structures to potential substantial adverse effects resulting from rupture of a known earthquake fault. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not change the significance of impacts involving the rupture of a known earthquake fault or the conclusions in the LRDP EIR. Impacts in this regard were determined to be less than significant.

According to LRDP, there is no active Alquist-Priolo fault zone or active or potentially active faults that traverse the UCR area. As concluded in the LRDP and verified in the State of California Department of Conservation[1], the project site is not affected by an Alquist-Priolo Earthquake Fault Zone. As such, the possibility of damage due to ground rupture is considered low since no active faults are known to cross the project site. As no known faults exist in the site vicinity and the site is not located within an Alquist-Priolo Earthquake Fault Zone, no impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

2) Strong seismic ground shaking?

No Impact. According to the LRDP EIR, there are no known active or potentially active faults on or immediately adjacent to the UCR campus. However, the campus lies within a seismically active area that includes faults that are expected to produce maximum credible earthquakes of magnitude 5.0 or greater. Therefore, people and structures on campus could be subject to seismically induced groundshaking, which could result in damage to structures and risk to building occupants. The LRDP EIR determined that implementation of the relevant LRDP Programs and Practices would ensure that all new buildings and other facilities would be designed to be consistent with current seismic and geotechnical engineering practice to provide adequate safety levels, as defined in the California Code of Regulations and the University Policy on Seismic Safety. In addition, the campus would continue the ongoing program to seismically strengthen existing buildings as appropriate and to anchor equipment and other potential hazards in existing buildings. The LRDP EIR concluded that with implementation of the relevant LRDP Programs and Practices, the LRDP would not expose people or structures to potential substantial adverse effects resulting from strong seismic ground shaking. Impacts in this regard were determined to be less than significant.

[1] State of California Department of Conservation California Geological Survey, *Alquist-Priolo Home Page*, http://www.quake.ca.gov/gmaps/ap/ap_maps.htm, Accessed March 2, 2015.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would not change the significance of impacts involving strong seismic ground shaking or the conclusions in the LRDP EIR. Impacts in this regard were determined to be less than significant.

As stated above in Response 4.6(a), no faults (active, potentially active, or inactive) are known to exist in the site vicinity. However, according to the LRDP EIR, while no known faults traverse the UCR area, several faults in the region have the potential to produce seismic impacts within UCR. Three significant faults, the San Andreas fault, the San Jacinto fault, and the Elsinore fault pass within 20 miles of UCR. There have been several earthquakes throughout recorded history which have caused significant strong ground motion in the region. Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region may affect the project site. Secondary effects include ground lurching and shallow ground rupture, soil liquefaction, and dynamic settlement. The secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology.

The proposed project involves the demolition of existing office uses in the Highlander Hall structures. After previous seismic evaluations, the structures were determined to have an assigned seismic rating of “POOR”. Additionally, a fire that occurred in the adjacent Human Resources Building in February 2015 has resulted in a fire damage and a structural evaluation is currently underway by UCR. As the project proposes removal of existing on-site structures and paving for additional surface parking, no impacts related to seismic shaking would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

3) Seismic-related ground failure, including liquefaction?

No Impact. As noted in Responses 4.6(1)(a) and 4.6(1)(b) above, the LRDP EIR concluded that implementation of the LRDP would result in the development of new buildings and facilities, and the replacement of existing structures, which could expose people or structures to potentially substantial adverse effects resulting from seismically induced groundshaking, which could result in damage to structures and risk to building occupants. As the UCR campus lies within a seismically active area, the people and structures on campus could be subject to seismic-related ground failure. The LRDP EIR determined that with implementation of LRDP Programs and Practices, potentially substantial adverse effects resulting from seismic-related ground failure would be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not change the significance of impacts involving liquefaction potential or the conclusions in the LRDP EIR. Impacts in this regard were determined to be less than significant.

Based on the Regulatory Maps prepared by the State of California Department of Conservation[2], the project site is not subject to the potential for liquefaction. As noted in Response 4.6(a)(2), the Highlander Hall structures were determined to have an assigned seismic rating of "POOR" in previous seismic evaluations. In addition, a fire that occurred in the adjacent Human Resources Building in February 2015 resulted in a fire damage and a structural evaluation is currently underway by UCR. As the project proposes removal of existing on-site structures and paving for additional surface parking, no impacts pertaining to liquefaction would result from the proposed project.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4) Landslides?

No Impact. As discussed in Responses 4.6(1)(a) through 4.6(1)(c) above, the LRDP EIR concluded that implementation of the LRDP could expose people or structures to potentially substantial adverse effects resulting from seismically induced groundshaking, which could involve landslides. The LRDP EIR determined that with implementation of the relevant LRDP Programs and Practices, the LRDP would not result in impacts involving landslides and impacts in this regard would be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not alter the significance of impacts involving landslides or the conclusions in the LRDP EIR. Impacts in this regard were determined to be less than significant.

The project site is located within a developed area of the UCR campus. As the proposed project is located on the western portion of the UCR campus, the project site and surrounding topography is relatively flat, ranging in elevation from approximately 1,022 feet above mean sea level (msl) to 1,030 feet above msl. Consequently, there is no potential for landslides to occur on or near the project site. Therefore, no significant impact associated with the exposure of people or structures to potential substantial adverse effects involving landslides would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

[2] State of California Department of Conservation, *Regulatory Maps*, http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm, accessed March 2, 2015.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Result in substantial soil erosion or the loss of topsoil?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that the development of new buildings and facilities under the LRDP could result in substantial soil erosion and the loss of topsoil. The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Programs and Practices, the LRDP would not result in substantial erosion or the loss of topsoil. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not change the significance of impacts resulting in substantial soil erosion or the loss of topsoil or the conclusions in the LRDP EIR. Impacts in this regard were determined to be less than significant.

The primary concern in regards to soil erosion or loss of topsoil would be during the construction phase of the project. Demolition, grading, and earthwork activities associated with project construction activities would expose soils to potential short-term erosion by wind and water. Construction of the proposed project would be required to comply with requirements set forth in the National Pollutant Discharge Elimination System (NPDES) Storm Water General Construction Permit for construction activities. The NPDES Storm Water General Construction Permit requires preparation of a Storm Water Pollution Prevention Plan (SWPPP), which would identify specific erosion and sediment control Best Management Practices (BMPs) that would be implemented to protect storm water runoff during construction activities. The project would also be required to comply with the LRDP Program and Practice (PP 4.6-2[a]) that would reduce erosion at construction sites.

Long-term operational impacts related to soil erosion or loss of topsoil would be required to comply with the NPDES requirements. Additionally, implementation of LRDP PS Open Space 4 and Conservation 2 and PP 4.6-2(a) as part of the proposed project would maintain existing landscape buffers along the I-215/SR-60 freeway, minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and comply with standard South Coast Air Quality Management District (SCAQMD) measures. Following compliance with the NPDES and LRDP Planning Strategies and Programs and Practices, project implementation would minimize effects from erosion and ensure consistency with the Regional Water Quality Control Board requirements, resulting in a less than significant impact regarding soil erosion.

Applicable LRDP EIR Planning Strategies:

PS Open Space 4 — Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.

PS Conservation 2 — Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.

Applicable LRDP EIR Programs and Practices:

PP 4.6-2(a) — The campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
(ii) Replace ground cover in disturbed areas as quickly as possible.
(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
(iv) Water active grading sites at least twice daily.
(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period. During project-specific building design, a site-specific geotechnical study shall be conducted under the direct supervision of a California Registered Engineering (vi) All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
(vi) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
(vii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
(viii) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
(ix) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in the development of new buildings and facilities, and the replacement of existing structures, which could occur in areas of varying soil and slope stability. According to the LRDP EIR, the older alluvium found on most of the campus is typically consolidated in a medium dense to dense condition and is generally suitable to support structures. However, certain localized areas have less dense strata and lenses of old alluvium that are susceptible to hydroconsolidation. The younger alluvium material, found in the vicinity of University Arroyo, is generally sandy and porous with a high potential for hydroconsolidation and is generally not suitable for the support of structures. Fill materials exhibit great variability in their density and compressibility because these materials in many areas of the campus were deposited prior to the development of modern building codes. As such, fill materials may not be suitable for the support of structures, and would need to be recompacted or removed. The LRDP EIR concluded that the risk of liquefaction at the campus is low, as exploratory drillings and measurements from an on-campus well on the southeast portion of the campus have indicated that the current depth of the groundwater beneath the campus is generally greater than 60 feet. In addition, the older alluvium and bedrock that underlies large portions of the campus are considered to be non-liquefiable regardless of groundwater depth. The LRDP EIR determined that with implementation of the relevant Planning Strategies and a Program and Practice, future development under the LRDP would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in liquefaction and this impact was determined to be less than significant.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would not result in development on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, or would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse with implementation of the relevant LRDP Planning Strategies and a Program and Practice. Impacts in this regard were concluded to be less than significant.

As stated within Response 4.6(a)(3), impacts related to liquefaction would be less than significant. The project site would not be subject to earthquake-induced landslides per Response 4.6(a)(4). As discussed above, the Highlander Hall structures were concluded to have an assigned seismic rating of “POOR” in previous seismic evaluations. Additionally, a fire that occurred in the adjacent Human Resources Building in February 2015 resulted in a fire damage and structural evaluation currently underway by UCR. As the project proposes removal of existing on-site structures and paving for additional surface parking, no impacts associated with landslides, lateral spreading, subsidence, liquefaction, or collapse would result from the proposed project.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in the development of new buildings and facilities, the replacement of existing structures, which could occur in areas of varying soil stability including expansive soils. All construction on the campus would be required to comply with applicable provisions of the CBC or construction standards of the Uniform Building Code (UBC). With implementation of all applicable regulations, and a LRDP Program and Practice consisting of recommendations to address expansive soil conditions, implementation of the LRDP would not create substantial risks to life or property. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would not result in development on expansive soils, creating substantial risks to life or property, with implementation of the relevant LRDP Programs and Practices. Impacts in this regard were concluded to be less than significant

The project site is underlain by Arlington fine sandy loam according to the United States Department of Agriculture.[3] The Arlington soils have a low shrink-swell characteristic and therefore, the potential for water uptake after rainfall to cause soils to expand and damage building foundations is considered low. As discussed above, the Highlander Hall structures were determined to have an assigned seismic rating of "POOR" in previous seismic evaluations. Additionally, a fire that occurred in the adjacent Human Resources Building in February 2015 resulted in a fire damage and a structural evaluation is currently underway by UCR. As the project proposes removal of existing on-site structures and paving for additional surface parking, no impacts pertaining to expansive soils would result from the proposed project.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that no impacts would result in this regard, as no septic tanks or alternative wastewater systems are associated with the proposed project.

The project would not involve the use of septic tanks or alternative wastewater disposal systems. Therefore, project implementation would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater damage. No impacts would result from the proposed project.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

[3] United States Department of Agriculture website, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed March 2, 2015.

4.7 GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?		✓			
b. Conflict with an applicable plan, policy, or regulations adopted for the purpose of reducing the emissions of greenhouse gases?		✓			

GLOBAL CLIMATE CHANGE

California is a substantial contributor of global greenhouse gases (GHGs), emitting over 400 million tons of carbon dioxide (CO_2) per year.[1] Climate studies indicate that California is likely to see an increase of three to four degrees Fahrenheit over the next century. Methane (CH_4) is also an important GHG that potentially contributes to global climate change. GHGs are global in their effect, which is to increase the earth's ability to absorb heat in the atmosphere. As primary GHGs have a long lifetime in the atmosphere, accumulate over time, and are generally well-mixed, their impact on the atmosphere is mostly independent of the point of emission.

The impact of human activities on global climate change is apparent in the observational record. Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of CO_2, CH_4, and nitrous oxide (N_2O) from before the start of industrialization (approximately 1750), to over 650,000 years ago. For that period, it was found that CO_2 concentrations ranged from 180 to 300 parts per million. For the period from approximately 1750 to the present, global CO_2 concentrations increased from a pre-industrialization period concentration of 280 to 379 parts per million in 2005, with the 2005 value far exceeding the upper end of the pre-industrial period range.

REGULATIONS AND SIGNIFICANCE CRITERIA

The Intergovernmental Panel on Climate Change (IPCC) developed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of GHGs at 400 to 450 parts per million CO_2 equivalent[2] (CO_2eq) concentration is required to keep global mean warming below two degrees Celsius, which in turn is assumed to be necessary to avoid significant levels of climate change.

[1] California Environmental Protection Agency Air Resources Board, *California Greenhouse Gas Emissions for 2000-2012 – Trends of Emissions and Other Indicators,* May 13, 2014.

[2] Carbon Dioxide Equivalent – A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

Executive Order S-3-05 was issued in June 2005, which established the following GHG emission reduction targets:

- 2010: Reduce GHG emissions to 2000 levels;
- 2020: Reduce GHG emissions to 1990 levels; and
- 2050: Reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32) requires that the California Air Resources Board (CARB) determine what the statewide GHG emissions level was in 1990, and approve a statewide GHG emissions limit that is equivalent to that level, to be achieved by 2020. CARB has approved a 2020 emissions limit of 427 million metric tons (MT) of CO_2eq ($MTCO_2$eq).

Due to the nature of global climate change, it is not anticipated that any single development project would have a substantial effect on global climate change. In actuality, GHG emissions from the proposed project would combine with emissions emitted across California, the United States, and the world to cumulatively contribute to global climate change.

In June 2008, the California Governor's Office of Planning and Research published a Technical Advisory, which provides informal guidance for public agencies as they address the issue of climate change in *CEQA* documents.[3] This is assessed by determining whether a proposed project is consistent with or obstructs the 39 Recommended Actions identified by CARB in its *Climate Change Scoping Plan* which includes nine Early Action Measures (qualitative approach). The Attorney General's Mitigation Measures identify areas were GHG emissions reductions can be achieved in order to achieve the goals of AB 32. As set forth in the California Governor's Office of Planning and Research Technical Advisory and in the proposed amendments to the *CEQA Guidelines* Section 15064.4, this analysis examines whether the proposed project's GHG emissions are significant based on a qualitative and performance based standard (Proposed *CEQA Guidelines* Section 15064.4(a)(1) and (2)).

South Coast Air Quality Management District Thresholds

On December 5, 2008, the South Coast Air Quality Management District (SCAQMD) adopted GHG significance thresholds for Stationary Sources, Rules, and Plans where the SCAQMD is lead agency. The threshold uses a tiered approach. A proposed project is compared with the requirements of each tier sequentially and would not result in a significant impact if it complies with any tier. Tier 1 excludes projects that are specifically exempt from Senate Bill 97 from resulting in a significant impact. Tier 2 excludes projects that are consistent with a GHG reduction plan that has a certified final *CEQA* document and complies with AB 32 GHG reduction goals. Tier 3 excludes projects with annual emissions lower than a screening threshold. For industrial stationary source projects, the SCAQMD adopted a screening threshold of 10,000 $MTCO_2$eq per year ($MTCO_2$eq/yr). This threshold was selected to capture 90 percent of the GHG emissions from these types of projects where the combustion of natural gas is the primary source of GHG emissions. The SCAQMD concluded that projects with emissions less than the screening threshold would not result in a significant cumulative impact. Tier 4 consists of three decision tree options. Under the first option, the proposed project would be excluded if design features and/or mitigation measures resulted in emissions 30 percent lower than business as usual (BAU) emissions. Under the second option the proposed project would be excluded if it had early compliance with AB 32 through early implementation of CARB's *Climate Change Scoping Plan* measures. Under the third option, the proposed project would be excluded if it met sector based

[3] Governor's Office of Planning and Research, *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*, 2008.

performance standards. However, the specifics of the Tier 4 compliance options were not adopted by the SCAQMD Board in order to allow further time to develop the options and coordinate with CARB's GHG significance threshold development efforts. Tier 5 would exclude projects that implement off-site mitigation (GHG reduction projects) or purchase offsets to reduce GHG emission impacts to less than the proposed screening level.

While not adopted by the SCAQMD Board, the guidance document prepared for the stationary source threshold also suggested the same tiered approach for residential and commercial projects with a 3,000 $MTCO_2eq$/yr screening threshold. However, at the time of adoption of the industrial stationary source threshold, the SCAQMD felt additional analysis was required along with coordination with CARB's GHG significance threshold development efforts.

At the November 2009 meeting of the SCAQMD GHG working group, SCAQMD staff presented two options for screening thresholds for residential and commercial projects. The first option would have different thresholds for specific land uses. The proposed threshold for residential projects is 3,500 $MTCO_2eq$/yr, the commercial threshold is 1,400 $MTCO_2eq$/yr, and the mixed-use threshold is 3,000 $MTCO_2eq$/yr. The second option would apply the 3,000 $MTCO_2eq$/yr screening threshold for all commercial/residential projects. Lead agencies would be able to select either option. These thresholds are based on capturing 90 percent of the emissions from projects and requiring them to comply with the higher tiers of the threshold (i.e., performance requirements or GHG reductions outside of the project) to not result in a significant impact.

SCAQMD staff also presented updates for compliance options for Tier 4 of the significance thresholds. The first option would be a reduction of 23.9 percent in GHG emissions over the base case. This percentage reduction represents the land use sector portion of the CARB's *Climate Change Scoping Plan's* overall reduction of 28 percent. This target would be updated as the AB 32 *Climate Change Scoping Plan* is revised. The base case scenario for this reduction still needs to be defined. Residual emissions would need to be less than 25,000 $MTCO_2eq$/yr to comply with the option. Staff proposed efficiency targets for the third option of 4.6 $MTCO_2eq$/yr per service population (population plus employment) for project level analysis and 6.6 $MTCO_2eq$/yr for plan level analyses. For project level analyses, residual emissions would need to be less than 25,000 $MTCO_2eq$/yr to comply with this option.

At the most recent meeting of the SCAQMD GHG working group, SCAQMD staff recommended extending the 10,000 $MTCO_2eq$/yr industrial project threshold for use by all lead agencies. The two options for land-use thresholds were reiterated with a recommendation that lead agencies use the second, 3,000 $MTCO_2eq$/yr threshold for all non-industrial development projects. Staff indicated that they would not be recommending a specific approach to address the first option of Tier 4, Percent Emissions Reduction Target. If lead agencies enquire about using this approach staff will reference the approach recommended by the San Joaquin Valley Air Pollution Control District and describe the challenges to using this approach. For the third option of Tier 4, SCAQMD staff re-calculated the recommended Tier 4 efficiency targets for project level analyses to 4.8 $MTCO_2eq$/yr in 2020 and 3.0 $MTCO_2eq$/yr in 2035. The recommended plan level analysis efficiency target remains 6.6 $MTCO_2eq$/yr for 2020, but was lowered to 4.1 $MTCO_2eq$/yr for 2035. SCAQMD staff also stated that they are no longer proposing to include a 25,000 $MTCO_2eq$/yr maximum emissions requirement for compliance with Tier 4. Staff indicated that they hoped to bring the proposed GHG significance thresholds to the board for their December 2010 meeting; however, this did not occur.

As the project proposes to demolish the former Highlander Hall and Human Resources Building and construct additional surface parking, the 3,000 $MTCO_2eq$ per year screening threshold has been selected as the significance threshold instead of the 6.6 $MTCO_2eq$/yr used in the LDRP, as it is a project level threshold, does not require a service population, and is most applicable to the proposed project. The 3,000 $MTCO_2eq$ per year is used in addition to the qualitative thresholds of significance set forth below from Section VII of *CEQA Guidelines* Appendix G.

University of California Policy on Sustainable Practices

In 2004, the University of California Policy on Sustainable Practices was issued by the UC President and revised in January 2006, March 2007, September 2009, and July 2011. The policy was developed to standardize campus practices and is a system-wide commitment to minimize the University of California's impact on the environment and reduce the University's dependence on non-renewable energy sources. The University of California Policy on Sustainable Practices establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice and sustainable water systems and provides policy guidelines to address University operations incorporating principles of energy efficiency and sustainability, minimizing the use of non-renewable energy sources, and incorporating alternative means of transportation to, from, and within the UCR campus.

University of California Riverside

In December 2010, UCR adopted the *UC Riverside Climate Action Plan* (CAP) as a strategic roadmap to establish emissions reduction targets and implement strategies to reach UCR's goal of reducing GHG emissions. As signatories to the American College and University Presidents Climate Commitment (ACUPCC), both the UC system and UCR have a long-term goal of becoming carbon neutral by 2050. To achieve this commitment, the CAP presents the campus's baseline, existing, and projected GHG emissions, summarizes UCR's current emissions reduction strategies, and lists additional GHG emissions reduction strategies that UCR plans to implement in the future. The CAP also includes other relevant information such as how UCR plans to monitor its progress towards the reduction goal and potential funding for its GHG reduction strategies. In conjunction with joining the ACUPCC, the University of California adopted system-wide interim climate protection targets to reduce GHG emissions to 2000 levels by 2014, and 1990 levels by 2020.

At the time of the LRDP EIR document preparation, the CEQA Guidelines did not expressly address global climate change, and GHG analyses were not required under CEQA, although the State subsequently added GHG to the list of environmental topics. The University has incorporated the GHG emissions threshold questions from the CEQA Appendix G Checklist into this tiered IS/MND. The effects of campus growth under the LRDP Amendment 2 related to GHG emissions that were not previously analyzed in the LRDP EIR were evaluated in the LRDP Amendment 2 EIR. Similarly to previous GHG emissions evaluations, the analysis below utilizes SCAQMD significance thresholds and addresses whether the project may have potentially significant impacts related to GHG emissions.

a) ***Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP Amendment 2 EIR determined that the implementation of the LRDP Amendment 2 would result in the generation of GHG emissions, from construction and operation of the existing and planned facilities. While at the time, it was not possible to predict which specific projects would be proposed or constructed on the campus through the academic year 2020-2021, a programmatic evaluation of the GHG emissions that would result from the UCR campus's entire development program under the LRDP

Amendment 2 was analyzed. The LRDP Amendment 2 EIR concluded that full buildout of the UCR campus under the LRDP Amendment 2 would exceed the 6.6 $MTCO_2eq$ per service population (SP) draft threshold.[4] Given UCR's existing commitments to reduce GHG emissions by over 70 percent from BAU projections by 2020, it can be assumed that the emissions rate associated with new development under the LRDP Amendment 2 would be reduced by more than eight percent from BAU, below the 6.6 $MTCO_2eq$ per SP draft threshold. Implementation of a LRDP EIR Mitigation Measure was required to ensure the UCR campus implemented appropriate GHG reduction measures from the UCR CAP and University Policy on Sustainable Practices. Therefore, with mitigation, implementation of the LRDP Amendment 2 would result in a less than significant impact related to GHG emissions.

Project-Related Sources of Greenhouse Gases

Project-related GHG emissions would include emissions from construction and operation activities. Construction of the project would result in direct emissions of CO_2, N_2O, and CH_4 from the operation of construction equipment. Transport of materials and construction workers to and from the project site would also result in GHG emissions. Construction activities would be short-term in duration and would cease upon project completion. The proposed project would result in the demolition of the former Highlander Hall and Human Resources Building and paving for additional parking. The operation of the proposed project would not result in any sources of operational GHG emissions, as there would be no increase in vehicle trips. The project would not generate new vehicle trips. The proposed project would only redistribute 1,020 daily trips intended to accommodate the existing parking demand from displaced parking supply in the main campus areas. Consequently, project-related GHG emissions would only be from construction activities.

Construction Emissions

Project-related GHG emissions would result from the proposed construction activities over the construction period. Construction of the proposed project would result in a total of 163.53 $MTCO_2eq$ (5.45 $MTCO_2eq$ amortized over 30 years), which is well below the 3,000 $MTCO_2eq$/year screening threshold. The California Emissions Estimator Model (CalEEMod) was used to calculate off-road construction emissions. The CalEEMod outputs are contained within the <u>Appendix 8.1</u>, <u>*Air Quality/Greenhouse Gas Data*</u>.

GHG emissions from construction of the proposed project would be minimal and less than the GHG emissions threshold adopted by the SCAQMD. Further, LRDP Amendment 2 EIR Mitigation Measure MM 4.16-1 would be required to be implemented by the proposed project. The project would be required to be evaluated for consistency with the GHG reduction policies of the UCR CAP and the UC Policy on Sustainable Practices including requiring the use of light-colored pavement for concrete surfaces, providing tree cover within parking lot areas, providing parking spaces for car share vehicles, construction waste management measures, exceeding Title 24 energy code requirements for new construction projects, and limiting and reducing commercial vehicles idling time. With implementation of LRDP Amendment 2 EIR Mitigation Measure, impacts would remain less than significant and no new or different impacts would result from the proposed project. Impacts would be less than significant in this regard.

[4] The plan-level efficiency target of 6.6 $MTCO_2eq$ per service population per year proposed by the SCAQMD and adopted by the Bay Area Air Quality Management District (BAAQMD) was utilized for the LRDP Amendment 2 EIR programmatic evaluation of GHG emissions for LRDP Amendment 2.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures:

MM 4.16-1 All projects developed under the amended 2005 LRDP shall be evaluated for consistency with the GHG reduction policies of the UCR CAP and the UC Policy on Sustainable Practices, as may be updated from time to time by the University. GHG reduction measures, including, but not limited to, those found within the UCR CAP and UC Policy identified in Tables 4.16-9 and 4.16-10 shall be incorporated in all campus projects so that at a minimum an 8 percent reduction in emissions from BAU is achieved. It is expected that the GHG reduction measures in the UCR CAP will be refined from time to time, especially in light of the evolving regulations and as more information becomes available regarding the effectiveness of specific GHG reduction measures. As part of the implementation of the UCR CAP, the Campus will also monitor its progress in reducing GHG emissions to ensure it will attain the established targets.
(LRDP Amendment 2 EIR)

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Conflict with an applicable plan, policy, or regulations adopted for the purpose of reducing the emissions of greenhouse gases?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP Amendment 2 EIR determined that the implementation of the LRDP Amendment 2 was accounted for by the UCR campus in developing the UCR CAP. With implementation of the LRDP Mitigation Measure, each project on the UCR campus would be evaluated for its consistency with the applicable emissions reduction measures in the CAP. The LRDP Amendment 2 EIR concluded that the implementation of the LRDP Amendment 2 would not conflict with any plans, policies, or regulations adopted for the purpose of reducing GHG emissions. Impacts in this regard were determined to be less than significant.

The proposed project would result in the demolition of the former Highlander Hall and Human Resources Building and paving for additional parking. The proposed project would not conflict with the University of California Policy on Sustainable Practices and the UCR CAP, as the project does not change UCR's land use designations and would not increase the population beyond that considered in the LRDP. The project would not generate new vehicle trips, and would only redistribute 1,020 daily trips intended to accommodate the existing parking demand from displaced parking supply in the main campus areas. Furthermore, the proposed project would be required to implement LRDP Amendment 2 EIR Mitigation Measure MM 4.16-1 to ensure consistency with the UCR CAP and the UC Policy on Sustainable Practices GHG reduction policies related to energy consumption, motor vehicles, and solid waste measures, as discussed above. Therefore, with implementation of LRDP Amendment 2 EIR Mitigation Measure, the implementation of the proposed project would not conflict with any plans, policies, or regulations adopted for the purpose of reducing GHG emissions. No new or different impacts would occur from the proposed project and with implementation of the LRDP EIR Mitigation Measure, a less than significant impact would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: Refer to LRDP Amendment 2 EIR Mitigation Measure MM 4.16-1.

Project-Specific Mitigation Measures: No mitigation measures are required.

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4.8 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		✓			
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		✓			
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		✓			
d. Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and, as a result, would it create a significant hazard to the public or the environment?					✓
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?					✓
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?					✓
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?		✓			
h. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?					✓

a) ***Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials associated with renovation or demolition of buildings with implementation of the relevant LRDP Programs and Practices. Impacts in this regard were determined to be less than significant.

Long-term operations of the proposed project would not include the routine transport, use or disposal of large quantities of hazardous materials. The occasional use of pesticides and herbicides for landscape maintenance of the project site would be generally the extent of hazardous materials that would be routinely utilized on-site, none of which would be considered significant quantities of hazardous substances. Less than significant impacts would result.

Limited amounts of some hazardous materials could be used in the short-term construction of the project, including standard construction materials (e.g., paints and solvents), vehicle fuel, and other hazardous materials. The routine transportation, use, and disposal of these materials would be required to adhere to State and local standards and regulations for handling, storage, and disposal of hazardous substances. The proposed project could involve the handling of hazardous waste during building demolition as a result of potential asbestos containing materials (ACMs) or lead-based paints (LBPs). However, compliance with the LRDP PP 4.7-2 would ensure that potential hazardous materials associated with on-site buildings would be identified and handled appropriately during demolition. Adherence to the LRDP Program and Practice would ensure that potential health risks associated with the routine handling, storage, and/or transport of hazardous materials during construction would be less than significant and no new or different impacts would result.

Operations of the project would not involve hazardous materials in reportable quantities. Thus, no impact would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.7-2 The campus shall perform hazardous materials surveys on buildings and soils, if applicable, prior to demolition. When remediation is deemed necessary, surveys shall identify all potential hazardous materials within the structure to be demolished, and identify handling and disposal practices. The campus shall follow the practices during building demolition to ensure construction worker and public safety.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendments, would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment with implementation of the relevant LRDP Programs and Practices, and compliance with Federal and State health and safety laws and regulations. Impacts were determined to be less than significant in this regard.

During project construction, there is a possibility of accidental release of hazardous substances such as petroleum-based fuels or hydraulic fluid used for construction equipment. The level of risk associated with the accidental release of hazardous substances is not considered significant due to the small volume and low concentration of hazardous materials utilized during construction. The construction contractor would be required to use standard construction controls and safety procedures that would avoid and minimize the potential for accidental release of such substances into the environment. Standard construction practices would be observed such that any materials released are appropriately contained and remediated as required by local, State, and Federal law.

As discussed in Response 4.2-2(a), the proposed project could involve the handling of hazardous waste during building demolition as a result of ACMs or LBPs. However, compliance with the LRDP PP 4.7-2 would ensure that potential hazardous materials associated with on-site buildings would be identified and handled appropriately during demolition. Implementation of LRDP Programs and Practices, Federal, State, and local laws and regulations pertaining to health and safety would result in less than significant impacts involving a hazard to the public or the environment through reasonably foreseeable upset and accident conditions. Impacts in this regard would be less than significant and no new or different impacts would result.

With implementation of LRDP Programs and Practices, as well as Federal, State, and local laws and regulations, impacts associated with the potential release hazardous materials into the environment through reasonably foreseeable upset and accident conditions during construction would be less than significant and no new or different impacts would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: Refer to PP 4.7-2.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR determined that while hazardous materials and waste could be handled within one-quarter mile of an existing or proposed school as a result of implementation of the LRDP, and subsequent amendment, these materials would not exist in quantities significant enough to pose a risk to occupants of the school or the campus community. With implementation of LRDP Programs and Practices, and compliance with Federal, State, and local regulations pertaining to hazardous wastes would ensure that risks associated with hazardous emissions or materials to existing or proposed schools located within one-quarter mile of campus would be eliminated or reduced through proper handling techniques, disposal practices, and/or clean-up procedures. As such, implementation of the LRDP would not emit significant quantities of hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Impacts in this regard were determined to be less than significant.

Operations of the proposed project would not involve hazardous materials in reportable quantities. However, construction activities may involve hazardous demolition materials. As discussed in Response 4.2-2(a), compliance with the LRDP PP 4.7-2 would ensure that potential hazardous materials associated with on-site buildings would be identified and handled appropriately during demolition. Implementation of LRDP Programs and Practices, Federal, State, and local laws and regulations pertaining to health and safety would result in less than significant impacts in this regard and no new or different impacts would occur.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: Refer to PP 4.7-2.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project Specific Mitigation Measures: No mitigation measures are required.

d) ***Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?***

No Impact. Government Code Section 65962.5 requires the DTSC and SWRCB to compile and update a regulatory sites listing (per the criteria of the Section). The California Department of Health Services is also required to compile and update, as appropriate, a list of all public drinking water wells that contain detectable levels of organic contaminants and that are subject to water analysis pursuant to Section 116395 of the Health and Safety Code. Section 65962.5 requires the local enforcement agency, as designated pursuant to Section 18051 of Title 14 of the California Code of Regulations (CCR), to compile, as appropriate, a list of all solid waste disposal facilities from which there is a known migration of hazardous waste.

The LRDP EIR identified the UCR campus listed on a list of hazardous materials sites pursuant to Government Code Section 65962.5, due to the former pesticide disposal pits located in the agricultural teaching and research fields in the western portion of campus. Remediation was completed over an approximate 1-acre area. Since remediation has been completed and no construction is planned in this area, it no longer presents a risk of exposure to hazardous materials. As remediation has already been completed in the former pesticide disposal pits, and no construction is planned in that area under the LRDP, no risk of exposure to hazardous materials were determined to be present. The LRDP EIR concluded that implementation of the LRDP would not result in development located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would not create a significant hazard to the public or the environment. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not create a significant hazard to the public or the environment. Impacts in this regard were determined to be less than significant.

The project site is not listed on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.[1] No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that the UCR campus is not located within an airport land use plan study area, or within two miles of a public airport or public use airport. No impacts would result in this regard.

The nearest airports to the project site is the Flabob Airport, located approximately 3.8 miles to the northwest, and March Air Reserve Base, which is located approximately 6.5 miles to the southeast. The project site is not located within the airport land use compatibility plan for either the Flabob Airport or the March Air Reserve Base.[2,3] Thus, project implementation would not result in a safety hazard for people residing or working in the project area. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

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[1] Department of Toxic Substances Control, *Cortese List Data Resources,* http://www.calepa.ca.gov/SiteCleanup/CorteseList/default.htm, accessed on March 9, 2015.

[2] Riverside County Airport Land Use Commission, *Riverside County Airport Land Use Compatibility Plan Policy Document*, adopted December 2004.

[3] Riverside County Airport Land Use Commission, *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan,* November 13, 2014.

Project-Specific Mitigation Measures: No mitigation measures are required.

f) ***For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR determined that the UCR campus is not located within the vicinity of a private airstrip. No impacts would occur in this regard.

Currently, there are no private airstrips located within the vicinity of the proposed project. Therefore, project implementation would not result in a safety hazard for people residing or working in the project area, and no impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

g) ***Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR identified that development under the LRDP could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Construction and operation activities could potentially affect emergency response or evacuation plans due to temporary construction barricades or other obstructions that could impede emergency access on campus. Implementation of LRDP Programs and Practices to preserve a single traffic lane on campus roadways whenever feasible, and consultation with emergency service providers regarding roadway closures would ensure that impacts to emergency access associated during construction of the LRDP would be less than significant. Additionally, implementation of the LRDP could result in the siting and development of new buildings and facilities that may currently be identified as emergency assembly areas or evacuation routes. Even with implementation of the identified LRDP Planning Strategies and Programs and Practices, implementation of the LRDP could result in development that could physically interfere with an adopted Emergency Operations Plan, given the magnitude of development that could occur during the LRDP planning horizon. Therefore, mitigation was recommended to require the avoidance of evacuation assembly areas, as designated under the Emergency Operations Plan. With the implementation of relevant LRDP Programs and Practices and LRDP EIR Mitigation Measures, this potentially significant impact was determined to be reduced to less than significant levels.

The LRDP Amendment 2 EIR determined that the impact of the proposed land use changes related to impairing the implementation of or physically interfering with an adopted emergency response plan or emergency evacuation plan for the LRDP Amendment 2 would not exceed the significance conclusion reached in the LRDP EIR and would similarly be reduced to a less than significant level with the implementation of mitigation measures previously adopted by the University in conjunction with its adoption of the LRDP.

The proposed project would not require lane closures during construction. Travel along surrounding roadways would remain open and proposed construction would not interfere with emergency access in the site vicinity. However, the southern-most portion of the project site is identified as within an evacuation assembly area per the *University of California Riverside Emergency Operation Plan* (EOP).[4] The LRDP EIR Mitigation Measures (MM 4.7-7[a]) would be required in order to avoid designated evacuation zones, to the extent feasible, when siting construction staging areas. Where evacuation zones cannot be avoided, alternative evacuation zones would be required to be identified. The UCR Police Department and the Riverside Fire Department must be notified of alternative evacuation zones, if needed, so that they can respond accordingly to any emergencies. Further, upon completion of construction, the project site can continue to function as a designated emergency evacuation zone. With implementation of the LRDP EIR Mitigation Measures, project impacts on the EOP would be reduced to less than significant and no new or different impacts would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures:

MM 4.7-7(a) Evacuation zones designated in the UCR Emergency Operations Plan will be avoided, to the extent feasible, when siting construction staging areas. Where evacuation zones cannot be avoided, alternative evacuation zones shall be identified. UCPD and the Riverside Fire Department shall be notified of alternative evacuation zones so that they can respond accordingly to any emergencies. *(LRDP EIR)*

Project-Specific Mitigation Measures: No mitigation measures are required.

h) ***Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?***

No Impact. The LRDP EIR identified that although development under the LRDP is not anticipated to increase the potential for fires to occur, the proximity of additional people and structures to this area would increase the risk of exposure to wildland fires that could occur in the nearby Box Springs Mountains and spread to on-campus areas dominated by natural vegetation. Thus, even with implementation of the identified LDRP Planning Strategy, implementation of the LRDP could expose people or structures to a risk of loss, injury, or death involving wildland fires. Identified mitigation would require landscaping with appropriate plant materials and implementation of annual fuel management procedures. With implementation of LRDP EIR mitigation, this impact was determined to be reduced to a less than significant level, and implementation of the LRDP would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

[4] University of California Riverside Environmental Health and Safety, *University of California Riverside Emergency Operation Plan,* December 20, 2011.

The LRDP Amendment 2 EIR determined that lands associated with the proposed LRDP Amendment 2 would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Impacts in this regard were concluded to be less than significant.

The project site is located within a completely urbanized area that is void of any wildland areas. Further, according to the California Department of Forestry and Fire Protection, the project site is not located within the vicinity of a "Very High Fire Hazard Severity Zone".[5] Thus, no impact would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

[5] California Department of Forestry and Fire Protection, *Fire Hazard Severity Zones in SRA*, adopted on November 7, 2007, http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps.php, accessed March 9, 2015.

4.9 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?		✓			
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				✓	
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?		✓			
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?				✓	
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				✓	
f. Otherwise substantially degrade water quality?		✓			
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?					✓
h. Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?					✓
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?					✓
j. Inundation by seiche, tsunami, or mudflow?					✓

The information presented in this analysis has been supplemented with the *Preliminary On-Site Hydrology Study* (Hydrology Study) and the *Preliminary Water Quality Management Plan* (WQMP), prepared for the proposed project by David Beckwith and Associates, Inc. (dated April 22, 2015, and April 27, 2015, respectively); refer to Appendix 8.2, *Hydrology/Water Quality Documentation*.

a) *Violate any water quality standards or waste discharge requirements?*

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not violate existing water quality standards or waste discharge requirements. With implementation of the relevant LRDP Planning Strategy and Program and Practice, this impact was determined to be less than significant.

As part of Section 402 of the Clean Water Act, the U.S. Environmental Protection Agency (EPA) has established regulations under the National Pollutant Discharge Elimination System (NPDES) program to control direct storm water discharges. In California, the State Water Resources Control Board (SWRCB) administers the NPDES permitting program and is responsible for developing NPDES permitting requirements. The NPDES program regulates industrial pollutant discharges, which include construction activities. The SWRCB works in coordination with the Regional Water Quality Control Boards (RWQCB) to preserve, protect, enhance, and restore water quality. UCR is within the jurisdiction of the Santa Ana RWQCB.

Short-Term Construction

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP would list Best Management Practices (BMPs) the discharger would use to protect storm water runoff and the placement of those BMPs. These BMPs would include measures to contain runoff from vehicle washing at the construction site, prevent sediment from disturbed areas from entering the storm drain system using structural controls (i.e., sand bags at inlets), and cover and contain stockpiled materials to prevent sediment and pollutant transport. Implementation of the BMPs would ensure runoff and discharges during the project's construction phase would not violate any water quality standards. The SWPPP would contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

UCR would be required to prepare a Notice of Intent (NOI) for submittal to the Santa Ana RWQCB providing notification of intent to comply with the General Construction Permit. A copy of the SWPPP would be made available and implemented at the construction site at all times.

Compliance with NPDES requirements would reduce short-term construction-related impacts to water quality to a less than significant level.

Long-Term Operations

Due to the developed character of the project site, construction of the proposed project would result in a decrease in impervious areas below existing conditions, which would result in a decrease in discharge of surface waters at the project site. However, the project would add additional surface parking, which could result in water quality concerns. The project would be regulated under a NPDES Non-traditional MS4 permit. Per the LRDP Program and Practice PP 4.8-1, the proposed project would be required to comply with all applicable water quality requirements established by the RWQCB. Per these requirements, a preliminary WQMP for the proposed project has been included in Appendix 8.2. Based on the WQMP, expected pollutants of concern regarding the surface parking lot would include trash and debris and oil and grease. Potential pollutants of concern would include suspended-solid/sediment, nutrients, organic compounds (solvants), oxygen demanding substances, pathogens (bacteria/virus), pesticides, and metals. Listed 303(d) impairments to the watershed include nutrients and pathogens. The proposed project would construct vegetative swales between proposed parking aisles collecting and treating the area directly adjacent to each swale. These swales are the primary BMP for the project site. Minimal fertilizers and pesticides would be used on these swales, as required by the WQMP.

Following compliance with the requirements of the NPDES and LRDP Program and Practice PP 4.8-1, project implementation would not violate any water quality standards or waste discharge requirements associated with long-term operations. Impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.8-1 The campus will continue to comply with all applicable water quality requirements established by the SARWQCB.
(This is identical to Utilities PP 4.15-5.)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?***

Less Than Significant Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not substantially deplete groundwater supplies or interfere with groundwater recharge. With implementation of the relevant LRDP Planning Strategy and Programs and Practices, this impact was determined to be less than significant.

Implementation of the proposed project would result in the demolition of existing on-site structures and the reconfiguration of an existing surface parking lot. The project would not substantially deplete groundwater supplies. Due to the developed nature of the area, the project site does not have the capacity to serve as a significant source for groundwater recharge. The project does not involve the direct withdrawal of groundwater for municipal use and would not substantially interfere with recharge capabilities. Thus, impacts in this regard are less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?***

***Project Impact Adequately Addressed in LRDP EIR*.** The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not substantially alter drainage patterns on campus and would not result in substantial erosion or siltation on or off site. With implementation of the relevant LRDP Planning Strategies and Programs and Practices, these impacts were determined to be less than significant.

Soil disturbance would temporarily occur during project construction due to minor earthwork activities such as soil compaction, moving, and grading. Disturbed soils would be susceptible to high rates of erosion from wind and rain, resulting in sediment transport via stormwater runoff from the project site.

The project would be subject to compliance with the requirements set forth in the NPDES Storm Water General Construction Permit for construction activities; refer to Response 4.9(a). Compliance with the NPDES, including preparation of a SWPPP would reduce the volume of sediment-laden runoff discharging from the site. Further, the proposed project would be required to comply with LRDP Program and Practices PP 4.8-3(c) and PP 4.8-3(d), pertaining to minimizing fugitive dust during construction and implementation of BMPs, as identified in the UCR Stormwater Management Plan (UCR 2003). Therefore, project implementation would not substantially alter the existing drainage pattern of the site during the construction process such that substantial erosion or siltation would occur.

The project would result in the modification of an existing surface parking lot to increase available parking on-site. Given the nature of the proposed use and the urbanized project setting, long-term operation of the project would not have the potential to result in substantial erosion or siltation off-site. The project would not include large areas of exposed soils that would be subject to runoff; rather, any unpaved areas would be improved with groundcover and landscaping to minimize the potential for erosion/siltation. In addition, as stated within Response 4.9(a), the project would also be subject to existing requirements of the NPDES (including preparation and implementation of a project SWPPP) and LRDP Programs and Practices PP 4.8-3(c) and (d), which would reduce sediment discharge off-site compared to the existing condition. Thus, impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.8-3(c) The campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403, and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
(ii) Replace ground cover in disturbed areas as quickly as possible.
(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
(iv) Water active grading sites at least twice daily.
(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period.
(vi) All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
(vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
(viii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
(ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

(This is identical to Air Quality PP 4.3-2(b) and Geology PP 4.6-2(a).)
(LRDP EIR)

PP 4.8-3(d) In compliance with NPDES, the campus would continue to implement Best Management Practices, as identified in the UCR Stormwater Management Plan (UCR 2003):

(i) Public education and outreach on stormwater impacts.
(ii) Public involvement/participation.
(iii) Illicit discharge detection and elimination.
(iv) Pollution prevention/good housekeeping for facilities.
(v) Construction site stormwater runoff control.

(vi) Post-construction stormwater management in new development and redevelopment.

(This is identical to Biological Resources PP 4.4-2(b) and Geology and Soils PP 4.6-2(b).)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?***

Less Than Significant Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not substantially alter site drainage patterns or substantially increase the rate or amount of surface runoff and would not result in flooding either on or off site. With implementation of the relevant Program and Practice, these impacts were determined to be reduced to a less-than-significant level.

Based on the Hydrology Study (provided in Appendix 8.2), the proposed project would not generate any additional run-off in either flow or volume at the project site, compared to the existing condition. The project would not result in a substantial change in topography that would alter or change flow patterns in the project area. Thus, implementation of the proposed project would not result in flooding on- or off-site. Impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?***

Less Than Significant Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not create runoff that would exceed the capacity of existing storm drain systems or provide substantial sources of polluted runoff. With implementation of the relevant Programs and Practices, these impacts were determined to be less than significant.

As noted in Response 4.9(d), based on the Hydrology Study (provided in Appendix 8.2), the proposed project would not generate any additional run-off in either flow or volume at the project site, compared to the existing condition. Further, based on the WQMP (also provided in Appendix

8.2), the proposed project would construct vegetative swales between proposed parking aisles collecting and treating the area directly adjacent to each swale for the purposes of water quality. These swales are the primary BMP for the project site and would be regularly maintained (mowed) once weekly.

Thus, as the proposed project would not result in any increased runoff at the project site and would implement BMPs to reduce potential water quality concerns associated with a surface parking lot, the proposed project is not anticipated to exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Impacts would be less than significant in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

f) ***Otherwise substantially degrade water quality?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP would not otherwise substantially degrade water quality. Impacts in this regard were determined to be less than significant.

Based on the WQMP (provided in Appendix 8.2), the proposed project would construct vegetative swales between proposed parking aisles collecting and treating the area directly adjacent to each swale for the purposes of water quality. With compliance with the existing requirements of the NPDES (including preparation and implementation of a project SWPPP) and LRDP Program and Practice PP 4.8-1 and 4.8-3(d), impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: Refer to LRDP Programs and Practices 4.8-1 and 4.8-3(d).

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

g) ***Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP would not place housing within a 100-year flood hazard area and no impact would result in this regard.

According to the Flood Insurance Rate Map (FIRM) for the project area, the project site is located within "Zone X", which is an area determined to be outside of the 0.2 percent annual chance flood.[1] As such, no impact would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

h) ***Place within a 100-year flood hazard area structures, which would impede or redirect flood flows.***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that with implementation of the relevant Program and Practice and Mitigation Measures, the LRDP, and subsequent amendment, would not place structures within a 100-year flood hazard area and development could not impede or redirect flood flows.

The project site is not located within a 100-year flood hazard area; refer also to Response 4.9(g). No impact would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

i) ***Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?***

No Impact. The Santa Ana Pipeline, a component of the State Water Project, conveys water from the Devil Canyon Power Plant to Lake Perris and is located east of the campus along the base of the Box Springs Mountains. The State of California Department of Water Resources

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[1] Federal Emergency Management Agency, *Flood Insurance Rate Map #06065C0727G*, Map Effective August 28, 2008.

(DWR) operates this pipeline, which is subject to periodic inspection by State authorities and DWR. Although the potential for catastrophic failure of the Santa Ana Pipeline is considered remote, continued implementation of the LRDP Program and Practice would ensure an appropriate response to flooding hazards in the event of a failure of the pipeline. The LRDP EIR concluded that implementation of the LRDP would alter site drainage patterns but would not expose people or structures to significant risk of loss, injury, or death involving flooding. With implementation of the relevant Program and Practice, this impact would be less than significant.

The LRDP Amendment 2 EIR determined that the subsequent amendment would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

Implementation of the project would demolish existing on-site structures and modify the existing surface parking lot to accommodate additional parking. The project would not result in a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. Therefore, no impact would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

j) ***Inundation by seiche, tsunami, or mudflow?***

No Impact. A seiche is an oscillation of a body of water in an enclosed or semi-enclosed basin, such as a reservoir, harbor, lake, or storage tank. A tsunami is a great sea wave, commonly referred to as a tidal wave, produced by a significant undersea disturbance such as tectonic displacement of a sea floor associated with large, shallow earthquakes. Mudflows result from the downslope movement of soil and/or rock under the influence of gravity.

The LRDP EIR and LRDP Amendment 2 EIR concluded that with implementation of the relevant LRDP Planning Strategies and Programs and Practices, development of the LRDP, and subsequent amendment, would not expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

The project site is not susceptible to tsunami- or seiche-related impacts. Further, the project site is situated within the northwestern portion of UCR, away from natural hillside/open space areas and is not susceptible to mudflows. Thus, no impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.10 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Physically divide an established community?					✓
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?		✓			
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?					✓
d. Result in development of land uses that are substantially incompatible with existing adjacent land uses or with planned uses?[1]					✓

a) *Physically divide an established community?*

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that no incursion into, or division of, the surrounding residential communities would occur as no development outside the established campus boundaries would be included with implementation of the LRDP. No impacts were determined to result in this regard.

The project site currently consists of vacant office buildings, the former Highlander Hall and the Human Resources Building. The proposed project would involve the removal of existing office uses and paving for additional parking. Project implementation would not physically divide an established community as no incursion into, or division of, any surrounding residential communities would occur. No impact would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

[1] This threshold is not included in Appendix G and was added to specifically address the compatibility of land uses in the LRDP with adjacent land uses.

b) ***Conflict with applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR determined that the LRDP would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. With the implementation of the relevant LRDP Planning Strategies and Programs and Practices as well as LRDP EIR Mitigation Measures, impacts were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the LRDP Amendment 2 would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. Impacts in this regard were concluded to be less than significant with implementation of the relevant LRDP Planning Strategies and Programs and Practices as well as LRDP EIR Mitigation Measures.

UCR determined that the former Highlander Hall buildings presented seismic and other safety issues. In addition, the Human Resources Building experienced a fire in February 2015. Implementation of the proposed project involves the demolition of the former Highlander Hall and Human Resources Building and paving for additional surface parking within a reconfigured existing lot (Parking Lot 50). Under the LRDP, the land use designation for the project site is primarily designated “Academic”, with some designated “Open Space” along the Gage Canal. Surface parking is permitted within the Academic land use designation as it does not preclude the future development of the site for academic uses. Therefore, the project would not alter any land use patterns within the project area. The proposed project would allow relocation of parking from central campus locations to the periphery of the academic core as required by LRDP Planning Strategy (PS) Land Use 7. The project would maintain existing landscape buffers along the I-215/SR-60 freeway as required by PS Open Space 4. The project would also be required to provide bicycle parking and parking management measures (PS Transportation 5 and 6). Additionally, the project would comply with Campus design guidelines pertaining to landscaping (Program and Practice [PP] 4.9-1[b]). With implementation of the relevant LRDP Planning Strategies and Programs and Practices, the proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. No new or different impacts would occur from the proposed project. Impacts in this regard would be less than significant.

Applicable LRDP EIR Planning Strategies:

PS Land Use 7	Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate.
PS Open Space 4	Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.
PS Transportation 5	Provide bicycle parking at convenient locations.

PS Transportation 6 Implement parking management measures that may include:

- Restricted permit availability.
- Restricted permit mobility.
- Differential permit pricing.

Applicable LRDP EIR Programs and Practices:

PP 4.9-1(b) The Campus shall continue to provide design professionals with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees and use of water conserving plants were feasible.
(This is identical to Aesthetics PP 4.1-2[a].)
(LRDP EIR)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Conflict with any applicable habitat conservation plan or natural community conservation plan?***

No Impact. The LRDP EIR identified the Box Springs Mountains and Sycamore Canyon Park as conservation target areas within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) in the vicinity of the UCR campus. However, as the MSHCP does not identify any portion of UCR for conservation, implementation of the 2005 LRDP would not conflict with the MSHCP. The LRDP EIR determined that with implementation of the relevant LRDP Planning Strategies and Programs and Practices, the LRDP would not conflict with any applicable conservation plan or natural community conservation plan. No impacts would occur in this regard.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would not conflict with any applicable conservation plan or natural community conservation plan, and no impacts would occur.

According to California Department of Fish and Wildlife NCCP Plan Summary – Western Riverside Multi-Species Habitat Conservation Plan[2] (MSHCP), the proposed project is located within the jurisdiction of a habitat conservation plan or natural community conservation plan. A portion of UCR is included in the MSHCP, but is not identified for conservation. Refer also to Response 4.4(f). Therefore, no impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

[2] California Department of Fish and Wildlife, *NCCP Plan Summary – Western Riverside Multi-Species Habitat Conservation Plan,* https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans/Riverside, accessed May 15, 2015.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Result in development of land uses that are substantially incompatible with existing adjacent land uses or with planned uses?***

No Impact. The LRDP EIR determined that implementation of the LRDP would result in the development of new buildings and facilities, the replacement of existing structures, and the conversion of existing open space and agricultural teaching and research fields into the sites of academic buildings and related support facilities, which have the potential to be substantially incompatible with existing adjacent land uses. With implementation of the relevant LRDP Planning Strategies and Programs and Practices, implementation of the LRDP would not result in development of land uses that are substantially incompatible with existing adjacent land uses or with planned uses, and potential land-use incompatibilities would be reduced to a less than significant level. Impacts would be less than significant in this regard.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2 would not result in development of land uses that are substantially incompatible with existing adjacent land uses with implementation of the relevant LRDP Planning Strategies and Programs and Practices. The LRDP Amendment 2 EIR also concluded that implementation of the LRDP Amendment 2 would be guided by design criteria, architectural guidelines, and landscape design guidelines specific to the development under LRDP Amendment 2. Therefore, with implementation of the relevant LRDP Planning Strategies, Programs and Practices, and specific design criteria, architectural guidelines, and landscape design guidelines, these potentially significant impacts were determined to be reduced to a less-than-significant level.

The proposed project would result in the demolition of the former Highlander Hall and Human Resources Building and paving for additional parking. As noted above, the land use designation for the project site is primarily designated “Academic”, with some designated “Open Space” along the Gage Canal. As surface parking is a permitted use within the Academic land use designation, it would not conflict with the existing land uses and would serve the uses that surround the site (institutional uses to the west, a surface parking lot to the south, and commercial uses to the north). The proposed project would not preclude the future development of the site for academic uses or associated campus facilities. Further, the project would comply with Campus design guidelines, which establishes a scale and visual character appropriate to the surrounding uses. Therefore, implementation of the proposed project would not result in development of land uses that are substantially incompatible with existing adjacent land uses. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.11 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?					✓
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?					✓

a) ***Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that development of the UCR campus would not result in the loss of availability of known mineral resources that would be of value to the regional and the residents of the state.

The UCR campus does not contain any mineral resource zones (MRZ) or known mineral resources of regional or statewide importance.[1] No mineral resource recovery activities have been associated with development of the UCR Campus. Project implementation involves demolition of the existing on-site office uses and paving for additional surface parking. Therefore, project implementation would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?***

No Impact. Refer to Response 4.11(a).

[1] U.S. Geological Survey, *California State Minerals Information website, 2010-2011 Minerals Yearbook,* http://minerals.usgs.gov/minerals/pubs/state/ca.html, accessed May 18, 2015.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.12 NOISE

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		✓			
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?		✓			
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				✓	
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		✓			
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?					✓
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?					✓

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air, and is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear de-emphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale (dBA) has been developed. On this scale, the human range of hearing extends from approximately three dBA to around 140 dBA.

Noise is generally defined as unwanted or excessive sound, which can vary in intensity by over one million times within the range of human hearing; therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity. Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks, and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates (is reduced) at a rate between 3.0 dBA and 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. Hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance. Noise generated by stationary sources typically attenuates at a rate between 6.0 dBA and about 7.5 dBA per doubling of distance.

There are a number of metrics used to characterize community noise exposure, which fluctuate constantly over time. One such metric, the equivalent sound level (L_{eq}), represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound. Noise exposure over a longer period of time is often evaluated based on the Day-Night Sound Level (L_{dn}). This is a measure of 24-hour noise levels that incorporates a 10-dBA penalty for sounds occurring between 10:00 p.m. and 7:00 a.m. The penalty is intended to reflect the increased human sensitivity to noises occurring during nighttime hours, particularly at times when people are sleeping and there are lower ambient noise conditions. Typical L_{dn} noise levels for light and medium density residential areas range from 55 dBA to 65 dBA.

REGULATORY FRAMEWORK

State of California Guidelines

<u>California Code of Regulations</u>

Title 24 of the California Code of Regulations codifies Sound Transmission Control requirements, which establishes uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 24 states that interior noise levels attributable to exterior sources shall not exceed 45 dBA CNEL in any habitable room of new dwellings. Dwellings are to be designed so that interior noise levels will meet this standard for at least ten years from the time of building permit application.

University of California Riverside

<u>Long Range Development Plan</u>

The UCR LRDP provides a general guide that discusses future land use patterns and development of facilities, roads, open space, and infrastructure. The planning strategies and programs and practices that are applicable to noise include the following:

LRDP Planning Strategies:

Campus and Community

1. *Provide sensitive land use transitions and landscaped buffers where residential neighborhoods might experience noise or light from UCR activities.*

Open Space

4. *Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive, and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.*

LRDP Programs and Practices:

PP 4.10-1(a) UCR will incorporate the following siting design measures to reduce long-term noise impacts:

(i) Truck access, parking area design, and air conditioning/refrigeration units will be designed and evaluated when planning specific individual new facilities to minimize the potential for noise impacts to adjacent developments.

(ii) Building setbacks, building design and orientation will be used to reduce intrusive noise at sensitive student residential and educational building locations near main campus access routes, such as Blaine Street, Canyon Crest Drive, University Avenue, and Martin Luther King Jr. Boulevard. Noise walls may be advisable to screen existing and proposed facilities located near the I-215/SR-60 freeway.

(iii) Adequate acoustic insulation would be added to residence halls to ensure that the interior Ldn would not exceed 45 dBA during the daytime and 40 dBA during the nighttime (10 P.M. to 7 A.M.) in rooms facing major streets.

(iv) Potential noise impacts would be evaluated as part of the design review for all projects. If determined to be significant, mitigation measures would be identified and alternatives suggested. At a minimum, campus residence halls and student housing design would comply with Title 24, Part 2 of the California Administrative Code.

PP 4.10-2 The UCR campus shall limit the hours of exterior construction activities from 7:00 A.M. to 9:00 P.M. Monday through Friday and 8:00 A.M. to 6:00 P.M. on Saturday when necessary. Construction traffic shall follow transportation routes prescribed for all construction traffic to minimize the impact of this traffic (including noise impacts) on the surrounding community.

PP 4.10-7(a) To the extent feasible, construction activities shall be limited to 7:00 A.M. to 9:00 P.M. Monday through Friday, 8:00 A.M. to 6:00 P.M. on Saturday, and no construction on Sunday and national holidays, as appropriate, in order to minimize disruption to area residences surrounding the campus and to on campus uses that are sensitive to noise.

PP 4.10-7(b) The Campus shall continue to require by contract specifications that construction equipment be required to be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.

PP 4.10-7(c) The Campus shall continue to require that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.

PP 4.10-7(d) The Campus shall continue to conduct regular meetings, as needed, with on campus constituents to provide advance notice of construction activities in order to coordinate these activities with the academic calendar, scheduled events, and other situations, as needed.

PP 4.10-8 The Campus shall continue to conduct meetings, as needed, with off-campus constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the *particular construction project and of those impacted by construction noise are met, to the extent feasible.*

PP 4.14-2 *The Campus will periodically assess construction schedules of major projects to determine the potential for overlapping construction activities to result in periods of heavy construction vehicle traffic on individual roadway segments, and adjust construction schedules, work hours, or access routes to the extent feasible to reduce construction-related traffic congestion.*

PP 4.14-6 *For any construction-related closure of pedestrian routes, the Campus shall provide alternate routes and appropriate signage and provide curb cuts and street crossings to assure alternate routes are accessible.*

PP 4.14-8 *To maintain adequate access for emergency vehicles when construction projects would result in roadway closures, the Office of Design and Construction shall consult with the UCPD, EH&S, and the RFD to disclose roadway closures and identify alternative travel routes. (This is identical to Hazards and Hazardous Materials PP 4.7-7(b).)*

EXISTING CONDITIONS

Stationary Sources

The project area is located within an urbanized area on the UCR campus. The primary sources of stationary noise in the project vicinity are urban-related activities (i.e., mechanical equipment, parking areas, and pedestrians). The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

Mobile Sources

The existing mobile noise sources in the project area are primarily generated from vehicles along I-215/SR-60 and University Avenue.

a) ***Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR determined that implementation of the LRDP would result in the development of new buildings and facilities on the UCR campus and corresponding population increase, which would generate increased traffic noise levels. The LRDP EIR determined that implementation of the relevant LRDP Planning Strategy would reduce roadway noise levels measured at locations on campus and implementation of the LRDP Programs and Practices would reduce impacts associated with construction and building siting and design. The LRDP EIR concluded that the implementation of the LRDP would not result in the exposure of persons to or generation of noise levels in excess of established standards. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would not generate increased traffic and traffic-related noise levels above levels analyzed in the LRDP EIR. However, the LRDP Amendment 2 EIR determined that the redistribution of traffic associated with the LRDP Amendment 2 could result in increased traffic noise at certain locations. The remaining elements of the proposed LRDP Amendment 2 are programmatic in nature and would not generate increased traffic and traffic-related noise levels. The LRDP Amendment 2 EIR determined that the relevant LRDP Planning Strategy would be implemented as applicable if specific noise analysis for the LRDP Amendment 2 determined the need to implement landscaped buffers or setbacks. In addition, the LRDP Amendment 2 EIR determined that with implementation of the LRDP Programs and Practices, impacts associated with construction and building siting and design would be below the significance threshold. The LRDP Amendment 2 EIR determined that if a proposed specific project implementing the LRDP Amendment 2 has a potential to exceed the significance threshold, the UCR campus would implement a relevant Planning Strategy and Program and Practice to further ensure a less than significant impact. Therefore, implementation of the LRDP Amendment 2 would not result in the exposure of persons to or generation of noise levels in excess of established standards. Impacts in this regard were determined to be less than significant.

Short-Term Construction

Construction activities generally are temporary and have a short duration, resulting in periodic increases in the ambient noise environment. Construction of the proposed project would occur over approximately five months and would include demolition, grading, and paving. Ground-borne noise and other types of construction-related noise impacts would typically occur during the initial construction phases. These phases of construction have the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 4.12-1, *Maximum Noise Levels Generated by Construction Equipment*. It should be noted that the noise levels identified in Table 4.12-1 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 4.12-1
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Acoustical Use Factor[1]	L_{max} at 50 Feet (dBA)
Concrete Saw	20	90
Crane	16	81
Concrete Mixer Truck	40	79
Backhoe	40	78
Dozer	40	82
Excavator	40	81
Forklift	40	78
Paver	50	77
Roller	20	80
Tractor	40	84
Water Truck	40	80
Grader	40	85
General Industrial Equipment	50	85

Note:
1. Acoustical use factor (percent) - Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Pursuant to the LRDP Programs and Practices, all construction activities would only occur between the hours of 7:00 a.m. and 9:00 p.m., Monday through Friday, and 8:00 a.m. and 6:00 p.m. on Saturday. Construction activities are prohibited on Sundays and national holidays. These permitted hours of construction are required in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption. Implementation of the LRDP Programs and Practices (PP 4.10-7[a] through PP 4.10-7[d], and PP 4.10-8) would be required to be implemented by the proposed project. The project would be required to minimize impacts from construction noise as construction equipment would be equipped with properly operating and maintained mufflers and other state required noise attenuation devices, construction staging materials and equipment be placed away from sensitive receptors, and continued campus meetings to provide advanced notice and coordination of construction activities. Thus, no new or different impacts would result from the proposed project. A less than significant noise impact would result from construction activities.

Long-Term Operations

Off-Site Mobile Noise

According to the *Traffic Impact Analysis*, the proposed project would result in no new trips but a redistribution of 1,020 daily trips within the study area. As the proposed parking lot is intended to accommodate the existing parking demand from displaced parking supply resulting from the removal of existing parking spaces currently located on the main campus areas east of I-215/SR-60, the proposed project would not result in additional traffic on adjacent roadways and vehicular noise in the vicinity. As such, overall traffic volumes along University Avenue and I-215/SR-60 would remain the same, and would not result in a perceptible increase traffic noise levels. A less than significant impact would occur in this regard.

Stationary Source Noise

The project proposes additional surface parking within a reconfiguration of an existing parking lot. Stationary noise associated with the proposed project would include parking activities. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Estimates of the maximum noise levels associated with some parking lot activities are presented in Table 4.12-2, *Typical Noise Levels Generated by Parking Lots*. Conversations in parking areas may also be an annoyance to sensitive receptors, approximately 25 feet to the west (UCR Extension). Sound levels of speech typically range from 33 dBA at 48 feet for normal speech to 50 dBA at 50 feet for very loud speech.

Table 4.12-2
Typical Noise Levels Generated by Parking Lots

Noise Source	Maximum Noise Levels at 50 Feet from Source
Car door slamming	63 dBA Leq
Car starting	60 dBA Leq
Car idling	61 dBA Leq

It should be noted that parking lot noise are instantaneous noise levels compared to noise standards in the CNEL scale, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower than what is identified in Table 4.12-2. Parking lot noise would also be partially masked by background noise from traffic along I-215/SR-60 and University Avenue. Additionally, parking lot noise currently exists within the surface parking of Parking Lot 50, which surrounds the project site to the north, west, and south. Therefore, the proposed surface parking would not result in substantially greater noise levels than currently exist in the vicinity. Noise associated with parking lot activities is not anticipated to exceed the LRDP's Programs and Practices Noise Standards during operation. Thus, noise impacts from the new additional parking would be less than significant and no new or different impacts would result from the proposed project. Impacts in this regard are less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.10-7(a) To the extent feasible, construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday, 8:00 a.m. to 6:00 p.m. on Saturday, and no construction on Sunday and national holidays, as appropriate, in order to minimize disruption to area residences surrounding the campus and to on-campus uses that are sensitive to noise.
(LRDP EIR)

PP 4.10-7(b) The campus shall continue to require by contract specifications that construction equipment be required to be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
(LRDP EIR)

PP 4.10-7(c) The campus shall continue to require that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.
(LRDP EIR)

PP 4.10-7(d) The campus shall continue to conduct regular meetings, as needed, with on campus constituents to provide advance notice of construction activities in order to coordinate these activities with the academic calendar, scheduled events, and other situations, as needed.
(LRDP EIR)

PP 4.10-8 The campus shall continue to conduct meetings, as needed, with off-campus constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.
(LRDP EIR)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR identified that development under the LRDP could generate low levels of groundborne vibration. Based on information presented in the LRDP EIR, vibration levels from construction activities could reach up to 87 vibration decibels (VdB) at the buildings located within 25 feet of construction, exceeding the thresholds for each building type. Where construction occurs more than 50 feet from campus classroom buildings, office buildings, and student housing buildings, the impact would be less than significant. In order for construction activities to not potentially impact research buildings containing vibration-sensitive equipment, the activities would need to occur at least 300 feet from the sensitive building. However, even with implementation of the relevant LRDP Program and Practice, and LRDP EIR Mitigation Measure, it would not ensure that groundborne vibration would not exceed the identified thresholds of significance for sensitive buildings located in close proximity to the construction sites. Noise impacts exposing persons on campus to excessive groundborne vibration were determined to be significant and unavoidable. However, the LRDP EIR concluded that development under the LRDP would not expose excessive groundborne vibration to off-campus persons from construction and groundborne vibration to on- or off-campus receptors from operations. Impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the proposed Campus Reserve site's housing and open space that were not previously considered under the LRDP and construction of future projects in this area under the LRDP Amendment 2 could result in vibration levels that were not previously considered. Similar to the conclusion reached in the LRDP EIR, even with implementation of the relevant LRDP Program and Practice and the mitigation measure, it would not ensure that noise impacts exposing people on campus to groundborne vibration does not exceed the identified thresholds of significance for sensitive buildings located in close proximity to the construction sites. Thus, this impact was determined to remain significant and unavoidable. However, the LRDP Amendment 2 EIR ultimately determined that the LRDP Amendment 2 would not substantially change the nature or increase the magnitude of the impacts resulting from groundborne vibration to off-campus persons from construction and groundborne vibration to on- or off-campus receptors from operations, or the conclusions in the LRDP EIR. Less than significant impacts would occur in this regard.

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.20 inch/second) appears to be conservative. The types of construction vibration impact include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Typical vibration produced by construction equipment is illustrated in <u>Table 4.12-3</u>, <u>*Typical Vibration Levels for Construction Equipment*</u>.

Table 4.12-3
Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 25 feet (inches/second)	Approximate peak particle velocity at 50 feet (inches/second)
Large bulldozer	0.089	0.031
Loaded trucks	0.076	0.027
Small bulldozer	0.003	0.001
Jackhammer	0.035	0.012

Notes:
1. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2. Calculated using the following formula:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV (equip) = the peak particle velocity in inch per second of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in inch per second from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006.

Ground-borne vibration decreases rapidly with distance. As indicated in Table 4.12-3, based on the FTA data, vibration velocities from typical heavy construction equipment operations that would be used during project construction range from 0.003 to 0.089 inch-per-second peak particle velocity (PPV) at 25 feet from the source of activity, and would range from 0.001 to 0.031 inch-per-second PPV at 50 feet. With regard to the proposed project, groundborne vibration would be generated primarily during grading activities on-site and by off-site haul-truck travel. The nearest sensitive receptors are institutional uses to the west (UCR Extension) located approximately 25 feet from the project boundary. As noted in Table 4.12-3, vibration from construction activities experienced at the nearest sensitive receptors (institutional uses to the west) would be below the 0.20 inch-per-second PPV significance threshold. The project would also be required to implement LRDP Program and Practice PP 4.10-2 to limit hours of construction. In addition, LRDP EIR Mitigation Measure MM 4.10-2(a) would be required to be implemented by the proposed project in order for construction activities to not impact sensitive research buildings, activities would need to occur at least 300 feet from sensitive buildings. With implementation of the LRDP Program and Practice and Mitigation Measure, vibration impacts from construction activities would be further reduced. No new or different impacts would result from the proposed project. As vibration from construction activities experienced at the nearest sensitive receptors would be below the 0.20 inch-per-second PPV significance threshold, a less than significant impact would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices:

PP 4.10-2 The UCR campus shall limit the hours of exterior construction activities from 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday when necessary. Construction traffic shall follow transportation routes prescribed for all construction traffic to minimize the impact of this traffic (including noise impacts) on the surrounding community.

Applicable LRDP EIR Mitigation Measures:

MM 4.10-2(a) The campus shall notify all academic and residential facilities within 300 feet of approved construction sites of the planned schedule of vibration causing activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research.
(LRDP EIR)

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?***

Less Than Significant Impact. The LRDP EIR identified that development under the LRDP would result in the development of new buildings and facilities on the UCR campus and corresponding population increase, which would result in an increase in traffic-related noise levels. With the implementation of a LRDP Program and Practice, implementation of the LRDP would not generate increased local traffic volumes that cause a substantial permanent on- or off campus increase in ambient noise levels in the project vicinity during the regular session. Less than significant impacts would occur in this regard. The LRDP EIR determined that the LRDP would not cause a substantial permanent increase in ambient noise levels due to HVAC equipment with implementation of relevant LRDP Planning Strategies and a Program and Practice. Impacts in this regard were determined to be less than significant.

As previously discussed in Impact Statement 4.12(a), “Long-Term Operations”, the LRDP Amendment 2 EIR determined that the impact of the proposed land use changes would not generate increased local traffic volumes that cause a substantial permanent on- or off-campus increase in ambient noise levels. Implementation of a LRDP Program and Practice ensured that impacts in this regard were less than significant. Additionally, the LRDP Amendment 2 EIR identified that the campus would continue to implement relevant LRDP Planning Strategies and a Program and Practice to reduce potential impacts associated with new stationary noise sources generated on campus and heard at off-campus locations. With implementation of relevant Planning Strategies and a Program and Practice, impacts were determined to be less than significant.

As discussed in Impact Statement 4.12(a), “Long-Term Operations”, the proposed project would construct additional surface parking and would not result in a substantial increase in noise levels from traffic noise impacts and stationary source noise impacts. Therefore, implementation of the proposed project would result in less than significant impacts in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR concluded that implementation of the LRDP would result in construction activities and resulting construction noise that could affect noise levels for on campus and off-campus locations. Based on historic trends at the campus, there could be an average of between two to four building projects under construction at one time. When construction is completed at one location, other buildings could be constructed or renovated. As these activities would not occur at a single location over the planning horizon of the LRDP (that would affect the same receptors), these construction-related noise impacts are considered temporary. Even with implementation of LRDP Programs and Practices that would minimize construction noise impacts to on campus and off-campus locations, it would not ensure that construction noise levels do not increase by less than 10 dBA at noise sensitive uses located in close proximity to the construction sites. Therefore, the LRDP EIR concluded that the development under the LRDP would result in a substantial periodic increase in ambient noise levels in the project vicinity above existing levels for on campus and off campus locations. Impacts in this regard would be significant and unavoidable. However, the LRDP EIR determined that the implementation of LRDP would not result in substantial temporary or periodic increases in ambient noise levels due to special events. Impacts in this regard are less than significant.

The LRDP Amendment 2 EIR determined that the impact of the proposed land use changes related to temporary or periodic increases in ambient noise levels for on-campus and off-campus locations due to construction noise for the LRDP Amendment 2 would exceed the significance conclusion reached in the LRDP EIR and would be significant, despite implementation of LRDP Programs and Practices. The LRDP Amendment 2 EIR concluded that the impact of the proposed land use changes would not result in substantial temporary or periodic increases in ambient noise levels due to special events. Impacts in this regard were determined to be less than significant.

As discussed in Impact Statements 4.12(a) and 4.12(b) above, the proposed project would demolish the existing on-site structures and construct additional surface parking, which would result in an increase in temporary or periodic noise levels from construction noise impacts. Implementation of LRDP Programs and Practices (PP 4.10-2, PP 4.10-7[a] through PP 4.10-7[d], and PP 4.10-8) would be required to be implemented by the proposed project to minimize construction noise impacts through construction timing limitations, construction equipment with properly operating and maintained mufflers, construction staging materials and equipment directed away from sensitive receptors, and providing advance notice of construction activities. Further, LRDP EIR Mitigation Measure MM 4.10-2(a) would also be required to be implemented to ensure construction activities do not impact sensitive research buildings as activities would need to occur at least 300 feet from sensitive buildings. Therefore, with implementation of LRDP Programs and Practices and Mitigation Measure, implementation of the proposed project would result in less than significant impacts in this regard and no new or different impacts would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: Refer to PP 4.10-2, PP 4.10-7(a) through PP 4.10-7(d), and PP 4.10-8.

Applicable LRDP EIR Mitigation Measures: Refer to LRDP EIR Mitigation Measure MM 4.10-2(a).

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that the UCR campus is not located within an airport land use plan study area, or within two miles of a public airport or public use airport. No impacts would result in this regard.

The nearest airports to the project site is the Flabob Airport, located approximately 3.8 miles to the northwest, and March Air Reserve Base, which is located approximately 6.5 miles to the southeast. The project site is not located within the airport land use compatibility plan for either the Flabob Airport or the March Air Reserve Base.[1,2] Thus, project implementation would not result in excessive noise levels for people residing or working in the project area. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

f) ***For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR determined that the UCR campus is not located within the vicinity of a private airstrip. No impacts would occur in this regard.

Currently, there are no private airstrips located within the vicinity of the proposed project. Therefore, project implementation would not result in an excessive noise levels for people residing or working in the project area, and no impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

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[1] Riverside County Airport Land Use Commission, *Riverside County Airport Land Use Compatibility Plan Policy Document*, adopted December 2004.

[2] Riverside County Airport Land Use Commission, *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan,* November 13, 2014.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

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4.13 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?					✓
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?					✓
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?					✓

a) ***Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would directly induce substantial population growth in the area by proposing increased enrollment and additional employment, although this increase would not result in population or housing effects that would lead to a significant impact on the environment. With implementation of the relevant LRDP Planning Strategies, this impact would be less than significant.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2 would result in the growth of the campus population which could induce growth in the surrounding area such as the City of Riverside. The City of Riverside and other local and regional planning agencies are aware of the projected population growth on the campus and the growth is accounted for in planning documents. In addition, housing for at least 50 percent of the student population is planned to be provided on the campus, reducing the impact on the City of Riverside and other areas. The analysis in the LRDP Amendment 2 EIR determined that there is adequate vacant housing in the City of Riverside to accommodate demand under the LRDP Amendment 2. Furthermore, continued implementation of LRDP Planning Strategy Land Use 4 as part of the LRDP Amendment 2 would reduce impacts from the increase in campus population to a less than significant impact. Thus, campus development under the LRDP Amendment 2 would have a less than significant impact related to population growth.

Project implementation involves demolition of the existing vacant Highlander Hall and Human Resources Building and paving for additional surface parking. Project implementation would not create new population to the campus or nearby communities. Therefore, project implementation would not induce substantial population growth in the area, either directly or indirectly. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?***

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP and LRDP Amendment 2 would result in an increased demand for housing. Campus development would under the LRDP would result in the growth of campus population, including students, staff, and faculty. The City of Riverside and other local and regional planning agencies are aware of the project population growth on the UCR campus. The staff and faculty housing demand would be met within the City of Riverside, as the housing demand does not exceed the projected supply. The LRDP proposed to replace any demolished on-campus housing with additional housing and provide housing for any displaced residents. Therefore, implementation of the LRDP and LRDP Amendment 2 were determined to have a less than significant impact on existing housing stock and displacement of existing housing.

Project implementation involves the demolition of the existing vacant office uses and paving for additional surface parking. The project would not displace existing housing, nor necessitate the construction of replacement housing elsewhere. Therefore, no impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?***

No Impact. Refer to Responses 4.13(a) and 4.13(b).

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.14 PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:					
1) Fire protection?					✓
2) Police protection?					✓
3) Schools?					✓
4) Parks?					✓
5) Other public facilities?					✓

a) ***Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:***

1) Fire protection?

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in the increase in occupied building space and the campus population, which would increase demands on the fire protection services, resulting in the potential for increased response times, fire flow requirements, fire prevention and suppression services and require additional domestic water service to assure adequate fire flow. With implementation of LRDP Planning Strategy and Programs and Practices, the LRDP EIR determined that implementation of the LRDP would not cause substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts. Impacts in this regard were concluded to be less than significant.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would increase the demand for fire prevention and suppression services and require additional domestic water service to assure adequate fire flow. The City of Riverside Fire Department (RFD) indicated that with the implementation of LRDP Amendment 2, they would not be able to meet their response time standard from Fire Station No. 4. In order to meet national standards for fire and life safety services, the RFD indicated that construction of a new fire station near the UCR campus would be necessary. The LRDP Amendment 2 EIR determined that although the addition of the new fire station is needed, the construction of a new fire station is not expected to result in significant environmental impacts as mitigation would require UCR to pay its proportional share of the cost of the environmental mitigation.

The RFD in conjunction with UCR Environmental Health & Safety (EH&S) currently provides fire services for the project site. There are 14 fire stations that serve the City. RFD Fire Station 4 is the nearest fire station to the project site, located at 3510 Cranford Avenue, approximately 0.5 mile to the northwest.[1] The proposed project would result in the demolition of the former Highlander Hall and Human Resources Building and the paving of additional surface parking. The modified surface parking lot would serve existing UCR campus operations and would not directly increase the number of students or faculty utilizing the site. The proposed project is not expected to result in the construction of new or physically altered fire facilities, the construction of which could cause significant environmental impacts. The existing vacant structures currently present a potential for structural fires on-site. The Human Resources Building experienced a structure fire in February 2015. Implementation of the project would demolish existing on-site structures, such that structural fires would no longer be a concern. Further, the proposed project would reduce fire service calls on-site as all building structures would be removed. No impacts (or reduced impacts) would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

2) Police protection?

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in the increase in occupied building space and the campus population, which would increase demands on the police protection services, resulting in the potential for increased response times. With implementation of LRDP Planning Strategy and Programs and Practices, implementation of the LRDP would not result in significant impacts associated with the provision of new or altered police protection facilities to maintain applicable service levels, and impacts would be less than significant in this regard.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would increase the demand the overall population on campus as employees who would occupy the medical office building space in the medical school and School of Medicine (SOM) visitors were not previously considered in the LRDP EIR. The increase in on-campus building space, and the increase in the on-campus population, would increase the demand for police services that could potentially affect police response times. With implementation of LRDP Planning Strategy and Programs and Practices, implementation of the LRDP Amendment 2 would not result in significant environmental impacts associated with the provision of new or altered police protection facilities to maintain applicable service levels and impacts in this regard would be less than significant.

[1] City of Riverside, *Fire Stations,* http://www.riversideca.gov/fire/stations.asp, accessed March 11, 2015.

The UCR Police Department provides law enforcement services to the UCR campus, including the project site. The UCR Police Department is located at 3500 Canyon Crest Drive, approximately 0.37 miles northeast of the project site. As stated, the proposed surface parking lot would serve UCR campus operations and would not directly increase the number of students or faculty utilizing the site. The nature of operations at the UCR campus is not expected to change and therefore, would not substantially increase the need for police protection services. Project implementation is not expected to require new or physically altered police protection facilities, the construction of which could cause significant environmental impacts. The existing vacant structures currently present general safety issues and loitering concerns. Implementation of the proposed project would demolish existing on-site structures and as such, safety issues would no longer be a concern and would reduce police protection service calls to the site. As implementation of the proposed project would reduce police protection services to the project site, no impacts (or reduced impacts) would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

3) Schools?

No Impact. The LRDP EIR concluded that implementation of the LRDP would result in an increase in the number of student families living on campus and increase the number of faculty and staff employed by UCR, which would increase the potential number of school-age children in local school districts. The addition of new students to the Riverside Unified School District (RUSD) resulting from the LRDP would increase demands at existing schools. As implementation of the LRDP would result in an increase in the number of students attending RUSD schools, new development of private residential and commercial projects in the City would be subject to school impact fees. In addition, the RUSD may increase capacity by using a variety of planning options such as providing new or temporary classrooms to existing schools to accommodate new students in addition to those generated by the development of the LRDP. The LRDP EIR determined that the LRDP would not have a significant environmental impact associated with the provision of new or altered school facilities and impacts in this regard were determined to be less than significant.

The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would increase the overall population on campus as families of employees who would occupy the SOM medical building were not previously considered in the LRDP EIR. Although the implementation of the proposed LRDP Amendment 2 would result in new students in the City of Riverside and surrounding areas, funds would be available from private residential and commercial development to pay for new facilities. The LRDP Amendment 2 EIR determined that the proposed LRDP Amendment 2 would not result in substantial adverse physical impacts associated with the provision of new or altered school facilities. Impacts in this regard were determined to be less than significant.

Project implementation involves the demolition of the former Highlander Hall and Human Resources Building and the construction of additional surface parking. Project implementation would not create new population to the campus or nearby communities. Therefore, project implementation is not expected to increase the use of existing schools and would not require new or physically altered school facilities, the construction of which could cause significant environmental impacts, as no population increase would result from the proposed project. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4) Parks?

No Impact. Refer to Response 4.15(b).

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

5) Other public facilities?

No Impact. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would result in less than significant impacts associated with the provision of new or altered library facilities to meet demand for library services, as expanded library services would be available on campus.

The proposed project would result in the demolition of the vacant on-site structures and paving for additional surface parking. Implementation of the proposed project would not create any new population to the campus or nearby communities. Therefore, project implementation would not increase the use of existing library facilities, and would not require new or physically altered library facilities, the construction of which could cause significant environmental impacts, as no population increase would result from the proposed project. Thus, no impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

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4.15 RECREATION

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?					✓
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?					✓

a) ***Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?***

No Impact. The LRDP EIR determined that the development of the LRDP would result in the growth of campus population, including students, staff, and faculty which would increase demand for recreational facilities. The LRDP would provide recreational space and parks on the campus. The staff and faculty would be distributed through the area and would not result in substantial increase in demand for park and recreation facilities within any one jurisdiction. The continued implementation of an LRDP Planning Strategy to provide neighborhood park facilities in family housing areas as part of the LRDP would minimize the impact from demand for recreational facilities. With implementation of the LRDP Planning Strategy, the LRDP EIR concluded that less than significant impacts would occur regarding an increase in the use of existing neighborhood parks, regional parks, or other recreational facilities such that substantial physical deterioration of facilities would occur or be accelerated.

The LRDP Amendment 2 EIR concluded that implementation of the proposed LRDP Amendment 2 would not change the significance of any impacts identified in the LRDP EIR regarding an increase in the use of existing neighborhood parks, regional parks, or other recreational facilities.

Project implementation involves demolition of the existing vacant Highlander Hall and Human Resources Building and the paving for additional surface parking. Project implementation would not directly add any new population to the campus or nearby communities. Therefore, project implementation would not increase the use of existing neighborhood parks, regional parks, or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. No impacts would occur in this regard.

Applicable LRDP PIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP PIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?***

No Impact. The LRDP EIR concluded that less than significant impacts would occur regarding construction or expansion of recreational facilities, which might have an adverse physical effect on the environment. Development of the campus under the LRDP would result in the construction of additional recreational facilities. The physical impacts of construction would be reduced with continued implementation of the LRDP Planning Strategies and Programs and Practices as well as LRDP EIR Mitigation Measures. The LRDP would displace some recreational facilities on-campus but the loss would be offset by the increased recreational opportunities elsewhere on the campus. Therefore, LRDP EIR determined that campus development under the LRDP would have a less than significant impact related to construction of recreational facilities and conversion of existing recreational facilities.

The LRDP Amendment 2 EIR concluded that the implementation of LRDP Amendment 2 would not change the significance of any impacts identified in the LRDP EIR associated with the construction or conversion of recreation facilities.

The proposed project does not include recreational facilities or require the construction or expansion of recreational facilities, as no population increase would result from the proposed project. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.16 TRANSPORTATION/TRAFFIC

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?		✓			
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?					✓
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?					✓
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		✓			
e. Result in inadequate emergency access?		✓			
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				✓	

This section is based upon the *UCR Highlander Hall Demolition & Parking Lot Project Traffic Impact Analysis* (Traffic Impact Analysis) prepared by Michael Baker International (revised April 16, 2015); refer to Appendix 8.3, *Traffic Impact Analysis*. The purpose of the Traffic Impact Analysis is to evaluate potential project impacts related to traffic and circulation in the vicinity of the project site. The evaluation considers impacts on local intersections and regional transportation facilities. The following analysis scenarios are evaluated in this section:

- Existing Conditions; and
- Forecast Existing Plus Project Conditions (Project Completion).

STUDY AREA

Based on discussions with UCR staff, the Traffic Impact Analysis considered seven signalized study intersections; refer to Exhibit 4.16-1, *Study Intersection Locations*. These study intersections are located in the vicinity of the project site and are based upon the roadways forecast to be experience changes in traffic patterns as a result of the proposed project. The study intersections include the following:

- Iowa Avenue at University Avenue;
- University Village at University Avenue;
- I-215 Southbound/SR-60 Eastbound Ramps at University Avenue;
- I-215 Northbound/SR-60 Westbound Ramps at University Avenue;
- West Campus Drive at University Avenue;
- Iowa Avenue at Everton Place; and
- Project Driveway at Everton Place.

ANALYSIS METHODOLOGY

Intersection Analysis Methodology

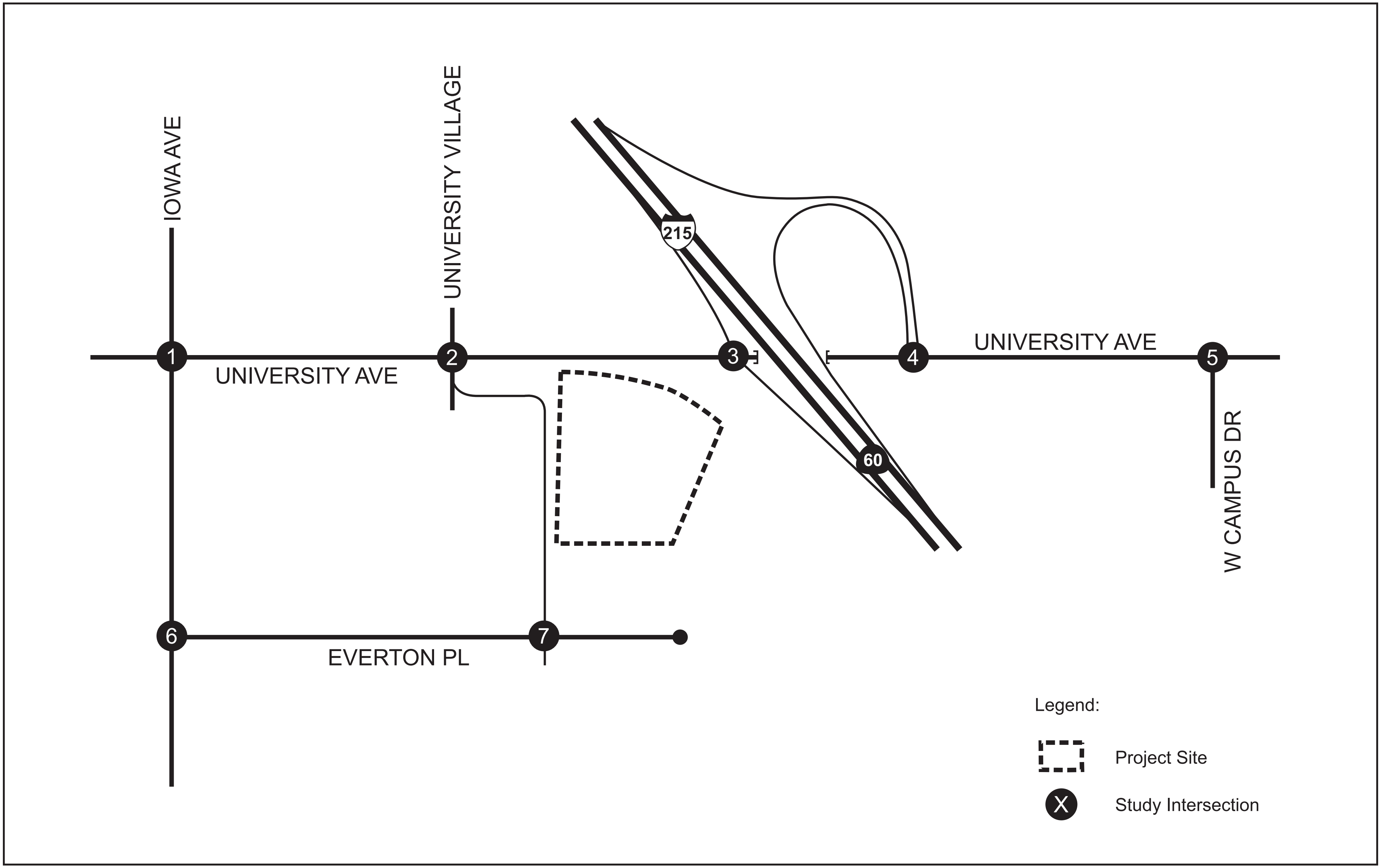
Level of service (LOS) is commonly used as a qualitative description of intersection operation and is based on the capacity of the intersection and the volume of traffic using the intersection. The Highway Capacity Manual (HCM) analysis methodology is utilized to determine the operating LOS of the study intersections. The 2010 HCM analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding ranges of stopped delay experienced per vehicle for signalized and unsignalized intersections shown in Table 4.16-1, *LOS and Delay Ranges*.

Table 4.16-1
LOS and Delay Ranges

LOS	Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	< 10.0	≤ 0.60
B	> 10.0 to < 20.0	0.61 to ≤ 0.70
C	> 20.0 to < 35.0	0.71 to ≤ 0.80
D	> 35.0 to < 55.0	0.81 to ≤ 0.90
E	> 55.0 to < 80.0	0.91 to ≤ 1.00
F	> 80.0	> 1.00

Source: *2010 Highway Capacity Manual.*

Level of service is based on the average stopped delay per vehicle for all movements of signalized intersections and all-way stop-controlled intersections; for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.



NOT TO SCALE

Michael Baker INTERNATIONAL

09/15 • JN 144698

HIGHLANDER HALL DEMOLITION PROJECT
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Study Intersection Locations

Exhibit 4.16-1

Thresholds of Significance and Performance Criteria

The thresholds of significance utilized in this study are consistent with the LRDP Amendment 2 EIR. For study intersections under the jurisdiction of the City of Riverside, a significant impact occurs when the addition of project-related trips causes the peak hour delay to increase as depicted in Table 4.16-2, *City of Riverside Thresholds of Significance*.

Table 4.16-2
City of Riverside Thresholds of Significance

LOS	Delay Threshold Criteria
A/B	By 10.0 seconds
LOS C	By 8.0 seconds
LOS D	By 5.0 seconds
LOS E	By 2.0 seconds
LOS F	By 1.0 seconds
Source: Michael Baker International, *UCR Highlander Hall Demolition & Parking Lot Project Traffic Impact Analysis*, April 16, 2015.	

For study intersections located within the University Campus, a significant impact occurs when the addition of project-related trips causes an intersection to operate at LOS E or F, regardless of the amount of project-related trips that travel through the intersection.

EXISTING ROADWAY SYSTEM

The characteristics of the roadway system in the vicinity of the project site are described below:

- *University Avenue* is a four-land divided roadway with a landscaped median west of I-215/SR-60 trending in an east-west direction. University Avenue transitions between a three-lane and two-lane undivided roadway east of I-215/SR-60. University Avenue provides on-street Class II bike lanes with pavement marking enhancements at intersections. The speed limit is 35 miles per hour on University Avenue within the project vicinity; on-street parking is prohibited.

- *Everton Place* is a two-lane undivided roadway trending in an east-west direction. There is no posted speed limit within the project vicinity; on-street parking is prohibited. Everton Place provides full access to the UCR Extension Center through a driveway at Everton Place.

- *Iowa Avenue* is a four-lane divided roadway trending in a north-south direction with a landscaped median north of University Avenue and a two-lane divided roadway with a continuous left-turn lane immediately south of University Avenue. The posted speed limit is 45 miles per hour on Iowa Avenue within the project vicinity; on-street parking is prohibited.

- *University Village* intersects University Avenue in a north-south direction and provides full access to the University Village shopping center north of University Avenue and full access to the UCR Extension Center south of University Avenue.

- *West Campus Drive* is a four-lane divided roadway with a landscaped median trending in a north-south direction. The posted speed limit is 25 miles per hour on West Campus Drive within the project vicinity; on-street parking is prohibited.

EXISTING TRAFFIC CONDITIONS

In order to determine the existing operation of the study intersections during the a.m. and p.m. peak periods, traffic movement counts for all study intersections were collected in January/ March 2015 during typical weekday conditions when school was in session. The a.m. peak period intersection counts were collected from 7:00 a.m. to 9:00 a.m. and the p.m. peak period intersection counts were collected from 4:00 p.m. to 6:00 p.m. The traffic volumes used in the Traffic Impact Analysis were taken from the highest hour within the two-hour peak period counted. Detailed study intersection traffic count data sheets are contained within the Traffic Impact Analysis (provided as Appendix 8.3).

Exhibit 4, *Existing Conditions AM & PM Peak Hour Study Intersection Volumes*, of the Traffic Impact Analysis (provided as Appendix 8.3), shows existing conditions a.m. and p.m. peak hour volumes at the study intersections.

Existing Conditions Peak Hour Intersection Level of Service

Table 4.16-3, *Existing Conditions AM and PM Peak Hour Intersection LOS*, summarizes existing conditions a.m. and p.m. peak hour LOS of the study intersections.

Table 4.16-3
Existing Conditions AM and PM Peak Hour Intersection LOS

Study Intersection		Existing Conditions (V/C – LOS)	
		AM Peak Hour	PM Peak Hour
1	Iowa Ave/University Avenue	31.1 – C	40.7 – D
2	University Village/University Avenue	19.0 – B	16.1 – B
3	I-215 SB Ramps (SR-60 EB)/University Avenue	17.5 – B	16.4 – B
4	I-215 NB Ramps (SR-60 WB)/University Avenue	15.2 – B	28.4 – C
5	West Campus Drive/University Avenue	18.5 – B	18.8 – B
6	Iowa Avenue/Everton Place	13.8 – B	31.3 – D
7	Project Driveway/Everton Place	10.0 – B	9.7 – A

Notes: Delay shown in seconds; SB = Southbound; NB = Northbound; EB = Eastbound; WB = Westbound.
Bold text indicates a deficient LOS.
Source: Michael Baker International, *UCR Highlander Hall Demolition & Parking Lot Project Traffic Impact Analysis*, April 16, 2015.

As shown in Table 4.16-3, the study intersections are currently operating at an acceptable LOS (LOS D or better).

a) ***Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to***

intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR determined that implementation of the LRDP would result in additional vehicular trips, which would increase traffic volumes and degrade intersection levels of service. Even with implementation of the relevant LRDP Planning Strategies and Program and Practice as well as LRDP EIR Mitigation Measures, this impact remained significant and unavoidable. The LRDP EIR also determined that implementation of the LRDP would result in the generation of construction-related vehicle trips, which could temporarily impact traffic conditions along roadway segments and at individual intersections. Even with implementation of the relevant Program and Practice, this impact remained significant and unavoidable.

The LRDP Amendment 2 EIR concluded that implementation of the LRDP Amendment 2, which includes relevant LRDP Planning Strategies and a Program and Practice, would result in additional vehicular trips, which would increase traffic volumes and degrade intersection levels of service. These impacts were determined to be significant and unavoidable. The LRDP Amendment 2 EIR also determined that implementation of the LRDP Amendment 2, which includes a relevant Program and Practice, would result in the generation of construction-related vehicle trips, which would temporarily impact traffic conditions along roadway segments and at individual intersections. The impact was determined to be significant and unavoidable.

Project-related impacts on the surrounding roadway system are analyzed below.

Project Trip Generation

The proposed project would not generate “new” trips in relation to UCR operations since the proposed parking lot is intended to accommodate the existing parking demand of displaced parking supply resulting from the removal of existing parking spaces currently located on the main campus areas east of I-215/SR-60. The proposed project is not associated with an increase in land uses or student enrollment. Therefore, this analysis considers the redistribution of vehicle trips that would change their destination from the main campus parking areas east of I-215/SR-60 to the project site west of I-215/SR-60 as a result of the project.

Based on the Traffic Impact Analysis, the existing parking spaces at the project site would continue to serve UCR staff, employees, and students, and each parking space would continue to be utilized by an average of two vehicles during a typical academic day. Based on the maximum of 255 proposed parking spaces within the defined project boundaries (195 net new parking spaces), the proposed parking lot is forecast to be utilized by approximately 510 vehicles per day, or 1,020 two-way vehicle trips per day. It should be noted, this is a conservative trip generation forecast since the proposed conceptual parking lot configuration would remove some existing parking spaces; therefore, the net increase would only be 195 additional parking spaces.

The peak hour percentages of forecast trips, as well as the inbound/outbound projections, are estimated based on 24-hour traffic counts collected at the two existing primary entrances to the project site; detailed 24-hour traffic count data is contained in <u>Appendix 8.3</u>. Based on the traffic count data collected, both the a.m. peak hour and p.m. peak hour are approximately 11-percent of the daily trips currently accessing the project site. It should be noted that the traffic counts account for trips associated with trips created within the project boundary, as well as trips associated with the adjacent, contiguous portions of Parking Lot 50.

Table 4.16-4, *Existing Project-Related Trips Forecast to be Redistributed Within the Study Area*, shows the existing trips forecast to be redistributed within the study area.

Table 4.16-4
Existing Project-Related Trips Forecast to be Redistributed Within the Study Area

Proposed Project	AM Peak Hour Trip Generation			PM Peak Hour Trip Generation			Daily Trip Generation
	In	Out	Total	In	Out	Total	
255 parking spaces	83	29	112	19	93	112	1,020

Notes:
1. Based on the percentage of trips occurring during the a.m. peak hour and p.m. peak hour compared to the total over 24-hours surveyed at the two primary entrances to Highlander Hall parking area.
2. Based on an average of two vehicles utilizing each parking space per day (four trips).

Source: Michael Baker International, UCR Highlander Hall Demolition & Parking Lot Project Traffic Impact Analysis, April 16, 2015.

As shown in Table 4.16-4, the proposed project is forecast to result in 1,020 daily trips being redistributed within the study area, including 112 redistributed trips during the a.m. peak hour and 112 redistributed trips during the p.m. peak hour.

Forecast Trip Distribution

Exhibit 7, *Forecast Project Trip Redistribution Patterns*, of the Traffic Impact Analysis (provided as Appendix 8.3), shows the forecast trip redistribution patterns of the proposed project. Exhibit 8, *Existing Trip Distribution Patterns*, of the Traffic Impact Analysis (provided as Appendix 8.3), shows the estimated trip redistribution patterns of existing trips forecast to be redistributed based on review of existing traffic data in the study area.

Forecast Trip Assignment

Exhibit 9, *Forecast Project-Related Redistributed AM & PM Peak Hour Study Intersection Volumes*, of the Traffic Impact Analysis (provided as Appendix 8.3), shows the corresponding forecast assignment of existing a.m. peak hour and p.m. peak hour trips forecast to be redistributed from the main campus parking areas east of I-215/SR-60 to the project site west of I-215/SR-60 based on the trip percent distributions shown in Exhibits 7 and 8 of the Traffic Impact Analysis (provided as Appendix 8.3).

Forecast Existing Plus Project Conditions

This section analyzes the potential traffic impact of the proposed project and corresponding project-related trip redistributions in comparison to existing traffic conditions.

Forecast Existing Plus Project Conditions Traffic Volumes

Exhibit 10, *Forecast Existing Plus Project Conditions AM & PM Peak Hour Study Intersection Volumes*, of the Traffic Impact Analysis (provided as Appendix 8.3), shows a.m. and p.m. peak hour volumes at the study intersections for forecast existing plus project conditions.

Forecast Existing Plus Project Conditions Intersection Peak Hour Level of Service

Table 4.16-5, *Forecast Existing Plus Project Conditions AM and PM Peak Hour Study Intersection LOS*, summarizes forecast existing plus project conditions a.m. and p.m. peak hour LOS of the study intersections.

Table 4.16-5
Forecast Existing Plus Project Conditions
AM and PM Peak Hour Study Intersection LOS

Study Intersection		Existing Conditions (Delay – LOS)		Forecast Existing Plus Project Conditions (Delay – LOS)		Change in Delay		Significant Impact?
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	
1	Iowa Ave/University Avenue	31.1 – C	40.7 – D	31.1 – C	40.7 – D	0.0	0.0	No
2	University Village/University Avenue	19.0 – B	16.1 – B	21.2 – C	17.3 – B	2.2	1.2	No
3	I-215 SB Ramps (SR-60 EB)/University Avenue	17.5 – B	16.4 – B	17.2 – B	15.6 – B	-0.3	-0.8	No
4	I-215 NB Ramps (SR-60 WB)/University Avenue	15.2 – B	28.4 – C	15.8 – B	27.6 – C	0.6	-0.8	No
5	West Campus Drive/University Avenue	18.5 – B	18.8 – B	18.0 – B	18.6 – B	-0.5	-0.2	No
6	Iowa Avenue/Everton Place	13.8 – B	31.3 – D	14.0 – B	32.8 – D	0.2	1.5	No

Notes: Delay shown in seconds; SB = Southbound; NB = Northbound; EB = Eastbound; WB = Westbound.
Bold text indicates a deficient LOS.
Source: Michael Baker International, *UCR Highlander Hall Demolition & Parking Lot Project Traffic Impact Analysis*, April 16, 2015.

As shown in Table 4.16-5, with the redistributed project trips, the study intersections are forecast to continue to operate at an acceptable LOS (LOS D or better) according to applicable performance criteria for forecast existing plus project conditions.

As also shown in Table 4.16-5, based on the established thresholds of significance, the addition of the proposed project is forecast to result in no significant impacts at the study intersections for forecast existing plus project conditions.

Conclusions

The proposed project is forecast to redistribute 1,020 daily trips, which includes approximately 112 net a.m. peak hour trips and approximately 112 net p.m. peak hour trips. Based on applicable agency-established thresholds of significance, the project-redistributed trips would not result in significant traffic impacts to the study area intersections. Further, LRDP Planning Strategies PS Land Use 7 and PS Transportation 6 would continue to be implemented on a campus-wide basis. As such, no new or different impacts would result and impacts in this regard would be less than significant; no mitigation measures are required.

Applicable LRDP EIR Planning Strategies:

PS Land Use 7 — Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate.

PS Transportation 6 — Implement parking management measures that may include:

- Restricted permit availability.
- Restricted permit mobility.
- Differential permit pricing.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?***

No Impact. The LRDP EIR determined that implementation of the LRDP would result in additional vehicular traffic volumes, which would exceed established service levels on roadways designated by the Riverside County Congestion Management Program (CMP). This impact was determined to be significant and unavoidable.

The LRDP Amendment 2 determined that implementation of the LRDP Amendment 2 would result in additional vehicular traffic volumes, which would exceed established service levels on roadways designated by the Riverside County CMP. These impacts were determined to be significant and unavoidable.

Implementation of the proposed project would result in the redistribution of trips within the project vicinity. No new trips would be generated as a result of the project. Redistributed trips would not occur along CMP facilities. Thus, the proposed project would not conflict with the Riverside County CMP. No impacts would result from the proposed project in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*

No Impact. The LRDP EIR and LRDP Amendment 2 EIR determined that implementation of the LRDP, and subsequent amendment, would not result in a change in air traffic patterns or an increase in air traffic levels.

The proposed project would demolish existing on-site structures and modify an existing surface parking lot to accommodate additional parking in support of existing UCR facilities. The project would not result in any change in air traffic patterns or traffic levels. No impact would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that implementation of the LRDP, and subsequent amendment, would not result in hazards due to design features or land use incompatibilities. With implementation of the relevant LRDP Planning Strategy and Program and Practice, the LRDP EIR and LRDP Amendment 2 EIR determined that these impacts would be less than significant. Short-term vehicular hazards due to closure of traffic lanes or roadway segments were also considered. The LRDP EIR and LRDP Amendment 2 EIR determined that with implementation of the relevant Programs and Practices, these impacts would be less than significant as well.

The proposed project is not anticipated to result in significant impacts related to hazardous design features. The proposed project would modify an existing surface parking lot to accommodate additional parking in support of existing UCR facilities. The existing access driveways to the surface parking lot would be maintained. Further, the project would be required to comply with LRDP Planning Strategy PP 4.14-4 regarding following the *University of California Riverside Campus Design Guidelines* (Campus Design Guidelines), dated 2007, relevant to parking and roadway design. Further, construction of the proposed project would not result in any lane closures. Thus, no new or different impacts would result in this regard. Less than significant impacts would occur.

Applicable LRDP EIR Planning Strategies:

PP 4.14-4 The campus shall provide design architects for roadway and parking improvements with the Campus Design Guidelines and instructions to implement those elements of the guidelines relevant to parking and roadway design.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***Result in inadequate emergency access?***

Project Impact Adequately Addressed in LRDP EIR. The LRDP EIR and LRDP Amendment 2 EIR concluded that emergency access would not be impaired. With implementation of the relevant LRDP Planning Strategy and Programs and Practices, these impacts were determined to be less than significant.

Implementation of the proposed project would not result in any modifications to the existing vehicular access driveways and would not result in any lane closures during construction. Thus, implementation of the proposed project would not result in inadequate emergency access. Refer to Response 4.8(g) pertaining to an analysis of impacts to designated evacuation assembly area(s) identified as part of the *University of California Riverside Emergency Operation Plan* (EOP) and the LRDP EIR Mitigation Measure 4.7-7(a). No new or different impacts would result in this regard and less than significant impacts would result.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: Refer to MM 4.7-7(a).

Project-Specific Mitigation Measures: No mitigation measures are required.

f) ***Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?***

Less Than Significant Impact. Transit impacts are considered significant if:

- A project or project-related mitigation disrupts existing transit services or facilities. This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters and impacts to transit operations from traffic improvements proposed or resulting from a project.
- A project interferes with planned transit services or facilities.
- A project creates demand for public transit services above the capacity which is provided, or planned.

Pedestrian impacts are considered significant if:

- A project interferes with existing or planned pedestrian routes.

The LRDP EIR and LRDP Amendment 2 EIR concluded that applicable policies, plans, or programs supporting alternative transportation would be consistent with proposed development. With implementation of the relevant LRDP Planning Strategies and Program and Practice, the LRDP EIR and LRDP Amendment 2 EIR concluded that these impacts would be less than significant. Further, impacts associated with an increase demand for public transit were also considered. The LRDP EIR and LRDP Amendment 2 EIR determined that with implementation of the relevant LRDP Planning Strategy and Program and Practice as well as LRDP EIR recommended mitigation, these potentially significant impacts were determined to be reduced to a less-than-significant level.

The project would not conflict with adopted policies, plans, or programs supporting alternative transportation. The proposed project would not result in any impacts to existing sidewalk areas, bus stop shelters, or bicycle facilities. Thus, impacts would be less than significant.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

4.17 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?					✓
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?					✓
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?					✓
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?		✓			
e. Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?					✓
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?[1]					✓
g. Comply with federal, state, and local statutes and regulations related to solid waste?[1]					✓
h. Require or result in the construction or expansion of electrical and natural gas facilities, which could cause significant environmental impacts?[1]					✓
i. Encourage the wasteful or inefficient use of energy?[1]		✓			

a) *Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*

No Impact. The LRDP EIR discussed that development of the LRDP would not exceed wastewater treatment requirements of the Santa Ana Regional Water Quality Control Board (SARWQCB). The LRDP EIR concluded that this impact would be less than significant.

[1] This threshold is not included in Appendix G and was added to address specific topical areas pertaining to LRDP's solid waste disposal needs, solid waste regulations, electrical and natural gas facilities, and energy use.

The LRDP Amendment 2 EIR concluded that there was adequate capacity to treat the additional flows from the campus that would occur as a result of the LRDP Amendment 2. The City of Riverside Regional Water Quality Control Plant (RRWQCP) is expected to continue to comply with wastewater treatment requirements of the SARWQCB. The LRDP Amendment 2 EIR concluded that this impact would be less than significant.

As the project site is currently developed, the Sewerage Systems Services Program and its Treatment Services unit, administered by the City of Riverside's Public Utility Department (RPU), collects, treats, and disposes of all wastewater generated within the City of Riverside (including the project site) and is responsible for compliance with State and Federal requirements governing the treatment and discharge of wastewater.

The proposed project would result in the demolition of the vacant Highlander Hall and Human Resources Building and paving for additional parking. Implementation of the proposed project would not increase the amount of wastewater leaving the site as, similar to existing conditions, no persons would occupy the project site. Thus, the project would not impact wastewater infrastructure serving the project site or surrounding area, and the project would not result in a violation of the existing requirements prescribed by the SARWQCB. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

b) ***Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would not require the construction of new or expanded water treatment facilities. With implementation of the relevant LRDP Planning Strategy and Programs and Practices, this impact was determined to be less than significant. However, development under the LRDP could require the construction of new or expanded wastewater conveyance and treatment systems. With implementation of the relevant LRDP Planning Strategy and LRDP EIR Mitigation Measures, the LRDP EIR determined that this potentially significant impact would be reduced to a less-than-significant level.

The LRDP Amendment 2 EIR stated that the LRDP Amendment 2 would generate an additional demand for water and would generate additional wastewater on the campus. However, implementation of relevant Programs and Practices would ensure that the construction of new or expanded water treatment facilities would not be required. Further, relevant Programs and Practices would also ensure that the construction and operation of the expanded wastewater treatment facilities necessary would not result in significant environmental impacts.

RPU has domestic water and wastewater infrastructure in place to serve the now vacant Highlander Hall and Human Resources Building currently on the project site. The proposed project would demolish the existing on-site structures and install paving for additional parking. The proposed project would not increase the water demand or generated wastewater at the project site, as no increase in population would occur compared to existing conditions. As the proposed project would reduce water demand and wastewater generation at the project site, no impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

c) ***Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?***

No Impact. The LRDP EIR concluded that implementation of the LRDP would not create runoff that would exceed the capacity of existing storm drain systems. With implementation of the relevant Programs and Practices, the LRDP determined that this impact would be less than significant.

Implementation of the LRDP Amendment 2 would require the construction of new stormwater drainage systems or the expansion of existing stormwater drainage systems. However, these improvements would not result in significant environmental effects. The LRDP Amendment 2 EIR determined that impacts in this regard would be less than significant.

As discussed in Response 4.9(e), implementation of the proposed project would not result in an increase in runoff leaving the property. Thus, the project would not require the construction of new storm water drainage facilities or expansion of existing facilities. No impacts would occur in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

d) ***Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?***

Project Impact Adequately Addressed in LRDP EIR. Development under the LRDP and LRDP Amendment 2 would generate an additional demands for water, but would not require new or expanded water supply entitlements or resources or result in the need for new or expanded entitlements. With implementation of the relevant LRDP Planning Strategy and Programs and Practices, these impacts were determined to be less than significant.

As discussed in Response 4.17(b), RPU has existing infrastructure in place to serve the now vacant Highlander Hall and Human Resources Building currently on the project site. The proposed project would result in the demolition of the existing on-site structures and paving for additional parking. Thus, the proposed project would not result in an increase in water demand at the project site. As irrigation of landscaping would continue, the proposed project would be required to comply with conservation requirements (Planning Strategy [PS] Conservation 5) and water reduction measures (Programs and Practices [PP] 4.15-1[b] and PP 4.15-1[c]). With implementation of the LRDP Planning Strategy and Programs and Practices, no new or different impacts would result from the proposed project, and less than significant impacts would result in this regard.

Applicable LRDP EIR Planning Strategies:

PS Conservation 5 — Continue to adhere to the conservation requirements of Title 24 of the California Code of Regulations and comply with any future conservation goals or programs enacted by the University of California.

Applicable LRDP EIR Programs and Practices:

PP 4.15-1(b) — To further reduce the campus' impact on domestic water resources, to the extent feasible, UCR will:

- (i) Install hot water recirculation devices (to reduce water waste).
- (ii) Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code).
- (iii) Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time.
- (iv) Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems.
- (iv) Prohibit using water as a means of cleaning impervious surfaces.
- (v) Install water-efficient irrigation equipment to local evaporation rates to maximize water savings for landscaping and retrofit existing systems over time.

(*This is identical to Hydrology PP 4.8-2(a).*)
(LRDP EIR)

PP 4.15-1(c) — The campus shall promptly detect and repair leaks in water and irrigation pipes.
(*This is identical to Hydrology PP 4.8-2(b).*)
(LRDP EIR)

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

e) ***Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?***

No Impact. Implementation of the LRDP and LRDP Amendment 2 would not increase wastewater generation such that treatment facilities would be inadequate to serve development under the LRDP and LRDP Amendment 2, or the provider's existing commitments. With implementation of the relevant LRDP Planning Strategy and Programs and Practices, these impacts were determined to be less than significant.

As discussed in Responses 4.17(a) and 4.17(b), RPU has infrastructure in place to serve the now vacant Highlander Hall and Human Resources Building currently on the project site. The proposed project would result in the demolition of existing on-site structures and paving for additional parking. Therefore, there would be no increase in generated wastewater at the project site compared to existing conditions and no increase to the capacity of wastewater infrastructure serving the project site and the surrounding area would be needed. No impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

f) ***Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?***

No Impact. Development under the LRDP and LRDP Amendment 2 would generate solid waste, but not enough to require the expansion of the permitted capacity of a regional landfill. These impacts were determined by the LRDP EIR and LRDP Amendment 2 EIR to be less than significant.

The proposed project would result in the demolition of the existing on-site vacant structures and paving for additional parking, such that there would be no increase in generated solid waste at the project site, compared to existing conditions. Additionally, UCR standard construction specifications require a minimum 95 percent diversion of construction and demolition waste from the landfill. Therefore, no impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

g) ***Comply with federal, state and local statutes and regulations related to solid waste?***

No Impact. Implementation of the LRDP and LRDP Amendment 2 would comply with all applicable federal, State, and local statutes and regulations related to solid waste. These impacts were determined to be less than significant.

As stated in Response 4.17(f), the proposed project would demolish the existing vacant on-site structures and install paving for additional parking. No source for generation of solid waste would be created by this project and UCR standard construction specifications require a minimum 95 percent diversion of construction and demolition waste from the landfill. Therefore, no impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Additional Mitigation Measures: No additional mitigation measures are required.

h) ***Require or result in the construction or expansion of electrical and natural gas facilities, which could cause significant environmental impacts?***

No Impact. Implementation of the LRDP and LRDP Amendment 2 could increase the demand for electricity and natural gas, but would not require or result in the construction of new energy or gas production, transmission facilities, the construction of which could cause a significant environmental impact. With implementation of the relevant LRDP Planning Strategy, these impacts were determined to be less than significant.

The proposed project would demolish existing vacant structures and install paving for additional parking. While the additional parking would include lighting, no new electrical or natural gas facilities would be required. Therefore, no impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: No LRDP EIR Planning Strategies are applicable to this topical area.

Applicable LRDP EIR Programs and Practices: No LRDP EIR Programs and Practices are applicable to this topical area.

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

i) ***Encourage the wasteful or inefficient use of energy?***

Project Impact Adequately Addressed in LRDP EIR. Implementation of the LRDP and LRDP Amendment 2 would not result in the wasteful, inefficient, or unnecessary use of energy by UCR. With implementation of the relevant LRDP Planning Strategy, these impacts were determined to be less than significant.

The proposed project would result in the demolition of the existing on-site vacant structures and paving for additional parking. All proposed landscaping would be required to follow LRDP Planning Strategies and Programs and Practices pertaining to water efficient landscaping. The proposed project would not result in the wasteful, inefficient, or unnecessary use of energy by UCR. Thus, no new or different impacts would result, and less than significant impacts would result in this regard.

Applicable LRDP EIR Planning Strategies: Refer to PS Conservation 5.

Applicable LRDP EIR Programs and Practices: Refer to PP 4.15-1(b) and PP 4.15-1(c).

Applicable LRDP EIR Mitigation Measures: No LRDP EIR mitigation measures are applicable to this topical area.

Project-Specific Mitigation Measures: No mitigation measures are required.

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4.18 MANDATORY FINDINGS OF SIGNIFICANCE

Would the project:	Potentially Significant Impact	Project Impact Adequately Addressed In LRDP EIR	Less Than Significant with Project-Level Mitigation Required	Less Than Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		✓			
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				✓	
c. Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?		✓			

a) ***Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?***

Project Impact Adequately Addressed in LRDP EIR. As concluded in Section 4.4, *Biological Resources*, and Section 4.5, *Cultural Resources*, the proposed project would result in no new significant impacts involving plant and wildlife species and/or communities nor significantly impact historical/archaeological and paleontological resources.

The project site currently consists of two vacant office buildings, the former Highlander Hall and the Human Resources Building, and is surrounded by existing institutional and commercial uses. Implementation of the proposed project would involve demolition of the existing vacant on-site structures and paving for additional surface parking. The proposed project would not substantially reduce the habitat of a wildlife species, cause a wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal. Further, construction of the proposed project would not impact historic resources. Therefore, project implementation would not eliminate important examples of the major periods of California history. As the proposed project would only involve demolition and grading activities, a potential impact to paleontological resources could occur. Implementation of the LRDP Program and Practice PP 4.5-4 would require specific construction specifications for unknown paleontological resources that are uncovered during construction activities. With implementation of a LRDP Program and Practice, no impacts to paleontological resources would occur. The project's potential impacts to biological, historical/archaeological, and paleontological resources were fully analyzed in the previously certified environmental documentation and no new or different impacts would result from the proposed project.

b) ***Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?***

Less Than Significant Impact. As noted within Section 4.0, *Environmental Analysis*, impacts related to the proposed project would be less than significant with implementation of LRDP Planning Strategies and Programs and Practices as well as LRDP EIR Mitigation Measures. No impacts related to the project have been identified that would be individually limited, but cumulatively considerable for the issue areas analyzed within this Initial Study. The proposed project would be consistent with the UCR LRDP Land Use designation for the project site and is consistent with the surrounding development. No new or different impacts would result from the proposed project. Impacts in this regard would be less than significant.

c) ***Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?***

Project Impact Adequately Addressed in LRDP EIR. Previous sections of this Initial Study reviewed the proposed project's potential impacts related to hazards and hazardous materials, air quality, greenhouse gas emissions, noise, and other issues. LRDP Planning Strategies, Programs and Practices, and Mitigation measures have been incorporated into the project that would reduce the potential adverse impacts on human beings to a less than significant level. Therefore, the proposed project would not result in environmental impacts that would cause substantial adverse effects on human beings.

5.0 INVENTORY OF MITIGATION MEASURES

The following Previous Planning Strategies, Programs and Practices, and Mitigation Measures are from the certified LRDP EIR and/or LRDP Amendment 2 EIR and are applicable to the proposed project. As discussed throughout Section 4.0, *Environmental Analysis*, no new mitigation measures are required.

AESTHETICS

Applicable LRDP PEIR Planning Strategies:

PS Open Space 4 Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.

Applicable LRDP PEIR Programs and Practices:

PP 4.1-1 The campus shall provide design architects with the Campus Design Guidelines and instructions to implement the guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design.

PP 4.1-2(b) The campus shall continue to relocate, where feasible, mature "specimen" trees that would be removed as a result of construction activities on the campus.
(This is identical to Land Use PP 4.9-1(c).)

Applicable LRDP PEIR Mitigation Measures:

MM 4.1-3(b) All outdoor lighting on campus resulting from new development shall be directed to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) to prevent stray light spillover onto adjacent residential areas. In addition, all fixtures on elevated light standards in parking lots, parking structures, and athletic fields shall be shielded to reduce glare. Lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.
(LRDP EIR)

AIR QUALITY

Applicable LRDP PEIR Planning Strategies:

PS Transportation 5 Provide bicycle parking at convenient locations.

PS Transportation 6 Implement parking management measures that may include:
- Restricted permit availability.
- Restricted permit mobility.
- Differential permit pricing.

Applicable LRDP PEIR Programs and Practices:

PP 4.3-2(a) Construction contract specifications shall include the following:

- (i) Compliance with all SCAQMD rules and regulations.
- (ii) Maintenance programs to assure vehicles remain in good operating condition.
- (iii) Avoid unnecessary idling of construction vehicles and equipment.
- (iv) Use of alternative fuel construction vehicles.
- (v) Provision of electrical power to the site, to eliminate the need for on-site generators.

PP 4.3-2(b) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

- (i) Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).

- (ii) Replace ground cover in disturbed areas as quickly as possible.

- (iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.

- (iv) Water active grading sites at least twice daily.

- (v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period.

- (vi) All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least 2 feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.

- (vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.

- (ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.

- (x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

PP 4.3-2(c) The UCR shall continue to implement SCAQMD Rule 1403—Asbestos when demolishing existing buildings on the campus.

Applicable LRDP PEIR Mitigation Measures:

MM 4.3-1a For each construction project on the campus, the project contractor will implement Programs and Practices 4.3-2(a) and 4.3-2(b). In addition, the following PM_{10} and $PM_{2.5}$ control measure shall be implemented for each construction project:

- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance.

(LRDP Amendment 2 EIR)

MM 4.3-1b For each construction project on the campus, the University shall require that the project include a construction emissions control plan that includes a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used for an aggregate of 40 or more hours during any portion of the construction project. During construction activity, the contractor shall utilize CARB certified equipment or better for all on-site construction equipment according to the following schedule:

- January 1, 2011 to December 31, 2011: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 2 off-road emissions standards. In addition, all construction equipment shall be outfitted with the BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 2 or Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- January 1, 2012 to December 31, 2014: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 3 off-road emissions standards. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- Post January 1, 2015: All off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- A copy of each unit's certified specification, BACT documentation and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit or equipment.

- Encourage construction contractors to apply for AQMD 'SOON" funds. Incentives could be provided for those construction contractors who apply for AQMD "SOON" funds. The "SOON" program provides funds to accelerate clean-up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/implementation/soonprogram.htm.

The contractor shall also implement the following measures during construction:

- Prohibit vehicle and engine idling in excess of 5 minutes and ensure that all off-road equipment is compliant with the California Air Resources Board's (CARB) in-use off-road diesel vehicle regulation and SCAQMD Rule 2449.

- Configure construction parking to minimize traffic interference.

- Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.

- Provide dedicated turn lanes for movement of construction trucks and equipment on and off site.

- Schedule construction activities that affect traffic flow on the arterial system to off-peak hour to the extent practicable.

- Improve traffic flow by signal synchronization, and ensure that all vehicles and equipment will be properly tuned and maintained according to manufacturers' specifications.

- Use diesel-powered construction vehicles and equipment that operate on low-NOx fuel where possible.

- Reroute construction trucks away from congested streets or sensitive receptor areas.

- Maintain and tune all vehicles and equipment according to manufacturers' specifications.

(LRDP Amendment 2 EIR)

MM 4.3-1c To minimize VOC emissions from the painting/finishing phase, for each construction project on the campus, the project contractor will implement the following VOC control measures:

- Construct or build with materials that do not require painting, or use pre-painted construction materials.

- If appropriate materials are not available or are cost-prohibitive, use low VOC-content materials more stringent than required under SCAQMD Rule 113.

(LRDP Amendment 2 EIR)

MM 4.3-2 Programs and Practices 4.3-2(a), (b), and (c), or their equivalent, shall be included in construction contract specifications. The contract specifications shall require the use of low NO_X diesel fuel and construction equipment to the extent that it is readily available at the time of development.
(LRDP EIR)

MM 4.3-2b UCR shall continue to participate in greenhouse gas (GHG) reduction programs such as the American College and University Presidents' Climate Commitment (ACUPCC) and shall adhere to the UC Policy on Sustainable Practices. The measures adopted by UCR are presented in Tables 4.16-9 and 4.16-10 in Section 4.16 Greenhouse Gas Emissions of the 2005 LRDP Amendment 2 EIR. While these measures are typically targeted at GHG emissions, many act to reduce energy consumption and vehicle use on campus and would consequently also reduce air pollutant emissions from both area and mobile sources. In accordance with the ACUPCC and the UC Policy on Sustainable Practices and through implementation of its Climate Action Plan, UCR shall commit to reducing GHG emissions to 1990 levels by 2020, which would require significant reductions (on the order of 70 percent) from these sources in terms of GHG and therefore reductions in other air pollutants as well.
(LRDP Amendment 2 EIR)

MM 4.3-3 To reduce energy consumption and areawide emission of criteria pollutants, the campus shall annually inspect and enforce an emissions reduction control strategy, which may include, where feasible, the following:

Design

- Provide electric vehicle charging systems at convenient location in campus parking facilities.

(LRDP EIR)

MM 4.3-6 The University will implement Mitigation Measure 4.3-1 which is designed to reduce construction emissions. It will also implement Mitigation Measure 4.3-2b which will reduce air pollutant emissions resulting from traffic and energy consumption during campus operations.
(LRDP Amendment 2 EIR)

BIOLOGICAL RESOURCES

Applicable LRDP PEIR Planning Strategies:

PS Conservation 1 Protect natural resources, including native habitat; remnant arroyos, and mature trees, identified as in good health as determined by a qualified arborist, to the extent feasible.
(LRDP EIR)

Applicable LRDP PEIR Mitigation Measures:

MM 4.4-4(a) Prior to the onset of construction activities that would result in the removal of mature trees that would occur between March and mid-August, surveys for nesting special status avian species and raptors shall be conducted on the affected portion of the campus following USFWS and/or CDFG (now CDFW) guidelines. If no active avian nests are identified on or within 250 feet of the construction site, no further mitigation is necessary.
(LRDP EIR)

MM 4.4-4(b) If active nests for avian species of concern or raptor nests are found within the construction footprint or a 250-foot buffer zone, exterior construction activities shall be delayed within the construction footprint and buffer zone until the young have fledged or appropriate mitigation measures responding to the specific situation have been developed and implemented in consultation with USFWS and CDFG (now CDFW).
(LRDP EIR)

CULTURAL RESOURCES

Applicable LRDP PEIR Programs and Practices:

PP 4.5-4 Construction specifications shall require that if a paleontological resource is uncovered during construction activities:

- (i) A qualified paleontologist shall determine the significance of the find.
- (ii) The campus shall make an effort to preserve the find intact through feasible project design measures.
- (iii) If it cannot be preserved intact, then the University shall retain a qualified non-University paleontologist to design and implement a treatment plan to document and evaluate the data and/or preserve appropriate scientific samples.
- (iv) The paleontologist shall prepare a report of the results of the study, following accepted professional practice.
- (v) Copies of the report shall be submitted to the University and the Riverside County Museum.

PP 4.5-5 In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected and the University immediately shall notify the Riverside County Coroner of the find and comply with the provisions of P.R.C. Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.
(LRDP EIR)

GEOLOGY AND SOILS

Applicable LRDP PEIR Planning Strategies:

PS Open Space 4 — Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.

PS Conservation 2 — Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.

Applicable LRDP PEIR Programs and Practices:

PP 4.6-2(a) — The campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
(ii) Replace ground cover in disturbed areas as quickly as possible.
(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
(iv) Water active grading sites at least twice daily.
(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period. During project-specific building design, a site-specific geotechnical study shall be conducted under the direct supervision of a California Registered Engineering (vi) All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
(vi) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
(vii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
(viii) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
(ix) Post and enforce traffic speed limits of 15 miles per hour or less on all

GREENHOUSE GAS EMISSIONS

Applicable LRDP PEIR Mitigation Measures:

MM 4.16-1 All projects developed under the amended 2005 LRDP shall be evaluated for consistency with the GHG reduction policies of the UCR CAP and the UC Policy on Sustainable Practices, as may be updated from time to time by the University. GHG reduction measures, including, but not limited to, those found within the UCR CAP and UC Policy identified in Tables 4.16-9 and 4.16-10 shall be incorporated in all campus projects so that at a minimum an 8 percent reduction in emissions from BAU is achieved. It is expected that the GHG reduction measures in the UCR CAP will be refined from time to time, especially in light of the evolving regulations and as more information becomes available regarding the effectiveness of specific GHG reduction measures. As part of the implementation of the UCR CAP, the Campus will also monitor its progress in reducing GHG emissions to ensure it will attain the established targets.
(LRDP Amendment 2 EIR)

HAZARDS AND HAZARDOUS MATERIALS

Applicable LRDP PEIR Programs and Practices:

PP 4.7-2 The campus shall perform hazardous materials surveys on buildings and soils, if applicable, prior to demolition. When remediation is deemed necessary, surveys shall identify all potential hazardous materials within the structure to be demolished, and identify handling and disposal practices. The campus shall follow the practices during building demolition to ensure construction worker and public safety.

Applicable LRDP PEIR Mitigation Measures:

MM 4.7-7(a) Evacuation zones designated in the UCR Emergency Operations Plan will be avoided, to the extent feasible, when siting construction staging areas. Where evacuation zones cannot be avoided, alternative evacuation zones shall be identified. UCPD and the Riverside Fire Department shall be notified of alternative evacuation zones so that they can respond accordingly to any emergencies.
(LRDP EIR)

HYDROLOGY AND WATER QUALITY

Applicable LRDP PEIR Programs and Practices:

PP 4.8-1 The campus will continue to comply with all applicable water quality requirements established by the SARWQCB.
(This is identical to Utilities PP 4.15-5.)

PP 4.8-3(c) The campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403, and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
(ii) Replace ground cover in disturbed areas as quickly as possible.
(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
(iv) Water active grading sites at least twice daily.
(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period.
(vi) All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
(vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
(viii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
(ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

(This is identical to Air Quality PP 4.3-2(b) and Geology PP 4.6-2(a).)
(LRDP EIR)

PP 4.8-3(d) In compliance with NPDES, the campus would continue to implement Best Management Practices, as identified in the UCR Stormwater Management Plan (UCR 2003):

(i) Public education and outreach on stormwater impacts.
(ii) Public involvement/participation.
(iii) Illicit discharge detection and elimination.
(iv) Pollution prevention/good housekeeping for facilities.
(v) Construction site stormwater runoff control.
(vi) Post-construction stormwater management in new development and redevelopment.

(This is identical to Biological Resources PP 4.4-2(b) and Geology and Soils PP 4.6-2(b).)

LAND USE AND PLANNING

Applicable LRDP PEIR Planning Strategies:

PS Land Use 7 — Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate.

PS Open Space 4 — Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.

PS Transportation 5 — Provide bicycle parking at convenient locations.

PS Transportation 6 — Implement parking management measures that may include:

- Restricted permit availability.
- Restricted permit mobility.
- Differential permit pricing.

Applicable LRDP PEIR Programs and Practices:

PP 4.9-1(b) — The Campus shall continue to provide design professionals with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees and use of water conserving plants were feasible.
(This is identical to Aesthetics PP 4.1-2[a].)
(LRDP EIR)

NOISE

Applicable LRDP PEIR Programs and Practices:

PP 4.10-2 — The UCR campus shall limit the hours of exterior construction activities from 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday when necessary. Construction traffic shall follow transportation routes prescribed for all construction traffic to minimize the impact of this traffic (including noise impacts) on the surrounding community.

PP 4.10-7(a) — To the extent feasible, construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday, 8:00 a.m. to 6:00 p.m. on Saturday, and no construction on Sunday and national holidays, as appropriate, in order to minimize disruption to area residences surrounding the campus and to on-campus uses that are sensitive to noise.
(LRDP EIR)

PP 4.10-7(b) — The campus shall continue to require by contract specifications that construction equipment be required to be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
(LRDP EIR)

PP 4.10-7(c) The campus shall continue to require that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.
(LRDP EIR)

PP 4.10-7(d) The campus shall continue to conduct regular meetings, as needed, with on campus constituents to provide advance notice of construction activities in order to coordinate these activities with the academic calendar, scheduled events, and other situations, as needed.
(LRDP EIR)

PP 4.10-8 The campus shall continue to conduct meetings, as needed, with off-campus constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.
(LRDP EIR)

Applicable LRDP PEIR Mitigation Measures:

MM 4.10-2(a) The campus shall notify all academic and residential facilities within 300 feet of approved construction sites of the planned schedule of vibration causing activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research.
(LRDP EIR)

TRANSPORTATION/TRAFFIC

Applicable LRDP PEIR Planning Strategies:

PS Land Use 7 Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate.

PS Transportation 6 Implement parking management measures that may include:
- Restricted permit availability.
- Restricted permit mobility.
- Differential permit pricing.

Applicable LRDP PEIR Programs and Practices:

PP 4.14-4 The campus shall provide design architects for roadway and parking improvements with the Campus Design Guidelines and instructions to implement those elements of the guidelines relevant to parking and roadway design.

UTILITIES AND SERVICE SYSTEMS

Applicable LRDP PEIR Planning Strategies:

PS Conservation 5 Continue to adhere to the conservation requirements of Title 24 of the California Code of Regulations and comply with any future conservation goals or programs enacted by the University of California.

Applicable LRDP PEIR Programs and Practices:

PP 4.15-1(b) To further reduce the campus' impact on domestic water resources, to the extent feasible, UCR will:

(i) Install hot water recirculation devices (to reduce water waste).
(ii) Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code).
(iii) Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time.
(iv) Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems.
(iv) Prohibit using water as a means of cleaning impervious surfaces.
(v) Install water-efficient irrigation equipment to local evaporation rates to maximize water savings for landscaping and retrofit existing systems over time.

(*This is identical to Hydrology PP 4.8-2(a).*)
(LRDP EIR)

PP 4.15-1(c) The campus shall promptly detect and repair leaks in water and irrigation pipes.
(*This is identical to Hydrology PP 4.8-2(b).*)
(LRDP EIR)

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7.0 REPORT PREPARATION PERSONNEL

University of California, Riverside (Lead Agency)
1223 University Avenue, Suite 240
Riverside, California 92507
CEQA@ucr.edu
951.827.1484

Ms. Tricia D. Thrasher, ASLA, LEED AP, Principal Environmental Planner

Michael Baker International (Environmental Analysis)
14725 Alton Parkway
Irvine, California 92618
949.472.3505

Mr. Eddie Torres, INCE, Environmental Sciences Manager
Ms. Kristen Bogue, Senior Environmental Analyst
Ms. Alesia Hsiao, Environmental Analyst
Mr. Adam Furman, Environmental Analyst
Mr. Achilles Malisos, Manager of Air & Noise Studies
Mr. Giancarlo Ganddini, PE, Transportation Planner
Ms. Linda Bo, Graphics/Technical Editor

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APPENDIX 8.1
Air Quality/Greenhouse Gas Data

Parenthetical CALEEMOD Assumptions
For: UCR Highlander Hall Demolition Project
Date: May 2015

CONSTRUCTION

Demolition (2015)

- Demolition of 61,251 square feet of existing Highlander Hall Buildings and 8,242 square feet of Human Resources Building.
- 54 days.

Equipment:

Quantity	Type	Hours of Daily Operation
1	Concrete/Industrial Saws	8
3	Excavators	8
2	Rubber Tired Dozers	8

Grading (2015)

- 22 days.

Equipment:

Quantity	Type	Hours of Daily Operation
1	Tractor/Loader/Backhoe	8

Paving (2015 - 2016)

- 44 days.

Equipment:

Quantity	Type	Hours of Daily Operation
2	Cement and Mortar Mixers	6
1	Pavers	8
2	Paving Equipment	6
2	Rollers	6
1	Tractors/Loaders/Backhoes	8

UCR Highlander Hall Demolition Project

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.00	Acre	1.00	43,560.00	0
Parking Lot	255.00	Space	2.29	102,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Proposed Project
1-acre City Park = Landscaping

Construction Phase - Proposed Construction Schedule

Off-road Equipment - Proposed Equipment

Off-road Equipment -

Grading - Acres Disturbed = 4.4

Demolition - 61,251 SF of Highlander Hall Buildings and 8,242 SF of Human Resources Building will be demolished.

Construction Off-road Equipment Mitigation - Per SCAQMD Rule 403

Area Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	26
tblConstructionPhase	NumDays	20.00	54.00
tblConstructionPhase	NumDays	8.00	22.00
tblConstructionPhase	NumDays	18.00	44.00
tblConstructionPhase	PhaseEndDate	1/15/2016	1/17/2016
tblConsumerProducts	ROG_EF	1.98E-05	1E-10
tblGrading	AcresOfGrading	0.00	4.40
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblVehicleTrips	WD_TR	1.59	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1669	1.7359	1.2991	1.6400e-003	0.0477	0.0903	0.1379	8.4100e-003	0.0839	0.0923	0.0000	152.0698	152.0698	0.0373	0.0000	152.8529
2016	0.0111	0.1015	0.0758	1.2000e-004	1.2100e-003	6.1000e-003	7.3000e-003	3.2000e-004	5.6200e-003	5.9400e-003	0.0000	10.6219	10.6219	2.8500e-003	0.0000	10.6817
Total	**0.1780**	**1.8374**	**1.3749**	**1.7600e-003**	**0.0489**	**0.0964**	**0.1452**	**8.7300e-003**	**0.0895**	**0.0983**	**0.0000**	**162.6916**	**162.6916**	**0.0401**	**0.0000**	**163.5346**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1669	1.7359	1.2991	1.6400e-003	0.0243	0.0903	0.1146	4.7100e-003	0.0839	0.0886	0.0000	152.0696	152.0696	0.0373	0.0000	152.8528
2016	0.0111	0.1015	0.0758	1.2000e-004	9.3000e-004	6.1000e-003	7.0300e-003	2.5000e-004	5.6200e-003	5.8700e-003	0.0000	10.6218	10.6218	2.8500e-003	0.0000	10.6817
Total	**0.1780**	**1.8374**	**1.3749**	**1.7600e-003**	**0.0253**	**0.0964**	**0.1216**	**4.9600e-003**	**0.0895**	**0.0945**	**0.0000**	**162.6915**	**162.6915**	**0.0401**	**0.0000**	**163.5344**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**48.34**	**0.00**	**16.26**	**43.18**	**0.00**	**3.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2015	10/15/2015	5	54	
2	Grading	Grading	10/16/2015	11/16/2015	5	22	
3	Paving	Paving	11/17/2015	1/17/2016	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.4

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Grading	Excavators	0	8.00	162	0.38
Paving	Pavers	1	8.00	125	0.42
Paving	Rollers	2	6.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	0	8.00	174	0.41
Paving	Paving Equipment	2	6.00	130	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	316.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0342	0.0000	0.0342	5.1800e-003	0.0000	5.1800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1217	1.3058	0.9740	1.0800e-003		0.0662	0.0662		0.0617	0.0617	0.0000	101.0914	101.0914	0.0274	0.0000	101.6669
Total	**0.1217**	**1.3058**	**0.9740**	**1.0800e-003**	**0.0342**	**0.0662**	**0.1004**	**5.1800e-003**	**0.0617**	**0.0669**	**0.0000**	**101.0914**	**101.0914**	**0.0274**	**0.0000**	**101.6669**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.2100e-003	0.0522	0.0371	1.2000e-004	2.7100e-003	8.5000e-004	3.5500e-003	7.4000e-004	7.8000e-004	1.5200e-003	0.0000	10.7743	10.7743	9.0000e-005	0.0000	10.7761
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-003	2.6400e-003	0.0275	5.0000e-005	4.4400e-003	4.0000e-005	4.4800e-003	1.1800e-003	4.0000e-005	1.2200e-003	0.0000	4.3120	4.3120	2.4000e-004	0.0000	4.3171
Total	**5.0100e-003**	**0.0549**	**0.0646**	**1.7000e-004**	**7.1500e-003**	**8.9000e-004**	**8.0300e-003**	**1.9200e-003**	**8.2000e-004**	**2.7400e-003**	**0.0000**	**15.0863**	**15.0863**	**3.3000e-004**	**0.0000**	**15.0932**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Fugitive Dust					0.0146	0.0000	0.0146	2.2100e-003	0.0000	2.2100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1217	1.3058	0.9740	1.0800e-003		0.0662	0.0662		0.0617	0.0617	0.0000	101.0913	101.0913	0.0274	0.0000	101.6668
Total	**0.1217**	**1.3058**	**0.9740**	**1.0800e-003**	**0.0146**	**0.0662**	**0.0808**	**2.2100e-003**	**0.0617**	**0.0639**	**0.0000**	**101.0913**	**101.0913**	**0.0274**	**0.0000**	**101.6668**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	3.2100e-003	0.0522	0.0371	1.2000e-004	2.1800e-003	8.5000e-004	3.0200e-003	6.1000e-004	7.8000e-004	1.3900e-003	0.0000	10.7743	10.7743	9.0000e-005	0.0000	10.7761
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-003	2.6400e-003	0.0275	5.0000e-005	3.4400e-003	4.0000e-005	3.4800e-003	9.3000e-004	4.0000e-005	9.7000e-004	0.0000	4.3120	4.3120	2.4000e-004	0.0000	4.3171
Total	**5.0100e-003**	**0.0549**	**0.0646**	**1.7000e-004**	**5.6200e-003**	**8.9000e-004**	**6.5000e-003**	**1.5400e-003**	**8.2000e-004**	**2.3600e-003**	**0.0000**	**15.0863**	**15.0863**	**3.3000e-004**	**0.0000**	**15.0932**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3300e-003	0.0000	2.3300e-003	2.5000e-004	0.0000	2.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.9600e-003	0.0378	0.0267	3.0000e-005		2.9600e-003	2.9600e-003		2.7200e-003	2.7200e-003	0.0000	3.2680	3.2680	9.8000e-004	0.0000	3.2885
Total	**3.9600e-003**	**0.0378**	**0.0267**	**3.0000e-005**	**2.3300e-003**	**2.9600e-003**	**5.2900e-003**	**2.5000e-004**	**2.7200e-003**	**2.9700e-003**	**0.0000**	**3.2680**	**3.2680**	**9.8000e-004**	**0.0000**	**3.2885**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	2.2000e-004	2.2400e-003	0.0000	3.6000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3514	0.3514	2.0000e-005	0.0000	0.3518
Total	**1.5000e-004**	**2.2000e-004**	**2.2400e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.7000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3514**	**0.3514**	**2.0000e-005**	**0.0000**	**0.3518**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-003	0.0000	1.0000e-003	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.9600e-003	0.0378	0.0267	3.0000e-005		2.9600e-003	2.9600e-003		2.7200e-003	2.7200e-003	0.0000	3.2680	3.2680	9.8000e-004	0.0000	3.2885
Total	**3.9600e-003**	**0.0378**	**0.0267**	**3.0000e-005**	**1.0000e-003**	**2.9600e-003**	**3.9600e-003**	**1.1000e-004**	**2.7200e-003**	**2.8300e-003**	**0.0000**	**3.2680**	**3.2680**	**9.8000e-004**	**0.0000**	**3.2885**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	2.2000e-004	2.2400e-003	0.0000	2.8000e-004	0.0000	2.8000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.3514	0.3514	2.0000e-005	0.0000	0.3518
Total	**1.5000e-004**	**2.2000e-004**	**2.2400e-003**	**0.0000**	**2.8000e-004**	**0.0000**	**2.8000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.3514**	**0.3514**	**2.0000e-005**	**0.0000**	**0.3518**

3.4 Paving - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0323	0.3351	0.2092	3.1000e-004		0.0202	0.0202		0.0186	0.0186	0.0000	28.7592	28.7592	8.3600e-003	0.0000	28.9349
Paving	2.2500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0346**	**0.3351**	**0.2092**	**3.1000e-004**		**0.0202**	**0.0202**		**0.0186**	**0.0186**	**0.0000**	**28.7592**	**28.7592**	**8.3600e-003**	**0.0000**	**28.9349**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4700e-003	2.1500e-003	0.0224	4.0000e-005	3.6200e-003	3.0000e-005	3.6500e-003	9.6000e-004	3.0000e-005	9.9000e-004	0.0000	3.5135	3.5135	2.0000e-004	0.0000	3.5177
Total	**1.4700e-003**	**2.1500e-003**	**0.0224**	**4.0000e-005**	**3.6200e-003**	**3.0000e-005**	**3.6500e-003**	**9.6000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**3.5135**	**3.5135**	**2.0000e-004**	**0.0000**	**3.5177**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0323	0.3351	0.2092	3.1000e-004		0.0202	0.0202		0.0186	0.0186	0.0000	28.7592	28.7592	8.3600e-003	0.0000	28.9348
Paving	2.2500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0346**	**0.3351**	**0.2092**	**3.1000e-004**		**0.0202**	**0.0202**		**0.0186**	**0.0186**	**0.0000**	**28.7592**	**28.7592**	**8.3600e-003**	**0.0000**	**28.9348**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4700e-003	2.1500e-003	0.0224	4.0000e-005	2.8000e-003	3.0000e-005	2.8400e-003	7.6000e-004	3.0000e-005	7.9000e-004	0.0000	3.5135	3.5135	2.0000e-004	0.0000	3.5177
Total	**1.4700e-003**	**2.1500e-003**	**0.0224**	**4.0000e-005**	**2.8000e-003**	**3.0000e-005**	**2.8400e-003**	**7.6000e-004**	**3.0000e-005**	**7.9000e-004**	**0.0000**	**3.5135**	**3.5135**	**2.0000e-004**	**0.0000**	**3.5177**

3.4 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8800e-003	0.1009	0.0691	1.0000e-004		6.0900e-003	6.0900e-003		5.6100e-003	5.6100e-003	0.0000	9.4912	9.4912	2.7900e-003	0.0000	9.5497
Paving	7.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0106**	**0.1009**	**0.0691**	**1.0000e-004**		**6.0900e-003**	**6.0900e-003**		**5.6100e-003**	**5.6100e-003**	**0.0000**	**9.4912**	**9.4912**	**2.7900e-003**	**0.0000**	**9.5497**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	6.5000e-004	6.7400e-003	1.0000e-005	1.2100e-003	1.0000e-005	1.2200e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.1307	1.1307	6.0000e-005	0.0000	1.1320
Total	**4.4000e-004**	**6.5000e-004**	**6.7400e-003**	**1.0000e-005**	**1.2100e-003**	**1.0000e-005**	**1.2200e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.1307**	**1.1307**	**6.0000e-005**	**0.0000**	**1.1320**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8800e-003	0.1009	0.0691	1.0000e-004		6.0900e-003	6.0900e-003		5.6100e-003	5.6100e-003	0.0000	9.4912	9.4912	2.7900e-003	0.0000	9.5497
Paving	7.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0106**	**0.1009**	**0.0691**	**1.0000e-004**		**6.0900e-003**	**6.0900e-003**		**5.6100e-003**	**5.6100e-003**	**0.0000**	**9.4912**	**9.4912**	**2.7900e-003**	**0.0000**	**9.5497**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	6.5000e-004	6.7400e-003	1.0000e-005	9.3000e-004	1.0000e-005	9.5000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	1.1307	1.1307	6.0000e-005	0.0000	1.1320
Total	**4.4000e-004**	**6.5000e-004**	**6.7400e-003**	**1.0000e-005**	**9.3000e-004**	**1.0000e-005**	**9.5000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**1.1307**	**1.1307**	**6.0000e-005**	**0.0000**	**1.1320**

UCR Highlander Hall Demolition Project

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.00	Acre	1.00	43,560.00	0
Parking Lot	255.00	Space	2.29	102,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Proposed Project
1-acre City Park = Landscaping

Construction Phase - Proposed Construction Schedule

Off-road Equipment - Proposed Equipment

Off-road Equipment -

Grading - Acres Disturbed = 4.4

Demolition - 61,251 SF of Highlander Hall Buildings and 8,242 SF of Human Resources Building will be demolished.

Construction Off-road Equipment Mitigation - Per SCAQMD Rule 403

Area Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	26
tblConstructionPhase	NumDays	20.00	54.00
tblConstructionPhase	NumDays	8.00	22.00
tblConstructionPhase	NumDays	18.00	44.00
tblConstructionPhase	PhaseEndDate	1/15/2016	1/17/2016
tblConsumerProducts	ROG_EF	1.98E-05	1E-10
tblGrading	AcresOfGrading	0.00	4.40
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblVehicleTrips	WD_TR	1.59	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	4.7001	50.3600	38.4641	0.0462	1.5364	2.4837	4.0201	0.2642	2.3161	2.5802	0.0000	4,739.8107	4,739.8107	1.1323	0.0000	4,763.5887
2016	2.0171	18.4561	13.7583	0.0213	0.2236	1.1084	1.3319	0.0593	1.0215	1.0808	0.0000	2,125.3602	2,125.3602	0.5710	0.0000	2,137.3509
Total	**6.7171**	**68.8161**	**52.2224**	**0.0675**	**1.7599**	**3.5921**	**5.3520**	**0.3235**	**3.3375**	**3.6610**	**0.0000**	**6,865.1709**	**6,865.1709**	**1.7033**	**0.0000**	**6,900.9395**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	4.7001	50.3600	38.4641	0.0462	0.7531	2.4837	3.2369	0.1401	2.3161	2.4562	0.0000	4,739.8107	4,739.8107	1.1323	0.0000	4,763.5886
2016	2.0171	18.4561	13.7583	0.0213	0.1730	1.1084	1.2814	0.0469	1.0215	1.0684	0.0000	2,125.3602	2,125.3602	0.5710	0.0000	2,137.3509
Total	**6.7171**	**68.8161**	**52.2224**	**0.0675**	**0.9261**	**3.5921**	**4.5182**	**0.1870**	**3.3375**	**3.5245**	**0.0000**	**6,865.1709**	**6,865.1709**	**1.7033**	**0.0000**	**6,900.9395**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**47.38**	**0.00**	**15.58**	**42.18**	**0.00**	**3.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2015	10/15/2015	5	54	
2	Grading	Grading	10/16/2015	11/16/2015	5	22	
3	Paving	Paving	11/17/2015	1/17/2016	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.4

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Grading	Excavators	0	8.00	162	0.38
Paving	Pavers	1	8.00	125	0.42
Paving	Rollers	2	6.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	0	8.00	174	0.41
Paving	Paving Equipment	2	6.00	130	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	316.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.2668	0.0000	1.2668	0.1918	0.0000	0.1918			0.0000			0.0000
Off-Road	4.5083	48.3629	36.0738	0.0399		2.4508	2.4508		2.2858	2.2858		4,127.1934	4,127.1934	1.1188		4,150.6886
Total	**4.5083**	**48.3629**	**36.0738**	**0.0399**	**1.2668**	**2.4508**	**3.7176**	**0.1918**	**2.2858**	**2.4776**		**4,127.1934**	**4,127.1934**	**1.1188**		**4,150.6886**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1209	1.9020	1.3964	4.3200e-003	0.1019	0.0315	0.1334	0.0279	0.0289	0.0568		439.2708	439.2708	3.5200e-003		439.3447
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0709	0.0951	0.9938	1.9900e-003	0.1677	1.4800e-003	0.1691	0.0445	1.3500e-003	0.0458		173.3466	173.3466	9.9400e-003		173.5553
Total	**0.1918**	**1.9971**	**2.3903**	**6.3100e-003**	**0.2696**	**0.0329**	**0.3025**	**0.0724**	**0.0303**	**0.1027**		**612.6173**	**612.6173**	**0.0135**		**612.9000**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Fugitive Dust					0.5416	0.0000	0.5416	0.0820	0.0000	0.0820			0.0000			0.0000
Off-Road	4.5083	48.3629	36.0738	0.0399		2.4508	2.4508		2.2858	2.2858	0.0000	4,127.1934	4,127.1934	1.1188		4,150.6886
Total	**4.5083**	**48.3629**	**36.0738**	**0.0399**	**0.5416**	**2.4508**	**2.9924**	**0.0820**	**2.2858**	**2.3678**	**0.0000**	**4,127.1934**	**4,127.1934**	**1.1188**		**4,150.6886**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.1209	1.9020	1.3964	4.3200e-003	0.0818	0.0315	0.1133	0.0230	0.0289	0.0519		439.2708	439.2708	3.5200e-003		439.3447
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0709	0.0951	0.9938	1.9900e-003	0.1298	1.4800e-003	0.1312	0.0352	1.3500e-003	0.0365		173.3466	173.3466	9.9400e-003		173.5553
Total	**0.1918**	**1.9971**	**2.3903**	**6.3100e-003**	**0.2116**	**0.0329**	**0.2445**	**0.0581**	**0.0303**	**0.0884**		**612.6173**	**612.6173**	**0.0135**		**612.9000**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2121	0.0000	0.2121	0.0229	0.0000	0.0229			0.0000			0.0000
Off-Road	0.3604	3.4321	2.4256	3.1200e-003		0.2686	0.2686		0.2472	0.2472		327.4877	327.4877	0.0978		329.5408
Total	**0.3604**	**3.4321**	**2.4256**	**3.1200e-003**	**0.2121**	**0.2686**	**0.4807**	**0.0229**	**0.2472**	**0.2701**		**327.4877**	**327.4877**	**0.0978**		**329.5408**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0142	0.0190	0.1988	4.0000e-004	0.0335	3.0000e-004	0.0338	8.8900e-003	2.7000e-004	9.1600e-003		34.6693	34.6693	1.9900e-003		34.7111
Total	**0.0142**	**0.0190**	**0.1988**	**4.0000e-004**	**0.0335**	**3.0000e-004**	**0.0338**	**8.8900e-003**	**2.7000e-004**	**9.1600e-003**		**34.6693**	**34.6693**	**1.9900e-003**		**34.7111**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0907	0.0000	0.0907	9.7900e-003	0.0000	9.7900e-003			0.0000			0.0000
Off-Road	0.3604	3.4321	2.4256	3.1200e-003		0.2686	0.2686		0.2472	0.2472	0.0000	327.4877	327.4877	0.0978		329.5408
Total	**0.3604**	**3.4321**	**2.4256**	**3.1200e-003**	**0.0907**	**0.2686**	**0.3593**	**9.7900e-003**	**0.2472**	**0.2569**	**0.0000**	**327.4877**	**327.4877**	**0.0978**		**329.5408**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0142	0.0190	0.1988	4.0000e-004	0.0260	3.0000e-004	0.0263	7.0300e-003	2.7000e-004	7.3000e-003		34.6693	34.6693	1.9900e-003		34.7111
Total	**0.0142**	**0.0190**	**0.1988**	**4.0000e-004**	**0.0260**	**3.0000e-004**	**0.0263**	**7.0300e-003**	**2.7000e-004**	**7.3000e-003**		**34.6693**	**34.6693**	**1.9900e-003**		**34.7111**

3.4 Paving - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9601	20.3064	12.6794	0.0186		1.2241	1.2241		1.1280	1.1280		1,921.3091	1,921.3091	0.5588		1,933.0446
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0965**	**20.3064**	**12.6794**	**0.0186**		**1.2241**	**1.2241**		**1.1280**	**1.1280**		**1,921.3091**	**1,921.3091**	**0.5588**		**1,933.0446**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0945	0.1268	1.3251	2.6600e-003	0.2236	1.9700e-003	0.2255	0.0593	1.8000e-003	0.0611		231.1287	231.1287	0.0133		231.4071
Total	**0.0945**	**0.1268**	**1.3251**	**2.6600e-003**	**0.2236**	**1.9700e-003**	**0.2255**	**0.0593**	**1.8000e-003**	**0.0611**		**231.1287**	**231.1287**	**0.0133**		**231.4071**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9601	20.3064	12.6794	0.0186		1.2241	1.2241		1.1280	1.1280	0.0000	1,921.3090	1,921.3090	0.5588		1,933.0446
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0965**	**20.3064**	**12.6794**	**0.0186**		**1.2241**	**1.2241**		**1.1280**	**1.1280**	**0.0000**	**1,921.3090**	**1,921.3090**	**0.5588**		**1,933.0446**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0945	0.1268	1.3251	2.6600e-003	0.1730	1.9700e-003	0.1750	0.0469	1.8000e-003	0.0487		231.1287	231.1287	0.0133		231.4071
Total	**0.0945**	**0.1268**	**1.3251**	**2.6600e-003**	**0.1730**	**1.9700e-003**	**0.1750**	**0.0469**	**1.8000e-003**	**0.0487**		**231.1287**	**231.1287**	**0.0133**		**231.4071**

3.4 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198		1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9320**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**		**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0851	0.1144	1.1960	2.6500e-003	0.2236	1.8700e-003	0.2254	0.0593	1.7200e-003	0.0610		223.1390	223.1390	0.0122		223.3952
Total	**0.0851**	**0.1144**	**1.1960**	**2.6500e-003**	**0.2236**	**1.8700e-003**	**0.2254**	**0.0593**	**1.7200e-003**	**0.0610**		**223.1390**	**223.1390**	**0.0122**		**223.3952**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198	0.0000	1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9320**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**	**0.0000**	**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0851	0.1144	1.1960	2.6500e-003	0.1730	1.8700e-003	0.1749	0.0469	1.7200e-003	0.0486		223.1390	223.1390	0.0122		223.3952
Total	**0.0851**	**0.1144**	**1.1960**	**2.6500e-003**	**0.1730**	**1.8700e-003**	**0.1749**	**0.0469**	**1.7200e-003**	**0.0486**		**223.1390**	**223.1390**	**0.0122**		**223.3952**

UCR Highlander Hall Demolition Project

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.00	Acre	1.00	43,560.00	0
Parking Lot	255.00	Space	2.29	102,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Proposed Project
1-acre City Park = Landscaping

Construction Phase - Proposed Construction Schedule

Off-road Equipment - Proposed Equipment

Off-road Equipment -

Grading - Acres Disturbed = 4.4

Demolition - 61,251 SF of Highlander Hall Buildings and 8,242 SF of Human Resources Building will be demolished.

Construction Off-road Equipment Mitigation - Per SCAQMD Rule 403

Area Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	26
tblConstructionPhase	NumDays	20.00	54.00
tblConstructionPhase	NumDays	8.00	22.00
tblConstructionPhase	NumDays	18.00	44.00
tblConstructionPhase	PhaseEndDate	1/15/2016	1/17/2016
tblConsumerProducts	ROG_EF	1.98E-05	1E-10
tblGrading	AcresOfGrading	0.00	4.40
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblVehicleTrips	WD_TR	1.59	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	4.6917	50.2848	38.3795	0.0464	1.5364	2.4836	4.0200	0.2642	2.3160	2.5801	0.0000	4,752.3116	4,752.3116	1.1322	0.0000	4,776.0886
2016	2.0152	18.4459	13.8596	0.0215	0.2236	1.1084	1.3319	0.0593	1.0215	1.0808	0.0000	2,140.1377	2,140.1377	0.5710	0.0000	2,152.1284
Total	**6.7069**	**68.7307**	**52.2391**	**0.0678**	**1.7599**	**3.5920**	**5.3519**	**0.3235**	**3.3374**	**3.6609**	**0.0000**	**6,892.4493**	**6,892.4493**	**1.7032**	**0.0000**	**6,928.2169**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	4.6917	50.2848	38.3795	0.0464	0.7531	2.4836	3.2367	0.1401	2.3160	2.4561	0.0000	4,752.3116	4,752.3116	1.1322	0.0000	4,776.0886
2016	2.0152	18.4459	13.8596	0.0215	0.1730	1.1084	1.2814	0.0469	1.0215	1.0684	0.0000	2,140.1377	2,140.1377	0.5710	0.0000	2,152.1284
Total	**6.7069**	**68.7307**	**52.2391**	**0.0678**	**0.9261**	**3.5920**	**4.5181**	**0.1870**	**3.3374**	**3.5244**	**0.0000**	**6,892.4493**	**6,892.4493**	**1.7032**	**0.0000**	**6,928.2169**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**47.38**	**0.00**	**15.58**	**42.18**	**0.00**	**3.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2015	10/15/2015	5	54	
2	Grading	Grading	10/16/2015	11/16/2015	5	22	
3	Paving	Paving	11/17/2015	1/17/2016	5	44	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.4

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Grading	Excavators	0	8.00	162	0.38
Paving	Pavers	1	8.00	125	0.42
Paving	Rollers	2	6.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	0	8.00	174	0.41
Paving	Paving Equipment	2	6.00	130	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	316.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2015

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Fugitive Dust					1.2668	0.0000	1.2668	0.1918	0.0000	0.1918			0.0000			0.0000
Off-Road	4.5083	48.3629	36.0738	0.0399		2.4508	2.4508		2.2858	2.2858		4,127.1934	4,127.1934	1.1188		4,150.6886
Total	**4.5083**	**48.3629**	**36.0738**	**0.0399**	**1.2668**	**2.4508**	**3.7176**	**0.1918**	**2.2858**	**2.4776**		**4,127.1934**	**4,127.1934**	**1.1188**		**4,150.6886**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.1142	1.8353	1.2312	4.3200e-003	0.1019	0.0313	0.1333	0.0279	0.0288	0.0567		440.3134	440.3134	3.4800e-003		440.3864
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0866	1.0745	2.1300e-003	0.1677	1.4800e-003	0.1691	0.0445	1.3500e-003	0.0458		184.8048	184.8048	9.9400e-003		185.0135
Total	**0.1834**	**1.9219**	**2.3057**	**6.4500e-003**	**0.2696**	**0.0328**	**0.3024**	**0.0724**	**0.0302**	**0.1026**		**625.1182**	**625.1182**	**0.0134**		**625.4000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5416	0.0000	0.5416	0.0820	0.0000	0.0820			0.0000			0.0000
Off-Road	4.5083	48.3629	36.0738	0.0399		2.4508	2.4508		2.2858	2.2858	0.0000	4,127.193 4	4,127.1934	1.1188		4,150.6886
Total	**4.5083**	**48.3629**	**36.0738**	**0.0399**	**0.5416**	**2.4508**	**2.9924**	**0.0820**	**2.2858**	**2.3678**	**0.0000**	**4,127.193 4**	**4,127.1934**	**1.1188**		**4,150.6886**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1142	1.8353	1.2312	4.3200e-003	0.0818	0.0313	0.1132	0.0230	0.0288	0.0518		440.3134	440.3134	3.4800e-003		440.3864
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0866	1.0745	2.1300e-003	0.1298	1.4800e-003	0.1312	0.0352	1.3500e-003	0.0365		184.8048	184.8048	9.9400e-003		185.0135
Total	**0.1834**	**1.9219**	**2.3057**	**6.4500e-003**	**0.2116**	**0.0328**	**0.2444**	**0.0581**	**0.0302**	**0.0883**		**625.1182**	**625.1182**	**0.0134**		**625.4000**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2121	0.0000	0.2121	0.0229	0.0000	0.0229			0.0000			0.0000
Off-Road	0.3604	3.4321	2.4256	3.1200e-003		0.2686	0.2686		0.2472	0.2472		327.4877	327.4877	0.0978		329.5408
Total	**0.3604**	**3.4321**	**2.4256**	**3.1200e-003**	**0.2121**	**0.2686**	**0.4807**	**0.0229**	**0.2472**	**0.2701**		**327.4877**	**327.4877**	**0.0978**		**329.5408**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0138	0.0173	0.2149	4.3000e-004	0.0335	3.0000e-004	0.0338	8.8900e-003	2.7000e-004	9.1600e-003		36.9610	36.9610	1.9900e-003		37.0027
Total	**0.0138**	**0.0173**	**0.2149**	**4.3000e-004**	**0.0335**	**3.0000e-004**	**0.0338**	**8.8900e-003**	**2.7000e-004**	**9.1600e-003**		**36.9610**	**36.9610**	**1.9900e-003**		**37.0027**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0907	0.0000	0.0907	9.7900e-003	0.0000	9.7900e-003			0.0000			0.0000
Off-Road	0.3604	3.4321	2.4256	3.1200e-003		0.2686	0.2686		0.2472	0.2472	0.0000	327.4877	327.4877	0.0978		329.5408
Total	**0.3604**	**3.4321**	**2.4256**	**3.1200e-003**	**0.0907**	**0.2686**	**0.3593**	**9.7900e-003**	**0.2472**	**0.2569**	**0.0000**	**327.4877**	**327.4877**	**0.0978**		**329.5408**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0138	0.0173	0.2149	4.3000e-004	0.0260	3.0000e-004	0.0263	7.0300e-003	2.7000e-004	7.3000e-003		36.9610	36.9610	1.9900e-003		37.0027
Total	**0.0138**	**0.0173**	**0.2149**	**4.3000e-004**	**0.0260**	**3.0000e-004**	**0.0263**	**7.0300e-003**	**2.7000e-004**	**7.3000e-003**		**36.9610**	**36.9610**	**1.9900e-003**		**37.0027**

3.4 Paving - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9601	20.3064	12.6794	0.0186		1.2241	1.2241		1.1280	1.1280		1,921.3091	1,921.3091	0.5588		1,933.0446
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0965**	**20.3064**	**12.6794**	**0.0186**		**1.2241**	**1.2241**		**1.1280**	**1.1280**		**1,921.3091**	**1,921.3091**	**0.5588**		**1,933.0446**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.1154	1.4326	2.8300e-003	0.2236	1.9700e-003	0.2255	0.0593	1.8000e-003	0.0611		246.4063	246.4063	0.0133		246.6847
Total	**0.0922**	**0.1154**	**1.4326**	**2.8300e-003**	**0.2236**	**1.9700e-003**	**0.2255**	**0.0593**	**1.8000e-003**	**0.0611**		**246.4063**	**246.4063**	**0.0133**		**246.6847**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9601	20.3064	12.6794	0.0186		1.2241	1.2241		1.1280	1.1280	0.0000	1,921.3090	1,921.3090	0.5588		1,933.0446
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0965**	**20.3064**	**12.6794**	**0.0186**		**1.2241**	**1.2241**		**1.1280**	**1.1280**	**0.0000**	**1,921.3090**	**1,921.3090**	**0.5588**		**1,933.0446**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.1154	1.4326	2.8300e-003	0.1730	1.9700e-003	0.1750	0.0469	1.8000e-003	0.0487		246.4063	246.4063	0.0133		246.6847
Total	**0.0922**	**0.1154**	**1.4326**	**2.8300e-003**	**0.1730**	**1.9700e-003**	**0.1750**	**0.0469**	**1.8000e-003**	**0.0487**		**246.4063**	**246.4063**	**0.0133**		**246.6847**

3.4 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198		1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9320**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**		**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0833	0.1041	1.2973	2.8300e-003	0.2236	1.8700e-003	0.2254	0.0593	1.7200e-003	0.0610		237.9165	237.9165	0.0122		238.1726
Total	**0.0833**	**0.1041**	**1.2973**	**2.8300e-003**	**0.2236**	**1.8700e-003**	**0.2254**	**0.0593**	**1.7200e-003**	**0.0610**		**237.9165**	**237.9165**	**0.0122**		**238.1726**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198	0.0000	1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.1364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9320**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**	**0.0000**	**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0833	0.1041	1.2973	2.8300e-003	0.1730	1.8700e-003	0.1749	0.0469	1.7200e-003	0.0486		237.9165	237.9165	0.0122		238.1726
Total	**0.0833**	**0.1041**	**1.2973**	**2.8300e-003**	**0.1730**	**1.8700e-003**	**0.1749**	**0.0469**	**1.7200e-003**	**0.0486**		**237.9165**	**237.9165**	**0.0122**		**238.1726**

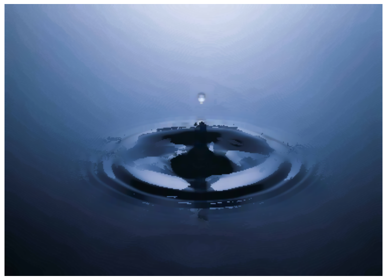
APPENDIX 8.2

Hydrology/Water Quality Documentation

Preliminary On-Site Hydrology Study

for

UC Riverside Highlander Hall Demolition Project





Prepared for:

UNIVERSITY OF CALIFORNIA
UC RIVERSIDE

Tricia Thrasher
1223 University Avenue Suite 200
Riverside, CA 92507

Prepared by:

David Beckwith and Associates, Inc
Civil & Structural Engineering - Land Surveying - QSD/QSP Environmental Services
1269 Pomona Road, Suite 108
Corona, CA 92882
www.davidbeckwithandassociates.com

Report Preparation Date
April 22, 2015

PRELIMINARY ON-SITE HYDROLOGY STUDY

for

UC Riverside Highlander Hall Demolition Project

Prepared for:

Tricia D Thrasher
Principal Environmental Project Manager
1223 University Avenue Suite 200
Riverside, CA 92507

Project Address:

Southwest Corner of University Avenue
and Southound I-215 Onramp
Riverside, CA 92507

Prepared by:

David M Beckwith, PE, QSD, QSP
David Beckwith and Associates, Inc
1269 Pomona Road, Suite 108
Corona, CA 92882
(714) 349-7007

Preparation Date:

April 22, 2015

Table of Contents

Section 1 Project Information

1.1 PURPOSE

The purpose of this report is to develop a hydrologic analysis of existing and proposed conditions, to determine the impact of the 100, 25, 10, 5, and 2-year storm events to the proposed project site and existing downstream facilities.

1.2 EXISTING CONDITIONS

The project site is located at the southwest corner of University Avenue and the Southbound I-215 onramp in the City of Riverside and is bordered by the I-215/60 freeway to the east, University Avenue to the north and Everton Place to the south. The topography has gentle relief sloping from southeast to northwest. It is currently developed with two residential (student housing) buildings and associated site parking. Approximately 84% of the 5.04-acre site is covered in impervious materials (pavement and buildings) leaving 16% of the site pervious for water infiltration.

An off-site hydrology study was not prepared as part of this report as no off-site waters will enter the project site given the current and future topography.

1.3 PROPOSED CONDITIONS

The proposed project consists of demolishing the existing buildings and associated site improvements and constructing a new student parking lot in its place. For the purposes of this analysis the University provided conceptual layout of 500 parking spaces was used. The proposed drainage patterns will mimic the existing topography and continue to drain from the southeast to northwest. Stormwater flows will be collected in a series of bioswale water quality systems, cleaned, and ultimately discharged into the existing storm drain system to the west. Major storm flows will bypass the bioswale system and be collected in a concrete ribbon gutter along the western edge of the project and discharged into the existing onsite storm drain system.

There is no need to provide on-site flow attenuation as the proposed site will not generate any additional storm run-off.

1.4 HYDROLOGIC METHODOLOGY

Peak run-off rates were developed using Bonadamins "CivilD – Riverside County Unit Hydrograph Method" computer programs. Methodology and supportive data for the hydrologic calculations may be found in this report, and in the "Riverside County Flood Control and Water Conservation District Hydrology Manual", dated April 1978.

Section 2 Results

2.1 HYDROLOGIC RESULTS

On-site analysis was performed to evaluate the run-off values.

Table 2.1 Pre-Construction Stormwater Run-Off Summary

Event Year	Event Duration (hrs)	Peak Flow (cfs)	Peak Volume (ac-ft)
2	24	1.31	0.75
5	24	1.75	0.98
10	24	2.08	1.15
25	24	2.51	1.39
100	24	3.17	1.76
2	6	3.32	0.45
5	6	4.11	0.55
10	6	4.70	0.63
25	6	5.49	0.74
100	6	6.67	0.91
2	3	3.28	0.30
5	3	4.21	0.38
10	3	4.92	0.45
25	3	5.86	0.54
100	3	7.28	0.68
2	1	4.97	0.19
5	1	6.70	0.25
10	1	8.00	0.31
25	1	9.73	0.37
100	1	12.35	0.48

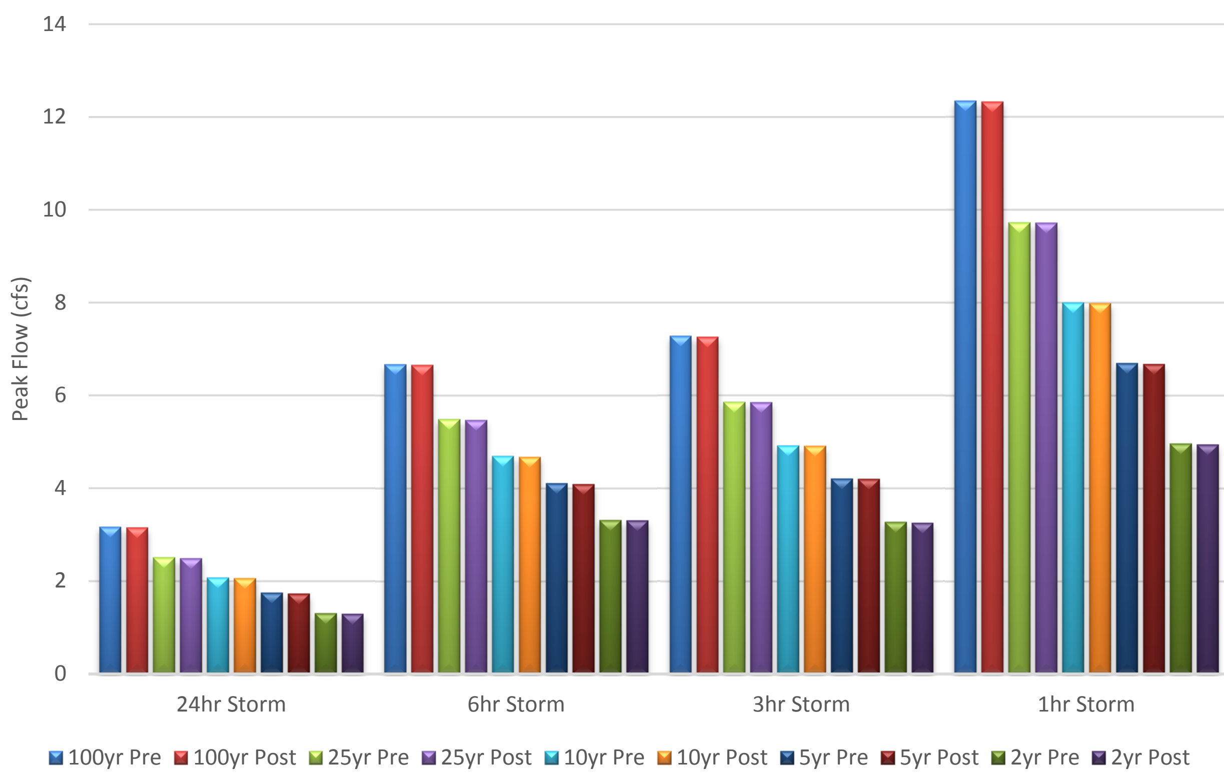
Table 2.2 Post-Construction Stormwater Run-Off Summary

Event Year	Event Duration (hrs)	Peak Flow (cfs)	Peak Volume (ac-ft)
2	24	1.30	0.74
5	24	1.73	0.97
10	24	2.06	1.14
25	24	2.49	1.38
100	24	3.15	1.74
2	6	3.31	0.44

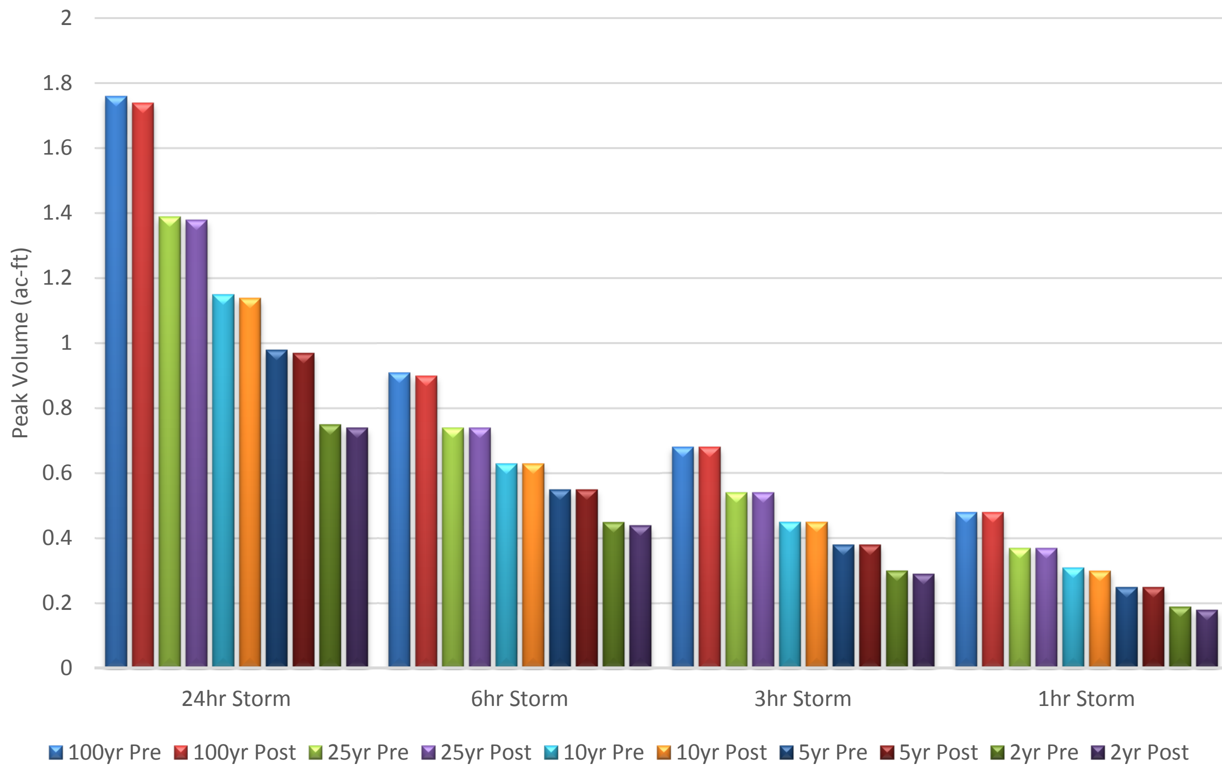
Table 2.2 Post-Construction Stormwater Run-Off Summary

Event Year	Event Duration (hrs)	Peak Flow (cfs)	Peak Volume (ac-ft)
5	6	4.09	0.55
10	6	4.68	0.63
25	6	5.47	0.74
100	6	6.66	0.90
2	3	3.26	0.29
5	3	4.20	0.38
10	3	4.91	0.45
25	3	5.85	0.54
100	3	7.26	0.68
2	1	4.95	0.18
5	1	6.68	0.25
10	1	7.99	0.30
25	1	9.72	0.37
100	1	12.33	0.48

Graph 2.1 Pre vs. Post Construction Stormwater Run-Off Peak Flow



Graph 2.2 Pre vs. Post Construction Stormwater Run-Off Peak Volume

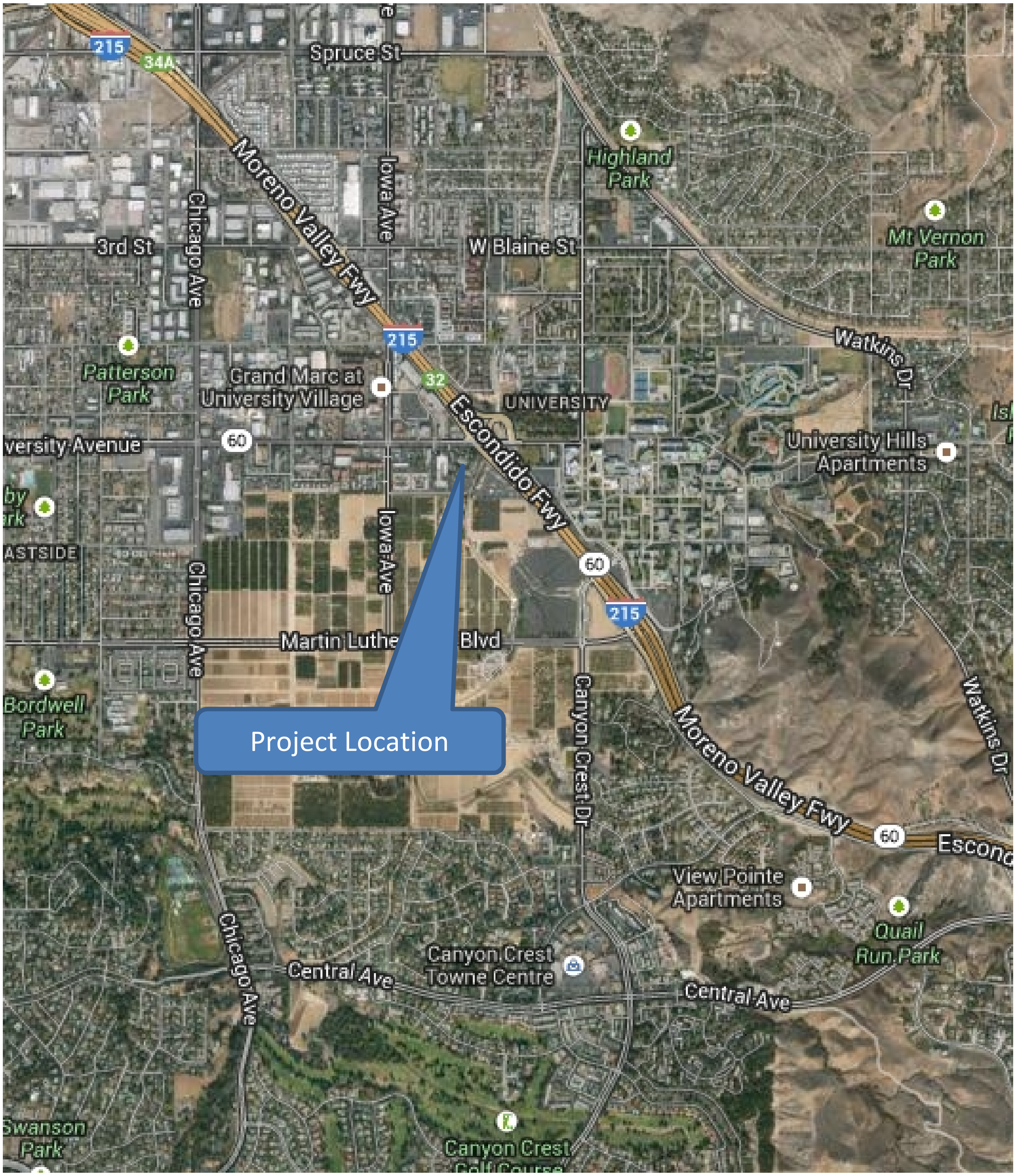


2.2 RESULTS AND CONCLUSIONS

It has been demonstrated that the 100, 25, 10, 5, and 2-year storm events in the post-construction version pre-construction situations will not generate any additional run-off in either flow or volume. As a result, no flow attenuation devices/structures will be necessary for the proposed development.

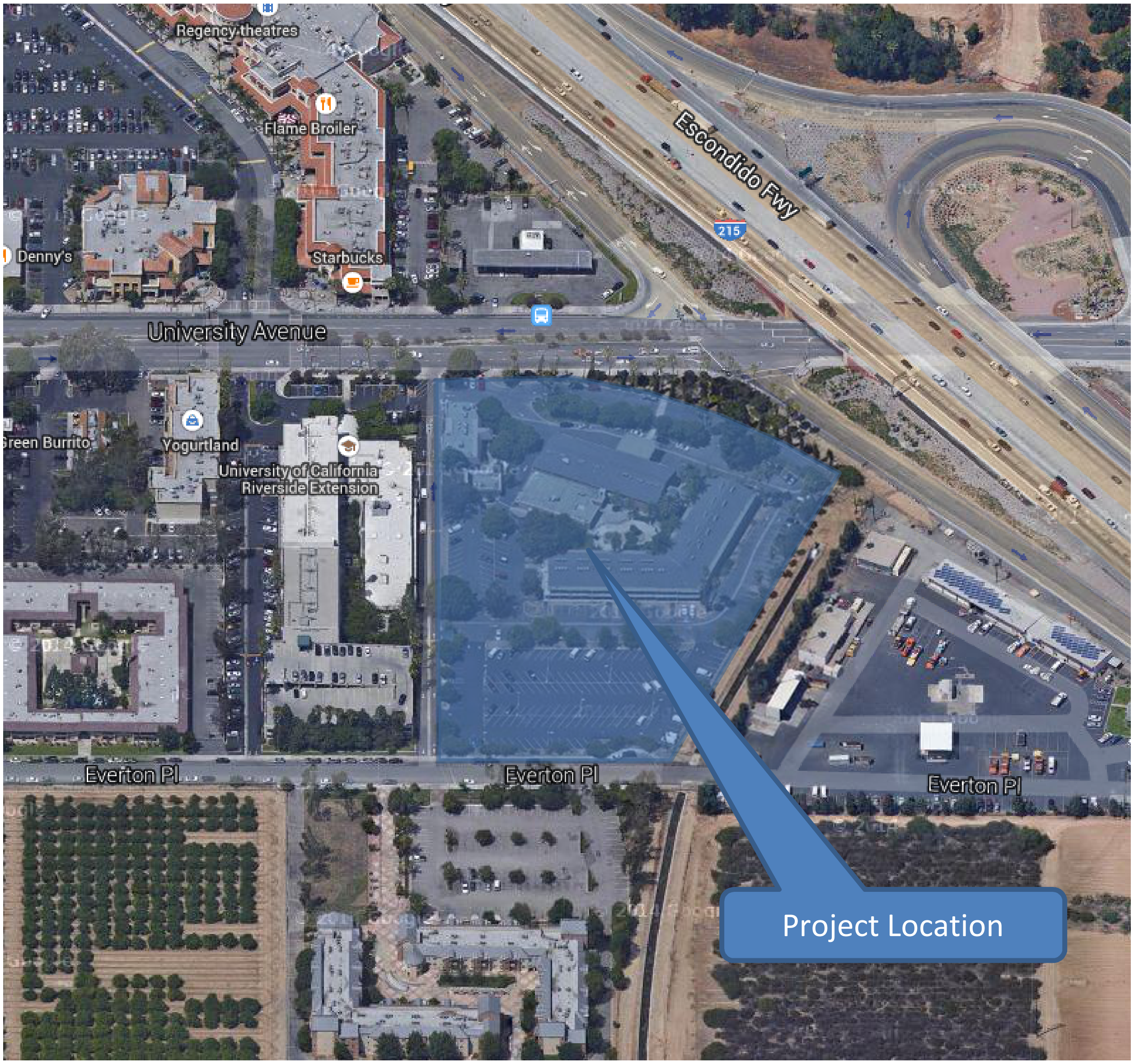
Section 3 Appendices

Site Map



Scale: 1in = 2000ft

Site Map

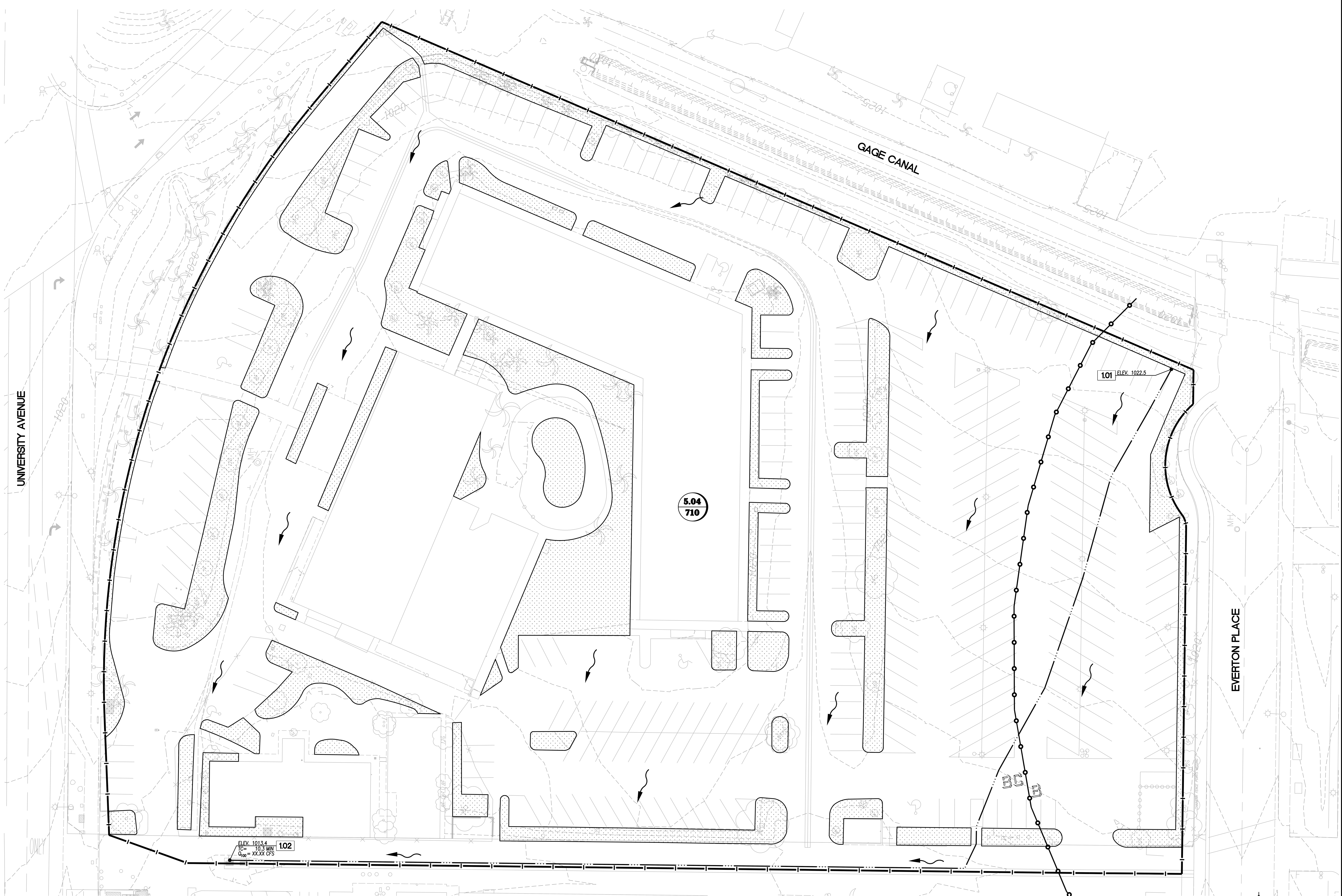


Scale: 1in = 200ft

Total Site Area: 5.04 acres

Existing Impervious Area: 4.21 acres

Proposed Impervious Area: 4.13 acres



HYDROLOGY LEGEND

AREA BOUNDARY

PROPOSED FLOWLINE

SOIL BOUNDARY

TIME OF CONCENTRATION — NODE ELEVATION — ELEV. XXX.XX — TC= XX.XX MIN — Q_{100} = XX.XX CFS — XX — NODE NUMBER — FLOW AT NODE — FLOW NODE

AC / LF — SUB-AREA (ACRES) — TRAVEL LENGTH (FT) — AREA NODE

PERVIOUS AREA

SURFACE FLOW DIRECTION

GRAPHIC SCALE

20 0 10 20 40 60

(IN FEET)
1 inch = 20 ft.

DAVID BECKWITH AND ASSOCIATES, INC
Civil & Structural Engineering - Land Surveying - QSD/QSP Environmental Services
1269 Pomona Road, Suite 108
Corona, CA 92882
(T) 714.349.7007 (F) 213.270.9488
www.davidbeckwithandassociates.com

REVISIONS

REV.	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	00/00/00

UNIVERSITY OF CALIFORNIA
UC RIVERSIDE
CAPITAL PROGRAMS
ARCHITECTS & ENGINEERS
1223 UNIVERSITY AVENUE, SUITE 200
RIVERSIDE, CA 92521
TEL:(951) 827-6424 FAX:(951) 827-5404

PROJECT TITLE:
HIGHLANDER HALL DEMOLITION

SHEET TITLE:
EXISTING CONDITIONS
HYDROLOGY MAP

DATE:	04/20/2015	ESTIMATE NO.	E-000-00
SCALE:	AS NOTED	CPMS NO.	CP00000000
DRAWN BY:	DMB	CAAN NO.	P0000
APPROVED BY:		PROJECT NO.	950545
COMMENTS:			

SHEET NUMBER 1
NUMBER OF SHEETS of 1

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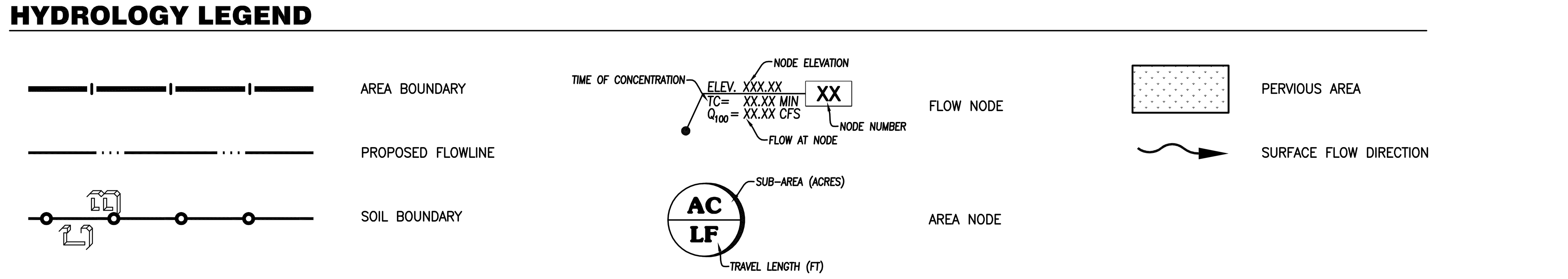
HYDROLOGY LEGEND



DAVID BECKWITH AND ASSOCIATES, INC
Civil & Structural Engineering - Land Surveying - QSD/QSP Environmental Services
1269 Pomona Road, Suite 108
Corona, CA 92882
(T) 714.349.7007 (F) 213.270.9488
www.davidbeckwithandassociates.com

REVISIONS

REV.	DESCRIPTION	DATE
	ISSUED FOR REVIEW	00/00/00

UC RIVERSIDE — UNIVERSITY OF CALIFORNIA
CAPITAL PROGRAMS
ARCHITECTS & ENGINEERS
1223 UNIVERSITY AVENUE, SUITE 200
RIVERSIDE, CA 92521
TEL:(951) 827-6424 FAX:(951) 827-5404

PROJECT TITLE:
HIGHLANDER HALL DEMOLITION

SHEET TITLE:
PROPOSED CONDITIONS HYDROLOGY MAP

DATE: 04/20/2015	ESTIMATE NO.	E-000-00
SCALE: AS NOTED	CPMS NO.	CP00000000
DRAWN BY: DMB	CAAN NO.	P0000
APPROVED BY:	PROJECT NO.	950545
COMMENTS:		

SHEET NUMBER 1 — NUMBER OF SHEETS 1 of 1

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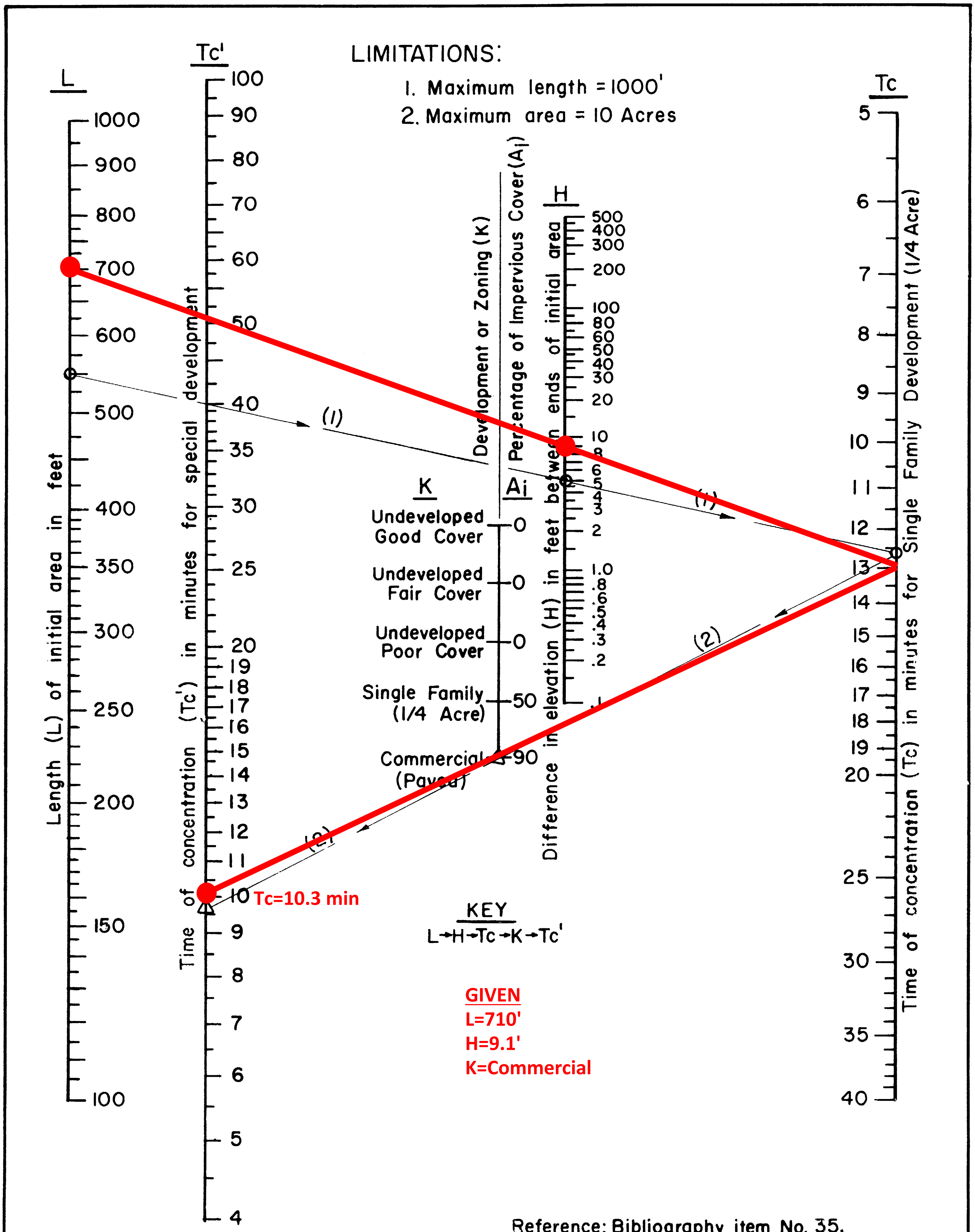
Time of Concentration

April 2015



Reference: Bibliography item No. 35.

RCFC & WCD

HYDROLOGY MANUAL

TIME OF CONCENTRATION FOR INITIAL SUBAREA

PLATE D-3

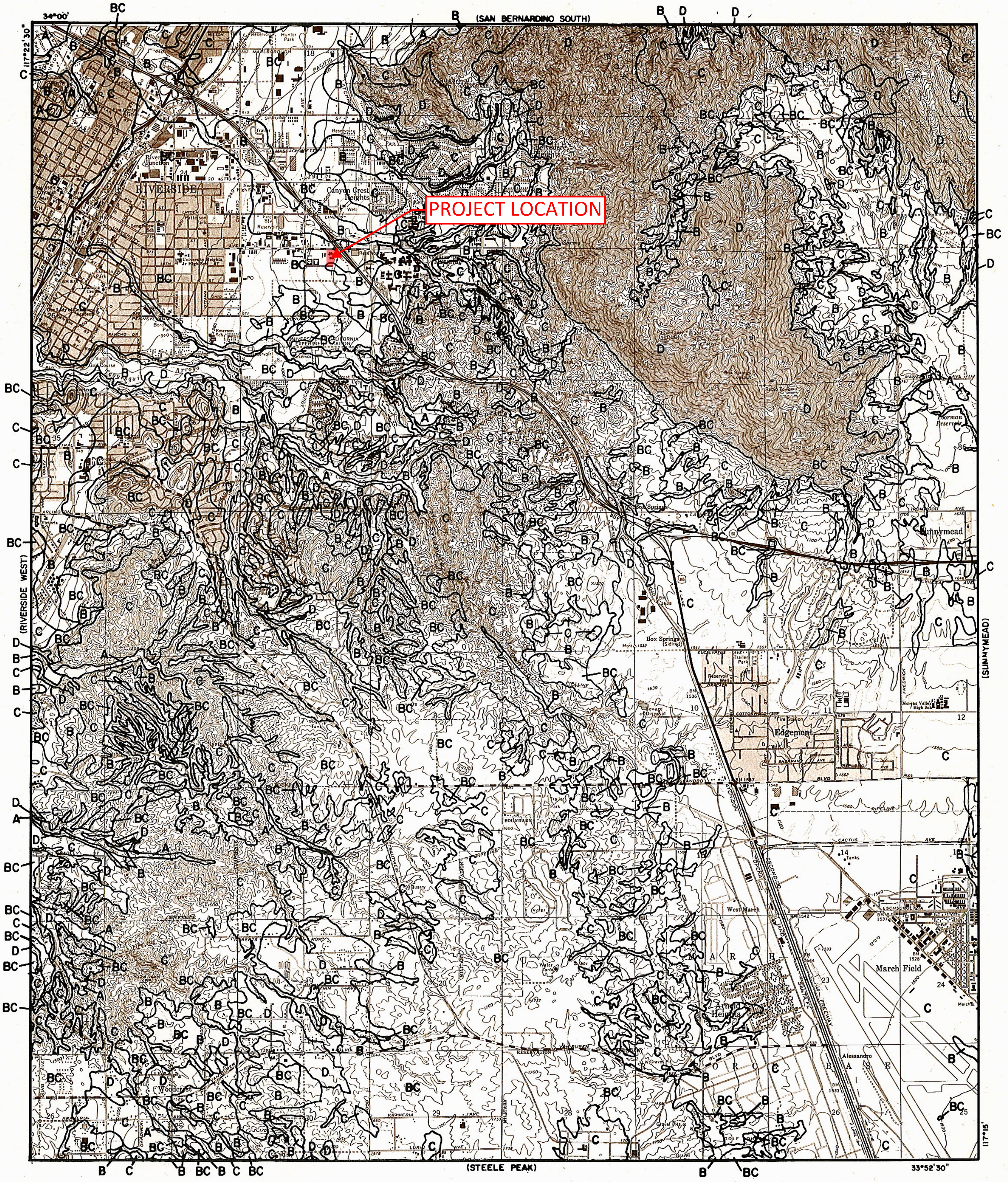
Runoff Index

April 2015

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

Soils Group Information Map



LEGEND

——— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

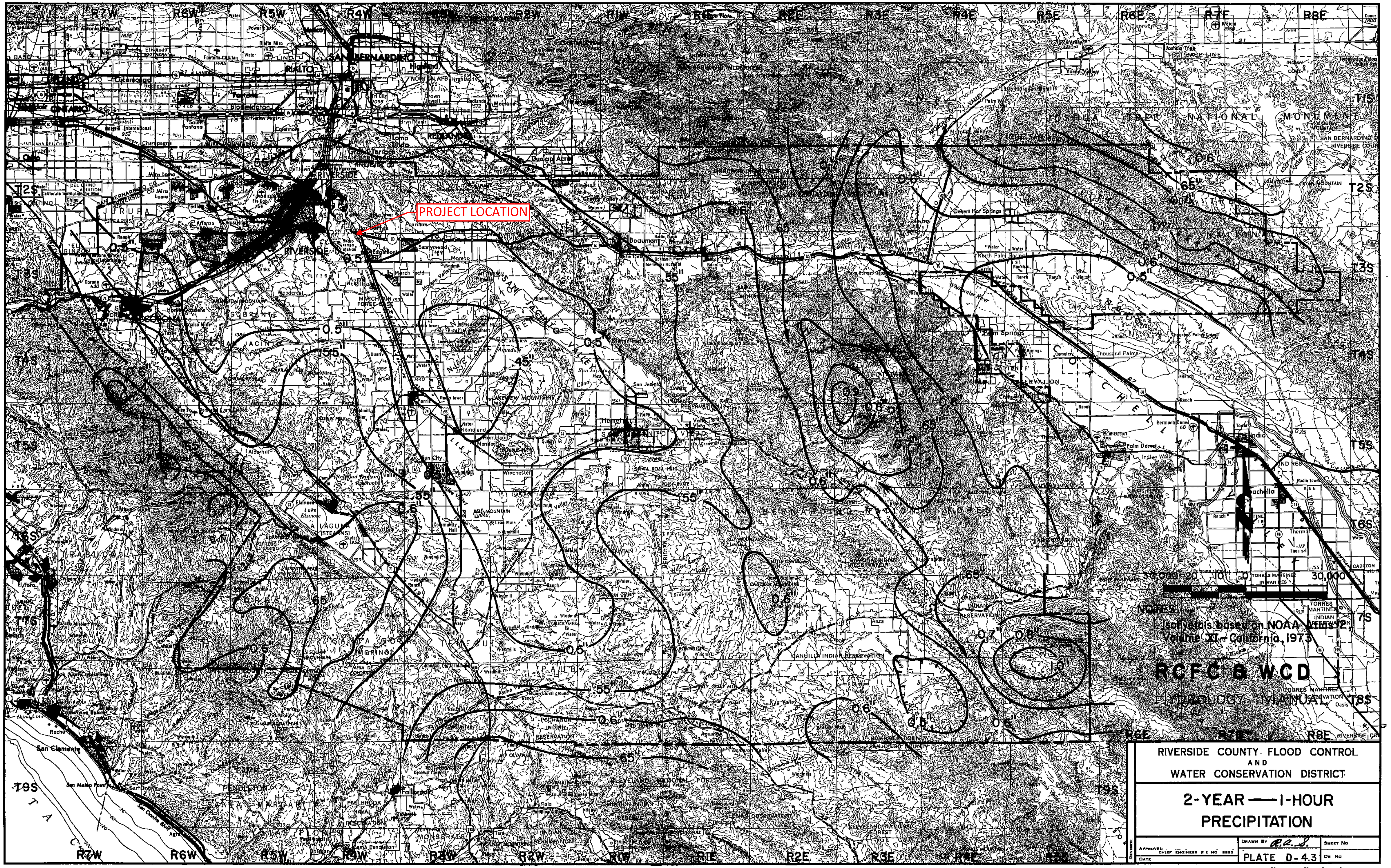
HYDROLOGY MANUAL

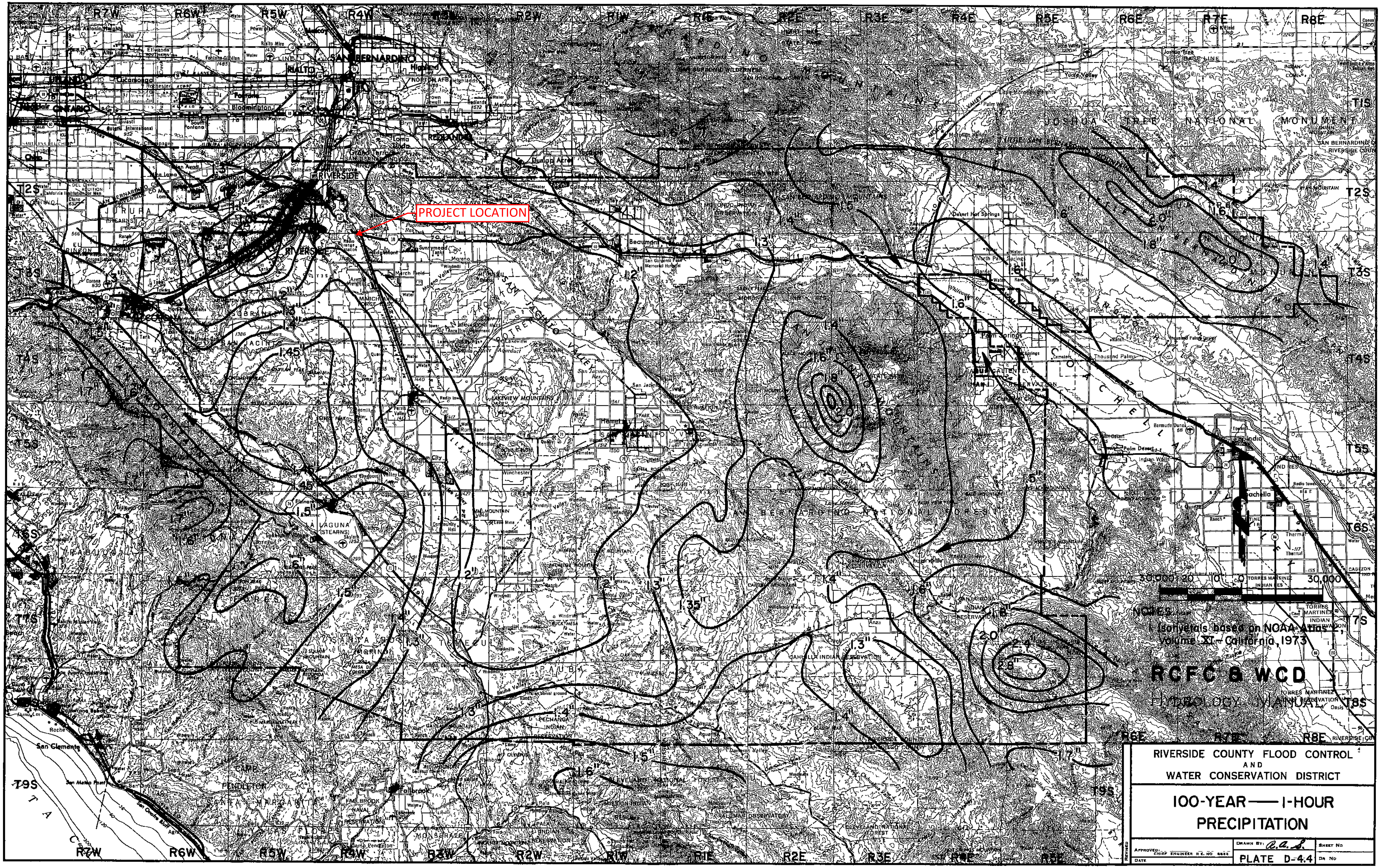
0 FEET 5000

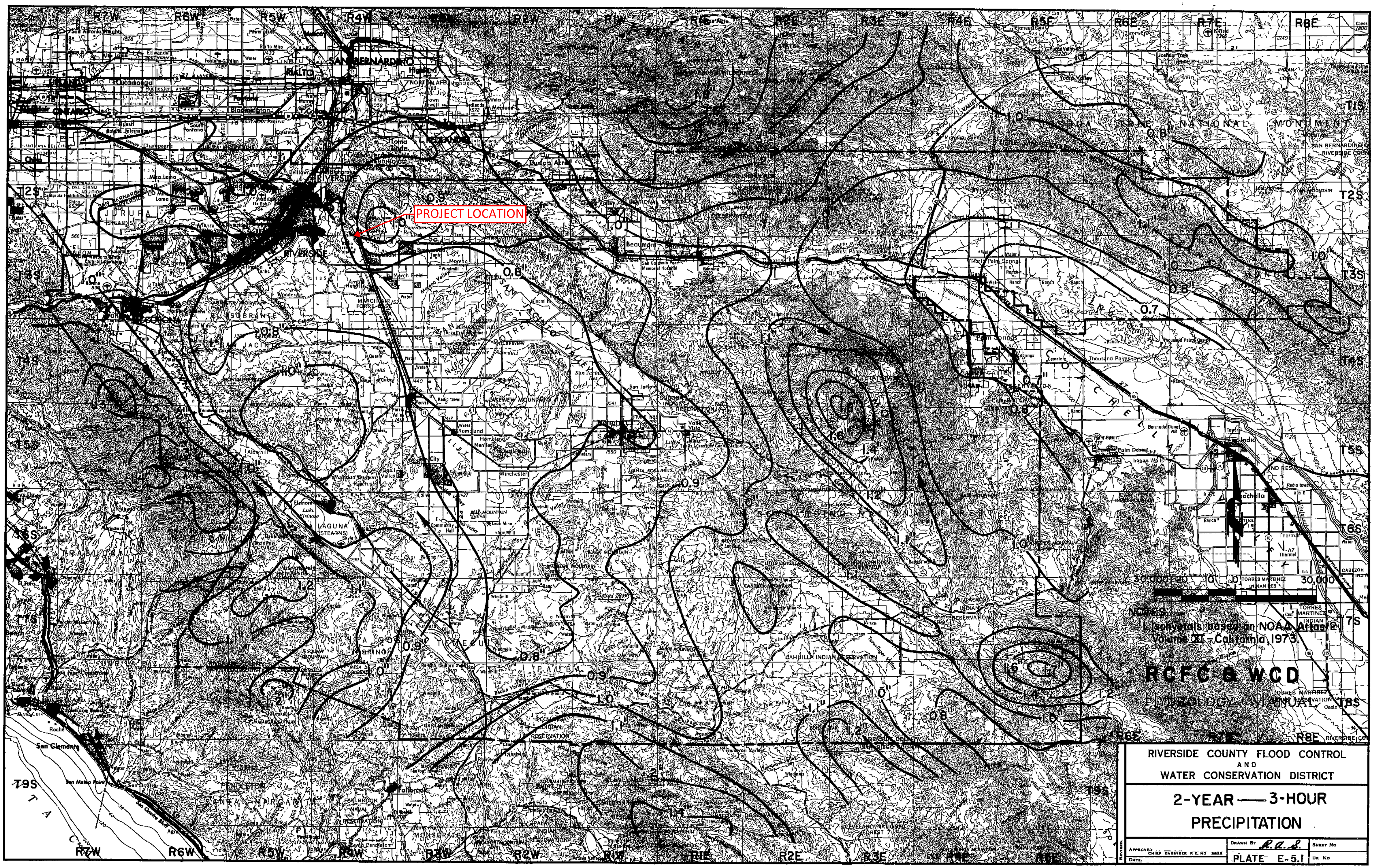
HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE-EAST

PLATE C-1.16

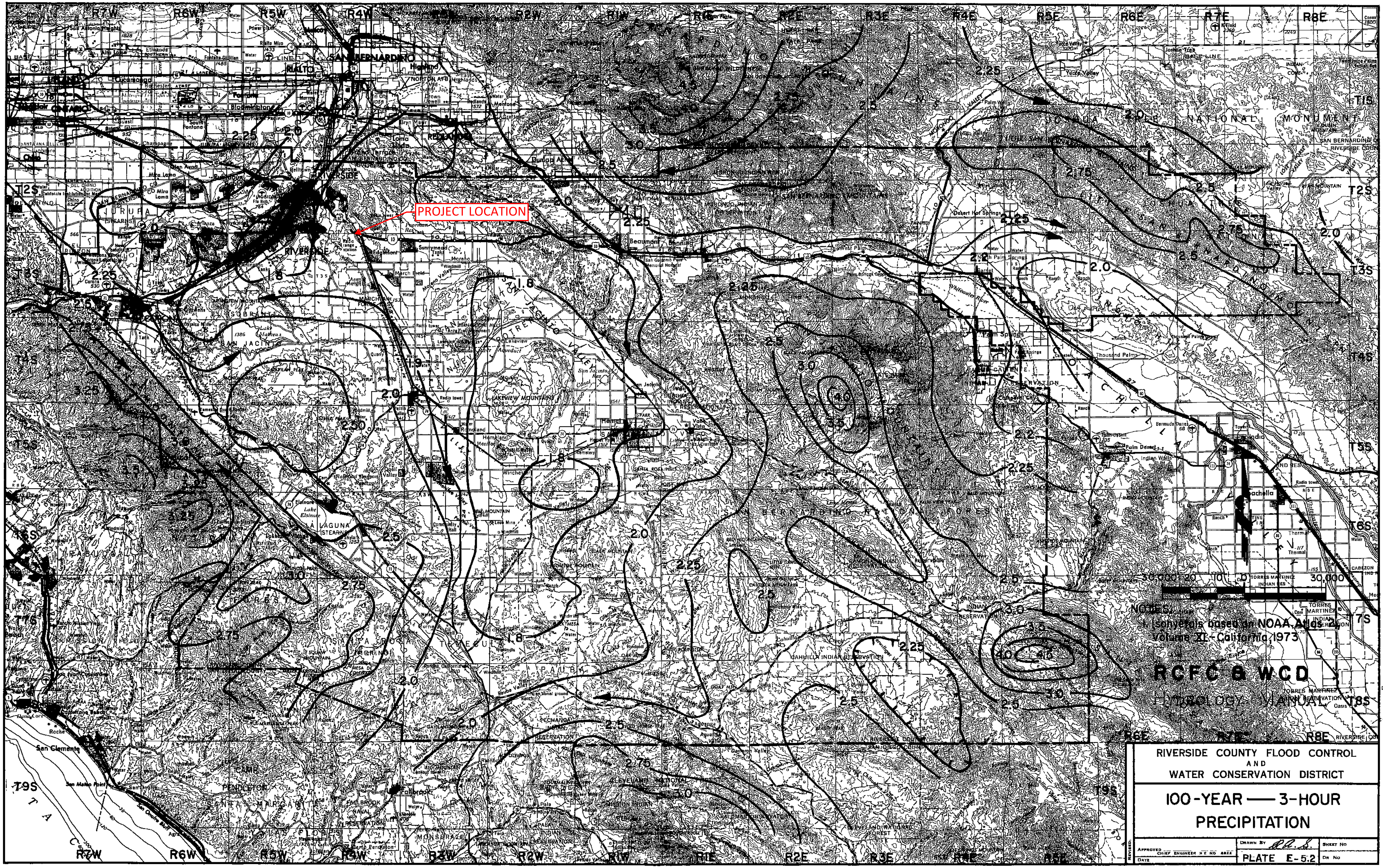
Isohyetals

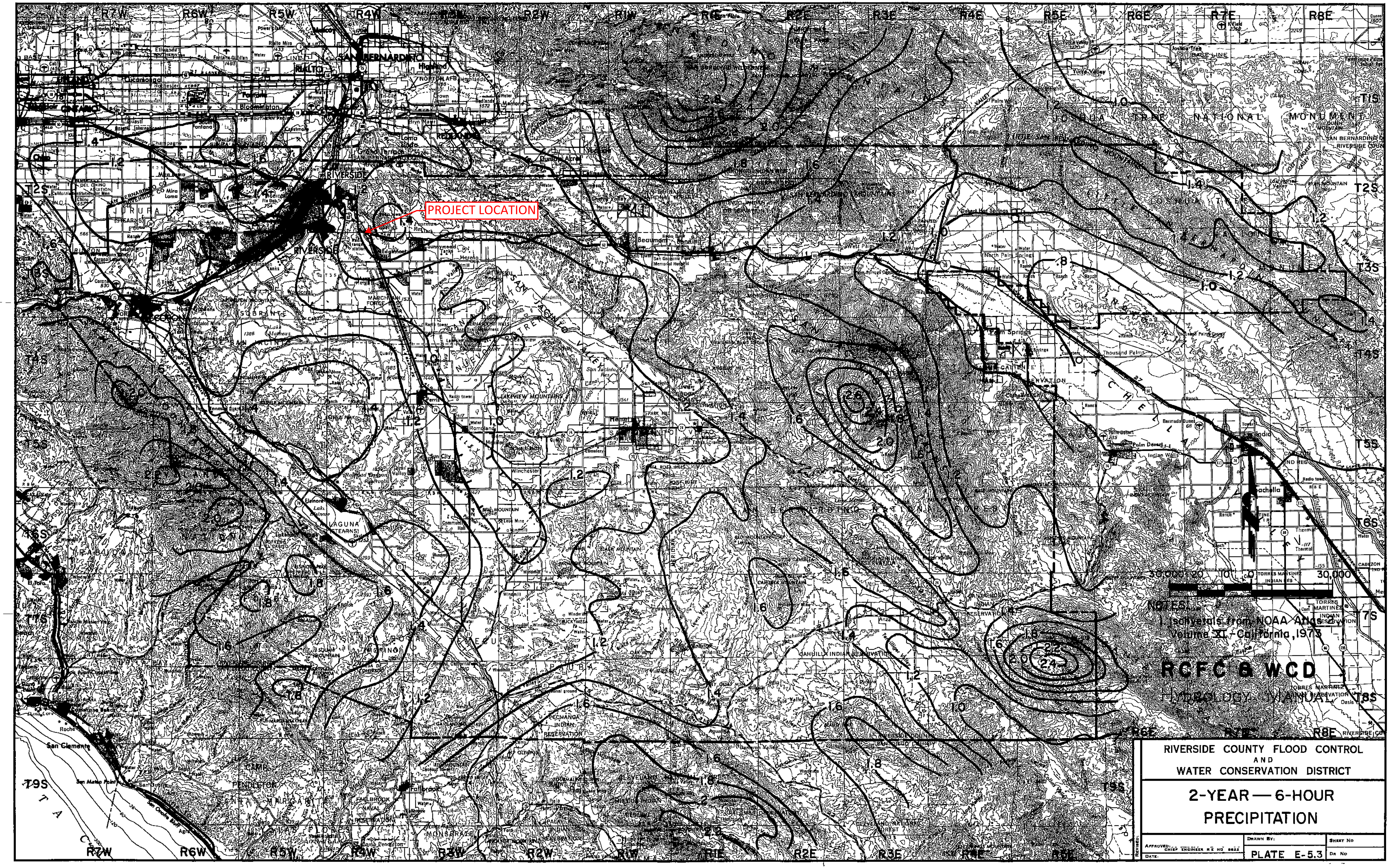

PROJECT LOCATION
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.3

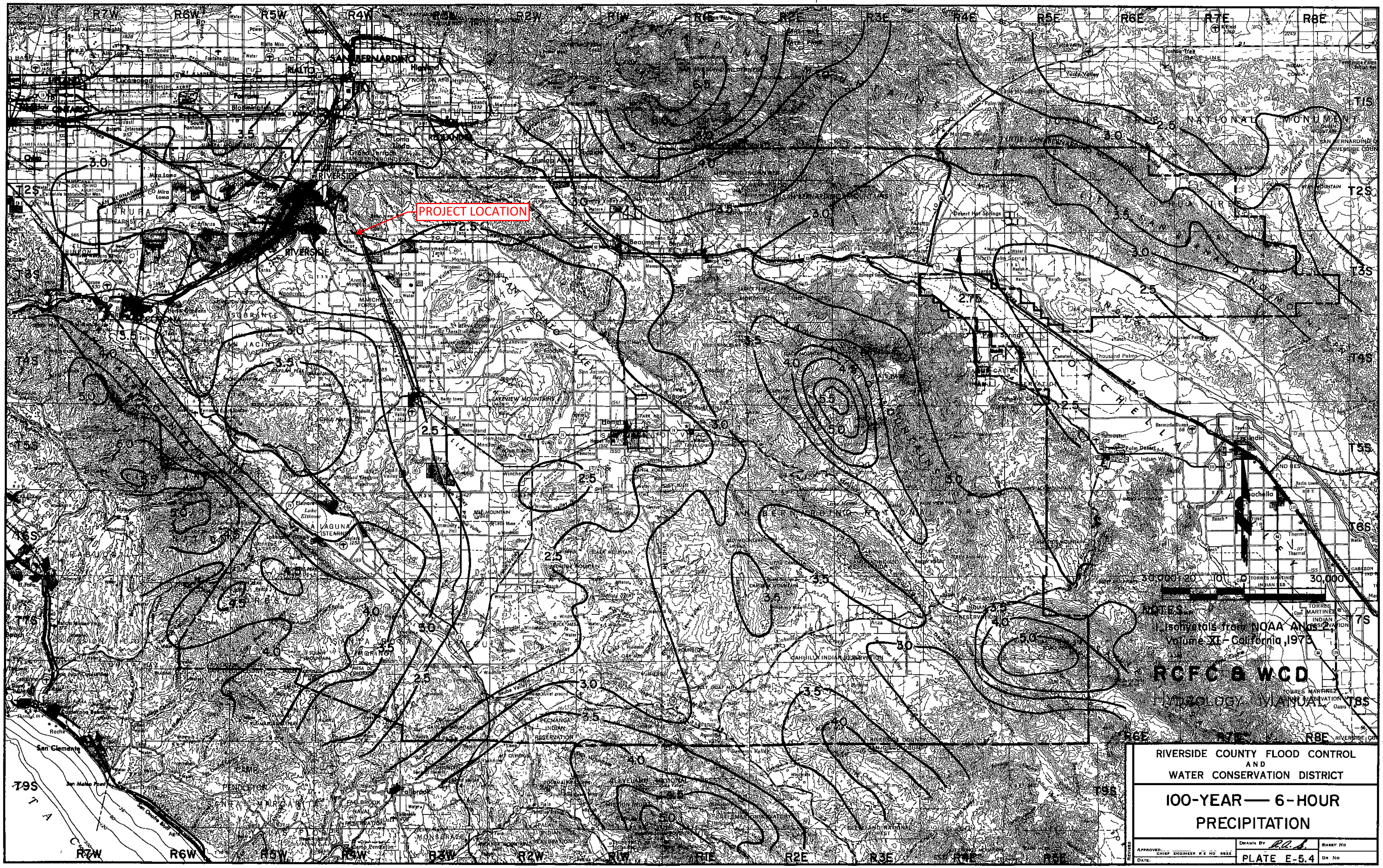

PROJECT LOCATION
NOTES:
1. Isohyetals based on NOAA Atlas 2 Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR —— 1-HOUR
PRECIPITATION
PLATE D-4.4
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO
RIVERSIDE
Beaumont
Perris
Hemet
San Clemente
PENDLETON
Fallbrook

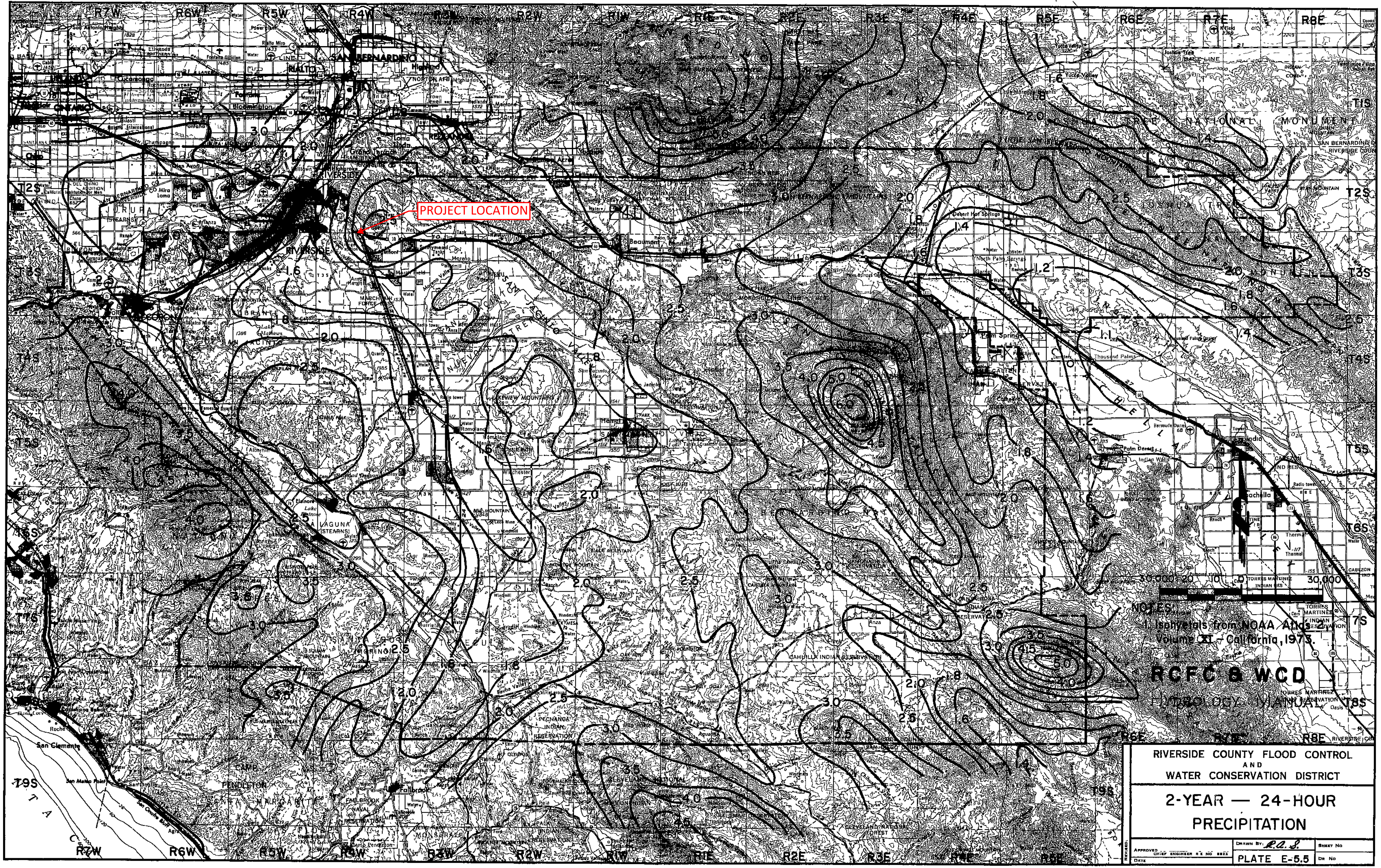


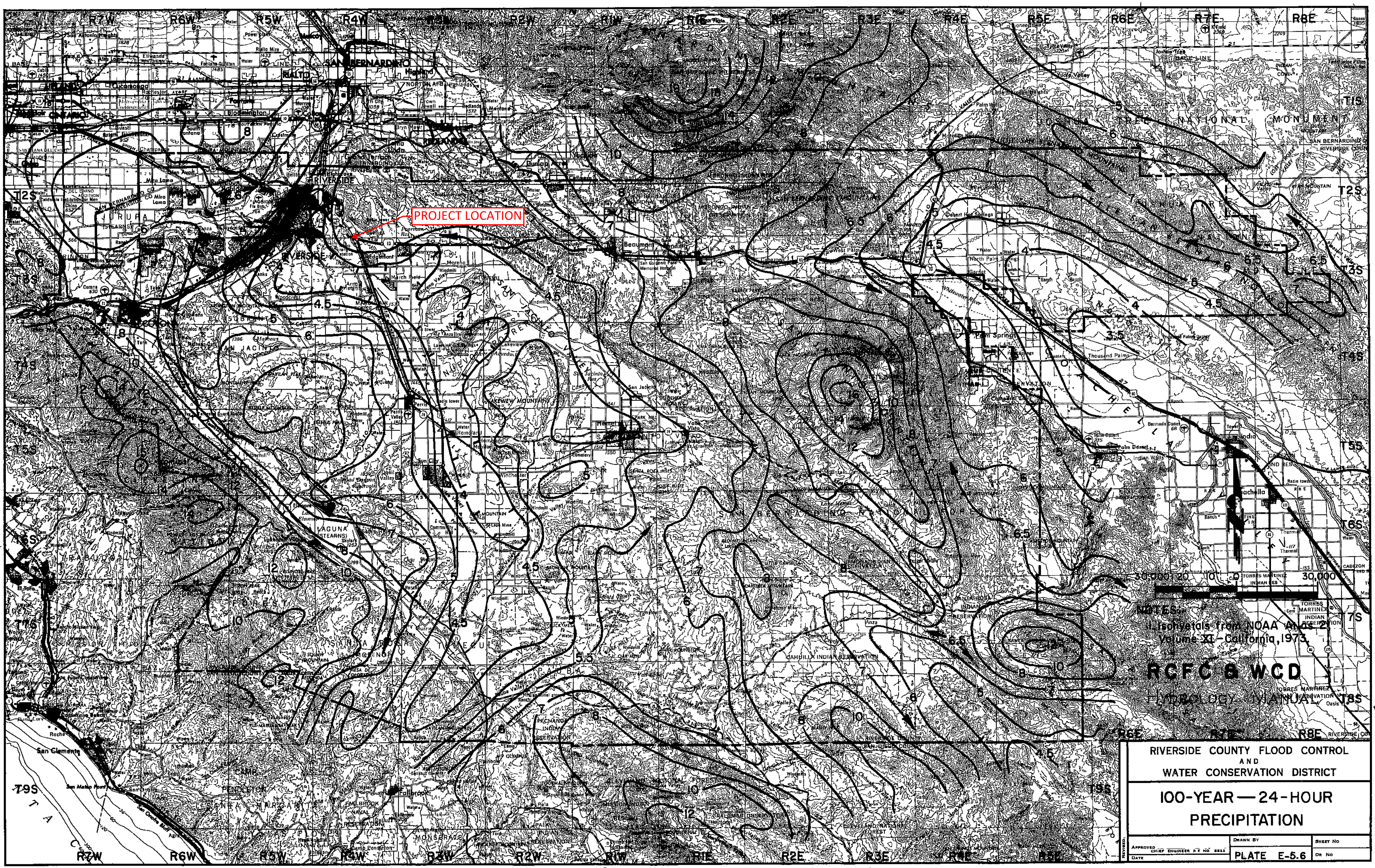
PROJECT LOCATION
NOTES:
Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR —— 3-HOUR PRECIPITATION
PLATE E-5.1


PROJECT LOCATION
SAN BERNARDINO
RIVERSIDE
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR —— 3-HOUR
PRECIPITATION
APPROVED
CHIEF ENGINEER
DATE
DRAWN BY
PLATE E-5.2
SHEET NO
DR NO


PROJECT LOCATION
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.3


PROJECT LOCATION
RIVERSIDE
SAN BERNARDINO
NOTES:
1. Isohyetals from NOAA Atlas 2 Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.4


PROJECT LOCATION
RIVERSIDE
SAN BERNARDINO
Beaumont
Banning
Hemet
Indio
Coachella
Elsinore
San Clemente
Fallbrook
NOTES:
1. Isohyetals from NOAA Atlas 2
Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.5
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S



PROJECT LOCATION
RIVERSIDE
SAN BERNARDINO
RIALTO
Beaumont
Palm Springs
Palm Desert
Indio
Coachella
San Clemente
CAMP PENDLETON
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.6

Existing Conditions Unit Hydrograph: 100yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 04/20/15 File: 201501PRE24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area =   5.04(Ac.) =   0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =   5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =   0.137 Hr.
Lag time =   8.24 Min.
25% of lag time =   2.06 Min.
40% of lag time =   3.30 Min.
Unit time =   5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =   0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall =   2.300(In)
Area Averaged 100-Year Rainfall =   5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.107)	0.009	0.031
2	0.17	0.07	0.040	(0.107)	0.009	0.031
3	0.25	0.07	0.040	(0.106)	0.009	0.031
4	0.33	0.10	0.060	(0.106)	0.014	0.046
5	0.42	0.10	0.060	(0.105)	0.014	0.046
6	0.50	0.10	0.060	(0.105)	0.014	0.046
7	0.58	0.10	0.060	(0.105)	0.014	0.046

8	0.67	0.10	0.060	(0.104)	0.014	0.046
9	0.75	0.10	0.060	(0.104)	0.014	0.046
10	0.83	0.13	0.080	(0.103)	0.018	0.062
11	0.92	0.13	0.080	(0.103)	0.018	0.062
12	1.00	0.13	0.080	(0.103)	0.018	0.062
13	1.08	0.10	0.060	(0.102)	0.014	0.046
14	1.17	0.10	0.060	(0.102)	0.014	0.046
15	1.25	0.10	0.060	(0.101)	0.014	0.046
16	1.33	0.10	0.060	(0.101)	0.014	0.046
17	1.42	0.10	0.060	(0.101)	0.014	0.046
18	1.50	0.10	0.060	(0.100)	0.014	0.046
19	1.58	0.10	0.060	(0.100)	0.014	0.046
20	1.67	0.10	0.060	(0.099)	0.014	0.046
21	1.75	0.10	0.060	(0.099)	0.014	0.046
22	1.83	0.13	0.080	(0.099)	0.018	0.062
23	1.92	0.13	0.080	(0.098)	0.018	0.062
24	2.00	0.13	0.080	(0.098)	0.018	0.062
25	2.08	0.13	0.080	(0.097)	0.018	0.062
26	2.17	0.13	0.080	(0.097)	0.018	0.062
27	2.25	0.13	0.080	(0.097)	0.018	0.062
28	2.33	0.13	0.080	(0.096)	0.018	0.062
29	2.42	0.13	0.080	(0.096)	0.018	0.062
30	2.50	0.13	0.080	(0.095)	0.018	0.062
31	2.58	0.17	0.100	(0.095)	0.023	0.077
32	2.67	0.17	0.100	(0.095)	0.023	0.077
33	2.75	0.17	0.100	(0.094)	0.023	0.077
34	2.83	0.17	0.100	(0.094)	0.023	0.077
35	2.92	0.17	0.100	(0.093)	0.023	0.077
36	3.00	0.17	0.100	(0.093)	0.023	0.077
37	3.08	0.17	0.100	(0.093)	0.023	0.077
38	3.17	0.17	0.100	(0.092)	0.023	0.077
39	3.25	0.17	0.100	(0.092)	0.023	0.077
40	3.33	0.17	0.100	(0.092)	0.023	0.077
41	3.42	0.17	0.100	(0.091)	0.023	0.077
42	3.50	0.17	0.100	(0.091)	0.023	0.077
43	3.58	0.17	0.100	(0.090)	0.023	0.077
44	3.67	0.17	0.100	(0.090)	0.023	0.077
45	3.75	0.17	0.100	(0.090)	0.023	0.077
46	3.83	0.20	0.120	(0.089)	0.028	0.092
47	3.92	0.20	0.120	(0.089)	0.028	0.092
48	4.00	0.20	0.120	(0.089)	0.028	0.092
49	4.08	0.20	0.120	(0.088)	0.028	0.092
50	4.17	0.20	0.120	(0.088)	0.028	0.092
51	4.25	0.20	0.120	(0.087)	0.028	0.092
52	4.33	0.23	0.140	(0.087)	0.032	0.108
53	4.42	0.23	0.140	(0.087)	0.032	0.108
54	4.50	0.23	0.140	(0.086)	0.032	0.108
55	4.58	0.23	0.140	(0.086)	0.032	0.108
56	4.67	0.23	0.140	(0.086)	0.032	0.108
57	4.75	0.23	0.140	(0.085)	0.032	0.108
58	4.83	0.27	0.160	(0.085)	0.037	0.123
59	4.92	0.27	0.160	(0.084)	0.037	0.123
60	5.00	0.27	0.160	(0.084)	0.037	0.123
61	5.08	0.20	0.120	(0.084)	0.028	0.092
62	5.17	0.20	0.120	(0.083)	0.028	0.092
63	5.25	0.20	0.120	(0.083)	0.028	0.092
64	5.33	0.23	0.140	(0.083)	0.032	0.108

65	5.42	0.23	0.140	(0.082)	0.032	0.108
66	5.50	0.23	0.140	(0.082)	0.032	0.108
67	5.58	0.27	0.160	(0.082)	0.037	0.123
68	5.67	0.27	0.160	(0.081)	0.037	0.123
69	5.75	0.27	0.160	(0.081)	0.037	0.123
70	5.83	0.27	0.160	(0.080)	0.037	0.123
71	5.92	0.27	0.160	(0.080)	0.037	0.123
72	6.00	0.27	0.160	(0.080)	0.037	0.123
73	6.08	0.30	0.180	(0.079)	0.042	0.138
74	6.17	0.30	0.180	(0.079)	0.042	0.138
75	6.25	0.30	0.180	(0.079)	0.042	0.138
76	6.33	0.30	0.180	(0.078)	0.042	0.138
77	6.42	0.30	0.180	(0.078)	0.042	0.138
78	6.50	0.30	0.180	(0.078)	0.042	0.138
79	6.58	0.33	0.200	(0.077)	0.046	0.154
80	6.67	0.33	0.200	(0.077)	0.046	0.154
81	6.75	0.33	0.200	(0.077)	0.046	0.154
82	6.83	0.33	0.200	(0.076)	0.046	0.154
83	6.92	0.33	0.200	(0.076)	0.046	0.154
84	7.00	0.33	0.200	(0.076)	0.046	0.154
85	7.08	0.33	0.200	(0.075)	0.046	0.154
86	7.17	0.33	0.200	(0.075)	0.046	0.154
87	7.25	0.33	0.200	(0.075)	0.046	0.154
88	7.33	0.37	0.220	(0.074)	0.051	0.169
89	7.42	0.37	0.220	(0.074)	0.051	0.169
90	7.50	0.37	0.220	(0.074)	0.051	0.169
91	7.58	0.40	0.240	(0.073)	0.055	0.185
92	7.67	0.40	0.240	(0.073)	0.055	0.185
93	7.75	0.40	0.240	(0.072)	0.055	0.185
94	7.83	0.43	0.260	(0.072)	0.060	0.200
95	7.92	0.43	0.260	(0.072)	0.060	0.200
96	8.00	0.43	0.260	(0.071)	0.060	0.200
97	8.08	0.50	0.300	(0.071)	0.069	0.231
98	8.17	0.50	0.300	(0.071)	0.069	0.231
99	8.25	0.50	0.300	(0.071)	0.069	0.231
100	8.33	0.50	0.300	(0.070)	0.069	0.231
101	8.42	0.50	0.300	(0.070)	0.069	0.231
102	8.50	0.50	0.300	(0.070)	0.069	0.231
103	8.58	0.53	0.320	0.069	(0.074)	0.251
104	8.67	0.53	0.320	0.069	(0.074)	0.251
105	8.75	0.53	0.320	0.069	(0.074)	0.251
106	8.83	0.57	0.340	0.068	(0.079)	0.272
107	8.92	0.57	0.340	0.068	(0.079)	0.272
108	9.00	0.57	0.340	0.068	(0.079)	0.272
109	9.08	0.63	0.380	0.067	(0.088)	0.313
110	9.17	0.63	0.380	0.067	(0.088)	0.313
111	9.25	0.63	0.380	0.067	(0.088)	0.313
112	9.33	0.67	0.400	0.066	(0.092)	0.334
113	9.42	0.67	0.400	0.066	(0.092)	0.334
114	9.50	0.67	0.400	0.066	(0.092)	0.334
115	9.58	0.70	0.420	0.065	(0.097)	0.355
116	9.67	0.70	0.420	0.065	(0.097)	0.355
117	9.75	0.70	0.420	0.065	(0.097)	0.355
118	9.83	0.73	0.440	0.064	(0.102)	0.376
119	9.92	0.73	0.440	0.064	(0.102)	0.376
120	10.00	0.73	0.440	0.064	(0.102)	0.376
121	10.08	0.50	0.300	0.063	(0.069)	0.237

122	10.17	0.50	0.300	0.063	(0.069)	0.237
123	10.25	0.50	0.300	0.063	(0.069)	0.237
124	10.33	0.50	0.300	0.063	(0.069)	0.237
125	10.42	0.50	0.300	0.062	(0.069)	0.238
126	10.50	0.50	0.300	0.062	(0.069)	0.238
127	10.58	0.67	0.400	0.062	(0.092)	0.338
128	10.67	0.67	0.400	0.061	(0.092)	0.339
129	10.75	0.67	0.400	0.061	(0.092)	0.339
130	10.83	0.67	0.400	0.061	(0.092)	0.339
131	10.92	0.67	0.400	0.060	(0.092)	0.340
132	11.00	0.67	0.400	0.060	(0.092)	0.340
133	11.08	0.63	0.380	0.060	(0.088)	0.320
134	11.17	0.63	0.380	0.060	(0.088)	0.320
135	11.25	0.63	0.380	0.059	(0.088)	0.321
136	11.33	0.63	0.380	0.059	(0.088)	0.321
137	11.42	0.63	0.380	0.059	(0.088)	0.321
138	11.50	0.63	0.380	0.058	(0.088)	0.322
139	11.58	0.57	0.340	0.058	(0.079)	0.282
140	11.67	0.57	0.340	0.058	(0.079)	0.282
141	11.75	0.57	0.340	0.058	(0.079)	0.282
142	11.83	0.60	0.360	0.057	(0.083)	0.303
143	11.92	0.60	0.360	0.057	(0.083)	0.303
144	12.00	0.60	0.360	0.057	(0.083)	0.303
145	12.08	0.83	0.500	0.056	(0.116)	0.444
146	12.17	0.83	0.500	0.056	(0.116)	0.444
147	12.25	0.83	0.500	0.056	(0.116)	0.444
148	12.33	0.87	0.520	0.056	(0.120)	0.464
149	12.42	0.87	0.520	0.055	(0.120)	0.465
150	12.50	0.87	0.520	0.055	(0.120)	0.465
151	12.58	0.93	0.560	0.055	(0.129)	0.505
152	12.67	0.93	0.560	0.054	(0.129)	0.506
153	12.75	0.93	0.560	0.054	(0.129)	0.506
154	12.83	0.97	0.580	0.054	(0.134)	0.526
155	12.92	0.97	0.580	0.054	(0.134)	0.526
156	13.00	0.97	0.580	0.053	(0.134)	0.527
157	13.08	1.13	0.680	0.053	(0.157)	0.627
158	13.17	1.13	0.680	0.053	(0.157)	0.627
159	13.25	1.13	0.680	0.053	(0.157)	0.627
160	13.33	1.13	0.680	0.052	(0.157)	0.628
161	13.42	1.13	0.680	0.052	(0.157)	0.628
162	13.50	1.13	0.680	0.052	(0.157)	0.628
163	13.58	0.77	0.460	0.051	(0.106)	0.409
164	13.67	0.77	0.460	0.051	(0.106)	0.409
165	13.75	0.77	0.460	0.051	(0.106)	0.409
166	13.83	0.77	0.460	0.051	(0.106)	0.409
167	13.92	0.77	0.460	0.050	(0.106)	0.410
168	14.00	0.77	0.460	0.050	(0.106)	0.410
169	14.08	0.90	0.540	0.050	(0.125)	0.490
170	14.17	0.90	0.540	0.050	(0.125)	0.490
171	14.25	0.90	0.540	0.049	(0.125)	0.491
172	14.33	0.87	0.520	0.049	(0.120)	0.471
173	14.42	0.87	0.520	0.049	(0.120)	0.471
174	14.50	0.87	0.520	0.049	(0.120)	0.471
175	14.58	0.87	0.520	0.048	(0.120)	0.472
176	14.67	0.87	0.520	0.048	(0.120)	0.472
177	14.75	0.87	0.520	0.048	(0.120)	0.472
178	14.83	0.83	0.500	0.048	(0.116)	0.452

179	14.92	0.83	0.500	0.047	(0.116)	0.453
180	15.00	0.83	0.500	0.047	(0.116)	0.453
181	15.08	0.80	0.480	0.047	(0.111)	0.433
182	15.17	0.80	0.480	0.047	(0.111)	0.433
183	15.25	0.80	0.480	0.046	(0.111)	0.434
184	15.33	0.77	0.460	0.046	(0.106)	0.414
185	15.42	0.77	0.460	0.046	(0.106)	0.414
186	15.50	0.77	0.460	0.046	(0.106)	0.414
187	15.58	0.63	0.380	0.046	(0.088)	0.334
188	15.67	0.63	0.380	0.045	(0.088)	0.335
189	15.75	0.63	0.380	0.045	(0.088)	0.335
190	15.83	0.63	0.380	0.045	(0.088)	0.335
191	15.92	0.63	0.380	0.045	(0.088)	0.335
192	16.00	0.63	0.380	0.044	(0.088)	0.336
193	16.08	0.13	0.080	(0.044)	0.018	0.062
194	16.17	0.13	0.080	(0.044)	0.018	0.062
195	16.25	0.13	0.080	(0.044)	0.018	0.062
196	16.33	0.13	0.080	(0.043)	0.018	0.062
197	16.42	0.13	0.080	(0.043)	0.018	0.062
198	16.50	0.13	0.080	(0.043)	0.018	0.062
199	16.58	0.10	0.060	(0.043)	0.014	0.046
200	16.67	0.10	0.060	(0.043)	0.014	0.046
201	16.75	0.10	0.060	(0.042)	0.014	0.046
202	16.83	0.10	0.060	(0.042)	0.014	0.046
203	16.92	0.10	0.060	(0.042)	0.014	0.046
204	17.00	0.10	0.060	(0.042)	0.014	0.046
205	17.08	0.17	0.100	(0.042)	0.023	0.077
206	17.17	0.17	0.100	(0.041)	0.023	0.077
207	17.25	0.17	0.100	(0.041)	0.023	0.077
208	17.33	0.17	0.100	(0.041)	0.023	0.077
209	17.42	0.17	0.100	(0.041)	0.023	0.077
210	17.50	0.17	0.100	(0.040)	0.023	0.077
211	17.58	0.17	0.100	(0.040)	0.023	0.077
212	17.67	0.17	0.100	(0.040)	0.023	0.077
213	17.75	0.17	0.100	(0.040)	0.023	0.077
214	17.83	0.13	0.080	(0.040)	0.018	0.062
215	17.92	0.13	0.080	(0.039)	0.018	0.062
216	18.00	0.13	0.080	(0.039)	0.018	0.062
217	18.08	0.13	0.080	(0.039)	0.018	0.062
218	18.17	0.13	0.080	(0.039)	0.018	0.062
219	18.25	0.13	0.080	(0.039)	0.018	0.062
220	18.33	0.13	0.080	(0.039)	0.018	0.062
221	18.42	0.13	0.080	(0.038)	0.018	0.062
222	18.50	0.13	0.080	(0.038)	0.018	0.062
223	18.58	0.10	0.060	(0.038)	0.014	0.046
224	18.67	0.10	0.060	(0.038)	0.014	0.046
225	18.75	0.10	0.060	(0.038)	0.014	0.046
226	18.83	0.07	0.040	(0.037)	0.009	0.031
227	18.92	0.07	0.040	(0.037)	0.009	0.031
228	19.00	0.07	0.040	(0.037)	0.009	0.031
229	19.08	0.10	0.060	(0.037)	0.014	0.046
230	19.17	0.10	0.060	(0.037)	0.014	0.046
231	19.25	0.10	0.060	(0.037)	0.014	0.046
232	19.33	0.13	0.080	(0.036)	0.018	0.062
233	19.42	0.13	0.080	(0.036)	0.018	0.062
234	19.50	0.13	0.080	(0.036)	0.018	0.062
235	19.58	0.10	0.060	(0.036)	0.014	0.046

236	19.67	0.10	0.060	(0.036)	0.014	0.046
237	19.75	0.10	0.060	(0.036)	0.014	0.046
238	19.83	0.07	0.040	(0.035)	0.009	0.031
239	19.92	0.07	0.040	(0.035)	0.009	0.031
240	20.00	0.07	0.040	(0.035)	0.009	0.031
241	20.08	0.10	0.060	(0.035)	0.014	0.046
242	20.17	0.10	0.060	(0.035)	0.014	0.046
243	20.25	0.10	0.060	(0.035)	0.014	0.046
244	20.33	0.10	0.060	(0.034)	0.014	0.046
245	20.42	0.10	0.060	(0.034)	0.014	0.046
246	20.50	0.10	0.060	(0.034)	0.014	0.046
247	20.58	0.10	0.060	(0.034)	0.014	0.046
248	20.67	0.10	0.060	(0.034)	0.014	0.046
249	20.75	0.10	0.060	(0.034)	0.014	0.046
250	20.83	0.07	0.040	(0.034)	0.009	0.031
251	20.92	0.07	0.040	(0.033)	0.009	0.031
252	21.00	0.07	0.040	(0.033)	0.009	0.031
253	21.08	0.10	0.060	(0.033)	0.014	0.046
254	21.17	0.10	0.060	(0.033)	0.014	0.046
255	21.25	0.10	0.060	(0.033)	0.014	0.046
256	21.33	0.07	0.040	(0.033)	0.009	0.031
257	21.42	0.07	0.040	(0.033)	0.009	0.031
258	21.50	0.07	0.040	(0.033)	0.009	0.031
259	21.58	0.10	0.060	(0.032)	0.014	0.046
260	21.67	0.10	0.060	(0.032)	0.014	0.046
261	21.75	0.10	0.060	(0.032)	0.014	0.046
262	21.83	0.07	0.040	(0.032)	0.009	0.031
263	21.92	0.07	0.040	(0.032)	0.009	0.031
264	22.00	0.07	0.040	(0.032)	0.009	0.031
265	22.08	0.10	0.060	(0.032)	0.014	0.046
266	22.17	0.10	0.060	(0.032)	0.014	0.046
267	22.25	0.10	0.060	(0.032)	0.014	0.046
268	22.33	0.07	0.040	(0.031)	0.009	0.031
269	22.42	0.07	0.040	(0.031)	0.009	0.031
270	22.50	0.07	0.040	(0.031)	0.009	0.031
271	22.58	0.07	0.040	(0.031)	0.009	0.031
272	22.67	0.07	0.040	(0.031)	0.009	0.031
273	22.75	0.07	0.040	(0.031)	0.009	0.031
274	22.83	0.07	0.040	(0.031)	0.009	0.031
275	22.92	0.07	0.040	(0.031)	0.009	0.031
276	23.00	0.07	0.040	(0.031)	0.009	0.031
277	23.08	0.07	0.040	(0.031)	0.009	0.031
278	23.17	0.07	0.040	(0.031)	0.009	0.031
279	23.25	0.07	0.040	(0.031)	0.009	0.031
280	23.33	0.07	0.040	(0.031)	0.009	0.031
281	23.42	0.07	0.040	(0.030)	0.009	0.031
282	23.50	0.07	0.040	(0.030)	0.009	0.031
283	23.58	0.07	0.040	(0.030)	0.009	0.031
284	23.67	0.07	0.040	(0.030)	0.009	0.031
285	23.75	0.07	0.040	(0.030)	0.009	0.031
286	23.83	0.07	0.040	(0.030)	0.009	0.031
287	23.92	0.07	0.040	(0.030)	0.009	0.031
288	24.00	0.07	0.040	(0.030)	0.009	0.031

(Loss Rate Not Used)

Sum = 100.0 Sum = 50.4

Flood volume = Effective rainfall 4.20(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)

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     Total soil loss =      0.80(In)
     Total soil loss =     0.337(Ac.Ft)
     Total rainfall =      5.00(In)
     Flood volume =       76782.3 Cubic Feet
     Total soil loss =      14692.8 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      3.165(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         24 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0         2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0001      0.01  Q          |         |         |         |
   0+10       0.0005      0.06  Q          |         |         |         |
   0+15       0.0012      0.11  Q          |         |         |         |
   0+20       0.0022      0.14  Q          |         |         |         |
   0+25       0.0034      0.17  Q          |         |         |         |
   0+30       0.0048      0.21  Q          |         |         |         |
   0+35       0.0063      0.22  Q          |         |         |         |
   0+40       0.0078      0.23  Q          |         |         |         |
   0+45       0.0094      0.23  Q          |         |         |         |
   0+50       0.0110      0.24  Q          |         |         |         |
   0+55       0.0128      0.26  VQ         |         |         |         |
   1+ 0       0.0148      0.29  VQ         |         |         |         |
   1+ 5       0.0169      0.30  VQ         |         |         |         |
   1+10       0.0188      0.28  VQ         |         |         |         |
   1+15       0.0205      0.25  VQ         |         |         |         |
   1+20       0.0222      0.25  Q          |         |         |         |
   1+25       0.0239      0.24  Q          |         |         |         |
   1+30       0.0255      0.24  Q          |         |         |         |
   1+35       0.0271      0.24  Q          |         |         |         |
   1+40       0.0287      0.24  Q          |         |         |         |
   1+45       0.0304      0.24  Q          |         |         |         |
   1+50       0.0320      0.24  Q          |         |         |         |
   1+55       0.0338      0.26  VQ         |         |         |         |
   2+ 0       0.0358      0.29  VQ         |         |         |         |
   2+ 5       0.0379      0.30  VQ         |         |         |         |
   2+10       0.0400      0.31  VQ         |         |         |         |
   2+15       0.0421      0.31  VQ         |         |         |         |
   2+20       0.0443      0.31  |Q         |         |         |         |
   2+25       0.0464      0.31  |Q         |         |         |         |
   2+30       0.0486      0.31  |Q         |         |         |         |
   2+35       0.0507      0.32  |Q         |         |         |         |
   2+40       0.0531      0.34  |Q         |         |         |         |
   2+45       0.0556      0.37  |Q         |         |         |         |
   2+50       0.0582      0.38  |Q         |         |         |         |
   2+55       0.0609      0.38  |Q         |         |         |         |
   3+ 0       0.0635      0.39  |Q         |         |         |         |
   3+ 5       0.0662      0.39  |Q         |         |         |         |
   3+10       0.0689      0.39  |Q         |         |         |         |
   3+15       0.0716      0.39  |Q         |         |         |         |
   3+20       0.0743      0.39  |Q         |         |         |         |
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3+25        0.0770      0.39  |Q        |         |         |         |
3+30        0.0797      0.39  |Q        |         |         |         |
3+35        0.0824      0.39  |Q        |         |         |         |
3+40        0.0850      0.39  |Q        |         |         |         |
3+45        0.0877      0.39  |Q        |         |         |         |
3+50        0.0905      0.40  |QV       |         |         |         |
3+55        0.0934      0.42  |QV       |         |         |         |
4+ 0        0.0964      0.45  |QV       |         |         |         |
4+ 5        0.0996      0.46  |QV       |         |         |         |
4+10        0.1028      0.46  |QV       |         |         |         |
4+15        0.1060      0.47  |QV       |         |         |         |
4+20        0.1092      0.47  |QV       |         |         |         |
4+25        0.1126      0.50  |QV       |         |         |         |
4+30        0.1162      0.52  | Q       |         |         |         |
4+35        0.1199      0.53  | Q       |         |         |         |
4+40        0.1236      0.54  | Q       |         |         |         |
4+45        0.1274      0.54  | Q       |         |         |         |
4+50        0.1312      0.55  | Q       |         |         |         |
4+55        0.1351      0.58  | QV      |         |         |         |
5+ 0        0.1393      0.60  | QV      |         |         |         |
5+ 5        0.1434      0.60  | QV      |         |         |         |
5+10        0.1473      0.56  | QV      |         |         |         |
5+15        0.1508      0.51  | QV      |         |         |         |
5+20        0.1542      0.50  |Q V      |         |         |         |
5+25        0.1577      0.51  | QV      |         |         |         |
5+30        0.1614      0.53  | QV      |         |         |         |
5+35        0.1651      0.54  | QV      |         |         |         |
5+40        0.1691      0.57  | QV      |         |         |         |
5+45        0.1732      0.60  | QV      |         |         |         |
5+50        0.1774      0.61  | Q V     |         |         |         |
5+55        0.1817      0.62  | Q V     |         |         |         |
6+ 0        0.1859      0.62  | Q V     |         |         |         |
6+ 5        0.1903      0.63  | Q V     |         |         |         |
6+10        0.1948      0.65  | Q V     |         |         |         |
6+15        0.1994      0.68  | Q V     |         |         |         |
6+20        0.2042      0.69  | Q V     |         |         |         |
6+25        0.2090      0.70  | Q V     |         |         |         |
6+30        0.2138      0.70  | Q V     |         |         |         |
6+35        0.2187      0.71  | Q V     |         |         |         |
6+40        0.2237      0.73  | Q  V    |         |         |         |
6+45        0.2289      0.76  |  Q V    |         |         |         |
6+50        0.2342      0.77  |  Q V    |         |         |         |
6+55        0.2396      0.77  |  Q V    |         |         |         |
7+ 0        0.2449      0.78  |  Q V    |         |         |         |
7+ 5        0.2503      0.78  |  Q V    |         |         |         |
7+10        0.2557      0.78  |  Q V    |         |         |         |
7+15        0.2610      0.78  |  Q V    |         |         |         |
7+20        0.2664      0.79  |  Q  V   |         |         |         |
7+25        0.2720      0.81  |  Q  V   |         |         |         |
7+30        0.2778      0.84  |  Q  V   |         |         |         |
7+35        0.2837      0.85  |  Q  V   |         |         |         |
7+40        0.2897      0.88  |  Q  V   |         |         |         |
7+45        0.2960      0.91  |  Q  V   |         |         |         |
7+50        0.3024      0.93  |  Q  V   |         |         |         |
7+55        0.3090      0.96  |  Q   V  |         |         |         |
8+ 0        0.3158      0.99  |  Q   V  |         |         |         |
8+ 5        0.3228      1.01  |   Q  V  |         |         |         |
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 8+10       0.3301      1.07  |   Q  V  |         |         |         |
 8+15       0.3379      1.12  |   Q  V  |         |         |         |
 8+20       0.3458      1.14  |   Q  V  |         |         |         |
 8+25       0.3537      1.16  |   Q   V |         |         |         |
 8+30       0.3617      1.16  |   Q   V |         |         |         |
 8+35       0.3698      1.17  |   Q   V |         |         |         |
 8+40       0.3782      1.21  |   Q   V |         |         |         |
 8+45       0.3867      1.24  |   Q   V |         |         |         |
 8+50       0.3954      1.27  |    Q  V |         |         |         |
 8+55       0.4044      1.31  |    Q   V|         |         |         |
 9+ 0       0.4137      1.35  |    Q   V|         |         |         |
 9+ 5       0.4232      1.38  |    Q   V|         |         |         |
 9+10       0.4332      1.45  |    Q   V|         |         |         |
 9+15       0.4437      1.53  |     Q   V         |         |         |
 9+20       0.4545      1.56  |     Q   V         |         |         |
 9+25       0.4656      1.61  |     Q   V         |         |         |
 9+30       0.4770      1.66  |     Q   V         |         |         |
 9+35       0.4885      1.68  |     Q   |V        |         |         |
 9+40       0.5004      1.73  |     Q   |V        |         |         |
 9+45       0.5126      1.77  |      Q  |V        |         |         |
 9+50       0.5249      1.79  |      Q  |V        |         |         |
 9+55       0.5375      1.83  |      Q  | V       |         |         |
10+ 0       0.5504      1.87  |      Q  | V       |         |         |
10+ 5       0.5632      1.85  |      Q  | V       |         |         |
10+10       0.5744      1.63  |     Q   |  V      |         |         |
10+15       0.5840      1.40  |    Q    |  V      |         |         |
10+20       0.5931      1.31  |    Q    |  V      |         |         |
10+25       0.6018      1.27  |    Q    |  V      |         |         |
10+30       0.6103      1.24  |   Q     |  V      |         |         |
10+35       0.6190      1.25  |    Q    |   V     |         |         |
10+40       0.6287      1.41  |    Q    |   V     |         |         |
10+45       0.6396      1.58  |     Q   |   V     |         |         |
10+50       0.6509      1.64  |     Q   |   V     |         |         |
10+55       0.6625      1.68  |     Q   |    V    |         |         |
11+ 0       0.6742      1.70  |     Q   |    V    |         |         |
11+ 5       0.6859      1.71  |     Q   |    V    |         |         |
11+10       0.6975      1.68  |     Q   |    V    |         |         |
11+15       0.7089      1.65  |     Q   |     V   |         |         |
11+20       0.7202      1.64  |     Q   |     V   |         |         |
11+25       0.7315      1.64  |     Q   |     V   |         |         |
11+30       0.7427      1.64  |     Q   |     V   |         |         |
11+35       0.7539      1.62  |     Q   |      V  |         |         |
11+40       0.7646      1.56  |     Q   |      V  |         |         |
11+45       0.7749      1.49  |    Q    |      V  |         |         |
11+50       0.7850      1.47  |    Q    |      V  |         |         |
11+55       0.7953      1.49  |    Q    |       V |         |         |
12+ 0       0.8058      1.52  |     Q   |       V |         |         |
12+ 5       0.8166      1.57  |     Q   |       V |         |         |
12+10       0.8290      1.81  |      Q  |       V |         |         |
12+15       0.8431      2.05  |       Q |        V|         |         |
12+20       0.8579      2.15  |       Q |        V|         |         |
12+25       0.8733      2.23  |       Q |        V|         |         |
12+30       0.8891      2.30  |        Q|         V         |         |
12+35       0.9052      2.34  |        Q|         V         |         |
12+40       0.9219      2.42  |        Q|         V         |         |
12+45       0.9391      2.50  |        Q|         |V        |         |
12+50       0.9566      2.54  |         Q         |V        |         |
```

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12+55       0.9744      2.59  |         Q         | V       |         |
13+ 0       0.9925      2.63  |         Q         | V       |         |
13+ 5       1.0110      2.68  |         Q         | V       |         |
13+10       1.0307      2.86  |         |Q        |  V      |         |
13+15       1.0516      3.04  |         | Q       |  V      |         |
13+20       1.0730      3.10  |         | Q       |   V     |         |
13+25       1.0946      3.14  |         | Q       |   V     |         |
13+30       1.1164      3.17  |         | Q       |    V    |         |
13+35       1.1379      3.12  |         | Q       |    V    |         |
13+40       1.1569      2.76  |         |Q        |     V   |         |
13+45       1.1733      2.39  |        Q|         |     V   |         |
13+50       1.1888      2.25  |        Q|         |     V   |         |
13+55       1.2038      2.18  |       Q |         |      V  |         |
14+ 0       1.2185      2.13  |       Q |         |      V  |         |
14+ 5       1.2332      2.13  |       Q |         |      V  |         |
14+10       1.2487      2.25  |        Q|         |       V |         |
14+15       1.2651      2.39  |        Q|         |       V |         |
14+20       1.2818      2.43  |        Q|         |        V|         |
14+25       1.2985      2.42  |        Q|         |        V|         |
14+30       1.3150      2.40  |        Q|         |        V|         |
14+35       1.3316      2.40  |        Q|         |         V         |
14+40       1.3481      2.40  |        Q|         |         V         |
14+45       1.3646      2.40  |        Q|         |         V         |
14+50       1.3811      2.39  |        Q|         |         |V        |
14+55       1.3973      2.36  |        Q|         |         |V        |
15+ 0       1.4134      2.33  |        Q|         |         | V       |
15+ 5       1.4293      2.31  |        Q|         |         | V       |
15+10       1.4449      2.27  |        Q|         |         | V       |
15+15       1.4603      2.23  |       Q |         |         |  V      |
15+20       1.4756      2.21  |       Q |         |         |  V      |
15+25       1.4905      2.17  |       Q |         |         |  V      |
15+30       1.5053      2.14  |       Q |         |         |   V     |
15+35       1.5197      2.10  |       Q |         |         |   V     |
15+40       1.5332      1.96  |      Q  |         |         |   V     |
15+45       1.5458      1.82  |      Q  |         |         |    V    |
15+50       1.5579      1.77  |      Q  |         |         |    V    |
15+55       1.5699      1.74  |     Q   |         |         |    V    |
16+ 0       1.5818      1.72  |     Q   |         |         |    V    |
16+ 5       1.5930      1.63  |     Q   |         |         |     V   |
16+10       1.6012      1.18  |   Q     |         |         |     V   |
16+15       1.6061      0.71  | Q       |         |         |     V   |
16+20       1.6098      0.54  | Q       |         |         |     V   |
16+25       1.6128      0.44  |Q        |         |         |     V   |
16+30       1.6154      0.38  |Q        |         |         |     V   |
16+35       1.6177      0.34  |Q        |         |         |     V   |
16+40       1.6198      0.30  |Q        |         |         |     V   |
16+45       1.6217      0.27  |Q        |         |         |     V   |
16+50       1.6234      0.25  |Q        |         |         |     V   |
16+55       1.6251      0.24  Q         |         |         |     V   |
17+ 0       1.6267      0.24  Q         |         |         |     V   |
17+ 5       1.6284      0.25  Q         |         |         |     V   |
17+10       1.6304      0.30  |Q        |         |         |     V   |
17+15       1.6328      0.35  |Q        |         |         |      V  |
17+20       1.6354      0.37  |Q        |         |         |      V  |
17+25       1.6380      0.38  |Q        |         |         |      V  |
17+30       1.6406      0.38  |Q        |         |         |      V  |
17+35       1.6433      0.39  |Q        |         |         |      V  |
```

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17+40       1.6459      0.39  |Q        |         |         |      V  |
17+45       1.6486      0.39  |Q        |         |         |      V  |
17+50       1.6513      0.39  |Q        |         |         |      V  |
17+55       1.6538      0.36  |Q        |         |         |      V  |
18+ 0       1.6561      0.33  |Q        |         |         |      V  |
18+ 5       1.6583      0.33  |Q        |         |         |      V  |
18+10       1.6605      0.32  |Q        |         |         |      V  |
18+15       1.6627      0.32  |Q        |         |         |      V  |
18+20       1.6648      0.31  |Q        |         |         |      V  |
18+25       1.6670      0.31  |Q        |         |         |      V  |
18+30       1.6692      0.31  |Q        |         |         |      V  |
18+35       1.6713      0.31  |Q        |         |         |      V  |
18+40       1.6732      0.28  |Q        |         |         |      V  |
18+45       1.6750      0.26  |Q        |         |         |       V |
18+50       1.6767      0.24  Q         |         |         |       V |
18+55       1.6781      0.21  Q         |         |         |       V |
19+ 0       1.6794      0.18  Q         |         |         |       V |
19+ 5       1.6806      0.18  Q         |         |         |       V |
19+10       1.6819      0.19  Q         |         |         |       V |
19+15       1.6834      0.22  Q         |         |         |       V |
19+20       1.6850      0.23  Q         |         |         |       V |
19+25       1.6868      0.26  |Q        |         |         |       V |
19+30       1.6887      0.29  |Q        |         |         |       V |
19+35       1.6908      0.29  |Q        |         |         |       V |
19+40       1.6927      0.27  |Q        |         |         |       V |
19+45       1.6944      0.25  |Q        |         |         |       V |
19+50       1.6961      0.24  Q         |         |         |       V |
19+55       1.6975      0.21  Q         |         |         |       V |
20+ 0       1.6988      0.18  Q         |         |         |       V |
20+ 5       1.7000      0.17  Q         |         |         |       V |
20+10       1.7013      0.19  Q         |         |         |       V |
20+15       1.7028      0.22  Q         |         |         |       V |
20+20       1.7043      0.22  Q         |         |         |       V |
20+25       1.7059      0.23  Q         |         |         |       V |
20+30       1.7075      0.23  Q         |         |         |       V |
20+35       1.7091      0.23  Q         |         |         |       V |
20+40       1.7107      0.23  Q         |         |         |       V |
20+45       1.7123      0.23  Q         |         |         |       V |
20+50       1.7139      0.23  Q         |         |         |       V |
20+55       1.7153      0.20  Q         |         |         |       V |
21+ 0       1.7165      0.18  Q         |         |         |       V |
21+ 5       1.7177      0.17  Q         |         |         |       V |
21+10       1.7191      0.19  Q         |         |         |        V|
21+15       1.7205      0.22  Q         |         |         |        V|
21+20       1.7221      0.22  Q         |         |         |        V|
21+25       1.7234      0.20  Q         |         |         |        V|
21+30       1.7246      0.18  Q         |         |         |        V|
21+35       1.7258      0.17  Q         |         |         |        V|
21+40       1.7271      0.19  Q         |         |         |        V|
21+45       1.7286      0.22  Q         |         |         |        V|
21+50       1.7301      0.22  Q         |         |         |        V|
21+55       1.7315      0.20  Q         |         |         |        V|
22+ 0       1.7327      0.18  Q         |         |         |        V|
22+ 5       1.7339      0.17  Q         |         |         |        V|
22+10       1.7352      0.19  Q         |         |         |        V|
22+15       1.7367      0.22  Q         |         |         |        V|
22+20       1.7382      0.22  Q         |         |         |        V|
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   22+25       1.7396      0.20  Q          |          |          |        V|
   22+30       1.7408      0.18  Q          |          |          |        V|
   22+35       1.7419      0.17  Q          |          |          |        V|
   22+40       1.7431      0.16  Q          |          |          |        V|
   22+45       1.7441      0.16  Q          |          |          |        V|
   22+50       1.7452      0.16  Q          |          |          |        V|
   22+55       1.7463      0.16  Q          |          |          |        V|
   23+ 0       1.7474      0.16  Q          |          |          |        V|
   23+ 5       1.7485      0.16  Q          |          |          |        V|
   23+10       1.7496      0.16  Q          |          |          |        V|
   23+15       1.7506      0.16  Q          |          |          |        V|
   23+20       1.7517      0.16  Q          |          |          |        V|
   23+25       1.7528      0.16  Q          |          |          |        V|
   23+30       1.7539      0.16  Q          |          |          |        V|
   23+35       1.7549      0.16  Q          |          |          |        V|
   23+40       1.7560      0.16  Q          |          |          |        V|
   23+45       1.7571      0.16  Q          |          |          |        V|
   23+50       1.7582      0.16  Q          |          |          |        V|
   23+55       1.7592      0.16  Q          |          |          |        V|
   24+ 0       1.7603      0.16  Q          |          |          |        V|
   24+ 5       1.7613      0.15  Q          |          |          |        V|
   24+10       1.7620      0.10  Q          |          |          |        V|
   24+15       1.7623      0.04  Q          |          |          |        V|
   24+20       1.7625      0.02  Q          |          |          |        V|
   24+25       1.7626      0.01  Q          |          |          |        V|
   24+30       1.7626      0.01  Q          |          |          |        V|
   24+35       1.7626      0.00  Q          |          |          |        V|
   24+40       1.7627      0.00  Q          |          |          |        V|
   24+45       1.7627      0.00  Q          |          |          |        V|
   24+50       1.7627      0.00  Q          |          |          |        V|
   24+55       1.7627      0.00  Q          |          |          |         V
-----------------------------------------------------------------------
```

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/20/15 File: 201501PRE6100.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             1.30                   6.55

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             2.50                  12.60

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.300(In)
Area Averaged 100-Year Rainfall =    2.500(In)
```

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.060)	0.035	0.115
2	0.17	0.60	0.180	(0.060)	0.042	0.138
3	0.25	0.60	0.180	(0.060)	0.042	0.138
4	0.33	0.60	0.180	(0.060)	0.042	0.138
5	0.42	0.60	0.180	(0.060)	0.042	0.138
6	0.50	0.70	0.210	(0.060)	0.049	0.161
7	0.58	0.70	0.210	(0.060)	0.049	0.161

8	0.67	0.70	0.210	(0.060)	0.049	0.161
9	0.75	0.70	0.210	(0.060)	0.049	0.161
10	0.83	0.70	0.210	(0.060)	0.049	0.161
11	0.92	0.70	0.210	(0.060)	0.049	0.161
12	1.00	0.80	0.240	(0.060)	0.055	0.185
13	1.08	0.80	0.240	(0.060)	0.055	0.185
14	1.17	0.80	0.240	(0.060)	0.055	0.185
15	1.25	0.80	0.240	(0.060)	0.055	0.185
16	1.33	0.80	0.240	(0.060)	0.055	0.185
17	1.42	0.80	0.240	(0.060)	0.055	0.185
18	1.50	0.80	0.240	(0.060)	0.055	0.185
19	1.58	0.80	0.240	(0.060)	0.055	0.185
20	1.67	0.80	0.240	(0.060)	0.055	0.185
21	1.75	0.80	0.240	(0.060)	0.055	0.185
22	1.83	0.80	0.240	(0.060)	0.055	0.185
23	1.92	0.80	0.240	(0.060)	0.055	0.185
24	2.00	0.90	0.270	0.060	(0.062)	0.210
25	2.08	0.80	0.240	(0.060)	0.055	0.185
26	2.17	0.90	0.270	0.060	(0.062)	0.210
27	2.25	0.90	0.270	0.060	(0.062)	0.210
28	2.33	0.90	0.270	0.060	(0.062)	0.210
29	2.42	0.90	0.270	0.060	(0.062)	0.210
30	2.50	0.90	0.270	0.060	(0.062)	0.210
31	2.58	0.90	0.270	0.060	(0.062)	0.210
32	2.67	0.90	0.270	0.060	(0.062)	0.210
33	2.75	1.00	0.300	0.060	(0.069)	0.240
34	2.83	1.00	0.300	0.060	(0.069)	0.240
35	2.92	1.00	0.300	0.060	(0.069)	0.240
36	3.00	1.00	0.300	0.060	(0.069)	0.240
37	3.08	1.00	0.300	0.060	(0.069)	0.240
38	3.17	1.10	0.330	0.060	(0.076)	0.270
39	3.25	1.10	0.330	0.060	(0.076)	0.270
40	3.33	1.10	0.330	0.060	(0.076)	0.270
41	3.42	1.20	0.360	0.060	(0.083)	0.300
42	3.50	1.30	0.390	0.060	(0.090)	0.330
43	3.58	1.40	0.420	0.060	(0.097)	0.360
44	3.67	1.40	0.420	0.060	(0.097)	0.360
45	3.75	1.50	0.450	0.060	(0.104)	0.390
46	3.83	1.50	0.450	0.060	(0.104)	0.390
47	3.92	1.60	0.480	0.060	(0.111)	0.420
48	4.00	1.60	0.480	0.060	(0.111)	0.420
49	4.08	1.70	0.510	0.060	(0.118)	0.450
50	4.17	1.80	0.540	0.060	(0.125)	0.480
51	4.25	1.90	0.570	0.060	(0.132)	0.510
52	4.33	2.00	0.600	0.060	(0.139)	0.540
53	4.42	2.10	0.630	0.060	(0.146)	0.570
54	4.50	2.10	0.630	0.060	(0.146)	0.570
55	4.58	2.20	0.660	0.060	(0.153)	0.600
56	4.67	2.30	0.690	0.060	(0.160)	0.630
57	4.75	2.40	0.720	0.060	(0.166)	0.660
58	4.83	2.40	0.720	0.060	(0.166)	0.660
59	4.92	2.50	0.750	0.060	(0.173)	0.690
60	5.00	2.60	0.780	0.060	(0.180)	0.720
61	5.08	3.10	0.930	0.060	(0.215)	0.870
62	5.17	3.60	1.080	0.060	(0.250)	1.020
63	5.25	3.90	1.170	0.060	(0.270)	1.110
64	5.33	4.20	1.260	0.060	(0.291)	1.200

```
65   5.42     4.70      1.410          0.060    (  0.326)        1.350
66   5.50     5.60      1.680          0.060    (  0.388)        1.620
67   5.58     1.90      0.570          0.060    (  0.132)        0.510
68   5.67     0.90      0.270          0.060    (  0.062)        0.210
69   5.75     0.60      0.180       (  0.060)      0.042         0.138
70   5.83     0.50      0.150       (  0.060)      0.035         0.115
71   5.92     0.30      0.090       (  0.060)      0.021         0.069
72   6.00     0.20      0.060       (  0.060)      0.014         0.046
           (Loss Rate Not Used)
   Sum =     100.0                               Sum =    26.0
    Flood volume = Effective rainfall      2.17(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.9(Ac.Ft)
    Total soil loss =      0.33(In)
    Total soil loss =     0.139(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =       39664.7 Cubic Feet
    Total soil loss =       6072.5 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      6.673(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0018      0.23  Q         |         |         |         |
  0+15       0.0050      0.47  VQ        |         |         |         |
  0+20       0.0090      0.58  V Q       |         |         |         |
  0+25       0.0133      0.63  V Q       |         |         |         |
  0+30       0.0180      0.67  V Q       |         |         |         |
  0+35       0.0230      0.73  |VQ       |         |         |         |
  0+40       0.0283      0.78  |V Q      |         |         |         |
  0+45       0.0338      0.79  |V Q      |         |         |         |
  0+50       0.0394      0.81  |V Q      |         |         |         |
  0+55       0.0450      0.81  |V Q      |         |         |         |
  1+ 0       0.0506      0.82  | VQ      |         |         |         |
  1+ 5       0.0566      0.86  | VQ      |         |         |         |
  1+10       0.0628      0.90  | VQ      |         |         |         |
  1+15       0.0691      0.92  |  Q      |         |         |         |
  1+20       0.0755      0.93  |  Q      |         |         |         |
  1+25       0.0819      0.93  |  Q      |         |         |         |
  1+30       0.0884      0.93  |  Q      |         |         |         |
  1+35       0.0948      0.94  |  QV     |         |         |         |
  1+40       0.1013      0.94  |  QV     |         |         |         |
  1+45       0.1077      0.94  |  QV     |         |         |         |
  1+50       0.1142      0.94  |  Q V    |         |         |         |
  1+55       0.1206      0.94  |  Q V    |         |         |         |
  2+ 0       0.1271      0.94  |  Q V    |         |         |         |
  2+ 5       0.1339      0.98  |  Q V    |         |         |         |
  2+10       0.1407      0.99  |  Q  V   |         |         |         |
  2+15       0.1476      1.00  |   Q V   |         |         |         |
  2+20       0.1547      1.04  |   Q V   |         |         |         |
```

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    2+25       0.1620      1.05  |   Q  V  |         |         |         |
    2+30       0.1692      1.06  |   Q  V  |         |         |         |
    2+35       0.1766      1.06  |   Q  V  |         |         |         |
    2+40       0.1839      1.06  |   Q   V |         |         |         |
    2+45       0.1913      1.07  |   Q   V |         |         |         |
    2+50       0.1990      1.12  |   Q   V |         |         |         |
    2+55       0.2071      1.17  |   Q    V|         |         |         |
    3+ 0       0.2153      1.19  |   Q    V|         |         |         |
    3+ 5       0.2236      1.20  |   Q    V|         |         |         |
    3+10       0.2320      1.22  |   Q     V         |         |         |
    3+15       0.2407      1.27  |    Q    V         |         |         |
    3+20       0.2499      1.32  |    Q    V         |         |         |
    3+25       0.2592      1.35  |    Q    |V        |         |         |
    3+30       0.2690      1.42  |    Q    |V        |         |         |
    3+35       0.2796      1.54  |     Q   | V       |         |         |
    3+40       0.2910      1.66  |     Q   | V       |         |         |
    3+45       0.3031      1.75  |      Q  |  V      |         |         |
    3+50       0.3158      1.84  |      Q  |  V      |         |         |
    3+55       0.3290      1.92  |      Q  |   V     |         |         |
    4+ 0       0.3428      2.00  |       Q |    V    |         |         |
    4+ 5       0.3571      2.08  |       Q |    V    |         |         |
    4+10       0.3720      2.16  |       Q |     V   |         |         |
    4+15       0.3877      2.29  |        Q|      V  |         |         |
    4+20       0.4044      2.43  |        Q|      V  |         |         |
    4+25       0.4221      2.57  |         Q       V |         |         |
    4+30       0.4408      2.71  |         Q        V|         |         |
    4+35       0.4601      2.81  |         |Q        V         |         |
    4+40       0.4802      2.91  |         |Q        |V        |         |
    4+45       0.5011      3.04  |         | Q       | V       |         |
    4+50       0.5230      3.18  |         | Q       | V       |         |
    4+55       0.5455      3.27  |         |  Q      |  V      |         |
    5+ 0       0.5687      3.37  |         |  Q      |   V     |         |
    5+ 5       0.5931      3.54  |         |   Q     |     V   |         |
    5+10       0.6200      3.91  |         |    Q    |      V  |         |
    5+15       0.6508      4.47  |         |      Q  |       V |         |
    5+20       0.6854      5.02  |         |         Q         V         |
    5+25       0.7234      5.52  |         |         | Q       |V        |
    5+30       0.7658      6.15  |         |         |   Q     |  V      |
    5+35       0.8118      6.67  |         |         |     Q   |    V    |
    5+40       0.8489      5.40  |         |         |Q        |      V  |
    5+45       0.8713      3.24  |         | Q       |         |       V |
    5+50       0.8855      2.07  |       Q |         |         |       V |
    5+55       0.8951      1.40  |    Q    |         |         |        V|
    6+ 0       0.9015      0.93  |  Q      |         |         |        V|
    6+ 5       0.9055      0.58  | Q       |         |         |        V|
    6+10       0.9079      0.34  |Q        |         |         |        V|
    6+15       0.9092      0.19  Q         |         |         |        V|
    6+20       0.9099      0.11  Q         |         |         |        V|
    6+25       0.9103      0.05  Q         |         |         |        V|
    6+30       0.9104      0.02  Q         |         |         |        V|
    6+35       0.9105      0.01  Q         |         |         |        V|
    6+40       0.9105      0.01  Q         |         |         |        V|
    6+45       0.9106      0.00  Q         |         |         |        V|
    6+50       0.9106      0.00  Q         |         |         |        V|
    6+55       0.9106      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.281	0.060	(0.065)	0.220
2	0.17	1.30	0.281	0.060	(0.065)	0.220
3	0.25	1.10	0.238	(0.060)	0.055	0.183
4	0.33	1.50	0.324	0.060	(0.075)	0.264
5	0.42	1.50	0.324	0.060	(0.075)	0.264
6	0.50	1.80	0.389	0.060	(0.090)	0.328
7	0.58	1.50	0.324	0.060	(0.075)	0.264

```
  8   0.67     1.80      0.389          0.060    (  0.090)        0.328
  9   0.75     1.80      0.389          0.060    (  0.090)        0.328
 10   0.83     1.50      0.324          0.060    (  0.075)        0.264
 11   0.92     1.60      0.346          0.060    (  0.080)        0.285
 12   1.00     1.80      0.389          0.060    (  0.090)        0.328
 13   1.08     2.20      0.475          0.060    (  0.110)        0.415
 14   1.17     2.20      0.475          0.060    (  0.110)        0.415
 15   1.25     2.20      0.475          0.060    (  0.110)        0.415
 16   1.33     2.00      0.432          0.060    (  0.100)        0.372
 17   1.42     2.60      0.562          0.060    (  0.130)        0.501
 18   1.50     2.70      0.583          0.060    (  0.135)        0.523
 19   1.58     2.40      0.518          0.060    (  0.120)        0.458
 20   1.67     2.70      0.583          0.060    (  0.135)        0.523
 21   1.75     3.30      0.713          0.060    (  0.165)        0.652
 22   1.83     3.10      0.670          0.060    (  0.155)        0.609
 23   1.92     2.90      0.626          0.060    (  0.145)        0.566
 24   2.00     3.00      0.648          0.060    (  0.150)        0.588
 25   2.08     3.10      0.670          0.060    (  0.155)        0.609
 26   2.17     4.20      0.907          0.060    (  0.210)        0.847
 27   2.25     5.00      1.080          0.060    (  0.250)        1.020
 28   2.33     3.50      0.756          0.060    (  0.175)        0.696
 29   2.42     6.80      1.469          0.060    (  0.340)        1.408
 30   2.50     7.30      1.577          0.060    (  0.365)        1.516
 31   2.58     8.20      1.771          0.060    (  0.409)        1.711
 32   2.67     5.90      1.274          0.060    (  0.295)        1.214
 33   2.75     2.00      0.432          0.060    (  0.100)        0.372
 34   2.83     1.80      0.389          0.060    (  0.090)        0.328
 35   2.92     1.80      0.389          0.060    (  0.090)        0.328
 36   3.00     0.60      0.130       (  0.060)       0.030        0.100
           (Loss Rate Not Used)
    Sum =     100.0                                 Sum =    19.5
     Flood volume = Effective rainfall      1.62(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.7(Ac.Ft)
     Total soil loss =      0.18(In)
     Total soil loss =     0.075(Ac.Ft)
     Total rainfall =      1.80(In)
     Flood volume =       29669.5 Cubic Feet
     Total soil loss =       3261.1 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      7.281(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         3 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5      0.0004      0.06  Q         |         |         |         |
   0+10      0.0034      0.43  VQ        |         |         |         |
   0+15      0.0088      0.79  V  Q      |         |         |         |
   0+20      0.0150      0.89  V  Q      |         |         |         |
   0+25      0.0221      1.04  |V  Q     |         |         |         |
   0+30      0.0305      1.22  |V  Q     |         |         |         |
   0+35      0.0400      1.37  | V  Q    |         |         |         |
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    0+40       0.0498       1.43  | V  Q    |         |         |         |
    0+45       0.0600       1.48  |  V Q    |         |         |         |
    0+50       0.0708       1.57  |   V Q   |         |         |         |
    0+55       0.0812       1.51  |   V Q   |         |         |         |
    1+ 0       0.0912       1.46  |    Q    |         |         |         |
    1+ 5       0.1020       1.57  |    VQ   |         |         |         |
    1+10       0.1143       1.78  |     VQ  |         |         |         |
    1+15       0.1277       1.95  |      Q  |         |         |         |
    1+20       0.1415       2.01  |       Q |         |         |         |
    1+25       0.1554       2.01  |       QV|         |         |         |
    1+30       0.1704       2.18  |       Q V         |         |         |
    1+35       0.1870       2.41  |        QV         |         |         |
    1+40       0.2037       2.43  |        Q|V        |         |         |
    1+45       0.2210       2.51  |         Q V       |         |         |
    1+50       0.2404       2.82  |         |Q  V     |         |         |
    1+55       0.2610       2.99  |         |Q   V    |         |         |
    2+ 0       0.2813       2.95  |         |Q    V   |         |         |
    2+ 5       0.3016       2.95  |         |Q     V  |         |         |
    2+10       0.3229       3.08  |         | Q     V |         |         |
    2+15       0.3474       3.57  |         |   Q     V         |         |
    2+20       0.3762       4.18  |         |     Q   | V       |         |
    2+25       0.4059       4.31  |         |      Q  |  V      |         |
    2+30       0.4414       5.16  |         |         Q    V    |         |
    2+35       0.4863       6.53  |         |         |     Q V |         |
    2+40       0.5365       7.28  |         |         |        Q|V        |
    2+45       0.5835       6.84  |         |         |      Q  |   V     |
    2+50       0.6172       4.88  |         |        Q|         |     V   |
    2+55       0.6394       3.23  |         | Q       |         |      V  |
    3+ 0       0.6564       2.47  |        Q|         |         |       V |
    3+ 5       0.6679       1.67  |     Q   |         |         |        V|
    3+10       0.6740       0.89  |  Q      |         |         |        V|
    3+15       0.6772       0.46  |Q        |         |         |        V|
    3+20       0.6791       0.27  |Q        |         |         |        V|
    3+25       0.6801       0.15  Q         |         |         |        V|
    3+30       0.6806       0.08  Q         |         |         |        V|
    3+35       0.6809       0.04  Q         |         |         |        V|
    3+40       0.6810       0.02  Q         |         |         |        V|
    3+45       0.6811       0.01  Q         |         |         |        V|
    3+50       0.6811       0.00  Q         |         |         |        V|
    3+55       0.6811       0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.50	2.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.20	6.05

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.475	0.060	(0.110)	0.415
2	0.17	4.20	0.605	0.060	(0.140)	0.544
3	0.25	4.40	0.634	0.060	(0.146)	0.573
4	0.33	4.80	0.691	0.060	(0.160)	0.631
5	0.42	5.20	0.749	0.060	(0.173)	0.688

```
  6   0.50     6.20      0.893          0.060    (  0.206)        0.832
  7   0.58     6.80      0.979          0.060    (  0.226)        0.919
  8   0.67     8.80      1.267          0.060    (  0.293)        1.207
  9   0.75    13.90      2.002          0.060    (  0.463)        1.941
 10   0.83    31.40      4.521          0.060    (  1.045)        4.461
 11   0.92     7.20      1.037          0.060    (  0.240)        0.976
 12   1.00     3.80      0.547          0.060    (  0.127)        0.487
           (Loss Rate Not Used)
    Sum =     100.0                                  Sum =    13.7
     Flood volume = Effective rainfall      1.14(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.5(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.025(Ac.Ft)
     Total rainfall =      1.20(In)
     Flood volume =       20847.9 Cubic Feet
     Total soil loss =       1105.3 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =     12.348(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
  -----------------------------------------------------------------------
    0+ 5       0.0008      0.12  Q         |         |         |         |
    0+10       0.0066      0.84  VQ        |         |         |         |
    0+15       0.0188      1.77  |V Q      |         |         |         |
    0+20       0.0348      2.32  | V Q     |         |         |         |
    0+25       0.0534      2.71  |   VQ    |         |         |         |
    0+30       0.0747      3.10  |     Q   |         |         |         |
    0+35       0.0994      3.58  |      QV |         |         |         |
    0+40       0.1279      4.15  |       Q V         |         |         |
    0+45       0.1632      5.13  |         Q  V      |         |         |
    0+50       0.2162      7.69  |         |    Q  V |         |         |
    0+55       0.3013     12.35  |         |         |   QV    |         |
    1+ 0       0.3798     11.40  |         |         | Q       |V        |
    1+ 5       0.4239      6.41  |         | Q       |         |    V    |
    1+10       0.4494      3.70  |      Q  |         |         |      V  |
    1+15       0.4629      1.96  |  Q      |         |         |       V |
    1+20       0.4703      1.07  | Q       |         |         |        V|
    1+25       0.4739      0.52  |Q        |         |         |        V|
    1+30       0.4759      0.29  Q         |         |         |        V|
    1+35       0.4772      0.19  Q         |         |         |        V|
    1+40       0.4780      0.13  Q         |         |         |        V|
    1+45       0.4785      0.06  Q         |         |         |        V|
    1+50       0.4786      0.02  Q         |         |         |        V|
    1+55       0.4786      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

Existing Conditions Unit Hydrograph: 25yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

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Study date 04/20/15 File: 201501PRE245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 2.932(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.932(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.023	(0.107)	0.005	0.018
2	0.17	0.07	0.023	(0.107)	0.005	0.018
3	0.25	0.07	0.023	(0.106)	0.005	0.018
4	0.33	0.10	0.035	(0.106)	0.008	0.027
5	0.42	0.10	0.035	(0.105)	0.008	0.027
6	0.50	0.10	0.035	(0.105)	0.008	0.027
7	0.58	0.10	0.035	(0.105)	0.008	0.027

8	0.67	0.10	0.035	(0.104)	0.008	0.027
9	0.75	0.10	0.035	(0.104)	0.008	0.027
10	0.83	0.13	0.047	(0.103)	0.011	0.036
11	0.92	0.13	0.047	(0.103)	0.011	0.036
12	1.00	0.13	0.047	(0.103)	0.011	0.036
13	1.08	0.10	0.035	(0.102)	0.008	0.027
14	1.17	0.10	0.035	(0.102)	0.008	0.027
15	1.25	0.10	0.035	(0.101)	0.008	0.027
16	1.33	0.10	0.035	(0.101)	0.008	0.027
17	1.42	0.10	0.035	(0.101)	0.008	0.027
18	1.50	0.10	0.035	(0.100)	0.008	0.027
19	1.58	0.10	0.035	(0.100)	0.008	0.027
20	1.67	0.10	0.035	(0.099)	0.008	0.027
21	1.75	0.10	0.035	(0.099)	0.008	0.027
22	1.83	0.13	0.047	(0.099)	0.011	0.036
23	1.92	0.13	0.047	(0.098)	0.011	0.036
24	2.00	0.13	0.047	(0.098)	0.011	0.036
25	2.08	0.13	0.047	(0.097)	0.011	0.036
26	2.17	0.13	0.047	(0.097)	0.011	0.036
27	2.25	0.13	0.047	(0.097)	0.011	0.036
28	2.33	0.13	0.047	(0.096)	0.011	0.036
29	2.42	0.13	0.047	(0.096)	0.011	0.036
30	2.50	0.13	0.047	(0.095)	0.011	0.036
31	2.58	0.17	0.059	(0.095)	0.014	0.045
32	2.67	0.17	0.059	(0.095)	0.014	0.045
33	2.75	0.17	0.059	(0.094)	0.014	0.045
34	2.83	0.17	0.059	(0.094)	0.014	0.045
35	2.92	0.17	0.059	(0.093)	0.014	0.045
36	3.00	0.17	0.059	(0.093)	0.014	0.045
37	3.08	0.17	0.059	(0.093)	0.014	0.045
38	3.17	0.17	0.059	(0.092)	0.014	0.045
39	3.25	0.17	0.059	(0.092)	0.014	0.045
40	3.33	0.17	0.059	(0.092)	0.014	0.045
41	3.42	0.17	0.059	(0.091)	0.014	0.045
42	3.50	0.17	0.059	(0.091)	0.014	0.045
43	3.58	0.17	0.059	(0.090)	0.014	0.045
44	3.67	0.17	0.059	(0.090)	0.014	0.045
45	3.75	0.17	0.059	(0.090)	0.014	0.045
46	3.83	0.20	0.070	(0.089)	0.016	0.054
47	3.92	0.20	0.070	(0.089)	0.016	0.054
48	4.00	0.20	0.070	(0.089)	0.016	0.054
49	4.08	0.20	0.070	(0.088)	0.016	0.054
50	4.17	0.20	0.070	(0.088)	0.016	0.054
51	4.25	0.20	0.070	(0.087)	0.016	0.054
52	4.33	0.23	0.082	(0.087)	0.019	0.063
53	4.42	0.23	0.082	(0.087)	0.019	0.063
54	4.50	0.23	0.082	(0.086)	0.019	0.063
55	4.58	0.23	0.082	(0.086)	0.019	0.063
56	4.67	0.23	0.082	(0.086)	0.019	0.063
57	4.75	0.23	0.082	(0.085)	0.019	0.063
58	4.83	0.27	0.094	(0.085)	0.022	0.072
59	4.92	0.27	0.094	(0.084)	0.022	0.072
60	5.00	0.27	0.094	(0.084)	0.022	0.072
61	5.08	0.20	0.070	(0.084)	0.016	0.054
62	5.17	0.20	0.070	(0.083)	0.016	0.054
63	5.25	0.20	0.070	(0.083)	0.016	0.054
64	5.33	0.23	0.082	(0.083)	0.019	0.063

65	5.42	0.23	0.082	(0.082)	0.019	0.063
66	5.50	0.23	0.082	(0.082)	0.019	0.063
67	5.58	0.27	0.094	(0.082)	0.022	0.072
68	5.67	0.27	0.094	(0.081)	0.022	0.072
69	5.75	0.27	0.094	(0.081)	0.022	0.072
70	5.83	0.27	0.094	(0.080)	0.022	0.072
71	5.92	0.27	0.094	(0.080)	0.022	0.072
72	6.00	0.27	0.094	(0.080)	0.022	0.072
73	6.08	0.30	0.106	(0.079)	0.024	0.081
74	6.17	0.30	0.106	(0.079)	0.024	0.081
75	6.25	0.30	0.106	(0.079)	0.024	0.081
76	6.33	0.30	0.106	(0.078)	0.024	0.081
77	6.42	0.30	0.106	(0.078)	0.024	0.081
78	6.50	0.30	0.106	(0.078)	0.024	0.081
79	6.58	0.33	0.117	(0.077)	0.027	0.090
80	6.67	0.33	0.117	(0.077)	0.027	0.090
81	6.75	0.33	0.117	(0.077)	0.027	0.090
82	6.83	0.33	0.117	(0.076)	0.027	0.090
83	6.92	0.33	0.117	(0.076)	0.027	0.090
84	7.00	0.33	0.117	(0.076)	0.027	0.090
85	7.08	0.33	0.117	(0.075)	0.027	0.090
86	7.17	0.33	0.117	(0.075)	0.027	0.090
87	7.25	0.33	0.117	(0.075)	0.027	0.090
88	7.33	0.37	0.129	(0.074)	0.030	0.099
89	7.42	0.37	0.129	(0.074)	0.030	0.099
90	7.50	0.37	0.129	(0.074)	0.030	0.099
91	7.58	0.40	0.141	(0.073)	0.033	0.108
92	7.67	0.40	0.141	(0.073)	0.033	0.108
93	7.75	0.40	0.141	(0.072)	0.033	0.108
94	7.83	0.43	0.152	(0.072)	0.035	0.117
95	7.92	0.43	0.152	(0.072)	0.035	0.117
96	8.00	0.43	0.152	(0.071)	0.035	0.117
97	8.08	0.50	0.176	(0.071)	0.041	0.135
98	8.17	0.50	0.176	(0.071)	0.041	0.135
99	8.25	0.50	0.176	(0.071)	0.041	0.135
100	8.33	0.50	0.176	(0.070)	0.041	0.135
101	8.42	0.50	0.176	(0.070)	0.041	0.135
102	8.50	0.50	0.176	(0.070)	0.041	0.135
103	8.58	0.53	0.188	(0.069)	0.043	0.144
104	8.67	0.53	0.188	(0.069)	0.043	0.144
105	8.75	0.53	0.188	(0.069)	0.043	0.144
106	8.83	0.57	0.199	(0.068)	0.046	0.153
107	8.92	0.57	0.199	(0.068)	0.046	0.153
108	9.00	0.57	0.199	(0.068)	0.046	0.153
109	9.08	0.63	0.223	(0.067)	0.052	0.171
110	9.17	0.63	0.223	(0.067)	0.052	0.171
111	9.25	0.63	0.223	(0.067)	0.052	0.171
112	9.33	0.67	0.235	(0.066)	0.054	0.180
113	9.42	0.67	0.235	(0.066)	0.054	0.180
114	9.50	0.67	0.235	(0.066)	0.054	0.180
115	9.58	0.70	0.246	(0.065)	0.057	0.189
116	9.67	0.70	0.246	(0.065)	0.057	0.189
117	9.75	0.70	0.246	(0.065)	0.057	0.189
118	9.83	0.73	0.258	(0.064)	0.060	0.198
119	9.92	0.73	0.258	(0.064)	0.060	0.198
120	10.00	0.73	0.258	(0.064)	0.060	0.198
121	10.08	0.50	0.176	(0.063)	0.041	0.135

122	10.17	0.50	0.176	(0.063)	0.041	0.135
123	10.25	0.50	0.176	(0.063)	0.041	0.135
124	10.33	0.50	0.176	(0.063)	0.041	0.135
125	10.42	0.50	0.176	(0.062)	0.041	0.135
126	10.50	0.50	0.176	(0.062)	0.041	0.135
127	10.58	0.67	0.235	(0.062)	0.054	0.180
128	10.67	0.67	0.235	(0.061)	0.054	0.180
129	10.75	0.67	0.235	(0.061)	0.054	0.180
130	10.83	0.67	0.235	(0.061)	0.054	0.180
131	10.92	0.67	0.235	(0.060)	0.054	0.180
132	11.00	0.67	0.235	(0.060)	0.054	0.180
133	11.08	0.63	0.223	(0.060)	0.052	0.171
134	11.17	0.63	0.223	(0.060)	0.052	0.171
135	11.25	0.63	0.223	(0.059)	0.052	0.171
136	11.33	0.63	0.223	(0.059)	0.052	0.171
137	11.42	0.63	0.223	(0.059)	0.052	0.171
138	11.50	0.63	0.223	(0.058)	0.052	0.171
139	11.58	0.57	0.199	(0.058)	0.046	0.153
140	11.67	0.57	0.199	(0.058)	0.046	0.153
141	11.75	0.57	0.199	(0.058)	0.046	0.153
142	11.83	0.60	0.211	(0.057)	0.049	0.162
143	11.92	0.60	0.211	(0.057)	0.049	0.162
144	12.00	0.60	0.211	(0.057)	0.049	0.162
145	12.08	0.83	0.293	0.056	(0.068)	0.237
146	12.17	0.83	0.293	0.056	(0.068)	0.237
147	12.25	0.83	0.293	0.056	(0.068)	0.237
148	12.33	0.87	0.305	0.056	(0.071)	0.249
149	12.42	0.87	0.305	0.055	(0.071)	0.250
150	12.50	0.87	0.305	0.055	(0.071)	0.250
151	12.58	0.93	0.328	0.055	(0.076)	0.274
152	12.67	0.93	0.328	0.054	(0.076)	0.274
153	12.75	0.93	0.328	0.054	(0.076)	0.274
154	12.83	0.97	0.340	0.054	(0.079)	0.286
155	12.92	0.97	0.340	0.054	(0.079)	0.287
156	13.00	0.97	0.340	0.053	(0.079)	0.287
157	13.08	1.13	0.399	0.053	(0.092)	0.346
158	13.17	1.13	0.399	0.053	(0.092)	0.346
159	13.25	1.13	0.399	0.053	(0.092)	0.346
160	13.33	1.13	0.399	0.052	(0.092)	0.347
161	13.42	1.13	0.399	0.052	(0.092)	0.347
162	13.50	1.13	0.399	0.052	(0.092)	0.347
163	13.58	0.77	0.270	0.051	(0.062)	0.218
164	13.67	0.77	0.270	0.051	(0.062)	0.219
165	13.75	0.77	0.270	0.051	(0.062)	0.219
166	13.83	0.77	0.270	0.051	(0.062)	0.219
167	13.92	0.77	0.270	0.050	(0.062)	0.219
168	14.00	0.77	0.270	0.050	(0.062)	0.220
169	14.08	0.90	0.317	0.050	(0.073)	0.267
170	14.17	0.90	0.317	0.050	(0.073)	0.267
171	14.25	0.90	0.317	0.049	(0.073)	0.267
172	14.33	0.87	0.305	0.049	(0.071)	0.256
173	14.42	0.87	0.305	0.049	(0.071)	0.256
174	14.50	0.87	0.305	0.049	(0.071)	0.256
175	14.58	0.87	0.305	0.048	(0.071)	0.257
176	14.67	0.87	0.305	0.048	(0.071)	0.257
177	14.75	0.87	0.305	0.048	(0.071)	0.257
178	14.83	0.83	0.293	0.048	(0.068)	0.246

179	14.92	0.83	0.293	0.047	(0.068)	0.246
180	15.00	0.83	0.293	0.047	(0.068)	0.246
181	15.08	0.80	0.282	0.047	(0.065)	0.235
182	15.17	0.80	0.282	0.047	(0.065)	0.235
183	15.25	0.80	0.282	0.046	(0.065)	0.235
184	15.33	0.77	0.270	0.046	(0.062)	0.224
185	15.42	0.77	0.270	0.046	(0.062)	0.224
186	15.50	0.77	0.270	0.046	(0.062)	0.224
187	15.58	0.63	0.223	0.046	(0.052)	0.177
188	15.67	0.63	0.223	0.045	(0.052)	0.178
189	15.75	0.63	0.223	0.045	(0.052)	0.178
190	15.83	0.63	0.223	0.045	(0.052)	0.178
191	15.92	0.63	0.223	0.045	(0.052)	0.178
192	16.00	0.63	0.223	0.044	(0.052)	0.178
193	16.08	0.13	0.047	(0.044)	0.011	0.036
194	16.17	0.13	0.047	(0.044)	0.011	0.036
195	16.25	0.13	0.047	(0.044)	0.011	0.036
196	16.33	0.13	0.047	(0.043)	0.011	0.036
197	16.42	0.13	0.047	(0.043)	0.011	0.036
198	16.50	0.13	0.047	(0.043)	0.011	0.036
199	16.58	0.10	0.035	(0.043)	0.008	0.027
200	16.67	0.10	0.035	(0.043)	0.008	0.027
201	16.75	0.10	0.035	(0.042)	0.008	0.027
202	16.83	0.10	0.035	(0.042)	0.008	0.027
203	16.92	0.10	0.035	(0.042)	0.008	0.027
204	17.00	0.10	0.035	(0.042)	0.008	0.027
205	17.08	0.17	0.059	(0.042)	0.014	0.045
206	17.17	0.17	0.059	(0.041)	0.014	0.045
207	17.25	0.17	0.059	(0.041)	0.014	0.045
208	17.33	0.17	0.059	(0.041)	0.014	0.045
209	17.42	0.17	0.059	(0.041)	0.014	0.045
210	17.50	0.17	0.059	(0.040)	0.014	0.045
211	17.58	0.17	0.059	(0.040)	0.014	0.045
212	17.67	0.17	0.059	(0.040)	0.014	0.045
213	17.75	0.17	0.059	(0.040)	0.014	0.045
214	17.83	0.13	0.047	(0.040)	0.011	0.036
215	17.92	0.13	0.047	(0.039)	0.011	0.036
216	18.00	0.13	0.047	(0.039)	0.011	0.036
217	18.08	0.13	0.047	(0.039)	0.011	0.036
218	18.17	0.13	0.047	(0.039)	0.011	0.036
219	18.25	0.13	0.047	(0.039)	0.011	0.036
220	18.33	0.13	0.047	(0.039)	0.011	0.036
221	18.42	0.13	0.047	(0.038)	0.011	0.036
222	18.50	0.13	0.047	(0.038)	0.011	0.036
223	18.58	0.10	0.035	(0.038)	0.008	0.027
224	18.67	0.10	0.035	(0.038)	0.008	0.027
225	18.75	0.10	0.035	(0.038)	0.008	0.027
226	18.83	0.07	0.023	(0.037)	0.005	0.018
227	18.92	0.07	0.023	(0.037)	0.005	0.018
228	19.00	0.07	0.023	(0.037)	0.005	0.018
229	19.08	0.10	0.035	(0.037)	0.008	0.027
230	19.17	0.10	0.035	(0.037)	0.008	0.027
231	19.25	0.10	0.035	(0.037)	0.008	0.027
232	19.33	0.13	0.047	(0.036)	0.011	0.036
233	19.42	0.13	0.047	(0.036)	0.011	0.036
234	19.50	0.13	0.047	(0.036)	0.011	0.036
235	19.58	0.10	0.035	(0.036)	0.008	0.027

236	19.67	0.10	0.035	(0.036)	0.008	0.027
237	19.75	0.10	0.035	(0.036)	0.008	0.027
238	19.83	0.07	0.023	(0.035)	0.005	0.018
239	19.92	0.07	0.023	(0.035)	0.005	0.018
240	20.00	0.07	0.023	(0.035)	0.005	0.018
241	20.08	0.10	0.035	(0.035)	0.008	0.027
242	20.17	0.10	0.035	(0.035)	0.008	0.027
243	20.25	0.10	0.035	(0.035)	0.008	0.027
244	20.33	0.10	0.035	(0.034)	0.008	0.027
245	20.42	0.10	0.035	(0.034)	0.008	0.027
246	20.50	0.10	0.035	(0.034)	0.008	0.027
247	20.58	0.10	0.035	(0.034)	0.008	0.027
248	20.67	0.10	0.035	(0.034)	0.008	0.027
249	20.75	0.10	0.035	(0.034)	0.008	0.027
250	20.83	0.07	0.023	(0.034)	0.005	0.018
251	20.92	0.07	0.023	(0.033)	0.005	0.018
252	21.00	0.07	0.023	(0.033)	0.005	0.018
253	21.08	0.10	0.035	(0.033)	0.008	0.027
254	21.17	0.10	0.035	(0.033)	0.008	0.027
255	21.25	0.10	0.035	(0.033)	0.008	0.027
256	21.33	0.07	0.023	(0.033)	0.005	0.018
257	21.42	0.07	0.023	(0.033)	0.005	0.018
258	21.50	0.07	0.023	(0.033)	0.005	0.018
259	21.58	0.10	0.035	(0.032)	0.008	0.027
260	21.67	0.10	0.035	(0.032)	0.008	0.027
261	21.75	0.10	0.035	(0.032)	0.008	0.027
262	21.83	0.07	0.023	(0.032)	0.005	0.018
263	21.92	0.07	0.023	(0.032)	0.005	0.018
264	22.00	0.07	0.023	(0.032)	0.005	0.018
265	22.08	0.10	0.035	(0.032)	0.008	0.027
266	22.17	0.10	0.035	(0.032)	0.008	0.027
267	22.25	0.10	0.035	(0.032)	0.008	0.027
268	22.33	0.07	0.023	(0.031)	0.005	0.018
269	22.42	0.07	0.023	(0.031)	0.005	0.018
270	22.50	0.07	0.023	(0.031)	0.005	0.018
271	22.58	0.07	0.023	(0.031)	0.005	0.018
272	22.67	0.07	0.023	(0.031)	0.005	0.018
273	22.75	0.07	0.023	(0.031)	0.005	0.018
274	22.83	0.07	0.023	(0.031)	0.005	0.018
275	22.92	0.07	0.023	(0.031)	0.005	0.018
276	23.00	0.07	0.023	(0.031)	0.005	0.018
277	23.08	0.07	0.023	(0.031)	0.005	0.018
278	23.17	0.07	0.023	(0.031)	0.005	0.018
279	23.25	0.07	0.023	(0.031)	0.005	0.018
280	23.33	0.07	0.023	(0.031)	0.005	0.018
281	23.42	0.07	0.023	(0.030)	0.005	0.018
282	23.50	0.07	0.023	(0.030)	0.005	0.018
283	23.58	0.07	0.023	(0.030)	0.005	0.018
284	23.67	0.07	0.023	(0.030)	0.005	0.018
285	23.75	0.07	0.023	(0.030)	0.005	0.018
286	23.83	0.07	0.023	(0.030)	0.005	0.018
287	23.92	0.07	0.023	(0.030)	0.005	0.018
288	24.00	0.07	0.023	(0.030)	0.005	0.018

(Loss Rate Not Used)

Sum = 100.0 Sum = 28.0

Flood volume = Effective rainfall 2.33(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)

```
    Total soil loss =      0.60(In)
    Total soil loss =     0.252(Ac.Ft)
    Total rainfall =      2.93(In)
    Flood volume =       42671.4 Cubic Feet
    Total soil loss =       10977.0 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      1.746(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q         |         |         |         |
  0+10       0.0003      0.03  Q         |         |         |         |
  0+15       0.0007      0.07  Q         |         |         |         |
  0+20       0.0013      0.08  Q         |         |         |         |
  0+25       0.0020      0.10  Q         |         |         |         |
  0+30       0.0028      0.12  Q         |         |         |         |
  0+35       0.0037      0.13  Q         |         |         |         |
  0+40       0.0046      0.13  Q         |         |         |         |
  0+45       0.0055      0.13  Q         |         |         |         |
  0+50       0.0065      0.14  Q         |         |         |         |
  0+55       0.0075      0.15  Q         |         |         |         |
  1+ 0       0.0087      0.17  Q         |         |         |         |
  1+ 5       0.0099      0.17  Q         |         |         |         |
  1+10       0.0110      0.16  Q         |         |         |         |
  1+15       0.0120      0.15  Q         |         |         |         |
  1+20       0.0130      0.14  Q         |         |         |         |
  1+25       0.0140      0.14  Q         |         |         |         |
  1+30       0.0150      0.14  Q         |         |         |         |
  1+35       0.0159      0.14  Q         |         |         |         |
  1+40       0.0169      0.14  Q         |         |         |         |
  1+45       0.0178      0.14  Q         |         |         |         |
  1+50       0.0188      0.14  Q         |         |         |         |
  1+55       0.0198      0.15  Q         |         |         |         |
  2+ 0       0.0210      0.17  Q         |         |         |         |
  2+ 5       0.0222      0.18  Q         |         |         |         |
  2+10       0.0235      0.18  Q         |         |         |         |
  2+15       0.0247      0.18  QV        |         |         |         |
  2+20       0.0260      0.18  QV        |         |         |         |
  2+25       0.0272      0.18  QV        |         |         |         |
  2+30       0.0285      0.18  QV        |         |         |         |
  2+35       0.0298      0.19  QV        |         |         |         |
  2+40       0.0311      0.20  QV        |         |         |         |
  2+45       0.0326      0.22  QV        |         |         |         |
  2+50       0.0342      0.22  QV        |         |         |         |
  2+55       0.0357      0.23  QV        |         |         |         |
  3+ 0       0.0373      0.23  QV        |         |         |         |
  3+ 5       0.0388      0.23  QV        |         |         |         |
  3+10       0.0404      0.23  QV        |         |         |         |
  3+15       0.0420      0.23  QV        |         |         |         |
  3+20       0.0436      0.23  QV        |         |         |         |
```

```
3+25       0.0451      0.23  QV         |         |         |         |
3+30       0.0467      0.23  QV         |         |         |         |
3+35       0.0483      0.23  QV         |         |         |         |
3+40       0.0499      0.23  Q V        |         |         |         |
3+45       0.0515      0.23  Q V        |         |         |         |
3+50       0.0531      0.23  Q V        |         |         |         |
3+55       0.0547      0.25  Q V        |         |         |         |
4+ 0       0.0566      0.26  |QV        |         |         |         |
4+ 5       0.0584      0.27  |QV        |         |         |         |
4+10       0.0603      0.27  |QV        |         |         |         |
4+15       0.0621      0.27  |QV        |         |         |         |
4+20       0.0640      0.28  |QV        |         |         |         |
4+25       0.0661      0.29  |QV        |         |         |         |
4+30       0.0682      0.31  |QV        |         |         |         |
4+35       0.0703      0.31  |QV        |         |         |         |
4+40       0.0725      0.32  |QV        |         |         |         |
4+45       0.0747      0.32  |Q V       |         |         |         |
4+50       0.0769      0.32  |Q V       |         |         |         |
4+55       0.0792      0.34  |Q V       |         |         |         |
5+ 0       0.0817      0.35  |Q V       |         |         |         |
5+ 5       0.0841      0.35  |Q V       |         |         |         |
5+10       0.0864      0.33  |Q V       |         |         |         |
5+15       0.0884      0.30  |Q V       |         |         |         |
5+20       0.0904      0.29  |Q V       |         |         |         |
5+25       0.0925      0.30  |Q V       |         |         |         |
5+30       0.0947      0.31  |Q V       |         |         |         |
5+35       0.0968      0.32  |Q V       |         |         |         |
5+40       0.0992      0.34  |Q  V      |         |         |         |
5+45       0.1016      0.35  |Q  V      |         |         |         |
5+50       0.1040      0.36  |Q  V      |         |         |         |
5+55       0.1065      0.36  |Q  V      |         |         |         |
6+ 0       0.1090      0.36  |Q  V      |         |         |         |
6+ 5       0.1116      0.37  |Q  V      |         |         |         |
6+10       0.1142      0.38  |Q  V      |         |         |         |
6+15       0.1170      0.40  |Q  V      |         |         |         |
6+20       0.1198      0.40  |Q  V      |         |         |         |
6+25       0.1226      0.41  |Q   V     |         |         |         |
6+30       0.1254      0.41  |Q   V     |         |         |         |
6+35       0.1282      0.41  |Q   V     |         |         |         |
6+40       0.1312      0.43  |Q   V     |         |         |         |
6+45       0.1343      0.44  |Q   V     |         |         |         |
6+50       0.1374      0.45  |Q   V     |         |         |         |
6+55       0.1405      0.45  |Q   V     |         |         |         |
7+ 0       0.1436      0.46  |Q   V     |         |         |         |
7+ 5       0.1468      0.46  |Q   V     |         |         |         |
7+10       0.1499      0.46  |Q    V    |         |         |         |
7+15       0.1531      0.46  |Q    V    |         |         |         |
7+20       0.1563      0.46  |Q    V    |         |         |         |
7+25       0.1595      0.48  |Q    V    |         |         |         |
7+30       0.1629      0.49  |Q    V    |         |         |         |
7+35       0.1664      0.50  |Q    V    |         |         |         |
7+40       0.1699      0.52  | Q   V    |         |         |         |
7+45       0.1736      0.53  | Q    V   |         |         |         |
7+50       0.1774      0.54  | Q    V   |         |         |         |
7+55       0.1812      0.56  | Q    V   |         |         |         |
8+ 0       0.1852      0.58  | Q    V   |         |         |         |
8+ 5       0.1893      0.59  | Q    V   |         |         |         |
```

```
 8+10       0.1936      0.63  | Q    V  |         |         |         |
 8+15       0.1982      0.66  | Q     V |         |         |         |
 8+20       0.2028      0.67  | Q     V |         |         |         |
 8+25       0.2075      0.68  | Q     V |         |         |         |
 8+30       0.2122      0.68  | Q     V |         |         |         |
 8+35       0.2169      0.69  | Q     V |         |         |         |
 8+40       0.2217      0.70  | Q      V|         |         |         |
 8+45       0.2267      0.72  | Q      V|         |         |         |
 8+50       0.2317      0.73  | Q      V|         |         |         |
 8+55       0.2368      0.75  | Q      V|         |         |         |
 9+ 0       0.2421      0.76  |  Q     V|         |         |         |
 9+ 5       0.2475      0.78  |  Q      V         |         |         |
 9+10       0.2530      0.81  |  Q      V         |         |         |
 9+15       0.2588      0.84  |  Q      V         |         |         |
 9+20       0.2647      0.86  |  Q      V         |         |         |
 9+25       0.2708      0.88  |  Q      |V        |         |         |
 9+30       0.2770      0.90  |  Q      |V        |         |         |
 9+35       0.2832      0.91  |  Q      |V        |         |         |
 9+40       0.2896      0.93  |  Q      |V        |         |         |
 9+45       0.2962      0.95  |  Q      | V       |         |         |
 9+50       0.3027      0.96  |  Q      | V       |         |         |
 9+55       0.3095      0.97  |  Q      | V       |         |         |
10+ 0       0.3163      0.99  |  Q      | V       |         |         |
10+ 5       0.3231      0.98  |  Q      |  V      |         |         |
10+10       0.3291      0.88  |  Q      |  V      |         |         |
10+15       0.3345      0.78  |  Q      |  V      |         |         |
10+20       0.3395      0.74  | Q       |  V      |         |         |
10+25       0.3445      0.72  | Q       |   V     |         |         |
10+30       0.3493      0.70  | Q       |   V     |         |         |
10+35       0.3542      0.71  | Q       |   V     |         |         |
10+40       0.3595      0.78  |  Q      |   V     |         |         |
10+45       0.3654      0.85  |  Q      |   V     |         |         |
10+50       0.3715      0.88  |  Q      |    V    |         |         |
10+55       0.3777      0.90  |  Q      |    V    |         |         |
11+ 0       0.3839      0.91  |  Q      |    V    |         |         |
11+ 5       0.3902      0.91  |  Q      |    V    |         |         |
11+10       0.3963      0.90  |  Q      |     V   |         |         |
11+15       0.4024      0.88  |  Q      |     V   |         |         |
11+20       0.4085      0.88  |  Q      |     V   |         |         |
11+25       0.4145      0.87  |  Q      |     V   |         |         |
11+30       0.4205      0.87  |  Q      |      V  |         |         |
11+35       0.4265      0.87  |  Q      |      V  |         |         |
11+40       0.4322      0.84  |  Q      |      V  |         |         |
11+45       0.4378      0.81  |  Q      |      V  |         |         |
11+50       0.4432      0.80  |  Q      |       V |         |         |
11+55       0.4488      0.80  |  Q      |       V |         |         |
12+ 0       0.4544      0.82  |  Q      |       V |         |         |
12+ 5       0.4602      0.84  |  Q      |       V |         |         |
12+10       0.4669      0.97  |  Q      |        V|         |         |
12+15       0.4744      1.10  |   Q     |        V|         |         |
12+20       0.4823      1.15  |   Q     |        V|         |         |
12+25       0.4905      1.19  |   Q     |         V         |         |
12+30       0.4990      1.23  |   Q     |         V         |         |
12+35       0.5077      1.26  |    Q    |         V         |         |
12+40       0.5167      1.30  |    Q    |         |V        |         |
12+45       0.5260      1.35  |    Q    |         |V        |         |
12+50       0.5354      1.37  |    Q    |         |V        |         |
```

```
12+55       0.5451      1.40  |    Q    |         | V       |         |
13+ 0       0.5550      1.43  |    Q    |         | V       |         |
13+ 5       0.5650      1.46  |    Q    |         |  V      |         |
13+10       0.5758      1.56  |     Q   |         |  V      |         |
13+15       0.5873      1.67  |     Q   |         |  V      |         |
13+20       0.5990      1.71  |     Q   |         |   V     |         |
13+25       0.6110      1.73  |     Q   |         |   V     |         |
13+30       0.6230      1.75  |     Q   |         |    V    |         |
13+35       0.6348      1.72  |     Q   |         |    V    |         |
13+40       0.6452      1.51  |     Q   |         |     V   |         |
13+45       0.6541      1.29  |    Q    |         |     V   |         |
13+50       0.6625      1.21  |   Q     |         |      V  |         |
13+55       0.6705      1.17  |   Q     |         |      V  |         |
14+ 0       0.6784      1.14  |   Q     |         |      V  |         |
14+ 5       0.6863      1.14  |   Q     |         |       V |         |
14+10       0.6947      1.22  |   Q     |         |       V |         |
14+15       0.7036      1.29  |    Q    |         |       V |         |
14+20       0.7126      1.32  |    Q    |         |        V|         |
14+25       0.7217      1.32  |    Q    |         |        V|         |
14+30       0.7307      1.31  |    Q    |         |        V|         |
14+35       0.7397      1.30  |    Q    |         |         V         |
14+40       0.7487      1.30  |    Q    |         |         V         |
14+45       0.7576      1.30  |    Q    |         |         V         |
14+50       0.7666      1.30  |    Q    |         |         |V        |
14+55       0.7755      1.28  |    Q    |         |         |V        |
15+ 0       0.7842      1.27  |    Q    |         |         | V       |
15+ 5       0.7928      1.26  |    Q    |         |         | V       |
15+10       0.8013      1.23  |   Q     |         |         | V       |
15+15       0.8096      1.21  |   Q     |         |         |  V      |
15+20       0.8179      1.20  |   Q     |         |         |  V      |
15+25       0.8260      1.18  |   Q     |         |         |  V      |
15+30       0.8340      1.16  |   Q     |         |         |   V     |
15+35       0.8418      1.13  |   Q     |         |         |   V     |
15+40       0.8491      1.05  |   Q     |         |         |   V     |
15+45       0.8558      0.97  |  Q      |         |         |   V     |
15+50       0.8622      0.94  |  Q      |         |         |    V    |
15+55       0.8686      0.93  |  Q      |         |         |    V    |
16+ 0       0.8749      0.92  |  Q      |         |         |    V    |
16+ 5       0.8809      0.87  |  Q      |         |         |    V    |
16+10       0.8853      0.63  | Q       |         |         |     V   |
16+15       0.8880      0.39  |Q        |         |         |     V   |
16+20       0.8900      0.30  |Q        |         |         |     V   |
16+25       0.8917      0.25  Q         |         |         |     V   |
16+30       0.8932      0.22  Q         |         |         |     V   |
16+35       0.8946      0.20  Q         |         |         |     V   |
16+40       0.8958      0.18  Q         |         |         |     V   |
16+45       0.8969      0.16  Q         |         |         |     V   |
16+50       0.8979      0.15  Q         |         |         |     V   |
16+55       0.8989      0.14  Q         |         |         |     V   |
17+ 0       0.8999      0.14  Q         |         |         |     V   |
17+ 5       0.9009      0.14  Q         |         |         |     V   |
17+10       0.9020      0.17  Q         |         |         |     V   |
17+15       0.9034      0.20  Q         |         |         |     V   |
17+20       0.9049      0.21  Q         |         |         |     V   |
17+25       0.9064      0.22  Q         |         |         |      V  |
17+30       0.9080      0.22  Q         |         |         |      V  |
17+35       0.9096      0.23  Q         |         |         |      V  |
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17+40	0.9111	0.23	Q	|	|	|	V |
17+45	0.9127	0.23	Q	|	|	|	V |
17+50	0.9143	0.23	Q	|	|	|	V |
17+55	0.9157	0.21	Q	|	|	|	V |
18+ 0	0.9171	0.20	Q	|	|	|	V |
18+ 5	0.9184	0.19	Q	|	|	|	V |
18+10	0.9197	0.19	Q	|	|	|	V |
18+15	0.9209	0.19	Q	|	|	|	V |
18+20	0.9222	0.18	Q	|	|	|	V |
18+25	0.9235	0.18	Q	|	|	|	V |
18+30	0.9248	0.18	Q	|	|	|	V |
18+35	0.9260	0.18	Q	|	|	|	V |
18+40	0.9271	0.17	Q	|	|	|	V |
18+45	0.9282	0.15	Q	|	|	|	V |
18+50	0.9292	0.14	Q	|	|	|	V |
18+55	0.9300	0.12	Q	|	|	|	V |
19+ 0	0.9307	0.11	Q	|	|	|	V |
19+ 5	0.9315	0.10	Q	|	|	|	V |
19+10	0.9322	0.11	Q	|	|	|	V |
19+15	0.9331	0.13	Q	|	|	|	V |
19+20	0.9340	0.13	Q	|	|	|	V |
19+25	0.9351	0.15	Q	|	|	|	V |
19+30	0.9362	0.17	Q	|	|	|	V |
19+35	0.9374	0.17	Q	|	|	|	V |
19+40	0.9385	0.16	Q	|	|	|	V |
19+45	0.9396	0.15	Q	|	|	|	V |
19+50	0.9405	0.14	Q	|	|	|	V |
19+55	0.9414	0.12	Q	|	|	|	V |
20+ 0	0.9421	0.11	Q	|	|	|	V |
20+ 5	0.9428	0.10	Q	|	|	|	V |
20+10	0.9436	0.11	Q	|	|	|	V |
20+15	0.9445	0.13	Q	|	|	|	V |
20+20	0.9454	0.13	Q	|	|	|	V |
20+25	0.9463	0.13	Q	|	|	|	V |
20+30	0.9472	0.14	Q	|	|	|	V |
20+35	0.9482	0.14	Q	|	|	|	V |
20+40	0.9491	0.14	Q	|	|	|	V |
20+45	0.9501	0.14	Q	|	|	|	V |
20+50	0.9510	0.13	Q	|	|	|	V |
20+55	0.9518	0.12	Q	|	|	|	V |
21+ 0	0.9525	0.10	Q	|	|	|	V |
21+ 5	0.9532	0.10	Q	|	|	|	V |
21+10	0.9540	0.11	Q	|	|	|	V |
21+15	0.9549	0.13	Q	|	|	|	V |
21+20	0.9558	0.13	Q	|	|	|	V|
21+25	0.9566	0.12	Q	|	|	|	V|
21+30	0.9573	0.10	Q	|	|	|	V|
21+35	0.9580	0.10	Q	|	|	|	V|
21+40	0.9588	0.11	Q	|	|	|	V|
21+45	0.9596	0.13	Q	|	|	|	V|
21+50	0.9605	0.13	Q	|	|	|	V|
21+55	0.9613	0.12	Q	|	|	|	V|
22+ 0	0.9620	0.10	Q	|	|	|	V|
22+ 5	0.9627	0.10	Q	|	|	|	V|
22+10	0.9635	0.11	Q	|	|	|	V|
22+15	0.9644	0.13	Q	|	|	|	V|
22+20	0.9652	0.13	Q	|	|	|	V|

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   22+25       0.9660      0.12  Q        |         |         |       V|
   22+30       0.9668      0.10  Q        |         |         |       V|
   22+35       0.9674      0.10  Q        |         |         |       V|
   22+40       0.9681      0.10  Q        |         |         |       V|
   22+45       0.9687      0.09  Q        |         |         |       V|
   22+50       0.9694      0.09  Q        |         |         |       V|
   22+55       0.9700      0.09  Q        |         |         |       V|
   23+ 0       0.9706      0.09  Q        |         |         |       V|
   23+ 5       0.9713      0.09  Q        |         |         |       V|
   23+10       0.9719      0.09  Q        |         |         |       V|
   23+15       0.9725      0.09  Q        |         |         |       V|
   23+20       0.9732      0.09  Q        |         |         |       V|
   23+25       0.9738      0.09  Q        |         |         |       V|
   23+30       0.9744      0.09  Q        |         |         |       V|
   23+35       0.9751      0.09  Q        |         |         |       V|
   23+40       0.9757      0.09  Q        |         |         |       V|
   23+45       0.9763      0.09  Q        |         |         |       V|
   23+50       0.9770      0.09  Q        |         |         |       V|
   23+55       0.9776      0.09  Q        |         |         |       V|
   24+ 0       0.9782      0.09  Q        |         |         |       V|
   24+ 5       0.9788      0.09  Q        |         |         |       V|
   24+10       0.9792      0.06  Q        |         |         |       V|
   24+15       0.9794      0.03  Q        |         |         |       V|
   24+20       0.9795      0.01  Q        |         |         |       V|
   24+25       0.9795      0.01  Q        |         |         |       V|
   24+30       0.9796      0.00  Q        |         |         |       V|
   24+35       0.9796      0.00  Q        |         |         |       V|
   24+40       0.9796      0.00  Q        |         |         |       V|
   24+45       0.9796      0.00  Q        |         |         |       V|
   24+50       0.9796      0.00  Q        |         |         |       V|
   24+55       0.9796      0.00  Q        |         |         |       V|
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501pre625.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 25.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.075(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.075(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.124	(0.060)	0.029	0.096
2	0.17	0.60	0.149	(0.060)	0.035	0.115
3	0.25	0.60	0.149	(0.060)	0.035	0.115
4	0.33	0.60	0.149	(0.060)	0.035	0.115
5	0.42	0.60	0.149	(0.060)	0.035	0.115
6	0.50	0.70	0.174	(0.060)	0.040	0.134
7	0.58	0.70	0.174	(0.060)	0.040	0.134

8	0.67	0.70	0.174	(0.060)	0.040	0.134
9	0.75	0.70	0.174	(0.060)	0.040	0.134
10	0.83	0.70	0.174	(0.060)	0.040	0.134
11	0.92	0.70	0.174	(0.060)	0.040	0.134
12	1.00	0.80	0.199	(0.060)	0.046	0.153
13	1.08	0.80	0.199	(0.060)	0.046	0.153
14	1.17	0.80	0.199	(0.060)	0.046	0.153
15	1.25	0.80	0.199	(0.060)	0.046	0.153
16	1.33	0.80	0.199	(0.060)	0.046	0.153
17	1.42	0.80	0.199	(0.060)	0.046	0.153
18	1.50	0.80	0.199	(0.060)	0.046	0.153
19	1.58	0.80	0.199	(0.060)	0.046	0.153
20	1.67	0.80	0.199	(0.060)	0.046	0.153
21	1.75	0.80	0.199	(0.060)	0.046	0.153
22	1.83	0.80	0.199	(0.060)	0.046	0.153
23	1.92	0.80	0.199	(0.060)	0.046	0.153
24	2.00	0.90	0.224	(0.060)	0.052	0.172
25	2.08	0.80	0.199	(0.060)	0.046	0.153
26	2.17	0.90	0.224	(0.060)	0.052	0.172
27	2.25	0.90	0.224	(0.060)	0.052	0.172
28	2.33	0.90	0.224	(0.060)	0.052	0.172
29	2.42	0.90	0.224	(0.060)	0.052	0.172
30	2.50	0.90	0.224	(0.060)	0.052	0.172
31	2.58	0.90	0.224	(0.060)	0.052	0.172
32	2.67	0.90	0.224	(0.060)	0.052	0.172
33	2.75	1.00	0.249	(0.060)	0.058	0.191
34	2.83	1.00	0.249	(0.060)	0.058	0.191
35	2.92	1.00	0.249	(0.060)	0.058	0.191
36	3.00	1.00	0.249	(0.060)	0.058	0.191
37	3.08	1.00	0.249	(0.060)	0.058	0.191
38	3.17	1.10	0.274	0.060	(0.063)	0.213
39	3.25	1.10	0.274	0.060	(0.063)	0.213
40	3.33	1.10	0.274	0.060	(0.063)	0.213
41	3.42	1.20	0.299	0.060	(0.069)	0.238
42	3.50	1.30	0.324	0.060	(0.075)	0.263
43	3.58	1.40	0.349	0.060	(0.081)	0.288
44	3.67	1.40	0.349	0.060	(0.081)	0.288
45	3.75	1.50	0.373	0.060	(0.086)	0.313
46	3.83	1.50	0.373	0.060	(0.086)	0.313
47	3.92	1.60	0.398	0.060	(0.092)	0.338
48	4.00	1.60	0.398	0.060	(0.092)	0.338
49	4.08	1.70	0.423	0.060	(0.098)	0.363
50	4.17	1.80	0.448	0.060	(0.104)	0.388
51	4.25	1.90	0.473	0.060	(0.109)	0.413
52	4.33	2.00	0.498	0.060	(0.115)	0.438
53	4.42	2.10	0.523	0.060	(0.121)	0.462
54	4.50	2.10	0.523	0.060	(0.121)	0.462
55	4.58	2.20	0.548	0.060	(0.127)	0.487
56	4.67	2.30	0.573	0.060	(0.132)	0.512
57	4.75	2.40	0.598	0.060	(0.138)	0.537
58	4.83	2.40	0.598	0.060	(0.138)	0.537
59	4.92	2.50	0.622	0.060	(0.144)	0.562
60	5.00	2.60	0.647	0.060	(0.150)	0.587
61	5.08	3.10	0.772	0.060	(0.178)	0.711
62	5.17	3.60	0.896	0.060	(0.207)	0.836
63	5.25	3.90	0.971	0.060	(0.224)	0.911
64	5.33	4.20	1.046	0.060	(0.242)	0.985

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65   5.42     4.70      1.170          0.060    (  0.271)        1.110
66   5.50     5.60      1.394          0.060    (  0.322)        1.334
67   5.58     1.90      0.473          0.060    (  0.109)        0.413
68   5.67     0.90      0.224       (  0.060)      0.052         0.172
69   5.75     0.60      0.149       (  0.060)      0.035         0.115
70   5.83     0.50      0.124       (  0.060)      0.029         0.096
71   5.92     0.30      0.075       (  0.060)      0.017         0.057
72   6.00     0.20      0.050       (  0.060)      0.012         0.038
           (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    21.2
    Flood volume = Effective rainfall      1.77(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.7(Ac.Ft)
    Total soil loss =      0.31(In)
    Total soil loss =     0.128(Ac.Ft)
    Total rainfall =      2.07(In)
    Flood volume =       32368.4 Cubic Feet
    Total soil loss =       5589.0 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      5.486(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0015      0.19  Q         |         |         |         |
  0+15       0.0042      0.39  VQ        |         |         |         |
  0+20       0.0075      0.48  VQ        |         |         |         |
  0+25       0.0111      0.52  V Q       |         |         |         |
  0+30       0.0149      0.56  V Q       |         |         |         |
  0+35       0.0191      0.60  |VQ       |         |         |         |
  0+40       0.0235      0.64  |VQ       |         |         |         |
  0+45       0.0281      0.66  |VQ       |         |         |         |
  0+50       0.0327      0.67  |VQ       |         |         |         |
  0+55       0.0373      0.68  | Q       |         |         |         |
  1+ 0       0.0420      0.68  | Q       |         |         |         |
  1+ 5       0.0470      0.72  | Q       |         |         |         |
  1+10       0.0521      0.75  | Q       |         |         |         |
  1+15       0.0574      0.76  |  Q      |         |         |         |
  1+20       0.0627      0.77  |  Q      |         |         |         |
  1+25       0.0680      0.77  |  Q      |         |         |         |
  1+30       0.0733      0.78  |  Q      |         |         |         |
  1+35       0.0787      0.78  |  QV     |         |         |         |
  1+40       0.0840      0.78  |  QV     |         |         |         |
  1+45       0.0894      0.78  |  QV     |         |         |         |
  1+50       0.0948      0.78  |  Q V    |         |         |         |
  1+55       0.1001      0.78  |  Q V    |         |         |         |
  2+ 0       0.1055      0.78  |  Q V    |         |         |         |
  2+ 5       0.1111      0.81  |  Q V    |         |         |         |
  2+10       0.1167      0.82  |  Q  V   |         |         |         |
  2+15       0.1224      0.83  |  Q  V   |         |         |         |
  2+20       0.1283      0.85  |  Q  V   |         |         |         |
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    2+25       0.1342      0.86  |  Q   V  |         |         |         |
    2+30       0.1402      0.87  |  Q   V  |         |         |         |
    2+35       0.1462      0.87  |  Q   V  |         |         |         |
    2+40       0.1523      0.87  |  Q    V |         |         |         |
    2+45       0.1583      0.88  |  Q    V |         |         |         |
    2+50       0.1646      0.91  |  Q    V |         |         |         |
    2+55       0.1711      0.94  |  Q     V|         |         |         |
    3+ 0       0.1777      0.96  |  Q     V|         |         |         |
    3+ 5       0.1843      0.96  |  Q     V|         |         |         |
    3+10       0.1910      0.97  |  Q      V         |         |         |
    3+15       0.1980      1.01  |   Q     V         |         |         |
    3+20       0.2053      1.05  |   Q     |V        |         |         |
    3+25       0.2127      1.07  |   Q     |V        |         |         |
    3+30       0.2204      1.13  |   Q     |V        |         |         |
    3+35       0.2289      1.23  |   Q     | V       |         |         |
    3+40       0.2380      1.33  |    Q    | V       |         |         |
    3+45       0.2477      1.40  |    Q    |  V      |         |         |
    3+50       0.2578      1.47  |    Q    |  V      |         |         |
    3+55       0.2684      1.54  |     Q   |   V     |         |         |
    4+ 0       0.2795      1.61  |     Q   |    V    |         |         |
    4+ 5       0.2910      1.67  |     Q   |    V    |         |         |
    4+10       0.3030      1.74  |     Q   |     V   |         |         |
    4+15       0.3158      1.85  |      Q  |     V   |         |         |
    4+20       0.3293      1.96  |      Q  |      V  |         |         |
    4+25       0.3436      2.08  |       Q |       V |         |         |
    4+30       0.3587      2.20  |       Q |        V|         |         |
    4+35       0.3744      2.28  |        Q|         V         |         |
    4+40       0.3907      2.36  |        Q|         |V        |         |
    4+45       0.4077      2.47  |        Q|         |V        |         |
    4+50       0.4255      2.58  |         Q         | V       |         |
    4+55       0.4439      2.66  |         Q         |  V      |         |
    5+ 0       0.4627      2.74  |         Q         |   V     |         |
    5+ 5       0.4826      2.88  |         |Q        |    V    |         |
    5+10       0.5046      3.19  |         | Q       |      V  |         |
    5+15       0.5298      3.66  |         |   Q     |       V |         |
    5+20       0.5581      4.11  |         |     Q   |         V         |
    5+25       0.5893      4.53  |         |       Q |         |V        |
    5+30       0.6241      5.05  |         |         Q         |  V      |
    5+35       0.6619      5.49  |         |         |Q        |    V    |
    5+40       0.6924      4.43  |         |      Q  |         |      V  |
    5+45       0.7107      2.66  |         Q         |         |       V |
    5+50       0.7224      1.70  |     Q   |         |         |       V |
    5+55       0.7303      1.15  |   Q     |         |         |        V|
    6+ 0       0.7356      0.77  |  Q      |         |         |        V|
    6+ 5       0.7389      0.48  |Q        |         |         |        V|
    6+10       0.7409      0.28  |Q        |         |         |        V|
    6+15       0.7419      0.15  Q         |         |         |        V|
    6+20       0.7425      0.09  Q         |         |         |        V|
    6+25       0.7428      0.04  Q         |         |         |        V|
    6+30       0.7430      0.02  Q         |         |         |        V|
    6+35       0.7430      0.01  Q         |         |         |        V|
    6+40       0.7430      0.00  Q         |         |         |        V|
    6+45       0.7431      0.00  Q         |         |         |        V|
    6+50       0.7431      0.00  Q         |         |         |        V|
    6+55       0.7431      0.00  Q         |         |         |         V
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501pre325.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 25.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.463(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.463(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.228	(0.060)	0.053	0.175
2	0.17	1.30	0.228	(0.060)	0.053	0.175
3	0.25	1.10	0.193	(0.060)	0.045	0.148
4	0.33	1.50	0.263	0.060	(0.061)	0.203
5	0.42	1.50	0.263	0.060	(0.061)	0.203
6	0.50	1.80	0.316	0.060	(0.073)	0.256
7	0.58	1.50	0.263	0.060	(0.061)	0.203

8	0.67	1.80	0.316	0.060	(0.073)	0.256
9	0.75	1.80	0.316	0.060	(0.073)	0.256
10	0.83	1.50	0.263	0.060	(0.061)	0.203
11	0.92	1.60	0.281	0.060	(0.065)	0.221
12	1.00	1.80	0.316	0.060	(0.073)	0.256
13	1.08	2.20	0.386	0.060	(0.089)	0.326
14	1.17	2.20	0.386	0.060	(0.089)	0.326
15	1.25	2.20	0.386	0.060	(0.089)	0.326
16	1.33	2.00	0.351	0.060	(0.081)	0.291
17	1.42	2.60	0.457	0.060	(0.106)	0.396
18	1.50	2.70	0.474	0.060	(0.110)	0.414
19	1.58	2.40	0.421	0.060	(0.097)	0.361
20	1.67	2.70	0.474	0.060	(0.110)	0.414
21	1.75	3.30	0.579	0.060	(0.134)	0.519
22	1.83	3.10	0.544	0.060	(0.126)	0.484
23	1.92	2.90	0.509	0.060	(0.118)	0.449
24	2.00	3.00	0.527	0.060	(0.122)	0.466
25	2.08	3.10	0.544	0.060	(0.126)	0.484
26	2.17	4.20	0.738	0.060	(0.171)	0.677
27	2.25	5.00	0.878	0.060	(0.203)	0.818
28	2.33	3.50	0.615	0.060	(0.142)	0.554
29	2.42	6.80	1.194	0.060	(0.276)	1.134
30	2.50	7.30	1.282	0.060	(0.296)	1.221
31	2.58	8.20	1.440	0.060	(0.333)	1.379
32	2.67	5.90	1.036	0.060	(0.240)	0.976
33	2.75	2.00	0.351	0.060	(0.081)	0.291
34	2.83	1.80	0.316	0.060	(0.073)	0.256
35	2.92	1.80	0.316	0.060	(0.073)	0.256
36	3.00	0.60	0.105	(0.060)	0.024	0.081

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.5

Flood volume = Effective rainfall 1.29(In)
times area 5.0(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.074(Ac.Ft)
Total rainfall = 1.46(In)
Flood volume = 23558.1 Cubic Feet
Total soil loss = 3213.6 Cubic Feet

Peak flow rate of this hydrograph = 5.861(CFS)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   3 - H O U R   S T O R M
              R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
           Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5      0.0003      0.05  Q         |         |         |         |
  0+10      0.0027      0.34  VQ        |         |         |         |
  0+15      0.0070      0.63  V Q       |         |         |         |
  0+20      0.0119      0.71  V Q       |         |         |         |
  0+25      0.0176      0.82  |V Q      |         |         |         |
  0+30      0.0241      0.95  |V Q      |         |         |         |
  0+35      0.0315      1.07  | V Q     |         |         |         |
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    0+40       0.0391      1.11  | V Q     |         |         |         |
    0+45       0.0470      1.15  |  VQ     |         |         |         |
    0+50       0.0554      1.22  |   Q     |         |         |         |
    0+55       0.0634      1.17  |   Q     |         |         |         |
    1+ 0       0.0712      1.13  |   QV    |         |         |         |
    1+ 5       0.0796      1.22  |   QV    |         |         |         |
    1+10       0.0891      1.39  |    QV   |         |         |         |
    1+15       0.0997      1.53  |     QV  |         |         |         |
    1+20       0.1105      1.57  |     Q V |         |         |         |
    1+25       0.1214      1.58  |     Q V |         |         |         |
    1+30       0.1332      1.72  |     Q  V|         |         |         |
    1+35       0.1463      1.90  |      Q  V         |         |         |
    1+40       0.1595      1.91  |      Q  |V        |         |         |
    1+45       0.1731      1.98  |      Q  | V       |         |         |
    1+50       0.1885      2.23  |       Q |  V      |         |         |
    1+55       0.2049      2.37  |        Q|    V    |         |         |
    2+ 0       0.2210      2.34  |        Q|     V   |         |         |
    2+ 5       0.2371      2.34  |        Q|      V  |         |         |
    2+10       0.2540      2.45  |        Q|       V |         |         |
    2+15       0.2736      2.84  |         |Q        V         |         |
    2+20       0.2966      3.34  |         |  Q      |V        |         |
    2+25       0.3203      3.44  |         |  Q      |  V      |         |
    2+30       0.3488      4.13  |         |     Q   |    V    |         |
    2+35       0.3849      5.25  |         |         Q       V |         |
    2+40       0.4253      5.86  |         |         |  Q      |V        |
    2+45       0.4632      5.50  |         |         | Q       |   V     |
    2+50       0.4901      3.91  |         |    Q    |         |     V   |
    2+55       0.5078      2.57  |         Q         |         |      V  |
    3+ 0       0.5212      1.95  |      Q  |         |         |       V |
    3+ 5       0.5304      1.33  |    Q    |         |         |        V|
    3+10       0.5352      0.70  | Q       |         |         |        V|
    3+15       0.5377      0.36  |Q        |         |         |        V|
    3+20       0.5392      0.21  Q         |         |         |        V|
    3+25       0.5400      0.12  Q         |         |         |        V|
    3+30       0.5404      0.06  Q         |         |         |        V|
    3+35       0.5406      0.03  Q         |         |         |        V|
    3+40       0.5407      0.01  Q         |         |         |        V|
    3+45       0.5408      0.01  Q         |         |         |        V|
    3+50       0.5408      0.00  Q         |         |         |        V|
    3+55       0.5408      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501pre125.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.50	2.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.20	6.05

STORM EVENT (YEAR) = 25.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.952(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.952(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.377	0.060	(0.087)	0.317
2	0.17	4.20	0.480	0.060	(0.111)	0.419
3	0.25	4.40	0.503	0.060	(0.116)	0.442
4	0.33	4.80	0.548	0.060	(0.127)	0.488
5	0.42	5.20	0.594	0.060	(0.137)	0.534

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  6   0.50     6.20      0.708          0.060    (  0.164)        0.648
  7   0.58     6.80      0.777          0.060    (  0.180)        0.716
  8   0.67     8.80      1.005          0.060    (  0.232)        0.945
  9   0.75    13.90      1.588          0.060    (  0.367)        1.527
 10   0.83    31.40      3.587          0.060    (  0.829)        3.526
 11   0.92     7.20      0.822          0.060    (  0.190)        0.762
 12   1.00     3.80      0.434          0.060    (  0.100)        0.374
           (Loss Rate Not Used)
    Sum =     100.0                                     Sum =    10.7
     Flood volume = Effective rainfall      0.89(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.025(Ac.Ft)
     Total rainfall =      0.95(In)
     Flood volume =       16309.9 Cubic Feet
     Total soil loss =       1105.3 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      9.732(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                      R u n o f f      H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
    0+ 5       0.0006      0.09  Q         |         |         |         |
    0+10       0.0050      0.64  V Q       |         |         |         |
    0+15       0.0144      1.36  |V   Q    |         |         |         |
    0+20       0.0267      1.78  | V    Q  |         |         |         |
    0+25       0.0411      2.09  |   V   Q |         |         |         |
    0+30       0.0576      2.40  |     V  Q|         |         |         |
    0+35       0.0767      2.78  |       V |Q        |         |         |
    0+40       0.0989      3.23  |         V Q       |         |         |
    0+45       0.1265      4.00  |         |  V  Q   |         |         |
    0+50       0.1681      6.04  |         |      V  |   Q     |         |
    0+55       0.2351      9.73  |         |         |    V    |       Q |
    1+ 0       0.2970      8.98  |         |         |         |V   Q    |
    1+ 5       0.3316      5.02  |         |         Q         |    V    |
    1+10       0.3515      2.90  |         |Q        |         |      V  |
    1+15       0.3621      1.54  |     Q   |         |         |       V |
    1+20       0.3679      0.84  |  Q      |         |         |        V|
    1+25       0.3707      0.41  |Q        |         |         |        V|
    1+30       0.3723      0.23  Q         |         |         |        V|
    1+35       0.3733      0.15  Q         |         |         |        V|
    1+40       0.3740      0.10  Q         |         |         |        V|
    1+45       0.3743      0.05  Q         |         |         |        V|
    1+50       0.3744      0.01  Q         |         |         |        V|
    1+55       0.3744      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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UC Riverside Lot 32 Overflow Parking
Hydrology and Hydraulics Study

Existing Conditions Unit Hydrograph: 10yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.411(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.411(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	60.694	5.690		0.289
2	0.167	121.389	32.349		1.643
3	0.250	182.083	33.711		1.712
4	0.333	242.777	12.272		0.623
5	0.417	303.472	7.080		0.360
6	0.500	364.166	4.248		0.216
7	0.583	424.860	2.304		0.117
8	0.667	485.555	0.888		0.045
9	0.750	546.249	0.547		0.028
10	0.833	606.943	0.423		0.021
11	0.917	667.638	0.333		0.017
12	1.000	728.332	0.156		0.008
			Sum = 100.000	Sum=	5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.027	(0.107)	0.006	0.021
2	0.17	0.07	0.027	(0.107)	0.006	0.021
3	0.25	0.07	0.027	(0.106)	0.006	0.021
4	0.33	0.10	0.041	(0.106)	0.009	0.031
5	0.42	0.10	0.041	(0.105)	0.009	0.031
6	0.50	0.10	0.041	(0.105)	0.009	0.031
7	0.58	0.10	0.041	(0.105)	0.009	0.031

8	0.67	0.10	0.041	(0.104)	0.009	0.031
9	0.75	0.10	0.041	(0.104)	0.009	0.031
10	0.83	0.13	0.055	(0.103)	0.013	0.042
11	0.92	0.13	0.055	(0.103)	0.013	0.042
12	1.00	0.13	0.055	(0.103)	0.013	0.042
13	1.08	0.10	0.041	(0.102)	0.009	0.031
14	1.17	0.10	0.041	(0.102)	0.009	0.031
15	1.25	0.10	0.041	(0.101)	0.009	0.031
16	1.33	0.10	0.041	(0.101)	0.009	0.031
17	1.42	0.10	0.041	(0.101)	0.009	0.031
18	1.50	0.10	0.041	(0.100)	0.009	0.031
19	1.58	0.10	0.041	(0.100)	0.009	0.031
20	1.67	0.10	0.041	(0.099)	0.009	0.031
21	1.75	0.10	0.041	(0.099)	0.009	0.031
22	1.83	0.13	0.055	(0.099)	0.013	0.042
23	1.92	0.13	0.055	(0.098)	0.013	0.042
24	2.00	0.13	0.055	(0.098)	0.013	0.042
25	2.08	0.13	0.055	(0.097)	0.013	0.042
26	2.17	0.13	0.055	(0.097)	0.013	0.042
27	2.25	0.13	0.055	(0.097)	0.013	0.042
28	2.33	0.13	0.055	(0.096)	0.013	0.042
29	2.42	0.13	0.055	(0.096)	0.013	0.042
30	2.50	0.13	0.055	(0.095)	0.013	0.042
31	2.58	0.17	0.068	(0.095)	0.016	0.052
32	2.67	0.17	0.068	(0.095)	0.016	0.052
33	2.75	0.17	0.068	(0.094)	0.016	0.052
34	2.83	0.17	0.068	(0.094)	0.016	0.052
35	2.92	0.17	0.068	(0.093)	0.016	0.052
36	3.00	0.17	0.068	(0.093)	0.016	0.052
37	3.08	0.17	0.068	(0.093)	0.016	0.052
38	3.17	0.17	0.068	(0.092)	0.016	0.052
39	3.25	0.17	0.068	(0.092)	0.016	0.052
40	3.33	0.17	0.068	(0.092)	0.016	0.052
41	3.42	0.17	0.068	(0.091)	0.016	0.052
42	3.50	0.17	0.068	(0.091)	0.016	0.052
43	3.58	0.17	0.068	(0.090)	0.016	0.052
44	3.67	0.17	0.068	(0.090)	0.016	0.052
45	3.75	0.17	0.068	(0.090)	0.016	0.052
46	3.83	0.20	0.082	(0.089)	0.019	0.063
47	3.92	0.20	0.082	(0.089)	0.019	0.063
48	4.00	0.20	0.082	(0.089)	0.019	0.063
49	4.08	0.20	0.082	(0.088)	0.019	0.063
50	4.17	0.20	0.082	(0.088)	0.019	0.063
51	4.25	0.20	0.082	(0.087)	0.019	0.063
52	4.33	0.23	0.096	(0.087)	0.022	0.073
53	4.42	0.23	0.096	(0.087)	0.022	0.073
54	4.50	0.23	0.096	(0.086)	0.022	0.073
55	4.58	0.23	0.096	(0.086)	0.022	0.073
56	4.67	0.23	0.096	(0.086)	0.022	0.073
57	4.75	0.23	0.096	(0.085)	0.022	0.073
58	4.83	0.27	0.109	(0.085)	0.025	0.084
59	4.92	0.27	0.109	(0.084)	0.025	0.084
60	5.00	0.27	0.109	(0.084)	0.025	0.084
61	5.08	0.20	0.082	(0.084)	0.019	0.063
62	5.17	0.20	0.082	(0.083)	0.019	0.063
63	5.25	0.20	0.082	(0.083)	0.019	0.063
64	5.33	0.23	0.096	(0.083)	0.022	0.073

65	5.42	0.23	0.096	(0.082)	0.022	0.073
66	5.50	0.23	0.096	(0.082)	0.022	0.073
67	5.58	0.27	0.109	(0.082)	0.025	0.084
68	5.67	0.27	0.109	(0.081)	0.025	0.084
69	5.75	0.27	0.109	(0.081)	0.025	0.084
70	5.83	0.27	0.109	(0.080)	0.025	0.084
71	5.92	0.27	0.109	(0.080)	0.025	0.084
72	6.00	0.27	0.109	(0.080)	0.025	0.084
73	6.08	0.30	0.123	(0.079)	0.028	0.094
74	6.17	0.30	0.123	(0.079)	0.028	0.094
75	6.25	0.30	0.123	(0.079)	0.028	0.094
76	6.33	0.30	0.123	(0.078)	0.028	0.094
77	6.42	0.30	0.123	(0.078)	0.028	0.094
78	6.50	0.30	0.123	(0.078)	0.028	0.094
79	6.58	0.33	0.136	(0.077)	0.032	0.105
80	6.67	0.33	0.136	(0.077)	0.032	0.105
81	6.75	0.33	0.136	(0.077)	0.032	0.105
82	6.83	0.33	0.136	(0.076)	0.032	0.105
83	6.92	0.33	0.136	(0.076)	0.032	0.105
84	7.00	0.33	0.136	(0.076)	0.032	0.105
85	7.08	0.33	0.136	(0.075)	0.032	0.105
86	7.17	0.33	0.136	(0.075)	0.032	0.105
87	7.25	0.33	0.136	(0.075)	0.032	0.105
88	7.33	0.37	0.150	(0.074)	0.035	0.115
89	7.42	0.37	0.150	(0.074)	0.035	0.115
90	7.50	0.37	0.150	(0.074)	0.035	0.115
91	7.58	0.40	0.164	(0.073)	0.038	0.126
92	7.67	0.40	0.164	(0.073)	0.038	0.126
93	7.75	0.40	0.164	(0.072)	0.038	0.126
94	7.83	0.43	0.177	(0.072)	0.041	0.136
95	7.92	0.43	0.177	(0.072)	0.041	0.136
96	8.00	0.43	0.177	(0.071)	0.041	0.136
97	8.08	0.50	0.205	(0.071)	0.047	0.157
98	8.17	0.50	0.205	(0.071)	0.047	0.157
99	8.25	0.50	0.205	(0.071)	0.047	0.157
100	8.33	0.50	0.205	(0.070)	0.047	0.157
101	8.42	0.50	0.205	(0.070)	0.047	0.157
102	8.50	0.50	0.205	(0.070)	0.047	0.157
103	8.58	0.53	0.218	(0.069)	0.050	0.168
104	8.67	0.53	0.218	(0.069)	0.050	0.168
105	8.75	0.53	0.218	(0.069)	0.050	0.168
106	8.83	0.57	0.232	(0.068)	0.054	0.178
107	8.92	0.57	0.232	(0.068)	0.054	0.178
108	9.00	0.57	0.232	(0.068)	0.054	0.178
109	9.08	0.63	0.259	(0.067)	0.060	0.199
110	9.17	0.63	0.259	(0.067)	0.060	0.199
111	9.25	0.63	0.259	(0.067)	0.060	0.199
112	9.33	0.67	0.273	(0.066)	0.063	0.210
113	9.42	0.67	0.273	(0.066)	0.063	0.210
114	9.50	0.67	0.273	(0.066)	0.063	0.210
115	9.58	0.70	0.287	0.065	(0.066)	0.221
116	9.67	0.70	0.287	0.065	(0.066)	0.221
117	9.75	0.70	0.287	0.065	(0.066)	0.222
118	9.83	0.73	0.300	0.064	(0.069)	0.236
119	9.92	0.73	0.300	0.064	(0.069)	0.236
120	10.00	0.73	0.300	0.064	(0.069)	0.236
121	10.08	0.50	0.205	(0.063)	0.047	0.157

122	10.17	0.50	0.205	(0.063)	0.047	0.157
123	10.25	0.50	0.205	(0.063)	0.047	0.157
124	10.33	0.50	0.205	(0.063)	0.047	0.157
125	10.42	0.50	0.205	(0.062)	0.047	0.157
126	10.50	0.50	0.205	(0.062)	0.047	0.157
127	10.58	0.67	0.273	0.062	(0.063)	0.211
128	10.67	0.67	0.273	0.061	(0.063)	0.212
129	10.75	0.67	0.273	0.061	(0.063)	0.212
130	10.83	0.67	0.273	0.061	(0.063)	0.212
131	10.92	0.67	0.273	0.060	(0.063)	0.212
132	11.00	0.67	0.273	0.060	(0.063)	0.213
133	11.08	0.63	0.259	0.060	(0.060)	0.199
134	11.17	0.63	0.259	0.060	(0.060)	0.200
135	11.25	0.63	0.259	0.059	(0.060)	0.200
136	11.33	0.63	0.259	0.059	(0.060)	0.200
137	11.42	0.63	0.259	0.059	(0.060)	0.201
138	11.50	0.63	0.259	0.058	(0.060)	0.201
139	11.58	0.57	0.232	(0.058)	0.054	0.178
140	11.67	0.57	0.232	(0.058)	0.054	0.178
141	11.75	0.57	0.232	(0.058)	0.054	0.178
142	11.83	0.60	0.246	(0.057)	0.057	0.189
143	11.92	0.60	0.246	(0.057)	0.057	0.189
144	12.00	0.60	0.246	0.057	(0.057)	0.189
145	12.08	0.83	0.341	0.056	(0.079)	0.285
146	12.17	0.83	0.341	0.056	(0.079)	0.285
147	12.25	0.83	0.341	0.056	(0.079)	0.285
148	12.33	0.87	0.355	0.056	(0.082)	0.299
149	12.42	0.87	0.355	0.055	(0.082)	0.299
150	12.50	0.87	0.355	0.055	(0.082)	0.300
151	12.58	0.93	0.382	0.055	(0.088)	0.327
152	12.67	0.93	0.382	0.054	(0.088)	0.328
153	12.75	0.93	0.382	0.054	(0.088)	0.328
154	12.83	0.97	0.396	0.054	(0.091)	0.342
155	12.92	0.97	0.396	0.054	(0.091)	0.342
156	13.00	0.97	0.396	0.053	(0.091)	0.342
157	13.08	1.13	0.464	0.053	(0.107)	0.411
158	13.17	1.13	0.464	0.053	(0.107)	0.411
159	13.25	1.13	0.464	0.053	(0.107)	0.411
160	13.33	1.13	0.464	0.052	(0.107)	0.412
161	13.42	1.13	0.464	0.052	(0.107)	0.412
162	13.50	1.13	0.464	0.052	(0.107)	0.412
163	13.58	0.77	0.314	0.051	(0.073)	0.262
164	13.67	0.77	0.314	0.051	(0.073)	0.263
165	13.75	0.77	0.314	0.051	(0.073)	0.263
166	13.83	0.77	0.314	0.051	(0.073)	0.263
167	13.92	0.77	0.314	0.050	(0.073)	0.263
168	14.00	0.77	0.314	0.050	(0.073)	0.264
169	14.08	0.90	0.368	0.050	(0.085)	0.318
170	14.17	0.90	0.368	0.050	(0.085)	0.319
171	14.25	0.90	0.368	0.049	(0.085)	0.319
172	14.33	0.87	0.355	0.049	(0.082)	0.306
173	14.42	0.87	0.355	0.049	(0.082)	0.306
174	14.50	0.87	0.355	0.049	(0.082)	0.306
175	14.58	0.87	0.355	0.048	(0.082)	0.306
176	14.67	0.87	0.355	0.048	(0.082)	0.307
177	14.75	0.87	0.355	0.048	(0.082)	0.307
178	14.83	0.83	0.341	0.048	(0.079)	0.293

179	14.92	0.83	0.341	0.047	(0.079)	0.294
180	15.00	0.83	0.341	0.047	(0.079)	0.294
181	15.08	0.80	0.327	0.047	(0.076)	0.280
182	15.17	0.80	0.327	0.047	(0.076)	0.281
183	15.25	0.80	0.327	0.046	(0.076)	0.281
184	15.33	0.77	0.314	0.046	(0.073)	0.268
185	15.42	0.77	0.314	0.046	(0.073)	0.268
186	15.50	0.77	0.314	0.046	(0.073)	0.268
187	15.58	0.63	0.259	0.046	(0.060)	0.214
188	15.67	0.63	0.259	0.045	(0.060)	0.214
189	15.75	0.63	0.259	0.045	(0.060)	0.214
190	15.83	0.63	0.259	0.045	(0.060)	0.214
191	15.92	0.63	0.259	0.045	(0.060)	0.215
192	16.00	0.63	0.259	0.044	(0.060)	0.215
193	16.08	0.13	0.055	(0.044)	0.013	0.042
194	16.17	0.13	0.055	(0.044)	0.013	0.042
195	16.25	0.13	0.055	(0.044)	0.013	0.042
196	16.33	0.13	0.055	(0.043)	0.013	0.042
197	16.42	0.13	0.055	(0.043)	0.013	0.042
198	16.50	0.13	0.055	(0.043)	0.013	0.042
199	16.58	0.10	0.041	(0.043)	0.009	0.031
200	16.67	0.10	0.041	(0.043)	0.009	0.031
201	16.75	0.10	0.041	(0.042)	0.009	0.031
202	16.83	0.10	0.041	(0.042)	0.009	0.031
203	16.92	0.10	0.041	(0.042)	0.009	0.031
204	17.00	0.10	0.041	(0.042)	0.009	0.031
205	17.08	0.17	0.068	(0.042)	0.016	0.052
206	17.17	0.17	0.068	(0.041)	0.016	0.052
207	17.25	0.17	0.068	(0.041)	0.016	0.052
208	17.33	0.17	0.068	(0.041)	0.016	0.052
209	17.42	0.17	0.068	(0.041)	0.016	0.052
210	17.50	0.17	0.068	(0.040)	0.016	0.052
211	17.58	0.17	0.068	(0.040)	0.016	0.052
212	17.67	0.17	0.068	(0.040)	0.016	0.052
213	17.75	0.17	0.068	(0.040)	0.016	0.052
214	17.83	0.13	0.055	(0.040)	0.013	0.042
215	17.92	0.13	0.055	(0.039)	0.013	0.042
216	18.00	0.13	0.055	(0.039)	0.013	0.042
217	18.08	0.13	0.055	(0.039)	0.013	0.042
218	18.17	0.13	0.055	(0.039)	0.013	0.042
219	18.25	0.13	0.055	(0.039)	0.013	0.042
220	18.33	0.13	0.055	(0.039)	0.013	0.042
221	18.42	0.13	0.055	(0.038)	0.013	0.042
222	18.50	0.13	0.055	(0.038)	0.013	0.042
223	18.58	0.10	0.041	(0.038)	0.009	0.031
224	18.67	0.10	0.041	(0.038)	0.009	0.031
225	18.75	0.10	0.041	(0.038)	0.009	0.031
226	18.83	0.07	0.027	(0.037)	0.006	0.021
227	18.92	0.07	0.027	(0.037)	0.006	0.021
228	19.00	0.07	0.027	(0.037)	0.006	0.021
229	19.08	0.10	0.041	(0.037)	0.009	0.031
230	19.17	0.10	0.041	(0.037)	0.009	0.031
231	19.25	0.10	0.041	(0.037)	0.009	0.031
232	19.33	0.13	0.055	(0.036)	0.013	0.042
233	19.42	0.13	0.055	(0.036)	0.013	0.042
234	19.50	0.13	0.055	(0.036)	0.013	0.042
235	19.58	0.10	0.041	(0.036)	0.009	0.031

236	19.67	0.10	0.041	(0.036)	0.009	0.031
237	19.75	0.10	0.041	(0.036)	0.009	0.031
238	19.83	0.07	0.027	(0.035)	0.006	0.021
239	19.92	0.07	0.027	(0.035)	0.006	0.021
240	20.00	0.07	0.027	(0.035)	0.006	0.021
241	20.08	0.10	0.041	(0.035)	0.009	0.031
242	20.17	0.10	0.041	(0.035)	0.009	0.031
243	20.25	0.10	0.041	(0.035)	0.009	0.031
244	20.33	0.10	0.041	(0.034)	0.009	0.031
245	20.42	0.10	0.041	(0.034)	0.009	0.031
246	20.50	0.10	0.041	(0.034)	0.009	0.031
247	20.58	0.10	0.041	(0.034)	0.009	0.031
248	20.67	0.10	0.041	(0.034)	0.009	0.031
249	20.75	0.10	0.041	(0.034)	0.009	0.031
250	20.83	0.07	0.027	(0.034)	0.006	0.021
251	20.92	0.07	0.027	(0.033)	0.006	0.021
252	21.00	0.07	0.027	(0.033)	0.006	0.021
253	21.08	0.10	0.041	(0.033)	0.009	0.031
254	21.17	0.10	0.041	(0.033)	0.009	0.031
255	21.25	0.10	0.041	(0.033)	0.009	0.031
256	21.33	0.07	0.027	(0.033)	0.006	0.021
257	21.42	0.07	0.027	(0.033)	0.006	0.021
258	21.50	0.07	0.027	(0.033)	0.006	0.021
259	21.58	0.10	0.041	(0.032)	0.009	0.031
260	21.67	0.10	0.041	(0.032)	0.009	0.031
261	21.75	0.10	0.041	(0.032)	0.009	0.031
262	21.83	0.07	0.027	(0.032)	0.006	0.021
263	21.92	0.07	0.027	(0.032)	0.006	0.021
264	22.00	0.07	0.027	(0.032)	0.006	0.021
265	22.08	0.10	0.041	(0.032)	0.009	0.031
266	22.17	0.10	0.041	(0.032)	0.009	0.031
267	22.25	0.10	0.041	(0.032)	0.009	0.031
268	22.33	0.07	0.027	(0.031)	0.006	0.021
269	22.42	0.07	0.027	(0.031)	0.006	0.021
270	22.50	0.07	0.027	(0.031)	0.006	0.021
271	22.58	0.07	0.027	(0.031)	0.006	0.021
272	22.67	0.07	0.027	(0.031)	0.006	0.021
273	22.75	0.07	0.027	(0.031)	0.006	0.021
274	22.83	0.07	0.027	(0.031)	0.006	0.021
275	22.92	0.07	0.027	(0.031)	0.006	0.021
276	23.00	0.07	0.027	(0.031)	0.006	0.021
277	23.08	0.07	0.027	(0.031)	0.006	0.021
278	23.17	0.07	0.027	(0.031)	0.006	0.021
279	23.25	0.07	0.027	(0.031)	0.006	0.021
280	23.33	0.07	0.027	(0.031)	0.006	0.021
281	23.42	0.07	0.027	(0.030)	0.006	0.021
282	23.50	0.07	0.027	(0.030)	0.006	0.021
283	23.58	0.07	0.027	(0.030)	0.006	0.021
284	23.67	0.07	0.027	(0.030)	0.006	0.021
285	23.75	0.07	0.027	(0.030)	0.006	0.021
286	23.83	0.07	0.027	(0.030)	0.006	0.021
287	23.92	0.07	0.027	(0.030)	0.006	0.021
288	24.00	0.07	0.027	(0.030)	0.006	0.021

(Loss Rate Not Used)

Sum = 100.0 Sum = 33.0

Flood volume = Effective rainfall 2.75(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)

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    Total soil loss =      0.66(In)
    Total soil loss =     0.278(Ac.Ft)
    Total rainfall =      3.41(In)
    Flood volume =       50288.8 Cubic Feet
    Total soil loss =       12111.8 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      2.075(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0         2.5       5.0       7.5      10.0
--------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q         |         |         |         |
  0+10       0.0003      0.04  Q         |         |         |         |
  0+15       0.0008      0.08  Q         |         |         |         |
  0+20       0.0015      0.09  Q         |         |         |         |
  0+25       0.0023      0.12  Q         |         |         |         |
  0+30       0.0033      0.14  Q         |         |         |         |
  0+35       0.0043      0.15  Q         |         |         |         |
  0+40       0.0053      0.15  Q         |         |         |         |
  0+45       0.0064      0.16  Q         |         |         |         |
  0+50       0.0075      0.16  Q         |         |         |         |
  0+55       0.0088      0.18  Q         |         |         |         |
  1+ 0       0.0101      0.20  Q         |         |         |         |
  1+ 5       0.0115      0.20  Q         |         |         |         |
  1+10       0.0128      0.19  Q         |         |         |         |
  1+15       0.0140      0.17  Q         |         |         |         |
  1+20       0.0151      0.17  Q         |         |         |         |
  1+25       0.0163      0.16  Q         |         |         |         |
  1+30       0.0174      0.16  Q         |         |         |         |
  1+35       0.0185      0.16  Q         |         |         |         |
  1+40       0.0196      0.16  Q         |         |         |         |
  1+45       0.0207      0.16  Q         |         |         |         |
  1+50       0.0218      0.16  Q         |         |         |         |
  1+55       0.0231      0.18  Q         |         |         |         |
  2+ 0       0.0244      0.20  Q         |         |         |         |
  2+ 5       0.0258      0.20  Q         |         |         |         |
  2+10       0.0273      0.21  Q         |         |         |         |
  2+15       0.0287      0.21  Q         |         |         |         |
  2+20       0.0302      0.21  QV        |         |         |         |
  2+25       0.0317      0.21  QV        |         |         |         |
  2+30       0.0331      0.21  QV        |         |         |         |
  2+35       0.0346      0.22  QV        |         |         |         |
  2+40       0.0362      0.23  QV        |         |         |         |
  2+45       0.0380      0.25  |Q        |         |         |         |
  2+50       0.0397      0.26  |Q        |         |         |         |
  2+55       0.0415      0.26  |Q        |         |         |         |
  3+ 0       0.0433      0.26  |Q        |         |         |         |
  3+ 5       0.0452      0.27  |Q        |         |         |         |
  3+10       0.0470      0.27  |Q        |         |         |         |
  3+15       0.0488      0.27  |Q        |         |         |         |
  3+20       0.0507      0.27  |Q        |         |         |         |
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3+25       0.0525      0.27  |Q        |         |         |         |
3+30       0.0543      0.27  |Q        |         |         |         |
3+35       0.0562      0.27  |Q        |         |         |         |
3+40       0.0580      0.27  |QV       |         |         |         |
3+45       0.0598      0.27  |QV       |         |         |         |
3+50       0.0617      0.27  |QV       |         |         |         |
3+55       0.0637      0.29  |QV       |         |         |         |
4+ 0       0.0658      0.30  |QV       |         |         |         |
4+ 5       0.0679      0.31  |QV       |         |         |         |
4+10       0.0701      0.32  |QV       |         |         |         |
4+15       0.0723      0.32  |QV       |         |         |         |
4+20       0.0745      0.32  |QV       |         |         |         |
4+25       0.0768      0.34  |QV       |         |         |         |
4+30       0.0793      0.36  |QV       |         |         |         |
4+35       0.0818      0.36  |QV       |         |         |         |
4+40       0.0843      0.37  |QV       |         |         |         |
4+45       0.0869      0.37  |Q V      |         |         |         |
4+50       0.0895      0.37  |Q V      |         |         |         |
4+55       0.0922      0.39  |Q V      |         |         |         |
5+ 0       0.0950      0.41  |Q V      |         |         |         |
5+ 5       0.0978      0.41  |Q V      |         |         |         |
5+10       0.1005      0.38  |Q V      |         |         |         |
5+15       0.1029      0.35  |Q V      |         |         |         |
5+20       0.1052      0.34  |Q V      |         |         |         |
5+25       0.1076      0.35  |Q V      |         |         |         |
5+30       0.1101      0.36  |Q V      |         |         |         |
5+35       0.1126      0.37  |Q V      |         |         |         |
5+40       0.1153      0.39  |Q V      |         |         |         |
5+45       0.1181      0.41  |Q  V     |         |         |         |
5+50       0.1210      0.42  |Q  V     |         |         |         |
5+55       0.1239      0.42  |Q  V     |         |         |         |
6+ 0       0.1268      0.42  |Q  V     |         |         |         |
6+ 5       0.1298      0.43  |Q  V     |         |         |         |
6+10       0.1329      0.45  |Q  V     |         |         |         |
6+15       0.1361      0.46  |Q  V     |         |         |         |
6+20       0.1393      0.47  |Q  V     |         |         |         |
6+25       0.1426      0.47  |Q  V     |         |         |         |
6+30       0.1459      0.48  |Q   V    |         |         |         |
6+35       0.1492      0.48  |Q   V    |         |         |         |
6+40       0.1526      0.50  |Q   V    |         |         |         |
6+45       0.1562      0.52  | Q  V    |         |         |         |
6+50       0.1598      0.52  | Q  V    |         |         |         |
6+55       0.1634      0.53  | Q  V    |         |         |         |
7+ 0       0.1671      0.53  | Q  V    |         |         |         |
7+ 5       0.1707      0.53  | Q  V    |         |         |         |
7+10       0.1744      0.53  | Q   V   |         |         |         |
7+15       0.1781      0.53  | Q   V   |         |         |         |
7+20       0.1818      0.54  | Q   V   |         |         |         |
7+25       0.1856      0.55  | Q   V   |         |         |         |
7+30       0.1895      0.57  | Q   V   |         |         |         |
7+35       0.1935      0.58  | Q   V   |         |         |         |
7+40       0.1977      0.60  | Q   V   |         |         |         |
7+45       0.2019      0.62  | Q   V   |         |         |         |
7+50       0.2063      0.63  | Q    V  |         |         |         |
7+55       0.2108      0.65  | Q    V  |         |         |         |
8+ 0       0.2155      0.67  | Q    V  |         |         |         |
8+ 5       0.2202      0.69  | Q    V  |         |         |         |
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  8+10       0.2252      0.73  | Q    V  |         |         |         |
  8+15       0.2305      0.77  |  Q   V  |         |         |         |
  8+20       0.2359      0.78  |  Q    V |         |         |         |
  8+25       0.2413      0.79  |  Q    V |         |         |         |
  8+30       0.2468      0.79  |  Q    V |         |         |         |
  8+35       0.2523      0.80  |  Q    V |         |         |         |
  8+40       0.2579      0.82  |  Q    V |         |         |         |
  8+45       0.2637      0.84  |  Q     V|         |         |         |
  8+50       0.2695      0.85  |  Q     V|         |         |         |
  8+55       0.2755      0.87  |  Q     V|         |         |         |
  9+ 0       0.2816      0.89  |  Q     V|         |         |         |
  9+ 5       0.2878      0.90  |  Q     V|         |         |         |
  9+10       0.2943      0.94  |  Q      V         |         |         |
  9+15       0.3011      0.98  |  Q      V         |         |         |
  9+20       0.3079      1.00  |  Q      V         |         |         |
  9+25       0.3150      1.02  |   Q     V         |         |         |
  9+30       0.3222      1.05  |   Q     |V        |         |         |
  9+35       0.3295      1.06  |   Q     |V        |         |         |
  9+40       0.3369      1.08  |   Q     |V        |         |         |
  9+45       0.3445      1.10  |   Q     |V        |         |         |
  9+50       0.3522      1.12  |   Q     | V       |         |         |
  9+55       0.3601      1.15  |   Q     | V       |         |         |
 10+ 0       0.3682      1.18  |   Q     | V       |         |         |
 10+ 5       0.3762      1.16  |   Q     |  V      |         |         |
 10+10       0.3834      1.04  |   Q     |  V      |         |         |
 10+15       0.3896      0.91  |  Q      |  V      |         |         |
 10+20       0.3956      0.86  |  Q      |  V      |         |         |
 10+25       0.4013      0.83  |  Q      |  V      |         |         |
 10+30       0.4070      0.82  |  Q      |   V     |         |         |
 10+35       0.4126      0.82  |  Q      |   V     |         |         |
 10+40       0.4189      0.91  |  Q      |   V     |         |         |
 10+45       0.4258      1.00  |   Q     |   V     |         |         |
 10+50       0.4329      1.03  |   Q     |   V     |         |         |
 10+55       0.4402      1.05  |   Q     |    V    |         |         |
 11+ 0       0.4475      1.07  |   Q     |    V    |         |         |
 11+ 5       0.4548      1.07  |   Q     |    V    |         |         |
 11+10       0.4621      1.05  |   Q     |     V   |         |         |
 11+15       0.4692      1.03  |   Q     |     V   |         |         |
 11+20       0.4762      1.02  |   Q     |     V   |         |         |
 11+25       0.4833      1.02  |   Q     |     V   |         |         |
 11+30       0.4903      1.02  |   Q     |     V   |         |         |
 11+35       0.4973      1.01  |   Q     |      V  |         |         |
 11+40       0.5040      0.98  |  Q      |      V  |         |         |
 11+45       0.5105      0.94  |  Q      |      V  |         |         |
 11+50       0.5169      0.93  |  Q      |      V  |         |         |
 11+55       0.5233      0.94  |  Q      |       V |         |         |
 12+ 0       0.5298      0.95  |  Q      |       V |         |         |
 12+ 5       0.5366      0.98  |  Q      |       V |         |         |
 12+10       0.5445      1.14  |   Q     |       V |         |         |
 12+15       0.5535      1.31  |    Q    |        V|         |         |
 12+20       0.5629      1.37  |    Q    |        V|         |         |
 12+25       0.5728      1.43  |    Q    |        V|         |         |
 12+30       0.5830      1.48  |    Q    |         V         |         |
 12+35       0.5934      1.51  |     Q   |         V         |         |
 12+40       0.6041      1.56  |     Q   |         V         |         |
 12+45       0.6152      1.62  |     Q   |         |V        |         |
 12+50       0.6266      1.64  |     Q   |         |V        |         |
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12+55       0.6381      1.68  |     Q   |         | V       |         |
13+ 0       0.6499      1.71  |     Q   |         | V       |         |
13+ 5       0.6619      1.74  |     Q   |         | V       |         |
13+10       0.6747      1.86  |      Q  |         |  V      |         |
13+15       0.6884      1.98  |      Q  |         |  V      |         |
13+20       0.7024      2.03  |       Q |         |   V     |         |
13+25       0.7166      2.06  |       Q |         |   V     |         |
13+30       0.7308      2.07  |       Q |         |    V    |         |
13+35       0.7449      2.04  |       Q |         |    V    |         |
13+40       0.7573      1.80  |      Q  |         |     V   |         |
13+45       0.7679      1.55  |     Q   |         |     V   |         |
13+50       0.7779      1.45  |    Q    |         |     V   |         |
13+55       0.7876      1.40  |    Q    |         |      V  |         |
14+ 0       0.7971      1.37  |    Q    |         |      V  |         |
14+ 5       0.8065      1.37  |    Q    |         |      V  |         |
14+10       0.8165      1.46  |    Q    |         |       V |         |
14+15       0.8272      1.55  |     Q   |         |       V |         |
14+20       0.8380      1.57  |     Q   |         |        V|         |
14+25       0.8488      1.57  |     Q   |         |        V|         |
14+30       0.8596      1.56  |     Q   |         |        V|         |
14+35       0.8703      1.56  |     Q   |         |         V         |
14+40       0.8810      1.56  |     Q   |         |         V         |
14+45       0.8918      1.56  |     Q   |         |         V         |
14+50       0.9025      1.55  |     Q   |         |         |V        |
14+55       0.9130      1.53  |     Q   |         |         |V        |
15+ 0       0.9234      1.51  |     Q   |         |         |V        |
15+ 5       0.9338      1.50  |    Q    |         |         | V       |
15+10       0.9439      1.47  |    Q    |         |         | V       |
15+15       0.9539      1.45  |    Q    |         |         |  V      |
15+20       0.9638      1.44  |    Q    |         |         |  V      |
15+25       0.9735      1.41  |    Q    |         |         |  V      |
15+30       0.9830      1.38  |    Q    |         |         |   V     |
15+35       0.9923      1.36  |    Q    |         |         |   V     |
15+40       1.0010      1.26  |    Q    |         |         |   V     |
15+45       1.0091      1.17  |   Q     |         |         |   V     |
15+50       1.0169      1.13  |   Q     |         |         |    V    |
15+55       1.0246      1.11  |   Q     |         |         |    V    |
16+ 0       1.0322      1.10  |   Q     |         |         |    V    |
16+ 5       1.0394      1.05  |   Q     |         |         |     V   |
16+10       1.0446      0.76  |  Q      |         |         |     V   |
16+15       1.0478      0.46  |Q        |         |         |     V   |
16+20       1.0503      0.35  |Q        |         |         |     V   |
16+25       1.0523      0.29  |Q        |         |         |     V   |
16+30       1.0540      0.25  |Q        |         |         |     V   |
16+35       1.0556      0.23  Q         |         |         |     V   |
16+40       1.0570      0.21  Q         |         |         |     V   |
16+45       1.0583      0.18  Q         |         |         |     V   |
16+50       1.0595      0.17  Q         |         |         |     V   |
16+55       1.0606      0.17  Q         |         |         |     V   |
17+ 0       1.0617      0.16  Q         |         |         |     V   |
17+ 5       1.0629      0.17  Q         |         |         |     V   |
17+10       1.0643      0.20  Q         |         |         |     V   |
17+15       1.0659      0.24  Q         |         |         |     V   |
17+20       1.0676      0.25  Q         |         |         |     V   |
17+25       1.0694      0.26  |Q        |         |         |      V  |
17+30       1.0712      0.26  |Q        |         |         |      V  |
17+35       1.0730      0.26  |Q        |         |         |      V  |
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17+40       1.0748      0.26  |Q         |         |         |     V   |
17+45       1.0767      0.27  |Q         |         |         |     V   |
17+50       1.0785      0.26  |Q         |         |         |     V   |
17+55       1.0802      0.25  Q          |         |         |     V   |
18+ 0       1.0817      0.23  Q          |         |         |     V   |
18+ 5       1.0833      0.22  Q          |         |         |     V   |
18+10       1.0848      0.22  Q          |         |         |     V   |
18+15       1.0863      0.22  Q          |         |         |     V   |
18+20       1.0877      0.21  Q          |         |         |     V   |
18+25       1.0892      0.21  Q          |         |         |     V   |
18+30       1.0907      0.21  Q          |         |         |     V   |
18+35       1.0921      0.21  Q          |         |         |     V   |
18+40       1.0935      0.19  Q          |         |         |     V   |
18+45       1.0947      0.17  Q          |         |         |     V   |
18+50       1.0958      0.17  Q          |         |         |     V   |
18+55       1.0968      0.14  Q          |         |         |      V  |
19+ 0       1.0976      0.12  Q          |         |         |      V  |
19+ 5       1.0985      0.12  Q          |         |         |      V  |
19+10       1.0994      0.13  Q          |         |         |      V  |
19+15       1.1004      0.15  Q          |         |         |      V  |
19+20       1.1015      0.16  Q          |         |         |      V  |
19+25       1.1027      0.18  Q          |         |         |      V  |
19+30       1.1040      0.20  Q          |         |         |      V  |
19+35       1.1054      0.20  Q          |         |         |      V  |
19+40       1.1067      0.19  Q          |         |         |      V  |
19+45       1.1079      0.17  Q          |         |         |      V  |
19+50       1.1090      0.16  Q          |         |         |      V  |
19+55       1.1100      0.14  Q          |         |         |      V  |
20+ 0       1.1109      0.12  Q          |         |         |      V  |
20+ 5       1.1117      0.12  Q          |         |         |      V  |
20+10       1.1126      0.13  Q          |         |         |      V  |
20+15       1.1136      0.15  Q          |         |         |      V  |
20+20       1.1147      0.15  Q          |         |         |      V  |
20+25       1.1157      0.16  Q          |         |         |      V  |
20+30       1.1168      0.16  Q          |         |         |      V  |
20+35       1.1179      0.16  Q          |         |         |      V  |
20+40       1.1190      0.16  Q          |         |         |      V  |
20+45       1.1201      0.16  Q          |         |         |      V  |
20+50       1.1212      0.16  Q          |         |         |      V  |
20+55       1.1222      0.14  Q          |         |         |      V  |
21+ 0       1.1230      0.12  Q          |         |         |      V  |
21+ 5       1.1238      0.12  Q          |         |         |      V  |
21+10       1.1247      0.13  Q          |         |         |      V  |
21+15       1.1257      0.15  Q          |         |         |        V|
21+20       1.1268      0.15  Q          |         |         |        V|
21+25       1.1277      0.14  Q          |         |         |        V|
21+30       1.1285      0.12  Q          |         |         |        V|
21+35       1.1293      0.12  Q          |         |         |        V|
21+40       1.1302      0.13  Q          |         |         |        V|
21+45       1.1312      0.15  Q          |         |         |        V|
21+50       1.1323      0.15  Q          |         |         |        V|
21+55       1.1332      0.14  Q          |         |         |        V|
22+ 0       1.1340      0.12  Q          |         |         |        V|
22+ 5       1.1348      0.12  Q          |         |         |        V|
22+10       1.1357      0.13  Q          |         |         |        V|
22+15       1.1367      0.15  Q          |         |         |        V|
22+20       1.1378      0.15  Q          |         |         |        V|
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22+25	1.1387	0.14	Q				V|
22+30	1.1395	0.12	Q				V|
22+35	1.1403	0.11	Q				V|
22+40	1.1411	0.11	Q				V|
22+45	1.1418	0.11	Q				V|
22+50	1.1426	0.11	Q				V|
22+55	1.1433	0.11	Q				V|
23+ 0	1.1440	0.11	Q				V|
23+ 5	1.1448	0.11	Q				V|
23+10	1.1455	0.11	Q				V|
23+15	1.1463	0.11	Q				V|
23+20	1.1470	0.11	Q				V|
23+25	1.1477	0.11	Q				V|
23+30	1.1485	0.11	Q				V|
23+35	1.1492	0.11	Q				V|
23+40	1.1499	0.11	Q				V|
23+45	1.1507	0.11	Q				V|
23+50	1.1514	0.11	Q				V|
23+55	1.1521	0.11	Q				V|
24+ 0	1.1529	0.11	Q				V|
24+ 5	1.1536	0.10	Q				V|
24+10	1.1540	0.07	Q				V|
24+15	1.1542	0.03	Q				V|
24+20	1.1543	0.02	Q				V|
24+25	1.1544	0.01	Q				V|
24+30	1.1544	0.00	Q				V|
24+35	1.1545	0.00	Q				V|
24+40	1.1545	0.00	Q				V|
24+45	1.1545	0.00	Q				V|
24+50	1.1545	0.00	Q				V|
24+55	1.1545	0.00	Q				V

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) =   1.794(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain =   1.794(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered =   5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.108	(0.060)	0.025	0.083
2	0.17	0.60	0.129	(0.060)	0.030	0.099
3	0.25	0.60	0.129	(0.060)	0.030	0.099
4	0.33	0.60	0.129	(0.060)	0.030	0.099
5	0.42	0.60	0.129	(0.060)	0.030	0.099
6	0.50	0.70	0.151	(0.060)	0.035	0.116
7	0.58	0.70	0.151	(0.060)	0.035	0.116

8	0.67	0.70	0.151	(0.060)	0.035	0.116
9	0.75	0.70	0.151	(0.060)	0.035	0.116
10	0.83	0.70	0.151	(0.060)	0.035	0.116
11	0.92	0.70	0.151	(0.060)	0.035	0.116
12	1.00	0.80	0.172	(0.060)	0.040	0.132
13	1.08	0.80	0.172	(0.060)	0.040	0.132
14	1.17	0.80	0.172	(0.060)	0.040	0.132
15	1.25	0.80	0.172	(0.060)	0.040	0.132
16	1.33	0.80	0.172	(0.060)	0.040	0.132
17	1.42	0.80	0.172	(0.060)	0.040	0.132
18	1.50	0.80	0.172	(0.060)	0.040	0.132
19	1.58	0.80	0.172	(0.060)	0.040	0.132
20	1.67	0.80	0.172	(0.060)	0.040	0.132
21	1.75	0.80	0.172	(0.060)	0.040	0.132
22	1.83	0.80	0.172	(0.060)	0.040	0.132
23	1.92	0.80	0.172	(0.060)	0.040	0.132
24	2.00	0.90	0.194	(0.060)	0.045	0.149
25	2.08	0.80	0.172	(0.060)	0.040	0.132
26	2.17	0.90	0.194	(0.060)	0.045	0.149
27	2.25	0.90	0.194	(0.060)	0.045	0.149
28	2.33	0.90	0.194	(0.060)	0.045	0.149
29	2.42	0.90	0.194	(0.060)	0.045	0.149
30	2.50	0.90	0.194	(0.060)	0.045	0.149
31	2.58	0.90	0.194	(0.060)	0.045	0.149
32	2.67	0.90	0.194	(0.060)	0.045	0.149
33	2.75	1.00	0.215	(0.060)	0.050	0.165
34	2.83	1.00	0.215	(0.060)	0.050	0.165
35	2.92	1.00	0.215	(0.060)	0.050	0.165
36	3.00	1.00	0.215	(0.060)	0.050	0.165
37	3.08	1.00	0.215	(0.060)	0.050	0.165
38	3.17	1.10	0.237	(0.060)	0.055	0.182
39	3.25	1.10	0.237	(0.060)	0.055	0.182
40	3.33	1.10	0.237	(0.060)	0.055	0.182
41	3.42	1.20	0.258	(0.060)	0.060	0.199
42	3.50	1.30	0.280	0.060	(0.065)	0.219
43	3.58	1.40	0.301	0.060	(0.070)	0.241
44	3.67	1.40	0.301	0.060	(0.070)	0.241
45	3.75	1.50	0.323	0.060	(0.075)	0.262
46	3.83	1.50	0.323	0.060	(0.075)	0.262
47	3.92	1.60	0.344	0.060	(0.080)	0.284
48	4.00	1.60	0.344	0.060	(0.080)	0.284
49	4.08	1.70	0.366	0.060	(0.085)	0.305
50	4.17	1.80	0.387	0.060	(0.090)	0.327
51	4.25	1.90	0.409	0.060	(0.095)	0.349
52	4.33	2.00	0.430	0.060	(0.100)	0.370
53	4.42	2.10	0.452	0.060	(0.105)	0.392
54	4.50	2.10	0.452	0.060	(0.105)	0.392
55	4.58	2.20	0.474	0.060	(0.109)	0.413
56	4.67	2.30	0.495	0.060	(0.114)	0.435
57	4.75	2.40	0.517	0.060	(0.119)	0.456
58	4.83	2.40	0.517	0.060	(0.119)	0.456
59	4.92	2.50	0.538	0.060	(0.124)	0.478
60	5.00	2.60	0.560	0.060	(0.129)	0.499
61	5.08	3.10	0.667	0.060	(0.154)	0.607
62	5.17	3.60	0.775	0.060	(0.179)	0.714
63	5.25	3.90	0.839	0.060	(0.194)	0.779
64	5.33	4.20	0.904	0.060	(0.209)	0.844

```
65   5.42     4.70      1.012          0.060    (  0.234)        0.951
66   5.50     5.60      1.205          0.060    (  0.279)        1.145
67   5.58     1.90      0.409          0.060    (  0.095)        0.349
68   5.67     0.90      0.194       (  0.060)      0.045         0.149
69   5.75     0.60      0.129       (  0.060)      0.030         0.099
70   5.83     0.50      0.108       (  0.060)      0.025         0.083
71   5.92     0.30      0.065       (  0.060)      0.015         0.050
72   6.00     0.20      0.043       (  0.060)      0.010         0.033
           (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    18.1
    Flood volume = Effective rainfall      1.51(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.6(Ac.Ft)
    Total soil loss =      0.28(In)
    Total soil loss =     0.119(Ac.Ft)
    Total rainfall =      1.79(In)
    Flood volume =       27636.1 Cubic Feet
    Total soil loss =       5179.2 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      4.701(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.02  Q         |         |         |         |
  0+10       0.0013      0.16  Q         |         |         |         |
  0+15       0.0036      0.33  VQ        |         |         |         |
  0+20       0.0064      0.41  VQ        |         |         |         |
  0+25       0.0096      0.45  VQ        |         |         |         |
  0+30       0.0129      0.48  VQ        |         |         |         |
  0+35       0.0165      0.52  |VQ       |         |         |         |
  0+40       0.0203      0.56  |VQ       |         |         |         |
  0+45       0.0243      0.57  |VQ       |         |         |         |
  0+50       0.0282      0.58  |VQ       |         |         |         |
  0+55       0.0323      0.58  | Q       |         |         |         |
  1+ 0       0.0363      0.59  | Q       |         |         |         |
  1+ 5       0.0406      0.62  | Q       |         |         |         |
  1+10       0.0451      0.65  | Q       |         |         |         |
  1+15       0.0496      0.66  | QV      |         |         |         |
  1+20       0.0542      0.67  | QV      |         |         |         |
  1+25       0.0588      0.67  | QV      |         |         |         |
  1+30       0.0634      0.67  | QV      |         |         |         |
  1+35       0.0680      0.67  | Q V     |         |         |         |
  1+40       0.0727      0.67  | Q V     |         |         |         |
  1+45       0.0773      0.67  | Q V     |         |         |         |
  1+50       0.0819      0.67  | Q  V    |         |         |         |
  1+55       0.0866      0.67  | Q  V    |         |         |         |
  2+ 0       0.0912      0.68  | Q  V    |         |         |         |
  2+ 5       0.0960      0.70  | Q   V   |         |         |         |
  2+10       0.1009      0.71  | Q   V   |         |         |         |
  2+15       0.1058      0.72  | Q   V   |         |         |         |
  2+20       0.1109      0.74  | Q   V   |         |         |         |
```

```
    2+25       0.1161      0.75  | Q    V  |         |         |         |
    2+30       0.1212      0.75  |  Q   V  |         |         |         |
    2+35       0.1264      0.75  |  Q   V  |         |         |         |
    2+40       0.1316      0.76  |  Q    V |         |         |         |
    2+45       0.1369      0.76  |  Q    V |         |         |         |
    2+50       0.1423      0.79  |  Q    V |         |         |         |
    2+55       0.1479      0.82  |  Q     V|         |         |         |
    3+ 0       0.1536      0.83  |  Q     V|         |         |         |
    3+ 5       0.1594      0.83  |  Q      V         |         |         |
    3+10       0.1652      0.84  |  Q      V         |         |         |
    3+15       0.1712      0.87  |  Q      V         |         |         |
    3+20       0.1774      0.90  |  Q      |V        |         |         |
    3+25       0.1837      0.92  |  Q      |V        |         |         |
    3+30       0.1902      0.96  |  Q      |V        |         |         |
    3+35       0.1973      1.03  |   Q     | V       |         |         |
    3+40       0.2050      1.11  |   Q     | V       |         |         |
    3+45       0.2131      1.17  |   Q     |  V      |         |         |
    3+50       0.2216      1.23  |   Q     |  V      |         |         |
    3+55       0.2305      1.29  |    Q    |   V     |         |         |
    4+ 0       0.2397      1.35  |    Q    |    V    |         |         |
    4+ 5       0.2494      1.40  |    Q    |    V    |         |         |
    4+10       0.2595      1.47  |    Q    |     V   |         |         |
    4+15       0.2702      1.56  |     Q   |      V  |         |         |
    4+20       0.2816      1.65  |     Q   |      V  |         |         |
    4+25       0.2937      1.76  |      Q  |       V |         |         |
    4+30       0.3065      1.86  |      Q  |        V|         |         |
    4+35       0.3198      1.93  |      Q  |         V         |         |
    4+40       0.3336      2.00  |       Q |         |V        |         |
    4+45       0.3480      2.10  |       Q |         |V        |         |
    4+50       0.3631      2.19  |       Q |         | V       |         |
    4+55       0.3787      2.26  |        Q|         |  V      |         |
    5+ 0       0.3947      2.33  |        Q|         |   V     |         |
    5+ 5       0.4116      2.45  |        Q|         |    V    |         |
    5+10       0.4303      2.72  |         Q         |      V  |         |
    5+15       0.4518      3.12  |         | Q       |       V |         |
    5+20       0.4760      3.51  |         |   Q     |         V         |
    5+25       0.5027      3.88  |         |    Q    |         |V        |
    5+30       0.5325      4.33  |         |      Q  |         |  V      |
    5+35       0.5649      4.70  |         |       Q |         |    V    |
    5+40       0.5910      3.79  |         |    Q    |         |      V  |
    5+45       0.6066      2.27  |        Q|         |         |       V |
    5+50       0.6167      1.46  |    Q    |         |         |       V |
    5+55       0.6235      0.99  |  Q      |         |         |        V|
    6+ 0       0.6280      0.66  | Q       |         |         |        V|
    6+ 5       0.6309      0.41  |Q        |         |         |        V|
    6+10       0.6325      0.24  Q         |         |         |        V|
    6+15       0.6334      0.13  Q         |         |         |        V|
    6+20       0.6340      0.08  Q         |         |         |        V|
    6+25       0.6342      0.04  Q         |         |         |        V|
    6+30       0.6343      0.02  Q         |         |         |        V|
    6+35       0.6344      0.01  Q         |         |         |        V|
    6+40       0.6344      0.00  Q         |         |         |        V|
    6+45       0.6344      0.00  Q         |         |         |        V|
    6+50       0.6344      0.00  Q         |         |         |        V|
    6+55       0.6344      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area =   5.04(Ac.) =   0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =   5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =   0.137 Hr.
Lag time =   8.24 Min.
25% of lag time =   2.06 Min.
40% of lag time =   3.30 Min.
Unit time =   5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =   0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =   0.850(In)
Area Averaged 100-Year Rainfall =   1.800(In)

Point rain (area averaged) = 1.241(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.241(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060

Sum (F) = 0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.194	(0.060)	0.045	0.149
2	0.17	1.30	0.194	(0.060)	0.045	0.149
3	0.25	1.10	0.164	(0.060)	0.038	0.126
4	0.33	1.50	0.223	(0.060)	0.052	0.172
5	0.42	1.50	0.223	(0.060)	0.052	0.172
6	0.50	1.80	0.268	0.060	(0.062)	0.208
7	0.58	1.50	0.223	(0.060)	0.052	0.172

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  8   0.67     1.80      0.268          0.060    (  0.062)       0.208
  9   0.75     1.80      0.268          0.060    (  0.062)       0.208
 10   0.83     1.50      0.223       (  0.060)      0.052        0.172
 11   0.92     1.60      0.238       (  0.060)      0.055        0.183
 12   1.00     1.80      0.268          0.060    (  0.062)       0.208
 13   1.08     2.20      0.328          0.060    (  0.076)       0.267
 14   1.17     2.20      0.328          0.060    (  0.076)       0.267
 15   1.25     2.20      0.328          0.060    (  0.076)       0.267
 16   1.33     2.00      0.298          0.060    (  0.069)       0.237
 17   1.42     2.60      0.387          0.060    (  0.090)       0.327
 18   1.50     2.70      0.402          0.060    (  0.093)       0.342
 19   1.58     2.40      0.357          0.060    (  0.083)       0.297
 20   1.67     2.70      0.402          0.060    (  0.093)       0.342
 21   1.75     3.30      0.491          0.060    (  0.114)       0.431
 22   1.83     3.10      0.462          0.060    (  0.107)       0.401
 23   1.92     2.90      0.432          0.060    (  0.100)       0.371
 24   2.00     3.00      0.447          0.060    (  0.103)       0.386
 25   2.08     3.10      0.462          0.060    (  0.107)       0.401
 26   2.17     4.20      0.625          0.060    (  0.145)       0.565
 27   2.25     5.00      0.744          0.060    (  0.172)       0.684
 28   2.33     3.50      0.521          0.060    (  0.120)       0.461
 29   2.42     6.80      1.013          0.060    (  0.234)       0.952
 30   2.50     7.30      1.087          0.060    (  0.251)       1.027
 31   2.58     8.20      1.221          0.060    (  0.282)       1.161
 32   2.67     5.90      0.878          0.060    (  0.203)       0.818
 33   2.75     2.00      0.298          0.060    (  0.069)       0.237
 34   2.83     1.80      0.268          0.060    (  0.062)       0.208
 35   2.92     1.80      0.268          0.060    (  0.062)       0.208
 36   3.00     0.60      0.089       (  0.060)      0.021        0.069
           (Loss Rate Not Used)
    Sum =     100.0                                 Sum =    12.8
     Flood volume = Effective rainfall      1.07(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
     Total soil loss =      0.17(In)
     Total soil loss =     0.071(Ac.Ft)
     Total rainfall =      1.24(In)
     Flood volume =       19589.4 Cubic Feet
     Total soil loss =       3111.5 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      4.924(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         3 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5      0.0003      0.04  Q         |         |         |         |
  0+10      0.0023      0.29  VQ        |         |         |         |
  0+15      0.0060      0.54  V Q       |         |         |         |
  0+20      0.0101      0.60  V Q       |         |         |         |
  0+25      0.0149      0.69  |VQ       |         |         |         |
  0+30      0.0204      0.80  |V Q      |         |         |         |
  0+35      0.0265      0.89  | VQ      |         |         |         |
```

```
    0+40       0.0329      0.92  | VQ      |         |         |         |
    0+45       0.0394      0.95  |  Q      |         |         |         |
    0+50       0.0463      1.00  |  QV     |         |         |         |
    0+55       0.0529      0.96  |  QV     |         |         |         |
    1+ 0       0.0594      0.94  |  Q V    |         |         |         |
    1+ 5       0.0663      1.00  |   QV    |         |         |         |
    1+10       0.0741      1.14  |   Q V   |         |         |         |
    1+15       0.0827      1.25  |    Q V  |         |         |         |
    1+20       0.0916      1.29  |    Q  V |         |         |         |
    1+25       0.1005      1.29  |    Q  V |         |         |         |
    1+30       0.1103      1.41  |    Q   V|         |         |         |
    1+35       0.1210      1.56  |     Q   V         |         |         |
    1+40       0.1319      1.58  |     Q   |V        |         |         |
    1+45       0.1432      1.64  |     Q   | V       |         |         |
    1+50       0.1559      1.85  |      Q  |  V      |         |         |
    1+55       0.1694      1.97  |      Q  |    V    |         |         |
    2+ 0       0.1828      1.94  |      Q  |     V   |         |         |
    2+ 5       0.1961      1.94  |      Q  |      V  |         |         |
    2+10       0.2101      2.03  |       Q |       V |         |         |
    2+15       0.2264      2.36  |        Q|         V         |         |
    2+20       0.2456      2.79  |         |Q        |V        |         |
    2+25       0.2653      2.87  |         |Q        |  V      |         |
    2+30       0.2892      3.46  |         |  Q      |    V    |         |
    2+35       0.3195      4.40  |         |      Q  |       V |         |
    2+40       0.3534      4.92  |         |        Q|         |V        |
    2+45       0.3852      4.62  |         |       Q |         |   V     |
    2+50       0.4077      3.27  |         |  Q      |         |     V   |
    2+55       0.4224      2.13  |       Q |         |         |      V  |
    3+ 0       0.4335      1.61  |     Q   |         |         |       V |
    3+ 5       0.4410      1.09  |   Q     |         |         |        V|
    3+10       0.4451      0.58  | Q       |         |         |        V|
    3+15       0.4471      0.30  |Q        |         |         |        V|
    3+20       0.4484      0.18  Q         |         |         |        V|
    3+25       0.4490      0.10  Q         |         |         |        V|
    3+30       0.4494      0.05  Q         |         |         |        V|
    3+35       0.4496      0.02  Q         |         |         |        V|
    3+40       0.4496      0.01  Q         |         |         |        V|
    3+45       0.4497      0.01  Q         |         |         |        V|
    3+50       0.4497      0.00  Q         |         |         |        V|
    3+55       0.4497      0.00  Q         |         |         |         V
----------------------------------------------------------------------
```

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/20/15 File: 201501PRE110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              0.50                    2.52

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              1.20                    6.05

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)
```

```
Point rain (area averaged) =    0.788(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    0.788(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
     5.040           62.50          0.836
 Total Area Entered =      5.04(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
62.5  80.0      0.244     0.836        0.060       1.000      0.060
                                                    Sum (F) =   0.060
Area averaged mean soil loss (F) (In/Hr) =  0.060
Minimum soil loss rate ((In/Hr)) =  0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.231
---------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5500
----------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                  FOOTHILL S-Curve
--------------------------------------------------------------------
            Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                            Graph %           (CFS)
---------------------------------------------------------------------
    1   0.083         60.694          5.690              0.289
    2   0.167        121.389         32.349              1.643
    3   0.250        182.083         33.711              1.712
    4   0.333        242.777         12.272              0.623
    5   0.417        303.472          7.080              0.360
    6   0.500        364.166          4.248              0.216
    7   0.583        424.860          2.304              0.117
    8   0.667        485.555          0.888              0.045
    9   0.750        546.249          0.547              0.028
   10   0.833        606.943          0.423              0.021
   11   0.917        667.638          0.333              0.017
   12   1.000        728.332          0.156              0.008
                               Sum = 100.000   Sum=       5.079
----------------------------------------------------------------------
```

```
 The following loss rate calculations reflect use of the minimum calculated loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low          (In/Hr)
   1   0.08     3.30      0.312          0.060    (  0.072)        0.252
   2   0.17     4.20      0.397          0.060    (  0.092)        0.337
   3   0.25     4.40      0.416          0.060    (  0.096)        0.356
   4   0.33     4.80      0.454          0.060    (  0.105)        0.393
   5   0.42     5.20      0.492          0.060    (  0.114)        0.431
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  6   0.50     6.20      0.586          0.060    (  0.136)        0.526
  7   0.58     6.80      0.643          0.060    (  0.149)        0.583
  8   0.67     8.80      0.832          0.060    (  0.192)        0.772
  9   0.75    13.90      1.314          0.060    (  0.304)        1.254
 10   0.83    31.40      2.969          0.060    (  0.686)        2.909
 11   0.92     7.20      0.681          0.060    (  0.157)        0.620
 12   1.00     3.80      0.359          0.060    (  0.083)        0.299
           (Loss Rate Not Used)
    Sum =     100.0                                   Sum =     8.7
     Flood volume = Effective rainfall      0.73(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.025(Ac.Ft)
     Total rainfall =      0.79(In)
     Flood volume =       13310.4 Cubic Feet
     Total soil loss =       1105.3 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      8.003(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0         2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0005      0.07  Q         |         |         |         |
   0+10       0.0040      0.51  V Q       |         |         |         |
   0+15       0.0115      1.09  |V  Q     |         |         |         |
   0+20       0.0214      1.43  | V  Q    |         |         |         |
   0+25       0.0330      1.68  |   V Q   |         |         |         |
   0+30       0.0463      1.93  |     VQ  |         |         |         |
   0+35       0.0617      2.25  |       Q |         |         |         |
   0+40       0.0798      2.62  |         Q         |         |         |
   0+45       0.1022      3.26  |         |  Q      |         |         |
   0+50       0.1363      4.95  |         |      V Q|         |         |
   0+55       0.1914      8.00  |         |         |    V    | Q       |
   1+ 0       0.2423      7.38  |         |         |        Q|V        |
   1+ 5       0.2706      4.11  |         |     Q   |         |    V    |
   1+10       0.2868      2.37  |        Q|         |         |      V  |
   1+15       0.2955      1.26  |    Q    |         |         |       V |
   1+20       0.3002      0.68  | Q       |         |         |        V|
   1+25       0.3025      0.33  |Q        |         |         |        V|
   1+30       0.3038      0.19  Q         |         |         |        V|
   1+35       0.3046      0.12  Q         |         |         |        V|
   1+40       0.3052      0.08  Q         |         |         |        V|
   1+45       0.3055      0.04  Q         |         |         |        V|
   1+50       0.3055      0.01  Q         |         |         |        V|
   1+55       0.3056      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

Existing Conditions Unit Hydrograph: 5yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 2.932(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.932(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.023	(0.107)	0.005	0.018
2	0.17	0.07	0.023	(0.107)	0.005	0.018
3	0.25	0.07	0.023	(0.106)	0.005	0.018
4	0.33	0.10	0.035	(0.106)	0.008	0.027
5	0.42	0.10	0.035	(0.105)	0.008	0.027
6	0.50	0.10	0.035	(0.105)	0.008	0.027
7	0.58	0.10	0.035	(0.105)	0.008	0.027

8	0.67	0.10	0.035	(0.104)	0.008	0.027
9	0.75	0.10	0.035	(0.104)	0.008	0.027
10	0.83	0.13	0.047	(0.103)	0.011	0.036
11	0.92	0.13	0.047	(0.103)	0.011	0.036
12	1.00	0.13	0.047	(0.103)	0.011	0.036
13	1.08	0.10	0.035	(0.102)	0.008	0.027
14	1.17	0.10	0.035	(0.102)	0.008	0.027
15	1.25	0.10	0.035	(0.101)	0.008	0.027
16	1.33	0.10	0.035	(0.101)	0.008	0.027
17	1.42	0.10	0.035	(0.101)	0.008	0.027
18	1.50	0.10	0.035	(0.100)	0.008	0.027
19	1.58	0.10	0.035	(0.100)	0.008	0.027
20	1.67	0.10	0.035	(0.099)	0.008	0.027
21	1.75	0.10	0.035	(0.099)	0.008	0.027
22	1.83	0.13	0.047	(0.099)	0.011	0.036
23	1.92	0.13	0.047	(0.098)	0.011	0.036
24	2.00	0.13	0.047	(0.098)	0.011	0.036
25	2.08	0.13	0.047	(0.097)	0.011	0.036
26	2.17	0.13	0.047	(0.097)	0.011	0.036
27	2.25	0.13	0.047	(0.097)	0.011	0.036
28	2.33	0.13	0.047	(0.096)	0.011	0.036
29	2.42	0.13	0.047	(0.096)	0.011	0.036
30	2.50	0.13	0.047	(0.095)	0.011	0.036
31	2.58	0.17	0.059	(0.095)	0.014	0.045
32	2.67	0.17	0.059	(0.095)	0.014	0.045
33	2.75	0.17	0.059	(0.094)	0.014	0.045
34	2.83	0.17	0.059	(0.094)	0.014	0.045
35	2.92	0.17	0.059	(0.093)	0.014	0.045
36	3.00	0.17	0.059	(0.093)	0.014	0.045
37	3.08	0.17	0.059	(0.093)	0.014	0.045
38	3.17	0.17	0.059	(0.092)	0.014	0.045
39	3.25	0.17	0.059	(0.092)	0.014	0.045
40	3.33	0.17	0.059	(0.092)	0.014	0.045
41	3.42	0.17	0.059	(0.091)	0.014	0.045
42	3.50	0.17	0.059	(0.091)	0.014	0.045
43	3.58	0.17	0.059	(0.090)	0.014	0.045
44	3.67	0.17	0.059	(0.090)	0.014	0.045
45	3.75	0.17	0.059	(0.090)	0.014	0.045
46	3.83	0.20	0.070	(0.089)	0.016	0.054
47	3.92	0.20	0.070	(0.089)	0.016	0.054
48	4.00	0.20	0.070	(0.089)	0.016	0.054
49	4.08	0.20	0.070	(0.088)	0.016	0.054
50	4.17	0.20	0.070	(0.088)	0.016	0.054
51	4.25	0.20	0.070	(0.087)	0.016	0.054
52	4.33	0.23	0.082	(0.087)	0.019	0.063
53	4.42	0.23	0.082	(0.087)	0.019	0.063
54	4.50	0.23	0.082	(0.086)	0.019	0.063
55	4.58	0.23	0.082	(0.086)	0.019	0.063
56	4.67	0.23	0.082	(0.086)	0.019	0.063
57	4.75	0.23	0.082	(0.085)	0.019	0.063
58	4.83	0.27	0.094	(0.085)	0.022	0.072
59	4.92	0.27	0.094	(0.084)	0.022	0.072
60	5.00	0.27	0.094	(0.084)	0.022	0.072
61	5.08	0.20	0.070	(0.084)	0.016	0.054
62	5.17	0.20	0.070	(0.083)	0.016	0.054
63	5.25	0.20	0.070	(0.083)	0.016	0.054
64	5.33	0.23	0.082	(0.083)	0.019	0.063

65	5.42	0.23	0.082	(0.082)	0.019	0.063
66	5.50	0.23	0.082	(0.082)	0.019	0.063
67	5.58	0.27	0.094	(0.082)	0.022	0.072
68	5.67	0.27	0.094	(0.081)	0.022	0.072
69	5.75	0.27	0.094	(0.081)	0.022	0.072
70	5.83	0.27	0.094	(0.080)	0.022	0.072
71	5.92	0.27	0.094	(0.080)	0.022	0.072
72	6.00	0.27	0.094	(0.080)	0.022	0.072
73	6.08	0.30	0.106	(0.079)	0.024	0.081
74	6.17	0.30	0.106	(0.079)	0.024	0.081
75	6.25	0.30	0.106	(0.079)	0.024	0.081
76	6.33	0.30	0.106	(0.078)	0.024	0.081
77	6.42	0.30	0.106	(0.078)	0.024	0.081
78	6.50	0.30	0.106	(0.078)	0.024	0.081
79	6.58	0.33	0.117	(0.077)	0.027	0.090
80	6.67	0.33	0.117	(0.077)	0.027	0.090
81	6.75	0.33	0.117	(0.077)	0.027	0.090
82	6.83	0.33	0.117	(0.076)	0.027	0.090
83	6.92	0.33	0.117	(0.076)	0.027	0.090
84	7.00	0.33	0.117	(0.076)	0.027	0.090
85	7.08	0.33	0.117	(0.075)	0.027	0.090
86	7.17	0.33	0.117	(0.075)	0.027	0.090
87	7.25	0.33	0.117	(0.075)	0.027	0.090
88	7.33	0.37	0.129	(0.074)	0.030	0.099
89	7.42	0.37	0.129	(0.074)	0.030	0.099
90	7.50	0.37	0.129	(0.074)	0.030	0.099
91	7.58	0.40	0.141	(0.073)	0.033	0.108
92	7.67	0.40	0.141	(0.073)	0.033	0.108
93	7.75	0.40	0.141	(0.072)	0.033	0.108
94	7.83	0.43	0.152	(0.072)	0.035	0.117
95	7.92	0.43	0.152	(0.072)	0.035	0.117
96	8.00	0.43	0.152	(0.071)	0.035	0.117
97	8.08	0.50	0.176	(0.071)	0.041	0.135
98	8.17	0.50	0.176	(0.071)	0.041	0.135
99	8.25	0.50	0.176	(0.071)	0.041	0.135
100	8.33	0.50	0.176	(0.070)	0.041	0.135
101	8.42	0.50	0.176	(0.070)	0.041	0.135
102	8.50	0.50	0.176	(0.070)	0.041	0.135
103	8.58	0.53	0.188	(0.069)	0.043	0.144
104	8.67	0.53	0.188	(0.069)	0.043	0.144
105	8.75	0.53	0.188	(0.069)	0.043	0.144
106	8.83	0.57	0.199	(0.068)	0.046	0.153
107	8.92	0.57	0.199	(0.068)	0.046	0.153
108	9.00	0.57	0.199	(0.068)	0.046	0.153
109	9.08	0.63	0.223	(0.067)	0.052	0.171
110	9.17	0.63	0.223	(0.067)	0.052	0.171
111	9.25	0.63	0.223	(0.067)	0.052	0.171
112	9.33	0.67	0.235	(0.066)	0.054	0.180
113	9.42	0.67	0.235	(0.066)	0.054	0.180
114	9.50	0.67	0.235	(0.066)	0.054	0.180
115	9.58	0.70	0.246	(0.065)	0.057	0.189
116	9.67	0.70	0.246	(0.065)	0.057	0.189
117	9.75	0.70	0.246	(0.065)	0.057	0.189
118	9.83	0.73	0.258	(0.064)	0.060	0.198
119	9.92	0.73	0.258	(0.064)	0.060	0.198
120	10.00	0.73	0.258	(0.064)	0.060	0.198
121	10.08	0.50	0.176	(0.063)	0.041	0.135

122	10.17	0.50	0.176	(0.063)	0.041	0.135
123	10.25	0.50	0.176	(0.063)	0.041	0.135
124	10.33	0.50	0.176	(0.063)	0.041	0.135
125	10.42	0.50	0.176	(0.062)	0.041	0.135
126	10.50	0.50	0.176	(0.062)	0.041	0.135
127	10.58	0.67	0.235	(0.062)	0.054	0.180
128	10.67	0.67	0.235	(0.061)	0.054	0.180
129	10.75	0.67	0.235	(0.061)	0.054	0.180
130	10.83	0.67	0.235	(0.061)	0.054	0.180
131	10.92	0.67	0.235	(0.060)	0.054	0.180
132	11.00	0.67	0.235	(0.060)	0.054	0.180
133	11.08	0.63	0.223	(0.060)	0.052	0.171
134	11.17	0.63	0.223	(0.060)	0.052	0.171
135	11.25	0.63	0.223	(0.059)	0.052	0.171
136	11.33	0.63	0.223	(0.059)	0.052	0.171
137	11.42	0.63	0.223	(0.059)	0.052	0.171
138	11.50	0.63	0.223	(0.058)	0.052	0.171
139	11.58	0.57	0.199	(0.058)	0.046	0.153
140	11.67	0.57	0.199	(0.058)	0.046	0.153
141	11.75	0.57	0.199	(0.058)	0.046	0.153
142	11.83	0.60	0.211	(0.057)	0.049	0.162
143	11.92	0.60	0.211	(0.057)	0.049	0.162
144	12.00	0.60	0.211	(0.057)	0.049	0.162
145	12.08	0.83	0.293	0.056	(0.068)	0.237
146	12.17	0.83	0.293	0.056	(0.068)	0.237
147	12.25	0.83	0.293	0.056	(0.068)	0.237
148	12.33	0.87	0.305	0.056	(0.071)	0.249
149	12.42	0.87	0.305	0.055	(0.071)	0.250
150	12.50	0.87	0.305	0.055	(0.071)	0.250
151	12.58	0.93	0.328	0.055	(0.076)	0.274
152	12.67	0.93	0.328	0.054	(0.076)	0.274
153	12.75	0.93	0.328	0.054	(0.076)	0.274
154	12.83	0.97	0.340	0.054	(0.079)	0.286
155	12.92	0.97	0.340	0.054	(0.079)	0.287
156	13.00	0.97	0.340	0.053	(0.079)	0.287
157	13.08	1.13	0.399	0.053	(0.092)	0.346
158	13.17	1.13	0.399	0.053	(0.092)	0.346
159	13.25	1.13	0.399	0.053	(0.092)	0.346
160	13.33	1.13	0.399	0.052	(0.092)	0.347
161	13.42	1.13	0.399	0.052	(0.092)	0.347
162	13.50	1.13	0.399	0.052	(0.092)	0.347
163	13.58	0.77	0.270	0.051	(0.062)	0.218
164	13.67	0.77	0.270	0.051	(0.062)	0.219
165	13.75	0.77	0.270	0.051	(0.062)	0.219
166	13.83	0.77	0.270	0.051	(0.062)	0.219
167	13.92	0.77	0.270	0.050	(0.062)	0.219
168	14.00	0.77	0.270	0.050	(0.062)	0.220
169	14.08	0.90	0.317	0.050	(0.073)	0.267
170	14.17	0.90	0.317	0.050	(0.073)	0.267
171	14.25	0.90	0.317	0.049	(0.073)	0.267
172	14.33	0.87	0.305	0.049	(0.071)	0.256
173	14.42	0.87	0.305	0.049	(0.071)	0.256
174	14.50	0.87	0.305	0.049	(0.071)	0.256
175	14.58	0.87	0.305	0.048	(0.071)	0.257
176	14.67	0.87	0.305	0.048	(0.071)	0.257
177	14.75	0.87	0.305	0.048	(0.071)	0.257
178	14.83	0.83	0.293	0.048	(0.068)	0.246

179	14.92	0.83	0.293	0.047	(0.068)	0.246
180	15.00	0.83	0.293	0.047	(0.068)	0.246
181	15.08	0.80	0.282	0.047	(0.065)	0.235
182	15.17	0.80	0.282	0.047	(0.065)	0.235
183	15.25	0.80	0.282	0.046	(0.065)	0.235
184	15.33	0.77	0.270	0.046	(0.062)	0.224
185	15.42	0.77	0.270	0.046	(0.062)	0.224
186	15.50	0.77	0.270	0.046	(0.062)	0.224
187	15.58	0.63	0.223	0.046	(0.052)	0.177
188	15.67	0.63	0.223	0.045	(0.052)	0.178
189	15.75	0.63	0.223	0.045	(0.052)	0.178
190	15.83	0.63	0.223	0.045	(0.052)	0.178
191	15.92	0.63	0.223	0.045	(0.052)	0.178
192	16.00	0.63	0.223	0.044	(0.052)	0.178
193	16.08	0.13	0.047	(0.044)	0.011	0.036
194	16.17	0.13	0.047	(0.044)	0.011	0.036
195	16.25	0.13	0.047	(0.044)	0.011	0.036
196	16.33	0.13	0.047	(0.043)	0.011	0.036
197	16.42	0.13	0.047	(0.043)	0.011	0.036
198	16.50	0.13	0.047	(0.043)	0.011	0.036
199	16.58	0.10	0.035	(0.043)	0.008	0.027
200	16.67	0.10	0.035	(0.043)	0.008	0.027
201	16.75	0.10	0.035	(0.042)	0.008	0.027
202	16.83	0.10	0.035	(0.042)	0.008	0.027
203	16.92	0.10	0.035	(0.042)	0.008	0.027
204	17.00	0.10	0.035	(0.042)	0.008	0.027
205	17.08	0.17	0.059	(0.042)	0.014	0.045
206	17.17	0.17	0.059	(0.041)	0.014	0.045
207	17.25	0.17	0.059	(0.041)	0.014	0.045
208	17.33	0.17	0.059	(0.041)	0.014	0.045
209	17.42	0.17	0.059	(0.041)	0.014	0.045
210	17.50	0.17	0.059	(0.040)	0.014	0.045
211	17.58	0.17	0.059	(0.040)	0.014	0.045
212	17.67	0.17	0.059	(0.040)	0.014	0.045
213	17.75	0.17	0.059	(0.040)	0.014	0.045
214	17.83	0.13	0.047	(0.040)	0.011	0.036
215	17.92	0.13	0.047	(0.039)	0.011	0.036
216	18.00	0.13	0.047	(0.039)	0.011	0.036
217	18.08	0.13	0.047	(0.039)	0.011	0.036
218	18.17	0.13	0.047	(0.039)	0.011	0.036
219	18.25	0.13	0.047	(0.039)	0.011	0.036
220	18.33	0.13	0.047	(0.039)	0.011	0.036
221	18.42	0.13	0.047	(0.038)	0.011	0.036
222	18.50	0.13	0.047	(0.038)	0.011	0.036
223	18.58	0.10	0.035	(0.038)	0.008	0.027
224	18.67	0.10	0.035	(0.038)	0.008	0.027
225	18.75	0.10	0.035	(0.038)	0.008	0.027
226	18.83	0.07	0.023	(0.037)	0.005	0.018
227	18.92	0.07	0.023	(0.037)	0.005	0.018
228	19.00	0.07	0.023	(0.037)	0.005	0.018
229	19.08	0.10	0.035	(0.037)	0.008	0.027
230	19.17	0.10	0.035	(0.037)	0.008	0.027
231	19.25	0.10	0.035	(0.037)	0.008	0.027
232	19.33	0.13	0.047	(0.036)	0.011	0.036
233	19.42	0.13	0.047	(0.036)	0.011	0.036
234	19.50	0.13	0.047	(0.036)	0.011	0.036
235	19.58	0.10	0.035	(0.036)	0.008	0.027

236	19.67	0.10	0.035	(0.036)	0.008	0.027
237	19.75	0.10	0.035	(0.036)	0.008	0.027
238	19.83	0.07	0.023	(0.035)	0.005	0.018
239	19.92	0.07	0.023	(0.035)	0.005	0.018
240	20.00	0.07	0.023	(0.035)	0.005	0.018
241	20.08	0.10	0.035	(0.035)	0.008	0.027
242	20.17	0.10	0.035	(0.035)	0.008	0.027
243	20.25	0.10	0.035	(0.035)	0.008	0.027
244	20.33	0.10	0.035	(0.034)	0.008	0.027
245	20.42	0.10	0.035	(0.034)	0.008	0.027
246	20.50	0.10	0.035	(0.034)	0.008	0.027
247	20.58	0.10	0.035	(0.034)	0.008	0.027
248	20.67	0.10	0.035	(0.034)	0.008	0.027
249	20.75	0.10	0.035	(0.034)	0.008	0.027
250	20.83	0.07	0.023	(0.034)	0.005	0.018
251	20.92	0.07	0.023	(0.033)	0.005	0.018
252	21.00	0.07	0.023	(0.033)	0.005	0.018
253	21.08	0.10	0.035	(0.033)	0.008	0.027
254	21.17	0.10	0.035	(0.033)	0.008	0.027
255	21.25	0.10	0.035	(0.033)	0.008	0.027
256	21.33	0.07	0.023	(0.033)	0.005	0.018
257	21.42	0.07	0.023	(0.033)	0.005	0.018
258	21.50	0.07	0.023	(0.033)	0.005	0.018
259	21.58	0.10	0.035	(0.032)	0.008	0.027
260	21.67	0.10	0.035	(0.032)	0.008	0.027
261	21.75	0.10	0.035	(0.032)	0.008	0.027
262	21.83	0.07	0.023	(0.032)	0.005	0.018
263	21.92	0.07	0.023	(0.032)	0.005	0.018
264	22.00	0.07	0.023	(0.032)	0.005	0.018
265	22.08	0.10	0.035	(0.032)	0.008	0.027
266	22.17	0.10	0.035	(0.032)	0.008	0.027
267	22.25	0.10	0.035	(0.032)	0.008	0.027
268	22.33	0.07	0.023	(0.031)	0.005	0.018
269	22.42	0.07	0.023	(0.031)	0.005	0.018
270	22.50	0.07	0.023	(0.031)	0.005	0.018
271	22.58	0.07	0.023	(0.031)	0.005	0.018
272	22.67	0.07	0.023	(0.031)	0.005	0.018
273	22.75	0.07	0.023	(0.031)	0.005	0.018
274	22.83	0.07	0.023	(0.031)	0.005	0.018
275	22.92	0.07	0.023	(0.031)	0.005	0.018
276	23.00	0.07	0.023	(0.031)	0.005	0.018
277	23.08	0.07	0.023	(0.031)	0.005	0.018
278	23.17	0.07	0.023	(0.031)	0.005	0.018
279	23.25	0.07	0.023	(0.031)	0.005	0.018
280	23.33	0.07	0.023	(0.031)	0.005	0.018
281	23.42	0.07	0.023	(0.030)	0.005	0.018
282	23.50	0.07	0.023	(0.030)	0.005	0.018
283	23.58	0.07	0.023	(0.030)	0.005	0.018
284	23.67	0.07	0.023	(0.030)	0.005	0.018
285	23.75	0.07	0.023	(0.030)	0.005	0.018
286	23.83	0.07	0.023	(0.030)	0.005	0.018
287	23.92	0.07	0.023	(0.030)	0.005	0.018
288	24.00	0.07	0.023	(0.030)	0.005	0.018

(Loss Rate Not Used)

Sum = 100.0 Sum = 28.0

Flood volume = Effective rainfall 2.33(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)

```
    Total soil loss =      0.60(In)
    Total soil loss =     0.252(Ac.Ft)
    Total rainfall =      2.93(In)
    Flood volume =       42671.4 Cubic Feet
    Total soil loss =       10977.0 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      1.746(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5      0.0000      0.01  Q         |         |         |         |
  0+10      0.0003      0.03  Q         |         |         |         |
  0+15      0.0007      0.07  Q         |         |         |         |
  0+20      0.0013      0.08  Q         |         |         |         |
  0+25      0.0020      0.10  Q         |         |         |         |
  0+30      0.0028      0.12  Q         |         |         |         |
  0+35      0.0037      0.13  Q         |         |         |         |
  0+40      0.0046      0.13  Q         |         |         |         |
  0+45      0.0055      0.13  Q         |         |         |         |
  0+50      0.0065      0.14  Q         |         |         |         |
  0+55      0.0075      0.15  Q         |         |         |         |
  1+ 0      0.0087      0.17  Q         |         |         |         |
  1+ 5      0.0099      0.17  Q         |         |         |         |
  1+10      0.0110      0.16  Q         |         |         |         |
  1+15      0.0120      0.15  Q         |         |         |         |
  1+20      0.0130      0.14  Q         |         |         |         |
  1+25      0.0140      0.14  Q         |         |         |         |
  1+30      0.0150      0.14  Q         |         |         |         |
  1+35      0.0159      0.14  Q         |         |         |         |
  1+40      0.0169      0.14  Q         |         |         |         |
  1+45      0.0178      0.14  Q         |         |         |         |
  1+50      0.0188      0.14  Q         |         |         |         |
  1+55      0.0198      0.15  Q         |         |         |         |
  2+ 0      0.0210      0.17  Q         |         |         |         |
  2+ 5      0.0222      0.18  Q         |         |         |         |
  2+10      0.0235      0.18  Q         |         |         |         |
  2+15      0.0247      0.18  QV        |         |         |         |
  2+20      0.0260      0.18  QV        |         |         |         |
  2+25      0.0272      0.18  QV        |         |         |         |
  2+30      0.0285      0.18  QV        |         |         |         |
  2+35      0.0298      0.19  QV        |         |         |         |
  2+40      0.0311      0.20  QV        |         |         |         |
  2+45      0.0326      0.22  QV        |         |         |         |
  2+50      0.0342      0.22  QV        |         |         |         |
  2+55      0.0357      0.23  QV        |         |         |         |
  3+ 0      0.0373      0.23  QV        |         |         |         |
  3+ 5      0.0388      0.23  QV        |         |         |         |
  3+10      0.0404      0.23  QV        |         |         |         |
  3+15      0.0420      0.23  QV        |         |         |         |
  3+20      0.0436      0.23  QV        |         |         |         |
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3+25       0.0451      0.23  QV        |         |         |         |
3+30       0.0467      0.23  QV        |         |         |         |
3+35       0.0483      0.23  QV        |         |         |         |
3+40       0.0499      0.23  Q V       |         |         |         |
3+45       0.0515      0.23  Q V       |         |         |         |
3+50       0.0531      0.23  Q V       |         |         |         |
3+55       0.0547      0.25  Q V       |         |         |         |
4+ 0       0.0566      0.26  |QV       |         |         |         |
4+ 5       0.0584      0.27  |QV       |         |         |         |
4+10       0.0603      0.27  |QV       |         |         |         |
4+15       0.0621      0.27  |QV       |         |         |         |
4+20       0.0640      0.28  |QV       |         |         |         |
4+25       0.0661      0.29  |QV       |         |         |         |
4+30       0.0682      0.31  |QV       |         |         |         |
4+35       0.0703      0.31  |QV       |         |         |         |
4+40       0.0725      0.32  |QV       |         |         |         |
4+45       0.0747      0.32  |Q V      |         |         |         |
4+50       0.0769      0.32  |Q V      |         |         |         |
4+55       0.0792      0.34  |Q V      |         |         |         |
5+ 0       0.0817      0.35  |Q V      |         |         |         |
5+ 5       0.0841      0.35  |Q V      |         |         |         |
5+10       0.0864      0.33  |Q V      |         |         |         |
5+15       0.0884      0.30  |Q V      |         |         |         |
5+20       0.0904      0.29  |Q V      |         |         |         |
5+25       0.0925      0.30  |Q V      |         |         |         |
5+30       0.0947      0.31  |Q V      |         |         |         |
5+35       0.0968      0.32  |Q V      |         |         |         |
5+40       0.0992      0.34  |Q  V     |         |         |         |
5+45       0.1016      0.35  |Q  V     |         |         |         |
5+50       0.1040      0.36  |Q  V     |         |         |         |
5+55       0.1065      0.36  |Q  V     |         |         |         |
6+ 0       0.1090      0.36  |Q  V     |         |         |         |
6+ 5       0.1116      0.37  |Q  V     |         |         |         |
6+10       0.1142      0.38  |Q  V     |         |         |         |
6+15       0.1170      0.40  |Q  V     |         |         |         |
6+20       0.1198      0.40  |Q  V     |         |         |         |
6+25       0.1226      0.41  |Q   V    |         |         |         |
6+30       0.1254      0.41  |Q   V    |         |         |         |
6+35       0.1282      0.41  |Q   V    |         |         |         |
6+40       0.1312      0.43  |Q   V    |         |         |         |
6+45       0.1343      0.44  |Q   V    |         |         |         |
6+50       0.1374      0.45  |Q   V    |         |         |         |
6+55       0.1405      0.45  |Q   V    |         |         |         |
7+ 0       0.1436      0.46  |Q   V    |         |         |         |
7+ 5       0.1468      0.46  |Q   V    |         |         |         |
7+10       0.1499      0.46  |Q    V   |         |         |         |
7+15       0.1531      0.46  |Q    V   |         |         |         |
7+20       0.1563      0.46  |Q    V   |         |         |         |
7+25       0.1595      0.48  |Q    V   |         |         |         |
7+30       0.1629      0.49  |Q    V   |         |         |         |
7+35       0.1664      0.50  |Q    V   |         |         |         |
7+40       0.1699      0.52  | Q   V   |         |         |         |
7+45       0.1736      0.53  | Q    V  |         |         |         |
7+50       0.1774      0.54  | Q    V  |         |         |         |
7+55       0.1812      0.56  | Q    V  |         |         |         |
8+ 0       0.1852      0.58  | Q    V  |         |         |         |
8+ 5       0.1893      0.59  | Q    V  |         |         |         |
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 8+10       0.1936      0.63  | Q    V  |         |         |         |
 8+15       0.1982      0.66  | Q     V |         |         |         |
 8+20       0.2028      0.67  | Q     V |         |         |         |
 8+25       0.2075      0.68  | Q     V |         |         |         |
 8+30       0.2122      0.68  | Q     V |         |         |         |
 8+35       0.2169      0.69  | Q     V |         |         |         |
 8+40       0.2217      0.70  | Q      V|         |         |         |
 8+45       0.2267      0.72  | Q      V|         |         |         |
 8+50       0.2317      0.73  | Q      V|         |         |         |
 8+55       0.2368      0.75  | Q      V|         |         |         |
 9+ 0       0.2421      0.76  |  Q     V|         |         |         |
 9+ 5       0.2475      0.78  |  Q      V         |         |         |
 9+10       0.2530      0.81  |  Q      V         |         |         |
 9+15       0.2588      0.84  |  Q      V         |         |         |
 9+20       0.2647      0.86  |  Q      V         |         |         |
 9+25       0.2708      0.88  |  Q      |V        |         |         |
 9+30       0.2770      0.90  |  Q      |V        |         |         |
 9+35       0.2832      0.91  |  Q      |V        |         |         |
 9+40       0.2896      0.93  |  Q      |V        |         |         |
 9+45       0.2962      0.95  |  Q      | V       |         |         |
 9+50       0.3027      0.96  |  Q      | V       |         |         |
 9+55       0.3095      0.97  |  Q      | V       |         |         |
10+ 0       0.3163      0.99  |  Q      | V       |         |         |
10+ 5       0.3231      0.98  |  Q      |  V      |         |         |
10+10       0.3291      0.88  |  Q      |  V      |         |         |
10+15       0.3345      0.78  |  Q      |  V      |         |         |
10+20       0.3395      0.74  | Q       |  V      |         |         |
10+25       0.3445      0.72  | Q       |   V     |         |         |
10+30       0.3493      0.70  | Q       |   V     |         |         |
10+35       0.3542      0.71  | Q       |   V     |         |         |
10+40       0.3595      0.78  |  Q      |   V     |         |         |
10+45       0.3654      0.85  |  Q      |   V     |         |         |
10+50       0.3715      0.88  |  Q      |    V    |         |         |
10+55       0.3777      0.90  |  Q      |    V    |         |         |
11+ 0       0.3839      0.91  |  Q      |    V    |         |         |
11+ 5       0.3902      0.91  |  Q      |    V    |         |         |
11+10       0.3963      0.90  |  Q      |     V   |         |         |
11+15       0.4024      0.88  |  Q      |     V   |         |         |
11+20       0.4085      0.88  |  Q      |     V   |         |         |
11+25       0.4145      0.87  |  Q      |     V   |         |         |
11+30       0.4205      0.87  |  Q      |      V  |         |         |
11+35       0.4265      0.87  |  Q      |      V  |         |         |
11+40       0.4322      0.84  |  Q      |      V  |         |         |
11+45       0.4378      0.81  |  Q      |      V  |         |         |
11+50       0.4432      0.80  |  Q      |       V |         |         |
11+55       0.4488      0.80  |  Q      |       V |         |         |
12+ 0       0.4544      0.82  |  Q      |       V |         |         |
12+ 5       0.4602      0.84  |  Q      |       V |         |         |
12+10       0.4669      0.97  |  Q      |        V|         |         |
12+15       0.4744      1.10  |   Q     |        V|         |         |
12+20       0.4823      1.15  |   Q     |        V|         |         |
12+25       0.4905      1.19  |   Q     |         V         |         |
12+30       0.4990      1.23  |   Q     |         V         |         |
12+35       0.5077      1.26  |    Q    |         V         |         |
12+40       0.5167      1.30  |    Q    |         |V        |         |
12+45       0.5260      1.35  |    Q    |         |V        |         |
12+50       0.5354      1.37  |    Q    |         |V        |         |
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12+55       0.5451      1.40  |    Q    |         | V       |         |
13+ 0       0.5550      1.43  |    Q    |         | V       |         |
13+ 5       0.5650      1.46  |    Q    |         |  V      |         |
13+10       0.5758      1.56  |     Q   |         |  V      |         |
13+15       0.5873      1.67  |     Q   |         |  V      |         |
13+20       0.5990      1.71  |     Q   |         |   V     |         |
13+25       0.6110      1.73  |     Q   |         |   V     |         |
13+30       0.6230      1.75  |     Q   |         |    V    |         |
13+35       0.6348      1.72  |     Q   |         |    V    |         |
13+40       0.6452      1.51  |     Q   |         |     V   |         |
13+45       0.6541      1.29  |    Q    |         |     V   |         |
13+50       0.6625      1.21  |   Q     |         |      V  |         |
13+55       0.6705      1.17  |   Q     |         |      V  |         |
14+ 0       0.6784      1.14  |   Q     |         |      V  |         |
14+ 5       0.6863      1.14  |   Q     |         |       V |         |
14+10       0.6947      1.22  |   Q     |         |       V |         |
14+15       0.7036      1.29  |    Q    |         |       V |         |
14+20       0.7126      1.32  |    Q    |         |        V|         |
14+25       0.7217      1.32  |    Q    |         |        V|         |
14+30       0.7307      1.31  |    Q    |         |        V|         |
14+35       0.7397      1.30  |    Q    |         |         V         |
14+40       0.7487      1.30  |    Q    |         |         V         |
14+45       0.7576      1.30  |    Q    |         |         V         |
14+50       0.7666      1.30  |    Q    |         |         |V        |
14+55       0.7755      1.28  |    Q    |         |         |V        |
15+ 0       0.7842      1.27  |    Q    |         |         | V       |
15+ 5       0.7928      1.26  |    Q    |         |         | V       |
15+10       0.8013      1.23  |   Q     |         |         | V       |
15+15       0.8096      1.21  |   Q     |         |         |  V      |
15+20       0.8179      1.20  |   Q     |         |         |  V      |
15+25       0.8260      1.18  |   Q     |         |         |  V      |
15+30       0.8340      1.16  |   Q     |         |         |   V     |
15+35       0.8418      1.13  |   Q     |         |         |   V     |
15+40       0.8491      1.05  |   Q     |         |         |   V     |
15+45       0.8558      0.97  |  Q      |         |         |   V     |
15+50       0.8622      0.94  |  Q      |         |         |    V    |
15+55       0.8686      0.93  |  Q      |         |         |    V    |
16+ 0       0.8749      0.92  |  Q      |         |         |    V    |
16+ 5       0.8809      0.87  |  Q      |         |         |    V    |
16+10       0.8853      0.63  | Q       |         |         |     V   |
16+15       0.8880      0.39  |Q        |         |         |     V   |
16+20       0.8900      0.30  |Q        |         |         |     V   |
16+25       0.8917      0.25  Q         |         |         |     V   |
16+30       0.8932      0.22  Q         |         |         |     V   |
16+35       0.8946      0.20  Q         |         |         |     V   |
16+40       0.8958      0.18  Q         |         |         |     V   |
16+45       0.8969      0.16  Q         |         |         |     V   |
16+50       0.8979      0.15  Q         |         |         |     V   |
16+55       0.8989      0.14  Q         |         |         |     V   |
17+ 0       0.8999      0.14  Q         |         |         |     V   |
17+ 5       0.9009      0.14  Q         |         |         |     V   |
17+10       0.9020      0.17  Q         |         |         |     V   |
17+15       0.9034      0.20  Q         |         |         |     V   |
17+20       0.9049      0.21  Q         |         |         |     V   |
17+25       0.9064      0.22  Q         |         |         |      V  |
17+30       0.9080      0.22  Q         |         |         |      V  |
17+35       0.9096      0.23  Q         |         |         |      V  |
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17+40        0.9111        0.23  Q         |         |         |      V  |
17+45        0.9127        0.23  Q         |         |         |      V  |
17+50        0.9143        0.23  Q         |         |         |      V  |
17+55        0.9157        0.21  Q         |         |         |      V  |
18+ 0        0.9171        0.20  Q         |         |         |      V  |
18+ 5        0.9184        0.19  Q         |         |         |      V  |
18+10        0.9197        0.19  Q         |         |         |      V  |
18+15        0.9209        0.19  Q         |         |         |      V  |
18+20        0.9222        0.18  Q         |         |         |      V  |
18+25        0.9235        0.18  Q         |         |         |      V  |
18+30        0.9248        0.18  Q         |         |         |      V  |
18+35        0.9260        0.18  Q         |         |         |      V  |
18+40        0.9271        0.17  Q         |         |         |      V  |
18+45        0.9282        0.15  Q         |         |         |      V  |
18+50        0.9292        0.14  Q         |         |         |      V  |
18+55        0.9300        0.12  Q         |         |         |      V  |
19+ 0        0.9307        0.11  Q         |         |         |       V |
19+ 5        0.9315        0.10  Q         |         |         |       V |
19+10        0.9322        0.11  Q         |         |         |       V |
19+15        0.9331        0.13  Q         |         |         |       V |
19+20        0.9340        0.13  Q         |         |         |       V |
19+25        0.9351        0.15  Q         |         |         |       V |
19+30        0.9362        0.17  Q         |         |         |       V |
19+35        0.9374        0.17  Q         |         |         |       V |
19+40        0.9385        0.16  Q         |         |         |       V |
19+45        0.9396        0.15  Q         |         |         |       V |
19+50        0.9405        0.14  Q         |         |         |       V |
19+55        0.9414        0.12  Q         |         |         |       V |
20+ 0        0.9421        0.11  Q         |         |         |       V |
20+ 5        0.9428        0.10  Q         |         |         |       V |
20+10        0.9436        0.11  Q         |         |         |       V |
20+15        0.9445        0.13  Q         |         |         |       V |
20+20        0.9454        0.13  Q         |         |         |       V |
20+25        0.9463        0.13  Q         |         |         |       V |
20+30        0.9472        0.14  Q         |         |         |       V |
20+35        0.9482        0.14  Q         |         |         |       V |
20+40        0.9491        0.14  Q         |         |         |       V |
20+45        0.9501        0.14  Q         |         |         |       V |
20+50        0.9510        0.13  Q         |         |         |       V |
20+55        0.9518        0.12  Q         |         |         |       V |
21+ 0        0.9525        0.10  Q         |         |         |       V |
21+ 5        0.9532        0.10  Q         |         |         |       V |
21+10        0.9540        0.11  Q         |         |         |       V |
21+15        0.9549        0.13  Q         |         |         |       V |
21+20        0.9558        0.13  Q         |         |         |        V|
21+25        0.9566        0.12  Q         |         |         |        V|
21+30        0.9573        0.10  Q         |         |         |        V|
21+35        0.9580        0.10  Q         |         |         |        V|
21+40        0.9588        0.11  Q         |         |         |        V|
21+45        0.9596        0.13  Q         |         |         |        V|
21+50        0.9605        0.13  Q         |         |         |        V|
21+55        0.9613        0.12  Q         |         |         |        V|
22+ 0        0.9620        0.10  Q         |         |         |        V|
22+ 5        0.9627        0.10  Q         |         |         |        V|
22+10        0.9635        0.11  Q         |         |         |        V|
22+15        0.9644        0.13  Q         |         |         |        V|
22+20        0.9652        0.13  Q         |         |         |        V|
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22+25	0.9660	0.12	Q	|	|	|	V|
22+30	0.9668	0.10	Q	|	|	|	V|
22+35	0.9674	0.10	Q	|	|	|	V|
22+40	0.9681	0.10	Q	|	|	|	V|
22+45	0.9687	0.09	Q	|	|	|	V|
22+50	0.9694	0.09	Q	|	|	|	V|
22+55	0.9700	0.09	Q	|	|	|	V|
23+ 0	0.9706	0.09	Q	|	|	|	V|
23+ 5	0.9713	0.09	Q	|	|	|	V|
23+10	0.9719	0.09	Q	|	|	|	V|
23+15	0.9725	0.09	Q	|	|	|	V|
23+20	0.9732	0.09	Q	|	|	|	V|
23+25	0.9738	0.09	Q	|	|	|	V|
23+30	0.9744	0.09	Q	|	|	|	V|
23+35	0.9751	0.09	Q	|	|	|	V|
23+40	0.9757	0.09	Q	|	|	|	V|
23+45	0.9763	0.09	Q	|	|	|	V|
23+50	0.9770	0.09	Q	|	|	|	V|
23+55	0.9776	0.09	Q	|	|	|	V|
24+ 0	0.9782	0.09	Q	|	|	|	V|
24+ 5	0.9788	0.09	Q	|	|	|	V|
24+10	0.9792	0.06	Q	|	|	|	V|
24+15	0.9794	0.03	Q	|	|	|	V|
24+20	0.9795	0.01	Q	|	|	|	V|
24+25	0.9795	0.01	Q	|	|	|	V|
24+30	0.9796	0.00	Q	|	|	|	V|
24+35	0.9796	0.00	Q	|	|	|	V|
24+40	0.9796	0.00	Q	|	|	|	V|
24+45	0.9796	0.00	Q	|	|	|	V|
24+50	0.9796	0.00	Q	|	|	|	V|
24+55	0.9796	0.00	Q	|	|	|	V|

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE65.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.581(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.581(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.095	(0.060)	0.022	0.073
2	0.17	0.60	0.114	(0.060)	0.026	0.088
3	0.25	0.60	0.114	(0.060)	0.026	0.088
4	0.33	0.60	0.114	(0.060)	0.026	0.088
5	0.42	0.60	0.114	(0.060)	0.026	0.088
6	0.50	0.70	0.133	(0.060)	0.031	0.102
7	0.58	0.70	0.133	(0.060)	0.031	0.102

8	0.67	0.70	0.133	(0.060)	0.031	0.102
9	0.75	0.70	0.133	(0.060)	0.031	0.102
10	0.83	0.70	0.133	(0.060)	0.031	0.102
11	0.92	0.70	0.133	(0.060)	0.031	0.102
12	1.00	0.80	0.152	(0.060)	0.035	0.117
13	1.08	0.80	0.152	(0.060)	0.035	0.117
14	1.17	0.80	0.152	(0.060)	0.035	0.117
15	1.25	0.80	0.152	(0.060)	0.035	0.117
16	1.33	0.80	0.152	(0.060)	0.035	0.117
17	1.42	0.80	0.152	(0.060)	0.035	0.117
18	1.50	0.80	0.152	(0.060)	0.035	0.117
19	1.58	0.80	0.152	(0.060)	0.035	0.117
20	1.67	0.80	0.152	(0.060)	0.035	0.117
21	1.75	0.80	0.152	(0.060)	0.035	0.117
22	1.83	0.80	0.152	(0.060)	0.035	0.117
23	1.92	0.80	0.152	(0.060)	0.035	0.117
24	2.00	0.90	0.171	(0.060)	0.039	0.131
25	2.08	0.80	0.152	(0.060)	0.035	0.117
26	2.17	0.90	0.171	(0.060)	0.039	0.131
27	2.25	0.90	0.171	(0.060)	0.039	0.131
28	2.33	0.90	0.171	(0.060)	0.039	0.131
29	2.42	0.90	0.171	(0.060)	0.039	0.131
30	2.50	0.90	0.171	(0.060)	0.039	0.131
31	2.58	0.90	0.171	(0.060)	0.039	0.131
32	2.67	0.90	0.171	(0.060)	0.039	0.131
33	2.75	1.00	0.190	(0.060)	0.044	0.146
34	2.83	1.00	0.190	(0.060)	0.044	0.146
35	2.92	1.00	0.190	(0.060)	0.044	0.146
36	3.00	1.00	0.190	(0.060)	0.044	0.146
37	3.08	1.00	0.190	(0.060)	0.044	0.146
38	3.17	1.10	0.209	(0.060)	0.048	0.160
39	3.25	1.10	0.209	(0.060)	0.048	0.160
40	3.33	1.10	0.209	(0.060)	0.048	0.160
41	3.42	1.20	0.228	(0.060)	0.053	0.175
42	3.50	1.30	0.247	(0.060)	0.057	0.190
43	3.58	1.40	0.266	0.060	(0.061)	0.205
44	3.67	1.40	0.266	0.060	(0.061)	0.205
45	3.75	1.50	0.285	0.060	(0.066)	0.224
46	3.83	1.50	0.285	0.060	(0.066)	0.224
47	3.92	1.60	0.304	0.060	(0.070)	0.243
48	4.00	1.60	0.304	0.060	(0.070)	0.243
49	4.08	1.70	0.323	0.060	(0.075)	0.262
50	4.17	1.80	0.342	0.060	(0.079)	0.281
51	4.25	1.90	0.360	0.060	(0.083)	0.300
52	4.33	2.00	0.379	0.060	(0.088)	0.319
53	4.42	2.10	0.398	0.060	(0.092)	0.338
54	4.50	2.10	0.398	0.060	(0.092)	0.338
55	4.58	2.20	0.417	0.060	(0.097)	0.357
56	4.67	2.30	0.436	0.060	(0.101)	0.376
57	4.75	2.40	0.455	0.060	(0.105)	0.395
58	4.83	2.40	0.455	0.060	(0.105)	0.395
59	4.92	2.50	0.474	0.060	(0.110)	0.414
60	5.00	2.60	0.493	0.060	(0.114)	0.433
61	5.08	3.10	0.588	0.060	(0.136)	0.528
62	5.17	3.60	0.683	0.060	(0.158)	0.623
63	5.25	3.90	0.740	0.060	(0.171)	0.680
64	5.33	4.20	0.797	0.060	(0.184)	0.736

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65   5.42     4.70      0.892          0.060    (  0.206)        0.831
66   5.50     5.60      1.062          0.060    (  0.246)        1.002
67   5.58     1.90      0.360          0.060    (  0.083)        0.300
68   5.67     0.90      0.171       (  0.060)      0.039         0.131
69   5.75     0.60      0.114       (  0.060)      0.026         0.088
70   5.83     0.50      0.095       (  0.060)      0.022         0.073
71   5.92     0.30      0.057       (  0.060)      0.013         0.044
72   6.00     0.20      0.038       (  0.060)      0.009         0.029
           (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    15.8
    Flood volume = Effective rainfall      1.32(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.6(Ac.Ft)
    Total soil loss =      0.26(In)
    Total soil loss =     0.111(Ac.Ft)
    Total rainfall =      1.58(In)
    Flood volume =       24081.5 Cubic Feet
    Total soil loss =       4844.0 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      4.107(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.02  Q         |         |         |         |
  0+10       0.0011      0.15  Q         |         |         |         |
  0+15       0.0032      0.29  VQ        |         |         |         |
  0+20       0.0057      0.36  VQ        |         |         |         |
  0+25       0.0084      0.40  VQ        |         |         |         |
  0+30       0.0114      0.43  VQ        |         |         |         |
  0+35       0.0145      0.46  |Q        |         |         |         |
  0+40       0.0179      0.49  |Q        |         |         |         |
  0+45       0.0214      0.50  |VQ       |         |         |         |
  0+50       0.0249      0.51  |VQ       |         |         |         |
  0+55       0.0284      0.51  | Q       |         |         |         |
  1+ 0       0.0320      0.52  | Q       |         |         |         |
  1+ 5       0.0358      0.55  | Q       |         |         |         |
  1+10       0.0397      0.57  | Q       |         |         |         |
  1+15       0.0437      0.58  | QV      |         |         |         |
  1+20       0.0478      0.59  | QV      |         |         |         |
  1+25       0.0518      0.59  | QV      |         |         |         |
  1+30       0.0559      0.59  | Q V     |         |         |         |
  1+35       0.0600      0.59  | Q V     |         |         |         |
  1+40       0.0640      0.59  | Q V     |         |         |         |
  1+45       0.0681      0.59  | Q V     |         |         |         |
  1+50       0.0722      0.59  | Q  V    |         |         |         |
  1+55       0.0763      0.59  | Q  V    |         |         |         |
  2+ 0       0.0804      0.60  | Q  V    |         |         |         |
  2+ 5       0.0847      0.62  | Q   V   |         |         |         |
  2+10       0.0889      0.62  | Q   V   |         |         |         |
  2+15       0.0933      0.63  | Q   V   |         |         |         |
  2+20       0.0978      0.65  | Q    V  |         |         |         |
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    2+25       0.1023      0.66  | Q    V  |         |         |         |
    2+30       0.1069      0.66  | Q    V  |         |         |         |
    2+35       0.1114      0.66  | Q     V |         |         |         |
    2+40       0.1160      0.67  | Q     V |         |         |         |
    2+45       0.1206      0.67  | Q     V |         |         |         |
    2+50       0.1254      0.69  | Q      V|         |         |         |
    2+55       0.1304      0.72  | Q      V|         |         |         |
    3+ 0       0.1354      0.73  | Q      V|         |         |         |
    3+ 5       0.1405      0.73  | Q       V         |         |         |
    3+10       0.1456      0.74  | Q       V         |         |         |
    3+15       0.1509      0.77  |  Q      V         |         |         |
    3+20       0.1563      0.79  |  Q      |V        |         |         |
    3+25       0.1619      0.81  |  Q      |V        |         |         |
    3+30       0.1677      0.84  |  Q      | V       |         |         |
    3+35       0.1739      0.90  |  Q      | V       |         |         |
    3+40       0.1805      0.96  |  Q      |  V      |         |         |
    3+45       0.1874      1.01  |   Q     |  V      |         |         |
    3+50       0.1947      1.06  |   Q     |   V     |         |         |
    3+55       0.2023      1.10  |   Q     |   V     |         |         |
    4+ 0       0.2102      1.15  |   Q     |    V    |         |         |
    4+ 5       0.2185      1.20  |   Q     |    V    |         |         |
    4+10       0.2272      1.26  |    Q    |     V   |         |         |
    4+15       0.2364      1.33  |    Q    |      V  |         |         |
    4+20       0.2461      1.42  |    Q    |      V  |         |         |
    4+25       0.2566      1.51  |     Q   |       V |         |         |
    4+30       0.2676      1.60  |     Q   |        V|         |         |
    4+35       0.2790      1.66  |     Q   |         V         |         |
    4+40       0.2909      1.73  |     Q   |         |V        |         |
    4+45       0.3034      1.81  |      Q  |         |V        |         |
    4+50       0.3165      1.90  |      Q  |         | V       |         |
    4+55       0.3299      1.96  |      Q  |         |  V      |         |
    5+ 0       0.3438      2.02  |       Q |         |   V     |         |
    5+ 5       0.3585      2.12  |       Q |         |    V    |         |
    5+10       0.3747      2.36  |        Q|         |      V  |         |
    5+15       0.3934      2.72  |         Q         |       V |         |
    5+20       0.4145      3.06  |         | Q       |        V|         |
    5+25       0.4378      3.38  |         |  Q      |         |V        |
    5+30       0.4638      3.78  |         |    Q    |         |  V      |
    5+35       0.4921      4.11  |         |     Q   |         |    V    |
    5+40       0.5149      3.31  |         |  Q      |         |      V  |
    5+45       0.5285      1.98  |      Q  |         |         |       V |
    5+50       0.5373      1.27  |    Q    |         |         |       V |
    5+55       0.5432      0.86  |  Q      |         |         |        V|
    6+ 0       0.5472      0.58  | Q       |         |         |        V|
    6+ 5       0.5497      0.36  |Q        |         |         |        V|
    6+10       0.5512      0.21  Q         |         |         |        V|
    6+15       0.5520      0.12  Q         |         |         |        V|
    6+20       0.5524      0.07  Q         |         |         |        V|
    6+25       0.5526      0.03  Q         |         |         |        V|
    6+30       0.5527      0.01  Q         |         |         |        V|
    6+35       0.5528      0.01  Q         |         |         |        V|
    6+40       0.5528      0.00  Q         |         |         |        V|
    6+45       0.5528      0.00  Q         |         |         |        V|
    6+50       0.5528      0.00  Q         |         |         |        V|
    6+55       0.5528      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE35.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.073(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.072(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.167	(0.060)	0.039	0.129
2	0.17	1.30	0.167	(0.060)	0.039	0.129
3	0.25	1.10	0.142	(0.060)	0.033	0.109
4	0.33	1.50	0.193	(0.060)	0.045	0.148
5	0.42	1.50	0.193	(0.060)	0.045	0.148
6	0.50	1.80	0.232	(0.060)	0.054	0.178
7	0.58	1.50	0.193	(0.060)	0.045	0.148

8	0.67	1.80	0.232	(0.060)	0.054	0.178
9	0.75	1.80	0.232	(0.060)	0.054	0.178
10	0.83	1.50	0.193	(0.060)	0.045	0.148
11	0.92	1.60	0.206	(0.060)	0.048	0.158
12	1.00	1.80	0.232	(0.060)	0.054	0.178
13	1.08	2.20	0.283	0.060	(0.065)	0.223
14	1.17	2.20	0.283	0.060	(0.065)	0.223
15	1.25	2.20	0.283	0.060	(0.065)	0.223
16	1.33	2.00	0.257	(0.060)	0.060	0.198
17	1.42	2.60	0.335	0.060	(0.077)	0.274
18	1.50	2.70	0.347	0.060	(0.080)	0.287
19	1.58	2.40	0.309	0.060	(0.071)	0.248
20	1.67	2.70	0.347	0.060	(0.080)	0.287
21	1.75	3.30	0.425	0.060	(0.098)	0.364
22	1.83	3.10	0.399	0.060	(0.092)	0.339
23	1.92	2.90	0.373	0.060	(0.086)	0.313
24	2.00	3.00	0.386	0.060	(0.089)	0.326
25	2.08	3.10	0.399	0.060	(0.092)	0.339
26	2.17	4.20	0.541	0.060	(0.125)	0.480
27	2.25	5.00	0.643	0.060	(0.149)	0.583
28	2.33	3.50	0.450	0.060	(0.104)	0.390
29	2.42	6.80	0.875	0.060	(0.202)	0.815
30	2.50	7.30	0.940	0.060	(0.217)	0.879
31	2.58	8.20	1.055	0.060	(0.244)	0.995
32	2.67	5.90	0.759	0.060	(0.176)	0.699
33	2.75	2.00	0.257	(0.060)	0.060	0.198
34	2.83	1.80	0.232	(0.060)	0.054	0.178
35	2.92	1.80	0.232	(0.060)	0.054	0.178
36	3.00	0.60	0.077	(0.060)	0.018	0.059

(Loss Rate Not Used)

Sum = 100.0 Sum = 10.9

Flood volume = Effective rainfall 0.91(In)
times area 5.0(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.16(In)
Total soil loss = 0.068(Ac.Ft)
Total rainfall = 1.07(In)
Flood volume = 16660.1 Cubic Feet
Total soil loss = 2961.3 Cubic Feet

```
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      4.214(CFS)
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   3 - H O U R   S T O R M
              R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
           Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0003      0.04  Q         |         |         |         |
  0+10       0.0020      0.25  Q         |         |         |         |
  0+15       0.0052      0.46  VQ        |         |         |         |
  0+20       0.0088      0.52  V Q       |         |         |         |
  0+25       0.0129      0.60  |VQ       |         |         |         |
  0+30       0.0177      0.69  |VQ       |         |         |         |
  0+35       0.0229      0.76  | VQ      |         |         |         |
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    0+40       0.0284      0.79  | VQ      |         |         |         |
    0+45       0.0340      0.82  |  Q      |         |         |         |
    0+50       0.0399      0.86  |  QV     |         |         |         |
    0+55       0.0456      0.83  |  QV     |         |         |         |
    1+ 0       0.0512      0.81  |  Q V    |         |         |         |
    1+ 5       0.0571      0.86  |  Q V    |         |         |         |
    1+10       0.0638      0.97  |  Q  V   |         |         |         |
    1+15       0.0710      1.05  |   Q  V  |         |         |         |
    1+20       0.0785      1.08  |   Q   V |         |         |         |
    1+25       0.0859      1.08  |   Q   V |         |         |         |
    1+30       0.0940      1.18  |   Q    V|         |         |         |
    1+35       0.1031      1.31  |    Q    V         |         |         |
    1+40       0.1122      1.32  |    Q    |V        |         |         |
    1+45       0.1216      1.37  |    Q    | V       |         |         |
    1+50       0.1323      1.55  |     Q   |  V      |         |         |
    1+55       0.1438      1.66  |     Q   |    V    |         |         |
    2+ 0       0.1550      1.63  |     Q   |     V   |         |         |
    2+ 5       0.1663      1.63  |     Q   |      V  |         |         |
    2+10       0.1780      1.71  |     Q   |       V |         |         |
    2+15       0.1918      2.00  |       Q |         V         |         |
    2+20       0.2081      2.37  |        Q|         |V        |         |
    2+25       0.2249      2.44  |        Q|         |  V      |         |
    2+30       0.2452      2.95  |         |Q        |    V    |         |
    2+35       0.2712      3.76  |         |    Q    |       V |         |
    2+40       0.3002      4.21  |         |     Q   |         |V        |
    2+45       0.3274      3.95  |         |    Q    |         |   V     |
    2+50       0.3466      2.79  |         |Q        |         |     V   |
    2+55       0.3591      1.81  |      Q  |         |         |      V  |
    3+ 0       0.3686      1.38  |    Q    |         |         |       V |
    3+ 5       0.3750      0.94  |  Q      |         |         |        V|
    3+10       0.3785      0.50  |Q        |         |         |        V|
    3+15       0.3803      0.26  |Q        |         |         |        V|
    3+20       0.3813      0.15  Q         |         |         |        V|
    3+25       0.3819      0.09  Q         |         |         |        V|
    3+30       0.3822      0.04  Q         |         |         |        V|
    3+35       0.3823      0.02  Q         |         |         |        V|
    3+40       0.3824      0.01  Q         |         |         |        V|
    3+45       0.3824      0.01  Q         |         |         |        V|
    3+50       0.3825      0.00  Q         |         |         |        V|
    3+55       0.3825      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE15.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.50	2.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.20	6.05

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.664(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.664(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.263	0.060	(0.061)	0.203
2	0.17	4.20	0.335	0.060	(0.077)	0.274
3	0.25	4.40	0.351	0.060	(0.081)	0.290
4	0.33	4.80	0.382	0.060	(0.088)	0.322
5	0.42	5.20	0.414	0.060	(0.096)	0.354

```
  6   0.50     6.20      0.494          0.060    (  0.114)        0.434
  7   0.58     6.80      0.542          0.060    (  0.125)        0.481
  8   0.67     8.80      0.701          0.060    (  0.162)        0.641
  9   0.75    13.90      1.107          0.060    (  0.256)        1.047
 10   0.83    31.40      2.502          0.060    (  0.578)        2.441
 11   0.92     7.20      0.574          0.060    (  0.133)        0.513
 12   1.00     3.80      0.303          0.060    (  0.070)        0.242
           (Loss Rate Not Used)
    Sum =     100.0                                    Sum =     7.2
     Flood volume = Effective rainfall      0.60(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.025(Ac.Ft)
     Total rainfall =      0.66(In)
     Flood volume =       11041.4 Cubic Feet
     Total soil loss =       1105.3 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      6.695(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0004      0.06  Q         |         |         |         |
   0+10       0.0032      0.41  VQ        |         |         |         |
   0+15       0.0093      0.88  |V Q      |         |         |         |
   0+20       0.0173      1.17  | V Q     |         |         |         |
   0+25       0.0268      1.37  |   VQ    |         |         |         |
   0+30       0.0377      1.58  |    VQ   |         |         |         |
   0+35       0.0504      1.85  |      Q  |         |         |         |
   0+40       0.0653      2.16  |       Q V         |         |         |
   0+45       0.0839      2.70  |         Q  V      |         |         |
   0+50       0.1123      4.12  |         |     QV  |         |         |
   0+55       0.1584      6.70  |         |         |   V Q   |         |
   1+ 0       0.2009      6.17  |         |         |   Q     |V        |
   1+ 5       0.2244      3.41  |         |  Q      |         |    V    |
   1+10       0.2379      1.96  |      Q  |         |         |      V  |
   1+15       0.2451      1.05  |   Q     |         |         |       V |
   1+20       0.2490      0.57  | Q       |         |         |        V|
   1+25       0.2509      0.28  |Q        |         |         |        V|
   1+30       0.2520      0.16  Q         |         |         |        V|
   1+35       0.2527      0.10  Q         |         |         |        V|
   1+40       0.2532      0.07  Q         |         |         |        V|
   1+45       0.2534      0.03  Q         |         |         |        V|
   1+50       0.2535      0.01  Q         |         |         |        V|
   1+55       0.2535      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

Existing Conditions Unit Hydrograph: 2yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 2.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.018	(0.107)	0.004	0.014
2	0.17	0.07	0.018	(0.107)	0.004	0.014
3	0.25	0.07	0.018	(0.106)	0.004	0.014
4	0.33	0.10	0.028	(0.106)	0.006	0.021
5	0.42	0.10	0.028	(0.105)	0.006	0.021
6	0.50	0.10	0.028	(0.105)	0.006	0.021
7	0.58	0.10	0.028	(0.105)	0.006	0.021

8	0.67	0.10	0.028	(0.104)	0.006	0.021
9	0.75	0.10	0.028	(0.104)	0.006	0.021
10	0.83	0.13	0.037	(0.103)	0.009	0.028
11	0.92	0.13	0.037	(0.103)	0.009	0.028
12	1.00	0.13	0.037	(0.103)	0.009	0.028
13	1.08	0.10	0.028	(0.102)	0.006	0.021
14	1.17	0.10	0.028	(0.102)	0.006	0.021
15	1.25	0.10	0.028	(0.101)	0.006	0.021
16	1.33	0.10	0.028	(0.101)	0.006	0.021
17	1.42	0.10	0.028	(0.101)	0.006	0.021
18	1.50	0.10	0.028	(0.100)	0.006	0.021
19	1.58	0.10	0.028	(0.100)	0.006	0.021
20	1.67	0.10	0.028	(0.099)	0.006	0.021
21	1.75	0.10	0.028	(0.099)	0.006	0.021
22	1.83	0.13	0.037	(0.099)	0.009	0.028
23	1.92	0.13	0.037	(0.098)	0.009	0.028
24	2.00	0.13	0.037	(0.098)	0.009	0.028
25	2.08	0.13	0.037	(0.097)	0.009	0.028
26	2.17	0.13	0.037	(0.097)	0.009	0.028
27	2.25	0.13	0.037	(0.097)	0.009	0.028
28	2.33	0.13	0.037	(0.096)	0.009	0.028
29	2.42	0.13	0.037	(0.096)	0.009	0.028
30	2.50	0.13	0.037	(0.095)	0.009	0.028
31	2.58	0.17	0.046	(0.095)	0.011	0.035
32	2.67	0.17	0.046	(0.095)	0.011	0.035
33	2.75	0.17	0.046	(0.094)	0.011	0.035
34	2.83	0.17	0.046	(0.094)	0.011	0.035
35	2.92	0.17	0.046	(0.093)	0.011	0.035
36	3.00	0.17	0.046	(0.093)	0.011	0.035
37	3.08	0.17	0.046	(0.093)	0.011	0.035
38	3.17	0.17	0.046	(0.092)	0.011	0.035
39	3.25	0.17	0.046	(0.092)	0.011	0.035
40	3.33	0.17	0.046	(0.092)	0.011	0.035
41	3.42	0.17	0.046	(0.091)	0.011	0.035
42	3.50	0.17	0.046	(0.091)	0.011	0.035
43	3.58	0.17	0.046	(0.090)	0.011	0.035
44	3.67	0.17	0.046	(0.090)	0.011	0.035
45	3.75	0.17	0.046	(0.090)	0.011	0.035
46	3.83	0.20	0.055	(0.089)	0.013	0.042
47	3.92	0.20	0.055	(0.089)	0.013	0.042
48	4.00	0.20	0.055	(0.089)	0.013	0.042
49	4.08	0.20	0.055	(0.088)	0.013	0.042
50	4.17	0.20	0.055	(0.088)	0.013	0.042
51	4.25	0.20	0.055	(0.087)	0.013	0.042
52	4.33	0.23	0.064	(0.087)	0.015	0.050
53	4.42	0.23	0.064	(0.087)	0.015	0.050
54	4.50	0.23	0.064	(0.086)	0.015	0.050
55	4.58	0.23	0.064	(0.086)	0.015	0.050
56	4.67	0.23	0.064	(0.086)	0.015	0.050
57	4.75	0.23	0.064	(0.085)	0.015	0.050
58	4.83	0.27	0.074	(0.085)	0.017	0.057
59	4.92	0.27	0.074	(0.084)	0.017	0.057
60	5.00	0.27	0.074	(0.084)	0.017	0.057
61	5.08	0.20	0.055	(0.084)	0.013	0.042
62	5.17	0.20	0.055	(0.083)	0.013	0.042
63	5.25	0.20	0.055	(0.083)	0.013	0.042
64	5.33	0.23	0.064	(0.083)	0.015	0.050

65	5.42	0.23	0.064	(0.082)	0.015	0.050
66	5.50	0.23	0.064	(0.082)	0.015	0.050
67	5.58	0.27	0.074	(0.082)	0.017	0.057
68	5.67	0.27	0.074	(0.081)	0.017	0.057
69	5.75	0.27	0.074	(0.081)	0.017	0.057
70	5.83	0.27	0.074	(0.080)	0.017	0.057
71	5.92	0.27	0.074	(0.080)	0.017	0.057
72	6.00	0.27	0.074	(0.080)	0.017	0.057
73	6.08	0.30	0.083	(0.079)	0.019	0.064
74	6.17	0.30	0.083	(0.079)	0.019	0.064
75	6.25	0.30	0.083	(0.079)	0.019	0.064
76	6.33	0.30	0.083	(0.078)	0.019	0.064
77	6.42	0.30	0.083	(0.078)	0.019	0.064
78	6.50	0.30	0.083	(0.078)	0.019	0.064
79	6.58	0.33	0.092	(0.077)	0.021	0.071
80	6.67	0.33	0.092	(0.077)	0.021	0.071
81	6.75	0.33	0.092	(0.077)	0.021	0.071
82	6.83	0.33	0.092	(0.076)	0.021	0.071
83	6.92	0.33	0.092	(0.076)	0.021	0.071
84	7.00	0.33	0.092	(0.076)	0.021	0.071
85	7.08	0.33	0.092	(0.075)	0.021	0.071
86	7.17	0.33	0.092	(0.075)	0.021	0.071
87	7.25	0.33	0.092	(0.075)	0.021	0.071
88	7.33	0.37	0.101	(0.074)	0.023	0.078
89	7.42	0.37	0.101	(0.074)	0.023	0.078
90	7.50	0.37	0.101	(0.074)	0.023	0.078
91	7.58	0.40	0.110	(0.073)	0.026	0.085
92	7.67	0.40	0.110	(0.073)	0.026	0.085
93	7.75	0.40	0.110	(0.072)	0.026	0.085
94	7.83	0.43	0.120	(0.072)	0.028	0.092
95	7.92	0.43	0.120	(0.072)	0.028	0.092
96	8.00	0.43	0.120	(0.071)	0.028	0.092
97	8.08	0.50	0.138	(0.071)	0.032	0.106
98	8.17	0.50	0.138	(0.071)	0.032	0.106
99	8.25	0.50	0.138	(0.071)	0.032	0.106
100	8.33	0.50	0.138	(0.070)	0.032	0.106
101	8.42	0.50	0.138	(0.070)	0.032	0.106
102	8.50	0.50	0.138	(0.070)	0.032	0.106
103	8.58	0.53	0.147	(0.069)	0.034	0.113
104	8.67	0.53	0.147	(0.069)	0.034	0.113
105	8.75	0.53	0.147	(0.069)	0.034	0.113
106	8.83	0.57	0.156	(0.068)	0.036	0.120
107	8.92	0.57	0.156	(0.068)	0.036	0.120
108	9.00	0.57	0.156	(0.068)	0.036	0.120
109	9.08	0.63	0.175	(0.067)	0.040	0.134
110	9.17	0.63	0.175	(0.067)	0.040	0.134
111	9.25	0.63	0.175	(0.067)	0.040	0.134
112	9.33	0.67	0.184	(0.066)	0.043	0.141
113	9.42	0.67	0.184	(0.066)	0.043	0.141
114	9.50	0.67	0.184	(0.066)	0.043	0.141
115	9.58	0.70	0.193	(0.065)	0.045	0.149
116	9.67	0.70	0.193	(0.065)	0.045	0.149
117	9.75	0.70	0.193	(0.065)	0.045	0.149
118	9.83	0.73	0.202	(0.064)	0.047	0.156
119	9.92	0.73	0.202	(0.064)	0.047	0.156
120	10.00	0.73	0.202	(0.064)	0.047	0.156
121	10.08	0.50	0.138	(0.063)	0.032	0.106

122	10.17	0.50	0.138	(0.063)	0.032	0.106
123	10.25	0.50	0.138	(0.063)	0.032	0.106
124	10.33	0.50	0.138	(0.063)	0.032	0.106
125	10.42	0.50	0.138	(0.062)	0.032	0.106
126	10.50	0.50	0.138	(0.062)	0.032	0.106
127	10.58	0.67	0.184	(0.062)	0.043	0.141
128	10.67	0.67	0.184	(0.061)	0.043	0.141
129	10.75	0.67	0.184	(0.061)	0.043	0.141
130	10.83	0.67	0.184	(0.061)	0.043	0.141
131	10.92	0.67	0.184	(0.060)	0.043	0.141
132	11.00	0.67	0.184	(0.060)	0.043	0.141
133	11.08	0.63	0.175	(0.060)	0.040	0.134
134	11.17	0.63	0.175	(0.060)	0.040	0.134
135	11.25	0.63	0.175	(0.059)	0.040	0.134
136	11.33	0.63	0.175	(0.059)	0.040	0.134
137	11.42	0.63	0.175	(0.059)	0.040	0.134
138	11.50	0.63	0.175	(0.058)	0.040	0.134
139	11.58	0.57	0.156	(0.058)	0.036	0.120
140	11.67	0.57	0.156	(0.058)	0.036	0.120
141	11.75	0.57	0.156	(0.058)	0.036	0.120
142	11.83	0.60	0.166	(0.057)	0.038	0.127
143	11.92	0.60	0.166	(0.057)	0.038	0.127
144	12.00	0.60	0.166	(0.057)	0.038	0.127
145	12.08	0.83	0.230	(0.056)	0.053	0.177
146	12.17	0.83	0.230	(0.056)	0.053	0.177
147	12.25	0.83	0.230	(0.056)	0.053	0.177
148	12.33	0.87	0.239	(0.056)	0.055	0.184
149	12.42	0.87	0.239	0.055	(0.055)	0.184
150	12.50	0.87	0.239	0.055	(0.055)	0.184
151	12.58	0.93	0.258	0.055	(0.060)	0.203
152	12.67	0.93	0.258	0.054	(0.060)	0.203
153	12.75	0.93	0.258	0.054	(0.060)	0.203
154	12.83	0.97	0.267	0.054	(0.062)	0.213
155	12.92	0.97	0.267	0.054	(0.062)	0.213
156	13.00	0.97	0.267	0.053	(0.062)	0.213
157	13.08	1.13	0.313	0.053	(0.072)	0.260
158	13.17	1.13	0.313	0.053	(0.072)	0.260
159	13.25	1.13	0.313	0.053	(0.072)	0.260
160	13.33	1.13	0.313	0.052	(0.072)	0.261
161	13.42	1.13	0.313	0.052	(0.072)	0.261
162	13.50	1.13	0.313	0.052	(0.072)	0.261
163	13.58	0.77	0.212	(0.051)	0.049	0.163
164	13.67	0.77	0.212	(0.051)	0.049	0.163
165	13.75	0.77	0.212	(0.051)	0.049	0.163
166	13.83	0.77	0.212	(0.051)	0.049	0.163
167	13.92	0.77	0.212	(0.050)	0.049	0.163
168	14.00	0.77	0.212	(0.050)	0.049	0.163
169	14.08	0.90	0.248	0.050	(0.057)	0.198
170	14.17	0.90	0.248	0.050	(0.057)	0.199
171	14.25	0.90	0.248	0.049	(0.057)	0.199
172	14.33	0.87	0.239	0.049	(0.055)	0.190
173	14.42	0.87	0.239	0.049	(0.055)	0.190
174	14.50	0.87	0.239	0.049	(0.055)	0.191
175	14.58	0.87	0.239	0.048	(0.055)	0.191
176	14.67	0.87	0.239	0.048	(0.055)	0.191
177	14.75	0.87	0.239	0.048	(0.055)	0.191
178	14.83	0.83	0.230	0.048	(0.053)	0.182

179	14.92	0.83	0.230	0.047	(0.053)	0.183
180	15.00	0.83	0.230	0.047	(0.053)	0.183
181	15.08	0.80	0.221	0.047	(0.051)	0.174
182	15.17	0.80	0.221	0.047	(0.051)	0.174
183	15.25	0.80	0.221	0.046	(0.051)	0.174
184	15.33	0.77	0.212	0.046	(0.049)	0.165
185	15.42	0.77	0.212	0.046	(0.049)	0.166
186	15.50	0.77	0.212	0.046	(0.049)	0.166
187	15.58	0.63	0.175	(0.046)	0.040	0.134
188	15.67	0.63	0.175	(0.045)	0.040	0.134
189	15.75	0.63	0.175	(0.045)	0.040	0.134
190	15.83	0.63	0.175	(0.045)	0.040	0.134
191	15.92	0.63	0.175	(0.045)	0.040	0.134
192	16.00	0.63	0.175	(0.044)	0.040	0.134
193	16.08	0.13	0.037	(0.044)	0.009	0.028
194	16.17	0.13	0.037	(0.044)	0.009	0.028
195	16.25	0.13	0.037	(0.044)	0.009	0.028
196	16.33	0.13	0.037	(0.043)	0.009	0.028
197	16.42	0.13	0.037	(0.043)	0.009	0.028
198	16.50	0.13	0.037	(0.043)	0.009	0.028
199	16.58	0.10	0.028	(0.043)	0.006	0.021
200	16.67	0.10	0.028	(0.043)	0.006	0.021
201	16.75	0.10	0.028	(0.042)	0.006	0.021
202	16.83	0.10	0.028	(0.042)	0.006	0.021
203	16.92	0.10	0.028	(0.042)	0.006	0.021
204	17.00	0.10	0.028	(0.042)	0.006	0.021
205	17.08	0.17	0.046	(0.042)	0.011	0.035
206	17.17	0.17	0.046	(0.041)	0.011	0.035
207	17.25	0.17	0.046	(0.041)	0.011	0.035
208	17.33	0.17	0.046	(0.041)	0.011	0.035
209	17.42	0.17	0.046	(0.041)	0.011	0.035
210	17.50	0.17	0.046	(0.040)	0.011	0.035
211	17.58	0.17	0.046	(0.040)	0.011	0.035
212	17.67	0.17	0.046	(0.040)	0.011	0.035
213	17.75	0.17	0.046	(0.040)	0.011	0.035
214	17.83	0.13	0.037	(0.040)	0.009	0.028
215	17.92	0.13	0.037	(0.039)	0.009	0.028
216	18.00	0.13	0.037	(0.039)	0.009	0.028
217	18.08	0.13	0.037	(0.039)	0.009	0.028
218	18.17	0.13	0.037	(0.039)	0.009	0.028
219	18.25	0.13	0.037	(0.039)	0.009	0.028
220	18.33	0.13	0.037	(0.039)	0.009	0.028
221	18.42	0.13	0.037	(0.038)	0.009	0.028
222	18.50	0.13	0.037	(0.038)	0.009	0.028
223	18.58	0.10	0.028	(0.038)	0.006	0.021
224	18.67	0.10	0.028	(0.038)	0.006	0.021
225	18.75	0.10	0.028	(0.038)	0.006	0.021
226	18.83	0.07	0.018	(0.037)	0.004	0.014
227	18.92	0.07	0.018	(0.037)	0.004	0.014
228	19.00	0.07	0.018	(0.037)	0.004	0.014
229	19.08	0.10	0.028	(0.037)	0.006	0.021
230	19.17	0.10	0.028	(0.037)	0.006	0.021
231	19.25	0.10	0.028	(0.037)	0.006	0.021
232	19.33	0.13	0.037	(0.036)	0.009	0.028
233	19.42	0.13	0.037	(0.036)	0.009	0.028
234	19.50	0.13	0.037	(0.036)	0.009	0.028
235	19.58	0.10	0.028	(0.036)	0.006	0.021

236	19.67	0.10	0.028	(0.036)	0.006	0.021
237	19.75	0.10	0.028	(0.036)	0.006	0.021
238	19.83	0.07	0.018	(0.035)	0.004	0.014
239	19.92	0.07	0.018	(0.035)	0.004	0.014
240	20.00	0.07	0.018	(0.035)	0.004	0.014
241	20.08	0.10	0.028	(0.035)	0.006	0.021
242	20.17	0.10	0.028	(0.035)	0.006	0.021
243	20.25	0.10	0.028	(0.035)	0.006	0.021
244	20.33	0.10	0.028	(0.034)	0.006	0.021
245	20.42	0.10	0.028	(0.034)	0.006	0.021
246	20.50	0.10	0.028	(0.034)	0.006	0.021
247	20.58	0.10	0.028	(0.034)	0.006	0.021
248	20.67	0.10	0.028	(0.034)	0.006	0.021
249	20.75	0.10	0.028	(0.034)	0.006	0.021
250	20.83	0.07	0.018	(0.034)	0.004	0.014
251	20.92	0.07	0.018	(0.033)	0.004	0.014
252	21.00	0.07	0.018	(0.033)	0.004	0.014
253	21.08	0.10	0.028	(0.033)	0.006	0.021
254	21.17	0.10	0.028	(0.033)	0.006	0.021
255	21.25	0.10	0.028	(0.033)	0.006	0.021
256	21.33	0.07	0.018	(0.033)	0.004	0.014
257	21.42	0.07	0.018	(0.033)	0.004	0.014
258	21.50	0.07	0.018	(0.033)	0.004	0.014
259	21.58	0.10	0.028	(0.032)	0.006	0.021
260	21.67	0.10	0.028	(0.032)	0.006	0.021
261	21.75	0.10	0.028	(0.032)	0.006	0.021
262	21.83	0.07	0.018	(0.032)	0.004	0.014
263	21.92	0.07	0.018	(0.032)	0.004	0.014
264	22.00	0.07	0.018	(0.032)	0.004	0.014
265	22.08	0.10	0.028	(0.032)	0.006	0.021
266	22.17	0.10	0.028	(0.032)	0.006	0.021
267	22.25	0.10	0.028	(0.032)	0.006	0.021
268	22.33	0.07	0.018	(0.031)	0.004	0.014
269	22.42	0.07	0.018	(0.031)	0.004	0.014
270	22.50	0.07	0.018	(0.031)	0.004	0.014
271	22.58	0.07	0.018	(0.031)	0.004	0.014
272	22.67	0.07	0.018	(0.031)	0.004	0.014
273	22.75	0.07	0.018	(0.031)	0.004	0.014
274	22.83	0.07	0.018	(0.031)	0.004	0.014
275	22.92	0.07	0.018	(0.031)	0.004	0.014
276	23.00	0.07	0.018	(0.031)	0.004	0.014
277	23.08	0.07	0.018	(0.031)	0.004	0.014
278	23.17	0.07	0.018	(0.031)	0.004	0.014
279	23.25	0.07	0.018	(0.031)	0.004	0.014
280	23.33	0.07	0.018	(0.031)	0.004	0.014
281	23.42	0.07	0.018	(0.030)	0.004	0.014
282	23.50	0.07	0.018	(0.030)	0.004	0.014
283	23.58	0.07	0.018	(0.030)	0.004	0.014
284	23.67	0.07	0.018	(0.030)	0.004	0.014
285	23.75	0.07	0.018	(0.030)	0.004	0.014
286	23.83	0.07	0.018	(0.030)	0.004	0.014
287	23.92	0.07	0.018	(0.030)	0.004	0.014
288	24.00	0.07	0.018	(0.030)	0.004	0.014

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.5

Flood volume = Effective rainfall 1.79(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)

```
Total soil loss =      0.51(In)
Total soil loss =     0.214(Ac.Ft)
Total rainfall =      2.30(In)
Flood volume =       32749.8 Cubic Feet
Total soil loss =       9328.8 Cubic Feet
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      1.312(CFS)
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   24 - H O U R   S T O R M
              R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0002      0.03  Q         |         |         |         |
  0+15       0.0006      0.05  Q         |         |         |         |
  0+20       0.0010      0.06  Q         |         |         |         |
  0+25       0.0015      0.08  Q         |         |         |         |
  0+30       0.0022      0.09  Q         |         |         |         |
  0+35       0.0029      0.10  Q         |         |         |         |
  0+40       0.0036      0.10  Q         |         |         |         |
  0+45       0.0043      0.11  Q         |         |         |         |
  0+50       0.0051      0.11  Q         |         |         |         |
  0+55       0.0059      0.12  Q         |         |         |         |
  1+ 0       0.0068      0.13  Q         |         |         |         |
  1+ 5       0.0078      0.14  Q         |         |         |         |
  1+10       0.0086      0.13  Q         |         |         |         |
  1+15       0.0094      0.12  Q         |         |         |         |
  1+20       0.0102      0.11  Q         |         |         |         |
  1+25       0.0110      0.11  Q         |         |         |         |
  1+30       0.0117      0.11  Q         |         |         |         |
  1+35       0.0125      0.11  Q         |         |         |         |
  1+40       0.0132      0.11  Q         |         |         |         |
  1+45       0.0140      0.11  Q         |         |         |         |
  1+50       0.0147      0.11  Q         |         |         |         |
  1+55       0.0156      0.12  Q         |         |         |         |
  2+ 0       0.0165      0.13  Q         |         |         |         |
  2+ 5       0.0174      0.14  Q         |         |         |         |
  2+10       0.0184      0.14  Q         |         |         |         |
  2+15       0.0194      0.14  QV        |         |         |         |
  2+20       0.0204      0.14  QV        |         |         |         |
  2+25       0.0213      0.14  QV        |         |         |         |
  2+30       0.0223      0.14  QV        |         |         |         |
  2+35       0.0233      0.15  QV        |         |         |         |
  2+40       0.0244      0.16  QV        |         |         |         |
  2+45       0.0256      0.17  QV        |         |         |         |
  2+50       0.0268      0.17  QV        |         |         |         |
  2+55       0.0280      0.18  QV        |         |         |         |
  3+ 0       0.0292      0.18  QV        |         |         |         |
  3+ 5       0.0305      0.18  QV        |         |         |         |
  3+10       0.0317      0.18  QV        |         |         |         |
  3+15       0.0329      0.18  QV        |         |         |         |
  3+20       0.0342      0.18  QV        |         |         |         |
```

```
3+25       0.0354      0.18  QV         |         |         |         |
3+30       0.0366      0.18  QV         |         |         |         |
3+35       0.0379      0.18  Q V        |         |         |         |
3+40       0.0391      0.18  Q V        |         |         |         |
3+45       0.0404      0.18  Q V        |         |         |         |
3+50       0.0416      0.18  Q V        |         |         |         |
3+55       0.0429      0.19  Q V        |         |         |         |
4+ 0       0.0444      0.21  Q V        |         |         |         |
4+ 5       0.0458      0.21  Q V        |         |         |         |
4+10       0.0473      0.21  Q V        |         |         |         |
4+15       0.0487      0.21  Q V        |         |         |         |
4+20       0.0502      0.22  Q V        |         |         |         |
4+25       0.0518      0.23  Q V        |         |         |         |
4+30       0.0535      0.24  Q V        |         |         |         |
4+35       0.0552      0.25  Q V        |         |         |         |
4+40       0.0569      0.25  Q  V       |         |         |         |
4+45       0.0586      0.25  Q  V       |         |         |         |
4+50       0.0603      0.25  |Q V       |         |         |         |
4+55       0.0622      0.26  |Q V       |         |         |         |
5+ 0       0.0641      0.28  |Q V       |         |         |         |
5+ 5       0.0660      0.28  |Q V       |         |         |         |
5+10       0.0677      0.26  |Q V       |         |         |         |
5+15       0.0694      0.23  Q  V       |         |         |         |
5+20       0.0709      0.23  Q  V       |         |         |         |
5+25       0.0726      0.24  Q  V       |         |         |         |
5+30       0.0742      0.24  Q  V       |         |         |         |
5+35       0.0760      0.25  Q   V      |         |         |         |
5+40       0.0778      0.26  |Q  V      |         |         |         |
5+45       0.0797      0.28  |Q  V      |         |         |         |
5+50       0.0816      0.28  |Q  V      |         |         |         |
5+55       0.0836      0.28  |Q  V      |         |         |         |
6+ 0       0.0855      0.29  |Q  V      |         |         |         |
6+ 5       0.0875      0.29  |Q  V      |         |         |         |
6+10       0.0896      0.30  |Q  V      |         |         |         |
6+15       0.0917      0.31  |Q  V      |         |         |         |
6+20       0.0939      0.32  |Q  V      |         |         |         |
6+25       0.0961      0.32  |Q   V     |         |         |         |
6+30       0.0984      0.32  |Q   V     |         |         |         |
6+35       0.1006      0.32  |Q   V     |         |         |         |
6+40       0.1029      0.34  |Q   V     |         |         |         |
6+45       0.1053      0.35  |Q   V     |         |         |         |
6+50       0.1077      0.35  |Q   V     |         |         |         |
6+55       0.1102      0.36  |Q   V     |         |         |         |
7+ 0       0.1127      0.36  |Q   V     |         |         |         |
7+ 5       0.1151      0.36  |Q    V    |         |         |         |
7+10       0.1176      0.36  |Q    V    |         |         |         |
7+15       0.1201      0.36  |Q    V    |         |         |         |
7+20       0.1226      0.36  |Q    V    |         |         |         |
7+25       0.1251      0.37  |Q    V    |         |         |         |
7+30       0.1278      0.39  |Q    V    |         |         |         |
7+35       0.1305      0.39  |Q    V    |         |         |         |
7+40       0.1333      0.41  |Q     V   |         |         |         |
7+45       0.1362      0.42  |Q     V   |         |         |         |
7+50       0.1391      0.43  |Q     V   |         |         |         |
7+55       0.1421      0.44  |Q     V   |         |         |         |
8+ 0       0.1453      0.46  |Q     V   |         |         |         |
8+ 5       0.1485      0.46  |Q     V   |         |         |         |
```

```
 8+10       0.1519      0.49  |Q      V |         |         |         |
 8+15       0.1554      0.52  | Q     V |         |         |         |
 8+20       0.1591      0.53  | Q     V |         |         |         |
 8+25       0.1627      0.53  | Q     V |         |         |         |
 8+30       0.1664      0.54  | Q     V |         |         |         |
 8+35       0.1701      0.54  | Q      V|         |         |         |
 8+40       0.1739      0.55  | Q      V|         |         |         |
 8+45       0.1778      0.56  | Q      V|         |         |         |
 8+50       0.1817      0.57  | Q      V|         |         |         |
 8+55       0.1858      0.59  | Q      V|         |         |         |
 9+ 0       0.1899      0.60  | Q       V         |         |         |
 9+ 5       0.1941      0.61  | Q       V         |         |         |
 9+10       0.1985      0.63  | Q       V         |         |         |
 9+15       0.2030      0.66  | Q       V         |         |         |
 9+20       0.2076      0.67  | Q       |V        |         |         |
 9+25       0.2124      0.69  | Q       |V        |         |         |
 9+30       0.2172      0.71  | Q       |V        |         |         |
 9+35       0.2222      0.71  | Q       |V        |         |         |
 9+40       0.2272      0.73  | Q       | V       |         |         |
 9+45       0.2323      0.74  | Q       | V       |         |         |
 9+50       0.2375      0.75  | Q       | V       |         |         |
 9+55       0.2427      0.76  |  Q      | V       |         |         |
10+ 0       0.2481      0.78  |  Q      |  V      |         |         |
10+ 5       0.2534      0.77  |  Q      |  V      |         |         |
10+10       0.2581      0.69  | Q       |  V      |         |         |
10+15       0.2623      0.61  | Q       |  V      |         |         |
10+20       0.2663      0.58  | Q       |   V     |         |         |
10+25       0.2702      0.56  | Q       |   V     |         |         |
10+30       0.2740      0.55  | Q       |   V     |         |         |
10+35       0.2778      0.56  | Q       |   V     |         |         |
10+40       0.2820      0.61  | Q       |    V    |         |         |
10+45       0.2866      0.67  | Q       |    V    |         |         |
10+50       0.2914      0.69  | Q       |    V    |         |         |
10+55       0.2962      0.70  | Q       |    V    |         |         |
11+ 0       0.3011      0.71  | Q       |     V   |         |         |
11+ 5       0.3060      0.71  | Q       |     V   |         |         |
11+10       0.3109      0.70  | Q       |     V   |         |         |
11+15       0.3156      0.69  | Q       |     V   |         |         |
11+20       0.3204      0.69  | Q       |      V  |         |         |
11+25       0.3251      0.69  | Q       |      V  |         |         |
11+30       0.3298      0.68  | Q       |      V  |         |         |
11+35       0.3345      0.68  | Q       |      V  |         |         |
11+40       0.3390      0.66  | Q       |       V |         |         |
11+45       0.3434      0.63  | Q       |       V |         |         |
11+50       0.3477      0.62  | Q       |       V |         |         |
11+55       0.3520      0.63  | Q       |       V |         |         |
12+ 0       0.3564      0.64  | Q       |       V |         |         |
12+ 5       0.3609      0.66  | Q       |        V|         |         |
12+10       0.3660      0.74  | Q       |        V|         |         |
12+15       0.3717      0.83  |  Q      |        V|         |         |
12+20       0.3777      0.86  |  Q      |         V         |         |
12+25       0.3838      0.89  |  Q      |         V         |         |
12+30       0.3901      0.91  |  Q      |         V         |         |
12+35       0.3965      0.93  |  Q      |         |V        |         |
12+40       0.4031      0.96  |  Q      |         |V        |         |
12+45       0.4100      1.00  |   Q     |         |V        |         |
12+50       0.4170      1.02  |   Q     |         | V       |         |
```

```
12+55       0.4242      1.04  |   Q     |         | V       |         |
13+ 0       0.4315      1.06  |   Q     |         | V       |         |
13+ 5       0.4390      1.09  |   Q     |         |  V      |         |
13+10       0.4470      1.17  |   Q     |         |  V      |         |
13+15       0.4557      1.25  |    Q    |         |   V     |         |
13+20       0.4645      1.28  |    Q    |         |   V     |         |
13+25       0.4734      1.30  |    Q    |         |    V    |         |
13+30       0.4825      1.31  |    Q    |         |    V    |         |
13+35       0.4914      1.29  |    Q    |         |     V   |         |
13+40       0.4992      1.13  |   Q     |         |     V   |         |
13+45       0.5058      0.97  |  Q      |         |     V   |         |
13+50       0.5120      0.91  |  Q      |         |      V  |         |
13+55       0.5180      0.87  |  Q      |         |      V  |         |
14+ 0       0.5239      0.85  |  Q      |         |      V  |         |
14+ 5       0.5297      0.85  |  Q      |         |       V |         |
14+10       0.5360      0.90  |  Q      |         |       V |         |
14+15       0.5426      0.96  |  Q      |         |       V |         |
14+20       0.5493      0.98  |  Q      |         |        V|         |
14+25       0.5561      0.98  |  Q      |         |        V|         |
14+30       0.5628      0.97  |  Q      |         |        V|         |
14+35       0.5694      0.97  |  Q      |         |         V         |
14+40       0.5761      0.97  |  Q      |         |         V         |
14+45       0.5828      0.97  |  Q      |         |         |V        |
14+50       0.5895      0.97  |  Q      |         |         |V        |
14+55       0.5960      0.95  |  Q      |         |         |V        |
15+ 0       0.6025      0.94  |  Q      |         |         | V       |
15+ 5       0.6089      0.93  |  Q      |         |         | V       |
15+10       0.6152      0.92  |  Q      |         |         | V       |
15+15       0.6214      0.90  |  Q      |         |         |  V      |
15+20       0.6276      0.89  |  Q      |         |         |  V      |
15+25       0.6336      0.87  |  Q      |         |         |  V      |
15+30       0.6395      0.86  |  Q      |         |         |   V     |
15+35       0.6453      0.84  |  Q      |         |         |   V     |
15+40       0.6507      0.79  |  Q      |         |         |   V     |
15+45       0.6557      0.73  | Q       |         |         |   V     |
15+50       0.6606      0.71  | Q       |         |         |    V    |
15+55       0.6654      0.70  | Q       |         |         |    V    |
16+ 0       0.6702      0.69  | Q       |         |         |    V    |
16+ 5       0.6747      0.66  | Q       |         |         |    V    |
16+10       0.6780      0.48  |Q        |         |         |     V   |
16+15       0.6800      0.30  |Q        |         |         |     V   |
16+20       0.6816      0.23  Q         |         |         |     V   |
16+25       0.6829      0.19  Q         |         |         |     V   |
16+30       0.6841      0.17  Q         |         |         |     V   |
16+35       0.6852      0.15  Q         |         |         |     V   |
16+40       0.6861      0.14  Q         |         |         |     V   |
16+45       0.6870      0.12  Q         |         |         |     V   |
16+50       0.6878      0.12  Q         |         |         |     V   |
16+55       0.6885      0.11  Q         |         |         |     V   |
17+ 0       0.6893      0.11  Q         |         |         |     V   |
17+ 5       0.6901      0.11  Q         |         |         |     V   |
17+10       0.6910      0.14  Q         |         |         |     V   |
17+15       0.6921      0.16  Q         |         |         |     V   |
17+20       0.6933      0.17  Q         |         |         |     V   |
17+25       0.6945      0.17  Q         |         |         |     V   |
17+30       0.6957      0.18  Q         |         |         |      V  |
17+35       0.6969      0.18  Q         |         |         |      V  |
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17+40       0.6981      0.18  Q         |         |         |      V  |
17+45       0.6994      0.18  Q         |         |         |      V  |
17+50       0.7006      0.18  Q         |         |         |      V  |
17+55       0.7017      0.17  Q         |         |         |      V  |
18+ 0       0.7028      0.15  Q         |         |         |      V  |
18+ 5       0.7038      0.15  Q         |         |         |      V  |
18+10       0.7048      0.15  Q         |         |         |      V  |
18+15       0.7058      0.15  Q         |         |         |      V  |
18+20       0.7068      0.14  Q         |         |         |      V  |
18+25       0.7078      0.14  Q         |         |         |      V  |
18+30       0.7088      0.14  Q         |         |         |      V  |
18+35       0.7098      0.14  Q         |         |         |      V  |
18+40       0.7107      0.13  Q         |         |         |      V  |
18+45       0.7115      0.12  Q         |         |         |      V  |
18+50       0.7123      0.11  Q         |         |         |      V  |
18+55       0.7129      0.10  Q         |         |         |      V  |
19+ 0       0.7135      0.08  Q         |         |         |      V  |
19+ 5       0.7141      0.08  Q         |         |         |      V  |
19+10       0.7147      0.09  Q         |         |         |       V |
19+15       0.7154      0.10  Q         |         |         |       V |
19+20       0.7161      0.11  Q         |         |         |       V |
19+25       0.7169      0.12  Q         |         |         |       V |
19+30       0.7178      0.13  Q         |         |         |       V |
19+35       0.7188      0.14  Q         |         |         |       V |
19+40       0.7196      0.13  Q         |         |         |       V |
19+45       0.7204      0.12  Q         |         |         |       V |
19+50       0.7212      0.11  Q         |         |         |       V |
19+55       0.7219      0.10  Q         |         |         |       V |
20+ 0       0.7224      0.08  Q         |         |         |       V |
20+ 5       0.7230      0.08  Q         |         |         |       V |
20+10       0.7236      0.09  Q         |         |         |       V |
20+15       0.7243      0.10  Q         |         |         |       V |
20+20       0.7250      0.10  Q         |         |         |       V |
20+25       0.7257      0.11  Q         |         |         |       V |
20+30       0.7264      0.11  Q         |         |         |       V |
20+35       0.7272      0.11  Q         |         |         |       V |
20+40       0.7279      0.11  Q         |         |         |       V |
20+45       0.7287      0.11  Q         |         |         |       V |
20+50       0.7294      0.11  Q         |         |         |       V |
20+55       0.7300      0.09  Q         |         |         |       V |
21+ 0       0.7306      0.08  Q         |         |         |       V |
21+ 5       0.7312      0.08  Q         |         |         |       V |
21+10       0.7318      0.09  Q         |         |         |       V |
21+15       0.7325      0.10  Q         |         |         |       V |
21+20       0.7331      0.10  Q         |         |         |        V|
21+25       0.7338      0.09  Q         |         |         |        V|
21+30       0.7343      0.08  Q         |         |         |        V|
21+35       0.7349      0.08  Q         |         |         |        V|
21+40       0.7355      0.09  Q         |         |         |        V|
21+45       0.7362      0.10  Q         |         |         |        V|
21+50       0.7369      0.10  Q         |         |         |        V|
21+55       0.7375      0.09  Q         |         |         |        V|
22+ 0       0.7380      0.08  Q         |         |         |        V|
22+ 5       0.7386      0.08  Q         |         |         |        V|
22+10       0.7392      0.09  Q         |         |         |        V|
22+15       0.7399      0.10  Q         |         |         |        V|
22+20       0.7406      0.10  Q         |         |         |        V|
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    22+25        0.7412       0.09  Q         |         |         |        V|
    22+30        0.7418       0.08  Q         |         |         |        V|
    22+35        0.7423       0.08  Q         |         |         |        V|
    22+40        0.7428       0.07  Q         |         |         |        V|
    22+45        0.7433       0.07  Q         |         |         |        V|
    22+50        0.7438       0.07  Q         |         |         |        V|
    22+55        0.7443       0.07  Q         |         |         |        V|
    23+ 0        0.7448       0.07  Q         |         |         |        V|
    23+ 5        0.7453       0.07  Q         |         |         |        V|
    23+10        0.7458       0.07  Q         |         |         |        V|
    23+15        0.7463       0.07  Q         |         |         |        V|
    23+20        0.7468       0.07  Q         |         |         |        V|
    23+25        0.7473       0.07  Q         |         |         |        V|
    23+30        0.7478       0.07  Q         |         |         |        V|
    23+35        0.7483       0.07  Q         |         |         |        V|
    23+40        0.7488       0.07  Q         |         |         |        V|
    23+45        0.7493       0.07  Q         |         |         |        V|
    23+50        0.7498       0.07  Q         |         |         |        V|
    23+55        0.7502       0.07  Q         |         |         |        V|
    24+ 0        0.7507       0.07  Q         |         |         |        V|
    24+ 5        0.7512       0.07  Q         |         |         |        V|
    24+10        0.7515       0.04  Q         |         |         |        V|
    24+15        0.7517       0.02  Q         |         |         |        V|
    24+20        0.7517       0.01  Q         |         |         |        V|
    24+25        0.7518       0.01  Q         |         |         |        V|
    24+30        0.7518       0.00  Q         |         |         |        V|
    24+35        0.7518       0.00  Q         |         |         |        V|
    24+40        0.7518       0.00  Q         |         |         |        V|
    24+45        0.7518       0.00  Q         |         |         |        V|
    24+50        0.7518       0.00  Q         |         |         |        V|
    24+55        0.7518       0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
```

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/20/15 File: 201501PRE62.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             1.30                   6.55

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             2.50                  12.60

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.300(In)
Area Averaged 100-Year Rainfall =    2.500(In)
```

Point rain (area averaged) = 1.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.078	(0.060)	0.018	0.060
2	0.17	0.60	0.094	(0.060)	0.022	0.072
3	0.25	0.60	0.094	(0.060)	0.022	0.072
4	0.33	0.60	0.094	(0.060)	0.022	0.072
5	0.42	0.60	0.094	(0.060)	0.022	0.072
6	0.50	0.70	0.109	(0.060)	0.025	0.084
7	0.58	0.70	0.109	(0.060)	0.025	0.084

8	0.67	0.70	0.109	(0.060)	0.025	0.084
9	0.75	0.70	0.109	(0.060)	0.025	0.084
10	0.83	0.70	0.109	(0.060)	0.025	0.084
11	0.92	0.70	0.109	(0.060)	0.025	0.084
12	1.00	0.80	0.125	(0.060)	0.029	0.096
13	1.08	0.80	0.125	(0.060)	0.029	0.096
14	1.17	0.80	0.125	(0.060)	0.029	0.096
15	1.25	0.80	0.125	(0.060)	0.029	0.096
16	1.33	0.80	0.125	(0.060)	0.029	0.096
17	1.42	0.80	0.125	(0.060)	0.029	0.096
18	1.50	0.80	0.125	(0.060)	0.029	0.096
19	1.58	0.80	0.125	(0.060)	0.029	0.096
20	1.67	0.80	0.125	(0.060)	0.029	0.096
21	1.75	0.80	0.125	(0.060)	0.029	0.096
22	1.83	0.80	0.125	(0.060)	0.029	0.096
23	1.92	0.80	0.125	(0.060)	0.029	0.096
24	2.00	0.90	0.140	(0.060)	0.032	0.108
25	2.08	0.80	0.125	(0.060)	0.029	0.096
26	2.17	0.90	0.140	(0.060)	0.032	0.108
27	2.25	0.90	0.140	(0.060)	0.032	0.108
28	2.33	0.90	0.140	(0.060)	0.032	0.108
29	2.42	0.90	0.140	(0.060)	0.032	0.108
30	2.50	0.90	0.140	(0.060)	0.032	0.108
31	2.58	0.90	0.140	(0.060)	0.032	0.108
32	2.67	0.90	0.140	(0.060)	0.032	0.108
33	2.75	1.00	0.156	(0.060)	0.036	0.120
34	2.83	1.00	0.156	(0.060)	0.036	0.120
35	2.92	1.00	0.156	(0.060)	0.036	0.120
36	3.00	1.00	0.156	(0.060)	0.036	0.120
37	3.08	1.00	0.156	(0.060)	0.036	0.120
38	3.17	1.10	0.172	(0.060)	0.040	0.132
39	3.25	1.10	0.172	(0.060)	0.040	0.132
40	3.33	1.10	0.172	(0.060)	0.040	0.132
41	3.42	1.20	0.187	(0.060)	0.043	0.144
42	3.50	1.30	0.203	(0.060)	0.047	0.156
43	3.58	1.40	0.218	(0.060)	0.050	0.168
44	3.67	1.40	0.218	(0.060)	0.050	0.168
45	3.75	1.50	0.234	(0.060)	0.054	0.180
46	3.83	1.50	0.234	(0.060)	0.054	0.180
47	3.92	1.60	0.250	(0.060)	0.058	0.192
48	4.00	1.60	0.250	(0.060)	0.058	0.192
49	4.08	1.70	0.265	0.060	(0.061)	0.205
50	4.17	1.80	0.281	0.060	(0.065)	0.220
51	4.25	1.90	0.296	0.060	(0.069)	0.236
52	4.33	2.00	0.312	0.060	(0.072)	0.252
53	4.42	2.10	0.328	0.060	(0.076)	0.267
54	4.50	2.10	0.328	0.060	(0.076)	0.267
55	4.58	2.20	0.343	0.060	(0.079)	0.283
56	4.67	2.30	0.359	0.060	(0.083)	0.298
57	4.75	2.40	0.374	0.060	(0.087)	0.314
58	4.83	2.40	0.374	0.060	(0.087)	0.314
59	4.92	2.50	0.390	0.060	(0.090)	0.330
60	5.00	2.60	0.406	0.060	(0.094)	0.345
61	5.08	3.10	0.484	0.060	(0.112)	0.423
62	5.17	3.60	0.562	0.060	(0.130)	0.501
63	5.25	3.90	0.608	0.060	(0.141)	0.548
64	5.33	4.20	0.655	0.060	(0.151)	0.595

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65   5.42     4.70      0.733          0.060    (  0.170)        0.673
66   5.50     5.60      0.874          0.060    (  0.202)        0.813
67   5.58     1.90      0.296          0.060    (  0.069)        0.236
68   5.67     0.90      0.140       (  0.060)       0.032        0.108
69   5.75     0.60      0.094       (  0.060)       0.022        0.072
70   5.83     0.50      0.078       (  0.060)       0.018        0.060
71   5.92     0.30      0.047       (  0.060)       0.011        0.036
72   6.00     0.20      0.031       (  0.060)       0.007        0.024
           (Loss Rate Not Used)
   Sum =     100.0                                   Sum =    12.8
    Flood volume = Effective rainfall      1.06(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
    Total soil loss =      0.24(In)
    Total soil loss =     0.100(Ac.Ft)
    Total rainfall =      1.30(In)
    Flood volume =       19448.9 Cubic Feet
    Total soil loss =       4334.4 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      3.323(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.02  Q         |         |         |         |
  0+10       0.0009      0.12  Q         |         |         |         |
  0+15       0.0026      0.24  Q         |         |         |         |
  0+20       0.0047      0.30  VQ        |         |         |         |
  0+25       0.0069      0.33  VQ        |         |         |         |
  0+30       0.0093      0.35  VQ        |         |         |         |
  0+35       0.0120      0.38  |Q        |         |         |         |
  0+40       0.0147      0.40  |Q        |         |         |         |
  0+45       0.0176      0.41  |Q        |         |         |         |
  0+50       0.0205      0.42  |Q        |         |         |         |
  0+55       0.0234      0.42  |QV       |         |         |         |
  1+ 0       0.0263      0.43  |QV       |         |         |         |
  1+ 5       0.0294      0.45  |QV       |         |         |         |
  1+10       0.0327      0.47  |QV       |         |         |         |
  1+15       0.0359      0.48  |Q V      |         |         |         |
  1+20       0.0393      0.48  |Q V      |         |         |         |
  1+25       0.0426      0.48  |Q V      |         |         |         |
  1+30       0.0460      0.49  |Q  V     |         |         |         |
  1+35       0.0493      0.49  |Q  V     |         |         |         |
  1+40       0.0527      0.49  |Q  V     |         |         |         |
  1+45       0.0560      0.49  |Q   V    |         |         |         |
  1+50       0.0594      0.49  |Q   V    |         |         |         |
  1+55       0.0627      0.49  |Q   V    |         |         |         |
  2+ 0       0.0661      0.49  |Q   V    |         |         |         |
  2+ 5       0.0696      0.51  | Q   V   |         |         |         |
  2+10       0.0731      0.51  | Q   V   |         |         |         |
  2+15       0.0767      0.52  | Q   V   |         |         |         |
  2+20       0.0804      0.54  | Q    V  |         |         |         |
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    2+25       0.0841      0.54  | Q    V  |         |         |         |
    2+30       0.0879      0.54  | Q    V  |         |         |         |
    2+35       0.0916      0.55  | Q     V |         |         |         |
    2+40       0.0954      0.55  | Q     V |         |         |         |
    2+45       0.0992      0.55  | Q     V |         |         |         |
    2+50       0.1031      0.57  | Q      V|         |         |         |
    2+55       0.1072      0.59  | Q      V|         |         |         |
    3+ 0       0.1113      0.60  | Q      V|         |         |         |
    3+ 5       0.1155      0.60  | Q       V         |         |         |
    3+10       0.1197      0.61  | Q       V         |         |         |
    3+15       0.1240      0.63  | Q       |V        |         |         |
    3+20       0.1285      0.65  | Q       |V        |         |         |
    3+25       0.1331      0.66  | Q       |V        |         |         |
    3+30       0.1379      0.69  | Q       | V       |         |         |
    3+35       0.1430      0.74  | Q       | V       |         |         |
    3+40       0.1484      0.79  |  Q      |  V      |         |         |
    3+45       0.1540      0.82  |  Q      |  V      |         |         |
    3+50       0.1600      0.86  |  Q      |   V     |         |         |
    3+55       0.1661      0.89  |  Q      |   V     |         |         |
    4+ 0       0.1724      0.92  |  Q      |    V    |         |         |
    4+ 5       0.1790      0.95  |  Q      |     V   |         |         |
    4+10       0.1858      0.99  |  Q      |     V   |         |         |
    4+15       0.1931      1.05  |   Q     |      V  |         |         |
    4+20       0.2008      1.12  |   Q     |      V  |         |         |
    4+25       0.2090      1.19  |   Q     |       V |         |         |
    4+30       0.2176      1.26  |    Q    |        V|         |         |
    4+35       0.2267      1.31  |    Q    |         V         |         |
    4+40       0.2361      1.37  |    Q    |         |V        |         |
    4+45       0.2460      1.43  |    Q    |         | V       |         |
    4+50       0.2563      1.50  |     Q   |         | V       |         |
    4+55       0.2670      1.55  |     Q   |         |  V      |         |
    5+ 0       0.2781      1.60  |     Q   |         |   V     |         |
    5+ 5       0.2897      1.69  |     Q   |         |    V    |         |
    5+10       0.3027      1.89  |      Q  |         |      V  |         |
    5+15       0.3177      2.18  |       Q |         |       V |         |
    5+20       0.3347      2.46  |        Q|         |        V|         |
    5+25       0.3535      2.73  |         Q         |         |V        |
    5+30       0.3745      3.05  |         | Q       |         |  V      |
    5+35       0.3974      3.32  |         |  Q      |         |    V    |
    5+40       0.4157      2.67  |         Q         |         |      V  |
    5+45       0.4267      1.59  |     Q   |         |         |       V |
    5+50       0.4338      1.03  |   Q     |         |         |       V |
    5+55       0.4386      0.70  | Q       |         |         |        V|
    6+ 0       0.4419      0.47  |Q        |         |         |        V|
    6+ 5       0.4439      0.30  |Q        |         |         |        V|
    6+10       0.4451      0.18  Q         |         |         |        V|
    6+15       0.4458      0.09  Q         |         |         |        V|
    6+20       0.4461      0.05  Q         |         |         |        V|
    6+25       0.4463      0.03  Q         |         |         |        V|
    6+30       0.4464      0.01  Q         |         |         |        V|
    6+35       0.4464      0.01  Q         |         |         |        V|
    6+40       0.4465      0.00  Q         |         |         |        V|
    6+45       0.4465      0.00  Q         |         |         |        V|
    6+50       0.4465      0.00  Q         |         |         |        V|
    6+55       0.4465      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE32.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 0.850(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.850(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.133	(0.060)	0.031	0.102
2	0.17	1.30	0.133	(0.060)	0.031	0.102
3	0.25	1.10	0.112	(0.060)	0.026	0.086
4	0.33	1.50	0.153	(0.060)	0.035	0.118
5	0.42	1.50	0.153	(0.060)	0.035	0.118
6	0.50	1.80	0.184	(0.060)	0.042	0.141
7	0.58	1.50	0.153	(0.060)	0.035	0.118

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 8   0.67     1.80      0.184       (  0.060)      0.042        0.141
 9   0.75     1.80      0.184       (  0.060)      0.042        0.141
10   0.83     1.50      0.153       (  0.060)      0.035        0.118
11   0.92     1.60      0.163       (  0.060)      0.038        0.125
12   1.00     1.80      0.184       (  0.060)      0.042        0.141
13   1.08     2.20      0.224       (  0.060)      0.052        0.173
14   1.17     2.20      0.224       (  0.060)      0.052        0.173
15   1.25     2.20      0.224       (  0.060)      0.052        0.173
16   1.33     2.00      0.204       (  0.060)      0.047        0.157
17   1.42     2.60      0.265          0.060    (  0.061)       0.205
18   1.50     2.70      0.275          0.060    (  0.064)       0.215
19   1.58     2.40      0.245       (  0.060)      0.057        0.188
20   1.67     2.70      0.275          0.060    (  0.064)       0.215
21   1.75     3.30      0.337          0.060    (  0.078)       0.276
22   1.83     3.10      0.316          0.060    (  0.073)       0.256
23   1.92     2.90      0.296          0.060    (  0.068)       0.235
24   2.00     3.00      0.306          0.060    (  0.071)       0.246
25   2.08     3.10      0.316          0.060    (  0.073)       0.256
26   2.17     4.20      0.428          0.060    (  0.099)       0.368
27   2.25     5.00      0.510          0.060    (  0.118)       0.450
28   2.33     3.50      0.357          0.060    (  0.083)       0.297
29   2.42     6.80      0.694          0.060    (  0.160)       0.633
30   2.50     7.30      0.745          0.060    (  0.172)       0.684
31   2.58     8.20      0.836          0.060    (  0.193)       0.776
32   2.67     5.90      0.602          0.060    (  0.139)       0.541
33   2.75     2.00      0.204       (  0.060)      0.047        0.157
34   2.83     1.80      0.184       (  0.060)      0.042        0.141
35   2.92     1.80      0.184       (  0.060)      0.042        0.141
36   3.00     0.60      0.061       (  0.060)      0.014        0.047
           (Loss Rate Not Used)
   Sum =     100.0                                 Sum =     8.5
    Flood volume = Effective rainfall      0.70(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
    Total soil loss =      0.15(In)
    Total soil loss =     0.061(Ac.Ft)
    Total rainfall =      0.85(In)
    Flood volume =       12885.4 Cubic Feet
    Total soil loss =       2665.1 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      3.276(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0016      0.20  Q         |         |         |         |
  0+15       0.0041      0.37  VQ        |         |         |         |
  0+20       0.0069      0.41  VQ        |         |         |         |
  0+25       0.0102      0.48  |Q        |         |         |         |
  0+30       0.0140      0.55  |VQ       |         |         |         |
  0+35       0.0182      0.61  | Q       |         |         |         |
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    0+40       0.0225      0.63  | QV      |         |         |         |
    0+45       0.0269      0.65  | QV      |         |         |         |
    0+50       0.0316      0.68  | Q V     |         |         |         |
    0+55       0.0362      0.66  | Q V     |         |         |         |
    1+ 0       0.0406      0.64  | Q  V    |         |         |         |
    1+ 5       0.0453      0.68  | Q   V   |         |         |         |
    1+10       0.0505      0.76  |  Q  V   |         |         |         |
    1+15       0.0561      0.82  |  Q   V  |         |         |         |
    1+20       0.0619      0.84  |  Q    V |         |         |         |
    1+25       0.0677      0.84  |  Q     V|         |         |         |
    1+30       0.0739      0.91  |  Q     V|         |         |         |
    1+35       0.0808      0.99  |  Q      V         |         |         |
    1+40       0.0877      1.00  |  Q      |V        |         |         |
    1+45       0.0948      1.04  |   Q     | V       |         |         |
    1+50       0.1029      1.17  |   Q     |  V      |         |         |
    1+55       0.1115      1.25  |    Q    |    V    |         |         |
    2+ 0       0.1200      1.23  |   Q     |     V   |         |         |
    2+ 5       0.1285      1.23  |   Q     |      V  |         |         |
    2+10       0.1374      1.29  |    Q    |       V |         |         |
    2+15       0.1479      1.52  |     Q   |        V|         |         |
    2+20       0.1604      1.81  |      Q  |         |V        |         |
    2+25       0.1732      1.87  |      Q  |         |  V      |         |
    2+30       0.1889      2.27  |        Q|         |    V    |         |
    2+35       0.2090      2.92  |         |Q        |       V |         |
    2+40       0.2316      3.28  |         |  Q      |         |V        |
    2+45       0.2527      3.07  |         | Q       |         |   V     |
    2+50       0.2677      2.17  |       Q |         |         |     V   |
    2+55       0.2774      1.42  |    Q    |         |         |      V  |
    3+ 0       0.2849      1.08  |   Q     |         |         |       V |
    3+ 5       0.2900      0.74  | Q       |         |         |        V|
    3+10       0.2927      0.39  |Q        |         |         |        V|
    3+15       0.2941      0.20  Q         |         |         |        V|
    3+20       0.2949      0.12  Q         |         |         |        V|
    3+25       0.2954      0.07  Q         |         |         |        V|
    3+30       0.2956      0.03  Q         |         |         |        V|
    3+35       0.2957      0.02  Q         |         |         |        V|
    3+40       0.2958      0.01  Q         |         |         |        V|
    3+45       0.2958      0.00  Q         |         |         |        V|
    3+50       0.2958      0.00  Q         |         |         |        V|
    3+55       0.2958      0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/20/15 File: 201501PRE12.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.50	2.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.20	6.05

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	60.694	5.690		0.289
2	0.167	121.389	32.349		1.643
3	0.250	182.083	33.711		1.712
4	0.333	242.777	12.272		0.623
5	0.417	303.472	7.080		0.360
6	0.500	364.166	4.248		0.216
7	0.583	424.860	2.304		0.117
8	0.667	485.555	0.888		0.045
9	0.750	546.249	0.547		0.028
10	0.833	606.943	0.423		0.021
11	0.917	667.638	0.333		0.017
12	1.000	728.332	0.156		0.008
			Sum = 100.000	Sum=	5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.198	(0.060)	0.046	0.152
2	0.17	4.20	0.252	(0.060)	0.058	0.194
3	0.25	4.40	0.264	0.060	(0.061)	0.204
4	0.33	4.80	0.288	0.060	(0.067)	0.228
5	0.42	5.20	0.312	0.060	(0.072)	0.252

```
  6   0.50     6.20      0.372          0.060    (  0.086)        0.312
  7   0.58     6.80      0.408          0.060    (  0.094)        0.348
  8   0.67     8.80      0.528          0.060    (  0.122)        0.468
  9   0.75    13.90      0.834          0.060    (  0.193)        0.774
 10   0.83    31.40      1.884          0.060    (  0.436)        1.823
 11   0.92     7.20      0.432          0.060    (  0.100)        0.372
 12   1.00     3.80      0.228       (  0.060)       0.053        0.175
           (Loss Rate Not Used)
    Sum =     100.0                                 Sum =     5.3
     Flood volume = Effective rainfall      0.44(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.2(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.025(Ac.Ft)
     Total rainfall =      0.50(In)
     Flood volume =        8079.2 Cubic Feet
     Total soil loss =       1067.9 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      4.967(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0003      0.04  Q         |         |         |         |
   0+10       0.0024      0.31  VQ        |         |         |         |
   0+15       0.0068      0.64  |VQ       |         |         |         |
   0+20       0.0125      0.83  | VQ      |         |         |         |
   0+25       0.0192      0.97  |  QV     |         |         |         |
   0+30       0.0269      1.12  |   QV    |         |         |         |
   0+35       0.0360      1.32  |    Q V  |         |         |         |
   0+40       0.0467      1.55  |     Q   V         |         |         |
   0+45       0.0602      1.96  |      Q  | V       |         |         |
   0+50       0.0810      3.03  |         | Q    V  |         |         |
   0+55       0.1152      4.97  |         |       Q|   V     |         |
   1+ 0       0.1468      4.57  |         |      Q  |         |V        |
   1+ 5       0.1641      2.51  |         Q         |         |    V    |
   1+10       0.1740      1.45  |    Q    |         |         |      V  |
   1+15       0.1793      0.77  |  Q      |         |         |       V |
   1+20       0.1822      0.42  |Q        |         |         |        V|
   1+25       0.1836      0.20  Q         |         |         |        V|
   1+30       0.1844      0.12  Q         |         |         |        V|
   1+35       0.1849      0.07  Q         |         |         |        V|
   1+40       0.1853      0.05  Q         |         |         |        V|
   1+45       0.1854      0.02  Q         |         |         |        V|
   1+50       0.1855      0.01  Q         |         |         |        V|
   1+55       0.1855      0.00  Q         |         |         |        V|
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Proposed Conditions Unit Hydrograph: 100yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 5.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 5.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.040	(0.113)	0.010	0.030
2	0.17	0.07	0.040	(0.113)	0.010	0.030
3	0.25	0.07	0.040	(0.112)	0.010	0.030
4	0.33	0.10	0.060	(0.112)	0.015	0.045
5	0.42	0.10	0.060	(0.111)	0.015	0.045
6	0.50	0.10	0.060	(0.111)	0.015	0.045
7	0.58	0.10	0.060	(0.110)	0.015	0.045

8	0.67	0.10	0.060	(0.110)	0.015	0.045
9	0.75	0.10	0.060	(0.109)	0.015	0.045
10	0.83	0.13	0.080	(0.109)	0.019	0.061
11	0.92	0.13	0.080	(0.109)	0.019	0.061
12	1.00	0.13	0.080	(0.108)	0.019	0.061
13	1.08	0.10	0.060	(0.108)	0.015	0.045
14	1.17	0.10	0.060	(0.107)	0.015	0.045
15	1.25	0.10	0.060	(0.107)	0.015	0.045
16	1.33	0.10	0.060	(0.106)	0.015	0.045
17	1.42	0.10	0.060	(0.106)	0.015	0.045
18	1.50	0.10	0.060	(0.106)	0.015	0.045
19	1.58	0.10	0.060	(0.105)	0.015	0.045
20	1.67	0.10	0.060	(0.105)	0.015	0.045
21	1.75	0.10	0.060	(0.104)	0.015	0.045
22	1.83	0.13	0.080	(0.104)	0.019	0.061
23	1.92	0.13	0.080	(0.104)	0.019	0.061
24	2.00	0.13	0.080	(0.103)	0.019	0.061
25	2.08	0.13	0.080	(0.103)	0.019	0.061
26	2.17	0.13	0.080	(0.102)	0.019	0.061
27	2.25	0.13	0.080	(0.102)	0.019	0.061
28	2.33	0.13	0.080	(0.101)	0.019	0.061
29	2.42	0.13	0.080	(0.101)	0.019	0.061
30	2.50	0.13	0.080	(0.101)	0.019	0.061
31	2.58	0.17	0.100	(0.100)	0.024	0.076
32	2.67	0.17	0.100	(0.100)	0.024	0.076
33	2.75	0.17	0.100	(0.099)	0.024	0.076
34	2.83	0.17	0.100	(0.099)	0.024	0.076
35	2.92	0.17	0.100	(0.099)	0.024	0.076
36	3.00	0.17	0.100	(0.098)	0.024	0.076
37	3.08	0.17	0.100	(0.098)	0.024	0.076
38	3.17	0.17	0.100	(0.097)	0.024	0.076
39	3.25	0.17	0.100	(0.097)	0.024	0.076
40	3.33	0.17	0.100	(0.097)	0.024	0.076
41	3.42	0.17	0.100	(0.096)	0.024	0.076
42	3.50	0.17	0.100	(0.096)	0.024	0.076
43	3.58	0.17	0.100	(0.095)	0.024	0.076
44	3.67	0.17	0.100	(0.095)	0.024	0.076
45	3.75	0.17	0.100	(0.095)	0.024	0.076
46	3.83	0.20	0.120	(0.094)	0.029	0.091
47	3.92	0.20	0.120	(0.094)	0.029	0.091
48	4.00	0.20	0.120	(0.093)	0.029	0.091
49	4.08	0.20	0.120	(0.093)	0.029	0.091
50	4.17	0.20	0.120	(0.093)	0.029	0.091
51	4.25	0.20	0.120	(0.092)	0.029	0.091
52	4.33	0.23	0.140	(0.092)	0.034	0.106
53	4.42	0.23	0.140	(0.091)	0.034	0.106
54	4.50	0.23	0.140	(0.091)	0.034	0.106
55	4.58	0.23	0.140	(0.091)	0.034	0.106
56	4.67	0.23	0.140	(0.090)	0.034	0.106
57	4.75	0.23	0.140	(0.090)	0.034	0.106
58	4.83	0.27	0.160	(0.089)	0.039	0.121
59	4.92	0.27	0.160	(0.089)	0.039	0.121
60	5.00	0.27	0.160	(0.089)	0.039	0.121
61	5.08	0.20	0.120	(0.088)	0.029	0.091
62	5.17	0.20	0.120	(0.088)	0.029	0.091
63	5.25	0.20	0.120	(0.087)	0.029	0.091
64	5.33	0.23	0.140	(0.087)	0.034	0.106

65	5.42	0.23	0.140	(0.087)	0.034	0.106
66	5.50	0.23	0.140	(0.086)	0.034	0.106
67	5.58	0.27	0.160	(0.086)	0.039	0.121
68	5.67	0.27	0.160	(0.086)	0.039	0.121
69	5.75	0.27	0.160	(0.085)	0.039	0.121
70	5.83	0.27	0.160	(0.085)	0.039	0.121
71	5.92	0.27	0.160	(0.084)	0.039	0.121
72	6.00	0.27	0.160	(0.084)	0.039	0.121
73	6.08	0.30	0.180	(0.084)	0.044	0.136
74	6.17	0.30	0.180	(0.083)	0.044	0.136
75	6.25	0.30	0.180	(0.083)	0.044	0.136
76	6.33	0.30	0.180	(0.083)	0.044	0.136
77	6.42	0.30	0.180	(0.082)	0.044	0.136
78	6.50	0.30	0.180	(0.082)	0.044	0.136
79	6.58	0.33	0.200	(0.081)	0.049	0.151
80	6.67	0.33	0.200	(0.081)	0.049	0.151
81	6.75	0.33	0.200	(0.081)	0.049	0.151
82	6.83	0.33	0.200	(0.080)	0.049	0.151
83	6.92	0.33	0.200	(0.080)	0.049	0.151
84	7.00	0.33	0.200	(0.080)	0.049	0.151
85	7.08	0.33	0.200	(0.079)	0.049	0.151
86	7.17	0.33	0.200	(0.079)	0.049	0.151
87	7.25	0.33	0.200	(0.079)	0.049	0.151
88	7.33	0.37	0.220	(0.078)	0.054	0.166
89	7.42	0.37	0.220	(0.078)	0.054	0.166
90	7.50	0.37	0.220	(0.078)	0.054	0.166
91	7.58	0.40	0.240	(0.077)	0.058	0.182
92	7.67	0.40	0.240	(0.077)	0.058	0.182
93	7.75	0.40	0.240	(0.076)	0.058	0.182
94	7.83	0.43	0.260	(0.076)	0.063	0.197
95	7.92	0.43	0.260	(0.076)	0.063	0.197
96	8.00	0.43	0.260	(0.075)	0.063	0.197
97	8.08	0.50	0.300	(0.075)	0.073	0.227
98	8.17	0.50	0.300	(0.075)	0.073	0.227
99	8.25	0.50	0.300	(0.074)	0.073	0.227
100	8.33	0.50	0.300	(0.074)	0.073	0.227
101	8.42	0.50	0.300	(0.074)	0.073	0.227
102	8.50	0.50	0.300	(0.073)	0.073	0.227
103	8.58	0.53	0.320	0.073	(0.078)	0.247
104	8.67	0.53	0.320	0.073	(0.078)	0.247
105	8.75	0.53	0.320	0.072	(0.078)	0.248
106	8.83	0.57	0.340	0.072	(0.083)	0.268
107	8.92	0.57	0.340	0.072	(0.083)	0.268
108	9.00	0.57	0.340	0.071	(0.083)	0.269
109	9.08	0.63	0.380	0.071	(0.092)	0.309
110	9.17	0.63	0.380	0.071	(0.092)	0.309
111	9.25	0.63	0.380	0.070	(0.092)	0.310
112	9.33	0.67	0.400	0.070	(0.097)	0.330
113	9.42	0.67	0.400	0.070	(0.097)	0.330
114	9.50	0.67	0.400	0.069	(0.097)	0.331
115	9.58	0.70	0.420	0.069	(0.102)	0.351
116	9.67	0.70	0.420	0.069	(0.102)	0.351
117	9.75	0.70	0.420	0.068	(0.102)	0.352
118	9.83	0.73	0.440	0.068	(0.107)	0.372
119	9.92	0.73	0.440	0.068	(0.107)	0.372
120	10.00	0.73	0.440	0.067	(0.107)	0.373
121	10.08	0.50	0.300	0.067	(0.073)	0.233

122	10.17	0.50	0.300	0.067	(0.073)	0.233
123	10.25	0.50	0.300	0.066	(0.073)	0.234
124	10.33	0.50	0.300	0.066	(0.073)	0.234
125	10.42	0.50	0.300	0.066	(0.073)	0.234
126	10.50	0.50	0.300	0.065	(0.073)	0.235
127	10.58	0.67	0.400	0.065	(0.097)	0.335
128	10.67	0.67	0.400	0.065	(0.097)	0.335
129	10.75	0.67	0.400	0.064	(0.097)	0.336
130	10.83	0.67	0.400	0.064	(0.097)	0.336
131	10.92	0.67	0.400	0.064	(0.097)	0.336
132	11.00	0.67	0.400	0.063	(0.097)	0.337
133	11.08	0.63	0.380	0.063	(0.092)	0.317
134	11.17	0.63	0.380	0.063	(0.092)	0.317
135	11.25	0.63	0.380	0.063	(0.092)	0.317
136	11.33	0.63	0.380	0.062	(0.092)	0.318
137	11.42	0.63	0.380	0.062	(0.092)	0.318
138	11.50	0.63	0.380	0.062	(0.092)	0.318
139	11.58	0.57	0.340	0.061	(0.083)	0.279
140	11.67	0.57	0.340	0.061	(0.083)	0.279
141	11.75	0.57	0.340	0.061	(0.083)	0.279
142	11.83	0.60	0.360	0.060	(0.088)	0.300
143	11.92	0.60	0.360	0.060	(0.088)	0.300
144	12.00	0.60	0.360	0.060	(0.088)	0.300
145	12.08	0.83	0.500	0.059	(0.122)	0.441
146	12.17	0.83	0.500	0.059	(0.122)	0.441
147	12.25	0.83	0.500	0.059	(0.122)	0.441
148	12.33	0.87	0.520	0.059	(0.126)	0.461
149	12.42	0.87	0.520	0.058	(0.126)	0.462
150	12.50	0.87	0.520	0.058	(0.126)	0.462
151	12.58	0.93	0.560	0.058	(0.136)	0.502
152	12.67	0.93	0.560	0.057	(0.136)	0.503
153	12.75	0.93	0.560	0.057	(0.136)	0.503
154	12.83	0.97	0.580	0.057	(0.141)	0.523
155	12.92	0.97	0.580	0.057	(0.141)	0.523
156	13.00	0.97	0.580	0.056	(0.141)	0.524
157	13.08	1.13	0.680	0.056	(0.165)	0.624
158	13.17	1.13	0.680	0.056	(0.165)	0.624
159	13.25	1.13	0.680	0.055	(0.165)	0.625
160	13.33	1.13	0.680	0.055	(0.165)	0.625
161	13.42	1.13	0.680	0.055	(0.165)	0.625
162	13.50	1.13	0.680	0.055	(0.165)	0.625
163	13.58	0.77	0.460	0.054	(0.112)	0.406
164	13.67	0.77	0.460	0.054	(0.112)	0.406
165	13.75	0.77	0.460	0.054	(0.112)	0.406
166	13.83	0.77	0.460	0.053	(0.112)	0.407
167	13.92	0.77	0.460	0.053	(0.112)	0.407
168	14.00	0.77	0.460	0.053	(0.112)	0.407
169	14.08	0.90	0.540	0.053	(0.131)	0.487
170	14.17	0.90	0.540	0.052	(0.131)	0.488
171	14.25	0.90	0.540	0.052	(0.131)	0.488
172	14.33	0.87	0.520	0.052	(0.126)	0.468
173	14.42	0.87	0.520	0.052	(0.126)	0.468
174	14.50	0.87	0.520	0.051	(0.126)	0.469
175	14.58	0.87	0.520	0.051	(0.126)	0.469
176	14.67	0.87	0.520	0.051	(0.126)	0.469
177	14.75	0.87	0.520	0.051	(0.126)	0.469
178	14.83	0.83	0.500	0.050	(0.122)	0.450

179	14.92	0.83	0.500	0.050	(0.122)	0.450
180	15.00	0.83	0.500	0.050	(0.122)	0.450
181	15.08	0.80	0.480	0.050	(0.117)	0.430
182	15.17	0.80	0.480	0.049	(0.117)	0.431
183	15.25	0.80	0.480	0.049	(0.117)	0.431
184	15.33	0.77	0.460	0.049	(0.112)	0.411
185	15.42	0.77	0.460	0.048	(0.112)	0.411
186	15.50	0.77	0.460	0.048	(0.112)	0.412
187	15.58	0.63	0.380	0.048	(0.092)	0.332
188	15.67	0.63	0.380	0.048	(0.092)	0.332
189	15.75	0.63	0.380	0.048	(0.092)	0.332
190	15.83	0.63	0.380	0.047	(0.092)	0.333
191	15.92	0.63	0.380	0.047	(0.092)	0.333
192	16.00	0.63	0.380	0.047	(0.092)	0.333
193	16.08	0.13	0.080	(0.047)	0.019	0.061
194	16.17	0.13	0.080	(0.046)	0.019	0.061
195	16.25	0.13	0.080	(0.046)	0.019	0.061
196	16.33	0.13	0.080	(0.046)	0.019	0.061
197	16.42	0.13	0.080	(0.046)	0.019	0.061
198	16.50	0.13	0.080	(0.045)	0.019	0.061
199	16.58	0.10	0.060	(0.045)	0.015	0.045
200	16.67	0.10	0.060	(0.045)	0.015	0.045
201	16.75	0.10	0.060	(0.045)	0.015	0.045
202	16.83	0.10	0.060	(0.044)	0.015	0.045
203	16.92	0.10	0.060	(0.044)	0.015	0.045
204	17.00	0.10	0.060	(0.044)	0.015	0.045
205	17.08	0.17	0.100	(0.044)	0.024	0.076
206	17.17	0.17	0.100	(0.044)	0.024	0.076
207	17.25	0.17	0.100	(0.043)	0.024	0.076
208	17.33	0.17	0.100	(0.043)	0.024	0.076
209	17.42	0.17	0.100	(0.043)	0.024	0.076
210	17.50	0.17	0.100	(0.043)	0.024	0.076
211	17.58	0.17	0.100	(0.042)	0.024	0.076
212	17.67	0.17	0.100	(0.042)	0.024	0.076
213	17.75	0.17	0.100	(0.042)	0.024	0.076
214	17.83	0.13	0.080	(0.042)	0.019	0.061
215	17.92	0.13	0.080	(0.042)	0.019	0.061
216	18.00	0.13	0.080	(0.041)	0.019	0.061
217	18.08	0.13	0.080	(0.041)	0.019	0.061
218	18.17	0.13	0.080	(0.041)	0.019	0.061
219	18.25	0.13	0.080	(0.041)	0.019	0.061
220	18.33	0.13	0.080	(0.041)	0.019	0.061
221	18.42	0.13	0.080	(0.040)	0.019	0.061
222	18.50	0.13	0.080	(0.040)	0.019	0.061
223	18.58	0.10	0.060	(0.040)	0.015	0.045
224	18.67	0.10	0.060	(0.040)	0.015	0.045
225	18.75	0.10	0.060	(0.040)	0.015	0.045
226	18.83	0.07	0.040	(0.039)	0.010	0.030
227	18.92	0.07	0.040	(0.039)	0.010	0.030
228	19.00	0.07	0.040	(0.039)	0.010	0.030
229	19.08	0.10	0.060	(0.039)	0.015	0.045
230	19.17	0.10	0.060	(0.039)	0.015	0.045
231	19.25	0.10	0.060	(0.039)	0.015	0.045
232	19.33	0.13	0.080	(0.038)	0.019	0.061
233	19.42	0.13	0.080	(0.038)	0.019	0.061
234	19.50	0.13	0.080	(0.038)	0.019	0.061
235	19.58	0.10	0.060	(0.038)	0.015	0.045

236	19.67	0.10	0.060	(0.038)	0.015	0.045
237	19.75	0.10	0.060	(0.037)	0.015	0.045
238	19.83	0.07	0.040	(0.037)	0.010	0.030
239	19.92	0.07	0.040	(0.037)	0.010	0.030
240	20.00	0.07	0.040	(0.037)	0.010	0.030
241	20.08	0.10	0.060	(0.037)	0.015	0.045
242	20.17	0.10	0.060	(0.037)	0.015	0.045
243	20.25	0.10	0.060	(0.037)	0.015	0.045
244	20.33	0.10	0.060	(0.036)	0.015	0.045
245	20.42	0.10	0.060	(0.036)	0.015	0.045
246	20.50	0.10	0.060	(0.036)	0.015	0.045
247	20.58	0.10	0.060	(0.036)	0.015	0.045
248	20.67	0.10	0.060	(0.036)	0.015	0.045
249	20.75	0.10	0.060	(0.036)	0.015	0.045
250	20.83	0.07	0.040	(0.035)	0.010	0.030
251	20.92	0.07	0.040	(0.035)	0.010	0.030
252	21.00	0.07	0.040	(0.035)	0.010	0.030
253	21.08	0.10	0.060	(0.035)	0.015	0.045
254	21.17	0.10	0.060	(0.035)	0.015	0.045
255	21.25	0.10	0.060	(0.035)	0.015	0.045
256	21.33	0.07	0.040	(0.035)	0.010	0.030
257	21.42	0.07	0.040	(0.034)	0.010	0.030
258	21.50	0.07	0.040	(0.034)	0.010	0.030
259	21.58	0.10	0.060	(0.034)	0.015	0.045
260	21.67	0.10	0.060	(0.034)	0.015	0.045
261	21.75	0.10	0.060	(0.034)	0.015	0.045
262	21.83	0.07	0.040	(0.034)	0.010	0.030
263	21.92	0.07	0.040	(0.034)	0.010	0.030
264	22.00	0.07	0.040	(0.034)	0.010	0.030
265	22.08	0.10	0.060	(0.034)	0.015	0.045
266	22.17	0.10	0.060	(0.033)	0.015	0.045
267	22.25	0.10	0.060	(0.033)	0.015	0.045
268	22.33	0.07	0.040	(0.033)	0.010	0.030
269	22.42	0.07	0.040	(0.033)	0.010	0.030
270	22.50	0.07	0.040	(0.033)	0.010	0.030
271	22.58	0.07	0.040	(0.033)	0.010	0.030
272	22.67	0.07	0.040	(0.033)	0.010	0.030
273	22.75	0.07	0.040	(0.033)	0.010	0.030
274	22.83	0.07	0.040	(0.033)	0.010	0.030
275	22.92	0.07	0.040	(0.033)	0.010	0.030
276	23.00	0.07	0.040	(0.032)	0.010	0.030
277	23.08	0.07	0.040	(0.032)	0.010	0.030
278	23.17	0.07	0.040	(0.032)	0.010	0.030
279	23.25	0.07	0.040	(0.032)	0.010	0.030
280	23.33	0.07	0.040	(0.032)	0.010	0.030
281	23.42	0.07	0.040	(0.032)	0.010	0.030
282	23.50	0.07	0.040	(0.032)	0.010	0.030
283	23.58	0.07	0.040	(0.032)	0.010	0.030
284	23.67	0.07	0.040	(0.032)	0.010	0.030
285	23.75	0.07	0.040	(0.032)	0.010	0.030
286	23.83	0.07	0.040	(0.032)	0.010	0.030
287	23.92	0.07	0.040	(0.032)	0.010	0.030
288	24.00	0.07	0.040	(0.032)	0.010	0.030

(Loss Rate Not Used)

Sum = 100.0 Sum = 49.8

Flood volume = Effective rainfall 4.15(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)

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Total soil loss =      0.85(In)
Total soil loss =     0.355(Ac.Ft)
Total rainfall =      5.00(In)
Flood volume =       75999.6 Cubic Feet
Total soil loss =       15475.5 Cubic Feet
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      3.151(CFS)
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   24 - H O U R   S T O R M
              R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.01  Q         |         |         |         |
  0+10       0.0005      0.06  Q         |         |         |         |
  0+15       0.0012      0.11  Q         |         |         |         |
  0+20       0.0021      0.13  Q         |         |         |         |
  0+25       0.0033      0.17  Q         |         |         |         |
  0+30       0.0047      0.20  Q         |         |         |         |
  0+35       0.0062      0.21  Q         |         |         |         |
  0+40       0.0077      0.22  Q         |         |         |         |
  0+45       0.0093      0.23  Q         |         |         |         |
  0+50       0.0109      0.23  Q         |         |         |         |
  0+55       0.0126      0.26  VQ        |         |         |         |
  1+ 0       0.0146      0.29  VQ        |         |         |         |
  1+ 5       0.0166      0.29  VQ        |         |         |         |
  1+10       0.0185      0.27  VQ        |         |         |         |
  1+15       0.0202      0.25  Q         |         |         |         |
  1+20       0.0219      0.24  Q         |         |         |         |
  1+25       0.0235      0.24  Q         |         |         |         |
  1+30       0.0251      0.23  Q         |         |         |         |
  1+35       0.0267      0.23  Q         |         |         |         |
  1+40       0.0283      0.23  Q         |         |         |         |
  1+45       0.0299      0.23  Q         |         |         |         |
  1+50       0.0315      0.24  Q         |         |         |         |
  1+55       0.0333      0.26  VQ        |         |         |         |
  2+ 0       0.0353      0.29  VQ        |         |         |         |
  2+ 5       0.0373      0.30  VQ        |         |         |         |
  2+10       0.0394      0.30  VQ        |         |         |         |
  2+15       0.0415      0.30  VQ        |         |         |         |
  2+20       0.0436      0.31  VQ        |         |         |         |
  2+25       0.0457      0.31  |Q        |         |         |         |
  2+30       0.0478      0.31  |Q        |         |         |         |
  2+35       0.0499      0.31  |Q        |         |         |         |
  2+40       0.0523      0.34  |Q        |         |         |         |
  2+45       0.0548      0.36  |Q        |         |         |         |
  2+50       0.0573      0.37  |Q        |         |         |         |
  2+55       0.0599      0.38  |Q        |         |         |         |
  3+ 0       0.0626      0.38  |Q        |         |         |         |
  3+ 5       0.0652      0.38  |Q        |         |         |         |
  3+10       0.0678      0.38  |Q        |         |         |         |
  3+15       0.0705      0.38  |Q        |         |         |         |
  3+20       0.0731      0.38  |Q        |         |         |         |
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3+25       0.0758      0.38  |Q        |         |         |         |
3+30       0.0784      0.38  |Q        |         |         |         |
3+35       0.0811      0.38  |Q        |         |         |         |
3+40       0.0837      0.38  |Q        |         |         |         |
3+45       0.0864      0.38  |Q        |         |         |         |
3+50       0.0890      0.39  |QV       |         |         |         |
3+55       0.0919      0.41  |QV       |         |         |         |
4+ 0       0.0949      0.44  |QV       |         |         |         |
4+ 5       0.0980      0.45  |QV       |         |         |         |
4+10       0.1011      0.45  |QV       |         |         |         |
4+15       0.1043      0.46  |QV       |         |         |         |
4+20       0.1075      0.46  |QV       |         |         |         |
4+25       0.1109      0.49  |QV       |         |         |         |
4+30       0.1144      0.52  | Q       |         |         |         |
4+35       0.1180      0.53  | Q       |         |         |         |
4+40       0.1217      0.53  | Q       |         |         |         |
4+45       0.1254      0.53  | Q       |         |         |         |
4+50       0.1291      0.54  | Q       |         |         |         |
4+55       0.1330      0.57  | QV      |         |         |         |
5+ 0       0.1371      0.59  | QV      |         |         |         |
5+ 5       0.1412      0.59  | QV      |         |         |         |
5+10       0.1450      0.55  | QV      |         |         |         |
5+15       0.1484      0.50  | QV      |         |         |         |
5+20       0.1518      0.49  |Q V      |         |         |         |
5+25       0.1553      0.50  | QV      |         |         |         |
5+30       0.1589      0.52  | QV      |         |         |         |
5+35       0.1625      0.53  | QV      |         |         |         |
5+40       0.1664      0.56  | QV      |         |         |         |
5+45       0.1705      0.59  | QV      |         |         |         |
5+50       0.1746      0.60  | Q V     |         |         |         |
5+55       0.1788      0.61  | Q V     |         |         |         |
6+ 0       0.1830      0.61  | Q V     |         |         |         |
6+ 5       0.1873      0.62  | Q V     |         |         |         |
6+10       0.1917      0.64  | Q V     |         |         |         |
6+15       0.1963      0.67  | Q V     |         |         |         |
6+20       0.2010      0.68  | Q V     |         |         |         |
6+25       0.2057      0.69  | Q V     |         |         |         |
6+30       0.2105      0.69  | Q V     |         |         |         |
6+35       0.2153      0.69  | Q V     |         |         |         |
6+40       0.2202      0.72  | Q  V    |         |         |         |
6+45       0.2254      0.75  | Q  V    |         |         |         |
6+50       0.2306      0.76  |  Q V    |         |         |         |
6+55       0.2358      0.76  |  Q V    |         |         |         |
7+ 0       0.2411      0.77  |  Q V    |         |         |         |
7+ 5       0.2464      0.77  |  Q V    |         |         |         |
7+10       0.2517      0.77  |  Q V    |         |         |         |
7+15       0.2570      0.77  |  Q V    |         |         |         |
7+20       0.2623      0.77  |  Q  V   |         |         |         |
7+25       0.2678      0.80  |  Q  V   |         |         |         |
7+30       0.2735      0.82  |  Q  V   |         |         |         |
7+35       0.2792      0.84  |  Q  V   |         |         |         |
7+40       0.2852      0.87  |  Q  V   |         |         |         |
7+45       0.2914      0.90  |  Q  V   |         |         |         |
7+50       0.2977      0.91  |  Q  V   |         |         |         |
7+55       0.3042      0.94  |  Q  V   |         |         |         |
8+ 0       0.3109      0.97  |  Q   V  |         |         |         |
8+ 5       0.3178      0.99  |  Q   V  |         |         |         |
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 8+10       0.3250      1.05  |   Q  V  |         |         |         |
 8+15       0.3326      1.11  |   Q  V  |         |         |         |
 8+20       0.3404      1.13  |   Q  V  |         |         |         |
 8+25       0.3482      1.14  |   Q  V  |         |         |         |
 8+30       0.3561      1.15  |   Q   V |         |         |         |
 8+35       0.3641      1.16  |   Q   V |         |         |         |
 8+40       0.3723      1.19  |   Q   V |         |         |         |
 8+45       0.3807      1.23  |   Q   V |         |         |         |
 8+50       0.3893      1.25  |   Q   V |         |         |         |
 8+55       0.3982      1.29  |    Q   V|         |         |         |
 9+ 0       0.4073      1.33  |    Q   V|         |         |         |
 9+ 5       0.4167      1.36  |    Q   V|         |         |         |
 9+10       0.4265      1.43  |    Q   V|         |         |         |
 9+15       0.4369      1.51  |     Q   V         |         |         |
 9+20       0.4475      1.54  |     Q   V         |         |         |
 9+25       0.4585      1.59  |     Q   V         |         |         |
 9+30       0.4698      1.64  |     Q   V         |         |         |
 9+35       0.4812      1.66  |     Q   |V        |         |         |
 9+40       0.4930      1.71  |     Q   |V        |         |         |
 9+45       0.5050      1.75  |     Q   |V        |         |         |
 9+50       0.5172      1.77  |      Q  |V        |         |         |
 9+55       0.5297      1.82  |      Q  | V       |         |         |
10+ 0       0.5425      1.86  |      Q  | V       |         |         |
10+ 5       0.5551      1.83  |      Q  | V       |         |         |
10+10       0.5662      1.61  |     Q   | V       |         |         |
10+15       0.5757      1.38  |    Q    |  V      |         |         |
10+20       0.5847      1.30  |    Q    |  V      |         |         |
10+25       0.5933      1.25  |   Q     |  V      |         |         |
10+30       0.6017      1.22  |   Q     |  V      |         |         |
10+35       0.6102      1.24  |   Q     |  V      |         |         |
10+40       0.6198      1.40  |    Q    |   V     |         |         |
10+45       0.6306      1.56  |     Q   |   V     |         |         |
10+50       0.6418      1.63  |     Q   |   V     |         |         |
10+55       0.6532      1.66  |     Q   |   V     |         |         |
11+ 0       0.6648      1.68  |     Q   |    V    |         |         |
11+ 5       0.6764      1.69  |     Q   |    V    |         |         |
11+10       0.6879      1.66  |     Q   |    V    |         |         |
11+15       0.6992      1.63  |     Q   |     V   |         |         |
11+20       0.7104      1.63  |     Q   |     V   |         |         |
11+25       0.7215      1.62  |     Q   |     V   |         |         |
11+30       0.7327      1.62  |     Q   |     V   |         |         |
11+35       0.7437      1.61  |     Q   |      V  |         |         |
11+40       0.7544      1.54  |     Q   |      V  |         |         |
11+45       0.7645      1.47  |    Q    |      V  |         |         |
11+50       0.7745      1.46  |    Q    |      V  |         |         |
11+55       0.7847      1.48  |    Q    |      V  |         |         |
12+ 0       0.7951      1.50  |     Q   |       V |         |         |
12+ 5       0.8058      1.55  |     Q   |       V |         |         |
12+10       0.8181      1.79  |      Q  |       V |         |         |
12+15       0.8321      2.03  |       Q |        V|         |         |
12+20       0.8468      2.13  |       Q |        V|         |         |
12+25       0.8620      2.22  |       Q |        V|         |         |
12+30       0.8778      2.28  |        Q|         V         |         |
12+35       0.8938      2.32  |        Q|         V         |         |
12+40       0.9103      2.41  |        Q|         V         |         |
12+45       0.9274      2.48  |        Q|         |V        |         |
12+50       0.9448      2.52  |         Q         |V        |         |
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12+55       0.9625      2.57  |         Q         | V       |         |
13+ 0       0.9806      2.62  |         Q         | V       |         |
13+ 5       0.9989      2.67  |         Q         | V       |         |
13+10       1.0185      2.84  |         |Q        |  V      |         |
13+15       1.0393      3.02  |         | Q       |  V      |         |
13+20       1.0606      3.09  |         | Q       |   V     |         |
13+25       1.0821      3.13  |         | Q       |   V     |         |
13+30       1.1038      3.15  |         | Q       |    V    |         |
13+35       1.1252      3.10  |         | Q       |    V    |         |
13+40       1.1441      2.75  |         Q         |     V   |         |
13+45       1.1604      2.37  |        Q|         |     V   |         |
13+50       1.1758      2.24  |       Q |         |     V   |         |
13+55       1.1907      2.16  |       Q |         |      V  |         |
14+ 0       1.2053      2.12  |       Q |         |      V  |         |
14+ 5       1.2199      2.12  |       Q |         |      V  |         |
14+10       1.2353      2.24  |       Q |         |       V |         |
14+15       1.2516      2.37  |        Q|         |       V |         |
14+20       1.2683      2.41  |        Q|         |        V|         |
14+25       1.2848      2.41  |        Q|         |        V|         |
14+30       1.3013      2.39  |        Q|         |        V|         |
14+35       1.3177      2.39  |        Q|         |         V         |
14+40       1.3341      2.38  |        Q|         |         V         |
14+45       1.3506      2.38  |        Q|         |         V         |
14+50       1.3669      2.38  |        Q|         |         |V        |
14+55       1.3831      2.35  |        Q|         |         |V        |
15+ 0       1.3991      2.31  |        Q|         |         | V       |
15+ 5       1.4149      2.30  |        Q|         |         | V       |
15+10       1.4304      2.26  |        Q|         |         | V       |
15+15       1.4457      2.22  |       Q |         |         |  V      |
15+20       1.4609      2.20  |       Q |         |         |  V      |
15+25       1.4758      2.16  |       Q |         |         |  V      |
15+30       1.4904      2.12  |       Q |         |         |   V     |
15+35       1.5048      2.09  |       Q |         |         |   V     |
15+40       1.5182      1.95  |      Q  |         |         |   V     |
15+45       1.5306      1.81  |      Q  |         |         |    V    |
15+50       1.5427      1.76  |      Q  |         |         |    V    |
15+55       1.5546      1.73  |     Q   |         |         |    V    |
16+ 0       1.5664      1.71  |     Q   |         |         |    V    |
16+ 5       1.5776      1.62  |     Q   |         |         |     V   |
16+10       1.5857      1.17  |   Q     |         |         |     V   |
16+15       1.5905      0.70  | Q       |         |         |     V   |
16+20       1.5942      0.53  | Q       |         |         |     V   |
16+25       1.5971      0.43  |Q        |         |         |     V   |
16+30       1.5997      0.37  |Q        |         |         |     V   |
16+35       1.6020      0.34  |Q        |         |         |     V   |
16+40       1.6041      0.30  |Q        |         |         |     V   |
16+45       1.6059      0.27  |Q        |         |         |     V   |
16+50       1.6076      0.25  Q         |         |         |     V   |
16+55       1.6093      0.24  Q         |         |         |     V   |
17+ 0       1.6109      0.23  Q         |         |         |     V   |
17+ 5       1.6125      0.24  Q         |         |         |     V   |
17+10       1.6145      0.29  |Q        |         |         |      V  |
17+15       1.6169      0.34  |Q        |         |         |      V  |
17+20       1.6194      0.36  |Q        |         |         |      V  |
17+25       1.6219      0.37  |Q        |         |         |      V  |
17+30       1.6245      0.38  |Q        |         |         |      V  |
17+35       1.6272      0.38  |Q        |         |         |      V  |
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17+40       1.6298      0.38  |Q        |         |         |      V  |
17+45       1.6324      0.38  |Q        |         |         |      V  |
17+50       1.6350      0.38  |Q        |         |         |      V  |
17+55       1.6375      0.36  |Q        |         |         |      V  |
18+ 0       1.6398      0.33  |Q        |         |         |      V  |
18+ 5       1.6420      0.32  |Q        |         |         |      V  |
18+10       1.6441      0.31  |Q        |         |         |      V  |
18+15       1.6463      0.31  |Q        |         |         |      V  |
18+20       1.6484      0.31  |Q        |         |         |      V  |
18+25       1.6505      0.31  |Q        |         |         |      V  |
18+30       1.6526      0.31  |Q        |         |         |      V  |
18+35       1.6547      0.30  |Q        |         |         |      V  |
18+40       1.6567      0.28  |Q        |         |         |      V  |
18+45       1.6584      0.25  |Q        |         |         |       V |
18+50       1.6600      0.24  Q         |         |         |       V |
18+55       1.6615      0.21  Q         |         |         |       V |
19+ 0       1.6627      0.18  Q         |         |         |       V |
19+ 5       1.6639      0.17  Q         |         |         |       V |
19+10       1.6652      0.19  Q         |         |         |       V |
19+15       1.6667      0.21  Q         |         |         |       V |
19+20       1.6682      0.23  Q         |         |         |       V |
19+25       1.6700      0.25  |Q        |         |         |       V |
19+30       1.6719      0.28  |Q        |         |         |       V |
19+35       1.6739      0.29  |Q        |         |         |       V |
19+40       1.6758      0.27  |Q        |         |         |       V |
19+45       1.6775      0.25  Q         |         |         |       V |
19+50       1.6791      0.24  Q         |         |         |       V |
19+55       1.6806      0.21  Q         |         |         |       V |
20+ 0       1.6818      0.18  Q         |         |         |       V |
20+ 5       1.6830      0.17  Q         |         |         |       V |
20+10       1.6843      0.19  Q         |         |         |       V |
20+15       1.6858      0.21  Q         |         |         |       V |
20+20       1.6873      0.22  Q         |         |         |       V |
20+25       1.6888      0.23  Q         |         |         |       V |
20+30       1.6904      0.23  Q         |         |         |       V |
20+35       1.6920      0.23  Q         |         |         |       V |
20+40       1.6936      0.23  Q         |         |         |       V |
20+45       1.6951      0.23  Q         |         |         |       V |
20+50       1.6967      0.23  Q         |         |         |       V |
20+55       1.6981      0.20  Q         |         |         |       V |
21+ 0       1.6993      0.18  Q         |         |         |       V |
21+ 5       1.7005      0.17  Q         |         |         |       V |
21+10       1.7018      0.19  Q         |         |         |        V|
21+15       1.7032      0.21  Q         |         |         |        V|
21+20       1.7047      0.22  Q         |         |         |        V|
21+25       1.7061      0.20  Q         |         |         |        V|
21+30       1.7073      0.17  Q         |         |         |        V|
21+35       1.7084      0.17  Q         |         |         |        V|
21+40       1.7097      0.19  Q         |         |         |        V|
21+45       1.7112      0.21  Q         |         |         |        V|
21+50       1.7127      0.22  Q         |         |         |        V|
21+55       1.7140      0.20  Q         |         |         |        V|
22+ 0       1.7152      0.17  Q         |         |         |        V|
22+ 5       1.7164      0.17  Q         |         |         |        V|
22+10       1.7177      0.19  Q         |         |         |        V|
22+15       1.7191      0.21  Q         |         |         |        V|
22+20       1.7206      0.22  Q         |         |         |        V|
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  22+25        1.7220       0.20  Q          |          |          |        V|
  22+30        1.7232       0.17  Q          |          |          |        V|
  22+35        1.7243       0.16  Q          |          |          |        V|
  22+40        1.7254       0.16  Q          |          |          |        V|
  22+45        1.7265       0.16  Q          |          |          |        V|
  22+50        1.7275       0.16  Q          |          |          |        V|
  22+55        1.7286       0.15  Q          |          |          |        V|
  23+ 0        1.7297       0.15  Q          |          |          |        V|
  23+ 5        1.7307       0.15  Q          |          |          |        V|
  23+10        1.7318       0.15  Q          |          |          |        V|
  23+15        1.7328       0.15  Q          |          |          |        V|
  23+20        1.7339       0.15  Q          |          |          |        V|
  23+25        1.7350       0.15  Q          |          |          |        V|
  23+30        1.7360       0.15  Q          |          |          |        V|
  23+35        1.7371       0.15  Q          |          |          |        V|
  23+40        1.7381       0.15  Q          |          |          |        V|
  23+45        1.7392       0.15  Q          |          |          |        V|
  23+50        1.7403       0.15  Q          |          |          |        V|
  23+55        1.7413       0.15  Q          |          |          |        V|
  24+ 0        1.7424       0.15  Q          |          |          |        V|
  24+ 5        1.7434       0.15  Q          |          |          |        V|
  24+10        1.7440       0.10  Q          |          |          |        V|
  24+15        1.7443       0.04  Q          |          |          |        V|
  24+20        1.7445       0.02  Q          |          |          |        V|
  24+25        1.7446       0.01  Q          |          |          |        V|
  24+30        1.7447       0.01  Q          |          |          |        V|
  24+35        1.7447       0.00  Q          |          |          |        V|
  24+40        1.7447       0.00  Q          |          |          |        V|
  24+45        1.7447       0.00  Q          |          |          |        V|
  24+50        1.7447       0.00  Q          |          |          |        V|
  24+55        1.7447       0.00  Q          |          |          |        V|
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.064)	0.036	0.114
2	0.17	0.60	0.180	(0.064)	0.044	0.136
3	0.25	0.60	0.180	(0.064)	0.044	0.136
4	0.33	0.60	0.180	(0.064)	0.044	0.136
5	0.42	0.60	0.180	(0.064)	0.044	0.136
6	0.50	0.70	0.210	(0.064)	0.051	0.159
7	0.58	0.70	0.210	(0.064)	0.051	0.159

8	0.67	0.70	0.210	(0.064)	0.051	0.159
9	0.75	0.70	0.210	(0.064)	0.051	0.159
10	0.83	0.70	0.210	(0.064)	0.051	0.159
11	0.92	0.70	0.210	(0.064)	0.051	0.159
12	1.00	0.80	0.240	(0.064)	0.058	0.182
13	1.08	0.80	0.240	(0.064)	0.058	0.182
14	1.17	0.80	0.240	(0.064)	0.058	0.182
15	1.25	0.80	0.240	(0.064)	0.058	0.182
16	1.33	0.80	0.240	(0.064)	0.058	0.182
17	1.42	0.80	0.240	(0.064)	0.058	0.182
18	1.50	0.80	0.240	(0.064)	0.058	0.182
19	1.58	0.80	0.240	(0.064)	0.058	0.182
20	1.67	0.80	0.240	(0.064)	0.058	0.182
21	1.75	0.80	0.240	(0.064)	0.058	0.182
22	1.83	0.80	0.240	(0.064)	0.058	0.182
23	1.92	0.80	0.240	(0.064)	0.058	0.182
24	2.00	0.90	0.270	0.064	(0.066)	0.206
25	2.08	0.80	0.240	(0.064)	0.058	0.182
26	2.17	0.90	0.270	0.064	(0.066)	0.206
27	2.25	0.90	0.270	0.064	(0.066)	0.206
28	2.33	0.90	0.270	0.064	(0.066)	0.206
29	2.42	0.90	0.270	0.064	(0.066)	0.206
30	2.50	0.90	0.270	0.064	(0.066)	0.206
31	2.58	0.90	0.270	0.064	(0.066)	0.206
32	2.67	0.90	0.270	0.064	(0.066)	0.206
33	2.75	1.00	0.300	0.064	(0.073)	0.236
34	2.83	1.00	0.300	0.064	(0.073)	0.236
35	2.92	1.00	0.300	0.064	(0.073)	0.236
36	3.00	1.00	0.300	0.064	(0.073)	0.236
37	3.08	1.00	0.300	0.064	(0.073)	0.236
38	3.17	1.10	0.330	0.064	(0.080)	0.266
39	3.25	1.10	0.330	0.064	(0.080)	0.266
40	3.33	1.10	0.330	0.064	(0.080)	0.266
41	3.42	1.20	0.360	0.064	(0.088)	0.296
42	3.50	1.30	0.390	0.064	(0.095)	0.326
43	3.58	1.40	0.420	0.064	(0.102)	0.356
44	3.67	1.40	0.420	0.064	(0.102)	0.356
45	3.75	1.50	0.450	0.064	(0.109)	0.386
46	3.83	1.50	0.450	0.064	(0.109)	0.386
47	3.92	1.60	0.480	0.064	(0.117)	0.416
48	4.00	1.60	0.480	0.064	(0.117)	0.416
49	4.08	1.70	0.510	0.064	(0.124)	0.446
50	4.17	1.80	0.540	0.064	(0.131)	0.476
51	4.25	1.90	0.570	0.064	(0.139)	0.506
52	4.33	2.00	0.600	0.064	(0.146)	0.536
53	4.42	2.10	0.630	0.064	(0.153)	0.566
54	4.50	2.10	0.630	0.064	(0.153)	0.566
55	4.58	2.20	0.660	0.064	(0.161)	0.596
56	4.67	2.30	0.690	0.064	(0.168)	0.626
57	4.75	2.40	0.720	0.064	(0.175)	0.656
58	4.83	2.40	0.720	0.064	(0.175)	0.656
59	4.92	2.50	0.750	0.064	(0.182)	0.686
60	5.00	2.60	0.780	0.064	(0.190)	0.716
61	5.08	3.10	0.930	0.064	(0.226)	0.866
62	5.17	3.60	1.080	0.064	(0.263)	1.016
63	5.25	3.90	1.170	0.064	(0.285)	1.106
64	5.33	4.20	1.260	0.064	(0.306)	1.196

```
65   5.42     4.70      1.410          0.064    (  0.343)        1.346
66   5.50     5.60      1.680          0.064    (  0.409)        1.616
67   5.58     1.90      0.570          0.064    (  0.139)        0.506
68   5.67     0.90      0.270          0.064    (  0.066)        0.206
69   5.75     0.60      0.180       (  0.064)      0.044         0.136
70   5.83     0.50      0.150       (  0.064)      0.036         0.114
71   5.92     0.30      0.090       (  0.064)      0.022         0.068
72   6.00     0.20      0.060       (  0.064)      0.015         0.045
           (Loss Rate Not Used)
   Sum =     100.0                               Sum =    25.8
    Flood volume = Effective rainfall      2.15(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.9(Ac.Ft)
    Total soil loss =      0.35(In)
    Total soil loss =     0.147(Ac.Ft)
    Total rainfall =      2.50(In)
    Flood volume =       39338.9 Cubic Feet
    Total soil loss =       6398.3 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      6.656(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       6 - H O U R   S T O R M
                  R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0018      0.23  Q         |         |         |         |
  0+15       0.0049      0.46  VQ        |         |         |         |
  0+20       0.0088      0.57  V Q       |         |         |         |
  0+25       0.0131      0.62  V Q       |         |         |         |
  0+30       0.0177      0.66  V Q       |         |         |         |
  0+35       0.0226      0.72  |VQ       |         |         |         |
  0+40       0.0279      0.76  |V Q      |         |         |         |
  0+45       0.0333      0.78  |V Q      |         |         |         |
  0+50       0.0387      0.79  |V Q      |         |         |         |
  0+55       0.0443      0.80  |V Q      |         |         |         |
  1+ 0       0.0498      0.81  | VQ      |         |         |         |
  1+ 5       0.0557      0.85  | VQ      |         |         |         |
  1+10       0.0618      0.89  | VQ      |         |         |         |
  1+15       0.0681      0.90  |  Q      |         |         |         |
  1+20       0.0743      0.91  |  Q      |         |         |         |
  1+25       0.0807      0.92  |  Q      |         |         |         |
  1+30       0.0870      0.92  |  Q      |         |         |         |
  1+35       0.0933      0.92  |  QV     |         |         |         |
  1+40       0.0997      0.92  |  QV     |         |         |         |
  1+45       0.1060      0.92  |  QV     |         |         |         |
  1+50       0.1124      0.92  |  QV     |         |         |         |
  1+55       0.1188      0.92  |  Q V    |         |         |         |
  2+ 0       0.1252      0.93  |  Q V    |         |         |         |
  2+ 5       0.1318      0.96  |  Q V    |         |         |         |
  2+10       0.1385      0.97  |  Q  V   |         |         |         |
  2+15       0.1453      0.99  |  Q  V   |         |         |         |
  2+20       0.1523      1.02  |   Q V   |         |         |         |
```

```
    2+25       0.1594      1.03  |   Q  V  |         |         |         |
    2+30       0.1666      1.04  |   Q  V  |         |         |         |
    2+35       0.1738      1.04  |   Q  V  |         |         |         |
    2+40       0.1810      1.05  |   Q   V |         |         |         |
    2+45       0.1883      1.06  |   Q   V |         |         |         |
    2+50       0.1959      1.11  |   Q   V |         |         |         |
    2+55       0.2039      1.16  |   Q    V|         |         |         |
    3+ 0       0.2120      1.18  |   Q    V|         |         |         |
    3+ 5       0.2201      1.19  |   Q    V|         |         |         |
    3+10       0.2284      1.20  |   Q     V         |         |         |
    3+15       0.2371      1.26  |    Q    V         |         |         |
    3+20       0.2461      1.31  |    Q    V         |         |         |
    3+25       0.2553      1.34  |    Q    |V        |         |         |
    3+30       0.2649      1.41  |    Q    |V        |         |         |
    3+35       0.2754      1.52  |     Q   | V       |         |         |
    3+40       0.2868      1.65  |     Q   | V       |         |         |
    3+45       0.2987      1.74  |     Q   |  V      |         |         |
    3+50       0.3113      1.82  |      Q  |  V      |         |         |
    3+55       0.3244      1.90  |      Q  |   V     |         |         |
    4+ 0       0.3380      1.98  |      Q  |   V     |         |         |
    4+ 5       0.3522      2.06  |       Q |    V    |         |         |
    4+10       0.3670      2.15  |       Q |     V   |         |         |
    4+15       0.3827      2.27  |        Q|     V   |         |         |
    4+20       0.3993      2.41  |        Q|      V  |         |         |
    4+25       0.4168      2.55  |         Q       V |         |         |
    4+30       0.4354      2.69  |         Q        V|         |         |
    4+35       0.4546      2.79  |         |Q        V         |         |
    4+40       0.4745      2.89  |         |Q        |V        |         |
    4+45       0.4954      3.03  |         | Q       |V        |         |
    4+50       0.5171      3.16  |         | Q       | V       |         |
    4+55       0.5395      3.25  |         |  Q      |  V      |         |
    5+ 0       0.5626      3.35  |         |  Q      |   V     |         |
    5+ 5       0.5869      3.52  |         |   Q     |    V    |         |
    5+10       0.6137      3.89  |         |    Q    |      V  |         |
    5+15       0.6444      4.46  |         |      Q  |       V |         |
    5+20       0.6788      5.00  |         |         Q         V         |
    5+25       0.7168      5.51  |         |         | Q       |V        |
    5+30       0.7590      6.14  |         |         |   Q     |  V      |
    5+35       0.8049      6.66  |         |         |     Q   |    V    |
    5+40       0.8419      5.38  |         |         |Q        |      V  |
    5+45       0.8641      3.23  |         | Q       |         |       V |
    5+50       0.8783      2.05  |       Q |         |         |       V |
    5+55       0.8878      1.38  |    Q    |         |         |        V|
    6+ 0       0.8941      0.92  |  Q      |         |         |        V|
    6+ 5       0.8981      0.58  | Q       |         |         |        V|
    6+10       0.9005      0.34  |Q        |         |         |        V|
    6+15       0.9017      0.18  Q         |         |         |        V|
    6+20       0.9024      0.11  Q         |         |         |        V|
    6+25       0.9028      0.05  Q         |         |         |        V|
    6+30       0.9030      0.02  Q         |         |         |        V|
    6+35       0.9030      0.01  Q         |         |         |        V|
    6+40       0.9031      0.01  Q         |         |         |        V|
    6+45       0.9031      0.00  Q         |         |         |        V|
    6+50       0.9031      0.00  Q         |         |         |        V|
    6+55       0.9031      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.281	0.064	(0.068)	0.217
2	0.17	1.30	0.281	0.064	(0.068)	0.217
3	0.25	1.10	0.238	(0.064)	0.058	0.180
4	0.33	1.50	0.324	0.064	(0.079)	0.260
5	0.42	1.50	0.324	0.064	(0.079)	0.260
6	0.50	1.80	0.389	0.064	(0.095)	0.325
7	0.58	1.50	0.324	0.064	(0.079)	0.260

8	0.67	1.80	0.389	0.064	(0.095)	0.325
9	0.75	1.80	0.389	0.064	(0.095)	0.325
10	0.83	1.50	0.324	0.064	(0.079)	0.260
11	0.92	1.60	0.346	0.064	(0.084)	0.282
12	1.00	1.80	0.389	0.064	(0.095)	0.325
13	1.08	2.20	0.475	0.064	(0.116)	0.411
14	1.17	2.20	0.475	0.064	(0.116)	0.411
15	1.25	2.20	0.475	0.064	(0.116)	0.411
16	1.33	2.00	0.432	0.064	(0.105)	0.368
17	1.42	2.60	0.562	0.064	(0.137)	0.498
18	1.50	2.70	0.583	0.064	(0.142)	0.519
19	1.58	2.40	0.518	0.064	(0.126)	0.455
20	1.67	2.70	0.583	0.064	(0.142)	0.519
21	1.75	3.30	0.713	0.064	(0.173)	0.649
22	1.83	3.10	0.670	0.064	(0.163)	0.606
23	1.92	2.90	0.626	0.064	(0.152)	0.563
24	2.00	3.00	0.648	0.064	(0.158)	0.584
25	2.08	3.10	0.670	0.064	(0.163)	0.606
26	2.17	4.20	0.907	0.064	(0.221)	0.843
27	2.25	5.00	1.080	0.064	(0.263)	1.016
28	2.33	3.50	0.756	0.064	(0.184)	0.692
29	2.42	6.80	1.469	0.064	(0.357)	1.405
30	2.50	7.30	1.577	0.064	(0.383)	1.513
31	2.58	8.20	1.771	0.064	(0.431)	1.707
32	2.67	5.90	1.274	0.064	(0.310)	1.211
33	2.75	2.00	0.432	0.064	(0.105)	0.368
34	2.83	1.80	0.389	0.064	(0.095)	0.325
35	2.92	1.80	0.389	0.064	(0.095)	0.325
36	3.00	0.60	0.130	(0.064)	0.032	0.098

```
          (Loss Rate Not Used)
   Sum =     100.0                               Sum =    19.3
    Flood volume = Effective rainfall      1.61(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.7(Ac.Ft)
    Total soil loss =      0.19(In)
    Total soil loss =     0.079(Ac.Ft)
    Total rainfall =      1.80(In)
    Flood volume =       29492.1 Cubic Feet
    Total soil loss =       3438.6 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      7.264(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0004      0.06  Q         |         |         |         |
  0+10       0.0033      0.42  VQ        |         |         |         |
  0+15       0.0087      0.78  V  Q      |         |         |         |
  0+20       0.0147      0.88  V  Q      |         |         |         |
  0+25       0.0218      1.02  |V  Q     |         |         |         |
  0+30       0.0301      1.20  |V  Q     |         |         |         |
  0+35       0.0394      1.35  | V  Q    |         |         |         |
```

```
    0+40       0.0491      1.41  | V  Q    |         |         |         |
    0+45       0.0592      1.46  |  V Q    |         |         |         |
    0+50       0.0699      1.55  |   V Q   |         |         |         |
    0+55       0.0802      1.49  |   VQ    |         |         |         |
    1+ 0       0.0901      1.45  |    Q    |         |         |         |
    1+ 5       0.1008      1.55  |    VQ   |         |         |         |
    1+10       0.1129      1.76  |     VQ  |         |         |         |
    1+15       0.1262      1.93  |      Q  |         |         |         |
    1+20       0.1399      1.99  |      QV |         |         |         |
    1+25       0.1537      2.00  |      Q V|         |         |         |
    1+30       0.1686      2.17  |       QV|         |         |         |
    1+35       0.1851      2.39  |        QV         |         |         |
    1+40       0.2016      2.41  |        Q|V        |         |         |
    1+45       0.2188      2.50  |        Q| V       |         |         |
    1+50       0.2381      2.80  |         |Q  V     |         |         |
    1+55       0.2586      2.98  |         |Q   V    |         |         |
    2+ 0       0.2788      2.93  |         |Q    V   |         |         |
    2+ 5       0.2990      2.93  |         |Q     V  |         |         |
    2+10       0.3201      3.07  |         | Q     V |         |         |
    2+15       0.3446      3.55  |         |   Q     V         |         |
    2+20       0.3732      4.16  |         |     Q   | V       |         |
    2+25       0.4028      4.29  |         |      Q  |  V      |         |
    2+30       0.4382      5.14  |         |         Q    V    |         |
    2+35       0.4830      6.51  |         |         |     Q V |         |
    2+40       0.5330      7.26  |         |         |        Q|V        |
    2+45       0.5800      6.82  |         |         |      Q  |   V     |
    2+50       0.6135      4.86  |         |        Q|         |     V   |
    2+55       0.6356      3.21  |         | Q       |         |      V  |
    3+ 0       0.6525      2.45  |        Q|         |         |       V |
    3+ 5       0.6640      1.66  |     Q   |         |         |        V|
    3+10       0.6700      0.88  |  Q      |         |         |        V|
    3+15       0.6732      0.46  |Q        |         |         |        V|
    3+20       0.6750      0.27  |Q        |         |         |        V|
    3+25       0.6760      0.15  Q         |         |         |        V|
    3+30       0.6766      0.08  Q         |         |         |        V|
    3+35       0.6768      0.04  Q         |         |         |        V|
    3+40       0.6769      0.02  Q         |         |         |        V|
    3+45       0.6770      0.01  Q         |         |         |        V|
    3+50       0.6770      0.00  Q         |         |         |        V|
    3+55       0.6770      0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
```

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/22/15 File: 201501POST1100.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              0.50                    2.52

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              1.20                    6.05

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)
```

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.475	0.064	(0.116)	0.411
2	0.17	4.20	0.605	0.064	(0.147)	0.541
3	0.25	4.40	0.634	0.064	(0.154)	0.570
4	0.33	4.80	0.691	0.064	(0.168)	0.627
5	0.42	5.20	0.749	0.064	(0.182)	0.685

```
  6   0.50     6.20      0.893          0.064    (  0.217)        0.829
  7   0.58     6.80      0.979          0.064    (  0.238)        0.915
  8   0.67     8.80      1.267          0.064    (  0.308)        1.203
  9   0.75    13.90      2.002          0.064    (  0.487)        1.938
 10   0.83    31.40      4.521          0.064    (  1.100)        4.458
 11   0.92     7.20      1.037          0.064    (  0.252)        0.973
 12   1.00     3.80      0.547          0.064    (  0.133)        0.483
           (Loss Rate Not Used)
    Sum =     100.0                                   Sum =    13.6
     Flood volume = Effective rainfall      1.14(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.5(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.027(Ac.Ft)
     Total rainfall =      1.20(In)
     Flood volume =       20787.7 Cubic Feet
     Total soil loss =       1165.6 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =     12.331(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
 -----------------------------------------------------------------------
   0+ 5       0.0008      0.12  Q         |         |         |         |
   0+10       0.0066      0.83  VQ        |         |         |         |
   0+15       0.0187      1.76  |V Q      |         |         |         |
   0+20       0.0345      2.30  | V Q     |         |         |         |
   0+25       0.0531      2.69  |   VQ    |         |         |         |
   0+30       0.0743      3.08  |     Q   |         |         |         |
   0+35       0.0988      3.56  |      QV |         |         |         |
   0+40       0.1273      4.13  |       Q V         |         |         |
   0+45       0.1624      5.11  |         Q  V      |         |         |
   0+50       0.2153      7.68  |         |    Q  V |         |         |
   0+55       0.3002     12.33  |         |         |   QV    |         |
   1+ 0       0.3787     11.39  |         |         | Q       |V        |
   1+ 5       0.4227      6.39  |         | Q       |         |    V    |
   1+10       0.4481      3.69  |      Q  |         |         |      V  |
   1+15       0.4616      1.95  |  Q      |         |         |       V |
   1+20       0.4689      1.07  | Q       |         |         |        V|
   1+25       0.4725      0.52  |Q        |         |         |        V|
   1+30       0.4745      0.29  Q         |         |         |        V|
   1+35       0.4758      0.19  Q         |         |         |        V|
   1+40       0.4767      0.13  Q         |         |         |        V|
   1+45       0.4771      0.06  Q         |         |         |        V|
   1+50       0.4772      0.02  Q         |         |         |        V|
   1+55       0.4772      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

Proposed Conditions Unit Hydrograph: 25yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST2425.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 25.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 4.043(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.043(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.032	(0.113)	0.008	0.024
2	0.17	0.07	0.032	(0.113)	0.008	0.024
3	0.25	0.07	0.032	(0.112)	0.008	0.024
4	0.33	0.10	0.049	(0.112)	0.012	0.037
5	0.42	0.10	0.049	(0.111)	0.012	0.037
6	0.50	0.10	0.049	(0.111)	0.012	0.037
7	0.58	0.10	0.049	(0.110)	0.012	0.037

8	0.67	0.10	0.049	(0.110)	0.012	0.037
9	0.75	0.10	0.049	(0.109)	0.012	0.037
10	0.83	0.13	0.065	(0.109)	0.016	0.049
11	0.92	0.13	0.065	(0.109)	0.016	0.049
12	1.00	0.13	0.065	(0.108)	0.016	0.049
13	1.08	0.10	0.049	(0.108)	0.012	0.037
14	1.17	0.10	0.049	(0.107)	0.012	0.037
15	1.25	0.10	0.049	(0.107)	0.012	0.037
16	1.33	0.10	0.049	(0.106)	0.012	0.037
17	1.42	0.10	0.049	(0.106)	0.012	0.037
18	1.50	0.10	0.049	(0.106)	0.012	0.037
19	1.58	0.10	0.049	(0.105)	0.012	0.037
20	1.67	0.10	0.049	(0.105)	0.012	0.037
21	1.75	0.10	0.049	(0.104)	0.012	0.037
22	1.83	0.13	0.065	(0.104)	0.016	0.049
23	1.92	0.13	0.065	(0.104)	0.016	0.049
24	2.00	0.13	0.065	(0.103)	0.016	0.049
25	2.08	0.13	0.065	(0.103)	0.016	0.049
26	2.17	0.13	0.065	(0.102)	0.016	0.049
27	2.25	0.13	0.065	(0.102)	0.016	0.049
28	2.33	0.13	0.065	(0.101)	0.016	0.049
29	2.42	0.13	0.065	(0.101)	0.016	0.049
30	2.50	0.13	0.065	(0.101)	0.016	0.049
31	2.58	0.17	0.081	(0.100)	0.020	0.061
32	2.67	0.17	0.081	(0.100)	0.020	0.061
33	2.75	0.17	0.081	(0.099)	0.020	0.061
34	2.83	0.17	0.081	(0.099)	0.020	0.061
35	2.92	0.17	0.081	(0.099)	0.020	0.061
36	3.00	0.17	0.081	(0.098)	0.020	0.061
37	3.08	0.17	0.081	(0.098)	0.020	0.061
38	3.17	0.17	0.081	(0.097)	0.020	0.061
39	3.25	0.17	0.081	(0.097)	0.020	0.061
40	3.33	0.17	0.081	(0.097)	0.020	0.061
41	3.42	0.17	0.081	(0.096)	0.020	0.061
42	3.50	0.17	0.081	(0.096)	0.020	0.061
43	3.58	0.17	0.081	(0.095)	0.020	0.061
44	3.67	0.17	0.081	(0.095)	0.020	0.061
45	3.75	0.17	0.081	(0.095)	0.020	0.061
46	3.83	0.20	0.097	(0.094)	0.024	0.073
47	3.92	0.20	0.097	(0.094)	0.024	0.073
48	4.00	0.20	0.097	(0.093)	0.024	0.073
49	4.08	0.20	0.097	(0.093)	0.024	0.073
50	4.17	0.20	0.097	(0.093)	0.024	0.073
51	4.25	0.20	0.097	(0.092)	0.024	0.073
52	4.33	0.23	0.113	(0.092)	0.028	0.086
53	4.42	0.23	0.113	(0.091)	0.028	0.086
54	4.50	0.23	0.113	(0.091)	0.028	0.086
55	4.58	0.23	0.113	(0.091)	0.028	0.086
56	4.67	0.23	0.113	(0.090)	0.028	0.086
57	4.75	0.23	0.113	(0.090)	0.028	0.086
58	4.83	0.27	0.129	(0.089)	0.031	0.098
59	4.92	0.27	0.129	(0.089)	0.031	0.098
60	5.00	0.27	0.129	(0.089)	0.031	0.098
61	5.08	0.20	0.097	(0.088)	0.024	0.073
62	5.17	0.20	0.097	(0.088)	0.024	0.073
63	5.25	0.20	0.097	(0.087)	0.024	0.073
64	5.33	0.23	0.113	(0.087)	0.028	0.086

65	5.42	0.23	0.113	(0.087)	0.028	0.086
66	5.50	0.23	0.113	(0.086)	0.028	0.086
67	5.58	0.27	0.129	(0.086)	0.031	0.098
68	5.67	0.27	0.129	(0.086)	0.031	0.098
69	5.75	0.27	0.129	(0.085)	0.031	0.098
70	5.83	0.27	0.129	(0.085)	0.031	0.098
71	5.92	0.27	0.129	(0.084)	0.031	0.098
72	6.00	0.27	0.129	(0.084)	0.031	0.098
73	6.08	0.30	0.146	(0.084)	0.035	0.110
74	6.17	0.30	0.146	(0.083)	0.035	0.110
75	6.25	0.30	0.146	(0.083)	0.035	0.110
76	6.33	0.30	0.146	(0.083)	0.035	0.110
77	6.42	0.30	0.146	(0.082)	0.035	0.110
78	6.50	0.30	0.146	(0.082)	0.035	0.110
79	6.58	0.33	0.162	(0.081)	0.039	0.122
80	6.67	0.33	0.162	(0.081)	0.039	0.122
81	6.75	0.33	0.162	(0.081)	0.039	0.122
82	6.83	0.33	0.162	(0.080)	0.039	0.122
83	6.92	0.33	0.162	(0.080)	0.039	0.122
84	7.00	0.33	0.162	(0.080)	0.039	0.122
85	7.08	0.33	0.162	(0.079)	0.039	0.122
86	7.17	0.33	0.162	(0.079)	0.039	0.122
87	7.25	0.33	0.162	(0.079)	0.039	0.122
88	7.33	0.37	0.178	(0.078)	0.043	0.135
89	7.42	0.37	0.178	(0.078)	0.043	0.135
90	7.50	0.37	0.178	(0.078)	0.043	0.135
91	7.58	0.40	0.194	(0.077)	0.047	0.147
92	7.67	0.40	0.194	(0.077)	0.047	0.147
93	7.75	0.40	0.194	(0.076)	0.047	0.147
94	7.83	0.43	0.210	(0.076)	0.051	0.159
95	7.92	0.43	0.210	(0.076)	0.051	0.159
96	8.00	0.43	0.210	(0.075)	0.051	0.159
97	8.08	0.50	0.243	(0.075)	0.059	0.184
98	8.17	0.50	0.243	(0.075)	0.059	0.184
99	8.25	0.50	0.243	(0.074)	0.059	0.184
100	8.33	0.50	0.243	(0.074)	0.059	0.184
101	8.42	0.50	0.243	(0.074)	0.059	0.184
102	8.50	0.50	0.243	(0.073)	0.059	0.184
103	8.58	0.53	0.259	(0.073)	0.063	0.196
104	8.67	0.53	0.259	(0.073)	0.063	0.196
105	8.75	0.53	0.259	(0.072)	0.063	0.196
106	8.83	0.57	0.275	(0.072)	0.067	0.208
107	8.92	0.57	0.275	(0.072)	0.067	0.208
108	9.00	0.57	0.275	(0.071)	0.067	0.208
109	9.08	0.63	0.307	0.071	(0.075)	0.236
110	9.17	0.63	0.307	0.071	(0.075)	0.237
111	9.25	0.63	0.307	0.070	(0.075)	0.237
112	9.33	0.67	0.323	0.070	(0.079)	0.254
113	9.42	0.67	0.323	0.070	(0.079)	0.254
114	9.50	0.67	0.323	0.069	(0.079)	0.254
115	9.58	0.70	0.340	0.069	(0.083)	0.271
116	9.67	0.70	0.340	0.069	(0.083)	0.271
117	9.75	0.70	0.340	0.068	(0.083)	0.271
118	9.83	0.73	0.356	0.068	(0.087)	0.288
119	9.92	0.73	0.356	0.068	(0.087)	0.288
120	10.00	0.73	0.356	0.067	(0.087)	0.289
121	10.08	0.50	0.243	(0.067)	0.059	0.184

122	10.17	0.50	0.243	(0.067)	0.059	0.184
123	10.25	0.50	0.243	(0.066)	0.059	0.184
124	10.33	0.50	0.243	(0.066)	0.059	0.184
125	10.42	0.50	0.243	(0.066)	0.059	0.184
126	10.50	0.50	0.243	(0.065)	0.059	0.184
127	10.58	0.67	0.323	0.065	(0.079)	0.258
128	10.67	0.67	0.323	0.065	(0.079)	0.259
129	10.75	0.67	0.323	0.064	(0.079)	0.259
130	10.83	0.67	0.323	0.064	(0.079)	0.259
131	10.92	0.67	0.323	0.064	(0.079)	0.260
132	11.00	0.67	0.323	0.063	(0.079)	0.260
133	11.08	0.63	0.307	0.063	(0.075)	0.244
134	11.17	0.63	0.307	0.063	(0.075)	0.244
135	11.25	0.63	0.307	0.063	(0.075)	0.245
136	11.33	0.63	0.307	0.062	(0.075)	0.245
137	11.42	0.63	0.307	0.062	(0.075)	0.245
138	11.50	0.63	0.307	0.062	(0.075)	0.246
139	11.58	0.57	0.275	0.061	(0.067)	0.214
140	11.67	0.57	0.275	0.061	(0.067)	0.214
141	11.75	0.57	0.275	0.061	(0.067)	0.214
142	11.83	0.60	0.291	0.060	(0.071)	0.231
143	11.92	0.60	0.291	0.060	(0.071)	0.231
144	12.00	0.60	0.291	0.060	(0.071)	0.231
145	12.08	0.83	0.404	0.059	(0.098)	0.345
146	12.17	0.83	0.404	0.059	(0.098)	0.345
147	12.25	0.83	0.404	0.059	(0.098)	0.345
148	12.33	0.87	0.420	0.059	(0.102)	0.362
149	12.42	0.87	0.420	0.058	(0.102)	0.362
150	12.50	0.87	0.420	0.058	(0.102)	0.362
151	12.58	0.93	0.453	0.058	(0.110)	0.395
152	12.67	0.93	0.453	0.057	(0.110)	0.395
153	12.75	0.93	0.453	0.057	(0.110)	0.396
154	12.83	0.97	0.469	0.057	(0.114)	0.412
155	12.92	0.97	0.469	0.057	(0.114)	0.412
156	13.00	0.97	0.469	0.056	(0.114)	0.413
157	13.08	1.13	0.550	0.056	(0.134)	0.494
158	13.17	1.13	0.550	0.056	(0.134)	0.494
159	13.25	1.13	0.550	0.055	(0.134)	0.494
160	13.33	1.13	0.550	0.055	(0.134)	0.495
161	13.42	1.13	0.550	0.055	(0.134)	0.495
162	13.50	1.13	0.550	0.055	(0.134)	0.495
163	13.58	0.77	0.372	0.054	(0.090)	0.318
164	13.67	0.77	0.372	0.054	(0.090)	0.318
165	13.75	0.77	0.372	0.054	(0.090)	0.318
166	13.83	0.77	0.372	0.053	(0.090)	0.319
167	13.92	0.77	0.372	0.053	(0.090)	0.319
168	14.00	0.77	0.372	0.053	(0.090)	0.319
169	14.08	0.90	0.437	0.053	(0.106)	0.384
170	14.17	0.90	0.437	0.052	(0.106)	0.384
171	14.25	0.90	0.437	0.052	(0.106)	0.385
172	14.33	0.87	0.420	0.052	(0.102)	0.369
173	14.42	0.87	0.420	0.052	(0.102)	0.369
174	14.50	0.87	0.420	0.051	(0.102)	0.369
175	14.58	0.87	0.420	0.051	(0.102)	0.369
176	14.67	0.87	0.420	0.051	(0.102)	0.370
177	14.75	0.87	0.420	0.051	(0.102)	0.370
178	14.83	0.83	0.404	0.050	(0.098)	0.354

179	14.92	0.83	0.404	0.050	(0.098)	0.354
180	15.00	0.83	0.404	0.050	(0.098)	0.355
181	15.08	0.80	0.388	0.050	(0.094)	0.339
182	15.17	0.80	0.388	0.049	(0.094)	0.339
183	15.25	0.80	0.388	0.049	(0.094)	0.339
184	15.33	0.77	0.372	0.049	(0.090)	0.323
185	15.42	0.77	0.372	0.048	(0.090)	0.323
186	15.50	0.77	0.372	0.048	(0.090)	0.324
187	15.58	0.63	0.307	0.048	(0.075)	0.259
188	15.67	0.63	0.307	0.048	(0.075)	0.260
189	15.75	0.63	0.307	0.048	(0.075)	0.260
190	15.83	0.63	0.307	0.047	(0.075)	0.260
191	15.92	0.63	0.307	0.047	(0.075)	0.260
192	16.00	0.63	0.307	0.047	(0.075)	0.260
193	16.08	0.13	0.065	(0.047)	0.016	0.049
194	16.17	0.13	0.065	(0.046)	0.016	0.049
195	16.25	0.13	0.065	(0.046)	0.016	0.049
196	16.33	0.13	0.065	(0.046)	0.016	0.049
197	16.42	0.13	0.065	(0.046)	0.016	0.049
198	16.50	0.13	0.065	(0.045)	0.016	0.049
199	16.58	0.10	0.049	(0.045)	0.012	0.037
200	16.67	0.10	0.049	(0.045)	0.012	0.037
201	16.75	0.10	0.049	(0.045)	0.012	0.037
202	16.83	0.10	0.049	(0.044)	0.012	0.037
203	16.92	0.10	0.049	(0.044)	0.012	0.037
204	17.00	0.10	0.049	(0.044)	0.012	0.037
205	17.08	0.17	0.081	(0.044)	0.020	0.061
206	17.17	0.17	0.081	(0.044)	0.020	0.061
207	17.25	0.17	0.081	(0.043)	0.020	0.061
208	17.33	0.17	0.081	(0.043)	0.020	0.061
209	17.42	0.17	0.081	(0.043)	0.020	0.061
210	17.50	0.17	0.081	(0.043)	0.020	0.061
211	17.58	0.17	0.081	(0.042)	0.020	0.061
212	17.67	0.17	0.081	(0.042)	0.020	0.061
213	17.75	0.17	0.081	(0.042)	0.020	0.061
214	17.83	0.13	0.065	(0.042)	0.016	0.049
215	17.92	0.13	0.065	(0.042)	0.016	0.049
216	18.00	0.13	0.065	(0.041)	0.016	0.049
217	18.08	0.13	0.065	(0.041)	0.016	0.049
218	18.17	0.13	0.065	(0.041)	0.016	0.049
219	18.25	0.13	0.065	(0.041)	0.016	0.049
220	18.33	0.13	0.065	(0.041)	0.016	0.049
221	18.42	0.13	0.065	(0.040)	0.016	0.049
222	18.50	0.13	0.065	(0.040)	0.016	0.049
223	18.58	0.10	0.049	(0.040)	0.012	0.037
224	18.67	0.10	0.049	(0.040)	0.012	0.037
225	18.75	0.10	0.049	(0.040)	0.012	0.037
226	18.83	0.07	0.032	(0.039)	0.008	0.024
227	18.92	0.07	0.032	(0.039)	0.008	0.024
228	19.00	0.07	0.032	(0.039)	0.008	0.024
229	19.08	0.10	0.049	(0.039)	0.012	0.037
230	19.17	0.10	0.049	(0.039)	0.012	0.037
231	19.25	0.10	0.049	(0.039)	0.012	0.037
232	19.33	0.13	0.065	(0.038)	0.016	0.049
233	19.42	0.13	0.065	(0.038)	0.016	0.049
234	19.50	0.13	0.065	(0.038)	0.016	0.049
235	19.58	0.10	0.049	(0.038)	0.012	0.037

236	19.67	0.10	0.049	(0.038)	0.012	0.037
237	19.75	0.10	0.049	(0.037)	0.012	0.037
238	19.83	0.07	0.032	(0.037)	0.008	0.024
239	19.92	0.07	0.032	(0.037)	0.008	0.024
240	20.00	0.07	0.032	(0.037)	0.008	0.024
241	20.08	0.10	0.049	(0.037)	0.012	0.037
242	20.17	0.10	0.049	(0.037)	0.012	0.037
243	20.25	0.10	0.049	(0.037)	0.012	0.037
244	20.33	0.10	0.049	(0.036)	0.012	0.037
245	20.42	0.10	0.049	(0.036)	0.012	0.037
246	20.50	0.10	0.049	(0.036)	0.012	0.037
247	20.58	0.10	0.049	(0.036)	0.012	0.037
248	20.67	0.10	0.049	(0.036)	0.012	0.037
249	20.75	0.10	0.049	(0.036)	0.012	0.037
250	20.83	0.07	0.032	(0.035)	0.008	0.024
251	20.92	0.07	0.032	(0.035)	0.008	0.024
252	21.00	0.07	0.032	(0.035)	0.008	0.024
253	21.08	0.10	0.049	(0.035)	0.012	0.037
254	21.17	0.10	0.049	(0.035)	0.012	0.037
255	21.25	0.10	0.049	(0.035)	0.012	0.037
256	21.33	0.07	0.032	(0.035)	0.008	0.024
257	21.42	0.07	0.032	(0.034)	0.008	0.024
258	21.50	0.07	0.032	(0.034)	0.008	0.024
259	21.58	0.10	0.049	(0.034)	0.012	0.037
260	21.67	0.10	0.049	(0.034)	0.012	0.037
261	21.75	0.10	0.049	(0.034)	0.012	0.037
262	21.83	0.07	0.032	(0.034)	0.008	0.024
263	21.92	0.07	0.032	(0.034)	0.008	0.024
264	22.00	0.07	0.032	(0.034)	0.008	0.024
265	22.08	0.10	0.049	(0.034)	0.012	0.037
266	22.17	0.10	0.049	(0.033)	0.012	0.037
267	22.25	0.10	0.049	(0.033)	0.012	0.037
268	22.33	0.07	0.032	(0.033)	0.008	0.024
269	22.42	0.07	0.032	(0.033)	0.008	0.024
270	22.50	0.07	0.032	(0.033)	0.008	0.024
271	22.58	0.07	0.032	(0.033)	0.008	0.024
272	22.67	0.07	0.032	(0.033)	0.008	0.024
273	22.75	0.07	0.032	(0.033)	0.008	0.024
274	22.83	0.07	0.032	(0.033)	0.008	0.024
275	22.92	0.07	0.032	(0.033)	0.008	0.024
276	23.00	0.07	0.032	(0.032)	0.008	0.024
277	23.08	0.07	0.032	(0.032)	0.008	0.024
278	23.17	0.07	0.032	(0.032)	0.008	0.024
279	23.25	0.07	0.032	(0.032)	0.008	0.024
280	23.33	0.07	0.032	(0.032)	0.008	0.024
281	23.42	0.07	0.032	(0.032)	0.008	0.024
282	23.50	0.07	0.032	(0.032)	0.008	0.024
283	23.58	0.07	0.032	(0.032)	0.008	0.024
284	23.67	0.07	0.032	(0.032)	0.008	0.024
285	23.75	0.07	0.032	(0.032)	0.008	0.024
286	23.83	0.07	0.032	(0.032)	0.008	0.024
287	23.92	0.07	0.032	(0.032)	0.008	0.024
288	24.00	0.07	0.032	(0.032)	0.008	0.024

(Loss Rate Not Used)

Sum = 100.0 Sum = 39.4

Flood volume = Effective rainfall 3.28(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)

```
    Total soil loss =      0.76(In)
    Total soil loss =     0.320(Ac.Ft)
    Total rainfall =      4.04(In)
    Flood volume =       60035.5 Cubic Feet
    Total soil loss =       13935.1 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      2.494(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q         |         |         |         |
  0+10       0.0004      0.05  Q         |         |         |         |
  0+15       0.0010      0.09  Q         |         |         |         |
  0+20       0.0017      0.11  Q         |         |         |         |
  0+25       0.0027      0.14  Q         |         |         |         |
  0+30       0.0038      0.16  Q         |         |         |         |
  0+35       0.0050      0.17  Q         |         |         |         |
  0+40       0.0062      0.18  Q         |         |         |         |
  0+45       0.0075      0.18  Q         |         |         |         |
  0+50       0.0088      0.19  Q         |         |         |         |
  0+55       0.0102      0.21  Q         |         |         |         |
  1+ 0       0.0118      0.23  Q         |         |         |         |
  1+ 5       0.0134      0.24  Q         |         |         |         |
  1+10       0.0149      0.22  Q         |         |         |         |
  1+15       0.0163      0.20  Q         |         |         |         |
  1+20       0.0177      0.20  Q         |         |         |         |
  1+25       0.0190      0.19  Q         |         |         |         |
  1+30       0.0203      0.19  Q         |         |         |         |
  1+35       0.0216      0.19  Q         |         |         |         |
  1+40       0.0229      0.19  Q         |         |         |         |
  1+45       0.0242      0.19  Q         |         |         |         |
  1+50       0.0255      0.19  Q         |         |         |         |
  1+55       0.0269      0.21  Q         |         |         |         |
  2+ 0       0.0285      0.23  Q         |         |         |         |
  2+ 5       0.0302      0.24  Q         |         |         |         |
  2+10       0.0318      0.24  Q         |         |         |         |
  2+15       0.0335      0.25  Q         |         |         |         |
  2+20       0.0352      0.25  QV        |         |         |         |
  2+25       0.0369      0.25  QV        |         |         |         |
  2+30       0.0387      0.25  QV        |         |         |         |
  2+35       0.0404      0.25  |Q        |         |         |         |
  2+40       0.0423      0.27  |Q        |         |         |         |
  2+45       0.0443      0.29  |Q        |         |         |         |
  2+50       0.0464      0.30  |Q        |         |         |         |
  2+55       0.0485      0.31  |Q        |         |         |         |
  3+ 0       0.0506      0.31  |Q        |         |         |         |
  3+ 5       0.0527      0.31  |Q        |         |         |         |
  3+10       0.0549      0.31  |Q        |         |         |         |
  3+15       0.0570      0.31  |Q        |         |         |         |
  3+20       0.0591      0.31  |Q        |         |         |         |
```

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3+25       0.0613      0.31  |Q        |         |         |         |
3+30       0.0634      0.31  |Q        |         |         |         |
3+35       0.0656      0.31  |Q        |         |         |         |
3+40       0.0677      0.31  |Q        |         |         |         |
3+45       0.0698      0.31  |QV       |         |         |         |
3+50       0.0720      0.31  |QV       |         |         |         |
3+55       0.0743      0.33  |QV       |         |         |         |
4+ 0       0.0768      0.36  |QV       |         |         |         |
4+ 5       0.0793      0.36  |QV       |         |         |         |
4+10       0.0818      0.37  |QV       |         |         |         |
4+15       0.0843      0.37  |QV       |         |         |         |
4+20       0.0869      0.38  |QV       |         |         |         |
4+25       0.0897      0.40  |QV       |         |         |         |
4+30       0.0925      0.42  |QV       |         |         |         |
4+35       0.0955      0.43  |QV       |         |         |         |
4+40       0.0984      0.43  |QV       |         |         |         |
4+45       0.1014      0.43  |QV       |         |         |         |
4+50       0.1044      0.44  |Q V      |         |         |         |
4+55       0.1076      0.46  |Q V      |         |         |         |
5+ 0       0.1109      0.48  |Q V      |         |         |         |
5+ 5       0.1142      0.48  |Q V      |         |         |         |
5+10       0.1172      0.44  |Q V      |         |         |         |
5+15       0.1200      0.41  |Q V      |         |         |         |
5+20       0.1228      0.40  |Q V      |         |         |         |
5+25       0.1256      0.41  |Q V      |         |         |         |
5+30       0.1285      0.42  |Q V      |         |         |         |
5+35       0.1314      0.43  |Q V      |         |         |         |
5+40       0.1346      0.46  |Q V      |         |         |         |
5+45       0.1379      0.48  |Q  V     |         |         |         |
5+50       0.1412      0.49  |Q  V     |         |         |         |
5+55       0.1446      0.49  |Q  V     |         |         |         |
6+ 0       0.1480      0.49  |Q  V     |         |         |         |
6+ 5       0.1514      0.50  |Q  V     |         |         |         |
6+10       0.1550      0.52  | Q V     |         |         |         |
6+15       0.1588      0.54  | Q V     |         |         |         |
6+20       0.1625      0.55  | Q V     |         |         |         |
6+25       0.1664      0.55  | Q V     |         |         |         |
6+30       0.1702      0.56  | Q V     |         |         |         |
6+35       0.1741      0.56  | Q  V    |         |         |         |
6+40       0.1781      0.58  | Q  V    |         |         |         |
6+45       0.1822      0.60  | Q  V    |         |         |         |
6+50       0.1865      0.61  | Q  V    |         |         |         |
6+55       0.1907      0.62  | Q  V    |         |         |         |
7+ 0       0.1950      0.62  | Q  V    |         |         |         |
7+ 5       0.1992      0.62  | Q  V    |         |         |         |
7+10       0.2035      0.62  | Q  V    |         |         |         |
7+15       0.2078      0.62  | Q   V   |         |         |         |
7+20       0.2121      0.63  | Q   V   |         |         |         |
7+25       0.2165      0.65  | Q   V   |         |         |         |
7+30       0.2211      0.67  | Q   V   |         |         |         |
7+35       0.2258      0.68  | Q   V   |         |         |         |
7+40       0.2306      0.70  | Q   V   |         |         |         |
7+45       0.2356      0.73  | Q   V   |         |         |         |
7+50       0.2407      0.74  | Q   V   |         |         |         |
7+55       0.2460      0.76  |  Q   V  |         |         |         |
8+ 0       0.2514      0.79  |  Q   V  |         |         |         |
8+ 5       0.2569      0.80  |  Q   V  |         |         |         |
```

```
 8+10       0.2628      0.85  |  Q   V  |         |         |         |
 8+15       0.2690      0.89  |  Q   V  |         |         |         |
 8+20       0.2752      0.91  |  Q   V  |         |         |         |
 8+25       0.2816      0.92  |  Q    V |         |         |         |
 8+30       0.2880      0.93  |  Q    V |         |         |         |
 8+35       0.2944      0.93  |  Q    V |         |         |         |
 8+40       0.3010      0.95  |  Q    V |         |         |         |
 8+45       0.3077      0.98  |  Q    V |         |         |         |
 8+50       0.3145      0.99  |  Q     V|         |         |         |
 8+55       0.3215      1.01  |   Q    V|         |         |         |
 9+ 0       0.3286      1.04  |   Q    V|         |         |         |
 9+ 5       0.3359      1.05  |   Q    V|         |         |         |
 9+10       0.3435      1.11  |   Q    V|         |         |         |
 9+15       0.3515      1.16  |   Q     V         |         |         |
 9+20       0.3596      1.18  |   Q     V         |         |         |
 9+25       0.3680      1.22  |   Q     V         |         |         |
 9+30       0.3767      1.26  |    Q    V         |         |         |
 9+35       0.3855      1.28  |    Q    |V        |         |         |
 9+40       0.3945      1.31  |    Q    |V        |         |         |
 9+45       0.4038      1.35  |    Q    |V        |         |         |
 9+50       0.4132      1.37  |    Q    |V        |         |         |
 9+55       0.4229      1.40  |    Q    | V       |         |         |
10+ 0       0.4328      1.43  |    Q    | V       |         |         |
10+ 5       0.4425      1.42  |    Q    | V       |         |         |
10+10       0.4512      1.25  |    Q    |  V      |         |         |
10+15       0.4586      1.08  |   Q     |  V      |         |         |
10+20       0.4656      1.02  |   Q     |  V      |         |         |
10+25       0.4723      0.98  |  Q      |  V      |         |         |
10+30       0.4789      0.96  |  Q      |  V      |         |         |
10+35       0.4856      0.97  |  Q      |   V     |         |         |
10+40       0.4930      1.09  |   Q     |   V     |         |         |
10+45       0.5014      1.21  |   Q     |   V     |         |         |
10+50       0.5100      1.26  |    Q    |   V     |         |         |
10+55       0.5189      1.28  |    Q    |    V    |         |         |
11+ 0       0.5278      1.30  |    Q    |    V    |         |         |
11+ 5       0.5368      1.31  |    Q    |    V    |         |         |
11+10       0.5457      1.28  |    Q    |    V    |         |         |
11+15       0.5544      1.26  |    Q    |     V   |         |         |
11+20       0.5630      1.25  |    Q    |     V   |         |         |
11+25       0.5716      1.25  |    Q    |     V   |         |         |
11+30       0.5802      1.25  |   Q     |     V   |         |         |
11+35       0.5887      1.24  |   Q     |      V  |         |         |
11+40       0.5969      1.19  |   Q     |      V  |         |         |
11+45       0.6047      1.13  |   Q     |      V  |         |         |
11+50       0.6124      1.12  |   Q     |      V  |         |         |
11+55       0.6202      1.13  |   Q     |       V |         |         |
12+ 0       0.6282      1.16  |   Q     |       V |         |         |
12+ 5       0.6364      1.20  |   Q     |       V |         |         |
12+10       0.6460      1.39  |    Q    |       V |         |         |
12+15       0.6569      1.59  |     Q   |        V|         |         |
12+20       0.6684      1.67  |     Q   |        V|         |         |
12+25       0.6804      1.73  |     Q   |        V|         |         |
12+30       0.6927      1.79  |      Q  |         V         |         |
12+35       0.7052      1.82  |      Q  |         V         |         |
12+40       0.7182      1.89  |      Q  |         V         |         |
12+45       0.7317      1.95  |      Q  |         |V        |         |
12+50       0.7453      1.98  |      Q  |         |V        |         |
```

```
12+55       0.7593      2.03  |       Q |         | V       |         |
13+ 0       0.7735      2.06  |       Q |         | V       |         |
13+ 5       0.7880      2.10  |       Q |         | V       |         |
13+10       0.8034      2.24  |       Q |         |  V      |         |
13+15       0.8199      2.39  |        Q|         |  V      |         |
13+20       0.8367      2.44  |        Q|         |   V     |         |
13+25       0.8537      2.47  |        Q|         |   V     |         |
13+30       0.8709      2.49  |        Q|         |    V    |         |
13+35       0.8878      2.45  |        Q|         |    V    |         |
13+40       0.9027      2.17  |       Q |         |     V   |         |
13+45       0.9156      1.87  |      Q  |         |     V   |         |
13+50       0.9277      1.76  |      Q  |         |     V   |         |
13+55       0.9394      1.70  |     Q   |         |      V  |         |
14+ 0       0.9508      1.66  |     Q   |         |      V  |         |
14+ 5       0.9622      1.66  |     Q   |         |      V  |         |
14+10       0.9744      1.76  |      Q  |         |       V |         |
14+15       0.9872      1.87  |      Q  |         |       V |         |
14+20       1.0003      1.90  |      Q  |         |        V|         |
14+25       1.0133      1.89  |      Q  |         |        V|         |
14+30       1.0263      1.88  |      Q  |         |        V|         |
14+35       1.0393      1.88  |      Q  |         |         V         |
14+40       1.0522      1.88  |      Q  |         |         V         |
14+45       1.0651      1.88  |      Q  |         |         V         |
14+50       1.0780      1.87  |      Q  |         |         |V        |
14+55       1.0908      1.85  |      Q  |         |         |V        |
15+ 0       1.1033      1.82  |      Q  |         |         | V       |
15+ 5       1.1158      1.81  |      Q  |         |         | V       |
15+10       1.1280      1.78  |      Q  |         |         | V       |
15+15       1.1401      1.75  |     Q   |         |         |  V      |
15+20       1.1520      1.73  |     Q   |         |         |  V      |
15+25       1.1637      1.70  |     Q   |         |         |  V      |
15+30       1.1752      1.67  |     Q   |         |         |   V     |
15+35       1.1865      1.64  |     Q   |         |         |   V     |
15+40       1.1970      1.53  |     Q   |         |         |   V     |
15+45       1.2068      1.41  |    Q    |         |         |    V    |
15+50       1.2162      1.37  |    Q    |         |         |    V    |
15+55       1.2255      1.35  |    Q    |         |         |    V    |
16+ 0       1.2347      1.34  |    Q    |         |         |    V    |
16+ 5       1.2435      1.27  |    Q    |         |         |     V   |
16+10       1.2498      0.92  |  Q      |         |         |     V   |
16+15       1.2536      0.56  | Q       |         |         |     V   |
16+20       1.2565      0.42  |Q        |         |         |     V   |
16+25       1.2589      0.34  |Q        |         |         |     V   |
16+30       1.2610      0.30  |Q        |         |         |     V   |
16+35       1.2628      0.27  |Q        |         |         |     V   |
16+40       1.2645      0.24  Q         |         |         |     V   |
16+45       1.2660      0.21  Q         |         |         |     V   |
16+50       1.2674      0.20  Q         |         |         |     V   |
16+55       1.2687      0.19  Q         |         |         |     V   |
17+ 0       1.2700      0.19  Q         |         |         |     V   |
17+ 5       1.2713      0.20  Q         |         |         |     V   |
17+10       1.2730      0.23  Q         |         |         |     V   |
17+15       1.2749      0.28  |Q        |         |         |      V  |
17+20       1.2769      0.29  |Q        |         |         |      V  |
17+25       1.2789      0.30  |Q        |         |         |      V  |
17+30       1.2810      0.31  |Q        |         |         |      V  |
17+35       1.2832      0.31  |Q        |         |         |      V  |
```

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17+40       1.2853      0.31  |Q        |         |         |      V  |
17+45       1.2874      0.31  |Q        |         |         |      V  |
17+50       1.2895      0.31  |Q        |         |         |      V  |
17+55       1.2915      0.29  |Q        |         |         |      V  |
18+ 0       1.2934      0.27  |Q        |         |         |      V  |
18+ 5       1.2951      0.26  |Q        |         |         |      V  |
18+10       1.2969      0.25  |Q        |         |         |      V  |
18+15       1.2986      0.25  |Q        |         |         |      V  |
18+20       1.3003      0.25  |Q        |         |         |      V  |
18+25       1.3021      0.25  Q         |         |         |      V  |
18+30       1.3038      0.25  Q         |         |         |      V  |
18+35       1.3055      0.25  Q         |         |         |      V  |
18+40       1.3070      0.23  Q         |         |         |      V  |
18+45       1.3084      0.20  Q         |         |         |      V  |
18+50       1.3098      0.19  Q         |         |         |       V |
18+55       1.3109      0.17  Q         |         |         |       V |
19+ 0       1.3119      0.14  Q         |         |         |       V |
19+ 5       1.3129      0.14  Q         |         |         |       V |
19+10       1.3139      0.15  Q         |         |         |       V |
19+15       1.3151      0.17  Q         |         |         |       V |
19+20       1.3164      0.18  Q         |         |         |       V |
19+25       1.3178      0.21  Q         |         |         |       V |
19+30       1.3194      0.23  Q         |         |         |       V |
19+35       1.3210      0.23  Q         |         |         |       V |
19+40       1.3225      0.22  Q         |         |         |       V |
19+45       1.3239      0.20  Q         |         |         |       V |
19+50       1.3252      0.19  Q         |         |         |       V |
19+55       1.3263      0.17  Q         |         |         |       V |
20+ 0       1.3273      0.14  Q         |         |         |       V |
20+ 5       1.3283      0.14  Q         |         |         |       V |
20+10       1.3294      0.15  Q         |         |         |       V |
20+15       1.3305      0.17  Q         |         |         |       V |
20+20       1.3318      0.18  Q         |         |         |       V |
20+25       1.3330      0.18  Q         |         |         |       V |
20+30       1.3343      0.18  Q         |         |         |       V |
20+35       1.3356      0.19  Q         |         |         |       V |
20+40       1.3369      0.19  Q         |         |         |       V |
20+45       1.3381      0.19  Q         |         |         |       V |
20+50       1.3394      0.18  Q         |         |         |       V |
20+55       1.3405      0.16  Q         |         |         |       V |
21+ 0       1.3415      0.14  Q         |         |         |       V |
21+ 5       1.3424      0.14  Q         |         |         |       V |
21+10       1.3435      0.15  Q         |         |         |       V |
21+15       1.3447      0.17  Q         |         |         |        V|
21+20       1.3459      0.17  Q         |         |         |        V|
21+25       1.3470      0.16  Q         |         |         |        V|
21+30       1.3479      0.14  Q         |         |         |        V|
21+35       1.3489      0.14  Q         |         |         |        V|
21+40       1.3499      0.15  Q         |         |         |        V|
21+45       1.3511      0.17  Q         |         |         |        V|
21+50       1.3523      0.17  Q         |         |         |        V|
21+55       1.3534      0.16  Q         |         |         |        V|
22+ 0       1.3544      0.14  Q         |         |         |        V|
22+ 5       1.3553      0.14  Q         |         |         |        V|
22+10       1.3564      0.15  Q         |         |         |        V|
22+15       1.3575      0.17  Q         |         |         |        V|
22+20       1.3587      0.17  Q         |         |         |        V|
```

22+25	1.3598	0.16	Q	|	|	|	V|
22+30	1.3608	0.14	Q	|	|	|	V|
22+35	1.3617	0.13	Q	|	|	|	V|
22+40	1.3626	0.13	Q	|	|	|	V|
22+45	1.3635	0.13	Q	|	|	|	V|
22+50	1.3643	0.13	Q	|	|	|	V|
22+55	1.3652	0.13	Q	|	|	|	V|
23+ 0	1.3661	0.12	Q	|	|	|	V|
23+ 5	1.3669	0.12	Q	|	|	|	V|
23+10	1.3678	0.12	Q	|	|	|	V|
23+15	1.3686	0.12	Q	|	|	|	V|
23+20	1.3695	0.12	Q	|	|	|	V|
23+25	1.3703	0.12	Q	|	|	|	V|
23+30	1.3712	0.12	Q	|	|	|	V|
23+35	1.3721	0.12	Q	|	|	|	V|
23+40	1.3729	0.12	Q	|	|	|	V|
23+45	1.3738	0.12	Q	|	|	|	V|
23+50	1.3746	0.12	Q	|	|	|	V|
23+55	1.3755	0.12	Q	|	|	|	V|
24+ 0	1.3763	0.12	Q	|	|	|	V|
24+ 5	1.3772	0.12	Q	|	|	|	V|
24+10	1.3777	0.08	Q	|	|	|	V|
24+15	1.3779	0.04	Q	|	|	|	V|
24+20	1.3781	0.02	Q	|	|	|	V|
24+25	1.3781	0.01	Q	|	|	|	V|
24+30	1.3782	0.01	Q	|	|	|	V|
24+35	1.3782	0.00	Q	|	|	|	V|
24+40	1.3782	0.00	Q	|	|	|	V|
24+45	1.3782	0.00	Q	|	|	|	V|
24+50	1.3782	0.00	Q	|	|	|	V|
24+55	1.3782	0.00	Q	|	|	|	V|

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST625.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 25.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.075(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.075(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.124	(0.064)	0.030	0.094
2	0.17	0.60	0.149	(0.064)	0.036	0.113
3	0.25	0.60	0.149	(0.064)	0.036	0.113
4	0.33	0.60	0.149	(0.064)	0.036	0.113
5	0.42	0.60	0.149	(0.064)	0.036	0.113
6	0.50	0.70	0.174	(0.064)	0.042	0.132
7	0.58	0.70	0.174	(0.064)	0.042	0.132

8	0.67	0.70	0.174	(0.064)	0.042	0.132
9	0.75	0.70	0.174	(0.064)	0.042	0.132
10	0.83	0.70	0.174	(0.064)	0.042	0.132
11	0.92	0.70	0.174	(0.064)	0.042	0.132
12	1.00	0.80	0.199	(0.064)	0.048	0.151
13	1.08	0.80	0.199	(0.064)	0.048	0.151
14	1.17	0.80	0.199	(0.064)	0.048	0.151
15	1.25	0.80	0.199	(0.064)	0.048	0.151
16	1.33	0.80	0.199	(0.064)	0.048	0.151
17	1.42	0.80	0.199	(0.064)	0.048	0.151
18	1.50	0.80	0.199	(0.064)	0.048	0.151
19	1.58	0.80	0.199	(0.064)	0.048	0.151
20	1.67	0.80	0.199	(0.064)	0.048	0.151
21	1.75	0.80	0.199	(0.064)	0.048	0.151
22	1.83	0.80	0.199	(0.064)	0.048	0.151
23	1.92	0.80	0.199	(0.064)	0.048	0.151
24	2.00	0.90	0.224	(0.064)	0.054	0.170
25	2.08	0.80	0.199	(0.064)	0.048	0.151
26	2.17	0.90	0.224	(0.064)	0.054	0.170
27	2.25	0.90	0.224	(0.064)	0.054	0.170
28	2.33	0.90	0.224	(0.064)	0.054	0.170
29	2.42	0.90	0.224	(0.064)	0.054	0.170
30	2.50	0.90	0.224	(0.064)	0.054	0.170
31	2.58	0.90	0.224	(0.064)	0.054	0.170
32	2.67	0.90	0.224	(0.064)	0.054	0.170
33	2.75	1.00	0.249	(0.064)	0.061	0.188
34	2.83	1.00	0.249	(0.064)	0.061	0.188
35	2.92	1.00	0.249	(0.064)	0.061	0.188
36	3.00	1.00	0.249	(0.064)	0.061	0.188
37	3.08	1.00	0.249	(0.064)	0.061	0.188
38	3.17	1.10	0.274	0.064	(0.067)	0.210
39	3.25	1.10	0.274	0.064	(0.067)	0.210
40	3.33	1.10	0.274	0.064	(0.067)	0.210
41	3.42	1.20	0.299	0.064	(0.073)	0.235
42	3.50	1.30	0.324	0.064	(0.079)	0.260
43	3.58	1.40	0.349	0.064	(0.085)	0.285
44	3.67	1.40	0.349	0.064	(0.085)	0.285
45	3.75	1.50	0.373	0.064	(0.091)	0.310
46	3.83	1.50	0.373	0.064	(0.091)	0.310
47	3.92	1.60	0.398	0.064	(0.097)	0.335
48	4.00	1.60	0.398	0.064	(0.097)	0.335
49	4.08	1.70	0.423	0.064	(0.103)	0.360
50	4.17	1.80	0.448	0.064	(0.109)	0.384
51	4.25	1.90	0.473	0.064	(0.115)	0.409
52	4.33	2.00	0.498	0.064	(0.121)	0.434
53	4.42	2.10	0.523	0.064	(0.127)	0.459
54	4.50	2.10	0.523	0.064	(0.127)	0.459
55	4.58	2.20	0.548	0.064	(0.133)	0.484
56	4.67	2.30	0.573	0.064	(0.139)	0.509
57	4.75	2.40	0.598	0.064	(0.145)	0.534
58	4.83	2.40	0.598	0.064	(0.145)	0.534
59	4.92	2.50	0.622	0.064	(0.151)	0.559
60	5.00	2.60	0.647	0.064	(0.157)	0.584
61	5.08	3.10	0.772	0.064	(0.188)	0.708
62	5.17	3.60	0.896	0.064	(0.218)	0.833
63	5.25	3.90	0.971	0.064	(0.236)	0.907
64	5.33	4.20	1.046	0.064	(0.254)	0.982

```
65   5.42     4.70      1.170          0.064    (  0.285)        1.106
66   5.50     5.60      1.394          0.064    (  0.339)        1.331
67   5.58     1.90      0.473          0.064    (  0.115)        0.409
68   5.67     0.90      0.224       (  0.064)      0.054         0.170
69   5.75     0.60      0.149       (  0.064)      0.036         0.113
70   5.83     0.50      0.124       (  0.064)      0.030         0.094
71   5.92     0.30      0.075       (  0.064)      0.018         0.057
72   6.00     0.20      0.050       (  0.064)      0.012         0.038
           (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    21.0
    Flood volume = Effective rainfall      1.75(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.7(Ac.Ft)
    Total soil loss =      0.32(In)
    Total soil loss =     0.135(Ac.Ft)
    Total rainfall =      2.07(In)
    Flood volume =       32071.1 Cubic Feet
    Total soil loss =       5886.4 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      5.469(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0         2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0015      0.19  Q         |         |         |         |
  0+15       0.0041      0.38  VQ        |         |         |         |
  0+20       0.0073      0.47  VQ        |         |         |         |
  0+25       0.0109      0.52  V Q       |         |         |         |
  0+30       0.0147      0.55  V Q       |         |         |         |
  0+35       0.0188      0.60  |VQ       |         |         |         |
  0+40       0.0231      0.63  |VQ       |         |         |         |
  0+45       0.0276      0.65  |VQ       |         |         |         |
  0+50       0.0322      0.66  |VQ       |         |         |         |
  0+55       0.0367      0.66  |VQ       |         |         |         |
  1+ 0       0.0414      0.67  | Q       |         |         |         |
  1+ 5       0.0462      0.71  | Q       |         |         |         |
  1+10       0.0513      0.74  | Q       |         |         |         |
  1+15       0.0565      0.75  |  Q      |         |         |         |
  1+20       0.0617      0.76  |  Q      |         |         |         |
  1+25       0.0669      0.76  |  Q      |         |         |         |
  1+30       0.0722      0.76  |  Q      |         |         |         |
  1+35       0.0775      0.76  |  QV     |         |         |         |
  1+40       0.0827      0.77  |  QV     |         |         |         |
  1+45       0.0880      0.77  |  QV     |         |         |         |
  1+50       0.0933      0.77  |  Q V    |         |         |         |
  1+55       0.0986      0.77  |  Q V    |         |         |         |
  2+ 0       0.1039      0.77  |  Q V    |         |         |         |
  2+ 5       0.1094      0.80  |  Q V    |         |         |         |
  2+10       0.1149      0.80  |  Q  V   |         |         |         |
  2+15       0.1205      0.81  |  Q  V   |         |         |         |
  2+20       0.1263      0.84  |  Q  V   |         |         |         |
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    2+25       0.1322      0.85  |  Q   V  |         |         |         |
    2+30       0.1380      0.86  |  Q   V  |         |         |         |
    2+35       0.1440      0.86  |  Q   V  |         |         |         |
    2+40       0.1499      0.86  |  Q    V |         |         |         |
    2+45       0.1558      0.87  |  Q    V |         |         |         |
    2+50       0.1620      0.90  |  Q    V |         |         |         |
    2+55       0.1684      0.93  |  Q     V|         |         |         |
    3+ 0       0.1749      0.94  |  Q     V|         |         |         |
    3+ 5       0.1815      0.95  |  Q     V|         |         |         |
    3+10       0.1881      0.96  |  Q      V         |         |         |
    3+15       0.1949      1.00  |  Q      V         |         |         |
    3+20       0.2021      1.04  |   Q     V         |         |         |
    3+25       0.2093      1.06  |   Q     |V        |         |         |
    3+30       0.2170      1.11  |   Q     |V        |         |         |
    3+35       0.2253      1.21  |   Q     | V       |         |         |
    3+40       0.2344      1.31  |    Q    | V       |         |         |
    3+45       0.2439      1.39  |    Q    |  V      |         |         |
    3+50       0.2539      1.46  |    Q    |  V      |         |         |
    3+55       0.2644      1.52  |     Q   |   V     |         |         |
    4+ 0       0.2754      1.59  |     Q   |   V     |         |         |
    4+ 5       0.2868      1.65  |     Q   |    V    |         |         |
    4+10       0.2987      1.73  |     Q   |     V   |         |         |
    4+15       0.3113      1.83  |      Q  |     V   |         |         |
    4+20       0.3247      1.94  |      Q  |      V  |         |         |
    4+25       0.3389      2.06  |       Q |       V |         |         |
    4+30       0.3539      2.18  |       Q |        V|         |         |
    4+35       0.3695      2.26  |        Q|         V         |         |
    4+40       0.3857      2.35  |        Q|         V         |         |
    4+45       0.4026      2.46  |        Q|         |V        |         |
    4+50       0.4202      2.57  |         Q         | V       |         |
    4+55       0.4385      2.65  |         Q         |  V      |         |
    5+ 0       0.4572      2.73  |         Q         |   V     |         |
    5+ 5       0.4770      2.87  |         |Q        |    V    |         |
    5+10       0.4988      3.18  |         | Q       |      V  |         |
    5+15       0.5239      3.64  |         |   Q     |       V |         |
    5+20       0.5522      4.10  |         |     Q   |        V|         |
    5+25       0.5833      4.52  |         |       Q |         |V        |
    5+30       0.6179      5.04  |         |         Q         |  V      |
    5+35       0.6556      5.47  |         |         |Q        |    V    |
    5+40       0.6860      4.41  |         |      Q  |         |      V  |
    5+45       0.7042      2.64  |         Q         |         |       V |
    5+50       0.7158      1.69  |     Q   |         |         |       V |
    5+55       0.7236      1.14  |   Q     |         |         |        V|
    6+ 0       0.7289      0.76  |  Q      |         |         |        V|
    6+ 5       0.7321      0.48  |Q        |         |         |        V|
    6+10       0.7341      0.28  |Q        |         |         |        V|
    6+15       0.7351      0.15  Q         |         |         |        V|
    6+20       0.7357      0.09  Q         |         |         |        V|
    6+25       0.7360      0.04  Q         |         |         |        V|
    6+30       0.7361      0.02  Q         |         |         |        V|
    6+35       0.7362      0.01  Q         |         |         |        V|
    6+40       0.7362      0.00  Q         |         |         |        V|
    6+45       0.7362      0.00  Q         |         |         |        V|
    6+50       0.7362      0.00  Q         |         |         |        V|
    6+55       0.7363      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/22/15 File: 201501POST325.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             0.85                     4.28

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             1.80                     9.07

STORM EVENT (YEAR) =   25.00
Area Averaged 2-Year Rainfall =    0.850(In)
Area Averaged 100-Year Rainfall =    1.800(In)
```

Point rain (area averaged) = 1.463(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.463(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.228	(0.064)	0.056	0.173
2	0.17	1.30	0.228	(0.064)	0.056	0.173
3	0.25	1.10	0.193	(0.064)	0.047	0.146
4	0.33	1.50	0.263	0.064	(0.064)	0.200
5	0.42	1.50	0.263	0.064	(0.064)	0.200
6	0.50	1.80	0.316	0.064	(0.077)	0.252
7	0.58	1.50	0.263	0.064	(0.064)	0.200

8	0.67	1.80	0.316	0.064	(0.077)	0.252
9	0.75	1.80	0.316	0.064	(0.077)	0.252
10	0.83	1.50	0.263	0.064	(0.064)	0.200
11	0.92	1.60	0.281	0.064	(0.068)	0.217
12	1.00	1.80	0.316	0.064	(0.077)	0.252
13	1.08	2.20	0.386	0.064	(0.094)	0.323
14	1.17	2.20	0.386	0.064	(0.094)	0.323
15	1.25	2.20	0.386	0.064	(0.094)	0.323
16	1.33	2.00	0.351	0.064	(0.085)	0.287
17	1.42	2.60	0.457	0.064	(0.111)	0.393
18	1.50	2.70	0.474	0.064	(0.115)	0.410
19	1.58	2.40	0.421	0.064	(0.102)	0.358
20	1.67	2.70	0.474	0.064	(0.115)	0.410
21	1.75	3.30	0.579	0.064	(0.141)	0.516
22	1.83	3.10	0.544	0.064	(0.132)	0.481
23	1.92	2.90	0.509	0.064	(0.124)	0.446
24	2.00	3.00	0.527	0.064	(0.128)	0.463
25	2.08	3.10	0.544	0.064	(0.132)	0.481
26	2.17	4.20	0.738	0.064	(0.179)	0.674
27	2.25	5.00	0.878	0.064	(0.214)	0.814
28	2.33	3.50	0.615	0.064	(0.149)	0.551
29	2.42	6.80	1.194	0.064	(0.290)	1.130
30	2.50	7.30	1.282	0.064	(0.312)	1.218
31	2.58	8.20	1.440	0.064	(0.350)	1.376
32	2.67	5.90	1.036	0.064	(0.252)	0.972
33	2.75	2.00	0.351	0.064	(0.085)	0.287
34	2.83	1.80	0.316	0.064	(0.077)	0.252
35	2.92	1.80	0.316	0.064	(0.077)	0.252
36	3.00	0.60	0.105	(0.064)	0.026	0.080

(Loss Rate Not Used)

Sum = 100.0 Sum = 15.3

Flood volume = Effective rainfall 1.28(In)
times area 5.0(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.19(In)
Total soil loss = 0.078(Ac.Ft)
Total rainfall = 1.46(In)
Flood volume = 23383.6 Cubic Feet
Total soil loss = 3388.1 Cubic Feet

```
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      5.845(CFS)
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    3 - H O U R   S T O R M
               R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
--------------------------------------------------------------------------
  0+ 5       0.0003      0.05  Q         |         |         |         |
  0+10       0.0026      0.33  VQ        |         |         |         |
  0+15       0.0069      0.62  V Q       |         |         |         |
  0+20       0.0118      0.70  V Q       |         |         |         |
  0+25       0.0173      0.81  |V Q      |         |         |         |
  0+30       0.0237      0.93  |V Q      |         |         |         |
  0+35       0.0310      1.05  | V Q     |         |         |         |
```

```
    0+40       0.0385      1.09  | V Q     |         |         |         |
    0+45       0.0463      1.13  |  VQ     |         |         |         |
    0+50       0.0546      1.20  |   Q     |         |         |         |
    0+55       0.0625      1.15  |   Q     |         |         |         |
    1+ 0       0.0702      1.12  |   QV    |         |         |         |
    1+ 5       0.0784      1.20  |   QV    |         |         |         |
    1+10       0.0879      1.37  |    QV   |         |         |         |
    1+15       0.0983      1.51  |     QV  |         |         |         |
    1+20       0.1090      1.56  |     Q V |         |         |         |
    1+25       0.1198      1.56  |     Q V |         |         |         |
    1+30       0.1315      1.70  |     Q  V|         |         |         |
    1+35       0.1444      1.88  |      Q  V         |         |         |
    1+40       0.1575      1.90  |      Q  |V        |         |         |
    1+45       0.1711      1.97  |      Q  | V       |         |         |
    1+50       0.1863      2.22  |       Q |  V      |         |         |
    1+55       0.2026      2.36  |        Q|    V    |         |         |
    2+ 0       0.2186      2.33  |        Q|     V   |         |         |
    2+ 5       0.2346      2.32  |        Q|      V  |         |         |
    2+10       0.2513      2.43  |        Q|       V |         |         |
    2+15       0.2708      2.83  |         |Q        V         |         |
    2+20       0.2937      3.32  |         |  Q      |V        |         |
    2+25       0.3173      3.43  |         |  Q      |  V      |         |
    2+30       0.3456      4.12  |         |     Q   |    V    |         |
    2+35       0.3816      5.23  |         |         Q       V |         |
    2+40       0.4219      5.84  |         |         |  Q      |V        |
    2+45       0.4597      5.49  |         |         |Q        |   V     |
    2+50       0.4865      3.89  |         |    Q    |         |     V   |
    2+55       0.5041      2.55  |         Q         |         |      V  |
    3+ 0       0.5174      1.94  |      Q  |         |         |       V |
    3+ 5       0.5264      1.31  |    Q    |         |         |        V|
    3+10       0.5312      0.70  | Q       |         |         |        V|
    3+15       0.5337      0.36  |Q        |         |         |        V|
    3+20       0.5352      0.21  Q         |         |         |        V|
    3+25       0.5360      0.12  Q         |         |         |        V|
    3+30       0.5364      0.06  Q         |         |         |        V|
    3+35       0.5366      0.03  Q         |         |         |        V|
    3+40       0.5367      0.01  Q         |         |         |        V|
    3+45       0.5368      0.01  Q         |         |         |        V|
    3+50       0.5368      0.00  Q         |         |         |        V|
    3+55       0.5368      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/22/15 File: 201501POST125.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             0.50                    2.52

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             1.20                    6.05

STORM EVENT (YEAR) =   25.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)
```

Point rain (area averaged) = 0.952(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.952(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.377	0.064	(0.092)	0.313
2	0.17	4.20	0.480	0.064	(0.117)	0.416
3	0.25	4.40	0.503	0.064	(0.122)	0.439
4	0.33	4.80	0.548	0.064	(0.133)	0.485
5	0.42	5.20	0.594	0.064	(0.144)	0.530

```
  6   0.50     6.20      0.708          0.064    (  0.172)       0.645
  7   0.58     6.80      0.777          0.064    (  0.189)       0.713
  8   0.67     8.80      1.005          0.064    (  0.244)       0.941
  9   0.75    13.90      1.588          0.064    (  0.386)       1.524
 10   0.83    31.40      3.587          0.064    (  0.872)       3.523
 11   0.92     7.20      0.822          0.064    (  0.200)       0.759
 12   1.00     3.80      0.434          0.064    (  0.106)       0.370
           (Loss Rate Not Used)
    Sum =     100.0                                 Sum =    10.7
     Flood volume = Effective rainfall      0.89(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.027(Ac.Ft)
     Total rainfall =      0.95(In)
     Flood volume =      16249.6 Cubic Feet
     Total soil loss =       1165.6 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      9.715(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0006      0.09  Q         |         |         |         |
   0+10       0.0050      0.64  V Q       |         |         |         |
   0+15       0.0143      1.35  |V   Q    |         |         |         |
   0+20       0.0265      1.77  | V    Q  |         |         |         |
   0+25       0.0408      2.07  |   V   Q |         |         |         |
   0+30       0.0571      2.38  |     V  Q|         |         |         |
   0+35       0.0762      2.76  |       V |Q        |         |         |
   0+40       0.0983      3.21  |         V Q       |         |         |
   0+45       0.1257      3.99  |         |  V Q    |         |         |
   0+50       0.1672      6.02  |         |      V  |   Q     |         |
   0+55       0.2341      9.72  |         |         |  V      |       Q |
   1+ 0       0.2959      8.97  |         |         |         |V   Q    |
   1+ 5       0.3303      5.01  |         |         Q         |    V    |
   1+10       0.3502      2.89  |         |Q        |         |      V  |
   1+15       0.3608      1.53  |      Q  |         |         |       V |
   1+20       0.3665      0.83  |   Q     |         |         |        V|
   1+25       0.3693      0.41  |Q        |         |         |        V|
   1+30       0.3709      0.23  Q         |         |         |        V|
   1+35       0.3719      0.15  Q         |         |         |        V|
   1+40       0.3726      0.10  Q         |         |         |        V|
   1+45       0.3729      0.05  Q         |         |         |        V|
   1+50       0.3730      0.01  Q         |         |         |        V|
   1+55       0.3730      0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
```

Proposed Conditions Unit Hydrograph: 10yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area =   5.04(Ac.) =   0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =   5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =   0.137 Hr.
Lag time =   8.24 Min.
25% of lag time =   2.06 Min.
40% of lag time =   3.30 Min.
Unit time =   5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =   0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =   2.300(In)
Area Averaged 100-Year Rainfall =   5.000(In)

Point rain (area averaged) = 3.411(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.411(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.027	(0.113)	0.007	0.021
2	0.17	0.07	0.027	(0.113)	0.007	0.021
3	0.25	0.07	0.027	(0.112)	0.007	0.021
4	0.33	0.10	0.041	(0.112)	0.010	0.031
5	0.42	0.10	0.041	(0.111)	0.010	0.031
6	0.50	0.10	0.041	(0.111)	0.010	0.031
7	0.58	0.10	0.041	(0.110)	0.010	0.031

8	0.67	0.10	0.041	(0.110)	0.010	0.031
9	0.75	0.10	0.041	(0.109)	0.010	0.031
10	0.83	0.13	0.055	(0.109)	0.013	0.041
11	0.92	0.13	0.055	(0.109)	0.013	0.041
12	1.00	0.13	0.055	(0.108)	0.013	0.041
13	1.08	0.10	0.041	(0.108)	0.010	0.031
14	1.17	0.10	0.041	(0.107)	0.010	0.031
15	1.25	0.10	0.041	(0.107)	0.010	0.031
16	1.33	0.10	0.041	(0.106)	0.010	0.031
17	1.42	0.10	0.041	(0.106)	0.010	0.031
18	1.50	0.10	0.041	(0.106)	0.010	0.031
19	1.58	0.10	0.041	(0.105)	0.010	0.031
20	1.67	0.10	0.041	(0.105)	0.010	0.031
21	1.75	0.10	0.041	(0.104)	0.010	0.031
22	1.83	0.13	0.055	(0.104)	0.013	0.041
23	1.92	0.13	0.055	(0.104)	0.013	0.041
24	2.00	0.13	0.055	(0.103)	0.013	0.041
25	2.08	0.13	0.055	(0.103)	0.013	0.041
26	2.17	0.13	0.055	(0.102)	0.013	0.041
27	2.25	0.13	0.055	(0.102)	0.013	0.041
28	2.33	0.13	0.055	(0.101)	0.013	0.041
29	2.42	0.13	0.055	(0.101)	0.013	0.041
30	2.50	0.13	0.055	(0.101)	0.013	0.041
31	2.58	0.17	0.068	(0.100)	0.017	0.052
32	2.67	0.17	0.068	(0.100)	0.017	0.052
33	2.75	0.17	0.068	(0.099)	0.017	0.052
34	2.83	0.17	0.068	(0.099)	0.017	0.052
35	2.92	0.17	0.068	(0.099)	0.017	0.052
36	3.00	0.17	0.068	(0.098)	0.017	0.052
37	3.08	0.17	0.068	(0.098)	0.017	0.052
38	3.17	0.17	0.068	(0.097)	0.017	0.052
39	3.25	0.17	0.068	(0.097)	0.017	0.052
40	3.33	0.17	0.068	(0.097)	0.017	0.052
41	3.42	0.17	0.068	(0.096)	0.017	0.052
42	3.50	0.17	0.068	(0.096)	0.017	0.052
43	3.58	0.17	0.068	(0.095)	0.017	0.052
44	3.67	0.17	0.068	(0.095)	0.017	0.052
45	3.75	0.17	0.068	(0.095)	0.017	0.052
46	3.83	0.20	0.082	(0.094)	0.020	0.062
47	3.92	0.20	0.082	(0.094)	0.020	0.062
48	4.00	0.20	0.082	(0.093)	0.020	0.062
49	4.08	0.20	0.082	(0.093)	0.020	0.062
50	4.17	0.20	0.082	(0.093)	0.020	0.062
51	4.25	0.20	0.082	(0.092)	0.020	0.062
52	4.33	0.23	0.096	(0.092)	0.023	0.072
53	4.42	0.23	0.096	(0.091)	0.023	0.072
54	4.50	0.23	0.096	(0.091)	0.023	0.072
55	4.58	0.23	0.096	(0.091)	0.023	0.072
56	4.67	0.23	0.096	(0.090)	0.023	0.072
57	4.75	0.23	0.096	(0.090)	0.023	0.072
58	4.83	0.27	0.109	(0.089)	0.027	0.083
59	4.92	0.27	0.109	(0.089)	0.027	0.083
60	5.00	0.27	0.109	(0.089)	0.027	0.083
61	5.08	0.20	0.082	(0.088)	0.020	0.062
62	5.17	0.20	0.082	(0.088)	0.020	0.062
63	5.25	0.20	0.082	(0.087)	0.020	0.062
64	5.33	0.23	0.096	(0.087)	0.023	0.072

65	5.42	0.23	0.096	(0.087)	0.023	0.072
66	5.50	0.23	0.096	(0.086)	0.023	0.072
67	5.58	0.27	0.109	(0.086)	0.027	0.083
68	5.67	0.27	0.109	(0.086)	0.027	0.083
69	5.75	0.27	0.109	(0.085)	0.027	0.083
70	5.83	0.27	0.109	(0.085)	0.027	0.083
71	5.92	0.27	0.109	(0.084)	0.027	0.083
72	6.00	0.27	0.109	(0.084)	0.027	0.083
73	6.08	0.30	0.123	(0.084)	0.030	0.093
74	6.17	0.30	0.123	(0.083)	0.030	0.093
75	6.25	0.30	0.123	(0.083)	0.030	0.093
76	6.33	0.30	0.123	(0.083)	0.030	0.093
77	6.42	0.30	0.123	(0.082)	0.030	0.093
78	6.50	0.30	0.123	(0.082)	0.030	0.093
79	6.58	0.33	0.136	(0.081)	0.033	0.103
80	6.67	0.33	0.136	(0.081)	0.033	0.103
81	6.75	0.33	0.136	(0.081)	0.033	0.103
82	6.83	0.33	0.136	(0.080)	0.033	0.103
83	6.92	0.33	0.136	(0.080)	0.033	0.103
84	7.00	0.33	0.136	(0.080)	0.033	0.103
85	7.08	0.33	0.136	(0.079)	0.033	0.103
86	7.17	0.33	0.136	(0.079)	0.033	0.103
87	7.25	0.33	0.136	(0.079)	0.033	0.103
88	7.33	0.37	0.150	(0.078)	0.036	0.114
89	7.42	0.37	0.150	(0.078)	0.036	0.114
90	7.50	0.37	0.150	(0.078)	0.036	0.114
91	7.58	0.40	0.164	(0.077)	0.040	0.124
92	7.67	0.40	0.164	(0.077)	0.040	0.124
93	7.75	0.40	0.164	(0.076)	0.040	0.124
94	7.83	0.43	0.177	(0.076)	0.043	0.134
95	7.92	0.43	0.177	(0.076)	0.043	0.134
96	8.00	0.43	0.177	(0.075)	0.043	0.134
97	8.08	0.50	0.205	(0.075)	0.050	0.155
98	8.17	0.50	0.205	(0.075)	0.050	0.155
99	8.25	0.50	0.205	(0.074)	0.050	0.155
100	8.33	0.50	0.205	(0.074)	0.050	0.155
101	8.42	0.50	0.205	(0.074)	0.050	0.155
102	8.50	0.50	0.205	(0.073)	0.050	0.155
103	8.58	0.53	0.218	(0.073)	0.053	0.165
104	8.67	0.53	0.218	(0.073)	0.053	0.165
105	8.75	0.53	0.218	(0.072)	0.053	0.165
106	8.83	0.57	0.232	(0.072)	0.056	0.176
107	8.92	0.57	0.232	(0.072)	0.056	0.176
108	9.00	0.57	0.232	(0.071)	0.056	0.176
109	9.08	0.63	0.259	(0.071)	0.063	0.196
110	9.17	0.63	0.259	(0.071)	0.063	0.196
111	9.25	0.63	0.259	(0.070)	0.063	0.196
112	9.33	0.67	0.273	(0.070)	0.066	0.207
113	9.42	0.67	0.273	(0.070)	0.066	0.207
114	9.50	0.67	0.273	(0.069)	0.066	0.207
115	9.58	0.70	0.287	0.069	(0.070)	0.218
116	9.67	0.70	0.287	0.069	(0.070)	0.218
117	9.75	0.70	0.287	0.068	(0.070)	0.218
118	9.83	0.73	0.300	0.068	(0.073)	0.232
119	9.92	0.73	0.300	0.068	(0.073)	0.233
120	10.00	0.73	0.300	0.067	(0.073)	0.233
121	10.08	0.50	0.205	(0.067)	0.050	0.155

122	10.17	0.50	0.205	(0.067)	0.050	0.155
123	10.25	0.50	0.205	(0.066)	0.050	0.155
124	10.33	0.50	0.205	(0.066)	0.050	0.155
125	10.42	0.50	0.205	(0.066)	0.050	0.155
126	10.50	0.50	0.205	(0.065)	0.050	0.155
127	10.58	0.67	0.273	0.065	(0.066)	0.208
128	10.67	0.67	0.273	0.065	(0.066)	0.208
129	10.75	0.67	0.273	0.064	(0.066)	0.208
130	10.83	0.67	0.273	0.064	(0.066)	0.209
131	10.92	0.67	0.273	0.064	(0.066)	0.209
132	11.00	0.67	0.273	0.063	(0.066)	0.209
133	11.08	0.63	0.259	(0.063)	0.063	0.196
134	11.17	0.63	0.259	0.063	(0.063)	0.196
135	11.25	0.63	0.259	0.063	(0.063)	0.197
136	11.33	0.63	0.259	0.062	(0.063)	0.197
137	11.42	0.63	0.259	0.062	(0.063)	0.197
138	11.50	0.63	0.259	0.062	(0.063)	0.198
139	11.58	0.57	0.232	(0.061)	0.056	0.176
140	11.67	0.57	0.232	(0.061)	0.056	0.176
141	11.75	0.57	0.232	(0.061)	0.056	0.176
142	11.83	0.60	0.246	(0.060)	0.060	0.186
143	11.92	0.60	0.246	(0.060)	0.060	0.186
144	12.00	0.60	0.246	(0.060)	0.060	0.186
145	12.08	0.83	0.341	0.059	(0.083)	0.282
146	12.17	0.83	0.341	0.059	(0.083)	0.282
147	12.25	0.83	0.341	0.059	(0.083)	0.282
148	12.33	0.87	0.355	0.059	(0.086)	0.296
149	12.42	0.87	0.355	0.058	(0.086)	0.296
150	12.50	0.87	0.355	0.058	(0.086)	0.297
151	12.58	0.93	0.382	0.058	(0.093)	0.324
152	12.67	0.93	0.382	0.057	(0.093)	0.325
153	12.75	0.93	0.382	0.057	(0.093)	0.325
154	12.83	0.97	0.396	0.057	(0.096)	0.339
155	12.92	0.97	0.396	0.057	(0.096)	0.339
156	13.00	0.97	0.396	0.056	(0.096)	0.339
157	13.08	1.13	0.464	0.056	(0.113)	0.408
158	13.17	1.13	0.464	0.056	(0.113)	0.408
159	13.25	1.13	0.464	0.055	(0.113)	0.408
160	13.33	1.13	0.464	0.055	(0.113)	0.409
161	13.42	1.13	0.464	0.055	(0.113)	0.409
162	13.50	1.13	0.464	0.055	(0.113)	0.409
163	13.58	0.77	0.314	0.054	(0.076)	0.260
164	13.67	0.77	0.314	0.054	(0.076)	0.260
165	13.75	0.77	0.314	0.054	(0.076)	0.260
166	13.83	0.77	0.314	0.053	(0.076)	0.260
167	13.92	0.77	0.314	0.053	(0.076)	0.261
168	14.00	0.77	0.314	0.053	(0.076)	0.261
169	14.08	0.90	0.368	0.053	(0.090)	0.316
170	14.17	0.90	0.368	0.052	(0.090)	0.316
171	14.25	0.90	0.368	0.052	(0.090)	0.316
172	14.33	0.87	0.355	0.052	(0.086)	0.303
173	14.42	0.87	0.355	0.052	(0.086)	0.303
174	14.50	0.87	0.355	0.051	(0.086)	0.303
175	14.58	0.87	0.355	0.051	(0.086)	0.304
176	14.67	0.87	0.355	0.051	(0.086)	0.304
177	14.75	0.87	0.355	0.051	(0.086)	0.304
178	14.83	0.83	0.341	0.050	(0.083)	0.291

179	14.92	0.83	0.341	0.050	(0.083)	0.291
180	15.00	0.83	0.341	0.050	(0.083)	0.291
181	15.08	0.80	0.327	0.050	(0.080)	0.278
182	15.17	0.80	0.327	0.049	(0.080)	0.278
183	15.25	0.80	0.327	0.049	(0.080)	0.278
184	15.33	0.77	0.314	0.049	(0.076)	0.265
185	15.42	0.77	0.314	0.048	(0.076)	0.265
186	15.50	0.77	0.314	0.048	(0.076)	0.266
187	15.58	0.63	0.259	0.048	(0.063)	0.211
188	15.67	0.63	0.259	0.048	(0.063)	0.211
189	15.75	0.63	0.259	0.048	(0.063)	0.212
190	15.83	0.63	0.259	0.047	(0.063)	0.212
191	15.92	0.63	0.259	0.047	(0.063)	0.212
192	16.00	0.63	0.259	0.047	(0.063)	0.212
193	16.08	0.13	0.055	(0.047)	0.013	0.041
194	16.17	0.13	0.055	(0.046)	0.013	0.041
195	16.25	0.13	0.055	(0.046)	0.013	0.041
196	16.33	0.13	0.055	(0.046)	0.013	0.041
197	16.42	0.13	0.055	(0.046)	0.013	0.041
198	16.50	0.13	0.055	(0.045)	0.013	0.041
199	16.58	0.10	0.041	(0.045)	0.010	0.031
200	16.67	0.10	0.041	(0.045)	0.010	0.031
201	16.75	0.10	0.041	(0.045)	0.010	0.031
202	16.83	0.10	0.041	(0.044)	0.010	0.031
203	16.92	0.10	0.041	(0.044)	0.010	0.031
204	17.00	0.10	0.041	(0.044)	0.010	0.031
205	17.08	0.17	0.068	(0.044)	0.017	0.052
206	17.17	0.17	0.068	(0.044)	0.017	0.052
207	17.25	0.17	0.068	(0.043)	0.017	0.052
208	17.33	0.17	0.068	(0.043)	0.017	0.052
209	17.42	0.17	0.068	(0.043)	0.017	0.052
210	17.50	0.17	0.068	(0.043)	0.017	0.052
211	17.58	0.17	0.068	(0.042)	0.017	0.052
212	17.67	0.17	0.068	(0.042)	0.017	0.052
213	17.75	0.17	0.068	(0.042)	0.017	0.052
214	17.83	0.13	0.055	(0.042)	0.013	0.041
215	17.92	0.13	0.055	(0.042)	0.013	0.041
216	18.00	0.13	0.055	(0.041)	0.013	0.041
217	18.08	0.13	0.055	(0.041)	0.013	0.041
218	18.17	0.13	0.055	(0.041)	0.013	0.041
219	18.25	0.13	0.055	(0.041)	0.013	0.041
220	18.33	0.13	0.055	(0.041)	0.013	0.041
221	18.42	0.13	0.055	(0.040)	0.013	0.041
222	18.50	0.13	0.055	(0.040)	0.013	0.041
223	18.58	0.10	0.041	(0.040)	0.010	0.031
224	18.67	0.10	0.041	(0.040)	0.010	0.031
225	18.75	0.10	0.041	(0.040)	0.010	0.031
226	18.83	0.07	0.027	(0.039)	0.007	0.021
227	18.92	0.07	0.027	(0.039)	0.007	0.021
228	19.00	0.07	0.027	(0.039)	0.007	0.021
229	19.08	0.10	0.041	(0.039)	0.010	0.031
230	19.17	0.10	0.041	(0.039)	0.010	0.031
231	19.25	0.10	0.041	(0.039)	0.010	0.031
232	19.33	0.13	0.055	(0.038)	0.013	0.041
233	19.42	0.13	0.055	(0.038)	0.013	0.041
234	19.50	0.13	0.055	(0.038)	0.013	0.041
235	19.58	0.10	0.041	(0.038)	0.010	0.031

236	19.67	0.10	0.041	(0.038)	0.010	0.031
237	19.75	0.10	0.041	(0.037)	0.010	0.031
238	19.83	0.07	0.027	(0.037)	0.007	0.021
239	19.92	0.07	0.027	(0.037)	0.007	0.021
240	20.00	0.07	0.027	(0.037)	0.007	0.021
241	20.08	0.10	0.041	(0.037)	0.010	0.031
242	20.17	0.10	0.041	(0.037)	0.010	0.031
243	20.25	0.10	0.041	(0.037)	0.010	0.031
244	20.33	0.10	0.041	(0.036)	0.010	0.031
245	20.42	0.10	0.041	(0.036)	0.010	0.031
246	20.50	0.10	0.041	(0.036)	0.010	0.031
247	20.58	0.10	0.041	(0.036)	0.010	0.031
248	20.67	0.10	0.041	(0.036)	0.010	0.031
249	20.75	0.10	0.041	(0.036)	0.010	0.031
250	20.83	0.07	0.027	(0.035)	0.007	0.021
251	20.92	0.07	0.027	(0.035)	0.007	0.021
252	21.00	0.07	0.027	(0.035)	0.007	0.021
253	21.08	0.10	0.041	(0.035)	0.010	0.031
254	21.17	0.10	0.041	(0.035)	0.010	0.031
255	21.25	0.10	0.041	(0.035)	0.010	0.031
256	21.33	0.07	0.027	(0.035)	0.007	0.021
257	21.42	0.07	0.027	(0.034)	0.007	0.021
258	21.50	0.07	0.027	(0.034)	0.007	0.021
259	21.58	0.10	0.041	(0.034)	0.010	0.031
260	21.67	0.10	0.041	(0.034)	0.010	0.031
261	21.75	0.10	0.041	(0.034)	0.010	0.031
262	21.83	0.07	0.027	(0.034)	0.007	0.021
263	21.92	0.07	0.027	(0.034)	0.007	0.021
264	22.00	0.07	0.027	(0.034)	0.007	0.021
265	22.08	0.10	0.041	(0.034)	0.010	0.031
266	22.17	0.10	0.041	(0.033)	0.010	0.031
267	22.25	0.10	0.041	(0.033)	0.010	0.031
268	22.33	0.07	0.027	(0.033)	0.007	0.021
269	22.42	0.07	0.027	(0.033)	0.007	0.021
270	22.50	0.07	0.027	(0.033)	0.007	0.021
271	22.58	0.07	0.027	(0.033)	0.007	0.021
272	22.67	0.07	0.027	(0.033)	0.007	0.021
273	22.75	0.07	0.027	(0.033)	0.007	0.021
274	22.83	0.07	0.027	(0.033)	0.007	0.021
275	22.92	0.07	0.027	(0.033)	0.007	0.021
276	23.00	0.07	0.027	(0.032)	0.007	0.021
277	23.08	0.07	0.027	(0.032)	0.007	0.021
278	23.17	0.07	0.027	(0.032)	0.007	0.021
279	23.25	0.07	0.027	(0.032)	0.007	0.021
280	23.33	0.07	0.027	(0.032)	0.007	0.021
281	23.42	0.07	0.027	(0.032)	0.007	0.021
282	23.50	0.07	0.027	(0.032)	0.007	0.021
283	23.58	0.07	0.027	(0.032)	0.007	0.021
284	23.67	0.07	0.027	(0.032)	0.007	0.021
285	23.75	0.07	0.027	(0.032)	0.007	0.021
286	23.83	0.07	0.027	(0.032)	0.007	0.021
287	23.92	0.07	0.027	(0.032)	0.007	0.021
288	24.00	0.07	0.027	(0.032)	0.007	0.021

(Loss Rate Not Used)

Sum = 100.0 Sum = 32.6

Flood volume = Effective rainfall 2.71(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)

```
Total soil loss =      0.70(In)
Total soil loss =     0.293(Ac.Ft)
Total rainfall =      3.41(In)
Flood volume =       49646.1 Cubic Feet
Total soil loss =       12754.6 Cubic Feet
--------------------------------------------------------------------
 Peak flow rate of this hydrograph =      2.060(CFS)
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   24 - H O U R   S T O R M
              R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

--------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q         |         |         |         |
  0+10       0.0003      0.04  Q         |         |         |         |
  0+15       0.0008      0.08  Q         |         |         |         |
  0+20       0.0015      0.09  Q         |         |         |         |
  0+25       0.0023      0.12  Q         |         |         |         |
  0+30       0.0032      0.14  Q         |         |         |         |
  0+35       0.0042      0.15  Q         |         |         |         |
  0+40       0.0053      0.15  Q         |         |         |         |
  0+45       0.0063      0.15  Q         |         |         |         |
  0+50       0.0074      0.16  Q         |         |         |         |
  0+55       0.0086      0.18  Q         |         |         |         |
  1+ 0       0.0100      0.19  Q         |         |         |         |
  1+ 5       0.0113      0.20  Q         |         |         |         |
  1+10       0.0126      0.19  Q         |         |         |         |
  1+15       0.0138      0.17  Q         |         |         |         |
  1+20       0.0149      0.16  Q         |         |         |         |
  1+25       0.0160      0.16  Q         |         |         |         |
  1+30       0.0171      0.16  Q         |         |         |         |
  1+35       0.0182      0.16  Q         |         |         |         |
  1+40       0.0193      0.16  Q         |         |         |         |
  1+45       0.0204      0.16  Q         |         |         |         |
  1+50       0.0215      0.16  Q         |         |         |         |
  1+55       0.0227      0.18  Q         |         |         |         |
  2+ 0       0.0241      0.20  Q         |         |         |         |
  2+ 5       0.0254      0.20  Q         |         |         |         |
  2+10       0.0269      0.21  Q         |         |         |         |
  2+15       0.0283      0.21  Q         |         |         |         |
  2+20       0.0297      0.21  QV        |         |         |         |
  2+25       0.0312      0.21  QV        |         |         |         |
  2+30       0.0326      0.21  QV        |         |         |         |
  2+35       0.0341      0.21  QV        |         |         |         |
  2+40       0.0357      0.23  QV        |         |         |         |
  2+45       0.0374      0.25  QV        |         |         |         |
  2+50       0.0391      0.25  |Q        |         |         |         |
  2+55       0.0409      0.26  |Q        |         |         |         |
  3+ 0       0.0427      0.26  |Q        |         |         |         |
  3+ 5       0.0445      0.26  |Q        |         |         |         |
  3+10       0.0463      0.26  |Q        |         |         |         |
  3+15       0.0481      0.26  |Q        |         |         |         |
  3+20       0.0499      0.26  |Q        |         |         |         |
```

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3+25       0.0517      0.26  |Q        |         |         |         |
3+30       0.0535      0.26  |Q        |         |         |         |
3+35       0.0553      0.26  |Q        |         |         |         |
3+40       0.0571      0.26  |QV       |         |         |         |
3+45       0.0589      0.26  |QV       |         |         |         |
3+50       0.0607      0.27  |QV       |         |         |         |
3+55       0.0627      0.28  |QV       |         |         |         |
4+ 0       0.0648      0.30  |QV       |         |         |         |
4+ 5       0.0669      0.31  |QV       |         |         |         |
4+10       0.0690      0.31  |QV       |         |         |         |
4+15       0.0712      0.31  |QV       |         |         |         |
4+20       0.0733      0.32  |QV       |         |         |         |
4+25       0.0756      0.33  |QV       |         |         |         |
4+30       0.0781      0.35  |QV       |         |         |         |
4+35       0.0805      0.36  |QV       |         |         |         |
4+40       0.0830      0.36  |QV       |         |         |         |
4+45       0.0855      0.36  |Q V      |         |         |         |
4+50       0.0881      0.37  |Q V      |         |         |         |
4+55       0.0907      0.39  |Q V      |         |         |         |
5+ 0       0.0935      0.40  |Q V      |         |         |         |
5+ 5       0.0963      0.41  |Q V      |         |         |         |
5+10       0.0989      0.38  |Q V      |         |         |         |
5+15       0.1013      0.34  |Q V      |         |         |         |
5+20       0.1036      0.33  |Q V      |         |         |         |
5+25       0.1059      0.34  |Q V      |         |         |         |
5+30       0.1084      0.36  |Q V      |         |         |         |
5+35       0.1109      0.36  |Q V      |         |         |         |
5+40       0.1135      0.38  |Q V      |         |         |         |
5+45       0.1163      0.40  |Q  V     |         |         |         |
5+50       0.1191      0.41  |Q  V     |         |         |         |
5+55       0.1220      0.41  |Q  V     |         |         |         |
6+ 0       0.1249      0.42  |Q  V     |         |         |         |
6+ 5       0.1278      0.42  |Q  V     |         |         |         |
6+10       0.1308      0.44  |Q  V     |         |         |         |
6+15       0.1339      0.46  |Q  V     |         |         |         |
6+20       0.1371      0.46  |Q  V     |         |         |         |
6+25       0.1403      0.47  |Q  V     |         |         |         |
6+30       0.1436      0.47  |Q   V    |         |         |         |
6+35       0.1468      0.47  |Q   V    |         |         |         |
6+40       0.1502      0.49  |Q   V    |         |         |         |
6+45       0.1537      0.51  | Q  V    |         |         |         |
6+50       0.1573      0.52  | Q  V    |         |         |         |
6+55       0.1609      0.52  | Q  V    |         |         |         |
7+ 0       0.1645      0.52  | Q  V    |         |         |         |
7+ 5       0.1681      0.52  | Q  V    |         |         |         |
7+10       0.1717      0.52  | Q   V   |         |         |         |
7+15       0.1753      0.52  | Q   V   |         |         |         |
7+20       0.1789      0.53  | Q   V   |         |         |         |
7+25       0.1827      0.54  | Q   V   |         |         |         |
7+30       0.1865      0.56  | Q   V   |         |         |         |
7+35       0.1905      0.57  | Q   V   |         |         |         |
7+40       0.1946      0.59  | Q   V   |         |         |         |
7+45       0.1988      0.61  | Q   V   |         |         |         |
7+50       0.2031      0.62  | Q    V  |         |         |         |
7+55       0.2075      0.64  | Q    V  |         |         |         |
8+ 0       0.2121      0.66  | Q    V  |         |         |         |
8+ 5       0.2168      0.68  | Q    V  |         |         |         |
```

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 8+10       0.2217      0.72  | Q    V  |         |         |         |
 8+15       0.2269      0.75  |  Q   V  |         |         |         |
 8+20       0.2322      0.77  |  Q    V |         |         |         |
 8+25       0.2375      0.78  |  Q    V |         |         |         |
 8+30       0.2429      0.78  |  Q    V |         |         |         |
 8+35       0.2483      0.79  |  Q    V |         |         |         |
 8+40       0.2539      0.81  |  Q    V |         |         |         |
 8+45       0.2596      0.82  |  Q     V|         |         |         |
 8+50       0.2653      0.83  |  Q     V|         |         |         |
 8+55       0.2712      0.85  |  Q     V|         |         |         |
 9+ 0       0.2772      0.87  |  Q     V|         |         |         |
 9+ 5       0.2833      0.89  |  Q     V|         |         |         |
 9+10       0.2897      0.93  |  Q      V         |         |         |
 9+15       0.2964      0.96  |  Q      V         |         |         |
 9+20       0.3031      0.98  |  Q      V         |         |         |
 9+25       0.3100      1.01  |   Q     V         |         |         |
 9+30       0.3171      1.03  |   Q     |V        |         |         |
 9+35       0.3243      1.04  |   Q     |V        |         |         |
 9+40       0.3316      1.06  |   Q     |V        |         |         |
 9+45       0.3391      1.09  |   Q     |V        |         |         |
 9+50       0.3467      1.10  |   Q     | V       |         |         |
 9+55       0.3545      1.13  |   Q     | V       |         |         |
10+ 0       0.3625      1.16  |   Q     | V       |         |         |
10+ 5       0.3704      1.15  |   Q     | V       |         |         |
10+10       0.3774      1.02  |   Q     |  V      |         |         |
10+15       0.3836      0.89  |  Q      |  V      |         |         |
10+20       0.3894      0.85  |  Q      |  V      |         |         |
10+25       0.3951      0.82  |  Q      |  V      |         |         |
10+30       0.4006      0.80  |  Q      |   V     |         |         |
10+35       0.4062      0.81  |  Q      |   V     |         |         |
10+40       0.4124      0.90  |  Q      |   V     |         |         |
10+45       0.4191      0.98  |  Q      |   V     |         |         |
10+50       0.4262      1.02  |   Q     |   V     |         |         |
10+55       0.4333      1.04  |   Q     |    V    |         |         |
11+ 0       0.4405      1.05  |   Q     |    V    |         |         |
11+ 5       0.4478      1.05  |   Q     |    V    |         |         |
11+10       0.4549      1.03  |   Q     |    V    |         |         |
11+15       0.4619      1.01  |   Q     |     V   |         |         |
11+20       0.4688      1.01  |   Q     |     V   |         |         |
11+25       0.4757      1.01  |   Q     |     V   |         |         |
11+30       0.4826      1.00  |   Q     |     V   |         |         |
11+35       0.4895      1.00  |  Q      |      V  |         |         |
11+40       0.4961      0.96  |  Q      |      V  |         |         |
11+45       0.5025      0.92  |  Q      |      V  |         |         |
11+50       0.5088      0.91  |  Q      |      V  |         |         |
11+55       0.5151      0.92  |  Q      |       V |         |         |
12+ 0       0.5216      0.93  |  Q      |       V |         |         |
12+ 5       0.5282      0.97  |  Q      |       V |         |         |
12+10       0.5360      1.13  |   Q     |       V |         |         |
12+15       0.5449      1.29  |    Q    |        V|         |         |
12+20       0.5542      1.36  |    Q    |        V|         |         |
12+25       0.5640      1.42  |    Q    |        V|         |         |
12+30       0.5741      1.46  |    Q    |         V         |         |
12+35       0.5843      1.49  |    Q    |         V         |         |
12+40       0.5950      1.55  |     Q   |         V         |         |
12+45       0.6060      1.60  |     Q   |         |V        |         |
12+50       0.6172      1.63  |     Q   |         |V        |         |
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12+55       0.6287      1.66  |     Q   |         | V       |         |
13+ 0       0.6404      1.69  |     Q   |         | V       |         |
13+ 5       0.6523      1.73  |     Q   |         | V       |         |
13+10       0.6650      1.85  |      Q  |         |  V      |         |
13+15       0.6785      1.97  |      Q  |         |  V      |         |
13+20       0.6924      2.02  |       Q |         |   V     |         |
13+25       0.7065      2.04  |       Q |         |   V     |         |
13+30       0.7207      2.06  |       Q |         |    V    |         |
13+35       0.7347      2.03  |       Q |         |    V    |         |
13+40       0.7469      1.78  |      Q  |         |     V   |         |
13+45       0.7575      1.53  |     Q   |         |     V   |         |
13+50       0.7674      1.44  |    Q    |         |     V   |         |
13+55       0.7770      1.39  |    Q    |         |      V  |         |
14+ 0       0.7863      1.36  |    Q    |         |      V  |         |
14+ 5       0.7957      1.36  |    Q    |         |      V  |         |
14+10       0.8056      1.44  |    Q    |         |       V |         |
14+15       0.8162      1.53  |     Q   |         |       V |         |
14+20       0.8269      1.56  |     Q   |         |        V|         |
14+25       0.8376      1.56  |     Q   |         |        V|         |
14+30       0.8483      1.55  |     Q   |         |        V|         |
14+35       0.8589      1.54  |     Q   |         |         V         |
14+40       0.8696      1.54  |     Q   |         |         V         |
14+45       0.8802      1.54  |     Q   |         |         V         |
14+50       0.8908      1.54  |     Q   |         |         |V        |
14+55       0.9013      1.52  |     Q   |         |         |V        |
15+ 0       0.9116      1.50  |    Q    |         |         |V        |
15+ 5       0.9218      1.49  |    Q    |         |         | V       |
15+10       0.9319      1.46  |    Q    |         |         | V       |
15+15       0.9418      1.43  |    Q    |         |         |  V      |
15+20       0.9515      1.42  |    Q    |         |         |  V      |
15+25       0.9612      1.40  |    Q    |         |         |  V      |
15+30       0.9706      1.37  |    Q    |         |         |   V     |
15+35       0.9799      1.35  |    Q    |         |         |   V     |
15+40       0.9885      1.25  |    Q    |         |         |   V     |
15+45       0.9964      1.16  |   Q     |         |         |   V     |
15+50       1.0041      1.12  |   Q     |         |         |    V    |
15+55       1.0117      1.10  |   Q     |         |         |    V    |
16+ 0       1.0192      1.09  |   Q     |         |         |    V    |
16+ 5       1.0264      1.04  |   Q     |         |         |     V   |
16+10       1.0316      0.75  |  Q      |         |         |     V   |
16+15       1.0347      0.46  |Q        |         |         |     V   |
16+20       1.0371      0.35  |Q        |         |         |     V   |
16+25       1.0391      0.29  |Q        |         |         |     V   |
16+30       1.0408      0.25  |Q        |         |         |     V   |
16+35       1.0424      0.23  Q         |         |         |     V   |
16+40       1.0438      0.20  Q         |         |         |     V   |
16+45       1.0450      0.18  Q         |         |         |     V   |
16+50       1.0462      0.17  Q         |         |         |     V   |
16+55       1.0473      0.16  Q         |         |         |     V   |
17+ 0       1.0484      0.16  Q         |         |         |     V   |
17+ 5       1.0496      0.16  Q         |         |         |     V   |
17+10       1.0509      0.20  Q         |         |         |     V   |
17+15       1.0525      0.23  Q         |         |         |     V   |
17+20       1.0542      0.25  Q         |         |         |     V   |
17+25       1.0560      0.25  |Q        |         |         |      V  |
17+30       1.0577      0.26  |Q        |         |         |      V  |
17+35       1.0595      0.26  |Q        |         |         |      V  |
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17+40        1.0613       0.26  |Q         |         |         |      V  |
17+45        1.0631       0.26  |Q         |         |         |      V  |
17+50        1.0649       0.26  |Q         |         |         |      V  |
17+55        1.0666       0.24  Q          |         |         |      V  |
18+ 0        1.0681       0.22  Q          |         |         |      V  |
18+ 5        1.0696       0.22  Q          |         |         |      V  |
18+10        1.0711       0.21  Q          |         |         |      V  |
18+15        1.0726       0.21  Q          |         |         |      V  |
18+20        1.0740       0.21  Q          |         |         |      V  |
18+25        1.0755       0.21  Q          |         |         |      V  |
18+30        1.0769       0.21  Q          |         |         |      V  |
18+35        1.0783       0.21  Q          |         |         |      V  |
18+40        1.0797       0.19  Q          |         |         |      V  |
18+45        1.0808       0.17  Q          |         |         |      V  |
18+50        1.0820       0.16  Q          |         |         |      V  |
18+55        1.0829       0.14  Q          |         |         |       V |
19+ 0        1.0838       0.12  Q          |         |         |       V |
19+ 5        1.0846       0.12  Q          |         |         |       V |
19+10        1.0855       0.13  Q          |         |         |       V |
19+15        1.0865       0.15  Q          |         |         |       V |
19+20        1.0875       0.15  Q          |         |         |       V |
19+25        1.0887       0.17  Q          |         |         |       V |
19+30        1.0901       0.19  Q          |         |         |       V |
19+35        1.0914       0.20  Q          |         |         |       V |
19+40        1.0927       0.18  Q          |         |         |       V |
19+45        1.0939       0.17  Q          |         |         |       V |
19+50        1.0950       0.16  Q          |         |         |       V |
19+55        1.0960       0.14  Q          |         |         |       V |
20+ 0        1.0968       0.12  Q          |         |         |       V |
20+ 5        1.0976       0.12  Q          |         |         |       V |
20+10        1.0985       0.13  Q          |         |         |       V |
20+15        1.0995       0.15  Q          |         |         |       V |
20+20        1.1005       0.15  Q          |         |         |       V |
20+25        1.1016       0.15  Q          |         |         |       V |
20+30        1.1027       0.16  Q          |         |         |       V |
20+35        1.1037       0.16  Q          |         |         |       V |
20+40        1.1048       0.16  Q          |         |         |       V |
20+45        1.1059       0.16  Q          |         |         |       V |
20+50        1.1070       0.15  Q          |         |         |       V |
20+55        1.1079       0.14  Q          |         |         |       V |
21+ 0        1.1087       0.12  Q          |         |         |       V |
21+ 5        1.1095       0.12  Q          |         |         |       V |
21+10        1.1104       0.13  Q          |         |         |       V |
21+15        1.1114       0.15  Q          |         |         |        V|
21+20        1.1124       0.15  Q          |         |         |        V|
21+25        1.1134       0.13  Q          |         |         |        V|
21+30        1.1142       0.12  Q          |         |         |        V|
21+35        1.1150       0.12  Q          |         |         |        V|
21+40        1.1159       0.13  Q          |         |         |        V|
21+45        1.1169       0.14  Q          |         |         |        V|
21+50        1.1179       0.15  Q          |         |         |        V|
21+55        1.1188       0.13  Q          |         |         |        V|
22+ 0        1.1196       0.12  Q          |         |         |        V|
22+ 5        1.1204       0.12  Q          |         |         |        V|
22+10        1.1213       0.13  Q          |         |         |        V|
22+15        1.1223       0.14  Q          |         |         |        V|
22+20        1.1233       0.15  Q          |         |         |        V|
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    22+25        1.1242       0.13  Q          |           |           |         V|
    22+30        1.1250       0.12  Q          |           |           |         V|
    22+35        1.1258       0.11  Q          |           |           |         V|
    22+40        1.1265       0.11  Q          |           |           |         V|
    22+45        1.1273       0.11  Q          |           |           |         V|
    22+50        1.1280       0.11  Q          |           |           |         V|
    22+55        1.1287       0.11  Q          |           |           |         V|
    23+ 0        1.1295       0.11  Q          |           |           |         V|
    23+ 5        1.1302       0.11  Q          |           |           |         V|
    23+10        1.1309       0.11  Q          |           |           |         V|
    23+15        1.1316       0.10  Q          |           |           |         V|
    23+20        1.1324       0.10  Q          |           |           |         V|
    23+25        1.1331       0.10  Q          |           |           |         V|
    23+30        1.1338       0.10  Q          |           |           |         V|
    23+35        1.1345       0.10  Q          |           |           |         V|
    23+40        1.1352       0.10  Q          |           |           |         V|
    23+45        1.1360       0.10  Q          |           |           |         V|
    23+50        1.1367       0.10  Q          |           |           |         V|
    23+55        1.1374       0.10  Q          |           |           |         V|
    24+ 0        1.1381       0.10  Q          |           |           |         V|
    24+ 5        1.1388       0.10  Q          |           |           |         V|
    24+10        1.1393       0.07  Q          |           |           |         V|
    24+15        1.1395       0.03  Q          |           |           |         V|
    24+20        1.1396       0.02  Q          |           |           |         V|
    24+25        1.1396       0.01  Q          |           |           |         V|
    24+30        1.1397       0.00  Q          |           |           |         V|
    24+35        1.1397       0.00  Q          |           |           |         V|
    24+40        1.1397       0.00  Q          |           |           |         V|
    24+45        1.1397       0.00  Q          |           |           |         V|
    24+50        1.1397       0.00  Q          |           |           |         V|
    24+55        1.1397       0.00  Q          |           |           |         V|
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.794(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.794(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.108	(0.064)	0.026	0.081
2	0.17	0.60	0.129	(0.064)	0.031	0.098
3	0.25	0.60	0.129	(0.064)	0.031	0.098
4	0.33	0.60	0.129	(0.064)	0.031	0.098
5	0.42	0.60	0.129	(0.064)	0.031	0.098
6	0.50	0.70	0.151	(0.064)	0.037	0.114
7	0.58	0.70	0.151	(0.064)	0.037	0.114

8	0.67	0.70	0.151	(0.064)	0.037	0.114
9	0.75	0.70	0.151	(0.064)	0.037	0.114
10	0.83	0.70	0.151	(0.064)	0.037	0.114
11	0.92	0.70	0.151	(0.064)	0.037	0.114
12	1.00	0.80	0.172	(0.064)	0.042	0.130
13	1.08	0.80	0.172	(0.064)	0.042	0.130
14	1.17	0.80	0.172	(0.064)	0.042	0.130
15	1.25	0.80	0.172	(0.064)	0.042	0.130
16	1.33	0.80	0.172	(0.064)	0.042	0.130
17	1.42	0.80	0.172	(0.064)	0.042	0.130
18	1.50	0.80	0.172	(0.064)	0.042	0.130
19	1.58	0.80	0.172	(0.064)	0.042	0.130
20	1.67	0.80	0.172	(0.064)	0.042	0.130
21	1.75	0.80	0.172	(0.064)	0.042	0.130
22	1.83	0.80	0.172	(0.064)	0.042	0.130
23	1.92	0.80	0.172	(0.064)	0.042	0.130
24	2.00	0.90	0.194	(0.064)	0.047	0.147
25	2.08	0.80	0.172	(0.064)	0.042	0.130
26	2.17	0.90	0.194	(0.064)	0.047	0.147
27	2.25	0.90	0.194	(0.064)	0.047	0.147
28	2.33	0.90	0.194	(0.064)	0.047	0.147
29	2.42	0.90	0.194	(0.064)	0.047	0.147
30	2.50	0.90	0.194	(0.064)	0.047	0.147
31	2.58	0.90	0.194	(0.064)	0.047	0.147
32	2.67	0.90	0.194	(0.064)	0.047	0.147
33	2.75	1.00	0.215	(0.064)	0.052	0.163
34	2.83	1.00	0.215	(0.064)	0.052	0.163
35	2.92	1.00	0.215	(0.064)	0.052	0.163
36	3.00	1.00	0.215	(0.064)	0.052	0.163
37	3.08	1.00	0.215	(0.064)	0.052	0.163
38	3.17	1.10	0.237	(0.064)	0.058	0.179
39	3.25	1.10	0.237	(0.064)	0.058	0.179
40	3.33	1.10	0.237	(0.064)	0.058	0.179
41	3.42	1.20	0.258	(0.064)	0.063	0.195
42	3.50	1.30	0.280	0.064	(0.068)	0.216
43	3.58	1.40	0.301	0.064	(0.073)	0.238
44	3.67	1.40	0.301	0.064	(0.073)	0.238
45	3.75	1.50	0.323	0.064	(0.079)	0.259
46	3.83	1.50	0.323	0.064	(0.079)	0.259
47	3.92	1.60	0.344	0.064	(0.084)	0.281
48	4.00	1.60	0.344	0.064	(0.084)	0.281
49	4.08	1.70	0.366	0.064	(0.089)	0.302
50	4.17	1.80	0.387	0.064	(0.094)	0.324
51	4.25	1.90	0.409	0.064	(0.099)	0.345
52	4.33	2.00	0.430	0.064	(0.105)	0.367
53	4.42	2.10	0.452	0.064	(0.110)	0.388
54	4.50	2.10	0.452	0.064	(0.110)	0.388
55	4.58	2.20	0.474	0.064	(0.115)	0.410
56	4.67	2.30	0.495	0.064	(0.120)	0.431
57	4.75	2.40	0.517	0.064	(0.126)	0.453
58	4.83	2.40	0.517	0.064	(0.126)	0.453
59	4.92	2.50	0.538	0.064	(0.131)	0.474
60	5.00	2.60	0.560	0.064	(0.136)	0.496
61	5.08	3.10	0.667	0.064	(0.162)	0.604
62	5.17	3.60	0.775	0.064	(0.188)	0.711
63	5.25	3.90	0.839	0.064	(0.204)	0.776
64	5.33	4.20	0.904	0.064	(0.220)	0.840

```
65   5.42     4.70      1.012          0.064    (  0.246)        0.948
66   5.50     5.60      1.205          0.064    (  0.293)        1.142
67   5.58     1.90      0.409          0.064    (  0.099)        0.345
68   5.67     0.90      0.194       (  0.064)      0.047         0.147
69   5.75     0.60      0.129       (  0.064)      0.031         0.098
70   5.83     0.50      0.108       (  0.064)      0.026         0.081
71   5.92     0.30      0.065       (  0.064)      0.016         0.049
72   6.00     0.20      0.043       (  0.064)      0.010         0.033
           (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    17.9
    Flood volume = Effective rainfall      1.50(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.6(Ac.Ft)
    Total soil loss =      0.30(In)
    Total soil loss =     0.125(Ac.Ft)
    Total rainfall =      1.79(In)
    Flood volume =       27361.1 Cubic Feet
    Total soil loss =        5454.3 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      4.684(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.02  Q         |         |         |         |
  0+10       0.0013      0.16  Q         |         |         |         |
  0+15       0.0035      0.33  VQ        |         |         |         |
  0+20       0.0063      0.41  VQ        |         |         |         |
  0+25       0.0094      0.45  VQ        |         |         |         |
  0+30       0.0127      0.47  VQ        |         |         |         |
  0+35       0.0162      0.51  |VQ       |         |         |         |
  0+40       0.0200      0.55  |VQ       |         |         |         |
  0+45       0.0239      0.56  |VQ       |         |         |         |
  0+50       0.0278      0.57  |VQ       |         |         |         |
  0+55       0.0318      0.57  | Q       |         |         |         |
  1+ 0       0.0358      0.58  | Q       |         |         |         |
  1+ 5       0.0400      0.61  | Q       |         |         |         |
  1+10       0.0444      0.64  | Q       |         |         |         |
  1+15       0.0488      0.65  | QV      |         |         |         |
  1+20       0.0533      0.65  | QV      |         |         |         |
  1+25       0.0579      0.66  | QV      |         |         |         |
  1+30       0.0624      0.66  | QV      |         |         |         |
  1+35       0.0670      0.66  | Q V     |         |         |         |
  1+40       0.0715      0.66  | Q V     |         |         |         |
  1+45       0.0761      0.66  | Q V     |         |         |         |
  1+50       0.0806      0.66  | Q  V    |         |         |         |
  1+55       0.0852      0.66  | Q  V    |         |         |         |
  2+ 0       0.0898      0.67  | Q  V    |         |         |         |
  2+ 5       0.0945      0.69  | Q   V   |         |         |         |
  2+10       0.0993      0.69  | Q   V   |         |         |         |
  2+15       0.1042      0.70  | Q   V   |         |         |         |
  2+20       0.1092      0.73  | Q   V   |         |         |         |
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    2+25       0.1143      0.74  | Q    V  |         |         |         |
    2+30       0.1193      0.74  | Q    V  |         |         |         |
    2+35       0.1245      0.74  | Q    V  |         |         |         |
    2+40       0.1296      0.74  | Q     V |         |         |         |
    2+45       0.1347      0.75  | Q     V |         |         |         |
    2+50       0.1401      0.78  |  Q    V |         |         |         |
    2+55       0.1456      0.80  |  Q     V|         |         |         |
    3+ 0       0.1512      0.81  |  Q     V|         |         |         |
    3+ 5       0.1569      0.82  |  Q     V|         |         |         |
    3+10       0.1626      0.83  |  Q      V         |         |         |
    3+15       0.1685      0.86  |  Q      V         |         |         |
    3+20       0.1746      0.89  |  Q      |V        |         |         |
    3+25       0.1808      0.90  |  Q      |V        |         |         |
    3+30       0.1873      0.94  |  Q      |V        |         |         |
    3+35       0.1942      1.01  |   Q     | V       |         |         |
    3+40       0.2018      1.10  |   Q     | V       |         |         |
    3+45       0.2098      1.16  |   Q     |  V      |         |         |
    3+50       0.2181      1.22  |   Q     |  V      |         |         |
    3+55       0.2269      1.28  |    Q    |   V     |         |         |
    4+ 0       0.2361      1.33  |    Q    |    V    |         |         |
    4+ 5       0.2457      1.39  |    Q    |    V    |         |         |
    4+10       0.2556      1.45  |    Q    |     V   |         |         |
    4+15       0.2662      1.54  |     Q   |     V   |         |         |
    4+20       0.2775      1.64  |     Q   |      V  |         |         |
    4+25       0.2895      1.74  |     Q   |       V |         |         |
    4+30       0.3022      1.84  |      Q  |        V|         |         |
    4+35       0.3153      1.91  |      Q  |         V         |         |
    4+40       0.3290      1.98  |      Q  |         V         |         |
    4+45       0.3433      2.08  |       Q |         |V        |         |
    4+50       0.3583      2.17  |       Q |         | V       |         |
    4+55       0.3738      2.24  |       Q |         |  V      |         |
    5+ 0       0.3897      2.31  |        Q|         |   V     |         |
    5+ 5       0.4064      2.43  |        Q|         |    V    |         |
    5+10       0.4251      2.70  |         Q         |      V  |         |
    5+15       0.4464      3.11  |         | Q       |       V |         |
    5+20       0.4705      3.50  |         |  Q      |        V|         |
    5+25       0.4971      3.86  |         |    Q    |         |V        |
    5+30       0.5268      4.31  |         |      Q  |         |  V      |
    5+35       0.5591      4.68  |         |       Q |         |    V    |
    5+40       0.5851      3.77  |         |    Q    |         |      V  |
    5+45       0.6006      2.26  |        Q|         |         |       V |
    5+50       0.6105      1.44  |    Q    |         |         |       V |
    5+55       0.6173      0.98  |  Q      |         |         |        V|
    6+ 0       0.6218      0.65  | Q       |         |         |        V|
    6+ 5       0.6246      0.41  |Q        |         |         |        V|
    6+10       0.6262      0.24  Q         |         |         |        V|
    6+15       0.6271      0.13  Q         |         |         |        V|
    6+20       0.6277      0.07  Q         |         |         |        V|
    6+25       0.6279      0.04  Q         |         |         |        V|
    6+30       0.6280      0.02  Q         |         |         |        V|
    6+35       0.6281      0.01  Q         |         |         |        V|
    6+40       0.6281      0.00  Q         |         |         |        V|
    6+45       0.6281      0.00  Q         |         |         |        V|
    6+50       0.6281      0.00  Q         |         |         |        V|
    6+55       0.6281      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.241(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.241(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.194	(0.064)	0.047	0.146
2	0.17	1.30	0.194	(0.064)	0.047	0.146
3	0.25	1.10	0.164	(0.064)	0.040	0.124
4	0.33	1.50	0.223	(0.064)	0.054	0.169
5	0.42	1.50	0.223	(0.064)	0.054	0.169
6	0.50	1.80	0.268	0.064	(0.065)	0.204
7	0.58	1.50	0.223	(0.064)	0.054	0.169

8	0.67	1.80	0.268	0.064	(0.065)	0.204
9	0.75	1.80	0.268	0.064	(0.065)	0.204
10	0.83	1.50	0.223	(0.064)	0.054	0.169
11	0.92	1.60	0.238	(0.064)	0.058	0.180
12	1.00	1.80	0.268	0.064	(0.065)	0.204
13	1.08	2.20	0.328	0.064	(0.080)	0.264
14	1.17	2.20	0.328	0.064	(0.080)	0.264
15	1.25	2.20	0.328	0.064	(0.080)	0.264
16	1.33	2.00	0.298	0.064	(0.072)	0.234
17	1.42	2.60	0.387	0.064	(0.094)	0.323
18	1.50	2.70	0.402	0.064	(0.098)	0.338
19	1.58	2.40	0.357	0.064	(0.087)	0.294
20	1.67	2.70	0.402	0.064	(0.098)	0.338
21	1.75	3.30	0.491	0.064	(0.119)	0.428
22	1.83	3.10	0.462	0.064	(0.112)	0.398
23	1.92	2.90	0.432	0.064	(0.105)	0.368
24	2.00	3.00	0.447	0.064	(0.109)	0.383
25	2.08	3.10	0.462	0.064	(0.112)	0.398
26	2.17	4.20	0.625	0.064	(0.152)	0.562
27	2.25	5.00	0.744	0.064	(0.181)	0.681
28	2.33	3.50	0.521	0.064	(0.127)	0.457
29	2.42	6.80	1.013	0.064	(0.246)	0.949
30	2.50	7.30	1.087	0.064	(0.264)	1.023
31	2.58	8.20	1.221	0.064	(0.297)	1.157
32	2.67	5.90	0.878	0.064	(0.214)	0.815
33	2.75	2.00	0.298	0.064	(0.072)	0.234
34	2.83	1.80	0.268	0.064	(0.065)	0.204
35	2.92	1.80	0.268	0.064	(0.065)	0.204
36	3.00	0.60	0.089	(0.064)	0.022	0.068

```
             (Loss Rate Not Used)
   Sum =     100.0                              Sum =    12.7
    Flood volume = Effective rainfall      1.06(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
    Total soil loss =      0.18(In)
    Total soil loss =     0.075(Ac.Ft)
    Total rainfall =      1.24(In)
    Flood volume =       19421.4 Cubic Feet
    Total soil loss =       3279.5 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      4.907(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0003      0.04  Q         |         |         |         |
  0+10       0.0022      0.28  VQ        |         |         |         |
  0+15       0.0059      0.53  V Q       |         |         |         |
  0+20       0.0100      0.59  V Q       |         |         |         |
  0+25       0.0147      0.68  |VQ       |         |         |         |
  0+30       0.0201      0.79  |V Q      |         |         |         |
  0+35       0.0261      0.87  | VQ      |         |         |         |
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    0+40       0.0323      0.90  | VQ      |         |         |         |
    0+45       0.0388      0.93  |  Q      |         |         |         |
    0+50       0.0455      0.98  |  QV     |         |         |         |
    0+55       0.0521      0.95  |  QV     |         |         |         |
    1+ 0       0.0585      0.93  |  Q V    |         |         |         |
    1+ 5       0.0652      0.98  |  Q V    |         |         |         |
    1+10       0.0730      1.12  |   Q V   |         |         |         |
    1+15       0.0815      1.24  |   Q  V  |         |         |         |
    1+20       0.0903      1.27  |    Q  V |         |         |         |
    1+25       0.0991      1.28  |    Q  V |         |         |         |
    1+30       0.1086      1.39  |    Q   V|         |         |         |
    1+35       0.1193      1.55  |     Q   V         |         |         |
    1+40       0.1300      1.56  |     Q   |V        |         |         |
    1+45       0.1412      1.62  |     Q   | V       |         |         |
    1+50       0.1538      1.83  |      Q  |  V      |         |         |
    1+55       0.1672      1.95  |      Q  |    V    |         |         |
    2+ 0       0.1805      1.92  |      Q  |     V   |         |         |
    2+ 5       0.1937      1.92  |      Q  |      V  |         |         |
    2+10       0.2076      2.01  |       Q |       V |         |         |
    2+15       0.2237      2.35  |        Q|         V         |         |
    2+20       0.2428      2.77  |         |Q        |V        |         |
    2+25       0.2625      2.86  |         |Q        |  V      |         |
    2+30       0.2862      3.44  |         |  Q      |    V    |         |
    2+35       0.3164      4.39  |         |      Q  |       V |         |
    2+40       0.3502      4.91  |         |        Q|         |V        |
    2+45       0.3819      4.60  |         |       Q |         |   V     |
    2+50       0.4043      3.25  |         |  Q      |         |     V   |
    2+55       0.4188      2.11  |       Q |         |         |      V  |
    3+ 0       0.4298      1.60  |     Q   |         |         |       V |
    3+ 5       0.4373      1.08  |   Q     |         |         |        V|
    3+10       0.4413      0.58  | Q       |         |         |        V|
    3+15       0.4433      0.30  |Q        |         |         |        V|
    3+20       0.4445      0.18  Q         |         |         |        V|
    3+25       0.4452      0.10  Q         |         |         |        V|
    3+30       0.4455      0.05  Q         |         |         |        V|
    3+35       0.4457      0.02  Q         |         |         |        V|
    3+40       0.4458      0.01  Q         |         |         |        V|
    3+45       0.4458      0.01  Q         |         |         |        V|
    3+50       0.4458      0.00  Q         |         |         |        V|
    3+55       0.4459      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.50	2.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.20	6.05

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.788(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.788(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.312	0.064	(0.076)	0.248
2	0.17	4.20	0.397	0.064	(0.097)	0.333
3	0.25	4.40	0.416	0.064	(0.101)	0.352
4	0.33	4.80	0.454	0.064	(0.110)	0.390
5	0.42	5.20	0.492	0.064	(0.120)	0.428

```
  6   0.50     6.20     0.586          0.064    (  0.143)       0.523
  7   0.58     6.80     0.643          0.064    (  0.156)       0.579
  8   0.67     8.80     0.832          0.064    (  0.202)       0.768
  9   0.75    13.90     1.314          0.064    (  0.320)       1.251
 10   0.83    31.40     2.969          0.064    (  0.722)       2.905
 11   0.92     7.20     0.681          0.064    (  0.166)       0.617
 12   1.00     3.80     0.359          0.064    (  0.087)       0.296
           (Loss Rate Not Used)
   Sum =     100.0                                  Sum =     8.7
    Flood volume = Effective rainfall      0.72(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
    Total soil loss =      0.06(In)
    Total soil loss =     0.027(Ac.Ft)
    Total rainfall =      0.79(In)
    Flood volume =       13250.1 Cubic Feet
    Total soil loss =       1165.6 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      7.986(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        1 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0005      0.07  Q         |         |         |         |
  0+10       0.0040      0.50  V Q       |         |         |         |
  0+15       0.0114      1.08  |V  Q     |         |         |         |
  0+20       0.0211      1.42  | V  Q    |         |         |         |
  0+25       0.0326      1.67  |   V Q   |         |         |         |
  0+30       0.0458      1.92  |     VQ  |         |         |         |
  0+35       0.0612      2.23  |       Q |         |         |         |
  0+40       0.0791      2.60  |         Q         |         |         |
  0+45       0.1015      3.24  |         | QV      |         |         |
  0+50       0.1354      4.93  |         |      V Q|         |         |
  0+55       0.1904      7.99  |         |         |    V    |Q        |
  1+ 0       0.2411      7.37  |         |         |        Q|V        |
  1+ 5       0.2693      4.09  |         |     Q   |         |    V    |
  1+10       0.2855      2.36  |        Q|         |         |      V  |
  1+15       0.2942      1.25  |    Q    |         |         |       V |
  1+20       0.2989      0.68  | Q       |         |         |        V|
  1+25       0.3011      0.33  |Q        |         |         |        V|
  1+30       0.3024      0.19  Q         |         |         |        V|
  1+35       0.3033      0.12  Q         |         |         |        V|
  1+40       0.3038      0.08  Q         |         |         |        V|
  1+45       0.3041      0.04  Q         |         |         |        V|
  1+50       0.3042      0.01  Q         |         |         |        V|
  1+55       0.3042      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
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Proposed Conditions Unit Hydrograph: 5yr Storm

April 2015

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     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/22/15 File: 201501POST245.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



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2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              2.30                  11.59

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              5.00                  25.20

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    2.300(In)
Area Averaged 100-Year Rainfall =    5.000(In)
```

Point rain (area averaged) = 2.932(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.932(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.023	(0.113)	0.006	0.018
2	0.17	0.07	0.023	(0.113)	0.006	0.018
3	0.25	0.07	0.023	(0.112)	0.006	0.018
4	0.33	0.10	0.035	(0.112)	0.009	0.027
5	0.42	0.10	0.035	(0.111)	0.009	0.027
6	0.50	0.10	0.035	(0.111)	0.009	0.027
7	0.58	0.10	0.035	(0.110)	0.009	0.027

8	0.67	0.10	0.035	(0.110)	0.009	0.027
9	0.75	0.10	0.035	(0.109)	0.009	0.027
10	0.83	0.13	0.047	(0.109)	0.011	0.036
11	0.92	0.13	0.047	(0.109)	0.011	0.036
12	1.00	0.13	0.047	(0.108)	0.011	0.036
13	1.08	0.10	0.035	(0.108)	0.009	0.027
14	1.17	0.10	0.035	(0.107)	0.009	0.027
15	1.25	0.10	0.035	(0.107)	0.009	0.027
16	1.33	0.10	0.035	(0.106)	0.009	0.027
17	1.42	0.10	0.035	(0.106)	0.009	0.027
18	1.50	0.10	0.035	(0.106)	0.009	0.027
19	1.58	0.10	0.035	(0.105)	0.009	0.027
20	1.67	0.10	0.035	(0.105)	0.009	0.027
21	1.75	0.10	0.035	(0.104)	0.009	0.027
22	1.83	0.13	0.047	(0.104)	0.011	0.036
23	1.92	0.13	0.047	(0.104)	0.011	0.036
24	2.00	0.13	0.047	(0.103)	0.011	0.036
25	2.08	0.13	0.047	(0.103)	0.011	0.036
26	2.17	0.13	0.047	(0.102)	0.011	0.036
27	2.25	0.13	0.047	(0.102)	0.011	0.036
28	2.33	0.13	0.047	(0.101)	0.011	0.036
29	2.42	0.13	0.047	(0.101)	0.011	0.036
30	2.50	0.13	0.047	(0.101)	0.011	0.036
31	2.58	0.17	0.059	(0.100)	0.014	0.044
32	2.67	0.17	0.059	(0.100)	0.014	0.044
33	2.75	0.17	0.059	(0.099)	0.014	0.044
34	2.83	0.17	0.059	(0.099)	0.014	0.044
35	2.92	0.17	0.059	(0.099)	0.014	0.044
36	3.00	0.17	0.059	(0.098)	0.014	0.044
37	3.08	0.17	0.059	(0.098)	0.014	0.044
38	3.17	0.17	0.059	(0.097)	0.014	0.044
39	3.25	0.17	0.059	(0.097)	0.014	0.044
40	3.33	0.17	0.059	(0.097)	0.014	0.044
41	3.42	0.17	0.059	(0.096)	0.014	0.044
42	3.50	0.17	0.059	(0.096)	0.014	0.044
43	3.58	0.17	0.059	(0.095)	0.014	0.044
44	3.67	0.17	0.059	(0.095)	0.014	0.044
45	3.75	0.17	0.059	(0.095)	0.014	0.044
46	3.83	0.20	0.070	(0.094)	0.017	0.053
47	3.92	0.20	0.070	(0.094)	0.017	0.053
48	4.00	0.20	0.070	(0.093)	0.017	0.053
49	4.08	0.20	0.070	(0.093)	0.017	0.053
50	4.17	0.20	0.070	(0.093)	0.017	0.053
51	4.25	0.20	0.070	(0.092)	0.017	0.053
52	4.33	0.23	0.082	(0.092)	0.020	0.062
53	4.42	0.23	0.082	(0.091)	0.020	0.062
54	4.50	0.23	0.082	(0.091)	0.020	0.062
55	4.58	0.23	0.082	(0.091)	0.020	0.062
56	4.67	0.23	0.082	(0.090)	0.020	0.062
57	4.75	0.23	0.082	(0.090)	0.020	0.062
58	4.83	0.27	0.094	(0.089)	0.023	0.071
59	4.92	0.27	0.094	(0.089)	0.023	0.071
60	5.00	0.27	0.094	(0.089)	0.023	0.071
61	5.08	0.20	0.070	(0.088)	0.017	0.053
62	5.17	0.20	0.070	(0.088)	0.017	0.053
63	5.25	0.20	0.070	(0.087)	0.017	0.053
64	5.33	0.23	0.082	(0.087)	0.020	0.062

65	5.42	0.23	0.082	(0.087)	0.020	0.062
66	5.50	0.23	0.082	(0.086)	0.020	0.062
67	5.58	0.27	0.094	(0.086)	0.023	0.071
68	5.67	0.27	0.094	(0.086)	0.023	0.071
69	5.75	0.27	0.094	(0.085)	0.023	0.071
70	5.83	0.27	0.094	(0.085)	0.023	0.071
71	5.92	0.27	0.094	(0.084)	0.023	0.071
72	6.00	0.27	0.094	(0.084)	0.023	0.071
73	6.08	0.30	0.106	(0.084)	0.026	0.080
74	6.17	0.30	0.106	(0.083)	0.026	0.080
75	6.25	0.30	0.106	(0.083)	0.026	0.080
76	6.33	0.30	0.106	(0.083)	0.026	0.080
77	6.42	0.30	0.106	(0.082)	0.026	0.080
78	6.50	0.30	0.106	(0.082)	0.026	0.080
79	6.58	0.33	0.117	(0.081)	0.029	0.089
80	6.67	0.33	0.117	(0.081)	0.029	0.089
81	6.75	0.33	0.117	(0.081)	0.029	0.089
82	6.83	0.33	0.117	(0.080)	0.029	0.089
83	6.92	0.33	0.117	(0.080)	0.029	0.089
84	7.00	0.33	0.117	(0.080)	0.029	0.089
85	7.08	0.33	0.117	(0.079)	0.029	0.089
86	7.17	0.33	0.117	(0.079)	0.029	0.089
87	7.25	0.33	0.117	(0.079)	0.029	0.089
88	7.33	0.37	0.129	(0.078)	0.031	0.098
89	7.42	0.37	0.129	(0.078)	0.031	0.098
90	7.50	0.37	0.129	(0.078)	0.031	0.098
91	7.58	0.40	0.141	(0.077)	0.034	0.107
92	7.67	0.40	0.141	(0.077)	0.034	0.107
93	7.75	0.40	0.141	(0.076)	0.034	0.107
94	7.83	0.43	0.152	(0.076)	0.037	0.115
95	7.92	0.43	0.152	(0.076)	0.037	0.115
96	8.00	0.43	0.152	(0.075)	0.037	0.115
97	8.08	0.50	0.176	(0.075)	0.043	0.133
98	8.17	0.50	0.176	(0.075)	0.043	0.133
99	8.25	0.50	0.176	(0.074)	0.043	0.133
100	8.33	0.50	0.176	(0.074)	0.043	0.133
101	8.42	0.50	0.176	(0.074)	0.043	0.133
102	8.50	0.50	0.176	(0.073)	0.043	0.133
103	8.58	0.53	0.188	(0.073)	0.046	0.142
104	8.67	0.53	0.188	(0.073)	0.046	0.142
105	8.75	0.53	0.188	(0.072)	0.046	0.142
106	8.83	0.57	0.199	(0.072)	0.048	0.151
107	8.92	0.57	0.199	(0.072)	0.048	0.151
108	9.00	0.57	0.199	(0.071)	0.048	0.151
109	9.08	0.63	0.223	(0.071)	0.054	0.169
110	9.17	0.63	0.223	(0.071)	0.054	0.169
111	9.25	0.63	0.223	(0.070)	0.054	0.169
112	9.33	0.67	0.235	(0.070)	0.057	0.178
113	9.42	0.67	0.235	(0.070)	0.057	0.178
114	9.50	0.67	0.235	(0.069)	0.057	0.178
115	9.58	0.70	0.246	(0.069)	0.060	0.186
116	9.67	0.70	0.246	(0.069)	0.060	0.186
117	9.75	0.70	0.246	(0.068)	0.060	0.186
118	9.83	0.73	0.258	(0.068)	0.063	0.195
119	9.92	0.73	0.258	(0.068)	0.063	0.195
120	10.00	0.73	0.258	(0.067)	0.063	0.195
121	10.08	0.50	0.176	(0.067)	0.043	0.133

122	10.17	0.50	0.176	(0.067)	0.043	0.133
123	10.25	0.50	0.176	(0.066)	0.043	0.133
124	10.33	0.50	0.176	(0.066)	0.043	0.133
125	10.42	0.50	0.176	(0.066)	0.043	0.133
126	10.50	0.50	0.176	(0.065)	0.043	0.133
127	10.58	0.67	0.235	(0.065)	0.057	0.178
128	10.67	0.67	0.235	(0.065)	0.057	0.178
129	10.75	0.67	0.235	(0.064)	0.057	0.178
130	10.83	0.67	0.235	(0.064)	0.057	0.178
131	10.92	0.67	0.235	(0.064)	0.057	0.178
132	11.00	0.67	0.235	(0.063)	0.057	0.178
133	11.08	0.63	0.223	(0.063)	0.054	0.169
134	11.17	0.63	0.223	(0.063)	0.054	0.169
135	11.25	0.63	0.223	(0.063)	0.054	0.169
136	11.33	0.63	0.223	(0.062)	0.054	0.169
137	11.42	0.63	0.223	(0.062)	0.054	0.169
138	11.50	0.63	0.223	(0.062)	0.054	0.169
139	11.58	0.57	0.199	(0.061)	0.048	0.151
140	11.67	0.57	0.199	(0.061)	0.048	0.151
141	11.75	0.57	0.199	(0.061)	0.048	0.151
142	11.83	0.60	0.211	(0.060)	0.051	0.160
143	11.92	0.60	0.211	(0.060)	0.051	0.160
144	12.00	0.60	0.211	(0.060)	0.051	0.160
145	12.08	0.83	0.293	0.059	(0.071)	0.234
146	12.17	0.83	0.293	0.059	(0.071)	0.234
147	12.25	0.83	0.293	0.059	(0.071)	0.234
148	12.33	0.87	0.305	0.059	(0.074)	0.246
149	12.42	0.87	0.305	0.058	(0.074)	0.247
150	12.50	0.87	0.305	0.058	(0.074)	0.247
151	12.58	0.93	0.328	0.058	(0.080)	0.271
152	12.67	0.93	0.328	0.057	(0.080)	0.271
153	12.75	0.93	0.328	0.057	(0.080)	0.271
154	12.83	0.97	0.340	0.057	(0.083)	0.283
155	12.92	0.97	0.340	0.057	(0.083)	0.284
156	13.00	0.97	0.340	0.056	(0.083)	0.284
157	13.08	1.13	0.399	0.056	(0.097)	0.343
158	13.17	1.13	0.399	0.056	(0.097)	0.343
159	13.25	1.13	0.399	0.055	(0.097)	0.343
160	13.33	1.13	0.399	0.055	(0.097)	0.344
161	13.42	1.13	0.399	0.055	(0.097)	0.344
162	13.50	1.13	0.399	0.055	(0.097)	0.344
163	13.58	0.77	0.270	0.054	(0.066)	0.215
164	13.67	0.77	0.270	0.054	(0.066)	0.216
165	13.75	0.77	0.270	0.054	(0.066)	0.216
166	13.83	0.77	0.270	0.053	(0.066)	0.216
167	13.92	0.77	0.270	0.053	(0.066)	0.217
168	14.00	0.77	0.270	0.053	(0.066)	0.217
169	14.08	0.90	0.317	0.053	(0.077)	0.264
170	14.17	0.90	0.317	0.052	(0.077)	0.264
171	14.25	0.90	0.317	0.052	(0.077)	0.265
172	14.33	0.87	0.305	0.052	(0.074)	0.253
173	14.42	0.87	0.305	0.052	(0.074)	0.253
174	14.50	0.87	0.305	0.051	(0.074)	0.254
175	14.58	0.87	0.305	0.051	(0.074)	0.254
176	14.67	0.87	0.305	0.051	(0.074)	0.254
177	14.75	0.87	0.305	0.051	(0.074)	0.254
178	14.83	0.83	0.293	0.050	(0.071)	0.243

179	14.92	0.83	0.293	0.050	(0.071)	0.243
180	15.00	0.83	0.293	0.050	(0.071)	0.243
181	15.08	0.80	0.282	0.050	(0.068)	0.232
182	15.17	0.80	0.282	0.049	(0.068)	0.232
183	15.25	0.80	0.282	0.049	(0.068)	0.233
184	15.33	0.77	0.270	0.049	(0.066)	0.221
185	15.42	0.77	0.270	0.048	(0.066)	0.221
186	15.50	0.77	0.270	0.048	(0.066)	0.222
187	15.58	0.63	0.223	0.048	(0.054)	0.175
188	15.67	0.63	0.223	0.048	(0.054)	0.175
189	15.75	0.63	0.223	0.048	(0.054)	0.175
190	15.83	0.63	0.223	0.047	(0.054)	0.176
191	15.92	0.63	0.223	0.047	(0.054)	0.176
192	16.00	0.63	0.223	0.047	(0.054)	0.176
193	16.08	0.13	0.047	(0.047)	0.011	0.036
194	16.17	0.13	0.047	(0.046)	0.011	0.036
195	16.25	0.13	0.047	(0.046)	0.011	0.036
196	16.33	0.13	0.047	(0.046)	0.011	0.036
197	16.42	0.13	0.047	(0.046)	0.011	0.036
198	16.50	0.13	0.047	(0.045)	0.011	0.036
199	16.58	0.10	0.035	(0.045)	0.009	0.027
200	16.67	0.10	0.035	(0.045)	0.009	0.027
201	16.75	0.10	0.035	(0.045)	0.009	0.027
202	16.83	0.10	0.035	(0.044)	0.009	0.027
203	16.92	0.10	0.035	(0.044)	0.009	0.027
204	17.00	0.10	0.035	(0.044)	0.009	0.027
205	17.08	0.17	0.059	(0.044)	0.014	0.044
206	17.17	0.17	0.059	(0.044)	0.014	0.044
207	17.25	0.17	0.059	(0.043)	0.014	0.044
208	17.33	0.17	0.059	(0.043)	0.014	0.044
209	17.42	0.17	0.059	(0.043)	0.014	0.044
210	17.50	0.17	0.059	(0.043)	0.014	0.044
211	17.58	0.17	0.059	(0.042)	0.014	0.044
212	17.67	0.17	0.059	(0.042)	0.014	0.044
213	17.75	0.17	0.059	(0.042)	0.014	0.044
214	17.83	0.13	0.047	(0.042)	0.011	0.036
215	17.92	0.13	0.047	(0.042)	0.011	0.036
216	18.00	0.13	0.047	(0.041)	0.011	0.036
217	18.08	0.13	0.047	(0.041)	0.011	0.036
218	18.17	0.13	0.047	(0.041)	0.011	0.036
219	18.25	0.13	0.047	(0.041)	0.011	0.036
220	18.33	0.13	0.047	(0.041)	0.011	0.036
221	18.42	0.13	0.047	(0.040)	0.011	0.036
222	18.50	0.13	0.047	(0.040)	0.011	0.036
223	18.58	0.10	0.035	(0.040)	0.009	0.027
224	18.67	0.10	0.035	(0.040)	0.009	0.027
225	18.75	0.10	0.035	(0.040)	0.009	0.027
226	18.83	0.07	0.023	(0.039)	0.006	0.018
227	18.92	0.07	0.023	(0.039)	0.006	0.018
228	19.00	0.07	0.023	(0.039)	0.006	0.018
229	19.08	0.10	0.035	(0.039)	0.009	0.027
230	19.17	0.10	0.035	(0.039)	0.009	0.027
231	19.25	0.10	0.035	(0.039)	0.009	0.027
232	19.33	0.13	0.047	(0.038)	0.011	0.036
233	19.42	0.13	0.047	(0.038)	0.011	0.036
234	19.50	0.13	0.047	(0.038)	0.011	0.036
235	19.58	0.10	0.035	(0.038)	0.009	0.027

236	19.67	0.10	0.035	(0.038)	0.009	0.027
237	19.75	0.10	0.035	(0.037)	0.009	0.027
238	19.83	0.07	0.023	(0.037)	0.006	0.018
239	19.92	0.07	0.023	(0.037)	0.006	0.018
240	20.00	0.07	0.023	(0.037)	0.006	0.018
241	20.08	0.10	0.035	(0.037)	0.009	0.027
242	20.17	0.10	0.035	(0.037)	0.009	0.027
243	20.25	0.10	0.035	(0.037)	0.009	0.027
244	20.33	0.10	0.035	(0.036)	0.009	0.027
245	20.42	0.10	0.035	(0.036)	0.009	0.027
246	20.50	0.10	0.035	(0.036)	0.009	0.027
247	20.58	0.10	0.035	(0.036)	0.009	0.027
248	20.67	0.10	0.035	(0.036)	0.009	0.027
249	20.75	0.10	0.035	(0.036)	0.009	0.027
250	20.83	0.07	0.023	(0.035)	0.006	0.018
251	20.92	0.07	0.023	(0.035)	0.006	0.018
252	21.00	0.07	0.023	(0.035)	0.006	0.018
253	21.08	0.10	0.035	(0.035)	0.009	0.027
254	21.17	0.10	0.035	(0.035)	0.009	0.027
255	21.25	0.10	0.035	(0.035)	0.009	0.027
256	21.33	0.07	0.023	(0.035)	0.006	0.018
257	21.42	0.07	0.023	(0.034)	0.006	0.018
258	21.50	0.07	0.023	(0.034)	0.006	0.018
259	21.58	0.10	0.035	(0.034)	0.009	0.027
260	21.67	0.10	0.035	(0.034)	0.009	0.027
261	21.75	0.10	0.035	(0.034)	0.009	0.027
262	21.83	0.07	0.023	(0.034)	0.006	0.018
263	21.92	0.07	0.023	(0.034)	0.006	0.018
264	22.00	0.07	0.023	(0.034)	0.006	0.018
265	22.08	0.10	0.035	(0.034)	0.009	0.027
266	22.17	0.10	0.035	(0.033)	0.009	0.027
267	22.25	0.10	0.035	(0.033)	0.009	0.027
268	22.33	0.07	0.023	(0.033)	0.006	0.018
269	22.42	0.07	0.023	(0.033)	0.006	0.018
270	22.50	0.07	0.023	(0.033)	0.006	0.018
271	22.58	0.07	0.023	(0.033)	0.006	0.018
272	22.67	0.07	0.023	(0.033)	0.006	0.018
273	22.75	0.07	0.023	(0.033)	0.006	0.018
274	22.83	0.07	0.023	(0.033)	0.006	0.018
275	22.92	0.07	0.023	(0.033)	0.006	0.018
276	23.00	0.07	0.023	(0.032)	0.006	0.018
277	23.08	0.07	0.023	(0.032)	0.006	0.018
278	23.17	0.07	0.023	(0.032)	0.006	0.018
279	23.25	0.07	0.023	(0.032)	0.006	0.018
280	23.33	0.07	0.023	(0.032)	0.006	0.018
281	23.42	0.07	0.023	(0.032)	0.006	0.018
282	23.50	0.07	0.023	(0.032)	0.006	0.018
283	23.58	0.07	0.023	(0.032)	0.006	0.018
284	23.67	0.07	0.023	(0.032)	0.006	0.018
285	23.75	0.07	0.023	(0.032)	0.006	0.018
286	23.83	0.07	0.023	(0.032)	0.006	0.018
287	23.92	0.07	0.023	(0.032)	0.006	0.018
288	24.00	0.07	0.023	(0.032)	0.006	0.018

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.6

Flood volume = Effective rainfall 2.30(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)

Total soil loss = 0.63(In)
Total soil loss = 0.265(Ac.Ft)
Total rainfall = 2.93(In)
Flood volume = 42092.0 Cubic Feet
Total soil loss = 11556.4 Cubic Feet

Peak flow rate of this hydrograph = 1.732(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q	|	|	|	|
0+10	0.0003	0.03	Q	|	|	|	|
0+15	0.0007	0.06	Q	|	|	|	|
0+20	0.0013	0.08	Q	|	|	|	|
0+25	0.0019	0.10	Q	|	|	|	|
0+30	0.0028	0.12	Q	|	|	|	|
0+35	0.0036	0.13	Q	|	|	|	|
0+40	0.0045	0.13	Q	|	|	|	|
0+45	0.0054	0.13	Q	|	|	|	|
0+50	0.0064	0.14	Q	|	|	|	|
0+55	0.0074	0.15	Q	|	|	|	|
1+ 0	0.0086	0.17	Q	|	|	|	|
1+ 5	0.0097	0.17	Q	|	|	|	|
1+10	0.0108	0.16	Q	|	|	|	|
1+15	0.0118	0.15	Q	|	|	|	|
1+20	0.0128	0.14	Q	|	|	|	|
1+25	0.0138	0.14	Q	|	|	|	|
1+30	0.0147	0.14	Q	|	|	|	|
1+35	0.0157	0.14	Q	|	|	|	|
1+40	0.0166	0.14	Q	|	|	|	|
1+45	0.0175	0.14	Q	|	|	|	|
1+50	0.0185	0.14	Q	|	|	|	|
1+55	0.0195	0.15	Q	|	|	|	|
2+ 0	0.0207	0.17	Q	|	|	|	|
2+ 5	0.0219	0.17	Q	|	|	|	|
2+10	0.0231	0.18	Q	|	|	|	|
2+15	0.0243	0.18	QV	|	|	|	|
2+20	0.0256	0.18	QV	|	|	|	|
2+25	0.0268	0.18	QV	|	|	|	|
2+30	0.0280	0.18	QV	|	|	|	|
2+35	0.0293	0.18	QV	|	|	|	|
2+40	0.0307	0.20	QV	|	|	|	|
2+45	0.0321	0.21	QV	|	|	|	|
2+50	0.0336	0.22	QV	|	|	|	|
2+55	0.0351	0.22	QV	|	|	|	|
3+ 0	0.0367	0.22	QV	|	|	|	|
3+ 5	0.0382	0.22	QV	|	|	|	|
3+10	0.0398	0.22	QV	|	|	|	|
3+15	0.0413	0.23	QV	|	|	|	|
3+20	0.0429	0.23	QV	|	|	|	|

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 3+25       0.0444      0.23  QV        |         |         |         |
 3+30       0.0460      0.23  QV        |         |         |         |
 3+35       0.0475      0.23  QV        |         |         |         |
 3+40       0.0491      0.23  Q V       |         |         |         |
 3+45       0.0507      0.23  Q V       |         |         |         |
 3+50       0.0522      0.23  Q V       |         |         |         |
 3+55       0.0539      0.24  Q V       |         |         |         |
 4+ 0       0.0557      0.26  |QV       |         |         |         |
 4+ 5       0.0575      0.26  |QV       |         |         |         |
 4+10       0.0593      0.27  |QV       |         |         |         |
 4+15       0.0612      0.27  |QV       |         |         |         |
 4+20       0.0630      0.27  |QV       |         |         |         |
 4+25       0.0650      0.29  |QV       |         |         |         |
 4+30       0.0671      0.30  |QV       |         |         |         |
 4+35       0.0692      0.31  |QV       |         |         |         |
 4+40       0.0714      0.31  |QV       |         |         |         |
 4+45       0.0735      0.31  |Q V      |         |         |         |
 4+50       0.0757      0.32  |Q V      |         |         |         |
 4+55       0.0780      0.33  |Q V      |         |         |         |
 5+ 0       0.0804      0.35  |Q V      |         |         |         |
 5+ 5       0.0828      0.35  |Q V      |         |         |         |
 5+10       0.0850      0.32  |Q V      |         |         |         |
 5+15       0.0871      0.29  |Q V      |         |         |         |
 5+20       0.0890      0.29  |Q V      |         |         |         |
 5+25       0.0911      0.30  |Q V      |         |         |         |
 5+30       0.0932      0.31  |Q V      |         |         |         |
 5+35       0.0953      0.31  |Q V      |         |         |         |
 5+40       0.0976      0.33  |Q  V     |         |         |         |
 5+45       0.1000      0.35  |Q  V     |         |         |         |
 5+50       0.1024      0.35  |Q  V     |         |         |         |
 5+55       0.1049      0.36  |Q  V     |         |         |         |
 6+ 0       0.1073      0.36  |Q  V     |         |         |         |
 6+ 5       0.1098      0.36  |Q  V     |         |         |         |
 6+10       0.1124      0.38  |Q  V     |         |         |         |
 6+15       0.1151      0.39  |Q  V     |         |         |         |
 6+20       0.1179      0.40  |Q  V     |         |         |         |
 6+25       0.1207      0.40  |Q  V     |         |         |         |
 6+30       0.1234      0.40  |Q   V    |         |         |         |
 6+35       0.1262      0.41  |Q   V    |         |         |         |
 6+40       0.1292      0.42  |Q   V    |         |         |         |
 6+45       0.1322      0.44  |Q   V    |         |         |         |
 6+50       0.1352      0.44  |Q   V    |         |         |         |
 6+55       0.1383      0.45  |Q   V    |         |         |         |
 7+ 0       0.1414      0.45  |Q   V    |         |         |         |
 7+ 5       0.1445      0.45  |Q   V    |         |         |         |
 7+10       0.1476      0.45  |Q    V   |         |         |         |
 7+15       0.1507      0.45  |Q    V   |         |         |         |
 7+20       0.1538      0.45  |Q    V   |         |         |         |
 7+25       0.1571      0.47  |Q    V   |         |         |         |
 7+30       0.1604      0.48  |Q    V   |         |         |         |
 7+35       0.1638      0.49  |Q    V   |         |         |         |
 7+40       0.1673      0.51  | Q   V   |         |         |         |
 7+45       0.1709      0.53  | Q    V  |         |         |         |
 7+50       0.1746      0.54  | Q    V  |         |         |         |
 7+55       0.1784      0.55  | Q    V  |         |         |         |
 8+ 0       0.1823      0.57  | Q    V  |         |         |         |
 8+ 5       0.1864      0.58  | Q    V  |         |         |         |
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 8+10       0.1906      0.62  | Q    V  |         |         |         |
 8+15       0.1951      0.65  | Q     V |         |         |         |
 8+20       0.1996      0.66  | Q     V |         |         |         |
 8+25       0.2042      0.67  | Q     V |         |         |         |
 8+30       0.2088      0.67  | Q     V |         |         |         |
 8+35       0.2135      0.68  | Q     V |         |         |         |
 8+40       0.2183      0.69  | Q      V|         |         |         |
 8+45       0.2232      0.71  | Q      V|         |         |         |
 8+50       0.2281      0.72  | Q      V|         |         |         |
 8+55       0.2332      0.73  | Q      V|         |         |         |
 9+ 0       0.2383      0.75  |  Q     V|         |         |         |
 9+ 5       0.2436      0.76  |  Q      V         |         |         |
 9+10       0.2491      0.80  |  Q      V         |         |         |
 9+15       0.2548      0.83  |  Q      V         |         |         |
 9+20       0.2606      0.84  |  Q      V         |         |         |
 9+25       0.2666      0.87  |  Q      |V        |         |         |
 9+30       0.2727      0.88  |  Q      |V        |         |         |
 9+35       0.2788      0.90  |  Q      |V        |         |         |
 9+40       0.2851      0.91  |  Q      |V        |         |         |
 9+45       0.2915      0.93  |  Q      | V       |         |         |
 9+50       0.2980      0.94  |  Q      | V       |         |         |
 9+55       0.3046      0.96  |  Q      | V       |         |         |
10+ 0       0.3114      0.98  |  Q      | V       |         |         |
10+ 5       0.3180      0.97  |  Q      |  V      |         |         |
10+10       0.3240      0.87  |  Q      |  V      |         |         |
10+15       0.3292      0.76  |  Q      |  V      |         |         |
10+20       0.3342      0.73  | Q       |  V      |         |         |
10+25       0.3391      0.70  | Q       |   V     |         |         |
10+30       0.3438      0.69  | Q       |   V     |         |         |
10+35       0.3486      0.70  | Q       |   V     |         |         |
10+40       0.3539      0.77  |  Q      |   V     |         |         |
10+45       0.3597      0.84  |  Q      |   V     |         |         |
10+50       0.3657      0.87  |  Q      |    V    |         |         |
10+55       0.3718      0.88  |  Q      |    V    |         |         |
11+ 0       0.3779      0.89  |  Q      |    V    |         |         |
11+ 5       0.3841      0.89  |  Q      |    V    |         |         |
11+10       0.3902      0.88  |  Q      |     V   |         |         |
11+15       0.3961      0.87  |  Q      |     V   |         |         |
11+20       0.4021      0.86  |  Q      |     V   |         |         |
11+25       0.4080      0.86  |  Q      |     V   |         |         |
11+30       0.4139      0.86  |  Q      |      V  |         |         |
11+35       0.4198      0.85  |  Q      |      V  |         |         |
11+40       0.4255      0.82  |  Q      |      V  |         |         |
11+45       0.4309      0.79  |  Q      |      V  |         |         |
11+50       0.4363      0.78  |  Q      |       V |         |         |
11+55       0.4418      0.79  |  Q      |       V |         |         |
12+ 0       0.4473      0.80  |  Q      |       V |         |         |
12+ 5       0.4530      0.83  |  Q      |       V |         |         |
12+10       0.4596      0.95  |  Q      |        V|         |         |
12+15       0.4670      1.08  |   Q     |        V|         |         |
12+20       0.4748      1.13  |   Q     |        V|         |         |
12+25       0.4830      1.18  |   Q     |        V|         |         |
12+30       0.4913      1.22  |   Q     |         V         |         |
12+35       0.4999      1.24  |   Q     |         V         |         |
12+40       0.5088      1.29  |    Q    |         |V        |         |
12+45       0.5180      1.34  |    Q    |         |V        |         |
12+50       0.5273      1.36  |    Q    |         |V        |         |
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12+55       0.5369      1.39  |    Q    |         | V       |         |
13+ 0       0.5466      1.42  |    Q    |         | V       |         |
13+ 5       0.5566      1.45  |    Q    |         |  V      |         |
13+10       0.5673      1.55  |     Q   |         |  V      |         |
13+15       0.5787      1.65  |     Q   |         |  V      |         |
13+20       0.5903      1.69  |     Q   |         |   V     |         |
13+25       0.6021      1.72  |     Q   |         |   V     |         |
13+30       0.6141      1.73  |     Q   |         |    V    |         |
13+35       0.6258      1.70  |     Q   |         |    V    |         |
13+40       0.6361      1.50  |    Q    |         |     V   |         |
13+45       0.6449      1.28  |    Q    |         |     V   |         |
13+50       0.6532      1.20  |   Q     |         |      V  |         |
13+55       0.6611      1.16  |   Q     |         |      V  |         |
14+ 0       0.6689      1.13  |   Q     |         |      V  |         |
14+ 5       0.6767      1.13  |   Q     |         |       V |         |
14+10       0.6850      1.20  |   Q     |         |       V |         |
14+15       0.6938      1.28  |    Q    |         |       V |         |
14+20       0.7028      1.30  |    Q    |         |        V|         |
14+25       0.7117      1.30  |    Q    |         |        V|         |
14+30       0.7206      1.29  |    Q    |         |        V|         |
14+35       0.7295      1.29  |    Q    |         |         V         |
14+40       0.7384      1.29  |    Q    |         |         V         |
14+45       0.7473      1.29  |    Q    |         |         V         |
14+50       0.7562      1.29  |    Q    |         |         |V        |
14+55       0.7649      1.27  |    Q    |         |         |V        |
15+ 0       0.7735      1.25  |    Q    |         |         | V       |
15+ 5       0.7821      1.24  |   Q     |         |         | V       |
15+10       0.7905      1.22  |   Q     |         |         | V       |
15+15       0.7987      1.20  |   Q     |         |         |  V      |
15+20       0.8069      1.19  |   Q     |         |         |  V      |
15+25       0.8149      1.16  |   Q     |         |         |  V      |
15+30       0.8228      1.14  |   Q     |         |         |   V     |
15+35       0.8305      1.12  |   Q     |         |         |   V     |
15+40       0.8377      1.04  |   Q     |         |         |   V     |
15+45       0.8443      0.96  |  Q      |         |         |   V     |
15+50       0.8507      0.93  |  Q      |         |         |    V    |
15+55       0.8570      0.91  |  Q      |         |         |    V    |
16+ 0       0.8632      0.90  |  Q      |         |         |    V    |
16+ 5       0.8691      0.86  |  Q      |         |         |    V    |
16+10       0.8735      0.63  | Q       |         |         |     V   |
16+15       0.8761      0.38  |Q        |         |         |     V   |
16+20       0.8781      0.30  |Q        |         |         |     V   |
16+25       0.8798      0.24  Q         |         |         |     V   |
16+30       0.8813      0.21  Q         |         |         |     V   |
16+35       0.8826      0.19  Q         |         |         |     V   |
16+40       0.8838      0.17  Q         |         |         |     V   |
16+45       0.8849      0.15  Q         |         |         |     V   |
16+50       0.8859      0.15  Q         |         |         |     V   |
16+55       0.8869      0.14  Q         |         |         |     V   |
17+ 0       0.8878      0.14  Q         |         |         |     V   |
17+ 5       0.8888      0.14  Q         |         |         |     V   |
17+10       0.8900      0.17  Q         |         |         |     V   |
17+15       0.8913      0.20  Q         |         |         |     V   |
17+20       0.8928      0.21  Q         |         |         |     V   |
17+25       0.8943      0.22  Q         |         |         |      V  |
17+30       0.8958      0.22  Q         |         |         |      V  |
17+35       0.8974      0.22  Q         |         |         |      V  |
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17+40	0.8989	0.22	Q				V
17+45	0.9004	0.22	Q				V
17+50	0.9020	0.22	Q				V
17+55	0.9034	0.21	Q				V
18+ 0	0.9047	0.19	Q				V
18+ 5	0.9060	0.19	Q				V
18+10	0.9073	0.18	Q				V
18+15	0.9086	0.18	Q				V
18+20	0.9098	0.18	Q				V
18+25	0.9111	0.18	Q				V
18+30	0.9123	0.18	Q				V
18+35	0.9135	0.18	Q				V
18+40	0.9147	0.16	Q				V
18+45	0.9157	0.15	Q				V
18+50	0.9166	0.14	Q				V
18+55	0.9175	0.12	Q				V
19+ 0	0.9182	0.11	Q				V
19+ 5	0.9189	0.10	Q				V
19+10	0.9197	0.11	Q				V
19+15	0.9205	0.13	Q				V
19+20	0.9214	0.13	Q				V
19+25	0.9225	0.15	Q				V
19+30	0.9236	0.17	Q				V
19+35	0.9248	0.17	Q				V
19+40	0.9259	0.16	Q				V
19+45	0.9269	0.15	Q				V
19+50	0.9278	0.14	Q				V
19+55	0.9287	0.12	Q				V
20+ 0	0.9294	0.10	Q				V
20+ 5	0.9301	0.10	Q				V
20+10	0.9309	0.11	Q				V
20+15	0.9317	0.13	Q				V
20+20	0.9326	0.13	Q				V
20+25	0.9335	0.13	Q				V
20+30	0.9344	0.13	Q				V
20+35	0.9354	0.13	Q				V
20+40	0.9363	0.13	Q				V
20+45	0.9372	0.13	Q				V
20+50	0.9381	0.13	Q				V
20+55	0.9390	0.12	Q				V
21+ 0	0.9397	0.10	Q				V
21+ 5	0.9404	0.10	Q				V
21+10	0.9411	0.11	Q				V
21+15	0.9420	0.12	Q				V
21+20	0.9428	0.13	Q				V
21+25	0.9436	0.11	Q				V
21+30	0.9443	0.10	Q				V
21+35	0.9450	0.10	Q				V
21+40	0.9458	0.11	Q				V
21+45	0.9466	0.12	Q				V
21+50	0.9475	0.13	Q				V
21+55	0.9483	0.11	Q				V
22+ 0	0.9490	0.10	Q				V
22+ 5	0.9497	0.10	Q				V
22+10	0.9504	0.11	Q				V
22+15	0.9513	0.12	Q				V
22+20	0.9522	0.13	Q				V

22+25	0.9530	0.11	Q	|	|	|	V|
22+30	0.9537	0.10	Q	|	|	|	V|
22+35	0.9543	0.10	Q	|	|	|	V|
22+40	0.9550	0.09	Q	|	|	|	V|
22+45	0.9556	0.09	Q	|	|	|	V|
22+50	0.9562	0.09	Q	|	|	|	V|
22+55	0.9569	0.09	Q	|	|	|	V|
23+ 0	0.9575	0.09	Q	|	|	|	V|
23+ 5	0.9581	0.09	Q	|	|	|	V|
23+10	0.9587	0.09	Q	|	|	|	V|
23+15	0.9593	0.09	Q	|	|	|	V|
23+20	0.9600	0.09	Q	|	|	|	V|
23+25	0.9606	0.09	Q	|	|	|	V|
23+30	0.9612	0.09	Q	|	|	|	V|
23+35	0.9618	0.09	Q	|	|	|	V|
23+40	0.9625	0.09	Q	|	|	|	V|
23+45	0.9631	0.09	Q	|	|	|	V|
23+50	0.9637	0.09	Q	|	|	|	V|
23+55	0.9643	0.09	Q	|	|	|	V|
24+ 0	0.9649	0.09	Q	|	|	|	V|
24+ 5	0.9655	0.09	Q	|	|	|	V|
24+10	0.9659	0.06	Q	|	|	|	V|
24+15	0.9661	0.03	Q	|	|	|	V|
24+20	0.9662	0.01	Q	|	|	|	V|
24+25	0.9662	0.01	Q	|	|	|	V|
24+30	0.9663	0.00	Q	|	|	|	V|
24+35	0.9663	0.00	Q	|	|	|	V|
24+40	0.9663	0.00	Q	|	|	|	V|
24+45	0.9663	0.00	Q	|	|	|	V|
24+50	0.9663	0.00	Q	|	|	|	V|
24+55	0.9663	0.00	Q	|	|	|	V

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST65.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.581(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.581(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.095	(0.064)	0.023	0.072
2	0.17	0.60	0.114	(0.064)	0.028	0.086
3	0.25	0.60	0.114	(0.064)	0.028	0.086
4	0.33	0.60	0.114	(0.064)	0.028	0.086
5	0.42	0.60	0.114	(0.064)	0.028	0.086
6	0.50	0.70	0.133	(0.064)	0.032	0.101
7	0.58	0.70	0.133	(0.064)	0.032	0.101

8	0.67	0.70	0.133	(0.064)	0.032	0.101
9	0.75	0.70	0.133	(0.064)	0.032	0.101
10	0.83	0.70	0.133	(0.064)	0.032	0.101
11	0.92	0.70	0.133	(0.064)	0.032	0.101
12	1.00	0.80	0.152	(0.064)	0.037	0.115
13	1.08	0.80	0.152	(0.064)	0.037	0.115
14	1.17	0.80	0.152	(0.064)	0.037	0.115
15	1.25	0.80	0.152	(0.064)	0.037	0.115
16	1.33	0.80	0.152	(0.064)	0.037	0.115
17	1.42	0.80	0.152	(0.064)	0.037	0.115
18	1.50	0.80	0.152	(0.064)	0.037	0.115
19	1.58	0.80	0.152	(0.064)	0.037	0.115
20	1.67	0.80	0.152	(0.064)	0.037	0.115
21	1.75	0.80	0.152	(0.064)	0.037	0.115
22	1.83	0.80	0.152	(0.064)	0.037	0.115
23	1.92	0.80	0.152	(0.064)	0.037	0.115
24	2.00	0.90	0.171	(0.064)	0.042	0.129
25	2.08	0.80	0.152	(0.064)	0.037	0.115
26	2.17	0.90	0.171	(0.064)	0.042	0.129
27	2.25	0.90	0.171	(0.064)	0.042	0.129
28	2.33	0.90	0.171	(0.064)	0.042	0.129
29	2.42	0.90	0.171	(0.064)	0.042	0.129
30	2.50	0.90	0.171	(0.064)	0.042	0.129
31	2.58	0.90	0.171	(0.064)	0.042	0.129
32	2.67	0.90	0.171	(0.064)	0.042	0.129
33	2.75	1.00	0.190	(0.064)	0.046	0.144
34	2.83	1.00	0.190	(0.064)	0.046	0.144
35	2.92	1.00	0.190	(0.064)	0.046	0.144
36	3.00	1.00	0.190	(0.064)	0.046	0.144
37	3.08	1.00	0.190	(0.064)	0.046	0.144
38	3.17	1.10	0.209	(0.064)	0.051	0.158
39	3.25	1.10	0.209	(0.064)	0.051	0.158
40	3.33	1.10	0.209	(0.064)	0.051	0.158
41	3.42	1.20	0.228	(0.064)	0.055	0.172
42	3.50	1.30	0.247	(0.064)	0.060	0.187
43	3.58	1.40	0.266	0.064	(0.065)	0.202
44	3.67	1.40	0.266	0.064	(0.065)	0.202
45	3.75	1.50	0.285	0.064	(0.069)	0.221
46	3.83	1.50	0.285	0.064	(0.069)	0.221
47	3.92	1.60	0.304	0.064	(0.074)	0.240
48	4.00	1.60	0.304	0.064	(0.074)	0.240
49	4.08	1.70	0.323	0.064	(0.078)	0.259
50	4.17	1.80	0.342	0.064	(0.083)	0.278
51	4.25	1.90	0.360	0.064	(0.088)	0.297
52	4.33	2.00	0.379	0.064	(0.092)	0.316
53	4.42	2.10	0.398	0.064	(0.097)	0.335
54	4.50	2.10	0.398	0.064	(0.097)	0.335
55	4.58	2.20	0.417	0.064	(0.102)	0.354
56	4.67	2.30	0.436	0.064	(0.106)	0.373
57	4.75	2.40	0.455	0.064	(0.111)	0.392
58	4.83	2.40	0.455	0.064	(0.111)	0.392
59	4.92	2.50	0.474	0.064	(0.115)	0.411
60	5.00	2.60	0.493	0.064	(0.120)	0.430
61	5.08	3.10	0.588	0.064	(0.143)	0.524
62	5.17	3.60	0.683	0.064	(0.166)	0.619
63	5.25	3.90	0.740	0.064	(0.180)	0.676
64	5.33	4.20	0.797	0.064	(0.194)	0.733

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65   5.42     4.70      0.892          0.064    (  0.217)        0.828
66   5.50     5.60      1.062          0.064    (  0.258)        0.999
67   5.58     1.90      0.360          0.064    (  0.088)        0.297
68   5.67     0.90      0.171       (  0.064)      0.042         0.129
69   5.75     0.60      0.114       (  0.064)      0.028         0.086
70   5.83     0.50      0.095       (  0.064)      0.023         0.072
71   5.92     0.30      0.057       (  0.064)      0.014         0.043
72   6.00     0.20      0.038       (  0.064)      0.009         0.029
           (Loss Rate Not Used)
   Sum =     100.0                                  Sum =    15.6
    Flood volume = Effective rainfall      1.30(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.5(Ac.Ft)
    Total soil loss =      0.28(In)
    Total soil loss =     0.117(Ac.Ft)
    Total rainfall =      1.58(In)
    Flood volume =       23824.1 Cubic Feet
    Total soil loss =        5101.4 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      4.091(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       6 - H O U R   S T O R M
                  R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
               Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.02  Q         |         |         |         |
  0+10       0.0011      0.14  Q         |         |         |         |
  0+15       0.0031      0.29  VQ        |         |         |         |
  0+20       0.0056      0.36  VQ        |         |         |         |
  0+25       0.0083      0.39  VQ        |         |         |         |
  0+30       0.0112      0.42  VQ        |         |         |         |
  0+35       0.0143      0.45  |Q        |         |         |         |
  0+40       0.0176      0.48  |Q        |         |         |         |
  0+45       0.0210      0.49  |Q        |         |         |         |
  0+50       0.0245      0.50  |VQ       |         |         |         |
  0+55       0.0280      0.51  | Q       |         |         |         |
  1+ 0       0.0315      0.51  | Q       |         |         |         |
  1+ 5       0.0352      0.54  | Q       |         |         |         |
  1+10       0.0391      0.56  | Q       |         |         |         |
  1+15       0.0430      0.57  | QV      |         |         |         |
  1+20       0.0470      0.58  | QV      |         |         |         |
  1+25       0.0510      0.58  | QV      |         |         |         |
  1+30       0.0550      0.58  | Q V     |         |         |         |
  1+35       0.0590      0.58  | Q V     |         |         |         |
  1+40       0.0630      0.58  | Q V     |         |         |         |
  1+45       0.0671      0.58  | Q V     |         |         |         |
  1+50       0.0711      0.58  | Q  V    |         |         |         |
  1+55       0.0751      0.58  | Q  V    |         |         |         |
  2+ 0       0.0792      0.59  | Q  V    |         |         |         |
  2+ 5       0.0833      0.61  | Q   V   |         |         |         |
  2+10       0.0876      0.61  | Q   V   |         |         |         |
  2+15       0.0918      0.62  | Q   V   |         |         |         |
  2+20       0.0962      0.64  | Q    V  |         |         |         |
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    2+25       0.1007      0.65  | Q    V  |         |         |         |
    2+30       0.1052      0.65  | Q    V  |         |         |         |
    2+35       0.1097      0.65  | Q     V |         |         |         |
    2+40       0.1142      0.66  | Q     V |         |         |         |
    2+45       0.1188      0.66  | Q     V |         |         |         |
    2+50       0.1235      0.68  | Q      V|         |         |         |
    2+55       0.1284      0.71  | Q      V|         |         |         |
    3+ 0       0.1333      0.72  | Q      V|         |         |         |
    3+ 5       0.1383      0.72  | Q       V         |         |         |
    3+10       0.1433      0.73  | Q       V         |         |         |
    3+15       0.1485      0.76  |  Q      V         |         |         |
    3+20       0.1539      0.78  |  Q      |V        |         |         |
    3+25       0.1594      0.79  |  Q      |V        |         |         |
    3+30       0.1651      0.83  |  Q      | V       |         |         |
    3+35       0.1712      0.88  |  Q      | V       |         |         |
    3+40       0.1777      0.94  |  Q      | V       |         |         |
    3+45       0.1845      0.99  |  Q      |  V      |         |         |
    3+50       0.1916      1.04  |   Q     |   V     |         |         |
    3+55       0.1991      1.09  |   Q     |   V     |         |         |
    4+ 0       0.2070      1.14  |   Q     |    V    |         |         |
    4+ 5       0.2151      1.19  |   Q     |    V    |         |         |
    4+10       0.2237      1.24  |   Q     |     V   |         |         |
    4+15       0.2327      1.32  |    Q    |      V  |         |         |
    4+20       0.2424      1.40  |    Q    |      V  |         |         |
    4+25       0.2527      1.50  |    Q    |       V |         |         |
    4+30       0.2636      1.58  |     Q   |        V|         |         |
    4+35       0.2750      1.65  |     Q   |         V         |         |
    4+40       0.2868      1.71  |     Q   |         V         |         |
    4+45       0.2991      1.79  |      Q  |         |V        |         |
    4+50       0.3120      1.88  |      Q  |         | V       |         |
    4+55       0.3254      1.94  |      Q  |         |  V      |         |
    5+ 0       0.3392      2.00  |       Q |         |   V     |         |
    5+ 5       0.3537      2.11  |       Q |         |    V    |         |
    5+10       0.3698      2.34  |        Q|         |      V  |         |
    5+15       0.3884      2.70  |         Q         |       V |         |
    5+20       0.4094      3.04  |         | Q       |        V|         |
    5+25       0.4326      3.36  |         |  Q      |         |V        |
    5+30       0.4585      3.76  |         |    Q    |         |  V      |
    5+35       0.4866      4.09  |         |     Q   |         |    V    |
    5+40       0.5093      3.29  |         |  Q      |         |      V  |
    5+45       0.5228      1.97  |      Q  |         |         |       V |
    5+50       0.5315      1.26  |    Q    |         |         |       V |
    5+55       0.5374      0.86  |  Q      |         |         |        V|
    6+ 0       0.5413      0.57  | Q       |         |         |        V|
    6+ 5       0.5438      0.36  |Q        |         |         |        V|
    6+10       0.5453      0.21  Q         |         |         |        V|
    6+15       0.5461      0.11  Q         |         |         |        V|
    6+20       0.5465      0.07  Q         |         |         |        V|
    6+25       0.5467      0.03  Q         |         |         |        V|
    6+30       0.5468      0.01  Q         |         |         |        V|
    6+35       0.5469      0.01  Q         |         |         |        V|
    6+40       0.5469      0.00  Q         |         |         |        V|
    6+45       0.5469      0.00  Q         |         |         |        V|
    6+50       0.5469      0.00  Q         |         |         |        V|
    6+55       0.5469      0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST35.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 1.073(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.072(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.167	(0.064)	0.041	0.127
2	0.17	1.30	0.167	(0.064)	0.041	0.127
3	0.25	1.10	0.142	(0.064)	0.034	0.107
4	0.33	1.50	0.193	(0.064)	0.047	0.146
5	0.42	1.50	0.193	(0.064)	0.047	0.146
6	0.50	1.80	0.232	(0.064)	0.056	0.175
7	0.58	1.50	0.193	(0.064)	0.047	0.146

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 8   0.67     1.80      0.232       (  0.064)       0.056        0.175
 9   0.75     1.80      0.232       (  0.064)       0.056        0.175
10   0.83     1.50      0.193       (  0.064)       0.047        0.146
11   0.92     1.60      0.206       (  0.064)       0.050        0.156
12   1.00     1.80      0.232       (  0.064)       0.056        0.175
13   1.08     2.20      0.283          0.064    (  0.069)        0.219
14   1.17     2.20      0.283          0.064    (  0.069)        0.219
15   1.25     2.20      0.283          0.064    (  0.069)        0.219
16   1.33     2.00      0.257       (  0.064)       0.063        0.195
17   1.42     2.60      0.335          0.064    (  0.081)        0.271
18   1.50     2.70      0.347          0.064    (  0.085)        0.284
19   1.58     2.40      0.309          0.064    (  0.075)        0.245
20   1.67     2.70      0.347          0.064    (  0.085)        0.284
21   1.75     3.30      0.425          0.064    (  0.103)        0.361
22   1.83     3.10      0.399          0.064    (  0.097)        0.335
23   1.92     2.90      0.373          0.064    (  0.091)        0.310
24   2.00     3.00      0.386          0.064    (  0.094)        0.322
25   2.08     3.10      0.399          0.064    (  0.097)        0.335
26   2.17     4.20      0.541          0.064    (  0.131)        0.477
27   2.25     5.00      0.643          0.064    (  0.156)        0.580
28   2.33     3.50      0.450          0.064    (  0.110)        0.387
29   2.42     6.80      0.875          0.064    (  0.213)        0.811
30   2.50     7.30      0.940          0.064    (  0.228)        0.876
31   2.58     8.20      1.055          0.064    (  0.257)        0.992
32   2.67     5.90      0.759          0.064    (  0.185)        0.696
33   2.75     2.00      0.257       (  0.064)       0.063        0.195
34   2.83     1.80      0.232       (  0.064)       0.056        0.175
35   2.92     1.80      0.232       (  0.064)       0.056        0.175
36   3.00     0.60      0.077       (  0.064)       0.019        0.058
           (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    10.8
    Flood volume = Effective rainfall      0.90(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
    Total soil loss =      0.17(In)
    Total soil loss =     0.072(Ac.Ft)
    Total rainfall =      1.07(In)
    Flood volume =       16501.8 Cubic Feet
    Total soil loss =       3119.6 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      4.197(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        3 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0003      0.04  Q          |         |         |         |
  0+10       0.0019      0.24  Q          |         |         |         |
  0+15       0.0051      0.46  VQ         |         |         |         |
  0+20       0.0086      0.51  V Q        |         |         |         |
  0+25       0.0127      0.59  |VQ        |         |         |         |
  0+30       0.0174      0.68  |VQ        |         |         |         |
  0+35       0.0226      0.75  | VQ       |         |         |         |
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    0+40       0.0279      0.78  | VQ      |         |         |         |
    0+45       0.0335      0.80  |  Q      |         |         |         |
    0+50       0.0393      0.84  |  QV     |         |         |         |
    0+55       0.0449      0.82  |  QV     |         |         |         |
    1+ 0       0.0504      0.80  |  Q V    |         |         |         |
    1+ 5       0.0562      0.85  |  Q V    |         |         |         |
    1+10       0.0628      0.95  |  Q  V   |         |         |         |
    1+15       0.0699      1.04  |   Q  V  |         |         |         |
    1+20       0.0772      1.06  |   Q   V |         |         |         |
    1+25       0.0846      1.07  |   Q   V |         |         |         |
    1+30       0.0926      1.16  |   Q    V|         |         |         |
    1+35       0.1015      1.29  |    Q    V         |         |         |
    1+40       0.1105      1.31  |    Q    |V        |         |         |
    1+45       0.1198      1.36  |    Q    | V       |         |         |
    1+50       0.1304      1.54  |     Q   |  V      |         |         |
    1+55       0.1417      1.64  |     Q   |   V     |         |         |
    2+ 0       0.1529      1.62  |     Q   |     V   |         |         |
    2+ 5       0.1640      1.62  |     Q   |      V  |         |         |
    2+10       0.1757      1.70  |     Q   |       V |         |         |
    2+15       0.1894      1.98  |      Q  |        V|         |         |
    2+20       0.2055      2.35  |        Q|         |V        |         |
    2+25       0.2222      2.43  |        Q|         |  V      |         |
    2+30       0.2424      2.93  |         |Q        |    V    |         |
    2+35       0.2682      3.75  |         |   Q     |       V |         |
    2+40       0.2971      4.20  |         |     Q   |         |V        |
    2+45       0.3242      3.93  |         |    Q    |         |   V     |
    2+50       0.3433      2.77  |         |Q        |         |     V   |
    2+55       0.3557      1.80  |      Q  |         |         |      V  |
    3+ 0       0.3651      1.36  |    Q    |         |         |       V |
    3+ 5       0.3715      0.93  |  Q      |         |         |        V|
    3+10       0.3749      0.49  |Q        |         |         |        V|
    3+15       0.3766      0.25  |Q        |         |         |        V|
    3+20       0.3777      0.15  Q         |         |         |        V|
    3+25       0.3783      0.09  Q         |         |         |        V|
    3+30       0.3786      0.04  Q         |         |         |        V|
    3+35       0.3787      0.02  Q         |         |         |        V|
    3+40       0.3788      0.01  Q         |         |         |        V|
    3+45       0.3788      0.01  Q         |         |         |        V|
    3+50       0.3788      0.00  Q         |         |         |        V|
    3+55       0.3788      0.00  Q         |         |         |         V
----------------------------------------------------------------------
```

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     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/22/15 File: 201501POST15.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             0.50                    2.52

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04             1.20                    6.05

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    0.500(In)
Area Averaged 100-Year Rainfall =    1.200(In)
```

Point rain (area averaged) = 0.664(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.664(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.263	0.064	(0.064)	0.199
2	0.17	4.20	0.335	0.064	(0.081)	0.271
3	0.25	4.40	0.351	0.064	(0.085)	0.287
4	0.33	4.80	0.382	0.064	(0.093)	0.319
5	0.42	5.20	0.414	0.064	(0.101)	0.351

```
  6   0.50     6.20      0.494          0.064    (  0.120)        0.430
  7   0.58     6.80      0.542          0.064    (  0.132)        0.478
  8   0.67     8.80      0.701          0.064    (  0.171)        0.637
  9   0.75    13.90      1.107          0.064    (  0.269)        1.044
 10   0.83    31.40      2.502          0.064    (  0.608)        2.438
 11   0.92     7.20      0.574          0.064    (  0.140)        0.510
 12   1.00     3.80      0.303          0.064    (  0.074)        0.239
             (Loss Rate Not Used)
    Sum =     100.0                                   Sum =     7.2
     Flood volume = Effective rainfall      0.60(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.027(Ac.Ft)
     Total rainfall =      0.66(In)
     Flood volume =       10981.1 Cubic Feet
     Total soil loss =       1165.6 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      6.679(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0004      0.06  Q         |         |         |         |
   0+10       0.0032      0.41  VQ        |         |         |         |
   0+15       0.0092      0.87  |V Q      |         |         |         |
   0+20       0.0171      1.15  | V Q     |         |         |         |
   0+25       0.0265      1.36  |   VQ    |         |         |         |
   0+30       0.0372      1.57  |    VQ   |         |         |         |
   0+35       0.0499      1.83  |      Q  |         |         |         |
   0+40       0.0646      2.14  |       Q V         |         |         |
   0+45       0.0831      2.68  |         Q  V      |         |         |
   0+50       0.1114      4.10  |         |     QV  |         |         |
   0+55       0.1573      6.68  |         |         |   V Q   |         |
   1+ 0       0.1997      6.15  |         |         |   Q     |V        |
   1+ 5       0.2231      3.40  |         |  Q      |         |    V    |
   1+10       0.2366      1.95  |      Q  |         |         |      V  |
   1+15       0.2438      1.04  |   Q     |         |         |       V |
   1+20       0.2477      0.57  | Q       |         |         |        V|
   1+25       0.2496      0.28  |Q        |         |         |        V|
   1+30       0.2506      0.16  Q         |         |         |        V|
   1+35       0.2513      0.10  Q         |         |         |        V|
   1+40       0.2518      0.07  Q         |         |         |        V|
   1+45       0.2520      0.03  Q         |         |         |        V|
   1+50       0.2521      0.01  Q         |         |         |        V|
   1+55       0.2521      0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
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Proposed Conditions Unit Hydrograph: 2yr Storm

April 2015

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 2.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.018	(0.113)	0.004	0.014
2	0.17	0.07	0.018	(0.113)	0.004	0.014
3	0.25	0.07	0.018	(0.112)	0.004	0.014
4	0.33	0.10	0.028	(0.112)	0.007	0.021
5	0.42	0.10	0.028	(0.111)	0.007	0.021
6	0.50	0.10	0.028	(0.111)	0.007	0.021
7	0.58	0.10	0.028	(0.110)	0.007	0.021

8	0.67	0.10	0.028	(0.110)	0.007	0.021
9	0.75	0.10	0.028	(0.109)	0.007	0.021
10	0.83	0.13	0.037	(0.109)	0.009	0.028
11	0.92	0.13	0.037	(0.109)	0.009	0.028
12	1.00	0.13	0.037	(0.108)	0.009	0.028
13	1.08	0.10	0.028	(0.108)	0.007	0.021
14	1.17	0.10	0.028	(0.107)	0.007	0.021
15	1.25	0.10	0.028	(0.107)	0.007	0.021
16	1.33	0.10	0.028	(0.106)	0.007	0.021
17	1.42	0.10	0.028	(0.106)	0.007	0.021
18	1.50	0.10	0.028	(0.106)	0.007	0.021
19	1.58	0.10	0.028	(0.105)	0.007	0.021
20	1.67	0.10	0.028	(0.105)	0.007	0.021
21	1.75	0.10	0.028	(0.104)	0.007	0.021
22	1.83	0.13	0.037	(0.104)	0.009	0.028
23	1.92	0.13	0.037	(0.104)	0.009	0.028
24	2.00	0.13	0.037	(0.103)	0.009	0.028
25	2.08	0.13	0.037	(0.103)	0.009	0.028
26	2.17	0.13	0.037	(0.102)	0.009	0.028
27	2.25	0.13	0.037	(0.102)	0.009	0.028
28	2.33	0.13	0.037	(0.101)	0.009	0.028
29	2.42	0.13	0.037	(0.101)	0.009	0.028
30	2.50	0.13	0.037	(0.101)	0.009	0.028
31	2.58	0.17	0.046	(0.100)	0.011	0.035
32	2.67	0.17	0.046	(0.100)	0.011	0.035
33	2.75	0.17	0.046	(0.099)	0.011	0.035
34	2.83	0.17	0.046	(0.099)	0.011	0.035
35	2.92	0.17	0.046	(0.099)	0.011	0.035
36	3.00	0.17	0.046	(0.098)	0.011	0.035
37	3.08	0.17	0.046	(0.098)	0.011	0.035
38	3.17	0.17	0.046	(0.097)	0.011	0.035
39	3.25	0.17	0.046	(0.097)	0.011	0.035
40	3.33	0.17	0.046	(0.097)	0.011	0.035
41	3.42	0.17	0.046	(0.096)	0.011	0.035
42	3.50	0.17	0.046	(0.096)	0.011	0.035
43	3.58	0.17	0.046	(0.095)	0.011	0.035
44	3.67	0.17	0.046	(0.095)	0.011	0.035
45	3.75	0.17	0.046	(0.095)	0.011	0.035
46	3.83	0.20	0.055	(0.094)	0.013	0.042
47	3.92	0.20	0.055	(0.094)	0.013	0.042
48	4.00	0.20	0.055	(0.093)	0.013	0.042
49	4.08	0.20	0.055	(0.093)	0.013	0.042
50	4.17	0.20	0.055	(0.093)	0.013	0.042
51	4.25	0.20	0.055	(0.092)	0.013	0.042
52	4.33	0.23	0.064	(0.092)	0.016	0.049
53	4.42	0.23	0.064	(0.091)	0.016	0.049
54	4.50	0.23	0.064	(0.091)	0.016	0.049
55	4.58	0.23	0.064	(0.091)	0.016	0.049
56	4.67	0.23	0.064	(0.090)	0.016	0.049
57	4.75	0.23	0.064	(0.090)	0.016	0.049
58	4.83	0.27	0.074	(0.089)	0.018	0.056
59	4.92	0.27	0.074	(0.089)	0.018	0.056
60	5.00	0.27	0.074	(0.089)	0.018	0.056
61	5.08	0.20	0.055	(0.088)	0.013	0.042
62	5.17	0.20	0.055	(0.088)	0.013	0.042
63	5.25	0.20	0.055	(0.087)	0.013	0.042
64	5.33	0.23	0.064	(0.087)	0.016	0.049

65	5.42	0.23	0.064	(0.087)	0.016	0.049
66	5.50	0.23	0.064	(0.086)	0.016	0.049
67	5.58	0.27	0.074	(0.086)	0.018	0.056
68	5.67	0.27	0.074	(0.086)	0.018	0.056
69	5.75	0.27	0.074	(0.085)	0.018	0.056
70	5.83	0.27	0.074	(0.085)	0.018	0.056
71	5.92	0.27	0.074	(0.084)	0.018	0.056
72	6.00	0.27	0.074	(0.084)	0.018	0.056
73	6.08	0.30	0.083	(0.084)	0.020	0.063
74	6.17	0.30	0.083	(0.083)	0.020	0.063
75	6.25	0.30	0.083	(0.083)	0.020	0.063
76	6.33	0.30	0.083	(0.083)	0.020	0.063
77	6.42	0.30	0.083	(0.082)	0.020	0.063
78	6.50	0.30	0.083	(0.082)	0.020	0.063
79	6.58	0.33	0.092	(0.081)	0.022	0.070
80	6.67	0.33	0.092	(0.081)	0.022	0.070
81	6.75	0.33	0.092	(0.081)	0.022	0.070
82	6.83	0.33	0.092	(0.080)	0.022	0.070
83	6.92	0.33	0.092	(0.080)	0.022	0.070
84	7.00	0.33	0.092	(0.080)	0.022	0.070
85	7.08	0.33	0.092	(0.079)	0.022	0.070
86	7.17	0.33	0.092	(0.079)	0.022	0.070
87	7.25	0.33	0.092	(0.079)	0.022	0.070
88	7.33	0.37	0.101	(0.078)	0.025	0.077
89	7.42	0.37	0.101	(0.078)	0.025	0.077
90	7.50	0.37	0.101	(0.078)	0.025	0.077
91	7.58	0.40	0.110	(0.077)	0.027	0.084
92	7.67	0.40	0.110	(0.077)	0.027	0.084
93	7.75	0.40	0.110	(0.076)	0.027	0.084
94	7.83	0.43	0.120	(0.076)	0.029	0.091
95	7.92	0.43	0.120	(0.076)	0.029	0.091
96	8.00	0.43	0.120	(0.075)	0.029	0.091
97	8.08	0.50	0.138	(0.075)	0.034	0.104
98	8.17	0.50	0.138	(0.075)	0.034	0.104
99	8.25	0.50	0.138	(0.074)	0.034	0.104
100	8.33	0.50	0.138	(0.074)	0.034	0.104
101	8.42	0.50	0.138	(0.074)	0.034	0.104
102	8.50	0.50	0.138	(0.073)	0.034	0.104
103	8.58	0.53	0.147	(0.073)	0.036	0.111
104	8.67	0.53	0.147	(0.073)	0.036	0.111
105	8.75	0.53	0.147	(0.072)	0.036	0.111
106	8.83	0.57	0.156	(0.072)	0.038	0.118
107	8.92	0.57	0.156	(0.072)	0.038	0.118
108	9.00	0.57	0.156	(0.071)	0.038	0.118
109	9.08	0.63	0.175	(0.071)	0.043	0.132
110	9.17	0.63	0.175	(0.071)	0.043	0.132
111	9.25	0.63	0.175	(0.070)	0.043	0.132
112	9.33	0.67	0.184	(0.070)	0.045	0.139
113	9.42	0.67	0.184	(0.070)	0.045	0.139
114	9.50	0.67	0.184	(0.069)	0.045	0.139
115	9.58	0.70	0.193	(0.069)	0.047	0.146
116	9.67	0.70	0.193	(0.069)	0.047	0.146
117	9.75	0.70	0.193	(0.068)	0.047	0.146
118	9.83	0.73	0.202	(0.068)	0.049	0.153
119	9.92	0.73	0.202	(0.068)	0.049	0.153
120	10.00	0.73	0.202	(0.067)	0.049	0.153
121	10.08	0.50	0.138	(0.067)	0.034	0.104

122	10.17	0.50	0.138	(0.067)	0.034	0.104
123	10.25	0.50	0.138	(0.066)	0.034	0.104
124	10.33	0.50	0.138	(0.066)	0.034	0.104
125	10.42	0.50	0.138	(0.066)	0.034	0.104
126	10.50	0.50	0.138	(0.065)	0.034	0.104
127	10.58	0.67	0.184	(0.065)	0.045	0.139
128	10.67	0.67	0.184	(0.065)	0.045	0.139
129	10.75	0.67	0.184	(0.064)	0.045	0.139
130	10.83	0.67	0.184	(0.064)	0.045	0.139
131	10.92	0.67	0.184	(0.064)	0.045	0.139
132	11.00	0.67	0.184	(0.063)	0.045	0.139
133	11.08	0.63	0.175	(0.063)	0.043	0.132
134	11.17	0.63	0.175	(0.063)	0.043	0.132
135	11.25	0.63	0.175	(0.063)	0.043	0.132
136	11.33	0.63	0.175	(0.062)	0.043	0.132
137	11.42	0.63	0.175	(0.062)	0.043	0.132
138	11.50	0.63	0.175	(0.062)	0.043	0.132
139	11.58	0.57	0.156	(0.061)	0.038	0.118
140	11.67	0.57	0.156	(0.061)	0.038	0.118
141	11.75	0.57	0.156	(0.061)	0.038	0.118
142	11.83	0.60	0.166	(0.060)	0.040	0.125
143	11.92	0.60	0.166	(0.060)	0.040	0.125
144	12.00	0.60	0.166	(0.060)	0.040	0.125
145	12.08	0.83	0.230	(0.059)	0.056	0.174
146	12.17	0.83	0.230	(0.059)	0.056	0.174
147	12.25	0.83	0.230	(0.059)	0.056	0.174
148	12.33	0.87	0.239	(0.059)	0.058	0.181
149	12.42	0.87	0.239	(0.058)	0.058	0.181
150	12.50	0.87	0.239	0.058	(0.058)	0.181
151	12.58	0.93	0.258	0.058	(0.063)	0.200
152	12.67	0.93	0.258	0.057	(0.063)	0.200
153	12.75	0.93	0.258	0.057	(0.063)	0.200
154	12.83	0.97	0.267	0.057	(0.065)	0.210
155	12.92	0.97	0.267	0.057	(0.065)	0.210
156	13.00	0.97	0.267	0.056	(0.065)	0.211
157	13.08	1.13	0.313	0.056	(0.076)	0.257
158	13.17	1.13	0.313	0.056	(0.076)	0.257
159	13.25	1.13	0.313	0.055	(0.076)	0.257
160	13.33	1.13	0.313	0.055	(0.076)	0.258
161	13.42	1.13	0.313	0.055	(0.076)	0.258
162	13.50	1.13	0.313	0.055	(0.076)	0.258
163	13.58	0.77	0.212	(0.054)	0.051	0.160
164	13.67	0.77	0.212	(0.054)	0.051	0.160
165	13.75	0.77	0.212	(0.054)	0.051	0.160
166	13.83	0.77	0.212	(0.053)	0.051	0.160
167	13.92	0.77	0.212	(0.053)	0.051	0.160
168	14.00	0.77	0.212	(0.053)	0.051	0.160
169	14.08	0.90	0.248	0.053	(0.060)	0.196
170	14.17	0.90	0.248	0.052	(0.060)	0.196
171	14.25	0.90	0.248	0.052	(0.060)	0.196
172	14.33	0.87	0.239	0.052	(0.058)	0.187
173	14.42	0.87	0.239	0.052	(0.058)	0.188
174	14.50	0.87	0.239	0.051	(0.058)	0.188
175	14.58	0.87	0.239	0.051	(0.058)	0.188
176	14.67	0.87	0.239	0.051	(0.058)	0.188
177	14.75	0.87	0.239	0.051	(0.058)	0.189
178	14.83	0.83	0.230	0.050	(0.056)	0.180

179	14.92	0.83	0.230	0.050	(0.056)	0.180
180	15.00	0.83	0.230	0.050	(0.056)	0.180
181	15.08	0.80	0.221	0.050	(0.054)	0.171
182	15.17	0.80	0.221	0.049	(0.054)	0.172
183	15.25	0.80	0.221	0.049	(0.054)	0.172
184	15.33	0.77	0.212	0.049	(0.051)	0.163
185	15.42	0.77	0.212	0.048	(0.051)	0.163
186	15.50	0.77	0.212	0.048	(0.051)	0.163
187	15.58	0.63	0.175	(0.048)	0.043	0.132
188	15.67	0.63	0.175	(0.048)	0.043	0.132
189	15.75	0.63	0.175	(0.048)	0.043	0.132
190	15.83	0.63	0.175	(0.047)	0.043	0.132
191	15.92	0.63	0.175	(0.047)	0.043	0.132
192	16.00	0.63	0.175	(0.047)	0.043	0.132
193	16.08	0.13	0.037	(0.047)	0.009	0.028
194	16.17	0.13	0.037	(0.046)	0.009	0.028
195	16.25	0.13	0.037	(0.046)	0.009	0.028
196	16.33	0.13	0.037	(0.046)	0.009	0.028
197	16.42	0.13	0.037	(0.046)	0.009	0.028
198	16.50	0.13	0.037	(0.045)	0.009	0.028
199	16.58	0.10	0.028	(0.045)	0.007	0.021
200	16.67	0.10	0.028	(0.045)	0.007	0.021
201	16.75	0.10	0.028	(0.045)	0.007	0.021
202	16.83	0.10	0.028	(0.044)	0.007	0.021
203	16.92	0.10	0.028	(0.044)	0.007	0.021
204	17.00	0.10	0.028	(0.044)	0.007	0.021
205	17.08	0.17	0.046	(0.044)	0.011	0.035
206	17.17	0.17	0.046	(0.044)	0.011	0.035
207	17.25	0.17	0.046	(0.043)	0.011	0.035
208	17.33	0.17	0.046	(0.043)	0.011	0.035
209	17.42	0.17	0.046	(0.043)	0.011	0.035
210	17.50	0.17	0.046	(0.043)	0.011	0.035
211	17.58	0.17	0.046	(0.042)	0.011	0.035
212	17.67	0.17	0.046	(0.042)	0.011	0.035
213	17.75	0.17	0.046	(0.042)	0.011	0.035
214	17.83	0.13	0.037	(0.042)	0.009	0.028
215	17.92	0.13	0.037	(0.042)	0.009	0.028
216	18.00	0.13	0.037	(0.041)	0.009	0.028
217	18.08	0.13	0.037	(0.041)	0.009	0.028
218	18.17	0.13	0.037	(0.041)	0.009	0.028
219	18.25	0.13	0.037	(0.041)	0.009	0.028
220	18.33	0.13	0.037	(0.041)	0.009	0.028
221	18.42	0.13	0.037	(0.040)	0.009	0.028
222	18.50	0.13	0.037	(0.040)	0.009	0.028
223	18.58	0.10	0.028	(0.040)	0.007	0.021
224	18.67	0.10	0.028	(0.040)	0.007	0.021
225	18.75	0.10	0.028	(0.040)	0.007	0.021
226	18.83	0.07	0.018	(0.039)	0.004	0.014
227	18.92	0.07	0.018	(0.039)	0.004	0.014
228	19.00	0.07	0.018	(0.039)	0.004	0.014
229	19.08	0.10	0.028	(0.039)	0.007	0.021
230	19.17	0.10	0.028	(0.039)	0.007	0.021
231	19.25	0.10	0.028	(0.039)	0.007	0.021
232	19.33	0.13	0.037	(0.038)	0.009	0.028
233	19.42	0.13	0.037	(0.038)	0.009	0.028
234	19.50	0.13	0.037	(0.038)	0.009	0.028
235	19.58	0.10	0.028	(0.038)	0.007	0.021

236	19.67	0.10	0.028	(0.038)	0.007	0.021
237	19.75	0.10	0.028	(0.037)	0.007	0.021
238	19.83	0.07	0.018	(0.037)	0.004	0.014
239	19.92	0.07	0.018	(0.037)	0.004	0.014
240	20.00	0.07	0.018	(0.037)	0.004	0.014
241	20.08	0.10	0.028	(0.037)	0.007	0.021
242	20.17	0.10	0.028	(0.037)	0.007	0.021
243	20.25	0.10	0.028	(0.037)	0.007	0.021
244	20.33	0.10	0.028	(0.036)	0.007	0.021
245	20.42	0.10	0.028	(0.036)	0.007	0.021
246	20.50	0.10	0.028	(0.036)	0.007	0.021
247	20.58	0.10	0.028	(0.036)	0.007	0.021
248	20.67	0.10	0.028	(0.036)	0.007	0.021
249	20.75	0.10	0.028	(0.036)	0.007	0.021
250	20.83	0.07	0.018	(0.035)	0.004	0.014
251	20.92	0.07	0.018	(0.035)	0.004	0.014
252	21.00	0.07	0.018	(0.035)	0.004	0.014
253	21.08	0.10	0.028	(0.035)	0.007	0.021
254	21.17	0.10	0.028	(0.035)	0.007	0.021
255	21.25	0.10	0.028	(0.035)	0.007	0.021
256	21.33	0.07	0.018	(0.035)	0.004	0.014
257	21.42	0.07	0.018	(0.034)	0.004	0.014
258	21.50	0.07	0.018	(0.034)	0.004	0.014
259	21.58	0.10	0.028	(0.034)	0.007	0.021
260	21.67	0.10	0.028	(0.034)	0.007	0.021
261	21.75	0.10	0.028	(0.034)	0.007	0.021
262	21.83	0.07	0.018	(0.034)	0.004	0.014
263	21.92	0.07	0.018	(0.034)	0.004	0.014
264	22.00	0.07	0.018	(0.034)	0.004	0.014
265	22.08	0.10	0.028	(0.034)	0.007	0.021
266	22.17	0.10	0.028	(0.033)	0.007	0.021
267	22.25	0.10	0.028	(0.033)	0.007	0.021
268	22.33	0.07	0.018	(0.033)	0.004	0.014
269	22.42	0.07	0.018	(0.033)	0.004	0.014
270	22.50	0.07	0.018	(0.033)	0.004	0.014
271	22.58	0.07	0.018	(0.033)	0.004	0.014
272	22.67	0.07	0.018	(0.033)	0.004	0.014
273	22.75	0.07	0.018	(0.033)	0.004	0.014
274	22.83	0.07	0.018	(0.033)	0.004	0.014
275	22.92	0.07	0.018	(0.033)	0.004	0.014
276	23.00	0.07	0.018	(0.032)	0.004	0.014
277	23.08	0.07	0.018	(0.032)	0.004	0.014
278	23.17	0.07	0.018	(0.032)	0.004	0.014
279	23.25	0.07	0.018	(0.032)	0.004	0.014
280	23.33	0.07	0.018	(0.032)	0.004	0.014
281	23.42	0.07	0.018	(0.032)	0.004	0.014
282	23.50	0.07	0.018	(0.032)	0.004	0.014
283	23.58	0.07	0.018	(0.032)	0.004	0.014
284	23.67	0.07	0.018	(0.032)	0.004	0.014
285	23.75	0.07	0.018	(0.032)	0.004	0.014
286	23.83	0.07	0.018	(0.032)	0.004	0.014
287	23.92	0.07	0.018	(0.032)	0.004	0.014
288	24.00	0.07	0.018	(0.032)	0.004	0.014

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.2

Flood volume = Effective rainfall 1.76(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

```
    Total soil loss =      0.54(In)
    Total soil loss =     0.225(Ac.Ft)
    Total rainfall =      2.30(In)
    Flood volume =       32259.3 Cubic Feet
    Total soil loss =       9819.2 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      1.298(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0002      0.03  Q         |         |         |         |
  0+15       0.0006      0.05  Q         |         |         |         |
  0+20       0.0010      0.06  Q         |         |         |         |
  0+25       0.0015      0.08  Q         |         |         |         |
  0+30       0.0022      0.09  Q         |         |         |         |
  0+35       0.0028      0.10  Q         |         |         |         |
  0+40       0.0035      0.10  Q         |         |         |         |
  0+45       0.0043      0.10  Q         |         |         |         |
  0+50       0.0050      0.11  Q         |         |         |         |
  0+55       0.0058      0.12  Q         |         |         |         |
  1+ 0       0.0067      0.13  Q         |         |         |         |
  1+ 5       0.0076      0.13  Q         |         |         |         |
  1+10       0.0085      0.12  Q         |         |         |         |
  1+15       0.0093      0.11  Q         |         |         |         |
  1+20       0.0101      0.11  Q         |         |         |         |
  1+25       0.0108      0.11  Q         |         |         |         |
  1+30       0.0115      0.11  Q         |         |         |         |
  1+35       0.0123      0.11  Q         |         |         |         |
  1+40       0.0130      0.11  Q         |         |         |         |
  1+45       0.0137      0.11  Q         |         |         |         |
  1+50       0.0145      0.11  Q         |         |         |         |
  1+55       0.0153      0.12  Q         |         |         |         |
  2+ 0       0.0162      0.13  Q         |         |         |         |
  2+ 5       0.0172      0.14  Q         |         |         |         |
  2+10       0.0181      0.14  Q         |         |         |         |
  2+15       0.0191      0.14  QV        |         |         |         |
  2+20       0.0200      0.14  QV        |         |         |         |
  2+25       0.0210      0.14  QV        |         |         |         |
  2+30       0.0220      0.14  QV        |         |         |         |
  2+35       0.0230      0.14  QV        |         |         |         |
  2+40       0.0240      0.15  QV        |         |         |         |
  2+45       0.0252      0.17  QV        |         |         |         |
  2+50       0.0264      0.17  QV        |         |         |         |
  2+55       0.0276      0.17  QV        |         |         |         |
  3+ 0       0.0288      0.18  QV        |         |         |         |
  3+ 5       0.0300      0.18  QV        |         |         |         |
  3+10       0.0312      0.18  QV        |         |         |         |
  3+15       0.0324      0.18  QV        |         |         |         |
  3+20       0.0336      0.18  QV        |         |         |         |
```

```
3+25       0.0349      0.18  QV         |         |         |         |
3+30       0.0361      0.18  QV         |         |         |         |
3+35       0.0373      0.18  Q V        |         |         |         |
3+40       0.0385      0.18  Q V        |         |         |         |
3+45       0.0397      0.18  Q V        |         |         |         |
3+50       0.0410      0.18  Q V        |         |         |         |
3+55       0.0423      0.19  Q V        |         |         |         |
4+ 0       0.0437      0.20  Q V        |         |         |         |
4+ 5       0.0451      0.21  Q V        |         |         |         |
4+10       0.0465      0.21  Q V        |         |         |         |
4+15       0.0480      0.21  Q V        |         |         |         |
4+20       0.0494      0.21  Q V        |         |         |         |
4+25       0.0510      0.23  Q V        |         |         |         |
4+30       0.0526      0.24  Q V        |         |         |         |
4+35       0.0543      0.24  Q V        |         |         |         |
4+40       0.0560      0.24  Q  V       |         |         |         |
4+45       0.0577      0.25  Q  V       |         |         |         |
4+50       0.0594      0.25  Q  V       |         |         |         |
4+55       0.0612      0.26  |Q V       |         |         |         |
5+ 0       0.0631      0.27  |Q V       |         |         |         |
5+ 5       0.0649      0.27  |Q V       |         |         |         |
5+10       0.0667      0.25  |Q V       |         |         |         |
5+15       0.0683      0.23  Q  V       |         |         |         |
5+20       0.0698      0.22  Q  V       |         |         |         |
5+25       0.0714      0.23  Q  V       |         |         |         |
5+30       0.0731      0.24  Q  V       |         |         |         |
5+35       0.0748      0.25  Q   V      |         |         |         |
5+40       0.0766      0.26  |Q  V      |         |         |         |
5+45       0.0784      0.27  |Q  V      |         |         |         |
5+50       0.0803      0.28  |Q  V      |         |         |         |
5+55       0.0823      0.28  |Q  V      |         |         |         |
6+ 0       0.0842      0.28  |Q  V      |         |         |         |
6+ 5       0.0862      0.28  |Q  V      |         |         |         |
6+10       0.0882      0.30  |Q  V      |         |         |         |
6+15       0.0903      0.31  |Q  V      |         |         |         |
6+20       0.0925      0.31  |Q  V      |         |         |         |
6+25       0.0946      0.32  |Q   V     |         |         |         |
6+30       0.0968      0.32  |Q   V     |         |         |         |
6+35       0.0990      0.32  |Q   V     |         |         |         |
6+40       0.1013      0.33  |Q   V     |         |         |         |
6+45       0.1037      0.34  |Q   V     |         |         |         |
6+50       0.1061      0.35  |Q   V     |         |         |         |
6+55       0.1085      0.35  |Q   V     |         |         |         |
7+ 0       0.1109      0.35  |Q   V     |         |         |         |
7+ 5       0.1133      0.35  |Q    V    |         |         |         |
7+10       0.1158      0.35  |Q    V    |         |         |         |
7+15       0.1182      0.35  |Q    V    |         |         |         |
7+20       0.1207      0.36  |Q    V    |         |         |         |
7+25       0.1232      0.37  |Q    V    |         |         |         |
7+30       0.1258      0.38  |Q    V    |         |         |         |
7+35       0.1285      0.39  |Q    V    |         |         |         |
7+40       0.1312      0.40  |Q     V   |         |         |         |
7+45       0.1340      0.41  |Q     V   |         |         |         |
7+50       0.1369      0.42  |Q     V   |         |         |         |
7+55       0.1399      0.43  |Q     V   |         |         |         |
8+ 0       0.1430      0.45  |Q     V   |         |         |         |
8+ 5       0.1462      0.46  |Q     V   |         |         |         |
```

```
  8+10       0.1495       0.48   |Q      V |         |         |         |
  8+15       0.1530       0.51   | Q     V |         |         |         |
  8+20       0.1566       0.52   | Q     V |         |         |         |
  8+25       0.1602       0.52   | Q     V |         |         |         |
  8+30       0.1638       0.53   | Q     V |         |         |         |
  8+35       0.1675       0.53   | Q      V|         |         |         |
  8+40       0.1712       0.54   | Q      V|         |         |         |
  8+45       0.1750       0.56   | Q      V|         |         |         |
  8+50       0.1789       0.56   | Q      V|         |         |         |
  8+55       0.1829       0.58   | Q      V|         |         |         |
  9+ 0       0.1869       0.59   | Q       V         |         |         |
  9+ 5       0.1911       0.60   | Q       V         |         |         |
  9+10       0.1954       0.62   | Q       V         |         |         |
  9+15       0.1998       0.65   | Q       V         |         |         |
  9+20       0.2044       0.66   | Q       |V        |         |         |
  9+25       0.2091       0.68   | Q       |V        |         |         |
  9+30       0.2139       0.69   | Q       |V        |         |         |
  9+35       0.2187       0.70   | Q       |V        |         |         |
  9+40       0.2236       0.72   | Q       | V       |         |         |
  9+45       0.2287       0.73   | Q       | V       |         |         |
  9+50       0.2337       0.74   | Q       | V       |         |         |
  9+55       0.2389       0.75   |  Q      | V       |         |         |
 10+ 0       0.2442       0.77   |  Q      |  V      |         |         |
 10+ 5       0.2494       0.76   |  Q      |  V      |         |         |
 10+10       0.2541       0.68   | Q       |  V      |         |         |
 10+15       0.2582       0.60   | Q       |  V      |         |         |
 10+20       0.2622       0.57   | Q       |   V     |         |         |
 10+25       0.2660       0.55   | Q       |   V     |         |         |
 10+30       0.2697       0.54   | Q       |   V     |         |         |
 10+35       0.2735       0.55   | Q       |   V     |         |         |
 10+40       0.2776       0.60   | Q       |   V     |         |         |
 10+45       0.2821       0.66   | Q       |    V    |         |         |
 10+50       0.2868       0.68   | Q       |    V    |         |         |
 10+55       0.2916       0.69   | Q       |    V    |         |         |
 11+ 0       0.2964       0.70   | Q       |     V   |         |         |
 11+ 5       0.3012       0.70   | Q       |     V   |         |         |
 11+10       0.3060       0.69   | Q       |     V   |         |         |
 11+15       0.3107       0.68   | Q       |     V   |         |         |
 11+20       0.3154       0.68   | Q       |      V  |         |         |
 11+25       0.3200       0.68   | Q       |      V  |         |         |
 11+30       0.3247       0.67   | Q       |      V  |         |         |
 11+35       0.3293       0.67   | Q       |      V  |         |         |
 11+40       0.3337       0.65   | Q       |       V |         |         |
 11+45       0.3380       0.62   | Q       |       V |         |         |
 11+50       0.3422       0.62   | Q       |       V |         |         |
 11+55       0.3465       0.62   | Q       |       V |         |         |
 12+ 0       0.3508       0.63   | Q       |       V |         |         |
 12+ 5       0.3553       0.65   | Q       |        V|         |         |
 12+10       0.3603       0.73   | Q       |        V|         |         |
 12+15       0.3659       0.81   |  Q      |        V|         |         |
 12+20       0.3718       0.85   |  Q      |         V         |         |
 12+25       0.3778       0.88   |  Q      |         V         |         |
 12+30       0.3840       0.90   |  Q      |         V         |         |
 12+35       0.3903       0.91   |  Q      |         |V        |         |
 12+40       0.3968       0.95   |  Q      |         |V        |         |
 12+45       0.4036       0.99   |  Q      |         |V        |         |
 12+50       0.4105       1.00   |   Q     |         | V       |         |
```

```
12+55       0.4176      1.03  |   Q     |         | V       |         |
13+ 0       0.4248      1.05  |   Q     |         | V       |         |
13+ 5       0.4322      1.07  |   Q     |         |  V      |         |
13+10       0.4401      1.15  |   Q     |         |  V      |         |
13+15       0.4486      1.24  |   Q     |         |   V     |         |
13+20       0.4574      1.27  |    Q    |         |   V     |         |
13+25       0.4662      1.29  |    Q    |         |    V    |         |
13+30       0.4752      1.30  |    Q    |         |    V    |         |
13+35       0.4840      1.28  |    Q    |         |     V   |         |
13+40       0.4917      1.12  |   Q     |         |     V   |         |
13+45       0.4982      0.95  |  Q      |         |     V   |         |
13+50       0.5044      0.89  |  Q      |         |      V  |         |
13+55       0.5103      0.86  |  Q      |         |      V  |         |
14+ 0       0.5160      0.84  |  Q      |         |      V  |         |
14+ 5       0.5218      0.84  |  Q      |         |       V |         |
14+10       0.5279      0.89  |  Q      |         |       V |         |
14+15       0.5344      0.95  |  Q      |         |       V |         |
14+20       0.5411      0.97  |  Q      |         |        V|         |
14+25       0.5478      0.96  |  Q      |         |        V|         |
14+30       0.5543      0.96  |  Q      |         |        V|         |
14+35       0.5609      0.96  |  Q      |         |         V         |
14+40       0.5675      0.96  |  Q      |         |         V         |
14+45       0.5741      0.96  |  Q      |         |         |V        |
14+50       0.5807      0.95  |  Q      |         |         |V        |
14+55       0.5872      0.94  |  Q      |         |         |V        |
15+ 0       0.5935      0.93  |  Q      |         |         | V       |
15+ 5       0.5999      0.92  |  Q      |         |         | V       |
15+10       0.6061      0.90  |  Q      |         |         | V       |
15+15       0.6122      0.89  |  Q      |         |         |  V      |
15+20       0.6182      0.88  |  Q      |         |         |  V      |
15+25       0.6242      0.86  |  Q      |         |         |  V      |
15+30       0.6300      0.84  |  Q      |         |         |   V     |
15+35       0.6357      0.83  |  Q      |         |         |   V     |
15+40       0.6410      0.77  |  Q      |         |         |   V     |
15+45       0.6459      0.72  | Q       |         |         |   V     |
15+50       0.6508      0.70  | Q       |         |         |    V    |
15+55       0.6555      0.69  | Q       |         |         |    V    |
16+ 0       0.6602      0.68  | Q       |         |         |    V    |
16+ 5       0.6646      0.65  | Q       |         |         |    V    |
16+10       0.6679      0.47  |Q        |         |         |     V   |
16+15       0.6699      0.29  |Q        |         |         |     V   |
16+20       0.6715      0.23  Q         |         |         |     V   |
16+25       0.6728      0.19  Q         |         |         |     V   |
16+30       0.6739      0.17  Q         |         |         |     V   |
16+35       0.6750      0.15  Q         |         |         |     V   |
16+40       0.6759      0.14  Q         |         |         |     V   |
16+45       0.6767      0.12  Q         |         |         |     V   |
16+50       0.6775      0.11  Q         |         |         |     V   |
16+55       0.6783      0.11  Q         |         |         |     V   |
17+ 0       0.6790      0.11  Q         |         |         |     V   |
17+ 5       0.6798      0.11  Q         |         |         |     V   |
17+10       0.6807      0.13  Q         |         |         |     V   |
17+15       0.6818      0.16  Q         |         |         |     V   |
17+20       0.6829      0.17  Q         |         |         |     V   |
17+25       0.6841      0.17  Q         |         |         |     V   |
17+30       0.6853      0.17  Q         |         |         |      V  |
17+35       0.6865      0.18  Q         |         |         |      V  |
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17+40       0.6877      0.18  Q         |         |         |      V  |
17+45       0.6889      0.18  Q         |         |         |      V  |
17+50       0.6901      0.17  Q         |         |         |      V  |
17+55       0.6912      0.16  Q         |         |         |      V  |
18+ 0       0.6923      0.15  Q         |         |         |      V  |
18+ 5       0.6933      0.15  Q         |         |         |      V  |
18+10       0.6943      0.14  Q         |         |         |      V  |
18+15       0.6953      0.14  Q         |         |         |      V  |
18+20       0.6963      0.14  Q         |         |         |      V  |
18+25       0.6972      0.14  Q         |         |         |      V  |
18+30       0.6982      0.14  Q         |         |         |      V  |
18+35       0.6992      0.14  Q         |         |         |      V  |
18+40       0.7001      0.13  Q         |         |         |      V  |
18+45       0.7009      0.12  Q         |         |         |      V  |
18+50       0.7016      0.11  Q         |         |         |      V  |
18+55       0.7023      0.10  Q         |         |         |      V  |
19+ 0       0.7029      0.08  Q         |         |         |      V  |
19+ 5       0.7034      0.08  Q         |         |         |      V  |
19+10       0.7040      0.09  Q         |         |         |       V |
19+15       0.7047      0.10  Q         |         |         |       V |
19+20       0.7054      0.10  Q         |         |         |       V |
19+25       0.7062      0.12  Q         |         |         |       V |
19+30       0.7071      0.13  Q         |         |         |       V |
19+35       0.7080      0.13  Q         |         |         |       V |
19+40       0.7089      0.12  Q         |         |         |       V |
19+45       0.7097      0.11  Q         |         |         |       V |
19+50       0.7104      0.11  Q         |         |         |       V |
19+55       0.7111      0.10  Q         |         |         |       V |
20+ 0       0.7116      0.08  Q         |         |         |       V |
20+ 5       0.7122      0.08  Q         |         |         |       V |
20+10       0.7128      0.09  Q         |         |         |       V |
20+15       0.7135      0.10  Q         |         |         |       V |
20+20       0.7142      0.10  Q         |         |         |       V |
20+25       0.7149      0.10  Q         |         |         |       V |
20+30       0.7156      0.10  Q         |         |         |       V |
20+35       0.7163      0.11  Q         |         |         |       V |
20+40       0.7170      0.11  Q         |         |         |       V |
20+45       0.7178      0.11  Q         |         |         |       V |
20+50       0.7185      0.10  Q         |         |         |       V |
20+55       0.7191      0.09  Q         |         |         |       V |
21+ 0       0.7197      0.08  Q         |         |         |       V |
21+ 5       0.7202      0.08  Q         |         |         |       V |
21+10       0.7208      0.09  Q         |         |         |       V |
21+15       0.7215      0.10  Q         |         |         |       V |
21+20       0.7222      0.10  Q         |         |         |        V|
21+25       0.7228      0.09  Q         |         |         |        V|
21+30       0.7233      0.08  Q         |         |         |        V|
21+35       0.7239      0.08  Q         |         |         |        V|
21+40       0.7245      0.09  Q         |         |         |        V|
21+45       0.7252      0.10  Q         |         |         |        V|
21+50       0.7258      0.10  Q         |         |         |        V|
21+55       0.7265      0.09  Q         |         |         |        V|
22+ 0       0.7270      0.08  Q         |         |         |        V|
22+ 5       0.7275      0.08  Q         |         |         |        V|
22+10       0.7281      0.09  Q         |         |         |        V|
22+15       0.7288      0.10  Q         |         |         |        V|
22+20       0.7295      0.10  Q         |         |         |        V|
```

22+25	0.7301	0.09	Q	|	|	|	V|
22+30	0.7307	0.08	Q	|	|	|	V|
22+35	0.7312	0.08	Q	|	|	|	V|
22+40	0.7317	0.07	Q	|	|	|	V|
22+45	0.7322	0.07	Q	|	|	|	V|
22+50	0.7327	0.07	Q	|	|	|	V|
22+55	0.7332	0.07	Q	|	|	|	V|
23+ 0	0.7337	0.07	Q	|	|	|	V|
23+ 5	0.7341	0.07	Q	|	|	|	V|
23+10	0.7346	0.07	Q	|	|	|	V|
23+15	0.7351	0.07	Q	|	|	|	V|
23+20	0.7356	0.07	Q	|	|	|	V|
23+25	0.7361	0.07	Q	|	|	|	V|
23+30	0.7366	0.07	Q	|	|	|	V|
23+35	0.7371	0.07	Q	|	|	|	V|
23+40	0.7376	0.07	Q	|	|	|	V|
23+45	0.7380	0.07	Q	|	|	|	V|
23+50	0.7385	0.07	Q	|	|	|	V|
23+55	0.7390	0.07	Q	|	|	|	V|
24+ 0	0.7395	0.07	Q	|	|	|	V|
24+ 5	0.7400	0.07	Q	|	|	|	V|
24+10	0.7403	0.04	Q	|	|	|	V|
24+15	0.7404	0.02	Q	|	|	|	V|
24+20	0.7405	0.01	Q	|	|	|	V|
24+25	0.7405	0.01	Q	|	|	|	V|
24+30	0.7405	0.00	Q	|	|	|	V|
24+35	0.7406	0.00	Q	|	|	|	V|
24+40	0.7406	0.00	Q	|	|	|	V|
24+45	0.7406	0.00	Q	|	|	|	V|
24+50	0.7406	0.00	Q	|	|	|	V|
24+55	0.7406	0.00	Q	|	|	|	V

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST62.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.30	6.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.50	12.60

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.078	(0.064)	0.019	0.059
2	0.17	0.60	0.094	(0.064)	0.023	0.071
3	0.25	0.60	0.094	(0.064)	0.023	0.071
4	0.33	0.60	0.094	(0.064)	0.023	0.071
5	0.42	0.60	0.094	(0.064)	0.023	0.071
6	0.50	0.70	0.109	(0.064)	0.027	0.083
7	0.58	0.70	0.109	(0.064)	0.027	0.083

8	0.67	0.70	0.109	(0.064)	0.027	0.083
9	0.75	0.70	0.109	(0.064)	0.027	0.083
10	0.83	0.70	0.109	(0.064)	0.027	0.083
11	0.92	0.70	0.109	(0.064)	0.027	0.083
12	1.00	0.80	0.125	(0.064)	0.030	0.094
13	1.08	0.80	0.125	(0.064)	0.030	0.094
14	1.17	0.80	0.125	(0.064)	0.030	0.094
15	1.25	0.80	0.125	(0.064)	0.030	0.094
16	1.33	0.80	0.125	(0.064)	0.030	0.094
17	1.42	0.80	0.125	(0.064)	0.030	0.094
18	1.50	0.80	0.125	(0.064)	0.030	0.094
19	1.58	0.80	0.125	(0.064)	0.030	0.094
20	1.67	0.80	0.125	(0.064)	0.030	0.094
21	1.75	0.80	0.125	(0.064)	0.030	0.094
22	1.83	0.80	0.125	(0.064)	0.030	0.094
23	1.92	0.80	0.125	(0.064)	0.030	0.094
24	2.00	0.90	0.140	(0.064)	0.034	0.106
25	2.08	0.80	0.125	(0.064)	0.030	0.094
26	2.17	0.90	0.140	(0.064)	0.034	0.106
27	2.25	0.90	0.140	(0.064)	0.034	0.106
28	2.33	0.90	0.140	(0.064)	0.034	0.106
29	2.42	0.90	0.140	(0.064)	0.034	0.106
30	2.50	0.90	0.140	(0.064)	0.034	0.106
31	2.58	0.90	0.140	(0.064)	0.034	0.106
32	2.67	0.90	0.140	(0.064)	0.034	0.106
33	2.75	1.00	0.156	(0.064)	0.038	0.118
34	2.83	1.00	0.156	(0.064)	0.038	0.118
35	2.92	1.00	0.156	(0.064)	0.038	0.118
36	3.00	1.00	0.156	(0.064)	0.038	0.118
37	3.08	1.00	0.156	(0.064)	0.038	0.118
38	3.17	1.10	0.172	(0.064)	0.042	0.130
39	3.25	1.10	0.172	(0.064)	0.042	0.130
40	3.33	1.10	0.172	(0.064)	0.042	0.130
41	3.42	1.20	0.187	(0.064)	0.046	0.142
42	3.50	1.30	0.203	(0.064)	0.049	0.153
43	3.58	1.40	0.218	(0.064)	0.053	0.165
44	3.67	1.40	0.218	(0.064)	0.053	0.165
45	3.75	1.50	0.234	(0.064)	0.057	0.177
46	3.83	1.50	0.234	(0.064)	0.057	0.177
47	3.92	1.60	0.250	(0.064)	0.061	0.189
48	4.00	1.60	0.250	(0.064)	0.061	0.189
49	4.08	1.70	0.265	0.064	(0.064)	0.201
50	4.17	1.80	0.281	0.064	(0.068)	0.217
51	4.25	1.90	0.296	0.064	(0.072)	0.233
52	4.33	2.00	0.312	0.064	(0.076)	0.248
53	4.42	2.10	0.328	0.064	(0.080)	0.264
54	4.50	2.10	0.328	0.064	(0.080)	0.264
55	4.58	2.20	0.343	0.064	(0.083)	0.279
56	4.67	2.30	0.359	0.064	(0.087)	0.295
57	4.75	2.40	0.374	0.064	(0.091)	0.311
58	4.83	2.40	0.374	0.064	(0.091)	0.311
59	4.92	2.50	0.390	0.064	(0.095)	0.326
60	5.00	2.60	0.406	0.064	(0.099)	0.342
61	5.08	3.10	0.484	0.064	(0.118)	0.420
62	5.17	3.60	0.562	0.064	(0.137)	0.498
63	5.25	3.90	0.608	0.064	(0.148)	0.545
64	5.33	4.20	0.655	0.064	(0.159)	0.591

```
65   5.42     4.70      0.733          0.064    (  0.178)        0.669
66   5.50     5.60      0.874          0.064    (  0.212)        0.810
67   5.58     1.90      0.296          0.064    (  0.072)        0.233
68   5.67     0.90      0.140       (  0.064)      0.034         0.106
69   5.75     0.60      0.094       (  0.064)      0.023         0.071
70   5.83     0.50      0.078       (  0.064)      0.019         0.059
71   5.92     0.30      0.047       (  0.064)      0.011         0.035
72   6.00     0.20      0.031       (  0.064)      0.008         0.024
           (Loss Rate Not Used)
   Sum =     100.0                               Sum =    12.6
    Flood volume = Effective rainfall      1.05(In)
     times area       5.0(Ac.)/[(In)/(Ft.)] =       0.4(Ac.Ft)
    Total soil loss =      0.25(In)
    Total soil loss =     0.105(Ac.Ft)
    Total rainfall =      1.30(In)
    Flood volume =       19219.3 Cubic Feet
    Total soil loss =        4564.0 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      3.306(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.02  Q         |         |         |         |
  0+10       0.0009      0.12  Q         |         |         |         |
  0+15       0.0026      0.24  Q         |         |         |         |
  0+20       0.0046      0.30  VQ        |         |         |         |
  0+25       0.0068      0.32  VQ        |         |         |         |
  0+30       0.0092      0.34  VQ        |         |         |         |
  0+35       0.0118      0.37  |Q        |         |         |         |
  0+40       0.0145      0.40  |Q        |         |         |         |
  0+45       0.0173      0.41  |Q        |         |         |         |
  0+50       0.0201      0.41  |Q        |         |         |         |
  0+55       0.0230      0.42  |QV       |         |         |         |
  1+ 0       0.0259      0.42  |QV       |         |         |         |
  1+ 5       0.0290      0.44  |QV       |         |         |         |
  1+10       0.0321      0.46  |QV       |         |         |         |
  1+15       0.0354      0.47  |Q V      |         |         |         |
  1+20       0.0387      0.47  |Q V      |         |         |         |
  1+25       0.0419      0.48  |Q V      |         |         |         |
  1+30       0.0452      0.48  |Q  V     |         |         |         |
  1+35       0.0485      0.48  |Q  V     |         |         |         |
  1+40       0.0518      0.48  |Q  V     |         |         |         |
  1+45       0.0551      0.48  |Q  V     |         |         |         |
  1+50       0.0584      0.48  |Q   V    |         |         |         |
  1+55       0.0618      0.48  |Q   V    |         |         |         |
  2+ 0       0.0651      0.48  |Q   V    |         |         |         |
  2+ 5       0.0685      0.50  |Q    V   |         |         |         |
  2+10       0.0720      0.50  | Q   V   |         |         |         |
  2+15       0.0755      0.51  | Q   V   |         |         |         |
  2+20       0.0791      0.53  | Q    V  |         |         |         |
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    2+25       0.0828      0.53  | Q    V  |         |         |         |
    2+30       0.0865      0.54  | Q    V  |         |         |         |
    2+35       0.0902      0.54  | Q     V |         |         |         |
    2+40       0.0939      0.54  | Q     V |         |         |         |
    2+45       0.0976      0.54  | Q     V |         |         |         |
    2+50       0.1015      0.56  | Q      V|         |         |         |
    2+55       0.1055      0.58  | Q      V|         |         |         |
    3+ 0       0.1096      0.59  | Q      V|         |         |         |
    3+ 5       0.1137      0.59  | Q       V         |         |         |
    3+10       0.1178      0.60  | Q       V         |         |         |
    3+15       0.1221      0.62  | Q       |V        |         |         |
    3+20       0.1265      0.64  | Q       |V        |         |         |
    3+25       0.1310      0.65  | Q       |V        |         |         |
    3+30       0.1357      0.68  | Q       | V       |         |         |
    3+35       0.1407      0.73  | Q       | V       |         |         |
    3+40       0.1461      0.77  |  Q      |  V      |         |         |
    3+45       0.1516      0.81  |  Q      |  V      |         |         |
    3+50       0.1575      0.84  |  Q      |   V     |         |         |
    3+55       0.1635      0.88  |  Q      |   V     |         |         |
    4+ 0       0.1698      0.91  |  Q      |    V    |         |         |
    4+ 5       0.1762      0.94  |  Q      |    V    |         |         |
    4+10       0.1829      0.97  |  Q      |     V   |         |         |
    4+15       0.1900      1.03  |   Q     |      V  |         |         |
    4+20       0.1976      1.10  |   Q     |      V  |         |         |
    4+25       0.2057      1.17  |   Q     |       V |         |         |
    4+30       0.2143      1.25  |   Q     |        V|         |         |
    4+35       0.2232      1.30  |    Q    |         V         |         |
    4+40       0.2325      1.35  |    Q    |         |V        |         |
    4+45       0.2423      1.42  |    Q    |         |V        |         |
    4+50       0.2525      1.49  |    Q    |         | V       |         |
    4+55       0.2631      1.54  |     Q   |         |  V      |         |
    5+ 0       0.2740      1.59  |     Q   |         |   V     |         |
    5+ 5       0.2856      1.67  |     Q   |         |    V    |         |
    5+10       0.2985      1.87  |      Q  |         |      V  |         |
    5+15       0.3133      2.16  |       Q |         |       V |         |
    5+20       0.3302      2.45  |        Q|         |        V|         |
    5+25       0.3488      2.71  |         Q         |         |V        |
    5+30       0.3697      3.03  |         | Q       |         |  V      |
    5+35       0.3925      3.31  |         |  Q      |         |    V    |
    5+40       0.4108      2.65  |         Q         |         |      V  |
    5+45       0.4217      1.58  |     Q   |         |         |       V |
    5+50       0.4287      1.02  |   Q     |         |         |       V |
    5+55       0.4335      0.69  | Q       |         |         |        V|
    6+ 0       0.4367      0.46  |Q        |         |         |        V|
    6+ 5       0.4387      0.29  |Q        |         |         |        V|
    6+10       0.4399      0.17  Q         |         |         |        V|
    6+15       0.4405      0.09  Q         |         |         |        V|
    6+20       0.4409      0.05  Q         |         |         |        V|
    6+25       0.4411      0.03  Q         |         |         |        V|
    6+30       0.4411      0.01  Q         |         |         |        V|
    6+35       0.4412      0.01  Q         |         |         |        V|
    6+40       0.4412      0.00  Q         |         |         |        V|
    6+45       0.4412      0.00  Q         |         |         |        V|
    6+50       0.4412      0.00  Q         |         |         |        V|
    6+55       0.4412      0.00  Q         |         |         |        V|
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U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST32.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.85	4.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.80	9.07

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.850(In)
Area Averaged 100-Year Rainfall = 1.800(In)

Point rain (area averaged) = 0.850(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.850(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	1.30	0.133	(0.064)	0.032	0.100
2	0.17	1.30	0.133	(0.064)	0.032	0.100
3	0.25	1.10	0.112	(0.064)	0.027	0.085
4	0.33	1.50	0.153	(0.064)	0.037	0.116
5	0.42	1.50	0.153	(0.064)	0.037	0.116
6	0.50	1.80	0.184	(0.064)	0.045	0.139
7	0.58	1.50	0.153	(0.064)	0.037	0.116

```
  8   0.67     1.80      0.184       (  0.064)       0.045        0.139
  9   0.75     1.80      0.184       (  0.064)       0.045        0.139
 10   0.83     1.50      0.153       (  0.064)       0.037        0.116
 11   0.92     1.60      0.163       (  0.064)       0.040        0.124
 12   1.00     1.80      0.184       (  0.064)       0.045        0.139
 13   1.08     2.20      0.224       (  0.064)       0.055        0.170
 14   1.17     2.20      0.224       (  0.064)       0.055        0.170
 15   1.25     2.20      0.224       (  0.064)       0.055        0.170
 16   1.33     2.00      0.204       (  0.064)       0.050        0.154
 17   1.42     2.60      0.265          0.064    (  0.064)        0.201
 18   1.50     2.70      0.275          0.064    (  0.067)        0.212
 19   1.58     2.40      0.245       (  0.064)       0.060        0.185
 20   1.67     2.70      0.275          0.064    (  0.067)        0.212
 21   1.75     3.30      0.337          0.064    (  0.082)        0.273
 22   1.83     3.10      0.316          0.064    (  0.077)        0.252
 23   1.92     2.90      0.296          0.064    (  0.072)        0.232
 24   2.00     3.00      0.306          0.064    (  0.074)        0.242
 25   2.08     3.10      0.316          0.064    (  0.077)        0.252
 26   2.17     4.20      0.428          0.064    (  0.104)        0.365
 27   2.25     5.00      0.510          0.064    (  0.124)        0.446
 28   2.33     3.50      0.357          0.064    (  0.087)        0.293
 29   2.42     6.80      0.694          0.064    (  0.169)        0.630
 30   2.50     7.30      0.745          0.064    (  0.181)        0.681
 31   2.58     8.20      0.836          0.064    (  0.203)        0.773
 32   2.67     5.90      0.602          0.064    (  0.146)        0.538
 33   2.75     2.00      0.204       (  0.064)       0.050        0.154
 34   2.83     1.80      0.184       (  0.064)       0.045        0.139
 35   2.92     1.80      0.184       (  0.064)       0.045        0.139
 36   3.00     0.60      0.061       (  0.064)       0.015        0.046
           (Loss Rate Not Used)
    Sum =     100.0                                   Sum =     8.4
     Flood volume = Effective rainfall      0.70(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.3(Ac.Ft)
     Total soil loss =      0.15(In)
     Total soil loss =     0.064(Ac.Ft)
     Total rainfall =      0.85(In)
     Flood volume =       12743.5 Cubic Feet
     Total soil loss =       2807.1 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      3.259(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         3 - H O U R   S T O R M
                    R u n o f f     H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 -----------------------------------------------------------------------
   0+ 5       0.0002      0.03  Q         |         |         |         |
   0+10       0.0015      0.19  Q         |         |         |         |
   0+15       0.0040      0.36  VQ        |         |         |         |
   0+20       0.0068      0.41  VQ        |         |         |         |
   0+25       0.0101      0.47  |Q        |         |         |         |
   0+30       0.0138      0.54  |VQ       |         |         |         |
   0+35       0.0179      0.60  | Q       |         |         |         |
```

```
    0+40       0.0221      0.62  | QV      |         |         |         |
    0+45       0.0265      0.64  | QV      |         |         |         |
    0+50       0.0311      0.67  | Q V     |         |         |         |
    0+55       0.0356      0.65  | Q V     |         |         |         |
    1+ 0       0.0399      0.63  | Q  V    |         |         |         |
    1+ 5       0.0446      0.67  | Q   V   |         |         |         |
    1+10       0.0497      0.75  | Q   V   |         |         |         |
    1+15       0.0552      0.81  |  Q   V  |         |         |         |
    1+20       0.0609      0.83  |  Q    V |         |         |         |
    1+25       0.0667      0.83  |  Q     V|         |         |         |
    1+30       0.0728      0.89  |  Q     V|         |         |         |
    1+35       0.0795      0.98  |  Q      V         |         |         |
    1+40       0.0863      0.98  |  Q      |V        |         |         |
    1+45       0.0933      1.02  |   Q     | V       |         |         |
    1+50       0.1013      1.16  |   Q     |  V      |         |         |
    1+55       0.1098      1.24  |   Q     |    V    |         |         |
    2+ 0       0.1182      1.22  |   Q     |     V   |         |         |
    2+ 5       0.1265      1.21  |   Q     |      V  |         |         |
    2+10       0.1353      1.28  |    Q    |       V |         |         |
    2+15       0.1457      1.51  |     Q   |        V|         |         |
    2+20       0.1581      1.79  |      Q  |         |V        |         |
    2+25       0.1709      1.85  |      Q  |         |  V      |         |
    2+30       0.1864      2.26  |        Q|         |    V    |         |
    2+35       0.2064      2.90  |         |Q        |       V |         |
    2+40       0.2288      3.26  |         |  Q      |         |V        |
    2+45       0.2499      3.05  |         | Q       |         |   V     |
    2+50       0.2647      2.15  |       Q |         |         |     V   |
    2+55       0.2744      1.41  |    Q    |         |         |      V  |
    3+ 0       0.2818      1.07  |   Q     |         |         |       V |
    3+ 5       0.2868      0.73  | Q       |         |         |        V|
    3+10       0.2895      0.39  |Q        |         |         |        V|
    3+15       0.2908      0.20  Q         |         |         |        V|
    3+20       0.2916      0.12  Q         |         |         |        V|
    3+25       0.2921      0.07  Q         |         |         |        V|
    3+30       0.2923      0.03  Q         |         |         |        V|
    3+35       0.2925      0.02  Q         |         |         |        V|
    3+40       0.2925      0.01  Q         |         |         |        V|
    3+45       0.2925      0.00  Q         |         |         |        V|
    3+50       0.2925      0.00  Q         |         |         |        V|
    3+55       0.2926      0.00  Q         |         |         |         V
-----------------------------------------------------------------------
```

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST12.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	0.50	2.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	1.20	6.05

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.30	0.198	(0.064)	0.048	0.150
2	0.17	4.20	0.252	(0.064)	0.061	0.191
3	0.25	4.40	0.264	0.064	(0.064)	0.200
4	0.33	4.80	0.288	0.064	(0.070)	0.224
5	0.42	5.20	0.312	0.064	(0.076)	0.248

```
  6   0.50     6.20      0.372         0.064    (  0.090)       0.308
  7   0.58     6.80      0.408         0.064    (  0.099)       0.344
  8   0.67     8.80      0.528         0.064    (  0.128)       0.464
  9   0.75    13.90      0.834         0.064    (  0.203)       0.770
 10   0.83    31.40      1.884         0.064    (  0.458)       1.820
 11   0.92     7.20      0.432         0.064    (  0.105)       0.368
 12   1.00     3.80      0.228      (  0.064)       0.055       0.173
           (Loss Rate Not Used)
    Sum =     100.0                                    Sum =     5.3
     Flood volume = Effective rainfall      0.44(In)
      times area       5.0(Ac.)/[(In)/(Ft.)] =       0.2(Ac.Ft)
     Total soil loss =      0.06(In)
     Total soil loss =     0.026(Ac.Ft)
     Total rainfall =      0.50(In)
     Flood volume =        8021.6 Cubic Feet
     Total soil loss =       1125.5 Cubic Feet
     --------------------------------------------------------------------
      Peak flow rate of this hydrograph =      4.950(CFS)
     --------------------------------------------------------------------
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         1 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     --------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------
   0+ 5      0.0003     0.04  Q          |         |         |         |
   0+10      0.0024     0.30  VQ         |         |         |         |
   0+15      0.0067     0.63  |VQ        |         |         |         |
   0+20      0.0123     0.81  | VQ       |         |         |         |
   0+25      0.0189     0.96  |  QV      |         |         |         |
   0+30      0.0265     1.11  |   QV     |         |         |         |
   0+35      0.0355     1.30  |    Q V   |         |         |         |
   0+40      0.0461     1.54  |     Q   V          |         |         |
   0+45      0.0594     1.94  |      Q   | V       |         |         |
   0+50      0.0802     3.01  |          | Q    V  |         |         |
   0+55      0.1143     4.95  |          |        Q|   V     |         |
   1+ 0      0.1457     4.56  |          |       Q |         |V        |
   1+ 5      0.1629     2.50  |         Q|         |         |    V    |
   1+10      0.1728     1.44  |    Q     |         |         |      V  |
   1+15      0.1780     0.77  |  Q       |         |         |       V |
   1+20      0.1809     0.42  |Q         |         |         |        V|
   1+25      0.1823     0.20  Q          |         |         |        V|
   1+30      0.1831     0.11  Q          |         |         |        V|
   1+35      0.1836     0.07  Q          |         |         |        V|
   1+40      0.1839     0.05  Q          |         |         |        V|
   1+45      0.1841     0.02  Q          |         |         |        V|
   1+50      0.1841     0.01  Q          |         |         |        V|
   1+55      0.1842     0.00  Q          |         |         |         V
-----------------------------------------------------------------------
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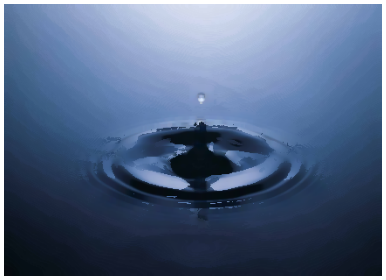
Preliminary Water Quality Management Plan (PWQMP)

for

UC Riverside Highlander Hall Demolition Project





Prepared for:

UNIVERSITY OF CALIFORNIA
UC RIVERSIDE

Tricia Thrasher
1223 University Avenue Suite 200
Riverside, CA 92507

Prepared by:

David Beckwith and Associates, Inc
Civil & Structural Engineering - Land Surveying - QSD/QSP Environmental Services
1269 Pomona Road, Suite 108
Corona, CA 92882
www.davidbeckwithandassociates.com

Report Preparation Date
April 27, 2015

PRELIMINARY WATER QUALITY MANAGEMENT PLAN

for

UC Riverside Highlander Hall Demolition Project

Prepared for:
Tricia D Thrasher
Principal Environmental Project Manager
1223 University Avenue Suite 200
Riverside, CA 92507

Project Address:
Southwest Corner of University Avenue
and Southound I-215 Onramp
Riverside, CA 92507

Prepared by:
David M Beckwith, PE, QSD, QSP
David Beckwith and Associates, Inc
1269 Pomona Road, Suite 108
Corona, CA 92882
(714) 349-7007

Preparation Date:
April 27, 2015

Table of Contents

Owner's Certification

This project-specific Preliminary Water Quality Management Plan (PWQMP) has been prepared for:

The University of California, Riverside

by David Beckwith and Associates, Inc for the project know as Highlander Hall Demolition, Riverside, California.

This PWQMP is intended to comply with the requirements of City of Riverside, County of Riverside, which includes the requirement for the preparation and implementation of a project-specific PWQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this PWQMP and will ensure that this PWQMP is amended as appropriate to reflect up-to-date conditions on the site. This PWQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this PWQMP. At least one copy of this PWQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this PWQMP. The undersigned is aware that implementation of this PWQMP is enforceable under City of Hemet Water Quality Ordinance.

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement this PWQMP

"I, the undersigned, certify under penalty of law that the provisions of this PWQMP have been reviewed and accepted and that the PWQMP will be transferred to future successors in interest."

Owner's Signature	*Date*
Tricia D Thrasher	Principal Environmental Project Manager
Owner's Printed Name	*Owner's Title/Position*

Section 1 Project Description

Project Owner:	University of California, Riverside 1223 University Avenue, Suite 200 Riverside, CA 92507 (951) 827-1484 (t)
PWQMP Preparer:	David Beckwith and Associates, Inc 1269 Pomona Road, Suite 108 Corona, CA 92882 (714) 349-7007 (t) (213) 270-9488 (f)
Project Site Address:	1600 University Avenue Riverside, CA 92507
Planning Area/ Community Name/ Development Name:	N/A
APN Number(s):	253-050-007
Thomas Bros. Map:	686/C5
Project Watershed:	Santa Ana River Reach 3
Sub-watershed:	HUC12 East Etiwanda Creek
Project Site Size:	5.04 acres (219,542 sf)

Standard Industrial Classification (SIC) Code: N/A

Formation of Home/Property Owners' Association (HOA/POA): ☐ Yes ☒ No

Additional Permits/Approvals required for the Project

AGENCY	Permit Required
State Department of Fish and Game, 1601 Streambed Alteration Agreement	☐ Yes ☒ No
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification	☐ Yes ☒ No
US Army Corps of Engineers, CWA section 404 permit	☐ Yes ☒ No
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	☐ Yes ☒ No
Other (please list in the space below as required)	☐ Yes ☒ No

The proposed site development will demolish the existing commercial building and associated ac pavement parking and will construct a 500 space parking lot. The proposed site will not negatively impact downstream facilities as there are no hydrologic conditions of concern with the development. To mitigate stormwater quality concerns vegetative swales have been designed and incorporated into the site plan to treat potential pollutants of concern.

Appendix A of this project-specific PWQMP includes a complete copy of the final Conditions of Approval. Appendix B of this project-specific PWQMP shall include:

a. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail to allow the project site to be plotted on Co-Permittee base mapping; and

b. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Treatment Control BMPs.
- Landscaped areas.
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
- Location(s) of Receiving Waters to which the project directly or indirectly discharges.
- Location of points where onsite (or tributary offsite) flows exit the property/project site.
- Proposed drainage areas boundaries, including tributary offsite areas, for each location where flows exits the property/project site. Each tributary area should be clearly denoted.
- Pre- and post-project topography.

Appendix G of this project-specific PWQMP shall include copies of CC&Rs, Covenant and Agreements, and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific PWQMP requirements.

Section 2 Site Characterization

Land Use Designation or Zoning: CITY

Current Property Use: CITY

Proposed Property Use: CITY

Availability of Soils Report: ☐ Yes ☒ No

Note: A soils report is required if infiltration BMPs are utilized. Attach report in Appendix E.

Phase 1 Site Assessment: ☐ Yes ☒ No

Note: If prepared, attached remediation summary and use restrictions in Appendix H.

Table 2.1 Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Santa Ana River HU#801.21	Nutrients – Pathogens	AGR – GWR – REC1 – REC2 – WARM – WILD – RARE – SPWN	3.5 miles

Section 3 Pollutants of Concern

Potential pollutants associated with Urban Runoff from the proposed project must be identified. Exhibit B of the PWQMP provides brief descriptions of typical pollutants associated with Urban Runoff and a table that associates typical potential pollutants with types of development (land use). It should be noted that at the CoPermittees discretion, the Co-Permittees may also accept updated studies from the California Association of Stormwater Quality Agencies (CASQA), USEPA, SWRCB and/or other commonly accepted agencies/associations acceptable to the Co-Permittee for determination of Pollutants of Concern associated with given land use. Additionally, in identifying Pollutants of Concern, the presence of legacy pesticides, nutrients, or hazardous substances in the site's soils as a result of past uses and their potential for exposure to Urban Runoff must be addressed in project-specific PWQMPs. The Co-Permittee may also require specific pollutants commonly associated with urban runoff to be addressed based on known problems in the watershed. The list of potential Urban Runoff pollutants identified for the project must be compared with the pollutants identified as causing an impairment of Receiving Waters, if any. To identify pollutants impairing proximate Receiving Waters, each project proponent preparing a project-specific PWQMP shall, at a minimum, do the following:

a. For each of the proposed project discharge points, identify the proximate Receiving Water for each discharge point, using hydrologic unit basin numbers as identified in the most recent version of the Water Quality Control Plan for the Santa Ana River Basin or the San Diego Region.

b. Identify each proximate identified above that is listed on the most recent list of Clean Water Act Section 303(d) list of impaired water bodies, which can be found at website www.swrcb.ca.gov/tmdl/303d_lists.html. List all pollutants for which the proximate Receiving Waters are impaired.

c. Compare the list of pollutants for which the proximate Receiving Waters are impaired with the potential pollutants to be generated by the project.

Urban Runoff Pollutants: See Table 3.1 for list of potential pollutants.

Table 3.1 Potential Pollutants Generated by Land Use Type

Land Use	Sediment Turbidity	Nutrients	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Bacteria & Virus	Oil & Grease	Pesticides	Metals
Detached Residential	E	E	N	E	E	E	E	E	N
Attached Residential	E	E	N	E	P(1)	P	P(2)	E	N
Commercial Industrial	P(1)	P(1)	P(5)	E	P(1)	P(3)	E	P(1)	P
Automotive Repair	N	N	E(4,5)	E	N	N	E	N	P
Restaurant	N	N	N	E	E	E	E	N	N
Hillside	E	E	N	E	E	E	E	E	N
Parking Lot	P(1)	P(1)	E(4)	E	P(1)	P(6)	E	P(1)	E
Streets, Highways, & Freeways	E	P(1)	E(4)	E	P(1)	P(6)	E	P(1)	E

Abbreviations:

E: Expected; P: Potential; N: Not Expected

Notes:

(1) Potential pollutant if landscaping or open area exists on the project site.
(2) Potential pollutant if the project includes uncovered parking areas.
(3) Potential pollutant if land use involves animal waste
(4) Specifically, petroleum hydrocarbons
(5) Specifically, solvents
(6) Bacterial indicator are routinely detected in pavement runoff.

Section 4 Hydrologic Conditions of Concern

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. Under certain circumstances, changes could also result in the reduction in the amount of available sediment for transport; storm flows could fill this sediment-carrying capacity by eroding the downstream channel. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime of a Project's site would be considered a hydrologic condition of concern if the change would have a significant impact on downstream erosion compared to the pre-development condition or have significant impacts on stream habitat, alone or as part of a cumulative impact from development in the watershed.

This project-specific PWQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions are met:

- *Condition A:* Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Co-Permittee.
- *Condition B:* The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development.
- *Condition C:* The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee.

This Project meets the following condition: **Condition C**.

Supporting engineering studies, calculations, and reports are included in Appendix C.

	2 year – 24 hour		**10 year – 24 hour**	
	Precondition	**Post-Condition**	**Precondition**	**Post-Condition**
Discharge (cfs)	1.31	1.30	2.08	2.06
Volume (ac-ft)	0.75	0.74	1.15	1.14

Section 5 Best Management Practices

5.1 SITE DESIGN BMPS

Project proponents shall implement Site Design concepts that achieve each of the following:

1. Minimize Urban Runoff
2. Minimize Impervious Footprint
3. Conserve Natural Areas
4. Minimize Directly Connected Impervious Areas (DCIAs)

The project proponent should identify the specific BMPs implemented to achieve each Site Design concept and provide a brief explanation for those Site Design concepts considered not applicable.

In an effort to mitigate stormwater quality concerns, the site shall implement both pervious pavement and vegetative swales to treat potential pollutants of concern.

Table 5.1 Site Design BMPs

Design Concept	Technique	Specific BMP	Included		
			Yes	No	N/A
Site Design Concept 1	*Minimize Urban Runoff*	Maximize the permeable area	☒	☐	☐
		Incorporate landscaped buffer areas between sidewalks and streets.	☒	☐	☐
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☐	☒	☐
		Use natural drainage systems.	☒	☐	☐
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.	☐	☐	☒
		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives.	☐	☒	☐

Table 5.1 Site Design BMPs

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
		Other comparable and equally effective site design concepts as approved by the Co-Permittee.	☐	☐	☒
Site Design Concept 2	*Minimize Impervious Footprint*	Maximize the permeable area	☒	☐	☐
		Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low -traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials.	☐	☒	☐
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised.	☒	☐	☐
		Reduce widths of street where off-street parking is available.	☐	☐	☒
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	☒	☐	☐
Site Design Concept 3	*Conserve Natural Areas*	Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☐	☒
		Conserve natural areas	☐	☐	☒
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☒	☐	☐
		Use natural drainage systems.	☒	☐	☐
		Other comparable and equally effective site design concepts as approved by the Co-Permittee.	☐	☐	☒

Table 5.1 Site Design BMPs

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
Site Design Concept 4	*Minimize Directly Connected Impervious Areas (DCIAs)*	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible.	☐	☐	☒
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	☒	☐	☐
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales.	☒	☐	☐
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.	☐	☐	☒
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter.	☒	☐	☐
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s.	☒	☐	☐
		Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the MS4.	☐	☐	☒
		Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface, or designed to drain into landscaping prior to discharging to the MS4.	☐	☐	☒
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.	☒	☐	☐
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving.	☐	☐	☒
		Other comparable and equally effective design concepts as approved by the Co-Permittee.	☐	☐	☒

5.1.1 NON-APPLICABLE SITE DESIGN BMPS

The existing site is currently fully developed with minimal pervious cover. As a result of this current state it is impractical/impossible to implement various BMPs that are designed to preserve native vegetation. However, where possible additional vegetative areas are provided to facilitate infiltration. In addition, given site constraints, the proposed site configuration does not allow for site design to accommodate larger areas of pervious cover. To combat these constraints vegetative swales are being used in the buffer zones between parking stalls/aisles.

5.1.2 PROJECT SITE DESIGN BMPS

The site stormwater quality will be handled with a flow based vegetative swale. The design of the swale shall follow design criteria set forth in the Riverside County WQMP Manual.

5.2 SOURCE CONTROL BMPS

Table 5.2 Source Control BMPs

BMP Name	Included	N/A	If Not Applicable, State Reason
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☐	☒	No Restrictions Onsite
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
MS4 Stenciling and Signage	☒	☐	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☐	☒	No Slope/Channels Onsite
Provide Community Car Wash Racks	☐	☒	Not Allowed Onsite
Properly Design:			
Fueling Areas	☐	☒	Not Allowed Onsite
Air/Water Supply Area Drainage	☐	☒	Not Allowed Onsite
Trash Storage Areas	☒	☐	
Loading Docks	☐	☒	No Loading Docks
Maintenance Bays	☐	☒	No Maintenance Bays
Vehicle and Equipment Wash Areas	☐	☒	No Washing Allowed
Outdoor Material Storage Areas	☐	☒	No Storage Areas
Outdoor Work Areas or Processing Areas	☐	☒	No Outdoor Work
Provide Wash Water Controls for Food Preparation Areas	☐	☒	No Washing Allowed

Appendix D includes copies of the educational materials that will be used in implementing this project-specific PWQMP.

5.3 TREATMENT CONTROL BMPS

Vegetative Swale

Vegetative swales will be constructed between parking aisles collecting and treating the area directly adjacent to each swale. This swale is the primary BMP for the site. The swale shall be maintained along with the rest of the site vegetation and be mowed once weekly. Minimal fertilizers and pesticides shall be used on this swale.

Supporting engineering calculations for Q_{BMP} and/or V_{BMP}, and Treatment Control BMP design details are included in Appendix F.

The location of each structural BMP are shown on the PWQMP Site Plan included in Appendix B.

Table 5.3 Treatment Control BMPs Selection Matrix[1]

Pollutant of Concern	Treatment Control BMP Categories[2]							
	Veg Swale & Filter Strips[3]	Detention Basins[4]	Infiltration Basins, Trenches, & Porous Pavement[5]	Wet Ponds or Wetlands[6]	Sand or Media Filters	Water Quality Inserts	Hydrodynamic Separator Systems[7]	Manufactured/ Proprietary Devices[8]
Sediment/Turbidity ☒ Yes ☐ No	H/M ☒	M ☐	H/M ☐	H/M ☐	H/M ☐	L ☐	H/M ☐	U ☐
Nutrients ☒ Yes ☐ No	L ☒	M ☐	H/M ☐	H/M ☐	L/M ☐	L ☐	L ☐	U ☐
Organic Compound ☒ Yes ☐ No	U ☒	U ☐	U ☐	U ☐	H/M ☐	L ☐	L ☐	U ☐
Trash & Debris ☒ Yes ☐ No	L ☒	M ☐	U ☐	U ☐	H/M ☐	M ☐	H/M ☐	U ☐
Oxygen Demanding Substances ☒ Yes ☐ No	L ☒	M ☐	H/M ☐	H/M ☐	H/M ☐	L ☐	L ☐	U ☐
Bacteria & Viruses ☐ Yes ☒ No	U ☐	U ☐	H/M ☐	U ☐	H/M ☐	L ☐	L ☐	U ☐
Oils & Grease ☒ Yes ☐ No	H/M ☒	M ☐	U ☐	U ☐	H/M ☐	M ☐	L/M ☐	U ☐
Pesticides ☒ Yes ☐ No	U ☒	U ☐	U ☐	U ☐	U ☐	L ☐	L ☐	U ☐
Metals ☒ Yes ☒ No	H/M ☒	M ☐	H ☐	H ☐	H ☐	L ☐	L ☐	U ☐

Abbreviations:

L: Low removal efficiency
H/M: High or medium removal efficiency
U: Unknown removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.
(2) Project applicants should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project applicants may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.
(3) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.
(4) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.
(5) Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement, etc.) must include a copy of the property/project soils report as Appendix E to the project-specific PWQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.
(6) Includes permanent pool wet ponds and constructed wetlands.
(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.
(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this PWQMP, or newly developed/emerging stormwater treatment technologies.

5.4 EQUIVALENT TREATMENT CONTROL ALTERNATIVES

"Not applicable"

5.5 REGIONALLY-BASED TREATMENT CONTROL BMPS

"Not applicable”

Section 6 Operation and Maintenance Responsibility for Treatment Control BMPs

Operation and maintenance (O&M) requirements for all structural Source Control and Treatment Control BMPs shall be identified in the project-specific PWQMP. The project-specific PWQMP shall address the following:

- Identification of each BMP that requires O&M.
- Thorough description of O&M activities, the O&M process, and the handling and placement of any wastes.
- BMP start-up dates.
- Schedule of the frequency of O&M for each BMP.
- Identification of the parties (name, address, and telephone number) responsible for O&M, including a written agreement with the entities responsible for O&M. This agreement can take the form of a Covenant and Agreement recorded by the Project Proponent with the County Recorder, HOA or POA CC&Rs, formation of a maintenance district or assessment district or other instrument sufficient to guarantee perpetual O&M. The preparer of this project-specific PWQMP should carefully review Section 4.6 of the PWQMP prior to completing this section of the project-specific PWQMP.
- Self-inspections and record-keeping requirements for BMPs (review local specific requirements regarding self-inspections and/or annual reporting), including identification of responsible parties for inspection and record- keeping.
- Thorough descriptions of water quality monitoring, if required by the Co-Permittee.

All site BMPs shall be maintained by the property owner (as indicated in Section 1 of this PWQMP) in compliance with both manufacturer recommendations (pervious pavers) and the maintenance schedule described above in Section 5.3 of this PWQMP.

Section 7 Funding

A funding source or sources for the O&M of each Treatment Control BMP identified in the project-specific PWQMP must be identified. By certifying the project-specific PWQMP, the Project applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners. One example of how to adhere to the requirement to transfer O&M responsibilities is to record the project-specific PWQMP against the title to the property.

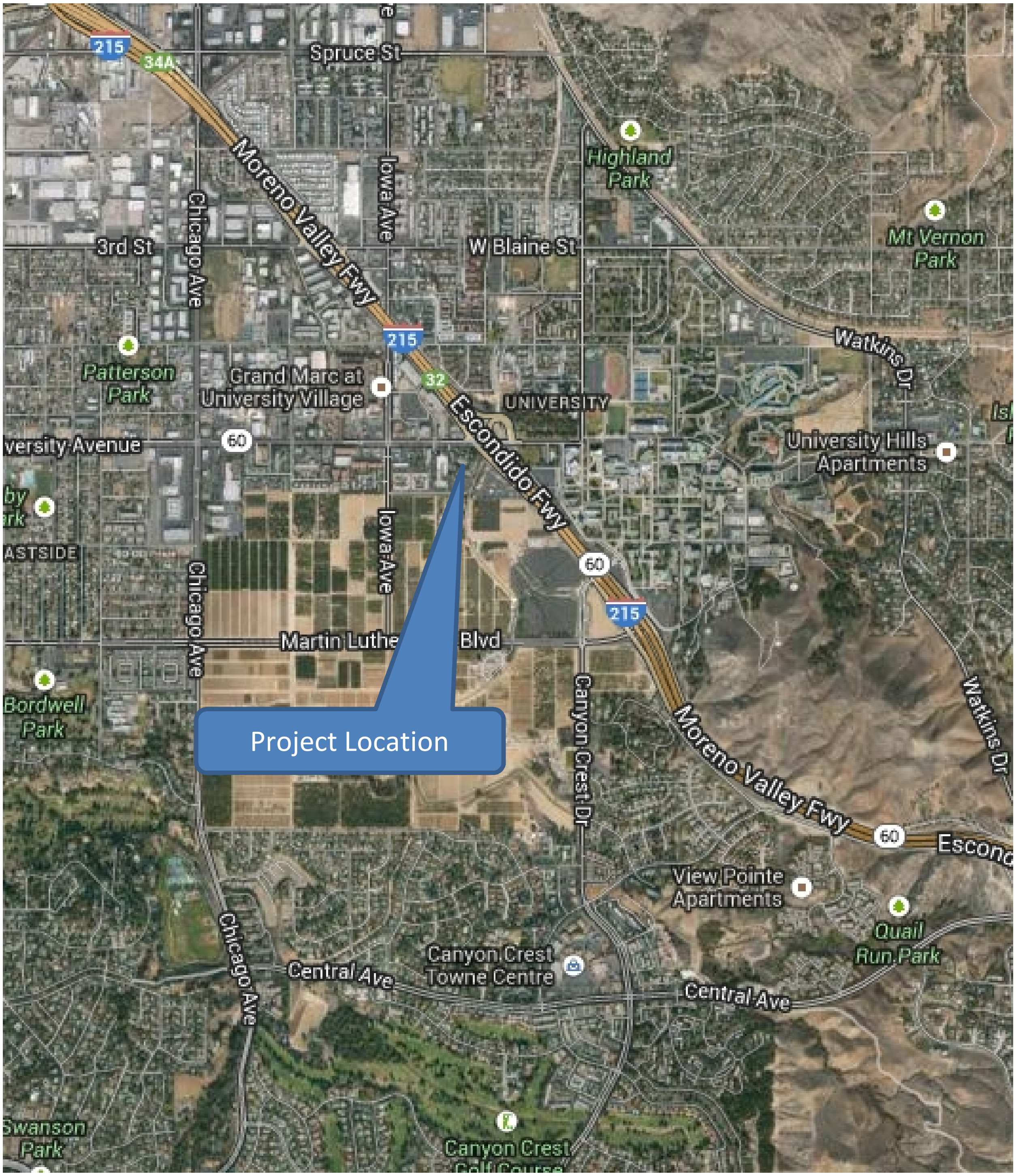
The property owner (as identified in Section 1 of this PWQMP) shall provide all funding for the O&M of site BMPs outlined herein this report. Upon transfer of ownership, the purchasing owner must be made aware of these requirements and will assume responsibility.

Appendix A: Conditions of Approval

N/A

Appendix B: Maps

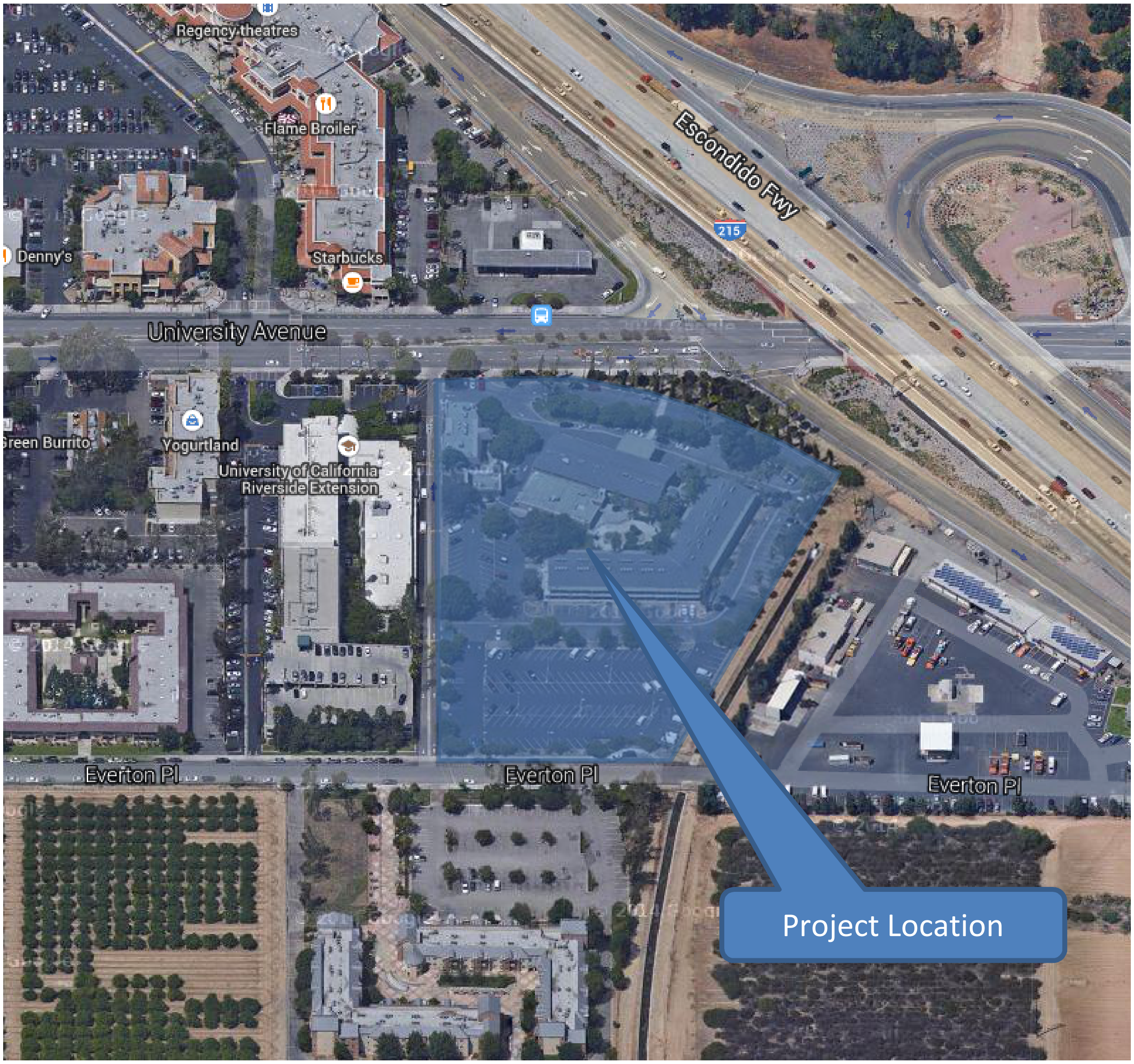
Site Map



Scale: 1in = 2000ft

April 2015

Site Map



Scale: 1in = 200ft

Total Site Area: 5.04 acres

Existing Impervious Area: 4.21 acres

Proposed Impervious Area: 4.13 acres

PWQMP LEGEND

- PAVEMENT (IMPERVIOUS)
- BUILDING (IMPERVIOUS)
- VEGETATION (PERVIOUS)
- VEGETATIVE SWALE (PERVIOUS)
- SURFACE FLOW DIRECTION

REVISIONS		
REV.	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	00/00/00

UNIVERSITY OF CALIFORNIA UC RIVERSIDE
CAPITAL PROGRAMS
ARCHITECTS & ENGINEERS
1223 UNIVERSITY AVENUE, SUITE 200
RIVERSIDE, CA 92521
TEL:(951) 827-6424 FAX:(951) 827-5404

PROJECT TITLE:

HIGHLANDER HALL DEMOLITION

SHEET TITLE:

PRELIMINARY WATER QUALITY MANGEMENT PLAN MAP

DATE:	04/20/2015	ESTIMATE NO.	E-000-00
SCALE:	AS NOTED	CPMS NO.	CP00000000
DRAWN BY:	DMB	CAAN NO.	P0000
APPROVED BY:		PROJECT NO.	950545
COMMENTS:			
SHEET NUMBER	1	NUMBER OF SHEETS	of 1

DAVID BECKWITH AND ASSOCIATES, INC
Civil & Structural Engineering - Land Surveying - QSD/QSP Environmental Services
1269 Pomona Road, Suite 108
Corona, CA 92882
(T) 714.349.7007 (F) 213.270.9488
www.davidbeckwithandassociates.com

D:\Projects\2015\2015–01_Highlander Hall\Admin\Reports\PWQMP\PWQMP Map.dwg – LAST PLOTTED ON Mon 04/27/15 – 01:49PM BY DBAinc

Appendix C: Hydrologic Conditions of Concern

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/20/15 File: 201501PRE242.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              2.30                   11.59

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              5.00                   25.20

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.300(In)
Area Averaged 100-Year Rainfall =    5.000(In)
```

Point rain (area averaged) = 2.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	(0.107)	0.004	0.014
2	0.17	0.07	0.018	(0.107)	0.004	0.014
3	0.25	0.07	0.018	(0.106)	0.004	0.014
4	0.33	0.10	0.028	(0.106)	0.006	0.021
5	0.42	0.10	0.028	(0.105)	0.006	0.021
6	0.50	0.10	0.028	(0.105)	0.006	0.021
7	0.58	0.10	0.028	(0.105)	0.006	0.021

8	0.67	0.10	0.028	(0.104)	0.006	0.021
9	0.75	0.10	0.028	(0.104)	0.006	0.021
10	0.83	0.13	0.037	(0.103)	0.009	0.028
11	0.92	0.13	0.037	(0.103)	0.009	0.028
12	1.00	0.13	0.037	(0.103)	0.009	0.028
13	1.08	0.10	0.028	(0.102)	0.006	0.021
14	1.17	0.10	0.028	(0.102)	0.006	0.021
15	1.25	0.10	0.028	(0.101)	0.006	0.021
16	1.33	0.10	0.028	(0.101)	0.006	0.021
17	1.42	0.10	0.028	(0.101)	0.006	0.021
18	1.50	0.10	0.028	(0.100)	0.006	0.021
19	1.58	0.10	0.028	(0.100)	0.006	0.021
20	1.67	0.10	0.028	(0.099)	0.006	0.021
21	1.75	0.10	0.028	(0.099)	0.006	0.021
22	1.83	0.13	0.037	(0.099)	0.009	0.028
23	1.92	0.13	0.037	(0.098)	0.009	0.028
24	2.00	0.13	0.037	(0.098)	0.009	0.028
25	2.08	0.13	0.037	(0.097)	0.009	0.028
26	2.17	0.13	0.037	(0.097)	0.009	0.028
27	2.25	0.13	0.037	(0.097)	0.009	0.028
28	2.33	0.13	0.037	(0.096)	0.009	0.028
29	2.42	0.13	0.037	(0.096)	0.009	0.028
30	2.50	0.13	0.037	(0.095)	0.009	0.028
31	2.58	0.17	0.046	(0.095)	0.011	0.035
32	2.67	0.17	0.046	(0.095)	0.011	0.035
33	2.75	0.17	0.046	(0.094)	0.011	0.035
34	2.83	0.17	0.046	(0.094)	0.011	0.035
35	2.92	0.17	0.046	(0.093)	0.011	0.035
36	3.00	0.17	0.046	(0.093)	0.011	0.035
37	3.08	0.17	0.046	(0.093)	0.011	0.035
38	3.17	0.17	0.046	(0.092)	0.011	0.035
39	3.25	0.17	0.046	(0.092)	0.011	0.035
40	3.33	0.17	0.046	(0.092)	0.011	0.035
41	3.42	0.17	0.046	(0.091)	0.011	0.035
42	3.50	0.17	0.046	(0.091)	0.011	0.035
43	3.58	0.17	0.046	(0.090)	0.011	0.035
44	3.67	0.17	0.046	(0.090)	0.011	0.035
45	3.75	0.17	0.046	(0.090)	0.011	0.035
46	3.83	0.20	0.055	(0.089)	0.013	0.042
47	3.92	0.20	0.055	(0.089)	0.013	0.042
48	4.00	0.20	0.055	(0.089)	0.013	0.042
49	4.08	0.20	0.055	(0.088)	0.013	0.042
50	4.17	0.20	0.055	(0.088)	0.013	0.042
51	4.25	0.20	0.055	(0.087)	0.013	0.042
52	4.33	0.23	0.064	(0.087)	0.015	0.050
53	4.42	0.23	0.064	(0.087)	0.015	0.050
54	4.50	0.23	0.064	(0.086)	0.015	0.050
55	4.58	0.23	0.064	(0.086)	0.015	0.050
56	4.67	0.23	0.064	(0.086)	0.015	0.050
57	4.75	0.23	0.064	(0.085)	0.015	0.050
58	4.83	0.27	0.074	(0.085)	0.017	0.057
59	4.92	0.27	0.074	(0.084)	0.017	0.057
60	5.00	0.27	0.074	(0.084)	0.017	0.057
61	5.08	0.20	0.055	(0.084)	0.013	0.042
62	5.17	0.20	0.055	(0.083)	0.013	0.042
63	5.25	0.20	0.055	(0.083)	0.013	0.042
64	5.33	0.23	0.064	(0.083)	0.015	0.050

65	5.42	0.23	0.064	(0.082)	0.015	0.050
66	5.50	0.23	0.064	(0.082)	0.015	0.050
67	5.58	0.27	0.074	(0.082)	0.017	0.057
68	5.67	0.27	0.074	(0.081)	0.017	0.057
69	5.75	0.27	0.074	(0.081)	0.017	0.057
70	5.83	0.27	0.074	(0.080)	0.017	0.057
71	5.92	0.27	0.074	(0.080)	0.017	0.057
72	6.00	0.27	0.074	(0.080)	0.017	0.057
73	6.08	0.30	0.083	(0.079)	0.019	0.064
74	6.17	0.30	0.083	(0.079)	0.019	0.064
75	6.25	0.30	0.083	(0.079)	0.019	0.064
76	6.33	0.30	0.083	(0.078)	0.019	0.064
77	6.42	0.30	0.083	(0.078)	0.019	0.064
78	6.50	0.30	0.083	(0.078)	0.019	0.064
79	6.58	0.33	0.092	(0.077)	0.021	0.071
80	6.67	0.33	0.092	(0.077)	0.021	0.071
81	6.75	0.33	0.092	(0.077)	0.021	0.071
82	6.83	0.33	0.092	(0.076)	0.021	0.071
83	6.92	0.33	0.092	(0.076)	0.021	0.071
84	7.00	0.33	0.092	(0.076)	0.021	0.071
85	7.08	0.33	0.092	(0.075)	0.021	0.071
86	7.17	0.33	0.092	(0.075)	0.021	0.071
87	7.25	0.33	0.092	(0.075)	0.021	0.071
88	7.33	0.37	0.101	(0.074)	0.023	0.078
89	7.42	0.37	0.101	(0.074)	0.023	0.078
90	7.50	0.37	0.101	(0.074)	0.023	0.078
91	7.58	0.40	0.110	(0.073)	0.026	0.085
92	7.67	0.40	0.110	(0.073)	0.026	0.085
93	7.75	0.40	0.110	(0.072)	0.026	0.085
94	7.83	0.43	0.120	(0.072)	0.028	0.092
95	7.92	0.43	0.120	(0.072)	0.028	0.092
96	8.00	0.43	0.120	(0.071)	0.028	0.092
97	8.08	0.50	0.138	(0.071)	0.032	0.106
98	8.17	0.50	0.138	(0.071)	0.032	0.106
99	8.25	0.50	0.138	(0.071)	0.032	0.106
100	8.33	0.50	0.138	(0.070)	0.032	0.106
101	8.42	0.50	0.138	(0.070)	0.032	0.106
102	8.50	0.50	0.138	(0.070)	0.032	0.106
103	8.58	0.53	0.147	(0.069)	0.034	0.113
104	8.67	0.53	0.147	(0.069)	0.034	0.113
105	8.75	0.53	0.147	(0.069)	0.034	0.113
106	8.83	0.57	0.156	(0.068)	0.036	0.120
107	8.92	0.57	0.156	(0.068)	0.036	0.120
108	9.00	0.57	0.156	(0.068)	0.036	0.120
109	9.08	0.63	0.175	(0.067)	0.040	0.134
110	9.17	0.63	0.175	(0.067)	0.040	0.134
111	9.25	0.63	0.175	(0.067)	0.040	0.134
112	9.33	0.67	0.184	(0.066)	0.043	0.141
113	9.42	0.67	0.184	(0.066)	0.043	0.141
114	9.50	0.67	0.184	(0.066)	0.043	0.141
115	9.58	0.70	0.193	(0.065)	0.045	0.149
116	9.67	0.70	0.193	(0.065)	0.045	0.149
117	9.75	0.70	0.193	(0.065)	0.045	0.149
118	9.83	0.73	0.202	(0.064)	0.047	0.156
119	9.92	0.73	0.202	(0.064)	0.047	0.156
120	10.00	0.73	0.202	(0.064)	0.047	0.156
121	10.08	0.50	0.138	(0.063)	0.032	0.106

122	10.17	0.50	0.138	(0.063)	0.032	0.106
123	10.25	0.50	0.138	(0.063)	0.032	0.106
124	10.33	0.50	0.138	(0.063)	0.032	0.106
125	10.42	0.50	0.138	(0.062)	0.032	0.106
126	10.50	0.50	0.138	(0.062)	0.032	0.106
127	10.58	0.67	0.184	(0.062)	0.043	0.141
128	10.67	0.67	0.184	(0.061)	0.043	0.141
129	10.75	0.67	0.184	(0.061)	0.043	0.141
130	10.83	0.67	0.184	(0.061)	0.043	0.141
131	10.92	0.67	0.184	(0.060)	0.043	0.141
132	11.00	0.67	0.184	(0.060)	0.043	0.141
133	11.08	0.63	0.175	(0.060)	0.040	0.134
134	11.17	0.63	0.175	(0.060)	0.040	0.134
135	11.25	0.63	0.175	(0.059)	0.040	0.134
136	11.33	0.63	0.175	(0.059)	0.040	0.134
137	11.42	0.63	0.175	(0.059)	0.040	0.134
138	11.50	0.63	0.175	(0.058)	0.040	0.134
139	11.58	0.57	0.156	(0.058)	0.036	0.120
140	11.67	0.57	0.156	(0.058)	0.036	0.120
141	11.75	0.57	0.156	(0.058)	0.036	0.120
142	11.83	0.60	0.166	(0.057)	0.038	0.127
143	11.92	0.60	0.166	(0.057)	0.038	0.127
144	12.00	0.60	0.166	(0.057)	0.038	0.127
145	12.08	0.83	0.230	(0.056)	0.053	0.177
146	12.17	0.83	0.230	(0.056)	0.053	0.177
147	12.25	0.83	0.230	(0.056)	0.053	0.177
148	12.33	0.87	0.239	(0.056)	0.055	0.184
149	12.42	0.87	0.239	0.055	(0.055)	0.184
150	12.50	0.87	0.239	0.055	(0.055)	0.184
151	12.58	0.93	0.258	0.055	(0.060)	0.203
152	12.67	0.93	0.258	0.054	(0.060)	0.203
153	12.75	0.93	0.258	0.054	(0.060)	0.203
154	12.83	0.97	0.267	0.054	(0.062)	0.213
155	12.92	0.97	0.267	0.054	(0.062)	0.213
156	13.00	0.97	0.267	0.053	(0.062)	0.213
157	13.08	1.13	0.313	0.053	(0.072)	0.260
158	13.17	1.13	0.313	0.053	(0.072)	0.260
159	13.25	1.13	0.313	0.053	(0.072)	0.260
160	13.33	1.13	0.313	0.052	(0.072)	0.261
161	13.42	1.13	0.313	0.052	(0.072)	0.261
162	13.50	1.13	0.313	0.052	(0.072)	0.261
163	13.58	0.77	0.212	(0.051)	0.049	0.163
164	13.67	0.77	0.212	(0.051)	0.049	0.163
165	13.75	0.77	0.212	(0.051)	0.049	0.163
166	13.83	0.77	0.212	(0.051)	0.049	0.163
167	13.92	0.77	0.212	(0.050)	0.049	0.163
168	14.00	0.77	0.212	(0.050)	0.049	0.163
169	14.08	0.90	0.248	0.050	(0.057)	0.198
170	14.17	0.90	0.248	0.050	(0.057)	0.199
171	14.25	0.90	0.248	0.049	(0.057)	0.199
172	14.33	0.87	0.239	0.049	(0.055)	0.190
173	14.42	0.87	0.239	0.049	(0.055)	0.190
174	14.50	0.87	0.239	0.049	(0.055)	0.191
175	14.58	0.87	0.239	0.048	(0.055)	0.191
176	14.67	0.87	0.239	0.048	(0.055)	0.191
177	14.75	0.87	0.239	0.048	(0.055)	0.191
178	14.83	0.83	0.230	0.048	(0.053)	0.182

179	14.92	0.83	0.230	0.047	(0.053)	0.183
180	15.00	0.83	0.230	0.047	(0.053)	0.183
181	15.08	0.80	0.221	0.047	(0.051)	0.174
182	15.17	0.80	0.221	0.047	(0.051)	0.174
183	15.25	0.80	0.221	0.046	(0.051)	0.174
184	15.33	0.77	0.212	0.046	(0.049)	0.165
185	15.42	0.77	0.212	0.046	(0.049)	0.166
186	15.50	0.77	0.212	0.046	(0.049)	0.166
187	15.58	0.63	0.175	(0.046)	0.040	0.134
188	15.67	0.63	0.175	(0.045)	0.040	0.134
189	15.75	0.63	0.175	(0.045)	0.040	0.134
190	15.83	0.63	0.175	(0.045)	0.040	0.134
191	15.92	0.63	0.175	(0.045)	0.040	0.134
192	16.00	0.63	0.175	(0.044)	0.040	0.134
193	16.08	0.13	0.037	(0.044)	0.009	0.028
194	16.17	0.13	0.037	(0.044)	0.009	0.028
195	16.25	0.13	0.037	(0.044)	0.009	0.028
196	16.33	0.13	0.037	(0.043)	0.009	0.028
197	16.42	0.13	0.037	(0.043)	0.009	0.028
198	16.50	0.13	0.037	(0.043)	0.009	0.028
199	16.58	0.10	0.028	(0.043)	0.006	0.021
200	16.67	0.10	0.028	(0.043)	0.006	0.021
201	16.75	0.10	0.028	(0.042)	0.006	0.021
202	16.83	0.10	0.028	(0.042)	0.006	0.021
203	16.92	0.10	0.028	(0.042)	0.006	0.021
204	17.00	0.10	0.028	(0.042)	0.006	0.021
205	17.08	0.17	0.046	(0.042)	0.011	0.035
206	17.17	0.17	0.046	(0.041)	0.011	0.035
207	17.25	0.17	0.046	(0.041)	0.011	0.035
208	17.33	0.17	0.046	(0.041)	0.011	0.035
209	17.42	0.17	0.046	(0.041)	0.011	0.035
210	17.50	0.17	0.046	(0.040)	0.011	0.035
211	17.58	0.17	0.046	(0.040)	0.011	0.035
212	17.67	0.17	0.046	(0.040)	0.011	0.035
213	17.75	0.17	0.046	(0.040)	0.011	0.035
214	17.83	0.13	0.037	(0.040)	0.009	0.028
215	17.92	0.13	0.037	(0.039)	0.009	0.028
216	18.00	0.13	0.037	(0.039)	0.009	0.028
217	18.08	0.13	0.037	(0.039)	0.009	0.028
218	18.17	0.13	0.037	(0.039)	0.009	0.028
219	18.25	0.13	0.037	(0.039)	0.009	0.028
220	18.33	0.13	0.037	(0.039)	0.009	0.028
221	18.42	0.13	0.037	(0.038)	0.009	0.028
222	18.50	0.13	0.037	(0.038)	0.009	0.028
223	18.58	0.10	0.028	(0.038)	0.006	0.021
224	18.67	0.10	0.028	(0.038)	0.006	0.021
225	18.75	0.10	0.028	(0.038)	0.006	0.021
226	18.83	0.07	0.018	(0.037)	0.004	0.014
227	18.92	0.07	0.018	(0.037)	0.004	0.014
228	19.00	0.07	0.018	(0.037)	0.004	0.014
229	19.08	0.10	0.028	(0.037)	0.006	0.021
230	19.17	0.10	0.028	(0.037)	0.006	0.021
231	19.25	0.10	0.028	(0.037)	0.006	0.021
232	19.33	0.13	0.037	(0.036)	0.009	0.028
233	19.42	0.13	0.037	(0.036)	0.009	0.028
234	19.50	0.13	0.037	(0.036)	0.009	0.028
235	19.58	0.10	0.028	(0.036)	0.006	0.021

236	19.67	0.10	0.028	(0.036)	0.006	0.021
237	19.75	0.10	0.028	(0.036)	0.006	0.021
238	19.83	0.07	0.018	(0.035)	0.004	0.014
239	19.92	0.07	0.018	(0.035)	0.004	0.014
240	20.00	0.07	0.018	(0.035)	0.004	0.014
241	20.08	0.10	0.028	(0.035)	0.006	0.021
242	20.17	0.10	0.028	(0.035)	0.006	0.021
243	20.25	0.10	0.028	(0.035)	0.006	0.021
244	20.33	0.10	0.028	(0.034)	0.006	0.021
245	20.42	0.10	0.028	(0.034)	0.006	0.021
246	20.50	0.10	0.028	(0.034)	0.006	0.021
247	20.58	0.10	0.028	(0.034)	0.006	0.021
248	20.67	0.10	0.028	(0.034)	0.006	0.021
249	20.75	0.10	0.028	(0.034)	0.006	0.021
250	20.83	0.07	0.018	(0.034)	0.004	0.014
251	20.92	0.07	0.018	(0.033)	0.004	0.014
252	21.00	0.07	0.018	(0.033)	0.004	0.014
253	21.08	0.10	0.028	(0.033)	0.006	0.021
254	21.17	0.10	0.028	(0.033)	0.006	0.021
255	21.25	0.10	0.028	(0.033)	0.006	0.021
256	21.33	0.07	0.018	(0.033)	0.004	0.014
257	21.42	0.07	0.018	(0.033)	0.004	0.014
258	21.50	0.07	0.018	(0.033)	0.004	0.014
259	21.58	0.10	0.028	(0.032)	0.006	0.021
260	21.67	0.10	0.028	(0.032)	0.006	0.021
261	21.75	0.10	0.028	(0.032)	0.006	0.021
262	21.83	0.07	0.018	(0.032)	0.004	0.014
263	21.92	0.07	0.018	(0.032)	0.004	0.014
264	22.00	0.07	0.018	(0.032)	0.004	0.014
265	22.08	0.10	0.028	(0.032)	0.006	0.021
266	22.17	0.10	0.028	(0.032)	0.006	0.021
267	22.25	0.10	0.028	(0.032)	0.006	0.021
268	22.33	0.07	0.018	(0.031)	0.004	0.014
269	22.42	0.07	0.018	(0.031)	0.004	0.014
270	22.50	0.07	0.018	(0.031)	0.004	0.014
271	22.58	0.07	0.018	(0.031)	0.004	0.014
272	22.67	0.07	0.018	(0.031)	0.004	0.014
273	22.75	0.07	0.018	(0.031)	0.004	0.014
274	22.83	0.07	0.018	(0.031)	0.004	0.014
275	22.92	0.07	0.018	(0.031)	0.004	0.014
276	23.00	0.07	0.018	(0.031)	0.004	0.014
277	23.08	0.07	0.018	(0.031)	0.004	0.014
278	23.17	0.07	0.018	(0.031)	0.004	0.014
279	23.25	0.07	0.018	(0.031)	0.004	0.014
280	23.33	0.07	0.018	(0.031)	0.004	0.014
281	23.42	0.07	0.018	(0.030)	0.004	0.014
282	23.50	0.07	0.018	(0.030)	0.004	0.014
283	23.58	0.07	0.018	(0.030)	0.004	0.014
284	23.67	0.07	0.018	(0.030)	0.004	0.014
285	23.75	0.07	0.018	(0.030)	0.004	0.014
286	23.83	0.07	0.018	(0.030)	0.004	0.014
287	23.92	0.07	0.018	(0.030)	0.004	0.014
288	24.00	0.07	0.018	(0.030)	0.004	0.014

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.5

Flood volume = Effective rainfall 1.79(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)

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    Total soil loss =      0.51(In)
    Total soil loss =     0.214(Ac.Ft)
    Total rainfall =      2.30(In)
    Flood volume =       32749.8 Cubic Feet
    Total soil loss =       9328.8 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      1.312(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0002      0.03  Q         |         |         |         |
  0+15       0.0006      0.05  Q         |         |         |         |
  0+20       0.0010      0.06  Q         |         |         |         |
  0+25       0.0015      0.08  Q         |         |         |         |
  0+30       0.0022      0.09  Q         |         |         |         |
  0+35       0.0029      0.10  Q         |         |         |         |
  0+40       0.0036      0.10  Q         |         |         |         |
  0+45       0.0043      0.11  Q         |         |         |         |
  0+50       0.0051      0.11  Q         |         |         |         |
  0+55       0.0059      0.12  Q         |         |         |         |
  1+ 0       0.0068      0.13  Q         |         |         |         |
  1+ 5       0.0078      0.14  Q         |         |         |         |
  1+10       0.0086      0.13  Q         |         |         |         |
  1+15       0.0094      0.12  Q         |         |         |         |
  1+20       0.0102      0.11  Q         |         |         |         |
  1+25       0.0110      0.11  Q         |         |         |         |
  1+30       0.0117      0.11  Q         |         |         |         |
  1+35       0.0125      0.11  Q         |         |         |         |
  1+40       0.0132      0.11  Q         |         |         |         |
  1+45       0.0140      0.11  Q         |         |         |         |
  1+50       0.0147      0.11  Q         |         |         |         |
  1+55       0.0156      0.12  Q         |         |         |         |
  2+ 0       0.0165      0.13  Q         |         |         |         |
  2+ 5       0.0174      0.14  Q         |         |         |         |
  2+10       0.0184      0.14  Q         |         |         |         |
  2+15       0.0194      0.14  QV        |         |         |         |
  2+20       0.0204      0.14  QV        |         |         |         |
  2+25       0.0213      0.14  QV        |         |         |         |
  2+30       0.0223      0.14  QV        |         |         |         |
  2+35       0.0233      0.15  QV        |         |         |         |
  2+40       0.0244      0.16  QV        |         |         |         |
  2+45       0.0256      0.17  QV        |         |         |         |
  2+50       0.0268      0.17  QV        |         |         |         |
  2+55       0.0280      0.18  QV        |         |         |         |
  3+ 0       0.0292      0.18  QV        |         |         |         |
  3+ 5       0.0305      0.18  QV        |         |         |         |
  3+10       0.0317      0.18  QV        |         |         |         |
  3+15       0.0329      0.18  QV        |         |         |         |
  3+20       0.0342      0.18  QV        |         |         |         |
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3+25       0.0354      0.18  QV        |         |         |         |
3+30       0.0366      0.18  QV        |         |         |         |
3+35       0.0379      0.18  Q V       |         |         |         |
3+40       0.0391      0.18  Q V       |         |         |         |
3+45       0.0404      0.18  Q V       |         |         |         |
3+50       0.0416      0.18  Q V       |         |         |         |
3+55       0.0429      0.19  Q V       |         |         |         |
4+ 0       0.0444      0.21  Q V       |         |         |         |
4+ 5       0.0458      0.21  Q V       |         |         |         |
4+10       0.0473      0.21  Q V       |         |         |         |
4+15       0.0487      0.21  Q V       |         |         |         |
4+20       0.0502      0.22  Q V       |         |         |         |
4+25       0.0518      0.23  Q V       |         |         |         |
4+30       0.0535      0.24  Q V       |         |         |         |
4+35       0.0552      0.25  Q V       |         |         |         |
4+40       0.0569      0.25  Q  V      |         |         |         |
4+45       0.0586      0.25  Q  V      |         |         |         |
4+50       0.0603      0.25  |Q V      |         |         |         |
4+55       0.0622      0.26  |Q V      |         |         |         |
5+ 0       0.0641      0.28  |Q V      |         |         |         |
5+ 5       0.0660      0.28  |Q V      |         |         |         |
5+10       0.0677      0.26  |Q V      |         |         |         |
5+15       0.0694      0.23  Q  V      |         |         |         |
5+20       0.0709      0.23  Q  V      |         |         |         |
5+25       0.0726      0.24  Q  V      |         |         |         |
5+30       0.0742      0.24  Q  V      |         |         |         |
5+35       0.0760      0.25  Q   V     |         |         |         |
5+40       0.0778      0.26  |Q  V     |         |         |         |
5+45       0.0797      0.28  |Q  V     |         |         |         |
5+50       0.0816      0.28  |Q  V     |         |         |         |
5+55       0.0836      0.28  |Q  V     |         |         |         |
6+ 0       0.0855      0.29  |Q  V     |         |         |         |
6+ 5       0.0875      0.29  |Q  V     |         |         |         |
6+10       0.0896      0.30  |Q  V     |         |         |         |
6+15       0.0917      0.31  |Q  V     |         |         |         |
6+20       0.0939      0.32  |Q  V     |         |         |         |
6+25       0.0961      0.32  |Q   V    |         |         |         |
6+30       0.0984      0.32  |Q   V    |         |         |         |
6+35       0.1006      0.32  |Q   V    |         |         |         |
6+40       0.1029      0.34  |Q   V    |         |         |         |
6+45       0.1053      0.35  |Q   V    |         |         |         |
6+50       0.1077      0.35  |Q   V    |         |         |         |
6+55       0.1102      0.36  |Q   V    |         |         |         |
7+ 0       0.1127      0.36  |Q   V    |         |         |         |
7+ 5       0.1151      0.36  |Q    V   |         |         |         |
7+10       0.1176      0.36  |Q    V   |         |         |         |
7+15       0.1201      0.36  |Q    V   |         |         |         |
7+20       0.1226      0.36  |Q    V   |         |         |         |
7+25       0.1251      0.37  |Q    V   |         |         |         |
7+30       0.1278      0.39  |Q    V   |         |         |         |
7+35       0.1305      0.39  |Q    V   |         |         |         |
7+40       0.1333      0.41  |Q     V  |         |         |         |
7+45       0.1362      0.42  |Q     V  |         |         |         |
7+50       0.1391      0.43  |Q     V  |         |         |         |
7+55       0.1421      0.44  |Q     V  |         |         |         |
8+ 0       0.1453      0.46  |Q     V  |         |         |         |
8+ 5       0.1485      0.46  |Q     V  |         |         |         |
```

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 8+10       0.1519      0.49  |Q      V |         |         |         |
 8+15       0.1554      0.52  | Q     V |         |         |         |
 8+20       0.1591      0.53  | Q     V |         |         |         |
 8+25       0.1627      0.53  | Q     V |         |         |         |
 8+30       0.1664      0.54  | Q     V |         |         |         |
 8+35       0.1701      0.54  | Q      V|         |         |         |
 8+40       0.1739      0.55  | Q      V|         |         |         |
 8+45       0.1778      0.56  | Q      V|         |         |         |
 8+50       0.1817      0.57  | Q      V|         |         |         |
 8+55       0.1858      0.59  | Q      V|         |         |         |
 9+ 0       0.1899      0.60  | Q       V         |         |         |
 9+ 5       0.1941      0.61  | Q       V         |         |         |
 9+10       0.1985      0.63  | Q       V         |         |         |
 9+15       0.2030      0.66  | Q       V         |         |         |
 9+20       0.2076      0.67  | Q       |V        |         |         |
 9+25       0.2124      0.69  | Q       |V        |         |         |
 9+30       0.2172      0.71  | Q       |V        |         |         |
 9+35       0.2222      0.71  | Q       |V        |         |         |
 9+40       0.2272      0.73  | Q       | V       |         |         |
 9+45       0.2323      0.74  | Q       | V       |         |         |
 9+50       0.2375      0.75  | Q       | V       |         |         |
 9+55       0.2427      0.76  |  Q      | V       |         |         |
10+ 0       0.2481      0.78  |  Q      |  V      |         |         |
10+ 5       0.2534      0.77  |  Q      |  V      |         |         |
10+10       0.2581      0.69  | Q       |  V      |         |         |
10+15       0.2623      0.61  | Q       |  V      |         |         |
10+20       0.2663      0.58  | Q       |   V     |         |         |
10+25       0.2702      0.56  | Q       |   V     |         |         |
10+30       0.2740      0.55  | Q       |   V     |         |         |
10+35       0.2778      0.56  | Q       |   V     |         |         |
10+40       0.2820      0.61  | Q       |    V    |         |         |
10+45       0.2866      0.67  | Q       |    V    |         |         |
10+50       0.2914      0.69  | Q       |    V    |         |         |
10+55       0.2962      0.70  | Q       |    V    |         |         |
11+ 0       0.3011      0.71  | Q       |     V   |         |         |
11+ 5       0.3060      0.71  | Q       |     V   |         |         |
11+10       0.3109      0.70  | Q       |     V   |         |         |
11+15       0.3156      0.69  | Q       |     V   |         |         |
11+20       0.3204      0.69  | Q       |      V  |         |         |
11+25       0.3251      0.69  | Q       |      V  |         |         |
11+30       0.3298      0.68  | Q       |      V  |         |         |
11+35       0.3345      0.68  | Q       |      V  |         |         |
11+40       0.3390      0.66  | Q       |       V |         |         |
11+45       0.3434      0.63  | Q       |       V |         |         |
11+50       0.3477      0.62  | Q       |       V |         |         |
11+55       0.3520      0.63  | Q       |       V |         |         |
12+ 0       0.3564      0.64  | Q       |       V |         |         |
12+ 5       0.3609      0.66  | Q       |        V|         |         |
12+10       0.3660      0.74  | Q       |        V|         |         |
12+15       0.3717      0.83  |  Q      |        V|         |         |
12+20       0.3777      0.86  |  Q      |         V         |         |
12+25       0.3838      0.89  |  Q      |         V         |         |
12+30       0.3901      0.91  |  Q      |         V         |         |
12+35       0.3965      0.93  |  Q      |         |V        |         |
12+40       0.4031      0.96  |  Q      |         |V        |         |
12+45       0.4100      1.00  |   Q     |         |V        |         |
12+50       0.4170      1.02  |   Q     |         | V       |         |
```

```
12+55       0.4242      1.04  |   Q     |         | V       |         |
13+ 0       0.4315      1.06  |   Q     |         | V       |         |
13+ 5       0.4390      1.09  |   Q     |         |  V      |         |
13+10       0.4470      1.17  |   Q     |         |  V      |         |
13+15       0.4557      1.25  |    Q    |         |   V     |         |
13+20       0.4645      1.28  |    Q    |         |   V     |         |
13+25       0.4734      1.30  |    Q    |         |    V    |         |
13+30       0.4825      1.31  |    Q    |         |    V    |         |
13+35       0.4914      1.29  |    Q    |         |     V   |         |
13+40       0.4992      1.13  |   Q     |         |     V   |         |
13+45       0.5058      0.97  |  Q      |         |     V   |         |
13+50       0.5120      0.91  |  Q      |         |      V  |         |
13+55       0.5180      0.87  |  Q      |         |      V  |         |
14+ 0       0.5239      0.85  |  Q      |         |      V  |         |
14+ 5       0.5297      0.85  |  Q      |         |       V |         |
14+10       0.5360      0.90  |  Q      |         |       V |         |
14+15       0.5426      0.96  |  Q      |         |       V |         |
14+20       0.5493      0.98  |  Q      |         |        V|         |
14+25       0.5561      0.98  |  Q      |         |        V|         |
14+30       0.5628      0.97  |  Q      |         |        V|         |
14+35       0.5694      0.97  |  Q      |         |         V         |
14+40       0.5761      0.97  |  Q      |         |         V         |
14+45       0.5828      0.97  |  Q      |         |         |V        |
14+50       0.5895      0.97  |  Q      |         |         |V        |
14+55       0.5960      0.95  |  Q      |         |         |V        |
15+ 0       0.6025      0.94  |  Q      |         |         | V       |
15+ 5       0.6089      0.93  |  Q      |         |         | V       |
15+10       0.6152      0.92  |  Q      |         |         | V       |
15+15       0.6214      0.90  |  Q      |         |         |  V      |
15+20       0.6276      0.89  |  Q      |         |         |  V      |
15+25       0.6336      0.87  |  Q      |         |         |  V      |
15+30       0.6395      0.86  |  Q      |         |         |   V     |
15+35       0.6453      0.84  |  Q      |         |         |   V     |
15+40       0.6507      0.79  |  Q      |         |         |   V     |
15+45       0.6557      0.73  | Q       |         |         |   V     |
15+50       0.6606      0.71  | Q       |         |         |    V    |
15+55       0.6654      0.70  | Q       |         |         |    V    |
16+ 0       0.6702      0.69  | Q       |         |         |    V    |
16+ 5       0.6747      0.66  | Q       |         |         |    V    |
16+10       0.6780      0.48  |Q        |         |         |     V   |
16+15       0.6800      0.30  |Q        |         |         |     V   |
16+20       0.6816      0.23  Q         |         |         |     V   |
16+25       0.6829      0.19  Q         |         |         |     V   |
16+30       0.6841      0.17  Q         |         |         |     V   |
16+35       0.6852      0.15  Q         |         |         |     V   |
16+40       0.6861      0.14  Q         |         |         |     V   |
16+45       0.6870      0.12  Q         |         |         |     V   |
16+50       0.6878      0.12  Q         |         |         |     V   |
16+55       0.6885      0.11  Q         |         |         |     V   |
17+ 0       0.6893      0.11  Q         |         |         |     V   |
17+ 5       0.6901      0.11  Q         |         |         |     V   |
17+10       0.6910      0.14  Q         |         |         |     V   |
17+15       0.6921      0.16  Q         |         |         |     V   |
17+20       0.6933      0.17  Q         |         |         |     V   |
17+25       0.6945      0.17  Q         |         |         |     V   |
17+30       0.6957      0.18  Q         |         |         |      V  |
17+35       0.6969      0.18  Q         |         |         |      V  |
```

17+40	0.6981	0.18	Q	|	|	|	V	|
17+45	0.6994	0.18	Q	|	|	|	V	|
17+50	0.7006	0.18	Q	|	|	|	V	|
17+55	0.7017	0.17	Q	|	|	|	V	|
18+ 0	0.7028	0.15	Q	|	|	|	V	|
18+ 5	0.7038	0.15	Q	|	|	|	V	|
18+10	0.7048	0.15	Q	|	|	|	V	|
18+15	0.7058	0.15	Q	|	|	|	V	|
18+20	0.7068	0.14	Q	|	|	|	V	|
18+25	0.7078	0.14	Q	|	|	|	V	|
18+30	0.7088	0.14	Q	|	|	|	V	|
18+35	0.7098	0.14	Q	|	|	|	V	|
18+40	0.7107	0.13	Q	|	|	|	V	|
18+45	0.7115	0.12	Q	|	|	|	V	|
18+50	0.7123	0.11	Q	|	|	|	V	|
18+55	0.7129	0.10	Q	|	|	|	V	|
19+ 0	0.7135	0.08	Q	|	|	|	V	|
19+ 5	0.7141	0.08	Q	|	|	|	V	|
19+10	0.7147	0.09	Q	|	|	|	V	|
19+15	0.7154	0.10	Q	|	|	|	V	|
19+20	0.7161	0.11	Q	|	|	|	V	|
19+25	0.7169	0.12	Q	|	|	|	V	|
19+30	0.7178	0.13	Q	|	|	|	V	|
19+35	0.7188	0.14	Q	|	|	|	V	|
19+40	0.7196	0.13	Q	|	|	|	V	|
19+45	0.7204	0.12	Q	|	|	|	V	|
19+50	0.7212	0.11	Q	|	|	|	V	|
19+55	0.7219	0.10	Q	|	|	|	V	|
20+ 0	0.7224	0.08	Q	|	|	|	V	|
20+ 5	0.7230	0.08	Q	|	|	|	V	|
20+10	0.7236	0.09	Q	|	|	|	V	|
20+15	0.7243	0.10	Q	|	|	|	V	|
20+20	0.7250	0.10	Q	|	|	|	V	|
20+25	0.7257	0.11	Q	|	|	|	V	|
20+30	0.7264	0.11	Q	|	|	|	V	|
20+35	0.7272	0.11	Q	|	|	|	V	|
20+40	0.7279	0.11	Q	|	|	|	V	|
20+45	0.7287	0.11	Q	|	|	|	V	|
20+50	0.7294	0.11	Q	|	|	|	V	|
20+55	0.7300	0.09	Q	|	|	|	V	|
21+ 0	0.7306	0.08	Q	|	|	|	V	|
21+ 5	0.7312	0.08	Q	|	|	|	V	|
21+10	0.7318	0.09	Q	|	|	|	V	|
21+15	0.7325	0.10	Q	|	|	|	V	|
21+20	0.7331	0.10	Q	|	|	|	V	|
21+25	0.7338	0.09	Q	|	|	|	V	|
21+30	0.7343	0.08	Q	|	|	|	V	|
21+35	0.7349	0.08	Q	|	|	|	V	|
21+40	0.7355	0.09	Q	|	|	|	V	|
21+45	0.7362	0.10	Q	|	|	|	V	|
21+50	0.7369	0.10	Q	|	|	|	V	|
21+55	0.7375	0.09	Q	|	|	|	V	|
22+ 0	0.7380	0.08	Q	|	|	|	V	|
22+ 5	0.7386	0.08	Q	|	|	|	V	|
22+10	0.7392	0.09	Q	|	|	|	V	|
22+15	0.7399	0.10	Q	|	|	|	V	|
22+20	0.7406	0.10	Q	|	|	|	V	|

22+25	0.7412	0.09	Q	|	|	|	V|
22+30	0.7418	0.08	Q	|	|	|	V|
22+35	0.7423	0.08	Q	|	|	|	V|
22+40	0.7428	0.07	Q	|	|	|	V|
22+45	0.7433	0.07	Q	|	|	|	V|
22+50	0.7438	0.07	Q	|	|	|	V|
22+55	0.7443	0.07	Q	|	|	|	V|
23+ 0	0.7448	0.07	Q	|	|	|	V|
23+ 5	0.7453	0.07	Q	|	|	|	V|
23+10	0.7458	0.07	Q	|	|	|	V|
23+15	0.7463	0.07	Q	|	|	|	V|
23+20	0.7468	0.07	Q	|	|	|	V|
23+25	0.7473	0.07	Q	|	|	|	V|
23+30	0.7478	0.07	Q	|	|	|	V|
23+35	0.7483	0.07	Q	|	|	|	V|
23+40	0.7488	0.07	Q	|	|	|	V|
23+45	0.7493	0.07	Q	|	|	|	V|
23+50	0.7498	0.07	Q	|	|	|	V|
23+55	0.7502	0.07	Q	|	|	|	V|
24+ 0	0.7507	0.07	Q	|	|	|	V|
24+ 5	0.7512	0.07	Q	|	|	|	V|
24+10	0.7515	0.04	Q	|	|	|	V|
24+15	0.7517	0.02	Q	|	|	|	V|
24+20	0.7517	0.01	Q	|	|	|	V|
24+25	0.7518	0.01	Q	|	|	|	V|
24+30	0.7518	0.00	Q	|	|	|	V|
24+35	0.7518	0.00	Q	|	|	|	V|
24+40	0.7518	0.00	Q	|	|	|	V|
24+45	0.7518	0.00	Q	|	|	|	V|
24+50	0.7518	0.00	Q	|	|	|	V|
24+55	0.7518	0.00	Q	|	|	|	V|

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/22/15 File: 201501POST242.out


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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              2.30                  11.59

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              5.00                  25.20

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.300(In)
Area Averaged 100-Year Rainfall =    5.000(In)
```

Point rain (area averaged) = 2.300(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.300(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.018	(0.113)	0.004	0.014
2	0.17	0.07	0.018	(0.113)	0.004	0.014
3	0.25	0.07	0.018	(0.112)	0.004	0.014
4	0.33	0.10	0.028	(0.112)	0.007	0.021
5	0.42	0.10	0.028	(0.111)	0.007	0.021
6	0.50	0.10	0.028	(0.111)	0.007	0.021
7	0.58	0.10	0.028	(0.110)	0.007	0.021

8	0.67	0.10	0.028	(0.110)	0.007	0.021
9	0.75	0.10	0.028	(0.109)	0.007	0.021
10	0.83	0.13	0.037	(0.109)	0.009	0.028
11	0.92	0.13	0.037	(0.109)	0.009	0.028
12	1.00	0.13	0.037	(0.108)	0.009	0.028
13	1.08	0.10	0.028	(0.108)	0.007	0.021
14	1.17	0.10	0.028	(0.107)	0.007	0.021
15	1.25	0.10	0.028	(0.107)	0.007	0.021
16	1.33	0.10	0.028	(0.106)	0.007	0.021
17	1.42	0.10	0.028	(0.106)	0.007	0.021
18	1.50	0.10	0.028	(0.106)	0.007	0.021
19	1.58	0.10	0.028	(0.105)	0.007	0.021
20	1.67	0.10	0.028	(0.105)	0.007	0.021
21	1.75	0.10	0.028	(0.104)	0.007	0.021
22	1.83	0.13	0.037	(0.104)	0.009	0.028
23	1.92	0.13	0.037	(0.104)	0.009	0.028
24	2.00	0.13	0.037	(0.103)	0.009	0.028
25	2.08	0.13	0.037	(0.103)	0.009	0.028
26	2.17	0.13	0.037	(0.102)	0.009	0.028
27	2.25	0.13	0.037	(0.102)	0.009	0.028
28	2.33	0.13	0.037	(0.101)	0.009	0.028
29	2.42	0.13	0.037	(0.101)	0.009	0.028
30	2.50	0.13	0.037	(0.101)	0.009	0.028
31	2.58	0.17	0.046	(0.100)	0.011	0.035
32	2.67	0.17	0.046	(0.100)	0.011	0.035
33	2.75	0.17	0.046	(0.099)	0.011	0.035
34	2.83	0.17	0.046	(0.099)	0.011	0.035
35	2.92	0.17	0.046	(0.099)	0.011	0.035
36	3.00	0.17	0.046	(0.098)	0.011	0.035
37	3.08	0.17	0.046	(0.098)	0.011	0.035
38	3.17	0.17	0.046	(0.097)	0.011	0.035
39	3.25	0.17	0.046	(0.097)	0.011	0.035
40	3.33	0.17	0.046	(0.097)	0.011	0.035
41	3.42	0.17	0.046	(0.096)	0.011	0.035
42	3.50	0.17	0.046	(0.096)	0.011	0.035
43	3.58	0.17	0.046	(0.095)	0.011	0.035
44	3.67	0.17	0.046	(0.095)	0.011	0.035
45	3.75	0.17	0.046	(0.095)	0.011	0.035
46	3.83	0.20	0.055	(0.094)	0.013	0.042
47	3.92	0.20	0.055	(0.094)	0.013	0.042
48	4.00	0.20	0.055	(0.093)	0.013	0.042
49	4.08	0.20	0.055	(0.093)	0.013	0.042
50	4.17	0.20	0.055	(0.093)	0.013	0.042
51	4.25	0.20	0.055	(0.092)	0.013	0.042
52	4.33	0.23	0.064	(0.092)	0.016	0.049
53	4.42	0.23	0.064	(0.091)	0.016	0.049
54	4.50	0.23	0.064	(0.091)	0.016	0.049
55	4.58	0.23	0.064	(0.091)	0.016	0.049
56	4.67	0.23	0.064	(0.090)	0.016	0.049
57	4.75	0.23	0.064	(0.090)	0.016	0.049
58	4.83	0.27	0.074	(0.089)	0.018	0.056
59	4.92	0.27	0.074	(0.089)	0.018	0.056
60	5.00	0.27	0.074	(0.089)	0.018	0.056
61	5.08	0.20	0.055	(0.088)	0.013	0.042
62	5.17	0.20	0.055	(0.088)	0.013	0.042
63	5.25	0.20	0.055	(0.087)	0.013	0.042
64	5.33	0.23	0.064	(0.087)	0.016	0.049

65	5.42	0.23	0.064	(0.087)	0.016	0.049
66	5.50	0.23	0.064	(0.086)	0.016	0.049
67	5.58	0.27	0.074	(0.086)	0.018	0.056
68	5.67	0.27	0.074	(0.086)	0.018	0.056
69	5.75	0.27	0.074	(0.085)	0.018	0.056
70	5.83	0.27	0.074	(0.085)	0.018	0.056
71	5.92	0.27	0.074	(0.084)	0.018	0.056
72	6.00	0.27	0.074	(0.084)	0.018	0.056
73	6.08	0.30	0.083	(0.084)	0.020	0.063
74	6.17	0.30	0.083	(0.083)	0.020	0.063
75	6.25	0.30	0.083	(0.083)	0.020	0.063
76	6.33	0.30	0.083	(0.083)	0.020	0.063
77	6.42	0.30	0.083	(0.082)	0.020	0.063
78	6.50	0.30	0.083	(0.082)	0.020	0.063
79	6.58	0.33	0.092	(0.081)	0.022	0.070
80	6.67	0.33	0.092	(0.081)	0.022	0.070
81	6.75	0.33	0.092	(0.081)	0.022	0.070
82	6.83	0.33	0.092	(0.080)	0.022	0.070
83	6.92	0.33	0.092	(0.080)	0.022	0.070
84	7.00	0.33	0.092	(0.080)	0.022	0.070
85	7.08	0.33	0.092	(0.079)	0.022	0.070
86	7.17	0.33	0.092	(0.079)	0.022	0.070
87	7.25	0.33	0.092	(0.079)	0.022	0.070
88	7.33	0.37	0.101	(0.078)	0.025	0.077
89	7.42	0.37	0.101	(0.078)	0.025	0.077
90	7.50	0.37	0.101	(0.078)	0.025	0.077
91	7.58	0.40	0.110	(0.077)	0.027	0.084
92	7.67	0.40	0.110	(0.077)	0.027	0.084
93	7.75	0.40	0.110	(0.076)	0.027	0.084
94	7.83	0.43	0.120	(0.076)	0.029	0.091
95	7.92	0.43	0.120	(0.076)	0.029	0.091
96	8.00	0.43	0.120	(0.075)	0.029	0.091
97	8.08	0.50	0.138	(0.075)	0.034	0.104
98	8.17	0.50	0.138	(0.075)	0.034	0.104
99	8.25	0.50	0.138	(0.074)	0.034	0.104
100	8.33	0.50	0.138	(0.074)	0.034	0.104
101	8.42	0.50	0.138	(0.074)	0.034	0.104
102	8.50	0.50	0.138	(0.073)	0.034	0.104
103	8.58	0.53	0.147	(0.073)	0.036	0.111
104	8.67	0.53	0.147	(0.073)	0.036	0.111
105	8.75	0.53	0.147	(0.072)	0.036	0.111
106	8.83	0.57	0.156	(0.072)	0.038	0.118
107	8.92	0.57	0.156	(0.072)	0.038	0.118
108	9.00	0.57	0.156	(0.071)	0.038	0.118
109	9.08	0.63	0.175	(0.071)	0.043	0.132
110	9.17	0.63	0.175	(0.071)	0.043	0.132
111	9.25	0.63	0.175	(0.070)	0.043	0.132
112	9.33	0.67	0.184	(0.070)	0.045	0.139
113	9.42	0.67	0.184	(0.070)	0.045	0.139
114	9.50	0.67	0.184	(0.069)	0.045	0.139
115	9.58	0.70	0.193	(0.069)	0.047	0.146
116	9.67	0.70	0.193	(0.069)	0.047	0.146
117	9.75	0.70	0.193	(0.068)	0.047	0.146
118	9.83	0.73	0.202	(0.068)	0.049	0.153
119	9.92	0.73	0.202	(0.068)	0.049	0.153
120	10.00	0.73	0.202	(0.067)	0.049	0.153
121	10.08	0.50	0.138	(0.067)	0.034	0.104

122	10.17	0.50	0.138	(0.067)	0.034	0.104
123	10.25	0.50	0.138	(0.066)	0.034	0.104
124	10.33	0.50	0.138	(0.066)	0.034	0.104
125	10.42	0.50	0.138	(0.066)	0.034	0.104
126	10.50	0.50	0.138	(0.065)	0.034	0.104
127	10.58	0.67	0.184	(0.065)	0.045	0.139
128	10.67	0.67	0.184	(0.065)	0.045	0.139
129	10.75	0.67	0.184	(0.064)	0.045	0.139
130	10.83	0.67	0.184	(0.064)	0.045	0.139
131	10.92	0.67	0.184	(0.064)	0.045	0.139
132	11.00	0.67	0.184	(0.063)	0.045	0.139
133	11.08	0.63	0.175	(0.063)	0.043	0.132
134	11.17	0.63	0.175	(0.063)	0.043	0.132
135	11.25	0.63	0.175	(0.063)	0.043	0.132
136	11.33	0.63	0.175	(0.062)	0.043	0.132
137	11.42	0.63	0.175	(0.062)	0.043	0.132
138	11.50	0.63	0.175	(0.062)	0.043	0.132
139	11.58	0.57	0.156	(0.061)	0.038	0.118
140	11.67	0.57	0.156	(0.061)	0.038	0.118
141	11.75	0.57	0.156	(0.061)	0.038	0.118
142	11.83	0.60	0.166	(0.060)	0.040	0.125
143	11.92	0.60	0.166	(0.060)	0.040	0.125
144	12.00	0.60	0.166	(0.060)	0.040	0.125
145	12.08	0.83	0.230	(0.059)	0.056	0.174
146	12.17	0.83	0.230	(0.059)	0.056	0.174
147	12.25	0.83	0.230	(0.059)	0.056	0.174
148	12.33	0.87	0.239	(0.059)	0.058	0.181
149	12.42	0.87	0.239	(0.058)	0.058	0.181
150	12.50	0.87	0.239	0.058	(0.058)	0.181
151	12.58	0.93	0.258	0.058	(0.063)	0.200
152	12.67	0.93	0.258	0.057	(0.063)	0.200
153	12.75	0.93	0.258	0.057	(0.063)	0.200
154	12.83	0.97	0.267	0.057	(0.065)	0.210
155	12.92	0.97	0.267	0.057	(0.065)	0.210
156	13.00	0.97	0.267	0.056	(0.065)	0.211
157	13.08	1.13	0.313	0.056	(0.076)	0.257
158	13.17	1.13	0.313	0.056	(0.076)	0.257
159	13.25	1.13	0.313	0.055	(0.076)	0.257
160	13.33	1.13	0.313	0.055	(0.076)	0.258
161	13.42	1.13	0.313	0.055	(0.076)	0.258
162	13.50	1.13	0.313	0.055	(0.076)	0.258
163	13.58	0.77	0.212	(0.054)	0.051	0.160
164	13.67	0.77	0.212	(0.054)	0.051	0.160
165	13.75	0.77	0.212	(0.054)	0.051	0.160
166	13.83	0.77	0.212	(0.053)	0.051	0.160
167	13.92	0.77	0.212	(0.053)	0.051	0.160
168	14.00	0.77	0.212	(0.053)	0.051	0.160
169	14.08	0.90	0.248	0.053	(0.060)	0.196
170	14.17	0.90	0.248	0.052	(0.060)	0.196
171	14.25	0.90	0.248	0.052	(0.060)	0.196
172	14.33	0.87	0.239	0.052	(0.058)	0.187
173	14.42	0.87	0.239	0.052	(0.058)	0.188
174	14.50	0.87	0.239	0.051	(0.058)	0.188
175	14.58	0.87	0.239	0.051	(0.058)	0.188
176	14.67	0.87	0.239	0.051	(0.058)	0.188
177	14.75	0.87	0.239	0.051	(0.058)	0.189
178	14.83	0.83	0.230	0.050	(0.056)	0.180

179	14.92	0.83	0.230	0.050	(0.056)	0.180
180	15.00	0.83	0.230	0.050	(0.056)	0.180
181	15.08	0.80	0.221	0.050	(0.054)	0.171
182	15.17	0.80	0.221	0.049	(0.054)	0.172
183	15.25	0.80	0.221	0.049	(0.054)	0.172
184	15.33	0.77	0.212	0.049	(0.051)	0.163
185	15.42	0.77	0.212	0.048	(0.051)	0.163
186	15.50	0.77	0.212	0.048	(0.051)	0.163
187	15.58	0.63	0.175	(0.048)	0.043	0.132
188	15.67	0.63	0.175	(0.048)	0.043	0.132
189	15.75	0.63	0.175	(0.048)	0.043	0.132
190	15.83	0.63	0.175	(0.047)	0.043	0.132
191	15.92	0.63	0.175	(0.047)	0.043	0.132
192	16.00	0.63	0.175	(0.047)	0.043	0.132
193	16.08	0.13	0.037	(0.047)	0.009	0.028
194	16.17	0.13	0.037	(0.046)	0.009	0.028
195	16.25	0.13	0.037	(0.046)	0.009	0.028
196	16.33	0.13	0.037	(0.046)	0.009	0.028
197	16.42	0.13	0.037	(0.046)	0.009	0.028
198	16.50	0.13	0.037	(0.045)	0.009	0.028
199	16.58	0.10	0.028	(0.045)	0.007	0.021
200	16.67	0.10	0.028	(0.045)	0.007	0.021
201	16.75	0.10	0.028	(0.045)	0.007	0.021
202	16.83	0.10	0.028	(0.044)	0.007	0.021
203	16.92	0.10	0.028	(0.044)	0.007	0.021
204	17.00	0.10	0.028	(0.044)	0.007	0.021
205	17.08	0.17	0.046	(0.044)	0.011	0.035
206	17.17	0.17	0.046	(0.044)	0.011	0.035
207	17.25	0.17	0.046	(0.043)	0.011	0.035
208	17.33	0.17	0.046	(0.043)	0.011	0.035
209	17.42	0.17	0.046	(0.043)	0.011	0.035
210	17.50	0.17	0.046	(0.043)	0.011	0.035
211	17.58	0.17	0.046	(0.042)	0.011	0.035
212	17.67	0.17	0.046	(0.042)	0.011	0.035
213	17.75	0.17	0.046	(0.042)	0.011	0.035
214	17.83	0.13	0.037	(0.042)	0.009	0.028
215	17.92	0.13	0.037	(0.042)	0.009	0.028
216	18.00	0.13	0.037	(0.041)	0.009	0.028
217	18.08	0.13	0.037	(0.041)	0.009	0.028
218	18.17	0.13	0.037	(0.041)	0.009	0.028
219	18.25	0.13	0.037	(0.041)	0.009	0.028
220	18.33	0.13	0.037	(0.041)	0.009	0.028
221	18.42	0.13	0.037	(0.040)	0.009	0.028
222	18.50	0.13	0.037	(0.040)	0.009	0.028
223	18.58	0.10	0.028	(0.040)	0.007	0.021
224	18.67	0.10	0.028	(0.040)	0.007	0.021
225	18.75	0.10	0.028	(0.040)	0.007	0.021
226	18.83	0.07	0.018	(0.039)	0.004	0.014
227	18.92	0.07	0.018	(0.039)	0.004	0.014
228	19.00	0.07	0.018	(0.039)	0.004	0.014
229	19.08	0.10	0.028	(0.039)	0.007	0.021
230	19.17	0.10	0.028	(0.039)	0.007	0.021
231	19.25	0.10	0.028	(0.039)	0.007	0.021
232	19.33	0.13	0.037	(0.038)	0.009	0.028
233	19.42	0.13	0.037	(0.038)	0.009	0.028
234	19.50	0.13	0.037	(0.038)	0.009	0.028
235	19.58	0.10	0.028	(0.038)	0.007	0.021

236	19.67	0.10	0.028	(0.038)	0.007	0.021
237	19.75	0.10	0.028	(0.037)	0.007	0.021
238	19.83	0.07	0.018	(0.037)	0.004	0.014
239	19.92	0.07	0.018	(0.037)	0.004	0.014
240	20.00	0.07	0.018	(0.037)	0.004	0.014
241	20.08	0.10	0.028	(0.037)	0.007	0.021
242	20.17	0.10	0.028	(0.037)	0.007	0.021
243	20.25	0.10	0.028	(0.037)	0.007	0.021
244	20.33	0.10	0.028	(0.036)	0.007	0.021
245	20.42	0.10	0.028	(0.036)	0.007	0.021
246	20.50	0.10	0.028	(0.036)	0.007	0.021
247	20.58	0.10	0.028	(0.036)	0.007	0.021
248	20.67	0.10	0.028	(0.036)	0.007	0.021
249	20.75	0.10	0.028	(0.036)	0.007	0.021
250	20.83	0.07	0.018	(0.035)	0.004	0.014
251	20.92	0.07	0.018	(0.035)	0.004	0.014
252	21.00	0.07	0.018	(0.035)	0.004	0.014
253	21.08	0.10	0.028	(0.035)	0.007	0.021
254	21.17	0.10	0.028	(0.035)	0.007	0.021
255	21.25	0.10	0.028	(0.035)	0.007	0.021
256	21.33	0.07	0.018	(0.035)	0.004	0.014
257	21.42	0.07	0.018	(0.034)	0.004	0.014
258	21.50	0.07	0.018	(0.034)	0.004	0.014
259	21.58	0.10	0.028	(0.034)	0.007	0.021
260	21.67	0.10	0.028	(0.034)	0.007	0.021
261	21.75	0.10	0.028	(0.034)	0.007	0.021
262	21.83	0.07	0.018	(0.034)	0.004	0.014
263	21.92	0.07	0.018	(0.034)	0.004	0.014
264	22.00	0.07	0.018	(0.034)	0.004	0.014
265	22.08	0.10	0.028	(0.034)	0.007	0.021
266	22.17	0.10	0.028	(0.033)	0.007	0.021
267	22.25	0.10	0.028	(0.033)	0.007	0.021
268	22.33	0.07	0.018	(0.033)	0.004	0.014
269	22.42	0.07	0.018	(0.033)	0.004	0.014
270	22.50	0.07	0.018	(0.033)	0.004	0.014
271	22.58	0.07	0.018	(0.033)	0.004	0.014
272	22.67	0.07	0.018	(0.033)	0.004	0.014
273	22.75	0.07	0.018	(0.033)	0.004	0.014
274	22.83	0.07	0.018	(0.033)	0.004	0.014
275	22.92	0.07	0.018	(0.033)	0.004	0.014
276	23.00	0.07	0.018	(0.032)	0.004	0.014
277	23.08	0.07	0.018	(0.032)	0.004	0.014
278	23.17	0.07	0.018	(0.032)	0.004	0.014
279	23.25	0.07	0.018	(0.032)	0.004	0.014
280	23.33	0.07	0.018	(0.032)	0.004	0.014
281	23.42	0.07	0.018	(0.032)	0.004	0.014
282	23.50	0.07	0.018	(0.032)	0.004	0.014
283	23.58	0.07	0.018	(0.032)	0.004	0.014
284	23.67	0.07	0.018	(0.032)	0.004	0.014
285	23.75	0.07	0.018	(0.032)	0.004	0.014
286	23.83	0.07	0.018	(0.032)	0.004	0.014
287	23.92	0.07	0.018	(0.032)	0.004	0.014
288	24.00	0.07	0.018	(0.032)	0.004	0.014

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.2

Flood volume = Effective rainfall 1.76(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

```
    Total soil loss =      0.54(In)
    Total soil loss =     0.225(Ac.Ft)
    Total rainfall =      2.30(In)
    Flood volume =       32259.3 Cubic Feet
    Total soil loss =       9819.2 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      1.298(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0002      0.03  Q         |         |         |         |
  0+15       0.0006      0.05  Q         |         |         |         |
  0+20       0.0010      0.06  Q         |         |         |         |
  0+25       0.0015      0.08  Q         |         |         |         |
  0+30       0.0022      0.09  Q         |         |         |         |
  0+35       0.0028      0.10  Q         |         |         |         |
  0+40       0.0035      0.10  Q         |         |         |         |
  0+45       0.0043      0.10  Q         |         |         |         |
  0+50       0.0050      0.11  Q         |         |         |         |
  0+55       0.0058      0.12  Q         |         |         |         |
  1+ 0       0.0067      0.13  Q         |         |         |         |
  1+ 5       0.0076      0.13  Q         |         |         |         |
  1+10       0.0085      0.12  Q         |         |         |         |
  1+15       0.0093      0.11  Q         |         |         |         |
  1+20       0.0101      0.11  Q         |         |         |         |
  1+25       0.0108      0.11  Q         |         |         |         |
  1+30       0.0115      0.11  Q         |         |         |         |
  1+35       0.0123      0.11  Q         |         |         |         |
  1+40       0.0130      0.11  Q         |         |         |         |
  1+45       0.0137      0.11  Q         |         |         |         |
  1+50       0.0145      0.11  Q         |         |         |         |
  1+55       0.0153      0.12  Q         |         |         |         |
  2+ 0       0.0162      0.13  Q         |         |         |         |
  2+ 5       0.0172      0.14  Q         |         |         |         |
  2+10       0.0181      0.14  Q         |         |         |         |
  2+15       0.0191      0.14  QV        |         |         |         |
  2+20       0.0200      0.14  QV        |         |         |         |
  2+25       0.0210      0.14  QV        |         |         |         |
  2+30       0.0220      0.14  QV        |         |         |         |
  2+35       0.0230      0.14  QV        |         |         |         |
  2+40       0.0240      0.15  QV        |         |         |         |
  2+45       0.0252      0.17  QV        |         |         |         |
  2+50       0.0264      0.17  QV        |         |         |         |
  2+55       0.0276      0.17  QV        |         |         |         |
  3+ 0       0.0288      0.18  QV        |         |         |         |
  3+ 5       0.0300      0.18  QV        |         |         |         |
  3+10       0.0312      0.18  QV        |         |         |         |
  3+15       0.0324      0.18  QV        |         |         |         |
  3+20       0.0336      0.18  QV        |         |         |         |
```

```
3+25       0.0349      0.18  QV        |         |         |         |
3+30       0.0361      0.18  QV        |         |         |         |
3+35       0.0373      0.18  Q V       |         |         |         |
3+40       0.0385      0.18  Q V       |         |         |         |
3+45       0.0397      0.18  Q V       |         |         |         |
3+50       0.0410      0.18  Q V       |         |         |         |
3+55       0.0423      0.19  Q V       |         |         |         |
4+ 0       0.0437      0.20  Q V       |         |         |         |
4+ 5       0.0451      0.21  Q V       |         |         |         |
4+10       0.0465      0.21  Q V       |         |         |         |
4+15       0.0480      0.21  Q V       |         |         |         |
4+20       0.0494      0.21  Q V       |         |         |         |
4+25       0.0510      0.23  Q V       |         |         |         |
4+30       0.0526      0.24  Q V       |         |         |         |
4+35       0.0543      0.24  Q V       |         |         |         |
4+40       0.0560      0.24  Q  V      |         |         |         |
4+45       0.0577      0.25  Q  V      |         |         |         |
4+50       0.0594      0.25  Q  V      |         |         |         |
4+55       0.0612      0.26  |Q V      |         |         |         |
5+ 0       0.0631      0.27  |Q V      |         |         |         |
5+ 5       0.0649      0.27  |Q V      |         |         |         |
5+10       0.0667      0.25  |Q V      |         |         |         |
5+15       0.0683      0.23  Q  V      |         |         |         |
5+20       0.0698      0.22  Q  V      |         |         |         |
5+25       0.0714      0.23  Q  V      |         |         |         |
5+30       0.0731      0.24  Q  V      |         |         |         |
5+35       0.0748      0.25  Q   V     |         |         |         |
5+40       0.0766      0.26  |Q  V     |         |         |         |
5+45       0.0784      0.27  |Q  V     |         |         |         |
5+50       0.0803      0.28  |Q  V     |         |         |         |
5+55       0.0823      0.28  |Q  V     |         |         |         |
6+ 0       0.0842      0.28  |Q  V     |         |         |         |
6+ 5       0.0862      0.28  |Q  V     |         |         |         |
6+10       0.0882      0.30  |Q  V     |         |         |         |
6+15       0.0903      0.31  |Q  V     |         |         |         |
6+20       0.0925      0.31  |Q  V     |         |         |         |
6+25       0.0946      0.32  |Q   V    |         |         |         |
6+30       0.0968      0.32  |Q   V    |         |         |         |
6+35       0.0990      0.32  |Q   V    |         |         |         |
6+40       0.1013      0.33  |Q   V    |         |         |         |
6+45       0.1037      0.34  |Q   V    |         |         |         |
6+50       0.1061      0.35  |Q   V    |         |         |         |
6+55       0.1085      0.35  |Q   V    |         |         |         |
7+ 0       0.1109      0.35  |Q   V    |         |         |         |
7+ 5       0.1133      0.35  |Q    V   |         |         |         |
7+10       0.1158      0.35  |Q    V   |         |         |         |
7+15       0.1182      0.35  |Q    V   |         |         |         |
7+20       0.1207      0.36  |Q    V   |         |         |         |
7+25       0.1232      0.37  |Q    V   |         |         |         |
7+30       0.1258      0.38  |Q    V   |         |         |         |
7+35       0.1285      0.39  |Q    V   |         |         |         |
7+40       0.1312      0.40  |Q     V  |         |         |         |
7+45       0.1340      0.41  |Q     V  |         |         |         |
7+50       0.1369      0.42  |Q     V  |         |         |         |
7+55       0.1399      0.43  |Q     V  |         |         |         |
8+ 0       0.1430      0.45  |Q     V  |         |         |         |
8+ 5       0.1462      0.46  |Q     V  |         |         |         |
```

```
 8+10       0.1495      0.48  |Q      V |         |         |         |
 8+15       0.1530      0.51  | Q     V |         |         |         |
 8+20       0.1566      0.52  | Q     V |         |         |         |
 8+25       0.1602      0.52  | Q     V |         |         |         |
 8+30       0.1638      0.53  | Q     V |         |         |         |
 8+35       0.1675      0.53  | Q      V|         |         |         |
 8+40       0.1712      0.54  | Q      V|         |         |         |
 8+45       0.1750      0.56  | Q      V|         |         |         |
 8+50       0.1789      0.56  | Q      V|         |         |         |
 8+55       0.1829      0.58  | Q      V|         |         |         |
 9+ 0       0.1869      0.59  | Q       V         |         |         |
 9+ 5       0.1911      0.60  | Q       V         |         |         |
 9+10       0.1954      0.62  | Q       V         |         |         |
 9+15       0.1998      0.65  | Q       V         |         |         |
 9+20       0.2044      0.66  | Q       |V        |         |         |
 9+25       0.2091      0.68  | Q       |V        |         |         |
 9+30       0.2139      0.69  | Q       |V        |         |         |
 9+35       0.2187      0.70  | Q       |V        |         |         |
 9+40       0.2236      0.72  | Q       | V       |         |         |
 9+45       0.2287      0.73  | Q       | V       |         |         |
 9+50       0.2337      0.74  | Q       | V       |         |         |
 9+55       0.2389      0.75  |  Q      | V       |         |         |
10+ 0       0.2442      0.77  |  Q      |  V      |         |         |
10+ 5       0.2494      0.76  |  Q      |  V      |         |         |
10+10       0.2541      0.68  | Q       |  V      |         |         |
10+15       0.2582      0.60  | Q       |  V      |         |         |
10+20       0.2622      0.57  | Q       |   V     |         |         |
10+25       0.2660      0.55  | Q       |   V     |         |         |
10+30       0.2697      0.54  | Q       |   V     |         |         |
10+35       0.2735      0.55  | Q       |   V     |         |         |
10+40       0.2776      0.60  | Q       |   V     |         |         |
10+45       0.2821      0.66  | Q       |    V    |         |         |
10+50       0.2868      0.68  | Q       |    V    |         |         |
10+55       0.2916      0.69  | Q       |    V    |         |         |
11+ 0       0.2964      0.70  | Q       |     V   |         |         |
11+ 5       0.3012      0.70  | Q       |     V   |         |         |
11+10       0.3060      0.69  | Q       |     V   |         |         |
11+15       0.3107      0.68  | Q       |     V   |         |         |
11+20       0.3154      0.68  | Q       |      V  |         |         |
11+25       0.3200      0.68  | Q       |      V  |         |         |
11+30       0.3247      0.67  | Q       |      V  |         |         |
11+35       0.3293      0.67  | Q       |      V  |         |         |
11+40       0.3337      0.65  | Q       |       V |         |         |
11+45       0.3380      0.62  | Q       |       V |         |         |
11+50       0.3422      0.62  | Q       |       V |         |         |
11+55       0.3465      0.62  | Q       |       V |         |         |
12+ 0       0.3508      0.63  | Q       |       V |         |         |
12+ 5       0.3553      0.65  | Q       |        V|         |         |
12+10       0.3603      0.73  | Q       |        V|         |         |
12+15       0.3659      0.81  |  Q      |        V|         |         |
12+20       0.3718      0.85  |  Q      |         V         |         |
12+25       0.3778      0.88  |  Q      |         V         |         |
12+30       0.3840      0.90  |  Q      |         V         |         |
12+35       0.3903      0.91  |  Q      |         |V        |         |
12+40       0.3968      0.95  |  Q      |         |V        |         |
12+45       0.4036      0.99  |  Q      |         |V        |         |
12+50       0.4105      1.00  |   Q     |         | V       |         |
```

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12+55       0.4176      1.03  |   Q     |         | V       |         |
13+ 0       0.4248      1.05  |   Q     |         | V       |         |
13+ 5       0.4322      1.07  |   Q     |         |  V      |         |
13+10       0.4401      1.15  |   Q     |         |  V      |         |
13+15       0.4486      1.24  |   Q     |         |   V     |         |
13+20       0.4574      1.27  |    Q    |         |   V     |         |
13+25       0.4662      1.29  |    Q    |         |    V    |         |
13+30       0.4752      1.30  |    Q    |         |    V    |         |
13+35       0.4840      1.28  |    Q    |         |     V   |         |
13+40       0.4917      1.12  |   Q     |         |     V   |         |
13+45       0.4982      0.95  |  Q      |         |     V   |         |
13+50       0.5044      0.89  |  Q      |         |      V  |         |
13+55       0.5103      0.86  |  Q      |         |      V  |         |
14+ 0       0.5160      0.84  |  Q      |         |      V  |         |
14+ 5       0.5218      0.84  |  Q      |         |       V |         |
14+10       0.5279      0.89  |  Q      |         |       V |         |
14+15       0.5344      0.95  |  Q      |         |       V |         |
14+20       0.5411      0.97  |  Q      |         |        V|         |
14+25       0.5478      0.96  |  Q      |         |        V|         |
14+30       0.5543      0.96  |  Q      |         |        V|         |
14+35       0.5609      0.96  |  Q      |         |         V         |
14+40       0.5675      0.96  |  Q      |         |         V         |
14+45       0.5741      0.96  |  Q      |         |         |V        |
14+50       0.5807      0.95  |  Q      |         |         |V        |
14+55       0.5872      0.94  |  Q      |         |         |V        |
15+ 0       0.5935      0.93  |  Q      |         |         | V       |
15+ 5       0.5999      0.92  |  Q      |         |         | V       |
15+10       0.6061      0.90  |  Q      |         |         | V       |
15+15       0.6122      0.89  |  Q      |         |         |  V      |
15+20       0.6182      0.88  |  Q      |         |         |  V      |
15+25       0.6242      0.86  |  Q      |         |         |  V      |
15+30       0.6300      0.84  |  Q      |         |         |   V     |
15+35       0.6357      0.83  |  Q      |         |         |   V     |
15+40       0.6410      0.77  |  Q      |         |         |   V     |
15+45       0.6459      0.72  | Q       |         |         |   V     |
15+50       0.6508      0.70  | Q       |         |         |    V    |
15+55       0.6555      0.69  | Q       |         |         |    V    |
16+ 0       0.6602      0.68  | Q       |         |         |    V    |
16+ 5       0.6646      0.65  | Q       |         |         |    V    |
16+10       0.6679      0.47  |Q        |         |         |     V   |
16+15       0.6699      0.29  |Q        |         |         |     V   |
16+20       0.6715      0.23  Q         |         |         |     V   |
16+25       0.6728      0.19  Q         |         |         |     V   |
16+30       0.6739      0.17  Q         |         |         |     V   |
16+35       0.6750      0.15  Q         |         |         |     V   |
16+40       0.6759      0.14  Q         |         |         |     V   |
16+45       0.6767      0.12  Q         |         |         |     V   |
16+50       0.6775      0.11  Q         |         |         |     V   |
16+55       0.6783      0.11  Q         |         |         |     V   |
17+ 0       0.6790      0.11  Q         |         |         |     V   |
17+ 5       0.6798      0.11  Q         |         |         |     V   |
17+10       0.6807      0.13  Q         |         |         |     V   |
17+15       0.6818      0.16  Q         |         |         |     V   |
17+20       0.6829      0.17  Q         |         |         |     V   |
17+25       0.6841      0.17  Q         |         |         |     V   |
17+30       0.6853      0.17  Q         |         |         |      V  |
17+35       0.6865      0.18  Q         |         |         |      V  |
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17+40       0.6877      0.18  Q         |         |         |      V  |
17+45       0.6889      0.18  Q         |         |         |      V  |
17+50       0.6901      0.17  Q         |         |         |      V  |
17+55       0.6912      0.16  Q         |         |         |      V  |
18+ 0       0.6923      0.15  Q         |         |         |      V  |
18+ 5       0.6933      0.15  Q         |         |         |      V  |
18+10       0.6943      0.14  Q         |         |         |      V  |
18+15       0.6953      0.14  Q         |         |         |      V  |
18+20       0.6963      0.14  Q         |         |         |      V  |
18+25       0.6972      0.14  Q         |         |         |      V  |
18+30       0.6982      0.14  Q         |         |         |      V  |
18+35       0.6992      0.14  Q         |         |         |      V  |
18+40       0.7001      0.13  Q         |         |         |      V  |
18+45       0.7009      0.12  Q         |         |         |      V  |
18+50       0.7016      0.11  Q         |         |         |      V  |
18+55       0.7023      0.10  Q         |         |         |      V  |
19+ 0       0.7029      0.08  Q         |         |         |      V  |
19+ 5       0.7034      0.08  Q         |         |         |      V  |
19+10       0.7040      0.09  Q         |         |         |       V |
19+15       0.7047      0.10  Q         |         |         |       V |
19+20       0.7054      0.10  Q         |         |         |       V |
19+25       0.7062      0.12  Q         |         |         |       V |
19+30       0.7071      0.13  Q         |         |         |       V |
19+35       0.7080      0.13  Q         |         |         |       V |
19+40       0.7089      0.12  Q         |         |         |       V |
19+45       0.7097      0.11  Q         |         |         |       V |
19+50       0.7104      0.11  Q         |         |         |       V |
19+55       0.7111      0.10  Q         |         |         |       V |
20+ 0       0.7116      0.08  Q         |         |         |       V |
20+ 5       0.7122      0.08  Q         |         |         |       V |
20+10       0.7128      0.09  Q         |         |         |       V |
20+15       0.7135      0.10  Q         |         |         |       V |
20+20       0.7142      0.10  Q         |         |         |       V |
20+25       0.7149      0.10  Q         |         |         |       V |
20+30       0.7156      0.10  Q         |         |         |       V |
20+35       0.7163      0.11  Q         |         |         |       V |
20+40       0.7170      0.11  Q         |         |         |       V |
20+45       0.7178      0.11  Q         |         |         |       V |
20+50       0.7185      0.10  Q         |         |         |       V |
20+55       0.7191      0.09  Q         |         |         |       V |
21+ 0       0.7197      0.08  Q         |         |         |       V |
21+ 5       0.7202      0.08  Q         |         |         |       V |
21+10       0.7208      0.09  Q         |         |         |       V |
21+15       0.7215      0.10  Q         |         |         |       V |
21+20       0.7222      0.10  Q         |         |         |        V|
21+25       0.7228      0.09  Q         |         |         |        V|
21+30       0.7233      0.08  Q         |         |         |        V|
21+35       0.7239      0.08  Q         |         |         |        V|
21+40       0.7245      0.09  Q         |         |         |        V|
21+45       0.7252      0.10  Q         |         |         |        V|
21+50       0.7258      0.10  Q         |         |         |        V|
21+55       0.7265      0.09  Q         |         |         |        V|
22+ 0       0.7270      0.08  Q         |         |         |        V|
22+ 5       0.7275      0.08  Q         |         |         |        V|
22+10       0.7281      0.09  Q         |         |         |        V|
22+15       0.7288      0.10  Q         |         |         |        V|
22+20       0.7295      0.10  Q         |         |         |        V|
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   22+25       0.7301      0.09  Q         |         |         |       V|
   22+30       0.7307      0.08  Q         |         |         |       V|
   22+35       0.7312      0.08  Q         |         |         |       V|
   22+40       0.7317      0.07  Q         |         |         |       V|
   22+45       0.7322      0.07  Q         |         |         |       V|
   22+50       0.7327      0.07  Q         |         |         |       V|
   22+55       0.7332      0.07  Q         |         |         |       V|
   23+ 0       0.7337      0.07  Q         |         |         |       V|
   23+ 5       0.7341      0.07  Q         |         |         |       V|
   23+10       0.7346      0.07  Q         |         |         |       V|
   23+15       0.7351      0.07  Q         |         |         |       V|
   23+20       0.7356      0.07  Q         |         |         |       V|
   23+25       0.7361      0.07  Q         |         |         |       V|
   23+30       0.7366      0.07  Q         |         |         |       V|
   23+35       0.7371      0.07  Q         |         |         |       V|
   23+40       0.7376      0.07  Q         |         |         |       V|
   23+45       0.7380      0.07  Q         |         |         |       V|
   23+50       0.7385      0.07  Q         |         |         |       V|
   23+55       0.7390      0.07  Q         |         |         |       V|
   24+ 0       0.7395      0.07  Q         |         |         |       V|
   24+ 5       0.7400      0.07  Q         |         |         |       V|
   24+10       0.7403      0.04  Q         |         |         |       V|
   24+15       0.7404      0.02  Q         |         |         |       V|
   24+20       0.7405      0.01  Q         |         |         |       V|
   24+25       0.7405      0.01  Q         |         |         |       V|
   24+30       0.7405      0.00  Q         |         |         |       V|
   24+35       0.7406      0.00  Q         |         |         |       V|
   24+40       0.7406      0.00  Q         |         |         |       V|
   24+45       0.7406      0.00  Q         |         |         |       V|
   24+50       0.7406      0.00  Q         |         |         |       V|
   24+55       0.7406      0.00  Q         |         |         |        V
-----------------------------------------------------------------------
```

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
           Study date  04/20/15 File: 201501PRE2410.out


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------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6304

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
2015-01_UCR HIGHLANDER HALL DEMO
EXISTING CONDITIONS UNIT HYDROGRAPH
201501PRE
04/20/2015 DMB
--------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =
0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.137 Hr.
Lag time =     8.24 Min.
25% of lag time =     2.06 Min.
40% of lag time =     3.30 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              2.30                  11.59

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        5.04              5.00                  25.20

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =    2.300(In)
Area Averaged 100-Year Rainfall =    5.000(In)
```

Point rain (area averaged) = 3.411(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.411(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.836

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.836	0.060	1.000	0.060
					Sum (F) =	0.060

Area averaged mean soil loss (F) (In/Hr) = 0.060
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.231

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Loss rate(In./Hr) Low	Effective (In/Hr)
1	0.08	0.07	0.027	(0.107)	0.006	0.021
2	0.17	0.07	0.027	(0.107)	0.006	0.021
3	0.25	0.07	0.027	(0.106)	0.006	0.021
4	0.33	0.10	0.041	(0.106)	0.009	0.031
5	0.42	0.10	0.041	(0.105)	0.009	0.031
6	0.50	0.10	0.041	(0.105)	0.009	0.031
7	0.58	0.10	0.041	(0.105)	0.009	0.031

8	0.67	0.10	0.041	(0.104)	0.009	0.031
9	0.75	0.10	0.041	(0.104)	0.009	0.031
10	0.83	0.13	0.055	(0.103)	0.013	0.042
11	0.92	0.13	0.055	(0.103)	0.013	0.042
12	1.00	0.13	0.055	(0.103)	0.013	0.042
13	1.08	0.10	0.041	(0.102)	0.009	0.031
14	1.17	0.10	0.041	(0.102)	0.009	0.031
15	1.25	0.10	0.041	(0.101)	0.009	0.031
16	1.33	0.10	0.041	(0.101)	0.009	0.031
17	1.42	0.10	0.041	(0.101)	0.009	0.031
18	1.50	0.10	0.041	(0.100)	0.009	0.031
19	1.58	0.10	0.041	(0.100)	0.009	0.031
20	1.67	0.10	0.041	(0.099)	0.009	0.031
21	1.75	0.10	0.041	(0.099)	0.009	0.031
22	1.83	0.13	0.055	(0.099)	0.013	0.042
23	1.92	0.13	0.055	(0.098)	0.013	0.042
24	2.00	0.13	0.055	(0.098)	0.013	0.042
25	2.08	0.13	0.055	(0.097)	0.013	0.042
26	2.17	0.13	0.055	(0.097)	0.013	0.042
27	2.25	0.13	0.055	(0.097)	0.013	0.042
28	2.33	0.13	0.055	(0.096)	0.013	0.042
29	2.42	0.13	0.055	(0.096)	0.013	0.042
30	2.50	0.13	0.055	(0.095)	0.013	0.042
31	2.58	0.17	0.068	(0.095)	0.016	0.052
32	2.67	0.17	0.068	(0.095)	0.016	0.052
33	2.75	0.17	0.068	(0.094)	0.016	0.052
34	2.83	0.17	0.068	(0.094)	0.016	0.052
35	2.92	0.17	0.068	(0.093)	0.016	0.052
36	3.00	0.17	0.068	(0.093)	0.016	0.052
37	3.08	0.17	0.068	(0.093)	0.016	0.052
38	3.17	0.17	0.068	(0.092)	0.016	0.052
39	3.25	0.17	0.068	(0.092)	0.016	0.052
40	3.33	0.17	0.068	(0.092)	0.016	0.052
41	3.42	0.17	0.068	(0.091)	0.016	0.052
42	3.50	0.17	0.068	(0.091)	0.016	0.052
43	3.58	0.17	0.068	(0.090)	0.016	0.052
44	3.67	0.17	0.068	(0.090)	0.016	0.052
45	3.75	0.17	0.068	(0.090)	0.016	0.052
46	3.83	0.20	0.082	(0.089)	0.019	0.063
47	3.92	0.20	0.082	(0.089)	0.019	0.063
48	4.00	0.20	0.082	(0.089)	0.019	0.063
49	4.08	0.20	0.082	(0.088)	0.019	0.063
50	4.17	0.20	0.082	(0.088)	0.019	0.063
51	4.25	0.20	0.082	(0.087)	0.019	0.063
52	4.33	0.23	0.096	(0.087)	0.022	0.073
53	4.42	0.23	0.096	(0.087)	0.022	0.073
54	4.50	0.23	0.096	(0.086)	0.022	0.073
55	4.58	0.23	0.096	(0.086)	0.022	0.073
56	4.67	0.23	0.096	(0.086)	0.022	0.073
57	4.75	0.23	0.096	(0.085)	0.022	0.073
58	4.83	0.27	0.109	(0.085)	0.025	0.084
59	4.92	0.27	0.109	(0.084)	0.025	0.084
60	5.00	0.27	0.109	(0.084)	0.025	0.084
61	5.08	0.20	0.082	(0.084)	0.019	0.063
62	5.17	0.20	0.082	(0.083)	0.019	0.063
63	5.25	0.20	0.082	(0.083)	0.019	0.063
64	5.33	0.23	0.096	(0.083)	0.022	0.073

65	5.42	0.23	0.096	(0.082)	0.022	0.073
66	5.50	0.23	0.096	(0.082)	0.022	0.073
67	5.58	0.27	0.109	(0.082)	0.025	0.084
68	5.67	0.27	0.109	(0.081)	0.025	0.084
69	5.75	0.27	0.109	(0.081)	0.025	0.084
70	5.83	0.27	0.109	(0.080)	0.025	0.084
71	5.92	0.27	0.109	(0.080)	0.025	0.084
72	6.00	0.27	0.109	(0.080)	0.025	0.084
73	6.08	0.30	0.123	(0.079)	0.028	0.094
74	6.17	0.30	0.123	(0.079)	0.028	0.094
75	6.25	0.30	0.123	(0.079)	0.028	0.094
76	6.33	0.30	0.123	(0.078)	0.028	0.094
77	6.42	0.30	0.123	(0.078)	0.028	0.094
78	6.50	0.30	0.123	(0.078)	0.028	0.094
79	6.58	0.33	0.136	(0.077)	0.032	0.105
80	6.67	0.33	0.136	(0.077)	0.032	0.105
81	6.75	0.33	0.136	(0.077)	0.032	0.105
82	6.83	0.33	0.136	(0.076)	0.032	0.105
83	6.92	0.33	0.136	(0.076)	0.032	0.105
84	7.00	0.33	0.136	(0.076)	0.032	0.105
85	7.08	0.33	0.136	(0.075)	0.032	0.105
86	7.17	0.33	0.136	(0.075)	0.032	0.105
87	7.25	0.33	0.136	(0.075)	0.032	0.105
88	7.33	0.37	0.150	(0.074)	0.035	0.115
89	7.42	0.37	0.150	(0.074)	0.035	0.115
90	7.50	0.37	0.150	(0.074)	0.035	0.115
91	7.58	0.40	0.164	(0.073)	0.038	0.126
92	7.67	0.40	0.164	(0.073)	0.038	0.126
93	7.75	0.40	0.164	(0.072)	0.038	0.126
94	7.83	0.43	0.177	(0.072)	0.041	0.136
95	7.92	0.43	0.177	(0.072)	0.041	0.136
96	8.00	0.43	0.177	(0.071)	0.041	0.136
97	8.08	0.50	0.205	(0.071)	0.047	0.157
98	8.17	0.50	0.205	(0.071)	0.047	0.157
99	8.25	0.50	0.205	(0.071)	0.047	0.157
100	8.33	0.50	0.205	(0.070)	0.047	0.157
101	8.42	0.50	0.205	(0.070)	0.047	0.157
102	8.50	0.50	0.205	(0.070)	0.047	0.157
103	8.58	0.53	0.218	(0.069)	0.050	0.168
104	8.67	0.53	0.218	(0.069)	0.050	0.168
105	8.75	0.53	0.218	(0.069)	0.050	0.168
106	8.83	0.57	0.232	(0.068)	0.054	0.178
107	8.92	0.57	0.232	(0.068)	0.054	0.178
108	9.00	0.57	0.232	(0.068)	0.054	0.178
109	9.08	0.63	0.259	(0.067)	0.060	0.199
110	9.17	0.63	0.259	(0.067)	0.060	0.199
111	9.25	0.63	0.259	(0.067)	0.060	0.199
112	9.33	0.67	0.273	(0.066)	0.063	0.210
113	9.42	0.67	0.273	(0.066)	0.063	0.210
114	9.50	0.67	0.273	(0.066)	0.063	0.210
115	9.58	0.70	0.287	0.065	(0.066)	0.221
116	9.67	0.70	0.287	0.065	(0.066)	0.221
117	9.75	0.70	0.287	0.065	(0.066)	0.222
118	9.83	0.73	0.300	0.064	(0.069)	0.236
119	9.92	0.73	0.300	0.064	(0.069)	0.236
120	10.00	0.73	0.300	0.064	(0.069)	0.236
121	10.08	0.50	0.205	(0.063)	0.047	0.157

122	10.17	0.50	0.205	(0.063)	0.047	0.157
123	10.25	0.50	0.205	(0.063)	0.047	0.157
124	10.33	0.50	0.205	(0.063)	0.047	0.157
125	10.42	0.50	0.205	(0.062)	0.047	0.157
126	10.50	0.50	0.205	(0.062)	0.047	0.157
127	10.58	0.67	0.273	0.062	(0.063)	0.211
128	10.67	0.67	0.273	0.061	(0.063)	0.212
129	10.75	0.67	0.273	0.061	(0.063)	0.212
130	10.83	0.67	0.273	0.061	(0.063)	0.212
131	10.92	0.67	0.273	0.060	(0.063)	0.212
132	11.00	0.67	0.273	0.060	(0.063)	0.213
133	11.08	0.63	0.259	0.060	(0.060)	0.199
134	11.17	0.63	0.259	0.060	(0.060)	0.200
135	11.25	0.63	0.259	0.059	(0.060)	0.200
136	11.33	0.63	0.259	0.059	(0.060)	0.200
137	11.42	0.63	0.259	0.059	(0.060)	0.201
138	11.50	0.63	0.259	0.058	(0.060)	0.201
139	11.58	0.57	0.232	(0.058)	0.054	0.178
140	11.67	0.57	0.232	(0.058)	0.054	0.178
141	11.75	0.57	0.232	(0.058)	0.054	0.178
142	11.83	0.60	0.246	(0.057)	0.057	0.189
143	11.92	0.60	0.246	(0.057)	0.057	0.189
144	12.00	0.60	0.246	0.057	(0.057)	0.189
145	12.08	0.83	0.341	0.056	(0.079)	0.285
146	12.17	0.83	0.341	0.056	(0.079)	0.285
147	12.25	0.83	0.341	0.056	(0.079)	0.285
148	12.33	0.87	0.355	0.056	(0.082)	0.299
149	12.42	0.87	0.355	0.055	(0.082)	0.299
150	12.50	0.87	0.355	0.055	(0.082)	0.300
151	12.58	0.93	0.382	0.055	(0.088)	0.327
152	12.67	0.93	0.382	0.054	(0.088)	0.328
153	12.75	0.93	0.382	0.054	(0.088)	0.328
154	12.83	0.97	0.396	0.054	(0.091)	0.342
155	12.92	0.97	0.396	0.054	(0.091)	0.342
156	13.00	0.97	0.396	0.053	(0.091)	0.342
157	13.08	1.13	0.464	0.053	(0.107)	0.411
158	13.17	1.13	0.464	0.053	(0.107)	0.411
159	13.25	1.13	0.464	0.053	(0.107)	0.411
160	13.33	1.13	0.464	0.052	(0.107)	0.412
161	13.42	1.13	0.464	0.052	(0.107)	0.412
162	13.50	1.13	0.464	0.052	(0.107)	0.412
163	13.58	0.77	0.314	0.051	(0.073)	0.262
164	13.67	0.77	0.314	0.051	(0.073)	0.263
165	13.75	0.77	0.314	0.051	(0.073)	0.263
166	13.83	0.77	0.314	0.051	(0.073)	0.263
167	13.92	0.77	0.314	0.050	(0.073)	0.263
168	14.00	0.77	0.314	0.050	(0.073)	0.264
169	14.08	0.90	0.368	0.050	(0.085)	0.318
170	14.17	0.90	0.368	0.050	(0.085)	0.319
171	14.25	0.90	0.368	0.049	(0.085)	0.319
172	14.33	0.87	0.355	0.049	(0.082)	0.306
173	14.42	0.87	0.355	0.049	(0.082)	0.306
174	14.50	0.87	0.355	0.049	(0.082)	0.306
175	14.58	0.87	0.355	0.048	(0.082)	0.306
176	14.67	0.87	0.355	0.048	(0.082)	0.307
177	14.75	0.87	0.355	0.048	(0.082)	0.307
178	14.83	0.83	0.341	0.048	(0.079)	0.293

179	14.92	0.83	0.341	0.047	(0.079)	0.294
180	15.00	0.83	0.341	0.047	(0.079)	0.294
181	15.08	0.80	0.327	0.047	(0.076)	0.280
182	15.17	0.80	0.327	0.047	(0.076)	0.281
183	15.25	0.80	0.327	0.046	(0.076)	0.281
184	15.33	0.77	0.314	0.046	(0.073)	0.268
185	15.42	0.77	0.314	0.046	(0.073)	0.268
186	15.50	0.77	0.314	0.046	(0.073)	0.268
187	15.58	0.63	0.259	0.046	(0.060)	0.214
188	15.67	0.63	0.259	0.045	(0.060)	0.214
189	15.75	0.63	0.259	0.045	(0.060)	0.214
190	15.83	0.63	0.259	0.045	(0.060)	0.214
191	15.92	0.63	0.259	0.045	(0.060)	0.215
192	16.00	0.63	0.259	0.044	(0.060)	0.215
193	16.08	0.13	0.055	(0.044)	0.013	0.042
194	16.17	0.13	0.055	(0.044)	0.013	0.042
195	16.25	0.13	0.055	(0.044)	0.013	0.042
196	16.33	0.13	0.055	(0.043)	0.013	0.042
197	16.42	0.13	0.055	(0.043)	0.013	0.042
198	16.50	0.13	0.055	(0.043)	0.013	0.042
199	16.58	0.10	0.041	(0.043)	0.009	0.031
200	16.67	0.10	0.041	(0.043)	0.009	0.031
201	16.75	0.10	0.041	(0.042)	0.009	0.031
202	16.83	0.10	0.041	(0.042)	0.009	0.031
203	16.92	0.10	0.041	(0.042)	0.009	0.031
204	17.00	0.10	0.041	(0.042)	0.009	0.031
205	17.08	0.17	0.068	(0.042)	0.016	0.052
206	17.17	0.17	0.068	(0.041)	0.016	0.052
207	17.25	0.17	0.068	(0.041)	0.016	0.052
208	17.33	0.17	0.068	(0.041)	0.016	0.052
209	17.42	0.17	0.068	(0.041)	0.016	0.052
210	17.50	0.17	0.068	(0.040)	0.016	0.052
211	17.58	0.17	0.068	(0.040)	0.016	0.052
212	17.67	0.17	0.068	(0.040)	0.016	0.052
213	17.75	0.17	0.068	(0.040)	0.016	0.052
214	17.83	0.13	0.055	(0.040)	0.013	0.042
215	17.92	0.13	0.055	(0.039)	0.013	0.042
216	18.00	0.13	0.055	(0.039)	0.013	0.042
217	18.08	0.13	0.055	(0.039)	0.013	0.042
218	18.17	0.13	0.055	(0.039)	0.013	0.042
219	18.25	0.13	0.055	(0.039)	0.013	0.042
220	18.33	0.13	0.055	(0.039)	0.013	0.042
221	18.42	0.13	0.055	(0.038)	0.013	0.042
222	18.50	0.13	0.055	(0.038)	0.013	0.042
223	18.58	0.10	0.041	(0.038)	0.009	0.031
224	18.67	0.10	0.041	(0.038)	0.009	0.031
225	18.75	0.10	0.041	(0.038)	0.009	0.031
226	18.83	0.07	0.027	(0.037)	0.006	0.021
227	18.92	0.07	0.027	(0.037)	0.006	0.021
228	19.00	0.07	0.027	(0.037)	0.006	0.021
229	19.08	0.10	0.041	(0.037)	0.009	0.031
230	19.17	0.10	0.041	(0.037)	0.009	0.031
231	19.25	0.10	0.041	(0.037)	0.009	0.031
232	19.33	0.13	0.055	(0.036)	0.013	0.042
233	19.42	0.13	0.055	(0.036)	0.013	0.042
234	19.50	0.13	0.055	(0.036)	0.013	0.042
235	19.58	0.10	0.041	(0.036)	0.009	0.031

236	19.67	0.10	0.041	(0.036)	0.009	0.031
237	19.75	0.10	0.041	(0.036)	0.009	0.031
238	19.83	0.07	0.027	(0.035)	0.006	0.021
239	19.92	0.07	0.027	(0.035)	0.006	0.021
240	20.00	0.07	0.027	(0.035)	0.006	0.021
241	20.08	0.10	0.041	(0.035)	0.009	0.031
242	20.17	0.10	0.041	(0.035)	0.009	0.031
243	20.25	0.10	0.041	(0.035)	0.009	0.031
244	20.33	0.10	0.041	(0.034)	0.009	0.031
245	20.42	0.10	0.041	(0.034)	0.009	0.031
246	20.50	0.10	0.041	(0.034)	0.009	0.031
247	20.58	0.10	0.041	(0.034)	0.009	0.031
248	20.67	0.10	0.041	(0.034)	0.009	0.031
249	20.75	0.10	0.041	(0.034)	0.009	0.031
250	20.83	0.07	0.027	(0.034)	0.006	0.021
251	20.92	0.07	0.027	(0.033)	0.006	0.021
252	21.00	0.07	0.027	(0.033)	0.006	0.021
253	21.08	0.10	0.041	(0.033)	0.009	0.031
254	21.17	0.10	0.041	(0.033)	0.009	0.031
255	21.25	0.10	0.041	(0.033)	0.009	0.031
256	21.33	0.07	0.027	(0.033)	0.006	0.021
257	21.42	0.07	0.027	(0.033)	0.006	0.021
258	21.50	0.07	0.027	(0.033)	0.006	0.021
259	21.58	0.10	0.041	(0.032)	0.009	0.031
260	21.67	0.10	0.041	(0.032)	0.009	0.031
261	21.75	0.10	0.041	(0.032)	0.009	0.031
262	21.83	0.07	0.027	(0.032)	0.006	0.021
263	21.92	0.07	0.027	(0.032)	0.006	0.021
264	22.00	0.07	0.027	(0.032)	0.006	0.021
265	22.08	0.10	0.041	(0.032)	0.009	0.031
266	22.17	0.10	0.041	(0.032)	0.009	0.031
267	22.25	0.10	0.041	(0.032)	0.009	0.031
268	22.33	0.07	0.027	(0.031)	0.006	0.021
269	22.42	0.07	0.027	(0.031)	0.006	0.021
270	22.50	0.07	0.027	(0.031)	0.006	0.021
271	22.58	0.07	0.027	(0.031)	0.006	0.021
272	22.67	0.07	0.027	(0.031)	0.006	0.021
273	22.75	0.07	0.027	(0.031)	0.006	0.021
274	22.83	0.07	0.027	(0.031)	0.006	0.021
275	22.92	0.07	0.027	(0.031)	0.006	0.021
276	23.00	0.07	0.027	(0.031)	0.006	0.021
277	23.08	0.07	0.027	(0.031)	0.006	0.021
278	23.17	0.07	0.027	(0.031)	0.006	0.021
279	23.25	0.07	0.027	(0.031)	0.006	0.021
280	23.33	0.07	0.027	(0.031)	0.006	0.021
281	23.42	0.07	0.027	(0.030)	0.006	0.021
282	23.50	0.07	0.027	(0.030)	0.006	0.021
283	23.58	0.07	0.027	(0.030)	0.006	0.021
284	23.67	0.07	0.027	(0.030)	0.006	0.021
285	23.75	0.07	0.027	(0.030)	0.006	0.021
286	23.83	0.07	0.027	(0.030)	0.006	0.021
287	23.92	0.07	0.027	(0.030)	0.006	0.021
288	24.00	0.07	0.027	(0.030)	0.006	0.021

(Loss Rate Not Used)

Sum = 100.0 Sum = 33.0

Flood volume = Effective rainfall 2.75(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)

```
   Total soil loss =      0.66(In)
   Total soil loss =     0.278(Ac.Ft)
   Total rainfall =      3.41(In)
   Flood volume =       50288.8 Cubic Feet
   Total soil loss =       12111.8 Cubic Feet
   --------------------------------------------------------------------
    Peak flow rate of this hydrograph =      2.075(CFS)
   --------------------------------------------------------------------
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       24 - H O U R   S T O R M
                  R u n o f f     H y d r o g r a p h
   --------------------------------------------------------------------
               Hydrograph in   5   Minute intervals ((CFS))

   --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q        |         |         |         |
  0+10       0.0003      0.04  Q        |         |         |         |
  0+15       0.0008      0.08  Q        |         |         |         |
  0+20       0.0015      0.09  Q        |         |         |         |
  0+25       0.0023      0.12  Q        |         |         |         |
  0+30       0.0033      0.14  Q        |         |         |         |
  0+35       0.0043      0.15  Q        |         |         |         |
  0+40       0.0053      0.15  Q        |         |         |         |
  0+45       0.0064      0.16  Q        |         |         |         |
  0+50       0.0075      0.16  Q        |         |         |         |
  0+55       0.0088      0.18  Q        |         |         |         |
  1+ 0       0.0101      0.20  Q        |         |         |         |
  1+ 5       0.0115      0.20  Q        |         |         |         |
  1+10       0.0128      0.19  Q        |         |         |         |
  1+15       0.0140      0.17  Q        |         |         |         |
  1+20       0.0151      0.17  Q        |         |         |         |
  1+25       0.0163      0.16  Q        |         |         |         |
  1+30       0.0174      0.16  Q        |         |         |         |
  1+35       0.0185      0.16  Q        |         |         |         |
  1+40       0.0196      0.16  Q        |         |         |         |
  1+45       0.0207      0.16  Q        |         |         |         |
  1+50       0.0218      0.16  Q        |         |         |         |
  1+55       0.0231      0.18  Q        |         |         |         |
  2+ 0       0.0244      0.20  Q        |         |         |         |
  2+ 5       0.0258      0.20  Q        |         |         |         |
  2+10       0.0273      0.21  Q        |         |         |         |
  2+15       0.0287      0.21  Q        |         |         |         |
  2+20       0.0302      0.21  QV       |         |         |         |
  2+25       0.0317      0.21  QV       |         |         |         |
  2+30       0.0331      0.21  QV       |         |         |         |
  2+35       0.0346      0.22  QV       |         |         |         |
  2+40       0.0362      0.23  QV       |         |         |         |
  2+45       0.0380      0.25  |Q       |         |         |         |
  2+50       0.0397      0.26  |Q       |         |         |         |
  2+55       0.0415      0.26  |Q       |         |         |         |
  3+ 0       0.0433      0.26  |Q       |         |         |         |
  3+ 5       0.0452      0.27  |Q       |         |         |         |
  3+10       0.0470      0.27  |Q       |         |         |         |
  3+15       0.0488      0.27  |Q       |         |         |         |
  3+20       0.0507      0.27  |Q       |         |         |         |
```

```
3+25       0.0525      0.27  |Q        |         |         |         |
3+30       0.0543      0.27  |Q        |         |         |         |
3+35       0.0562      0.27  |Q        |         |         |         |
3+40       0.0580      0.27  |QV       |         |         |         |
3+45       0.0598      0.27  |QV       |         |         |         |
3+50       0.0617      0.27  |QV       |         |         |         |
3+55       0.0637      0.29  |QV       |         |         |         |
4+ 0       0.0658      0.30  |QV       |         |         |         |
4+ 5       0.0679      0.31  |QV       |         |         |         |
4+10       0.0701      0.32  |QV       |         |         |         |
4+15       0.0723      0.32  |QV       |         |         |         |
4+20       0.0745      0.32  |QV       |         |         |         |
4+25       0.0768      0.34  |QV       |         |         |         |
4+30       0.0793      0.36  |QV       |         |         |         |
4+35       0.0818      0.36  |QV       |         |         |         |
4+40       0.0843      0.37  |QV       |         |         |         |
4+45       0.0869      0.37  |Q V      |         |         |         |
4+50       0.0895      0.37  |Q V      |         |         |         |
4+55       0.0922      0.39  |Q V      |         |         |         |
5+ 0       0.0950      0.41  |Q V      |         |         |         |
5+ 5       0.0978      0.41  |Q V      |         |         |         |
5+10       0.1005      0.38  |Q V      |         |         |         |
5+15       0.1029      0.35  |Q V      |         |         |         |
5+20       0.1052      0.34  |Q V      |         |         |         |
5+25       0.1076      0.35  |Q V      |         |         |         |
5+30       0.1101      0.36  |Q V      |         |         |         |
5+35       0.1126      0.37  |Q V      |         |         |         |
5+40       0.1153      0.39  |Q V      |         |         |         |
5+45       0.1181      0.41  |Q  V     |         |         |         |
5+50       0.1210      0.42  |Q  V     |         |         |         |
5+55       0.1239      0.42  |Q  V     |         |         |         |
6+ 0       0.1268      0.42  |Q  V     |         |         |         |
6+ 5       0.1298      0.43  |Q  V     |         |         |         |
6+10       0.1329      0.45  |Q  V     |         |         |         |
6+15       0.1361      0.46  |Q  V     |         |         |         |
6+20       0.1393      0.47  |Q  V     |         |         |         |
6+25       0.1426      0.47  |Q  V     |         |         |         |
6+30       0.1459      0.48  |Q   V    |         |         |         |
6+35       0.1492      0.48  |Q   V    |         |         |         |
6+40       0.1526      0.50  |Q   V    |         |         |         |
6+45       0.1562      0.52  | Q  V    |         |         |         |
6+50       0.1598      0.52  | Q  V    |         |         |         |
6+55       0.1634      0.53  | Q  V    |         |         |         |
7+ 0       0.1671      0.53  | Q  V    |         |         |         |
7+ 5       0.1707      0.53  | Q  V    |         |         |         |
7+10       0.1744      0.53  | Q   V   |         |         |         |
7+15       0.1781      0.53  | Q   V   |         |         |         |
7+20       0.1818      0.54  | Q   V   |         |         |         |
7+25       0.1856      0.55  | Q   V   |         |         |         |
7+30       0.1895      0.57  | Q   V   |         |         |         |
7+35       0.1935      0.58  | Q   V   |         |         |         |
7+40       0.1977      0.60  | Q   V   |         |         |         |
7+45       0.2019      0.62  | Q   V   |         |         |         |
7+50       0.2063      0.63  | Q    V  |         |         |         |
7+55       0.2108      0.65  | Q    V  |         |         |         |
8+ 0       0.2155      0.67  | Q    V  |         |         |         |
8+ 5       0.2202      0.69  | Q    V  |         |         |         |
```

```
 8+10       0.2252      0.73   | Q    V  |         |         |         |
 8+15       0.2305      0.77   |  Q   V  |         |         |         |
 8+20       0.2359      0.78   |  Q    V |         |         |         |
 8+25       0.2413      0.79   |  Q    V |         |         |         |
 8+30       0.2468      0.79   |  Q    V |         |         |         |
 8+35       0.2523      0.80   |  Q    V |         |         |         |
 8+40       0.2579      0.82   |  Q    V |         |         |         |
 8+45       0.2637      0.84   |  Q     V|         |         |         |
 8+50       0.2695      0.85   |  Q     V|         |         |         |
 8+55       0.2755      0.87   |  Q     V|         |         |         |
 9+ 0       0.2816      0.89   |  Q     V|         |         |         |
 9+ 5       0.2878      0.90   |  Q     V|         |         |         |
 9+10       0.2943      0.94   |  Q      V         |         |         |
 9+15       0.3011      0.98   |  Q      V         |         |         |
 9+20       0.3079      1.00   |  Q      V         |         |         |
 9+25       0.3150      1.02   |   Q     V         |         |         |
 9+30       0.3222      1.05   |   Q     |V        |         |         |
 9+35       0.3295      1.06   |   Q     |V        |         |         |
 9+40       0.3369      1.08   |   Q     |V        |         |         |
 9+45       0.3445      1.10   |   Q     |V        |         |         |
 9+50       0.3522      1.12   |   Q     | V       |         |         |
 9+55       0.3601      1.15   |   Q     | V       |         |         |
10+ 0       0.3682      1.18   |   Q     | V       |         |         |
10+ 5       0.3762      1.16   |   Q     |  V      |         |         |
10+10       0.3834      1.04   |   Q     |  V      |         |         |
10+15       0.3896      0.91   |  Q      |  V      |         |         |
10+20       0.3956      0.86   |  Q      |  V      |         |         |
10+25       0.4013      0.83   |  Q      |  V      |         |         |
10+30       0.4070      0.82   |  Q      |   V     |         |         |
10+35       0.4126      0.82   |  Q      |   V     |         |         |
10+40       0.4189      0.91   |  Q      |   V     |         |         |
10+45       0.4258      1.00   |   Q     |   V     |         |         |
10+50       0.4329      1.03   |   Q     |   V     |         |         |
10+55       0.4402      1.05   |   Q     |    V    |         |         |
11+ 0       0.4475      1.07   |   Q     |    V    |         |         |
11+ 5       0.4548      1.07   |   Q     |    V    |         |         |
11+10       0.4621      1.05   |   Q     |     V   |         |         |
11+15       0.4692      1.03   |   Q     |     V   |         |         |
11+20       0.4762      1.02   |   Q     |     V   |         |         |
11+25       0.4833      1.02   |   Q     |     V   |         |         |
11+30       0.4903      1.02   |   Q     |     V   |         |         |
11+35       0.4973      1.01   |   Q     |      V  |         |         |
11+40       0.5040      0.98   |  Q      |      V  |         |         |
11+45       0.5105      0.94   |  Q      |      V  |         |         |
11+50       0.5169      0.93   |  Q      |      V  |         |         |
11+55       0.5233      0.94   |  Q      |       V |         |         |
12+ 0       0.5298      0.95   |  Q      |       V |         |         |
12+ 5       0.5366      0.98   |  Q      |       V |         |         |
12+10       0.5445      1.14   |   Q     |       V |         |         |
12+15       0.5535      1.31   |    Q    |        V|         |         |
12+20       0.5629      1.37   |    Q    |        V|         |         |
12+25       0.5728      1.43   |    Q    |        V|         |         |
12+30       0.5830      1.48   |    Q    |         V         |         |
12+35       0.5934      1.51   |     Q   |         V         |         |
12+40       0.6041      1.56   |     Q   |         V         |         |
12+45       0.6152      1.62   |     Q   |         |V        |         |
12+50       0.6266      1.64   |     Q   |         |V        |         |
```

```
12+55       0.6381      1.68  |     Q   |         | V       |         |
13+ 0       0.6499      1.71  |     Q   |         | V       |         |
13+ 5       0.6619      1.74  |     Q   |         | V       |         |
13+10       0.6747      1.86  |      Q  |         |  V      |         |
13+15       0.6884      1.98  |      Q  |         |  V      |         |
13+20       0.7024      2.03  |       Q |         |   V     |         |
13+25       0.7166      2.06  |       Q |         |   V     |         |
13+30       0.7308      2.07  |       Q |         |    V    |         |
13+35       0.7449      2.04  |       Q |         |    V    |         |
13+40       0.7573      1.80  |      Q  |         |     V   |         |
13+45       0.7679      1.55  |     Q   |         |     V   |         |
13+50       0.7779      1.45  |    Q    |         |     V   |         |
13+55       0.7876      1.40  |    Q    |         |      V  |         |
14+ 0       0.7971      1.37  |    Q    |         |      V  |         |
14+ 5       0.8065      1.37  |    Q    |         |      V  |         |
14+10       0.8165      1.46  |    Q    |         |       V |         |
14+15       0.8272      1.55  |     Q   |         |       V |         |
14+20       0.8380      1.57  |     Q   |         |        V|         |
14+25       0.8488      1.57  |     Q   |         |        V|         |
14+30       0.8596      1.56  |     Q   |         |        V|         |
14+35       0.8703      1.56  |     Q   |         |         V         |
14+40       0.8810      1.56  |     Q   |         |         V         |
14+45       0.8918      1.56  |     Q   |         |         V         |
14+50       0.9025      1.55  |     Q   |         |         |V        |
14+55       0.9130      1.53  |     Q   |         |         |V        |
15+ 0       0.9234      1.51  |     Q   |         |         |V        |
15+ 5       0.9338      1.50  |    Q    |         |         | V       |
15+10       0.9439      1.47  |    Q    |         |         | V       |
15+15       0.9539      1.45  |    Q    |         |         |  V      |
15+20       0.9638      1.44  |    Q    |         |         |  V      |
15+25       0.9735      1.41  |    Q    |         |         |  V      |
15+30       0.9830      1.38  |    Q    |         |         |   V     |
15+35       0.9923      1.36  |    Q    |         |         |   V     |
15+40       1.0010      1.26  |    Q    |         |         |   V     |
15+45       1.0091      1.17  |   Q     |         |         |   V     |
15+50       1.0169      1.13  |   Q     |         |         |    V    |
15+55       1.0246      1.11  |   Q     |         |         |    V    |
16+ 0       1.0322      1.10  |   Q     |         |         |    V    |
16+ 5       1.0394      1.05  |   Q     |         |         |     V   |
16+10       1.0446      0.76  |  Q      |         |         |     V   |
16+15       1.0478      0.46  |Q        |         |         |     V   |
16+20       1.0503      0.35  |Q        |         |         |     V   |
16+25       1.0523      0.29  |Q        |         |         |     V   |
16+30       1.0540      0.25  |Q        |         |         |     V   |
16+35       1.0556      0.23  Q         |         |         |     V   |
16+40       1.0570      0.21  Q         |         |         |     V   |
16+45       1.0583      0.18  Q         |         |         |     V   |
16+50       1.0595      0.17  Q         |         |         |     V   |
16+55       1.0606      0.17  Q         |         |         |     V   |
17+ 0       1.0617      0.16  Q         |         |         |     V   |
17+ 5       1.0629      0.17  Q         |         |         |     V   |
17+10       1.0643      0.20  Q         |         |         |     V   |
17+15       1.0659      0.24  Q         |         |         |     V   |
17+20       1.0676      0.25  Q         |         |         |     V   |
17+25       1.0694      0.26  |Q        |         |         |      V  |
17+30       1.0712      0.26  |Q        |         |         |      V  |
17+35       1.0730      0.26  |Q        |         |         |      V  |
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 17+40         1.0748       0.26  |Q         |         |         |      V   |
 17+45         1.0767       0.27  |Q         |         |         |      V   |
 17+50         1.0785       0.26  |Q         |         |         |      V   |
 17+55         1.0802       0.25  Q          |         |         |      V   |
 18+ 0         1.0817       0.23  Q          |         |         |      V   |
 18+ 5         1.0833       0.22  Q          |         |         |      V   |
 18+10         1.0848       0.22  Q          |         |         |      V   |
 18+15         1.0863       0.22  Q          |         |         |      V   |
 18+20         1.0877       0.21  Q          |         |         |      V   |
 18+25         1.0892       0.21  Q          |         |         |      V   |
 18+30         1.0907       0.21  Q          |         |         |      V   |
 18+35         1.0921       0.21  Q          |         |         |      V   |
 18+40         1.0935       0.19  Q          |         |         |      V   |
 18+45         1.0947       0.17  Q          |         |         |      V   |
 18+50         1.0958       0.17  Q          |         |         |      V   |
 18+55         1.0968       0.14  Q          |         |         |       V  |
 19+ 0         1.0976       0.12  Q          |         |         |       V  |
 19+ 5         1.0985       0.12  Q          |         |         |       V  |
 19+10         1.0994       0.13  Q          |         |         |       V  |
 19+15         1.1004       0.15  Q          |         |         |       V  |
 19+20         1.1015       0.16  Q          |         |         |       V  |
 19+25         1.1027       0.18  Q          |         |         |       V  |
 19+30         1.1040       0.20  Q          |         |         |       V  |
 19+35         1.1054       0.20  Q          |         |         |       V  |
 19+40         1.1067       0.19  Q          |         |         |       V  |
 19+45         1.1079       0.17  Q          |         |         |       V  |
 19+50         1.1090       0.16  Q          |         |         |       V  |
 19+55         1.1100       0.14  Q          |         |         |       V  |
 20+ 0         1.1109       0.12  Q          |         |         |       V  |
 20+ 5         1.1117       0.12  Q          |         |         |       V  |
 20+10         1.1126       0.13  Q          |         |         |       V  |
 20+15         1.1136       0.15  Q          |         |         |       V  |
 20+20         1.1147       0.15  Q          |         |         |       V  |
 20+25         1.1157       0.16  Q          |         |         |       V  |
 20+30         1.1168       0.16  Q          |         |         |       V  |
 20+35         1.1179       0.16  Q          |         |         |       V  |
 20+40         1.1190       0.16  Q          |         |         |       V  |
 20+45         1.1201       0.16  Q          |         |         |       V  |
 20+50         1.1212       0.16  Q          |         |         |       V  |
 20+55         1.1222       0.14  Q          |         |         |       V  |
 21+ 0         1.1230       0.12  Q          |         |         |       V  |
 21+ 5         1.1238       0.12  Q          |         |         |       V  |
 21+10         1.1247       0.13  Q          |         |         |       V  |
 21+15         1.1257       0.15  Q          |         |         |        V|
 21+20         1.1268       0.15  Q          |         |         |        V|
 21+25         1.1277       0.14  Q          |         |         |        V|
 21+30         1.1285       0.12  Q          |         |         |        V|
 21+35         1.1293       0.12  Q          |         |         |        V|
 21+40         1.1302       0.13  Q          |         |         |        V|
 21+45         1.1312       0.15  Q          |         |         |        V|
 21+50         1.1323       0.15  Q          |         |         |        V|
 21+55         1.1332       0.14  Q          |         |         |        V|
 22+ 0         1.1340       0.12  Q          |         |         |        V|
 22+ 5         1.1348       0.12  Q          |         |         |        V|
 22+10         1.1357       0.13  Q          |         |         |        V|
 22+15         1.1367       0.15  Q          |         |         |        V|
 22+20         1.1378       0.15  Q          |         |         |        V|
```

22+25	1.1387	0.14	Q	|	|	|	V|
22+30	1.1395	0.12	Q	|	|	|	V|
22+35	1.1403	0.11	Q	|	|	|	V|
22+40	1.1411	0.11	Q	|	|	|	V|
22+45	1.1418	0.11	Q	|	|	|	V|
22+50	1.1426	0.11	Q	|	|	|	V|
22+55	1.1433	0.11	Q	|	|	|	V|
23+ 0	1.1440	0.11	Q	|	|	|	V|
23+ 5	1.1448	0.11	Q	|	|	|	V|
23+10	1.1455	0.11	Q	|	|	|	V|
23+15	1.1463	0.11	Q	|	|	|	V|
23+20	1.1470	0.11	Q	|	|	|	V|
23+25	1.1477	0.11	Q	|	|	|	V|
23+30	1.1485	0.11	Q	|	|	|	V|
23+35	1.1492	0.11	Q	|	|	|	V|
23+40	1.1499	0.11	Q	|	|	|	V|
23+45	1.1507	0.11	Q	|	|	|	V|
23+50	1.1514	0.11	Q	|	|	|	V|
23+55	1.1521	0.11	Q	|	|	|	V|
24+ 0	1.1529	0.11	Q	|	|	|	V|
24+ 5	1.1536	0.10	Q	|	|	|	V|
24+10	1.1540	0.07	Q	|	|	|	V|
24+15	1.1542	0.03	Q	|	|	|	V|
24+20	1.1543	0.02	Q	|	|	|	V|
24+25	1.1544	0.01	Q	|	|	|	V|
24+30	1.1544	0.00	Q	|	|	|	V|
24+35	1.1545	0.00	Q	|	|	|	V|
24+40	1.1545	0.00	Q	|	|	|	V|
24+45	1.1545	0.00	Q	|	|	|	V|
24+50	1.1545	0.00	Q	|	|	|	V|
24+55	1.1545	0.00	Q	|	|	|	V

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/22/15 File: 201501POST2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6304

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

2015-01_UCR HIGHLANDER HALL DEMO
POST CONSTRUCTION CONDITIONS UNIT HYDROGRAPH
201501POST
04/22/2015 DMB

Drainage Area = 5.04(Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.04(Ac.) = 0.008 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.137 Hr.
Lag time = 8.24 Min.
25% of lag time = 2.06 Min.
40% of lag time = 3.30 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	2.30	11.59

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.04	5.00	25.20

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.300(In)
Area Averaged 100-Year Rainfall = 5.000(In)

Point rain (area averaged) = 3.411(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.411(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.040	62.50	0.821

Total Area Entered = 5.04(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
62.5	80.0	0.244	0.821	0.064	1.000	0.064
					Sum (F) =	0.064

Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.243

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	60.694	5.690	0.289
2	0.167	121.389	32.349	1.643
3	0.250	182.083	33.711	1.712
4	0.333	242.777	12.272	0.623
5	0.417	303.472	7.080	0.360
6	0.500	364.166	4.248	0.216
7	0.583	424.860	2.304	0.117
8	0.667	485.555	0.888	0.045
9	0.750	546.249	0.547	0.028
10	0.833	606.943	0.423	0.021
11	0.917	667.638	0.333	0.017
12	1.000	728.332	0.156	0.008
			Sum = 100.000	Sum= 5.079

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.027	(0.113)	0.007	0.021
2	0.17	0.07	0.027	(0.113)	0.007	0.021
3	0.25	0.07	0.027	(0.112)	0.007	0.021
4	0.33	0.10	0.041	(0.112)	0.010	0.031
5	0.42	0.10	0.041	(0.111)	0.010	0.031
6	0.50	0.10	0.041	(0.111)	0.010	0.031
7	0.58	0.10	0.041	(0.110)	0.010	0.031

8	0.67	0.10	0.041	(0.110)	0.010	0.031
9	0.75	0.10	0.041	(0.109)	0.010	0.031
10	0.83	0.13	0.055	(0.109)	0.013	0.041
11	0.92	0.13	0.055	(0.109)	0.013	0.041
12	1.00	0.13	0.055	(0.108)	0.013	0.041
13	1.08	0.10	0.041	(0.108)	0.010	0.031
14	1.17	0.10	0.041	(0.107)	0.010	0.031
15	1.25	0.10	0.041	(0.107)	0.010	0.031
16	1.33	0.10	0.041	(0.106)	0.010	0.031
17	1.42	0.10	0.041	(0.106)	0.010	0.031
18	1.50	0.10	0.041	(0.106)	0.010	0.031
19	1.58	0.10	0.041	(0.105)	0.010	0.031
20	1.67	0.10	0.041	(0.105)	0.010	0.031
21	1.75	0.10	0.041	(0.104)	0.010	0.031
22	1.83	0.13	0.055	(0.104)	0.013	0.041
23	1.92	0.13	0.055	(0.104)	0.013	0.041
24	2.00	0.13	0.055	(0.103)	0.013	0.041
25	2.08	0.13	0.055	(0.103)	0.013	0.041
26	2.17	0.13	0.055	(0.102)	0.013	0.041
27	2.25	0.13	0.055	(0.102)	0.013	0.041
28	2.33	0.13	0.055	(0.101)	0.013	0.041
29	2.42	0.13	0.055	(0.101)	0.013	0.041
30	2.50	0.13	0.055	(0.101)	0.013	0.041
31	2.58	0.17	0.068	(0.100)	0.017	0.052
32	2.67	0.17	0.068	(0.100)	0.017	0.052
33	2.75	0.17	0.068	(0.099)	0.017	0.052
34	2.83	0.17	0.068	(0.099)	0.017	0.052
35	2.92	0.17	0.068	(0.099)	0.017	0.052
36	3.00	0.17	0.068	(0.098)	0.017	0.052
37	3.08	0.17	0.068	(0.098)	0.017	0.052
38	3.17	0.17	0.068	(0.097)	0.017	0.052
39	3.25	0.17	0.068	(0.097)	0.017	0.052
40	3.33	0.17	0.068	(0.097)	0.017	0.052
41	3.42	0.17	0.068	(0.096)	0.017	0.052
42	3.50	0.17	0.068	(0.096)	0.017	0.052
43	3.58	0.17	0.068	(0.095)	0.017	0.052
44	3.67	0.17	0.068	(0.095)	0.017	0.052
45	3.75	0.17	0.068	(0.095)	0.017	0.052
46	3.83	0.20	0.082	(0.094)	0.020	0.062
47	3.92	0.20	0.082	(0.094)	0.020	0.062
48	4.00	0.20	0.082	(0.093)	0.020	0.062
49	4.08	0.20	0.082	(0.093)	0.020	0.062
50	4.17	0.20	0.082	(0.093)	0.020	0.062
51	4.25	0.20	0.082	(0.092)	0.020	0.062
52	4.33	0.23	0.096	(0.092)	0.023	0.072
53	4.42	0.23	0.096	(0.091)	0.023	0.072
54	4.50	0.23	0.096	(0.091)	0.023	0.072
55	4.58	0.23	0.096	(0.091)	0.023	0.072
56	4.67	0.23	0.096	(0.090)	0.023	0.072
57	4.75	0.23	0.096	(0.090)	0.023	0.072
58	4.83	0.27	0.109	(0.089)	0.027	0.083
59	4.92	0.27	0.109	(0.089)	0.027	0.083
60	5.00	0.27	0.109	(0.089)	0.027	0.083
61	5.08	0.20	0.082	(0.088)	0.020	0.062
62	5.17	0.20	0.082	(0.088)	0.020	0.062
63	5.25	0.20	0.082	(0.087)	0.020	0.062
64	5.33	0.23	0.096	(0.087)	0.023	0.072

65	5.42	0.23	0.096	(0.087)	0.023	0.072
66	5.50	0.23	0.096	(0.086)	0.023	0.072
67	5.58	0.27	0.109	(0.086)	0.027	0.083
68	5.67	0.27	0.109	(0.086)	0.027	0.083
69	5.75	0.27	0.109	(0.085)	0.027	0.083
70	5.83	0.27	0.109	(0.085)	0.027	0.083
71	5.92	0.27	0.109	(0.084)	0.027	0.083
72	6.00	0.27	0.109	(0.084)	0.027	0.083
73	6.08	0.30	0.123	(0.084)	0.030	0.093
74	6.17	0.30	0.123	(0.083)	0.030	0.093
75	6.25	0.30	0.123	(0.083)	0.030	0.093
76	6.33	0.30	0.123	(0.083)	0.030	0.093
77	6.42	0.30	0.123	(0.082)	0.030	0.093
78	6.50	0.30	0.123	(0.082)	0.030	0.093
79	6.58	0.33	0.136	(0.081)	0.033	0.103
80	6.67	0.33	0.136	(0.081)	0.033	0.103
81	6.75	0.33	0.136	(0.081)	0.033	0.103
82	6.83	0.33	0.136	(0.080)	0.033	0.103
83	6.92	0.33	0.136	(0.080)	0.033	0.103
84	7.00	0.33	0.136	(0.080)	0.033	0.103
85	7.08	0.33	0.136	(0.079)	0.033	0.103
86	7.17	0.33	0.136	(0.079)	0.033	0.103
87	7.25	0.33	0.136	(0.079)	0.033	0.103
88	7.33	0.37	0.150	(0.078)	0.036	0.114
89	7.42	0.37	0.150	(0.078)	0.036	0.114
90	7.50	0.37	0.150	(0.078)	0.036	0.114
91	7.58	0.40	0.164	(0.077)	0.040	0.124
92	7.67	0.40	0.164	(0.077)	0.040	0.124
93	7.75	0.40	0.164	(0.076)	0.040	0.124
94	7.83	0.43	0.177	(0.076)	0.043	0.134
95	7.92	0.43	0.177	(0.076)	0.043	0.134
96	8.00	0.43	0.177	(0.075)	0.043	0.134
97	8.08	0.50	0.205	(0.075)	0.050	0.155
98	8.17	0.50	0.205	(0.075)	0.050	0.155
99	8.25	0.50	0.205	(0.074)	0.050	0.155
100	8.33	0.50	0.205	(0.074)	0.050	0.155
101	8.42	0.50	0.205	(0.074)	0.050	0.155
102	8.50	0.50	0.205	(0.073)	0.050	0.155
103	8.58	0.53	0.218	(0.073)	0.053	0.165
104	8.67	0.53	0.218	(0.073)	0.053	0.165
105	8.75	0.53	0.218	(0.072)	0.053	0.165
106	8.83	0.57	0.232	(0.072)	0.056	0.176
107	8.92	0.57	0.232	(0.072)	0.056	0.176
108	9.00	0.57	0.232	(0.071)	0.056	0.176
109	9.08	0.63	0.259	(0.071)	0.063	0.196
110	9.17	0.63	0.259	(0.071)	0.063	0.196
111	9.25	0.63	0.259	(0.070)	0.063	0.196
112	9.33	0.67	0.273	(0.070)	0.066	0.207
113	9.42	0.67	0.273	(0.070)	0.066	0.207
114	9.50	0.67	0.273	(0.069)	0.066	0.207
115	9.58	0.70	0.287	0.069	(0.070)	0.218
116	9.67	0.70	0.287	0.069	(0.070)	0.218
117	9.75	0.70	0.287	0.068	(0.070)	0.218
118	9.83	0.73	0.300	0.068	(0.073)	0.232
119	9.92	0.73	0.300	0.068	(0.073)	0.233
120	10.00	0.73	0.300	0.067	(0.073)	0.233
121	10.08	0.50	0.205	(0.067)	0.050	0.155

122	10.17	0.50	0.205	(0.067)	0.050	0.155
123	10.25	0.50	0.205	(0.066)	0.050	0.155
124	10.33	0.50	0.205	(0.066)	0.050	0.155
125	10.42	0.50	0.205	(0.066)	0.050	0.155
126	10.50	0.50	0.205	(0.065)	0.050	0.155
127	10.58	0.67	0.273	0.065	(0.066)	0.208
128	10.67	0.67	0.273	0.065	(0.066)	0.208
129	10.75	0.67	0.273	0.064	(0.066)	0.208
130	10.83	0.67	0.273	0.064	(0.066)	0.209
131	10.92	0.67	0.273	0.064	(0.066)	0.209
132	11.00	0.67	0.273	0.063	(0.066)	0.209
133	11.08	0.63	0.259	(0.063)	0.063	0.196
134	11.17	0.63	0.259	0.063	(0.063)	0.196
135	11.25	0.63	0.259	0.063	(0.063)	0.197
136	11.33	0.63	0.259	0.062	(0.063)	0.197
137	11.42	0.63	0.259	0.062	(0.063)	0.197
138	11.50	0.63	0.259	0.062	(0.063)	0.198
139	11.58	0.57	0.232	(0.061)	0.056	0.176
140	11.67	0.57	0.232	(0.061)	0.056	0.176
141	11.75	0.57	0.232	(0.061)	0.056	0.176
142	11.83	0.60	0.246	(0.060)	0.060	0.186
143	11.92	0.60	0.246	(0.060)	0.060	0.186
144	12.00	0.60	0.246	(0.060)	0.060	0.186
145	12.08	0.83	0.341	0.059	(0.083)	0.282
146	12.17	0.83	0.341	0.059	(0.083)	0.282
147	12.25	0.83	0.341	0.059	(0.083)	0.282
148	12.33	0.87	0.355	0.059	(0.086)	0.296
149	12.42	0.87	0.355	0.058	(0.086)	0.296
150	12.50	0.87	0.355	0.058	(0.086)	0.297
151	12.58	0.93	0.382	0.058	(0.093)	0.324
152	12.67	0.93	0.382	0.057	(0.093)	0.325
153	12.75	0.93	0.382	0.057	(0.093)	0.325
154	12.83	0.97	0.396	0.057	(0.096)	0.339
155	12.92	0.97	0.396	0.057	(0.096)	0.339
156	13.00	0.97	0.396	0.056	(0.096)	0.339
157	13.08	1.13	0.464	0.056	(0.113)	0.408
158	13.17	1.13	0.464	0.056	(0.113)	0.408
159	13.25	1.13	0.464	0.055	(0.113)	0.408
160	13.33	1.13	0.464	0.055	(0.113)	0.409
161	13.42	1.13	0.464	0.055	(0.113)	0.409
162	13.50	1.13	0.464	0.055	(0.113)	0.409
163	13.58	0.77	0.314	0.054	(0.076)	0.260
164	13.67	0.77	0.314	0.054	(0.076)	0.260
165	13.75	0.77	0.314	0.054	(0.076)	0.260
166	13.83	0.77	0.314	0.053	(0.076)	0.260
167	13.92	0.77	0.314	0.053	(0.076)	0.261
168	14.00	0.77	0.314	0.053	(0.076)	0.261
169	14.08	0.90	0.368	0.053	(0.090)	0.316
170	14.17	0.90	0.368	0.052	(0.090)	0.316
171	14.25	0.90	0.368	0.052	(0.090)	0.316
172	14.33	0.87	0.355	0.052	(0.086)	0.303
173	14.42	0.87	0.355	0.052	(0.086)	0.303
174	14.50	0.87	0.355	0.051	(0.086)	0.303
175	14.58	0.87	0.355	0.051	(0.086)	0.304
176	14.67	0.87	0.355	0.051	(0.086)	0.304
177	14.75	0.87	0.355	0.051	(0.086)	0.304
178	14.83	0.83	0.341	0.050	(0.083)	0.291

179	14.92	0.83	0.341	0.050	(0.083)	0.291
180	15.00	0.83	0.341	0.050	(0.083)	0.291
181	15.08	0.80	0.327	0.050	(0.080)	0.278
182	15.17	0.80	0.327	0.049	(0.080)	0.278
183	15.25	0.80	0.327	0.049	(0.080)	0.278
184	15.33	0.77	0.314	0.049	(0.076)	0.265
185	15.42	0.77	0.314	0.048	(0.076)	0.265
186	15.50	0.77	0.314	0.048	(0.076)	0.266
187	15.58	0.63	0.259	0.048	(0.063)	0.211
188	15.67	0.63	0.259	0.048	(0.063)	0.211
189	15.75	0.63	0.259	0.048	(0.063)	0.212
190	15.83	0.63	0.259	0.047	(0.063)	0.212
191	15.92	0.63	0.259	0.047	(0.063)	0.212
192	16.00	0.63	0.259	0.047	(0.063)	0.212
193	16.08	0.13	0.055	(0.047)	0.013	0.041
194	16.17	0.13	0.055	(0.046)	0.013	0.041
195	16.25	0.13	0.055	(0.046)	0.013	0.041
196	16.33	0.13	0.055	(0.046)	0.013	0.041
197	16.42	0.13	0.055	(0.046)	0.013	0.041
198	16.50	0.13	0.055	(0.045)	0.013	0.041
199	16.58	0.10	0.041	(0.045)	0.010	0.031
200	16.67	0.10	0.041	(0.045)	0.010	0.031
201	16.75	0.10	0.041	(0.045)	0.010	0.031
202	16.83	0.10	0.041	(0.044)	0.010	0.031
203	16.92	0.10	0.041	(0.044)	0.010	0.031
204	17.00	0.10	0.041	(0.044)	0.010	0.031
205	17.08	0.17	0.068	(0.044)	0.017	0.052
206	17.17	0.17	0.068	(0.044)	0.017	0.052
207	17.25	0.17	0.068	(0.043)	0.017	0.052
208	17.33	0.17	0.068	(0.043)	0.017	0.052
209	17.42	0.17	0.068	(0.043)	0.017	0.052
210	17.50	0.17	0.068	(0.043)	0.017	0.052
211	17.58	0.17	0.068	(0.042)	0.017	0.052
212	17.67	0.17	0.068	(0.042)	0.017	0.052
213	17.75	0.17	0.068	(0.042)	0.017	0.052
214	17.83	0.13	0.055	(0.042)	0.013	0.041
215	17.92	0.13	0.055	(0.042)	0.013	0.041
216	18.00	0.13	0.055	(0.041)	0.013	0.041
217	18.08	0.13	0.055	(0.041)	0.013	0.041
218	18.17	0.13	0.055	(0.041)	0.013	0.041
219	18.25	0.13	0.055	(0.041)	0.013	0.041
220	18.33	0.13	0.055	(0.041)	0.013	0.041
221	18.42	0.13	0.055	(0.040)	0.013	0.041
222	18.50	0.13	0.055	(0.040)	0.013	0.041
223	18.58	0.10	0.041	(0.040)	0.010	0.031
224	18.67	0.10	0.041	(0.040)	0.010	0.031
225	18.75	0.10	0.041	(0.040)	0.010	0.031
226	18.83	0.07	0.027	(0.039)	0.007	0.021
227	18.92	0.07	0.027	(0.039)	0.007	0.021
228	19.00	0.07	0.027	(0.039)	0.007	0.021
229	19.08	0.10	0.041	(0.039)	0.010	0.031
230	19.17	0.10	0.041	(0.039)	0.010	0.031
231	19.25	0.10	0.041	(0.039)	0.010	0.031
232	19.33	0.13	0.055	(0.038)	0.013	0.041
233	19.42	0.13	0.055	(0.038)	0.013	0.041
234	19.50	0.13	0.055	(0.038)	0.013	0.041
235	19.58	0.10	0.041	(0.038)	0.010	0.031

236	19.67	0.10	0.041	(0.038)	0.010	0.031
237	19.75	0.10	0.041	(0.037)	0.010	0.031
238	19.83	0.07	0.027	(0.037)	0.007	0.021
239	19.92	0.07	0.027	(0.037)	0.007	0.021
240	20.00	0.07	0.027	(0.037)	0.007	0.021
241	20.08	0.10	0.041	(0.037)	0.010	0.031
242	20.17	0.10	0.041	(0.037)	0.010	0.031
243	20.25	0.10	0.041	(0.037)	0.010	0.031
244	20.33	0.10	0.041	(0.036)	0.010	0.031
245	20.42	0.10	0.041	(0.036)	0.010	0.031
246	20.50	0.10	0.041	(0.036)	0.010	0.031
247	20.58	0.10	0.041	(0.036)	0.010	0.031
248	20.67	0.10	0.041	(0.036)	0.010	0.031
249	20.75	0.10	0.041	(0.036)	0.010	0.031
250	20.83	0.07	0.027	(0.035)	0.007	0.021
251	20.92	0.07	0.027	(0.035)	0.007	0.021
252	21.00	0.07	0.027	(0.035)	0.007	0.021
253	21.08	0.10	0.041	(0.035)	0.010	0.031
254	21.17	0.10	0.041	(0.035)	0.010	0.031
255	21.25	0.10	0.041	(0.035)	0.010	0.031
256	21.33	0.07	0.027	(0.035)	0.007	0.021
257	21.42	0.07	0.027	(0.034)	0.007	0.021
258	21.50	0.07	0.027	(0.034)	0.007	0.021
259	21.58	0.10	0.041	(0.034)	0.010	0.031
260	21.67	0.10	0.041	(0.034)	0.010	0.031
261	21.75	0.10	0.041	(0.034)	0.010	0.031
262	21.83	0.07	0.027	(0.034)	0.007	0.021
263	21.92	0.07	0.027	(0.034)	0.007	0.021
264	22.00	0.07	0.027	(0.034)	0.007	0.021
265	22.08	0.10	0.041	(0.034)	0.010	0.031
266	22.17	0.10	0.041	(0.033)	0.010	0.031
267	22.25	0.10	0.041	(0.033)	0.010	0.031
268	22.33	0.07	0.027	(0.033)	0.007	0.021
269	22.42	0.07	0.027	(0.033)	0.007	0.021
270	22.50	0.07	0.027	(0.033)	0.007	0.021
271	22.58	0.07	0.027	(0.033)	0.007	0.021
272	22.67	0.07	0.027	(0.033)	0.007	0.021
273	22.75	0.07	0.027	(0.033)	0.007	0.021
274	22.83	0.07	0.027	(0.033)	0.007	0.021
275	22.92	0.07	0.027	(0.033)	0.007	0.021
276	23.00	0.07	0.027	(0.032)	0.007	0.021
277	23.08	0.07	0.027	(0.032)	0.007	0.021
278	23.17	0.07	0.027	(0.032)	0.007	0.021
279	23.25	0.07	0.027	(0.032)	0.007	0.021
280	23.33	0.07	0.027	(0.032)	0.007	0.021
281	23.42	0.07	0.027	(0.032)	0.007	0.021
282	23.50	0.07	0.027	(0.032)	0.007	0.021
283	23.58	0.07	0.027	(0.032)	0.007	0.021
284	23.67	0.07	0.027	(0.032)	0.007	0.021
285	23.75	0.07	0.027	(0.032)	0.007	0.021
286	23.83	0.07	0.027	(0.032)	0.007	0.021
287	23.92	0.07	0.027	(0.032)	0.007	0.021
288	24.00	0.07	0.027	(0.032)	0.007	0.021

(Loss Rate Not Used)

Sum = 100.0 Sum = 32.6

Flood volume = Effective rainfall 2.71(In)

times area 5.0(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)

```
    Total soil loss =      0.70(In)
    Total soil loss =     0.293(Ac.Ft)
    Total rainfall =      3.41(In)
    Flood volume =       49646.1 Cubic Feet
    Total soil loss =       12754.6 Cubic Feet
    --------------------------------------------------------------------
     Peak flow rate of this hydrograph =      2.060(CFS)
    --------------------------------------------------------------------
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R   S T O R M
                   R u n o f f     H y d r o g r a p h
    --------------------------------------------------------------------
                Hydrograph in   5   Minute intervals ((CFS))

    --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.01  Q         |         |         |         |
  0+10       0.0003      0.04  Q         |         |         |         |
  0+15       0.0008      0.08  Q         |         |         |         |
  0+20       0.0015      0.09  Q         |         |         |         |
  0+25       0.0023      0.12  Q         |         |         |         |
  0+30       0.0032      0.14  Q         |         |         |         |
  0+35       0.0042      0.15  Q         |         |         |         |
  0+40       0.0053      0.15  Q         |         |         |         |
  0+45       0.0063      0.15  Q         |         |         |         |
  0+50       0.0074      0.16  Q         |         |         |         |
  0+55       0.0086      0.18  Q         |         |         |         |
  1+ 0       0.0100      0.19  Q         |         |         |         |
  1+ 5       0.0113      0.20  Q         |         |         |         |
  1+10       0.0126      0.19  Q         |         |         |         |
  1+15       0.0138      0.17  Q         |         |         |         |
  1+20       0.0149      0.16  Q         |         |         |         |
  1+25       0.0160      0.16  Q         |         |         |         |
  1+30       0.0171      0.16  Q         |         |         |         |
  1+35       0.0182      0.16  Q         |         |         |         |
  1+40       0.0193      0.16  Q         |         |         |         |
  1+45       0.0204      0.16  Q         |         |         |         |
  1+50       0.0215      0.16  Q         |         |         |         |
  1+55       0.0227      0.18  Q         |         |         |         |
  2+ 0       0.0241      0.20  Q         |         |         |         |
  2+ 5       0.0254      0.20  Q         |         |         |         |
  2+10       0.0269      0.21  Q         |         |         |         |
  2+15       0.0283      0.21  Q         |         |         |         |
  2+20       0.0297      0.21  QV        |         |         |         |
  2+25       0.0312      0.21  QV        |         |         |         |
  2+30       0.0326      0.21  QV        |         |         |         |
  2+35       0.0341      0.21  QV        |         |         |         |
  2+40       0.0357      0.23  QV        |         |         |         |
  2+45       0.0374      0.25  QV        |         |         |         |
  2+50       0.0391      0.25  |Q        |         |         |         |
  2+55       0.0409      0.26  |Q        |         |         |         |
  3+ 0       0.0427      0.26  |Q        |         |         |         |
  3+ 5       0.0445      0.26  |Q        |         |         |         |
  3+10       0.0463      0.26  |Q        |         |         |         |
  3+15       0.0481      0.26  |Q        |         |         |         |
  3+20       0.0499      0.26  |Q        |         |         |         |
```

```
3+25       0.0517      0.26  |Q         |         |         |         |
3+30       0.0535      0.26  |Q         |         |         |         |
3+35       0.0553      0.26  |Q         |         |         |         |
3+40       0.0571      0.26  |QV        |         |         |         |
3+45       0.0589      0.26  |QV        |         |         |         |
3+50       0.0607      0.27  |QV        |         |         |         |
3+55       0.0627      0.28  |QV        |         |         |         |
4+ 0       0.0648      0.30  |QV        |         |         |         |
4+ 5       0.0669      0.31  |QV        |         |         |         |
4+10       0.0690      0.31  |QV        |         |         |         |
4+15       0.0712      0.31  |QV        |         |         |         |
4+20       0.0733      0.32  |QV        |         |         |         |
4+25       0.0756      0.33  |QV        |         |         |         |
4+30       0.0781      0.35  |QV        |         |         |         |
4+35       0.0805      0.36  |QV        |         |         |         |
4+40       0.0830      0.36  |QV        |         |         |         |
4+45       0.0855      0.36  |Q V       |         |         |         |
4+50       0.0881      0.37  |Q V       |         |         |         |
4+55       0.0907      0.39  |Q V       |         |         |         |
5+ 0       0.0935      0.40  |Q V       |         |         |         |
5+ 5       0.0963      0.41  |Q V       |         |         |         |
5+10       0.0989      0.38  |Q V       |         |         |         |
5+15       0.1013      0.34  |Q V       |         |         |         |
5+20       0.1036      0.33  |Q V       |         |         |         |
5+25       0.1059      0.34  |Q V       |         |         |         |
5+30       0.1084      0.36  |Q V       |         |         |         |
5+35       0.1109      0.36  |Q V       |         |         |         |
5+40       0.1135      0.38  |Q V       |         |         |         |
5+45       0.1163      0.40  |Q  V      |         |         |         |
5+50       0.1191      0.41  |Q  V      |         |         |         |
5+55       0.1220      0.41  |Q  V      |         |         |         |
6+ 0       0.1249      0.42  |Q  V      |         |         |         |
6+ 5       0.1278      0.42  |Q  V      |         |         |         |
6+10       0.1308      0.44  |Q  V      |         |         |         |
6+15       0.1339      0.46  |Q  V      |         |         |         |
6+20       0.1371      0.46  |Q  V      |         |         |         |
6+25       0.1403      0.47  |Q  V      |         |         |         |
6+30       0.1436      0.47  |Q   V     |         |         |         |
6+35       0.1468      0.47  |Q   V     |         |         |         |
6+40       0.1502      0.49  |Q   V     |         |         |         |
6+45       0.1537      0.51  | Q  V     |         |         |         |
6+50       0.1573      0.52  | Q  V     |         |         |         |
6+55       0.1609      0.52  | Q  V     |         |         |         |
7+ 0       0.1645      0.52  | Q  V     |         |         |         |
7+ 5       0.1681      0.52  | Q  V     |         |         |         |
7+10       0.1717      0.52  | Q   V    |         |         |         |
7+15       0.1753      0.52  | Q   V    |         |         |         |
7+20       0.1789      0.53  | Q   V    |         |         |         |
7+25       0.1827      0.54  | Q   V    |         |         |         |
7+30       0.1865      0.56  | Q   V    |         |         |         |
7+35       0.1905      0.57  | Q   V    |         |         |         |
7+40       0.1946      0.59  | Q   V    |         |         |         |
7+45       0.1988      0.61  | Q   V    |         |         |         |
7+50       0.2031      0.62  | Q    V   |         |         |         |
7+55       0.2075      0.64  | Q    V   |         |         |         |
8+ 0       0.2121      0.66  | Q    V   |         |         |         |
8+ 5       0.2168      0.68  | Q    V   |         |         |         |
```

```
 8+10       0.2217      0.72  | Q    V  |         |         |         |
 8+15       0.2269      0.75  |  Q   V  |         |         |         |
 8+20       0.2322      0.77  |  Q    V |         |         |         |
 8+25       0.2375      0.78  |  Q    V |         |         |         |
 8+30       0.2429      0.78  |  Q    V |         |         |         |
 8+35       0.2483      0.79  |  Q    V |         |         |         |
 8+40       0.2539      0.81  |  Q    V |         |         |         |
 8+45       0.2596      0.82  |  Q     V|         |         |         |
 8+50       0.2653      0.83  |  Q     V|         |         |         |
 8+55       0.2712      0.85  |  Q     V|         |         |         |
 9+ 0       0.2772      0.87  |  Q     V|         |         |         |
 9+ 5       0.2833      0.89  |  Q     V|         |         |         |
 9+10       0.2897      0.93  |  Q      V         |         |         |
 9+15       0.2964      0.96  |  Q      V         |         |         |
 9+20       0.3031      0.98  |  Q      V         |         |         |
 9+25       0.3100      1.01  |   Q     V         |         |         |
 9+30       0.3171      1.03  |   Q     |V        |         |         |
 9+35       0.3243      1.04  |   Q     |V        |         |         |
 9+40       0.3316      1.06  |   Q     |V        |         |         |
 9+45       0.3391      1.09  |   Q     |V        |         |         |
 9+50       0.3467      1.10  |   Q     | V       |         |         |
 9+55       0.3545      1.13  |   Q     | V       |         |         |
10+ 0       0.3625      1.16  |   Q     | V       |         |         |
10+ 5       0.3704      1.15  |   Q     | V       |         |         |
10+10       0.3774      1.02  |   Q     |  V      |         |         |
10+15       0.3836      0.89  |  Q      |  V      |         |         |
10+20       0.3894      0.85  |  Q      |  V      |         |         |
10+25       0.3951      0.82  |  Q      |  V      |         |         |
10+30       0.4006      0.80  |  Q      |   V     |         |         |
10+35       0.4062      0.81  |  Q      |   V     |         |         |
10+40       0.4124      0.90  |  Q      |   V     |         |         |
10+45       0.4191      0.98  |  Q      |   V     |         |         |
10+50       0.4262      1.02  |   Q     |   V     |         |         |
10+55       0.4333      1.04  |   Q     |    V    |         |         |
11+ 0       0.4405      1.05  |   Q     |    V    |         |         |
11+ 5       0.4478      1.05  |   Q     |    V    |         |         |
11+10       0.4549      1.03  |   Q     |    V    |         |         |
11+15       0.4619      1.01  |   Q     |     V   |         |         |
11+20       0.4688      1.01  |   Q     |     V   |         |         |
11+25       0.4757      1.01  |   Q     |     V   |         |         |
11+30       0.4826      1.00  |   Q     |     V   |         |         |
11+35       0.4895      1.00  |  Q      |      V  |         |         |
11+40       0.4961      0.96  |  Q      |      V  |         |         |
11+45       0.5025      0.92  |  Q      |      V  |         |         |
11+50       0.5088      0.91  |  Q      |      V  |         |         |
11+55       0.5151      0.92  |  Q      |       V |         |         |
12+ 0       0.5216      0.93  |  Q      |       V |         |         |
12+ 5       0.5282      0.97  |  Q      |       V |         |         |
12+10       0.5360      1.13  |   Q     |       V |         |         |
12+15       0.5449      1.29  |    Q    |        V|         |         |
12+20       0.5542      1.36  |    Q    |        V|         |         |
12+25       0.5640      1.42  |    Q    |        V|         |         |
12+30       0.5741      1.46  |    Q    |         V         |         |
12+35       0.5843      1.49  |    Q    |         V         |         |
12+40       0.5950      1.55  |     Q   |         V         |         |
12+45       0.6060      1.60  |     Q   |         |V        |         |
12+50       0.6172      1.63  |     Q   |         |V        |         |
```

```
12+55       0.6287      1.66  |     Q   |         | V       |         |
13+ 0       0.6404      1.69  |     Q   |         | V       |         |
13+ 5       0.6523      1.73  |     Q   |         | V       |         |
13+10       0.6650      1.85  |      Q  |         |  V      |         |
13+15       0.6785      1.97  |      Q  |         |  V      |         |
13+20       0.6924      2.02  |       Q |         |   V     |         |
13+25       0.7065      2.04  |       Q |         |   V     |         |
13+30       0.7207      2.06  |       Q |         |    V    |         |
13+35       0.7347      2.03  |       Q |         |    V    |         |
13+40       0.7469      1.78  |      Q  |         |     V   |         |
13+45       0.7575      1.53  |     Q   |         |     V   |         |
13+50       0.7674      1.44  |    Q    |         |     V   |         |
13+55       0.7770      1.39  |    Q    |         |      V  |         |
14+ 0       0.7863      1.36  |    Q    |         |      V  |         |
14+ 5       0.7957      1.36  |    Q    |         |      V  |         |
14+10       0.8056      1.44  |    Q    |         |       V |         |
14+15       0.8162      1.53  |     Q   |         |       V |         |
14+20       0.8269      1.56  |     Q   |         |        V|         |
14+25       0.8376      1.56  |     Q   |         |        V|         |
14+30       0.8483      1.55  |     Q   |         |        V|         |
14+35       0.8589      1.54  |     Q   |         |         V         |
14+40       0.8696      1.54  |     Q   |         |         V         |
14+45       0.8802      1.54  |     Q   |         |         V         |
14+50       0.8908      1.54  |     Q   |         |         |V        |
14+55       0.9013      1.52  |     Q   |         |         |V        |
15+ 0       0.9116      1.50  |    Q    |         |         |V        |
15+ 5       0.9218      1.49  |    Q    |         |         | V       |
15+10       0.9319      1.46  |    Q    |         |         | V       |
15+15       0.9418      1.43  |    Q    |         |         |  V      |
15+20       0.9515      1.42  |    Q    |         |         |  V      |
15+25       0.9612      1.40  |    Q    |         |         |  V      |
15+30       0.9706      1.37  |    Q    |         |         |   V     |
15+35       0.9799      1.35  |    Q    |         |         |   V     |
15+40       0.9885      1.25  |    Q    |         |         |   V     |
15+45       0.9964      1.16  |   Q     |         |         |   V     |
15+50       1.0041      1.12  |   Q     |         |         |    V    |
15+55       1.0117      1.10  |   Q     |         |         |    V    |
16+ 0       1.0192      1.09  |   Q     |         |         |    V    |
16+ 5       1.0264      1.04  |   Q     |         |         |     V   |
16+10       1.0316      0.75  |  Q      |         |         |     V   |
16+15       1.0347      0.46  |Q        |         |         |     V   |
16+20       1.0371      0.35  |Q        |         |         |     V   |
16+25       1.0391      0.29  |Q        |         |         |     V   |
16+30       1.0408      0.25  |Q        |         |         |     V   |
16+35       1.0424      0.23  Q         |         |         |     V   |
16+40       1.0438      0.20  Q         |         |         |     V   |
16+45       1.0450      0.18  Q         |         |         |     V   |
16+50       1.0462      0.17  Q         |         |         |     V   |
16+55       1.0473      0.16  Q         |         |         |     V   |
17+ 0       1.0484      0.16  Q         |         |         |     V   |
17+ 5       1.0496      0.16  Q         |         |         |     V   |
17+10       1.0509      0.20  Q         |         |         |     V   |
17+15       1.0525      0.23  Q         |         |         |     V   |
17+20       1.0542      0.25  Q         |         |         |     V   |
17+25       1.0560      0.25  |Q        |         |         |      V  |
17+30       1.0577      0.26  |Q        |         |         |      V  |
17+35       1.0595      0.26  |Q        |         |         |      V  |
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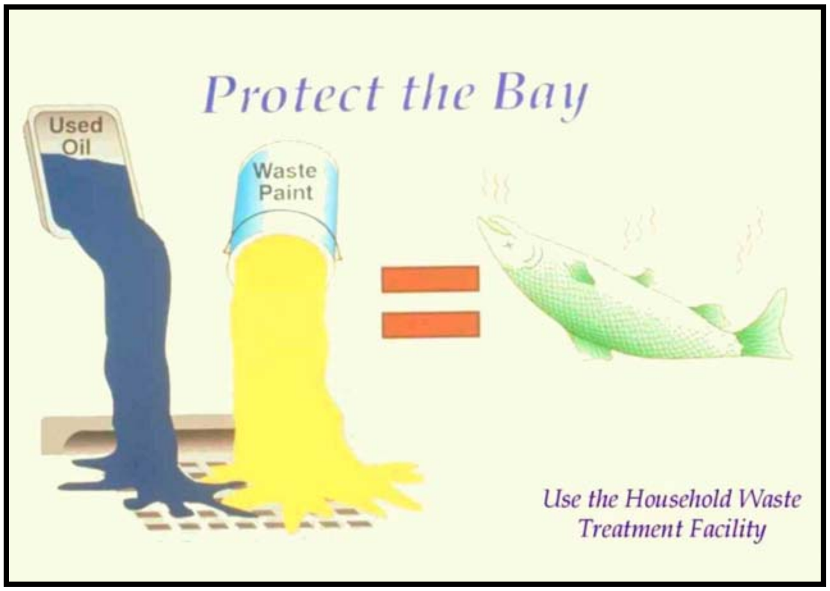
17+40	1.0613	0.26	|Q	|	|	|	V |
17+45	1.0631	0.26	|Q	|	|	|	V |
17+50	1.0649	0.26	|Q	|	|	|	V |
17+55	1.0666	0.24	Q	|	|	|	V |
18+ 0	1.0681	0.22	Q	|	|	|	V |
18+ 5	1.0696	0.22	Q	|	|	|	V |
18+10	1.0711	0.21	Q	|	|	|	V |
18+15	1.0726	0.21	Q	|	|	|	V |
18+20	1.0740	0.21	Q	|	|	|	V |
18+25	1.0755	0.21	Q	|	|	|	V |
18+30	1.0769	0.21	Q	|	|	|	V |
18+35	1.0783	0.21	Q	|	|	|	V |
18+40	1.0797	0.19	Q	|	|	|	V |
18+45	1.0808	0.17	Q	|	|	|	V |
18+50	1.0820	0.16	Q	|	|	|	V |
18+55	1.0829	0.14	Q	|	|	|	V |
19+ 0	1.0838	0.12	Q	|	|	|	V |
19+ 5	1.0846	0.12	Q	|	|	|	V |
19+10	1.0855	0.13	Q	|	|	|	V |
19+15	1.0865	0.15	Q	|	|	|	V |
19+20	1.0875	0.15	Q	|	|	|	V |
19+25	1.0887	0.17	Q	|	|	|	V |
19+30	1.0901	0.19	Q	|	|	|	V |
19+35	1.0914	0.20	Q	|	|	|	V |
19+40	1.0927	0.18	Q	|	|	|	V |
19+45	1.0939	0.17	Q	|	|	|	V |
19+50	1.0950	0.16	Q	|	|	|	V |
19+55	1.0960	0.14	Q	|	|	|	V |
20+ 0	1.0968	0.12	Q	|	|	|	V |
20+ 5	1.0976	0.12	Q	|	|	|	V |
20+10	1.0985	0.13	Q	|	|	|	V |
20+15	1.0995	0.15	Q	|	|	|	V |
20+20	1.1005	0.15	Q	|	|	|	V |
20+25	1.1016	0.15	Q	|	|	|	V |
20+30	1.1027	0.16	Q	|	|	|	V |
20+35	1.1037	0.16	Q	|	|	|	V |
20+40	1.1048	0.16	Q	|	|	|	V |
20+45	1.1059	0.16	Q	|	|	|	V |
20+50	1.1070	0.15	Q	|	|	|	V |
20+55	1.1079	0.14	Q	|	|	|	V |
21+ 0	1.1087	0.12	Q	|	|	|	V |
21+ 5	1.1095	0.12	Q	|	|	|	V |
21+10	1.1104	0.13	Q	|	|	|	V |
21+15	1.1114	0.15	Q	|	|	|	V|
21+20	1.1124	0.15	Q	|	|	|	V|
21+25	1.1134	0.13	Q	|	|	|	V|
21+30	1.1142	0.12	Q	|	|	|	V|
21+35	1.1150	0.12	Q	|	|	|	V|
21+40	1.1159	0.13	Q	|	|	|	V|
21+45	1.1169	0.14	Q	|	|	|	V|
21+50	1.1179	0.15	Q	|	|	|	V|
21+55	1.1188	0.13	Q	|	|	|	V|
22+ 0	1.1196	0.12	Q	|	|	|	V|
22+ 5	1.1204	0.12	Q	|	|	|	V|
22+10	1.1213	0.13	Q	|	|	|	V|
22+15	1.1223	0.14	Q	|	|	|	V|
22+20	1.1233	0.15	Q	|	|	|	V|

22+25	1.1242	0.13	Q	|	|	|	V|
22+30	1.1250	0.12	Q	|	|	|	V|
22+35	1.1258	0.11	Q	|	|	|	V|
22+40	1.1265	0.11	Q	|	|	|	V|
22+45	1.1273	0.11	Q	|	|	|	V|
22+50	1.1280	0.11	Q	|	|	|	V|
22+55	1.1287	0.11	Q	|	|	|	V|
23+ 0	1.1295	0.11	Q	|	|	|	V|
23+ 5	1.1302	0.11	Q	|	|	|	V|
23+10	1.1309	0.11	Q	|	|	|	V|
23+15	1.1316	0.10	Q	|	|	|	V|
23+20	1.1324	0.10	Q	|	|	|	V|
23+25	1.1331	0.10	Q	|	|	|	V|
23+30	1.1338	0.10	Q	|	|	|	V|
23+35	1.1345	0.10	Q	|	|	|	V|
23+40	1.1352	0.10	Q	|	|	|	V|
23+45	1.1360	0.10	Q	|	|	|	V|
23+50	1.1367	0.10	Q	|	|	|	V|
23+55	1.1374	0.10	Q	|	|	|	V|
24+ 0	1.1381	0.10	Q	|	|	|	V|
24+ 5	1.1388	0.10	Q	|	|	|	V|
24+10	1.1393	0.07	Q	|	|	|	V|
24+15	1.1395	0.03	Q	|	|	|	V|
24+20	1.1396	0.02	Q	|	|	|	V|
24+25	1.1396	0.01	Q	|	|	|	V|
24+30	1.1397	0.00	Q	|	|	|	V|
24+35	1.1397	0.00	Q	|	|	|	V|
24+40	1.1397	0.00	Q	|	|	|	V|
24+45	1.1397	0.00	Q	|	|	|	V|
24+50	1.1397	0.00	Q	|	|	|	V|
24+55	1.1397	0.00	Q	|	|	|	V|

Appendix D: Educational Materials



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

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Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections
- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of “as-built” piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory
- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping
- A review of the “as-built” piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing
- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing
- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System
- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping
- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.

- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.

- Lighting or barriers may also be needed to discourage future dumping.

- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.

- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.

- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.

- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.

- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.

- Document and report annually the results of the program.

- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.

- Consider posting the quick reference table near storm drains to reinforce training.

- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.

- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.

- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention
- See SC11 Spill Prevention Control and Cleanup.

Other Considerations
- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)
- The primary cost is for staff time and depends on how aggressively a program is implemented.

- Cost for containment and disposal is borne by the discharger.

- Illicit connections can be difficult to locate especially if there is groundwater infiltration.

- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)
- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping
- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.

- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a “non-stormwater” discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State’s General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility’s SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California’s Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Approach

Pollution Prevention

- Accomplish reduction in the amount of waste generated using the following source controls:
  - Production planning and sequencing
  - Process or equipment modification
  - Raw material substitution or elimination
  - Loss prevention and housekeeping
  - Waste segregation and separation
  - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

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Suggested Protocols

General

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.

- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.

- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.

- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.

- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.

- Transfer waste from damaged containers into safe containers.

- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post “No Littering” signs and enforce anti-litter laws.

- Provide a sufficient number of litter receptacles for the facility.

- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.

- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.

- Secure solid waste containers; containers must be closed tightly when not in use.

- Do not fill waste containers with washout water or any other liquid.

- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers and protect them from vandalism.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.

Run-on/Runoff Prevention

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropyleneor hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training
- Train staff in pollution prevention measures and proper disposal methods.

- Train employees and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills

- Collect all spilled liquids and properly dispose of them.

- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.

- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:

  - Vehicles equipped with baffles for liquid waste

  - Trucks with sealed gates and spill guards for solid waste

Other Considerations (Limitations and Regulations)
Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements

Costs
Capital and O&M costs for these programs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance
- None except for maintaining equipment for material tracking program.

Supplemental Information

Further Detail of the BMP
Land Treatment System
Minimize runoff of polluted stormwater from land application by:

- Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, and there is a closed drainage system

- Avoiding application of waste to the site when it is raining or when the ground is saturated with water
- Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site
- Maintaining adequate barriers between the land application site and the receiving waters (planted strips are particularly good)
- Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins
- Performing routine maintenance to ensure the erosion control or site stabilization measures are working

Examples

The port of Long Beach has a state-of-the-art database for identifying potential pollutant sources, documenting facility management practices, and tracking pollutants.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual http://www.co.clark.wa.us/pubworks/bmpman.pdf

Solid Waste Container Best Management Practices – Fact Sheet On-Line Resources – Environmental Health and Safety. Harvard University. 2002.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

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Association

- Encourage use of Integrated Pest Management techniques for pest control.

- Encourage proper onsite recycling of yard trimmings.

- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.

- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.

- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.

- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures when soils are exposed.

- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.

- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.

- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.

- Do not use pesticides if rain is expected.

- Do not mix or prepare pesticides for application near storm drains.

- Use the minimum amount needed for the job.

- Calibrate fertilizer distributors to avoid excessive application.

- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.

- Apply pesticides only when wind speeds are low.

- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.

- Irrigate slowly to prevent runoff and then only as much as is needed.

- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.

- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.

- Train employees and contractors in proper techniques for spill containment and cleanup.

- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.

- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.

- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.

- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.

- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

California Stormwater Quality Association

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)

- Keep accurate maintenance logs to evaluate BMP implementation.

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Design Considerations

- Tributary Area
- Area Required
- Slope
- Water Availability

Targeted Constituents

☑	Sediment	▲
☑	Nutrients	●
☑	Trash	●
☑	Metals	▲
☑	Bacteria	●
☑	Oil and Grease	▲
☑	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

Description

Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems.

California Experience

Caltrans constructed and monitored six vegetated swales in southern California. These swales were generally effective in reducing the volume and mass of pollutants in runoff. Even in the areas where the annual rainfall was only about 10 inches/yr, the vegetation did not require additional irrigation. One factor that strongly affected performance was the presence of large numbers of gophers at most of the sites. The gophers created earthen mounds, destroyed vegetation, and generally reduced the effectiveness of the controls for TSS reduction.

Advantages

- If properly designed, vegetated, and operated, swales can serve as an aesthetic, potentially inexpensive urban development or roadway drainage conveyance measure with significant collateral water quality benefits.

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- Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible.

Limitations

- Can be difficult to avoid channelization.
- May not be appropriate for industrial sites or locations where spills may occur
- Grassed swales cannot treat a very large drainage area. Large areas may be divided and treated using multiple swales.
- A thick vegetative cover is needed for these practices to function properly.
- They are impractical in areas with steep topography.
- They are not effective and may even erode when flow velocities are high, if the grass cover is not properly maintained.
- In some places, their use is restricted by law: many local municipalities require curb and gutter systems in residential areas.
- Swales are mores susceptible to failure if not properly maintained than other treatment BMPs.

Design and Sizing Guidelines

- Flow rate based design determined by local requirements or sized so that 85% of the annual runoff volume is discharged at less than the design rainfall intensity.
- Swale should be designed so that the water level does not exceed 2/3rds the height of the grass or 4 inches, which ever is less, at the design treatment rate.
- Longitudinal slopes should not exceed 2.5%
- Trapezoidal channels are normally recommended but other configurations, such as parabolic, can also provide substantial water quality improvement and may be easier to mow than designs with sharp breaks in slope.
- Swales constructed in cut are preferred, or in fill areas that are far enough from an adjacent slope to minimize the potential for gopher damage. Do not use side slopes constructed of fill, which are prone to structural damage by gophers and other burrowing animals.
- A diverse selection of low growing, plants that thrive under the specific site, climatic, and watering conditions should be specified. Vegetation whose growing season corresponds to the wet season are preferred. Drought tolerant vegetation should be considered especially for swales that are not part of a regularly irrigated landscaped area.
- The width of the swale should be determined using Manning's Equation using a value of 0.25 for Manning's n.

Construction/Inspection Considerations

- Include directions in the specifications for use of appropriate fertilizer and soil amendments based on soil properties determined through testing and compared to the needs of the vegetation requirements.
- Install swales at the time of the year when there is a reasonable chance of successful establishment without irrigation; however, it is recognized that rainfall in a given year may not be sufficient and temporary irrigation may be used.
- If sod tiles must be used, they should be placed so that there are no gaps between the tiles; stagger the ends of the tiles to prevent the formation of channels along the swale or strip.
- Use a roller on the sod to ensure that no air pockets form between the sod and the soil.
- Where seeds are used, erosion controls will be necessary to protect seeds for at least 75 days after the first rainfall of the season.

Performance

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

Conventional vegetated swale designs have achieved mixed results in removing particulate pollutants. A study performed by the Nationwide Urban Runoff Program (NURP) monitored three grass swales in the Washington, D.C., area and found no significant improvement in urban runoff quality for the pollutants analyzed. However, the weak performance of these swales was attributed to the high flow velocities in the swales, soil compaction, steep slopes, and short grass height.

Another project in Durham, NC, monitored the performance of a carefully designed artificial swale that received runoff from a commercial parking lot. The project tracked 11 storms and concluded that particulate concentrations of heavy metals (Cu, Pb, Zn, and Cd) were reduced by approximately 50 percent. However, the swale proved largely ineffective for removing soluble nutrients.

The effectiveness of vegetated swales can be enhanced by adding check dams at approximately 17 meter (50 foot) increments along their length (See Figure 1). These dams maximize the retention time within the swale, decrease flow velocities, and promote particulate settling. Finally, the incorporation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.

Only 9 studies have been conducted on all grassed channels designed for water quality (Table 1). The data suggest relatively high removal rates for some pollutants, but negative removals for some bacteria, and fair performance for phosphorus.

Table 1 Grassed swale pollutant removal efficiency data

Study	Removal Efficiencies (% Removal)						
	TSS	TP	TN	NO_3	Metals	Bacteria	Type
Caltrans 2002	77	8	67	66	83-90	-33	dry swales
Goldberg 1993	67.8	4.5	-	31.4	42–62	-100	grassed channel
Seattle Metro and Washington Department of Ecology 1992	60	45	-	-25	2–16	-25	grassed channel
Seattle Metro and Washington Department of Ecology, 1992	83	29	-	-25	46–73	-25	grassed channel
Wang et al., 1981	80	-	-	-	70–80	-	dry swale
Dorman et al., 1989	98	18	-	45	37–81	-	dry swale
Harper, 1988	87	83	84	80	88–90	-	dry swale
Kercher et al., 1983	99	99	99	99	99	-	dry swale
Harper, 1988.	81	17	40	52	37–69	-	wet swale
Koon, 1995	67	39	-	9	-35 to 6	-	wet swale

While it is difficult to distinguish between different designs based on the small amount of available data, grassed channels generally have poorer removal rates than wet and dry swales, although some swales appear to export soluble phosphorus (Harper, 1988; Koon, 1995). It is not clear why swales export bacteria. One explanation is that bacteria thrive in the warm swale soils.

Siting Criteria

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system (Schueler et al., 1992). In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. Use of natural topographic lows is encouraged and natural drainage courses should be regarded as significant local resources to be kept in use (Young et al., 1996).

Selection Criteria (NCTCOG, 1993)

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

The topography of the site should permit the design of a channel with appropriate slope and cross-sectional area. Site topography may also dictate a need for additional structural controls. Recommendations for longitudinal slopes range between 2 and 6 percent. Flatter slopes can be used, if sufficient to provide adequate conveyance. Steep slopes increase flow velocity, decrease detention time, and may require energy dissipating and grade check. Steep slopes also can be managed using a series of check dams to terrace the swale and reduce the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.

Additional Design Guidelines

Most of the design guidelines adopted for swale design specify a minimum hydraulic residence time of 9 minutes. This criterion is based on the results of a single study conducted in Seattle, Washington (Seattle Metro and Washington Department of Ecology, 1992), and is not well supported. Analysis of the data collected in that study indicates that pollutant removal at a residence time of 5 minutes was not significantly different, although there is more variability in that data. Therefore, additional research in the design criteria for swales is needed. Substantial pollutant removal has also been observed for vegetated controls designed solely for conveyance (Barrett et al, 1998); consequently, some flexibility in the design is warranted.

Many design guidelines recommend that grass be frequently mowed to maintain dense coverage near the ground surface. Recent research (Colwell et al., 2000) has shown mowing frequency or grass height has little or no effect on pollutant removal.

Summary of Design Recommendations

1) The swale should have a length that provides a minimum hydraulic residence time of at least 10 minutes. The maximum bottom width should not exceed 10 feet unless a dividing berm is provided. The depth of flow should not exceed 2/3rds the height of the grass at the peak of the water quality design storm intensity. The channel slope should not exceed 2.5%.

2) A design grass height of 6 inches is recommended.

3) Regardless of the recommended detention time, the swale should be not less than 100 feet in length.

4) The width of the swale should be determined using Manning's Equation, at the peak of the design storm, using a Manning's n of 0.25.

5) The swale can be sized as both a treatment facility for the design storm and as a conveyance system to pass the peak hydraulic flows of the 100-year storm if it is located "on-line." The side slopes should be no steeper than 3:1 (H:V).

6) Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible. If flow is to be introduced through curb cuts, place pavement slightly above the elevation of the vegetated areas. Curb cuts should be at least 12 inches wide to prevent clogging.

7) Swales must be vegetated in order to provide adequate treatment of runoff. It is important to maximize water contact with vegetation and the soil surface. For general purposes, select fine, close-growing, water-resistant grasses. If possible, divert runoff (other than necessary irrigation) during the period of vegetation

establishment. Where runoff diversion is not possible, cover graded and seeded areas with suitable erosion control materials.

Maintenance

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.

- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

- Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

- Sediment accumulating near culverts and in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.

- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

Cost

Construction Cost

Little data is available to estimate the difference in cost between various swale designs. One study (SWRPC, 1991) estimated the construction cost of grassed channels at approximately \$0.25 per ft^2. This price does not include design costs or contingencies. Brown and Schueler (1997) estimate these costs at approximately 32 percent of construction costs for most stormwater management practices. For swales, however, these costs would probably be significantly higher since the construction costs are so low compared with other practices. A more realistic estimate would be a total cost of approximately \$0.50 per ft^2, which compares favorably with other stormwater management practices.

Table 2 Swale Cost Estimate (SEWRPC, 1991)

Component	Unit	Extent	Unit Cost Low	Unit Cost Moderate	Unit Cost High	Total Cost Low	Total Cost Moderate	Total Cost High
Mobilization / Demobilization-Light	Swale	1	$107	$274	$441	$107	$274	$441
Site Preparation								
Clearing[b]...............	Acre	0.5	$2,200	$3,800	$5,400	$1,100	$1,900	$2,700
Grubbing[c].............	Acre	0.25	$3,800	$5,200	$6,600	$950	$1,300	$1,650
General Excavation[d]...........	Yd^3	372	$2.10	$3.70	$5.30	$781	$1,376	$1,972
Level and Till[e]........	Yd^2	1,210	$0.20	$0.35	$0.50	$242	$424	$605
Sites Development								
Salvaged Topsoil Seed, and Mulch[f]..	Yd^2	1,210	$0.40	$1.00	$1.60	$484	$1,210	$1,936
Sod[g]......................	Yd^2	1,210	$1.20	$2.40	$3.60	$1,452	$2,904	$4,356
Subtotal	--	–	--	–	--	$5,116	$9,388	$13,660
Contingencies	Swale	1	25%	25%	25%	$1,279	$2,347	$3,415
Total	--	–	--	–	--	$6,395	$11,735	$17,075

Source: (SEWRPC, 1991)

Note: Mobilization/demobilization refers to the organization and planning involved in establishing a vegetative swale.

[a] Swale has a bottom width of 1.0 foot, a top width of 10 feet with 1:3 side slopes, and a 1,000-foot length.

[b] Area cleared = (top width + 10 feet) x swale length.

[c] Area grubbed = (top width x swale length).

[d] Volume excavated = (0.67 x top width x swale depth) x swale length (parabolic cross-section).

[e] Area tilled = $\left(\text{top width} + \frac{8(\text{swale depth}^2)}{3(\text{top width})}\right)$ x swale length (parabolic cross-section).

[f] Area seeded = area cleared x 0.5.

[g] Area sodded = area cleared x 0.5.

Table 3 Estimated Maintenance Costs (SEWRPC, 1991)

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	\$0.85 / 1,000 ft^2/ mowing	\$0.14 / linear foot	\$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	\$9.00 / 1,000 ft^2/ year	\$0.18 / linear foot	\$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	\$0.10 / linear foot / year	\$0.10 / linear foot	\$0.10 / linear foot	–
Grass Reseeding with Mulch and Fertilizer	\$0.30 / yd^2	\$0.01 / linear foot	\$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	\$0.15 / linear foot / year, plus \$25 / inspection	\$0.15 / linear foot	\$0.15 / linear foot	Inspect four times per year
Total	--	**\$0.58 / linear foot**	**\$ 0.75 / linear foot**	--

Maintenance Cost

Caltrans (2002) estimated the expected annual maintenance cost for a swale with a tributary area of approximately 2 ha at approximately $2,700. Since almost all maintenance consists of mowing, the cost is fundamentally a function of the mowing frequency. Unit costs developed by SEWRPC are shown in Table 3. In many cases vegetated channels would be used to convey runoff and would require periodic mowing as well, so there may be little additional cost for the water quality component. Since essentially all the activities are related to vegetation management, no special training is required for maintenance personnel.

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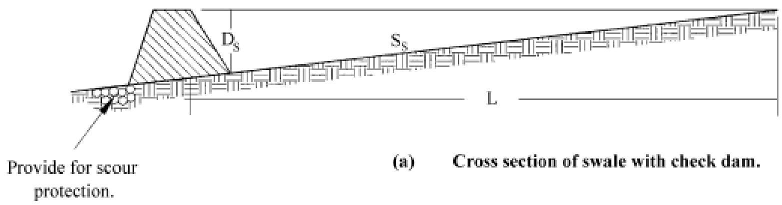
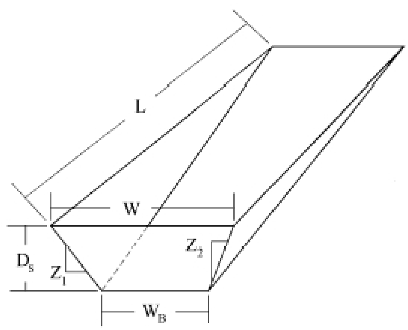


(a) **Cross section of swale with check dam.**



(b) **Dimensional view of swale impoundment area.**

Notation:
- L = Length of swale impoundment area per check dam (ft)
- D_S = Depth of check dam (ft)
- S_S = Bottom slpe of swale (ft/ft)
- W = Top width of check dam (ft)
- W_B = Bottom width of check dam (ft)
- $Z_{1\&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.

- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.

- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

After the Storm

A Citizen's Guide to Understanding Stormwater

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

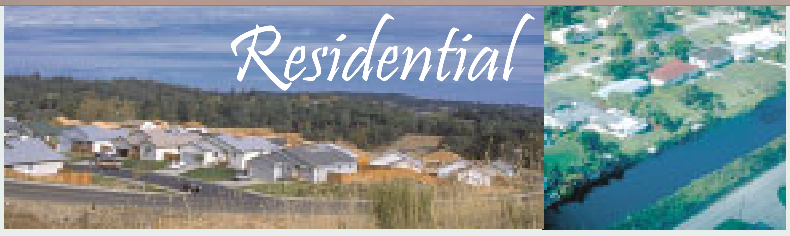
United States Environmental Protection Agency
EPA 833-B-03-002
January 2003
Internet Address (URL) • HTTP://www.epa.gov
Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer, Process Chlorine Free Recycled Paper

THE YEAR OF CLEAN WATER
Celebration & Recommitment

Stormwater Pollution Solutions

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

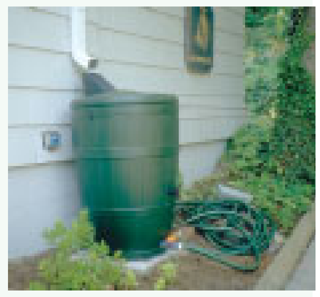
Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.



Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

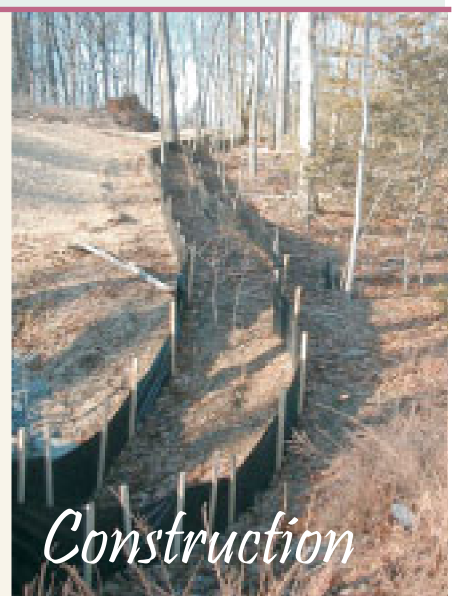
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction

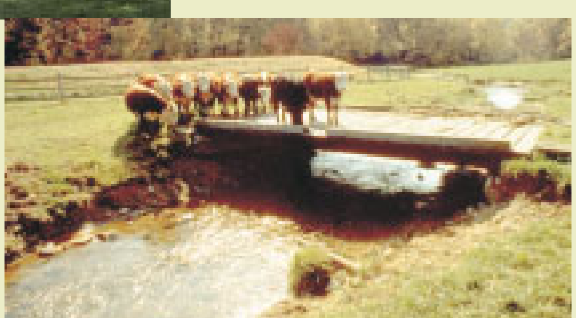
Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



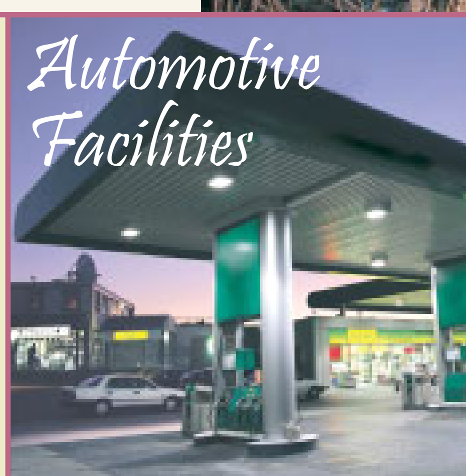
Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

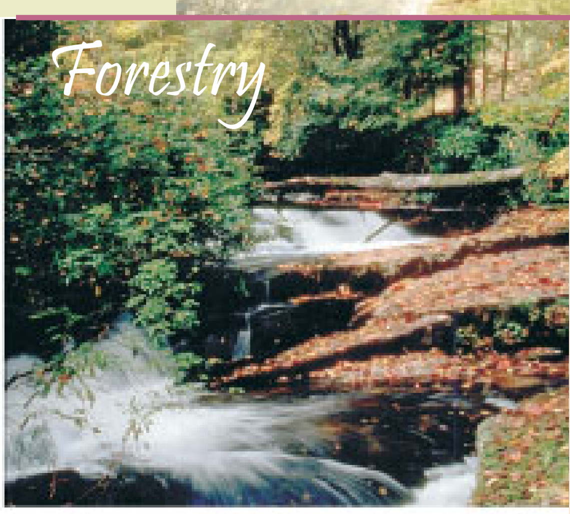
Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.

StormWater Pollution . . . What You Should Know

Riverside County has two drainage systems - sewers and storm drains. The storm drain system was designed to reduce flooding by carrying excess rainwater away from streets and developed areas. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our local waterways.

Unlike sanitary sewers, storm drains are not connected to a wastewater treatment plant – they flow directly to our local streams, rivers and lakes.

Stormwater runoff is a part of the natural hydrologic process. However, land development and construction activities can significantly alter natural drainage processes and introduce pollutants into stormwater runoff. Polluted stormwater runoff from construction sites has been identified as a major source of water pollution in California. It jeopardizes the quality of our local waterways and can pose a serious threat to the health of our aquatic ecosystems.

The Cities and County of Riverside StormWater/CleanWater Protection Program

Because preventing pollution is much easier and less costly than cleaning up "after the fact," the Cities and County of Riverside StormWater/CleanWater Protection Program informs residents and businesses on pollution prevention activities. This pamphlet describes various Best Management Practices (BMPs) that construction site operators can use to prevent stormwater pollution.

In accordance with applicable federal and state law, the Cities and County of Riverside have adopted ordinances for stormwater management and discharge control that **prohibit** the discharge of pollutants into the storm drain system or local surface water. This includes discharges from construction sites containing sediment, concrete, mortar, paint, solvents, lubricants, vehicle fluids, fuel, pesticides, and construction debris.

PLEASE NOTE: The Federal, State and local regulations strictly prohibit the discharge of sediment and pollutants into the streets, the storm drain system or waterways. As an owner, operator or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees.

Stormwater Pollution from Construction Activities

The two most common sources of stormwater pollution problems associated with construction activities are ***erosion*** and ***sedimentation***. Failure to maintain adequate erosion and sediment controls at construction sites often results in sediment discharges into the storm drain system, creating multiple problems once it enters local waterways.

Construction vehicles and heavy equipment can also track significant amounts of mud and sediment onto adjacent streets. Additionally, wind may transport construction materials and wastes into streets storm drains, or directly into our local waterways.

Resources

State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento CA 95814
(916) 341-5455
www.swrcb.ca.gov/stormwtr/

Colorado River Basin Regional Water
Quality Control Board - Region 7
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(760) 346-7491
www.swrcb.ca.gov/~rwqcb7/

Santa Ana Regional Water
Quality Control Board - Region 8
3737 Main Street, Suite 500
Riverside, CA 92501-3348
(909) 782-4130
www.swrcb.ca.gov/~rwqcb8/

San Diego Regional Water
Quality Control Board - Region 9
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124
(858) 467-2952
www.swrcb.ca.gov/~rwqcb9/

To report a hazardous materials spill, call:

Riverside County Hazardous Materials
Emergency Response Team
(909) 358-5055 8:00 a.m. – 5:00 p.m.
(909) 358-5245 after 5:00 p.m.

In an emergency call: **911**

For recycling and hazardous waste disposal, call:

(909) 358-5055

To report an illegal dumping or a clogged storm drain, call:

1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, please call (909) 955-1200 or visit the StormWater/CleanWater Protection Program website at:
www.co.riverside.ca.us/depts/flood/waterquality npdes.asp

StormWater CleanWater
PROTECTION PROGRAM

The StormWater/CleanWater Protection Program gratefully acknowledges the Santa Clara Valley Nonpoint Pollution Control Program, Alameda Countywide CleanWater Program and the City of Los Angeles Stormwater Management Division for information provided in this brochure.

StormWater Pollution

What you should know for...

GENERAL CONSTRUCTION & SITE SUPERVISION

Best Management Practices (BMPs) for:

- Developers
- General Contractors
- Home Builders
- Construction Inspectors
- Anyone in the construction business

What Should You Do?

Advance Planning to Prevent Pollution

- ❑ Remove existing vegetation only as needed.
- ❑ Schedule excavation, grading, and paving operations for dry weather periods, if possible.
- ❑ Designate a specific area of the construction site, well away from storm drain inlets or watercourses, for material storage and equipment maintenance.
- ❑ Develop and implement an effective combination of erosion and sediment controls for the construction site.
- ❑ Practice source reduction by ordering only the amount of materials that are needed to finish the project.
- ❑ Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- ❑ Control the amount of surface runoff at the construction site by impeding internally generated flows and using berms or drainage ditches to direct incoming offsite flows to go around the site. ***Note:*** *Consult local drainage policies for more information.*

Best Management Practices

The following Best Management Practices (BMPs) can significantly reduce pollutant discharges from your construction site. Compliance with stormwater regulations can be as simple as minimizing stormwater contact with potential pollutants by providing covers and secondary containment for construction materials, designating areas away from storm drain systems for storing equipment and materials and implementing good housekeeping practices at the construction site.

- ❑ Protect all storm drain inlets and streams located near the construction site to prevent sediment-laden water from entering the storm drain system.
- ❑ Limit access to and from the site. Stabilize construction entrances/exits to minimize the track out of dirt and mud onto adjacent streets. Conduct frequent street sweeping.
- ❑ Protect stockpiles and construction materials from winds and rain by storing them under a roof, secured impermeable tarp or plastic sheeting.
- ❑ Avoid storing or stockpiling materials near storm drain inlets, gullies or streams.
- ❑ Phase grading operations to limit disturbed areas and duration of exposure.
- ❑ Perform major maintenance and repairs of vehicles and equipment offsite.
- ❑ Wash out concrete mixers only in designated washout areas at the construction site.
- ❑ Set-up and operate small concrete mixers on tarps or heavy plastic drop cloths.
- ❑ Keep construction sites clean by removing trash, debris, wastes, etc. on a regular basis.
- ❑ Clean-up spills immediately using dry clean-up methods (e.g., absorbent materials such as cat litter, sand or rags for liquid spills; sweeping for dry spills such as cement, mortar or fertilizer) and by removing the contaminated soil from spills on dirt areas. .
- ❑ Prevent erosion by implementing any or a combination of soil stabilization practices such as mulching, surface roughening, permanent or temporary seeding.
- ❑ Maintain all vehicles and equipment in good working condition. Inspect frequently for leaks, and repair promptly.
- ❑ Practice proper waste disposal. Many construction materials and wastes, including solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation can be recycled. Materials that cannot be recycled must be taken to an appropriate landfill or disposed of as hazardous waste.
- ❑ Cover open dumpsters with secured tarps or plastic sheeting. Never clean out a dumpster by washing it down on the construction site.
- ❑ Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

General Construction Activities Stormwater Permit

(Construction Activities General Permit)

The State Water Resources Control Board (SWRCB) adopted a new Construction Activities General Permit (WQ Order No. 99-08DWQ) on August 19, 1999, superseding the now expired SWRCB statewide General Permit (WQ Order No. 92-08DWQ). This permit is administered and enforced by the SWRCB and the local Regional Water Quality Control Boards (RWQCB). The updated Construction Activities General Permit establishes a number of new stormwater management requirements for construction site operator.

NOTE: *Some construction activies stormwater permits are issued on a regional basis. Consult your local RWQCB to find out if your project requires coverage under any of these permits.*

Frequently Asked Questions:

Does my construction site require coverage under the Construction Activities General Permit?

Yes, if construction activity results in the disturbance of five or more acres of total land area or is part of a common plan of development that results in the disturbance of five or more acres.

How do I obtain coverage under the Construction Activities General Permit?

Obtain the permit package and submit the completed Notice of Intent (NOI) form to the SWRCB prior to grading or disturbing soil at the construction site. For ongoing construction activity involving a change of ownership, the new owner must submit a new NOI within 30 days of the date of change of ownership. The completed NOI along with the required fee should be mailed to the SWRCB.

What must I do to comply with the requirements of the Construction Activities General Permit?

- Implement BMPs for non-stormwater discharges year-round.
- Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) prior to commencing construction activities.
- Keep a copy of the SWPPP at the construction site for the entire duration of the project.
- Calculate the anticipated stormwater run-off.
- Implement an effective combination of erosion and sediment control on all soil disturbed areas.
- Conduct site inspections prior to anticipated storm events, every 24-hours during extended storm events, and after actual storm event.
- Perform repair and maintenance of BMPs as soon as possible after storm events depending upon worker safety.
- Update the SWPPP as needed, to manage pollutants or reflect changes in site conditions.
- Include description of post construction BMPs at the construction site, including parties responsible for long-term maintenance.

NOTE: *Please refer to the Construction Activities General Permit for detailed information. You may contact the SWRCB, your local RWQCB, or visit the SWRCB website at www.swrcb.ca.gov/stormwtr/ to obtain a State Construction Activities Stormwater General Permit packet.*

How long is this Construction Activities General Permit in effect?

The Permit coverage stays in effect untilyou submit a Notice of Termination (NOT) to the SWRCB. For the purpose of submitting a NOT, all soil disturbing activities have to be completed and one of the three following criteria has to be met:

1. Change of ownership;
2. A uniform vegetative cover with 70 percent coverage has been established; or,
3. Equivalent stabilization measures such as the use of reinforced channel liners, soil cement, fiber matrices, geotextiles, etc., have been employed.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers

Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555

Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.

When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Appendix E: Soils Report

N/A

Appendix F: BMP Sizing Calculations/Details

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: **David M Beckwith, PE**
Company: **David Beckwith and Associates, Inc**
Date: **April 27, 2015**
Project: **Highlander Hall Demolition**
Location: **UC Riverside**

1. Determine Impervious Percentage			
a. Determine total tributary area	A_{total} = 5.04	acres	***(1)***
b. Determine Impervious %	i = 82	%	***(2)***
2. Determine Runoff Coefficient Values Use **Table 4** and impervious % found in step 1			
a. A Soil Runoff Coefficient	C_a =		***(3)***
b. B Soil Runoff Coefficient	C_b = 0.77		***(4)***
c. C Soil Runoff Coefficient	C_c = 0.78		***(5)***
d. D Soil Runoff Coefficient	C_d =		***(6)***
3. Determine the Area decimal fraction of each soil type in tributary area			
a. Area of A Soil / ***(1)*** =	A_a =		***(7)***
b. Area of B Soil / ***(1)*** =	A_b = 0.50		***(8)***
c. Area of C Soil / ***(1)*** =	A_c = 0.50		***(9)***
d. Area of D Soil / ***(1)*** =	A_d =		***(10)***
4. Determine Runoff Coefficient			
a. C = ***(3)***x***(7)*** + ***(4)***x***(8)*** + ***(5)***x***(9)*** + ***(6)***x***(10)*** **=**	C = 0.775		***(11)***
5. Determine BMP Design flow			
a. Q_{BMP} = C x I x A = ***(11)*** x 0.2 x ***(1)***	Q_{BMP} = 0.78	$\frac{ft^3}{s}$	***(12)***

Table 4. Runoff Coefficients for an Intensity = 0.2 $^{in}/_{hr}$ for Urban Soil Types*

Impervious %	A Soil RI =32	B Soil RI =56	C Soil RI =69	D Soil RI =75
0 (Natural)	0.06	0.14	0.23	0.28
5	0.10	0.18	0.26	0.31
10	0.14	0.22	0.29	0.34
15	0.19	0.26	0.33	0.37
20 (1-Acre)	0.23	0.30	0.36	0.40
25	0.27	0.33	0.39	0.43
30	0.31	0.37	0.43	0.47
35	0.35	0.41	0.46	0.50
40 (1/2-Acre)	0.40	0.45	0.50	0.53
45	0.44	0.48	0.53	0.56
50 (1/4-Acre)	0.48	0.52	0.56	0.59
55	0.52	0.56	0.60	0.62
60	0.56	0.60	0.63	0.65
65 (Condominiums)	0.61	0.64	0.66	0.68
70	0.65	0.67	0.70	0.71
75 (Mobilehomes)	0.69	0.71	0.73	0.74
80 (Apartments)	0.73	0.75	0.77	0.78
85	0.77	0.79	0.80	0.81
90 (Commercial)	0.82	0.82	0.83	0.84
95	0.86	0.86	0.87	0.87
100	0.90	0.90	0.90	0.90

*Complete District's standards can be found in the Riverside County Flood Control Hydrology Manual

Worksheet 9

Design Procedure Form for Grassed Swale

Designer: David M Beckwith, PE
Company: David Beckwith and Associates, Inc
Date: April 27, 2015
Project: Highlander Hall Demolition
Location: UC Riverside

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = 0.78 cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	 b = 4.0 ft z = 3 s = 1.5 %
3. Design flow velocity (Manning n = 0.2)	v = 0.40 ft/s
4. Depth of flow (D)	D = 0.38 ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = 168 ft
6. Vegetation (describe)	5" tall drought tolerant native grass species
8. Outflow Collection (check type used or describe "other")	X Grated Inlet' ___ Infiltration Trench ___ Underdrain ___ Other______

Notes:
Final channel parameters will affect required flow length. Engineer to calculate final values during final design and engineering.

Grassed Swales

General

A Grass swale is a wide, shallow densely vegetated channel that treats stormwater runoff as it is slowly conveyed into a downstream system. These swales have very shallow slopes in order to allow maximum contact time with the vegetation. The depth of water of the design flow should be less than the height of the vegetation. Contact with vegetation improves water quality by plant uptake of pollutants, removal of sediment, and an increase in infiltration. Overall the effectiveness of a grass swale is limited and it is recommended that they are used in combination with other BMPs.

This BMP is not appropriate for industrial sites or locations where spills occur. Important factors to consider when using this BMP include: natural channelization should be avoided to maintain this BMP's effectiveness, large areas must be divided and treated with multiple swales, thick cover is required to function properly, impractical for steep topography, and not effective with high flow velocities.

Grass Swale Design Criteria:

Design Parameter	Unit	Design Criteria
Design Flow	cfs	Q_{BMP}
Minimum bottom width	ft	2 ft [2]
Maximum channel side slope	H:V	3:1 [2]
Minimum slope in flow direction	%	0.2 (provide underdrains for slopes < 0.5) [1]
Maximum slope in flow direction	%	2.0 (provide grade-control checks for slopes >2.0) [1]
Maximum flow velocity	ft/sec	1.0 (based on Manning n = 0.20) [1]
Maximum depth of flow	inches	3 to 5 (1 inch below top of grass) [1]
Minimum contact time	minutes	7 [1]
Minimum length	ft	Sufficient length to provide minimum contact time [1]
Vegetation	-	Turf grass or approved equal [1]
Grass height	inches	4 to 6 (mow to maintain height) [1]

1 Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures
2 City of Modesto's Guidance Manual for New Development Stormwater Quality Control Measures
3 CA Stormwater BMP Handbook for New Development and Significant Redevelopment
4 Riverside County DAMP Supplement A Attachment

Appendix G: Agreements

N/A

Appendix H: Phase 1 Environmental Assessment

N/A

APPENDIX 8.3
Traffic Impact Analysis

UCR HIGHLANDER HALL DEMOLITION & PARKING LOT PROJECT TRAFFIC IMPACT ANALYSIS

UCR #950545

City of Riverside

Prepared for

University of California, Riverside

Prepared by

Michael Baker INTERNATIONAL

14725 ALTON PARKWAY, IRVINE, CALIFORNIA 92618-2027
CONTACT: GIANCARLO GANDDINI 949.855.7085 giancarlo.ganddini@mbakerintl.com
CONTACT: TOM HUANG 949.855.5754 tom.huang@mbakerintl.com

February 2, 2015
(Revised April 6, 2015)
(Revised April 16, 2015)

JN 144698

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LIST OF EXHIBITS

EXECUTIVE SUMMARY

This study analyzes the forecast traffic conditions associated with the proposed Highlander Hall Demolition & Parking Lot Project at the University of California, Riverside (UCR) in the City of Riverside. The project site is located in the southwest corner of University Avenue and I-215/SR-60. The proposed project consists of demolition of the currently vacated Highlander Hall and replacing it with an off-street surface parking lot. The Human Resources building may also be demolished; however, no additional new parking is proposed in its place.

The project site is currently developed with an unoccupied building (Highlander Hall) for which the associated parking is currently being utilized by staff, employees, and students of UCR. Full access for the project site is provided via the University Village intersection at University Avenue; additional access at University Avenue is restricted to right-turn out only and a secondary access is provided at Everton Place. The proposed reconfigured parking lot is anticipated to be completed in 2015. The reconfigured lot would result in up to 195 net new parking spaces.

The proposed parking lot project will not generate "new" trips in relation to UCR operations since the proposed parking lot is intended to accommodate the existing parking demand from displaced parking supply resulting from the removal of existing parking spaces currently located on the main campus areas east of I-215/SR-60. The proposed project is not associated with an increase in land uses or student enrollment. Therefore, the project trip generation considers redistribution of vehicle trips that change their destination from the main campus parking areas east of I-215/SR-60 to the project site west of I-215/SR-60.

The proposed project is forecast to result in 1,020 daily trips being redistributed within the study area, including 112 redistributed trips during the a.m. peak hour and 112 redistributed trips during the p.m. peak hour.

Based on agency-established thresholds of significance, the proposed project is forecast to result in no significant traffic impacts at the study intersections for the evaluated scenarios; hence, no traffic mitigation measures are required for the proposed project.

INTRODUCTION

This study analyzes the forecast traffic conditions associated with the proposed Highlander Hall Demolition & Parking Lot Project at the University of California, Riverside (UCR) in the City of Riverside. The project site is located in the southwest corner of University Avenue and I-215/SR-60. The proposed project consists of demolition of the currently vacated Highlander Hall and replacing it with a reconfigured and expanded off-street surface parking lot.

The project site is currently developed with an unoccupied building (Highlander Hall) for which the associated parking is currently being utilized by staff, employees, and students of UCR. Full access for the project site is provided via the University Village intersection at University Avenue; additional access at University Avenue is restricted to right-turn out only and a secondary access is provided at Everton Place. Within the project boundaries, the proposed project involves the demolition of the existing 61,251 square feet of office uses and the construction of new additional surface parking. Of the existing 96 on-site parking spaces within the project boundaries, 36 would remain on-site and 255 new parking spaces would be constructed, for a proposed 291 parking spaces (or a new net 195 parking spaces) on the project site. There is an adjacent contiguous parking lot which shares access. The existing Human Resources building may also be demolished due to fire damage received on February 18, 2015. The area occupied by the Human Resources building would be reconfigured and landscaped with no additional new parking spaces added.

Exhibit 1 shows the regional location of the project site. Exhibit 2 shows the project site location.

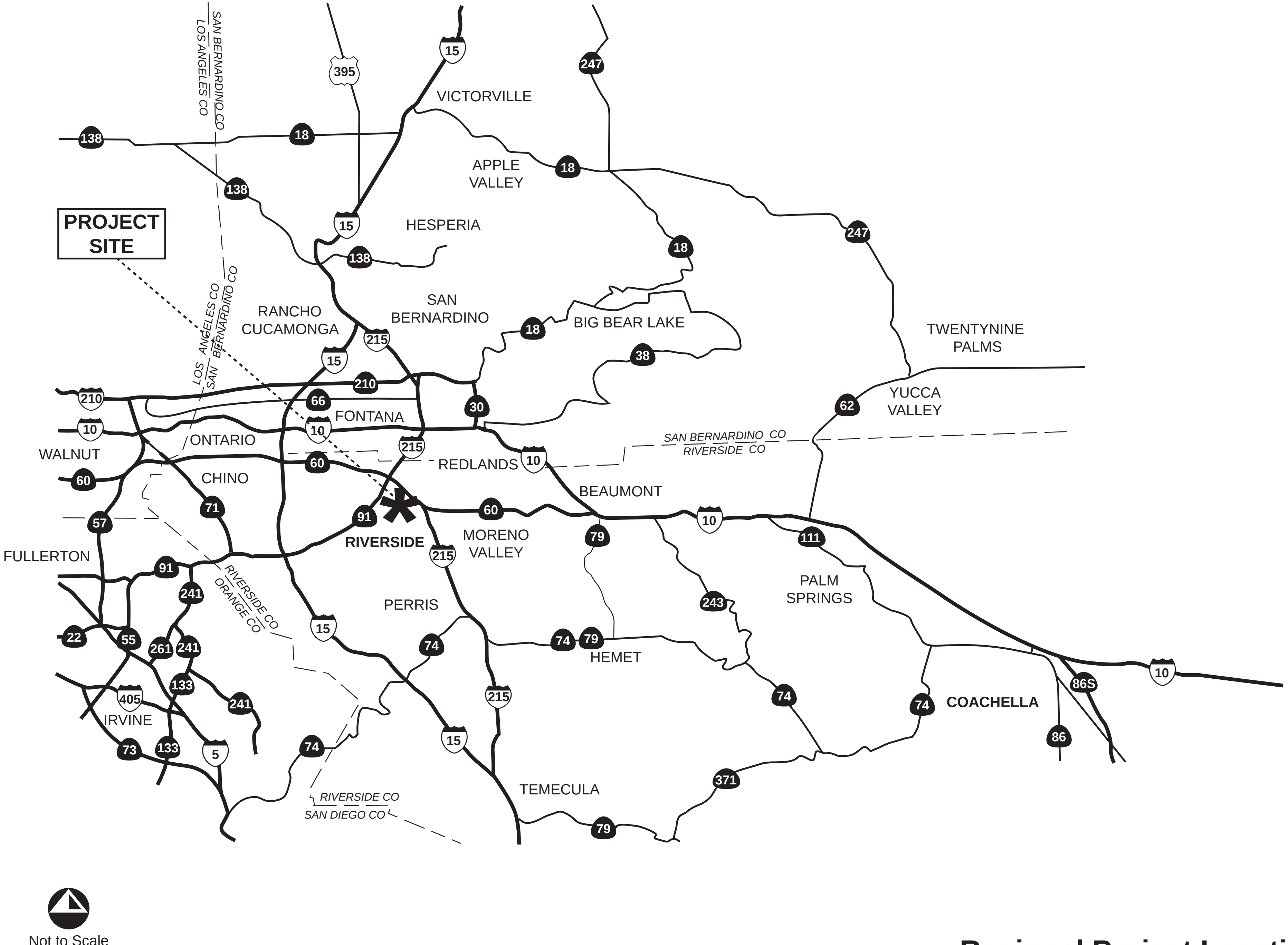
Study Area

The study area consists of the following seven (7) signalized study intersections in the vicinity of the project site based upon the roadways forecast to be experience changes in traffic patterns as a result of the proposed project:

- Iowa Avenue at University Avenue;
- University Village at University Avenue;
- I-215 Southbound/SR-60 Eastbound Ramps at University Avenue;
- I-215 Northbound/SR-60 Westbound Ramps at University Avenue;
- West Campus Drive at University Avenue;
- Iowa Avenue at Everton Place; and
- Project Driveway at Everton Place.

Exhibit 3 shows the location of the study intersections which are analyzed for the following study scenarios identified in the scoping agreement:

- Existing Conditions;
- Forecast Existing Plus Project Conditions (Project Completion).



Regional Project Location

Exhibit 1

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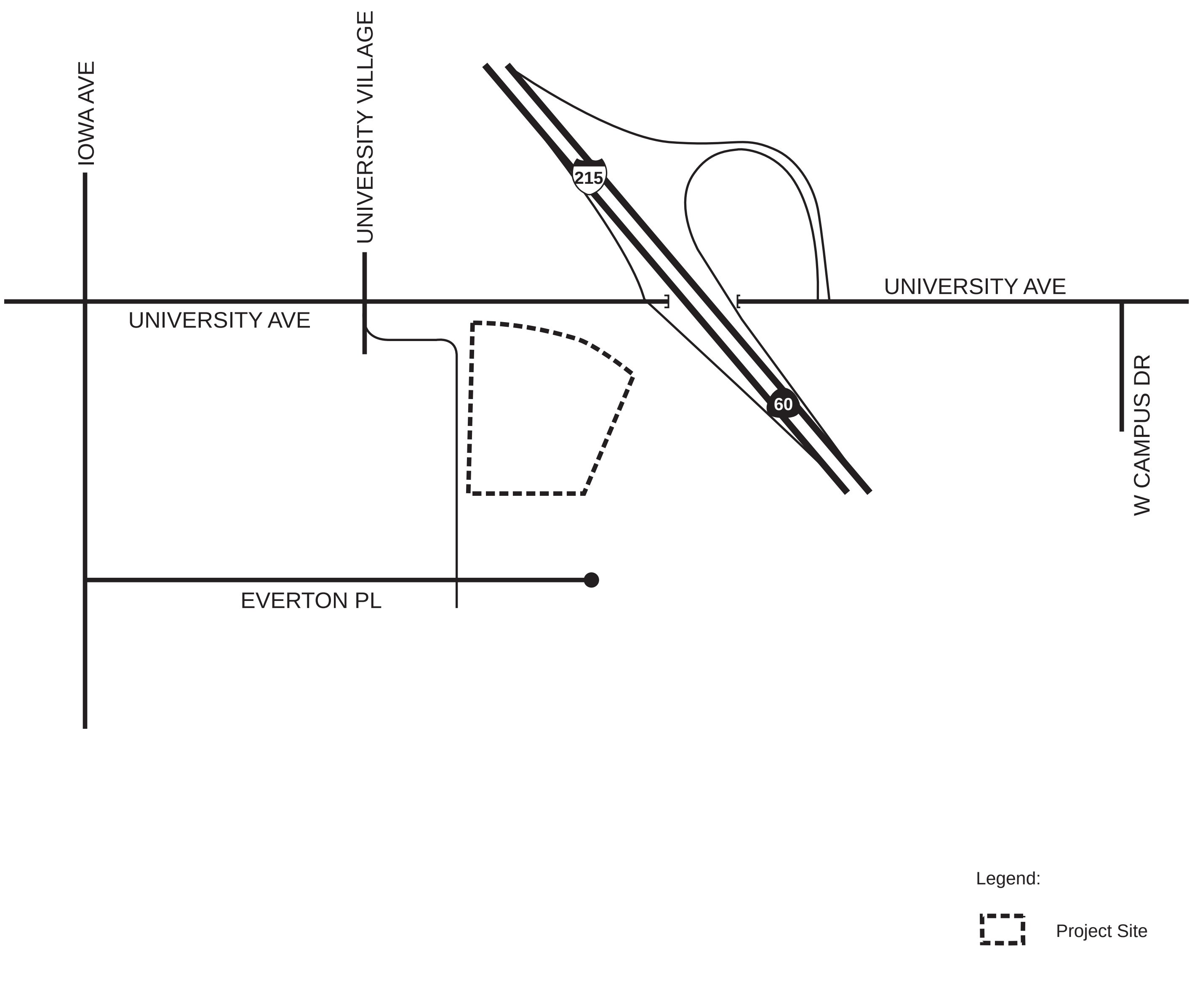

Project Site Location

Exhibit 2

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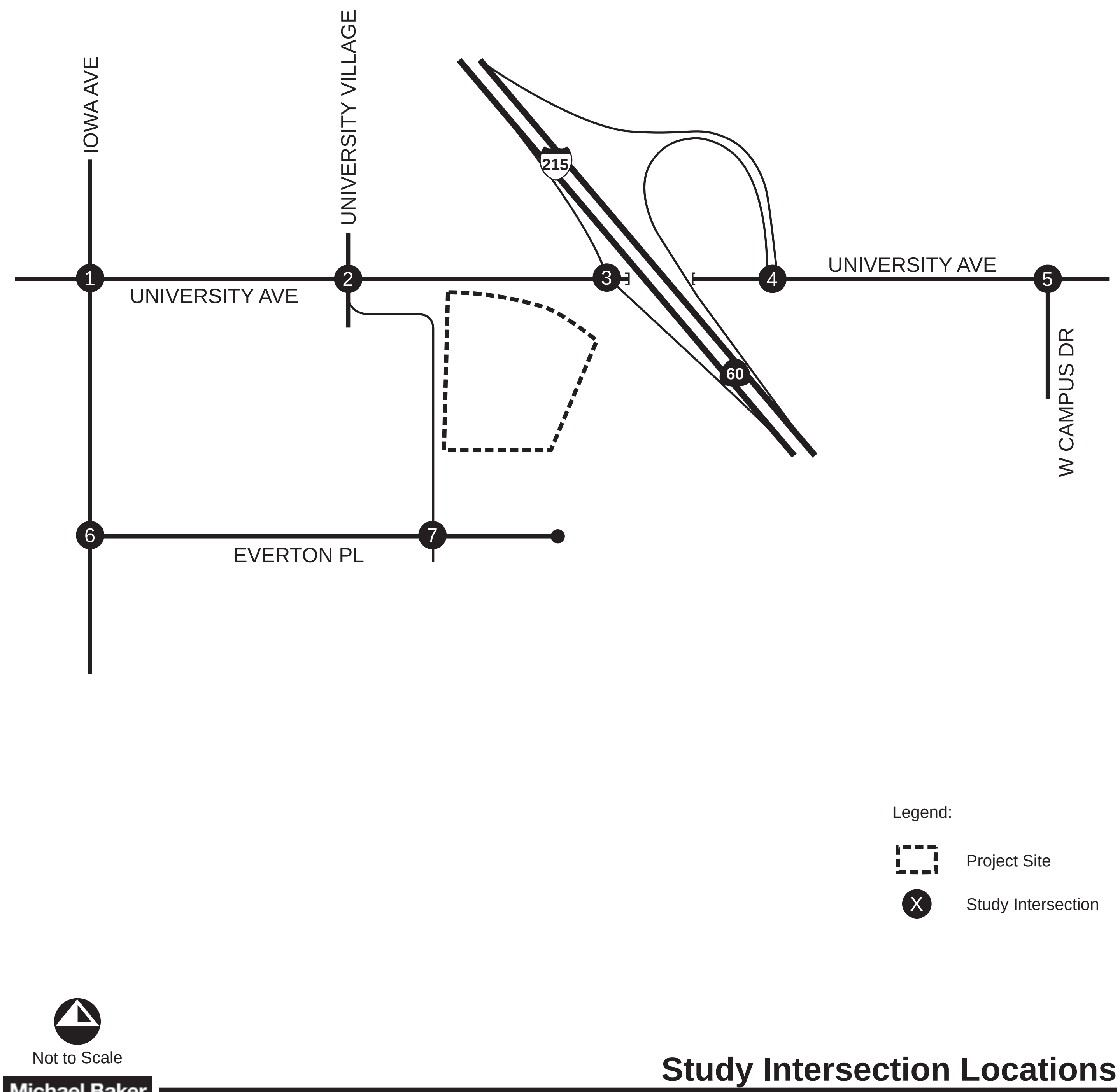

Study Intersection Locations

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Exhibit 3

Intersection Analysis Methodology

Level of service (LOS) is commonly used as a qualitative description of intersection operation and is based on the capacity of the intersection and the volume of traffic using the intersection. The Highway Capacity Manual (HCM) analysis methodology is utilized to determine the operating LOS of the study intersections.

The *2010 HCM* analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding ranges of stopped delay experienced per vehicle for signalized and unsignalized intersections shown in Table 1. HCM analysis methodology is utilized in this study for the study intersections.

Table 1
LOS & Delay Ranges

LOS	Delay (seconds/vehicle)	
	Signalized Intersections	**Unsignalized Intersections**
A	$\leq$ 10.0	$\leq$ 10.0
B	> 10.0 to $\leq$ 20.0	> 10.0 to $\leq$ 15.0
C	> 20.0 to $\leq$ 35.0	> 15.0 to $\leq$ 25.0
D	> 35.0 to $\leq$ 55.0	> 25.0 to $\leq$ 35.0
E	> 55.0 to $\leq$ 80.0	> 35.0 to $\leq$ 50.0
F	> 80.0	> 50.0

Source: *2010 Highway Capacity Manual*

Level of service is based on the average stopped delay per vehicle for all movements of signalized intersections and all-way stop-controlled intersections; for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.

Thresholds of Significance

The thresholds of significance utilized in this study are consistent with the *2005 Long Range Development Plan Amendment 2 Draft Environmental Impact Report (University of California Riverside, August 2011)*.

For study intersections under the jurisdiction of the City of Riverside, a significant impact occurs when the addition of project-related trips causes the peak hour delay to increase as follows:

LOS A/B = By 10.0 seconds

LOS C = By 8.0 seconds

LOS D = By 5.0 seconds

LOS E = By 2.0 seconds

LOS F = By 1.0 seconds

For study intersections located within the University Campus, a significant impact occurs when the addition of project-related trips causes an intersection to operate at LOS E or F, regardless of the amount of project-related trips that travel through the intersection.

EXISTING CONDITIONS

Roadway Description

The characteristics of the roadway system in the vicinity of the project site are described below:

University Avenue is a four-land divided roadway with a landscaped median west of I-215/SR-60 trending in an east-west direction. University Avenue transitions between a three-lane and two-lane undivided roadway east of I-215/SR-60. University Avenue provides on-street Class II bike lanes with pavement marking enhancements at intersections. The speed limit is 35 miles per hour on University Avenue within the project vicinity; on-street parking is prohibited.

Everton Place is a two-lane undivided roadway trending in an east-west direction. There is no posted speed limit within the project vicinity; on-street parking is prohibited. Everton Place provides full access to the UCR Extension Center through a driveway at Everton Place.

Iowa Avenue is a four-lane divided roadway trending in a north-south direction with a landscaped median north of University Avenue and a two-lane divided roadway with a continuous left-turn lane immediately south of University Avenue. The posted speed limit is 45 miles per hour on Iowa Avenue within the project vicinity; on-street parking is prohibited.

University Village intersects University Avenue in a north-south direction and provides full access to the University Village shopping center north of University Avenue and full access to the UCR Extension Center south of University Avenue.

West Campus Drive is a four-lane divided roadway with a landscaped median trending in a north-south direction. The posted speed limit is 25 miles per hour on West Campus Drive within the project vicinity; on-street parking is prohibited.

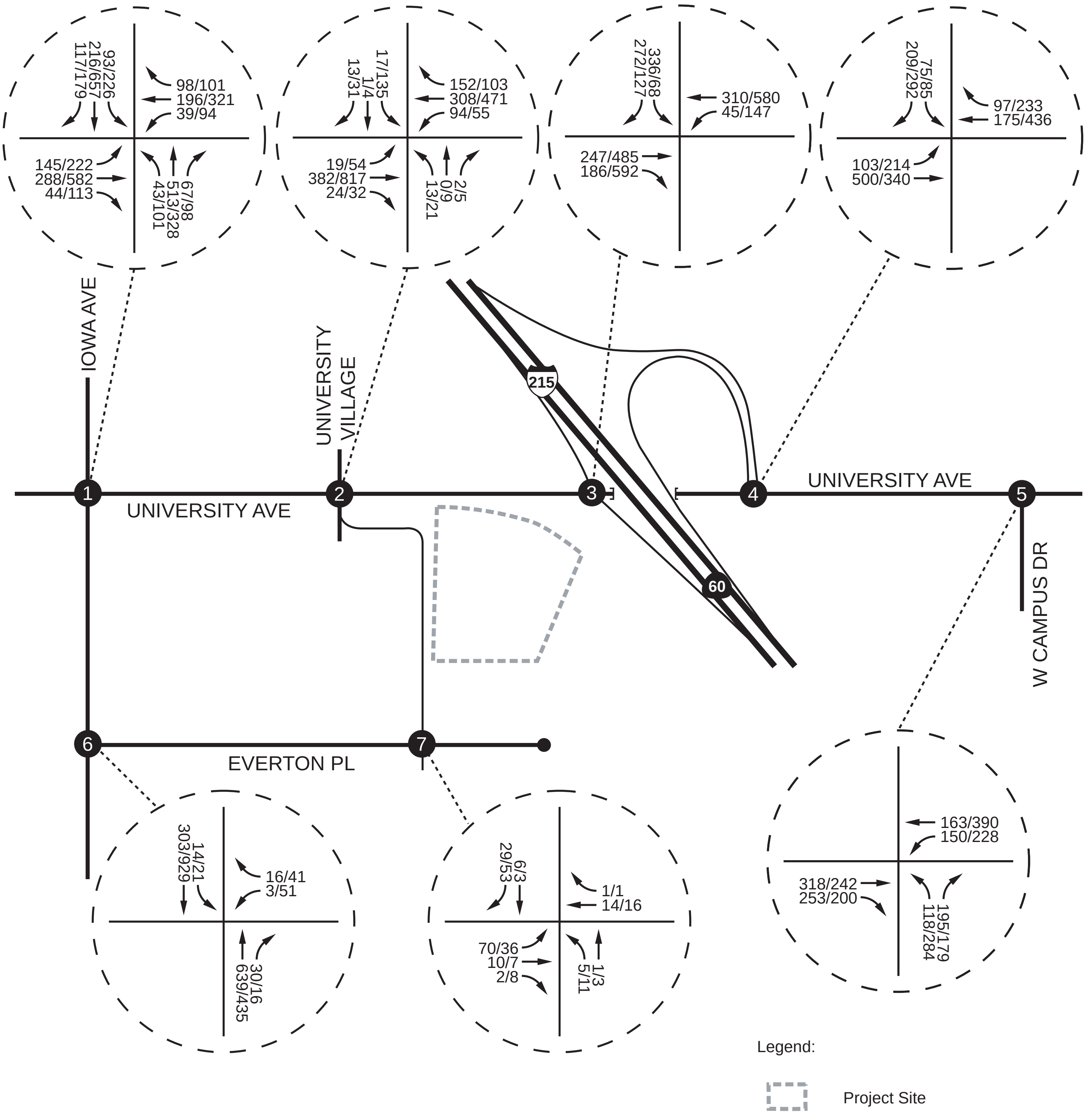
Existing Conditions Traffic Volumes and Geometry

To determine the existing operation of the study intersections, a.m. peak hour and p.m. peak hour intersection movement counts were collected in January/March 2015 during typical weekday conditions when school was in session; a.m. peak period intersection counts were collected from 7:00 a.m. to 9:00 a.m. and p.m. peak period intersection counts were collected from 4:00 p.m. to 6:00 p.m. The counts used in this analysis were taken from the highest hour within the peak period counted.

Exhibit 4 shows existing conditions a.m. peak hour and p.m. peak hour volumes at the study intersections; detailed January/March 2015 traffic count data is contained in Appendix A. Exhibit 5 shows existing conditions study intersection geometry and traffic control.

Existing Conditions Peak Hour Intersection Level of Service

Table 2 summarizes existing conditions a.m. and p.m. peak hour LOS of the study intersections; detailed analysis sheets are contained in Appendix B.



Not to Scale

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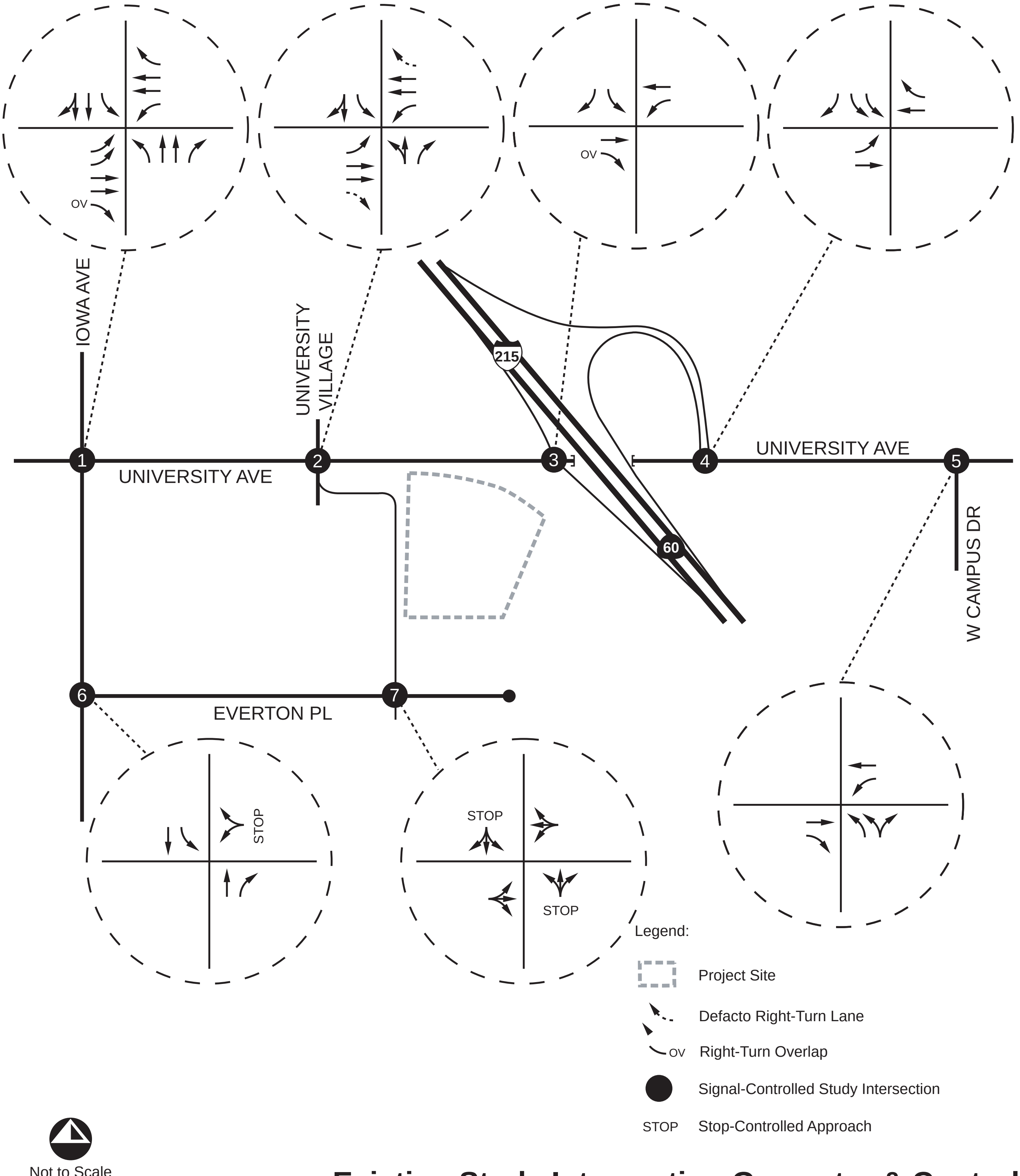
Existing Conditions
AM & PM Peak Hour Study Intersection Volumes

Exhibit 4



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Existing Study Intersection Geometry & Control

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Exhibit 5

Table 2
Existing Conditions AM & PM Peak Hour LOS of Study Intersections

Study Intersection	Delay – LOS	
	AM Peak Hour	PM Peak Hour
1. Iowa Ave/University Ave	31.1 – C	40.7 – D
2. University Village/University Ave	19.0 – B	16.1 – B
3. I-215 SB Ramps (SR-60 EB)/University Ave	17.5 – B	16.4 – B
4. I-215 NB Ramps (SR-60 WB)/University Ave	15.2 – B	28.4 – C
5. W Campus Dr/University Ave	18.5 – B	18.8 – B
6. Iowa Avenue/Everton Pl	13.8 – B	31.3 – D
7. Project Driveway/Everton Pl	10.0 – B	9.7 – A

Notes: Delay shown in seconds; SB = Southbound; NB = Northbound; EB = Eastbound; WB = Westbound.

As shown in Table 2, the study intersections are currently operating at an acceptable LOS (LOS D or better).

PROPOSED PROJECT

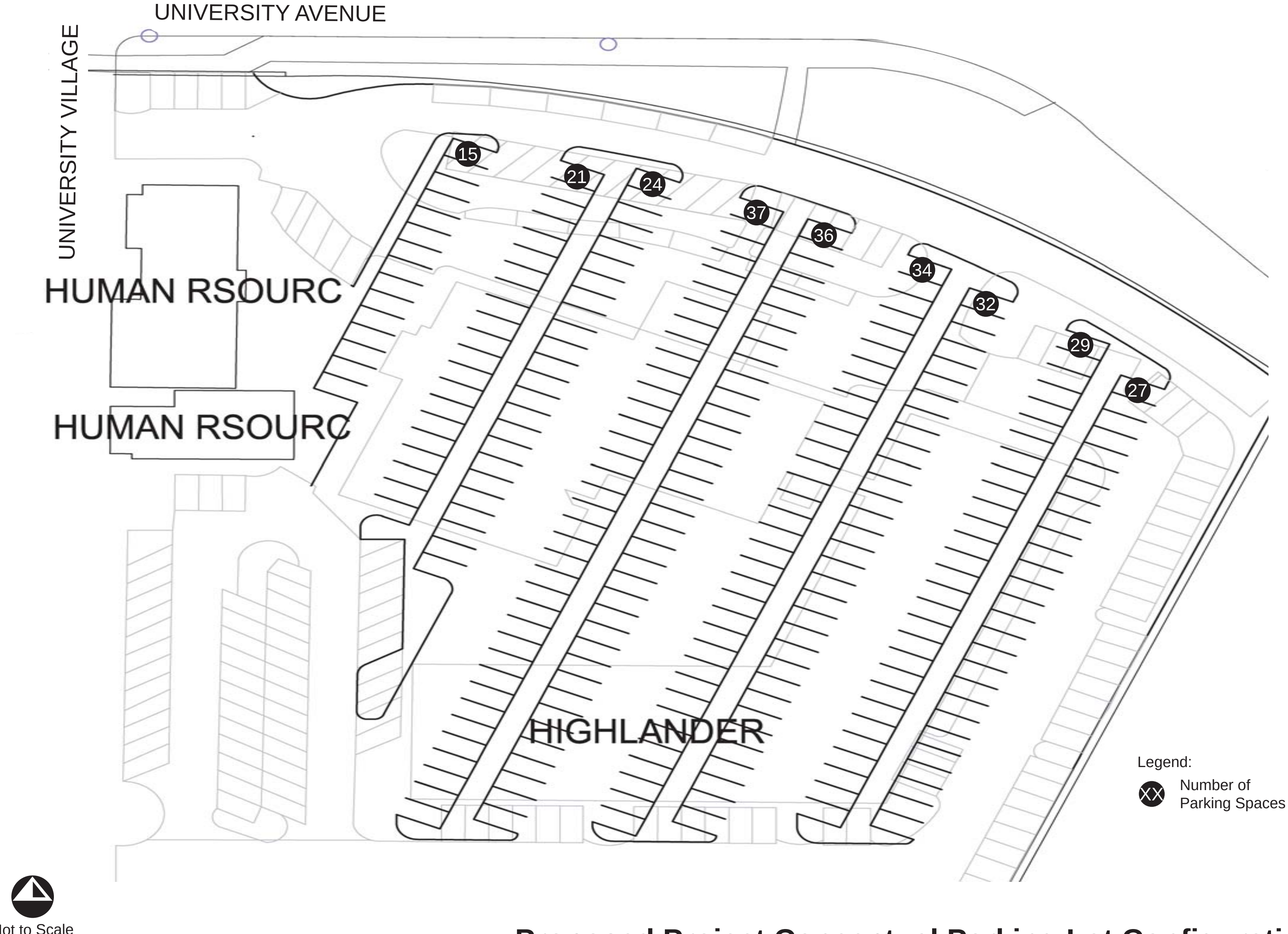
The project site is located in the southwest corner of University Avenue and I-215 (SR-60). The proposed project consists of demolition of the currently vacated Highlander Hall and replacing it with an off-street surface parking lot.

The project site is currently developed with an unoccupied building (Highlander Hall) for which the associated parking is currently being utilized by staff, employees, and students of UCR. Full access for the project site is provided via the University Village intersection at University Avenue; an additional access at University Avenue is restricted to right-turn out only.

The proposed project conceptual parking lot configuration is shown on Exhibit 6.

Forecast Project Trip Generation

The proposed parking lot project will not generate "new" trips in relation to UCR operations since the proposed parking lot is intended to accommodate the existing parking demand of displaced parking supply resulting from the removal of existing parking spaces currently located on the main campus areas east of I-215/SR-60. The proposed project is not associated with an increase in land uses or student enrollment. Therefore, the project trip generation considers redistribution of vehicle trips that change their destination from the main campus parking areas east of I-215/SR-60 to the project site west of I-215/SR-60.



Proposed Project Conceptual Parking Lot Configuration

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Exhibit 6

Based on information provided by UCR Transportation and Parking Services, the existing parking spaces associated with Highlander Hall will continue to serve UCR staff, employees, and students, and each parking space is utilized by an average of two vehicles during a typical academic day. Based on the maximum of 255 proposed parking spaces within the defined project boundaries (195 net new parking spaces), the proposed parking lot is forecast to be utilized by approximately 510 vehicles per day, or 1,020 two-way vehicle trips per day. It should be noted, this is a conservative trip generation forecast since the proposed conceptual parking lot configuration would remove some existing parking spaces; therefore, the net increase would only be 195 additional parking spaces.

The peak hour percentages of forecast trips, as well as the inbound/outbound splits, are estimated based on 24-hour traffic counts collected at the two existing primary entrances to the Highlander Hall parking area; detailed 24-hour traffic count data is contained in Appendix C. Based on the traffic count data collected, both the a.m. peak hour and p.m. peak hour are approximately 11-percent of the daily trips currently accessing the Highlander Hall parking area. It should be noted that the traffic counts account for trips associated with trips created within the project boundary, as well as trips associated with the adjacent, contiguous parking lot.

Table 3 shows the existing trips forecast to be redistributed within the study area.

Table 3
Existing Project-Related Trips Forecast to be Redistributed Within the Study Area

Proposed Project	AM Peak Hour[1]			PM Peak Hour[1]			Daily Trips[2]
	In	Out	Total	In	Out	Total	
255 parking spaces	83	29	112	19	93	112	1,020

Notes: 1 = Based on the percentage of trips occurring during the a.m. peak hour and p.m. peak hour compared to the total over 24-hours surveyed at the two primary entrances to Highlander Hall parking area.
2 = Based on an average of two vehicles utilizing each parking space per day (four trips).

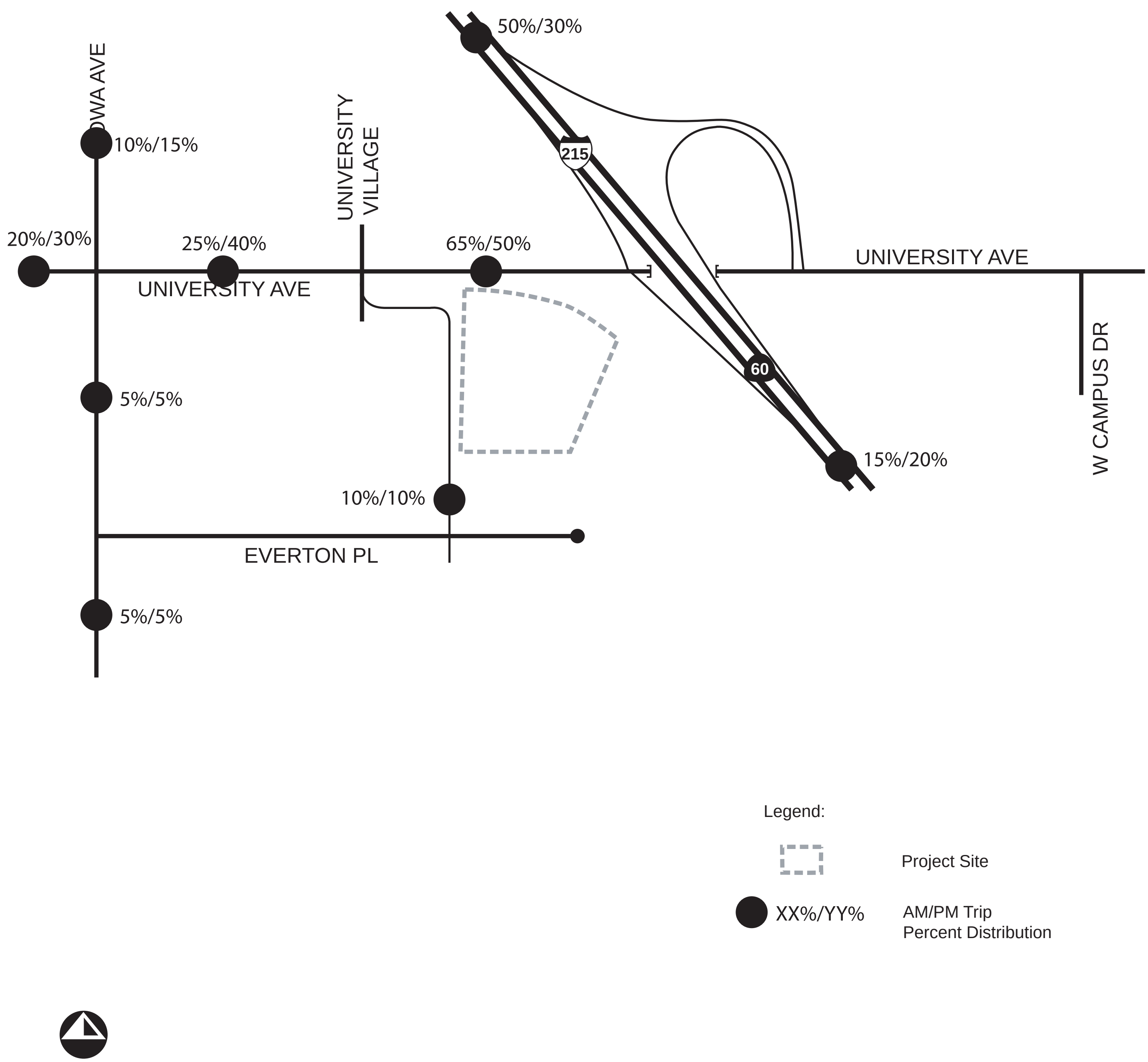
As shown in Table 3, the proposed project is forecast to result in 1,020 daily trips being redistributed within the study area, including 112 redistributed trips during the a.m. peak hour and 112 redistributed trips during the p.m. peak hour.

Forecast Project Site Trip Distribution

Exhibit 7 shows the forecast trip redistribution patterns of the proposed project. Exhibit 8 shows the estimated trip redistribution patterns of existing trips forecast to be redistributed based on review of existing traffic data in the study area.

Forecast Trip Assignment of Proposed Project

Exhibit 9 shows the corresponding forecast assignment of existing a.m. peak hour and p.m. peak hour trips forecast to be redistributed from the main campus parking areas east of I-215/SR-60 to the project site west of I-215/SR-60 based on the trip percent distributions shown in Exhibits 7 and 8.



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Forecast Project Trip Redistribution Patterns

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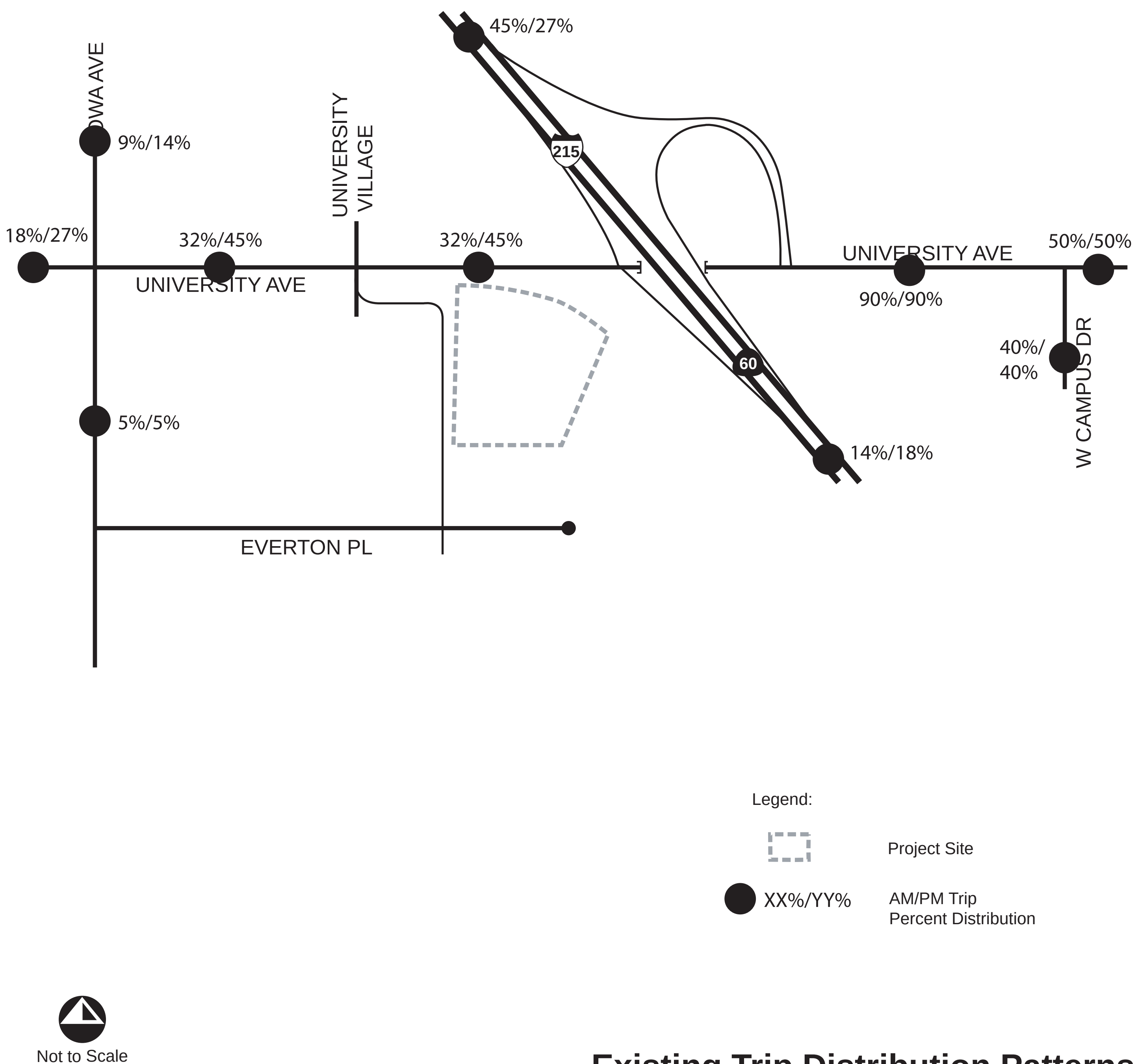
Exhibit 7



Existing Trip Distribution Patterns

Exhibit 8

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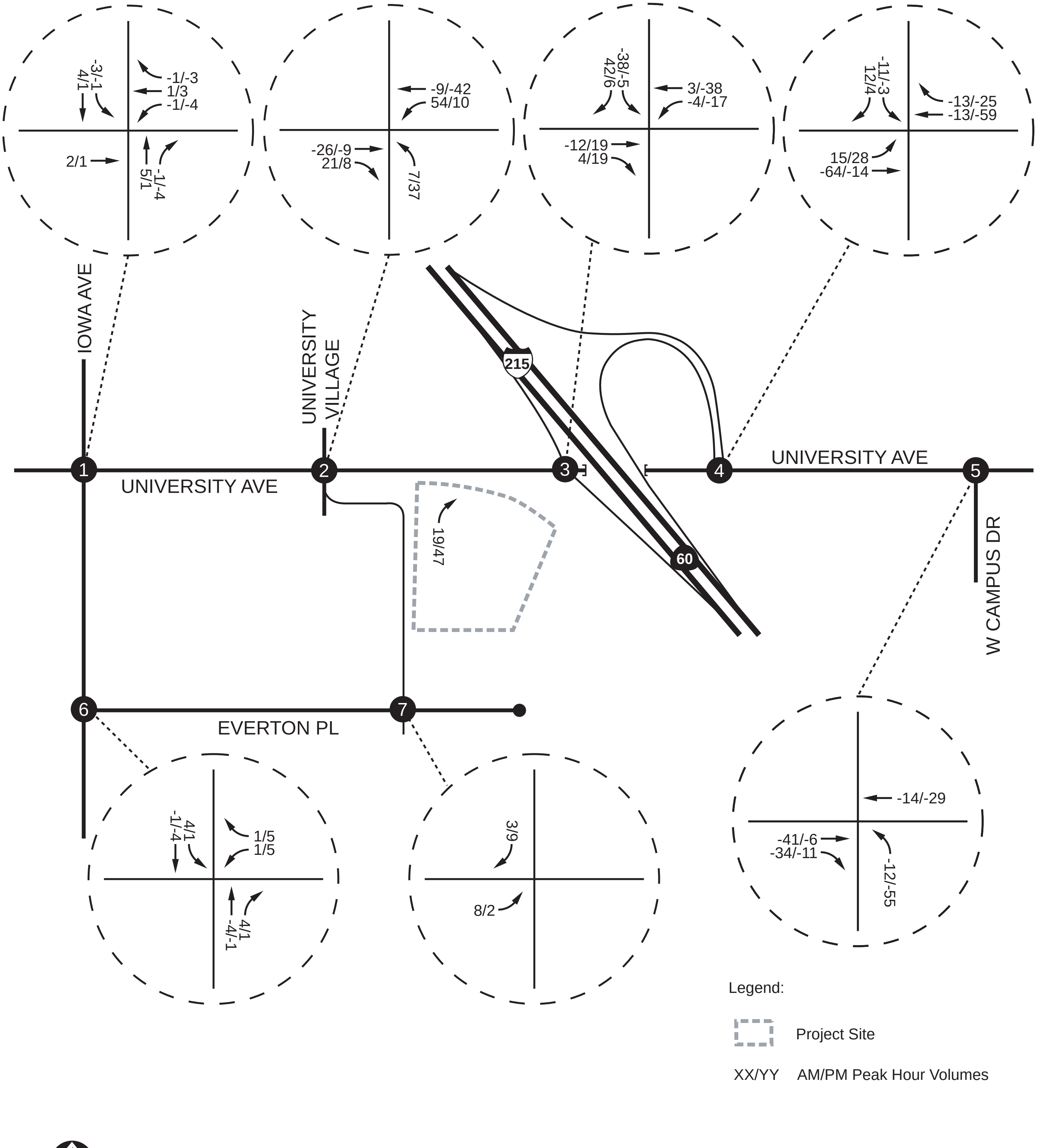

Forecast Project-Related Redistributed AM & PM Peak Hour Study Intersection Volumes

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Exhibit 9

FORECAST EXISTING PLUS PROJECT CONDITIONS

This section analyzes the potential traffic impact of the proposed project and corresponding project-related trip redistributions in comparison to existing traffic conditions.

Forecast Existing Plus Project Conditions Traffic Volumes

Exhibit 10 shows a.m. and p.m. peak hour volumes at the study intersections for forecast existing plus project conditions.

Forecast Existing Plus Project Conditions Peak Hour Intersection Level of Service

Table 4 summarizes forecast existing plus project conditions a.m. and p.m. peak hour LOS of the study intersections; detailed analysis sheets are contained in Appendix B.

Table 4
Forecast Existing Plus Project Conditions
AM & PM Peak Hour LOS of Study Intersections

Study Intersection	Existing Conditions		Forecast Existing Plus Project Conditions		Change in Delay		Significant Impact?
	Delay – LOS		Delay – LOS		AM Peak Hour	PM Peak Hour	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour			
1. Iowa Ave/University Ave	31.1 – C	40.7 – D	31.1 – C	40.7 – D	0.0	0.0	No
2. University Village/University Ave	19.0 – B	16.1 – B	21.2 – C	17.3 – B	2.2	1.2	No
3. I-215 SB Ramps (SR-60 EB)/ University Ave	17.5 – B	16.4 – B	17.2 – B	15.6 – B	-0.3	-0.8	No
4. I-215 NB Ramps (SR-60 WB)/ University Ave	15.2 – B	28.4 – C	15.8 – B	27.6 – C	0.6	-0.8	No
5. W Campus Dr/University Ave	18.5 – B	18.8 – B	18.0 – B	18.6 – B	-0.5	-0.2	No
6. Iowa Avenue/Everton Pl	13.8 – B	31.3 – D	14.0 – B	32.8 – D	0.2	1.5	No
7. Project Driveway/Everton Pl	10.0 – B	9.7 – A	10.2 – B	9.8 – A	0.2	0.1	No

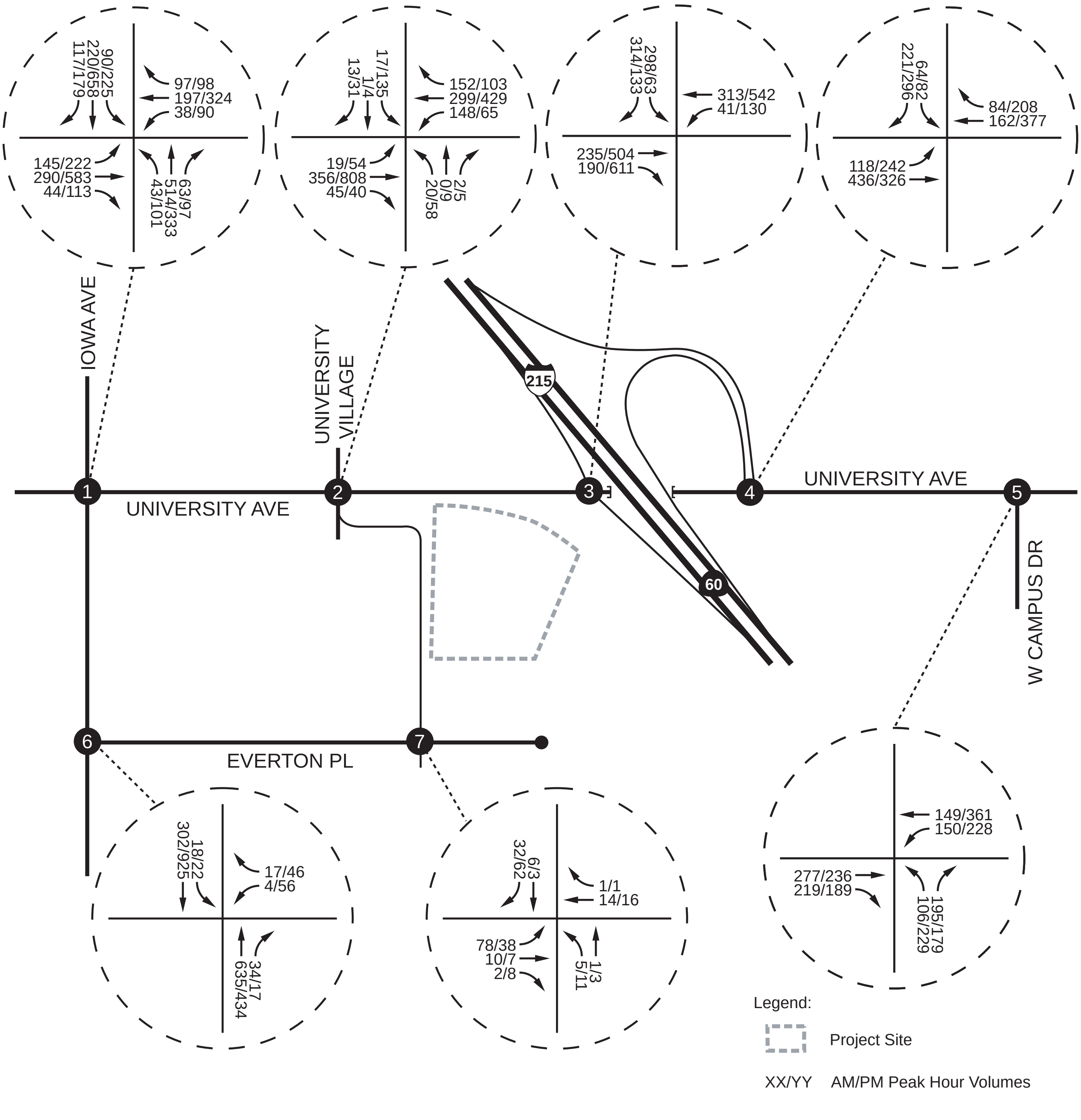
Notes: Delay shown in seconds; SB = Southbound; NB = Northbound; EB = Eastbound; WB = Westbound.

As shown in Table 4, with the redistributed project trips, the study intersections are forecast to continue to operate at an acceptable LOS (LOS D or better) according to applicable performance criteria for forecast existing plus project conditions.

As also shown in Table 4, based on the City-established thresholds of significance, the addition of the proposed project is forecast to result in no significant impacts at the study intersections for forecast existing plus project conditions.

MITIGATION MEASURES

Based on agency-established thresholds of significance (both City of Riverside and University of California Riverside), the proposed project is forecast to result in no significant traffic impacts at the study intersections for the evaluated scenarios; hence, no traffic mitigation measures are required for the proposed project.



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Forecast Existing Plus Project Conditions
AM & PM Peak Hour Study Intersection Volumes

H:\pdata\144698\Exhibits MAR/2015 Exhibit 10

CONCLUSIONS

The proposed parking lot project will not generate "new" trips in relation to UCR operations since the proposed parking lot is intended to accommodate the existing parking demand of displaced parking supply resulting from the removal of existing parking spaces currently located on the main campus areas east of I-215/SR-60. The proposed project is not associated with an increase in land uses or student enrollment. Therefore, the project trip generation considers redistribution of vehicle trips that change their destination from the main campus parking areas east of I-215/SR-60 to the project site west of I-215/SR-60.

The proposed project is forecast to result in 1,020 daily trips being redistributed within the study area, including 112 redistributed trips during the a.m. peak hour and 112 redistributed trips during the p.m. peak hour.

Based on agency-established thresholds of significance, the proposed project is forecast to result in no significant traffic impacts at the study intersections for the evaluated scenarios; hence, no traffic mitigation measures are required for the proposed project.

APPENDIX A
Existing Count Data

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	SC0519
Tue, Jan 13, 15	NORTH & SOUTH:	Iowa	LOCATION #:	1
	EAST & WEST:	University	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND University			WESTBOUND University			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	1	1	2	0	2	2	1	1	2	1	
AM	7:00 AM	8	69	3	12	24	14	22	41	2	6	34	15	250
AM	7:15 AM	15	115	11	20	39	15	31	69	4	5	38	14	376
AM	7:30 AM	6	158	14	33	53	30	27	68	11	4	47	20	471
AM	7:45 AM	12	157	27	21	60	45	47	86	11	10	48	33	557
AM	8:00 AM	12	104	14	19	60	19	44	73	15	16	49	24	449
AM	8:15 AM	13	94	12	20	43	23	27	61	7	9	52	21	382
AM	8:30 AM	12	84	13	26	37	20	30	70	11	8	45	19	375
AM	8:45 AM	16	67	19	45	39	25	25	63	8	7	53	25	392
AM	VOLUMES	94	848	113	196	355	191	253	531	69	65	366	171	3,282
AM	APPROACH %	9%	80%	11%	26%	48%	26%	30%	62%	8%	11%	61%	28%	
AM	APP/DEPART	1,055	/	1,279	749	/	489	854	/	862	624	/	652	0
AM	BEGIN PEAK HR		7:30 AM											
AM	VOLUMES	43	513	67	93	216	117	145	288	44	39	196	98	1,859
AM	APPROACH %	7%	82%	11%	22%	51%	27%	30%	60%	9%	12%	59%	29%	
AM	PEAK HR FACTOR		0.795			0.845			0.828			0.915		0.834
AM	APP/DEPART	623	/	756	426	/	299	477	/	448	333	/	356	0
PM	4:00 PM	22	77	28	44	133	45	35	120	13	14	87	26	644
PM	4:15 PM	19	42	21	40	145	43	53	106	19	25	77	33	623
PM	4:30 PM	20	52	20	43	148	32	50	148	29	39	67	14	662
PM	4:45 PM	23	64	18	71	168	30	49	123	29	15	81	8	679
PM	5:00 PM	26	91	25	55	148	47	72	154	33	32	82	36	801
PM	5:15 PM	26	102	31	49	185	54	49	153	31	25	82	33	820
PM	5:30 PM	26	71	24	51	156	48	52	152	20	22	76	24	722
PM	5:45 PM	13	59	22	60	150	45	38	127	38	18	79	19	668
PM	VOLUMES	175	558	189	413	1,233	344	398	1,083	212	190	631	193	5,707
PM	APPROACH %	19%	61%	20%	21%	62%	17%	24%	64%	13%	19%	62%	19%	
PM	APP/DEPART	922	/	1,160	2,001	/	1,635	1,696	/	1,759	1,088	/	1,153	0
PM	BEGIN PEAK HR		4:45 PM											
PM	VOLUMES	101	328	98	226	657	179	222	582	113	94	321	101	3,022
PM	APPROACH %	19%	62%	19%	21%	62%	17%	24%	63%	12%	18%	62%	20%	
PM	PEAK HR FACTOR		0.829			0.922			0.885			0.860		0.921
PM	APP/DEPART	527	/	651	1,062	/	864	917	/	906	516	/	601	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	SC0519
Tue, Jan 13, 15	NORTH & SOUTH:	University Village	LOCATION #:	2
	EAST & WEST:	University	CONTROL:	SIGNAL

NOTES:

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		NORTHBOUND University Village			SOUTHBOUND University Village			EASTBOUND University			WESTBOUND University			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0.5	0.5	1	1	0.5	0.5	1	3	0	1	3	0	
AM	7:00 AM	1	0	5	3	1	2	2	57	3	12	59	15	160
AM	7:15 AM	0	0	2	2	0	1	6	85	4	11	61	23	195
AM	7:30 AM	4	0	0	3	0	2	4	101	4	19	73	59	269
AM	7:45 AM	2	0	0	4	0	2	6	120	6	26	84	45	295
AM	8:00 AM	2	0	0	6	1	4	4	95	5	23	82	26	248
AM	8:15 AM	5	0	2	4	0	5	5	66	9	26	69	22	213
AM	8:30 AM	6	2	7	2	0	1	5	87	14	33	56	34	247
AM	8:45 AM	3	1	3	7	0	4	7	87	28	29	78	44	291
AM	VOLUMES	23	3	19	31	2	21	39	698	73	179	562	268	2,019
AM	APPROACH %	51%	7%	42%	57%	4%	39%	5%	86%	9%	18%	56%	27%	
AM	APP/DEPART	45	/	313	57	/	254	849	/	807	1,068	/	645	0
AM	BEGIN PEAK HR		7:30 AM											
AM	VOLUMES	13	0	2	17	1	13	19	382	24	94	308	152	1,025
AM	APPROACH %	87%	0%	13%	55%	3%	42%	4%	90%	6%	17%	56%	27%	
AM	PEAK HR FACTOR		0.536			0.705			0.805			0.894		0.869
AM	APP/DEPART	15	/	171	31	/	119	425	/	401	554	/	334	0
PM	4:00 PM	2	2	2	23	3	7	12	180	3	4	117	23	378
PM	4:15 PM	4	0	2	24	1	3	11	146	8	7	116	25	347
PM	4:30 PM	8	0	4	24	0	9	10	180	3	8	82	19	347
PM	4:45 PM	2	2	1	19	1	6	9	197	4	12	107	26	386
PM	5:00 PM	6	0	1	43	2	4	21	214	9	6	149	25	480
PM	5:15 PM	8	2	0	50	1	14	14	194	10	21	107	26	447
PM	5:30 PM	5	5	3	23	0	7	10	212	9	16	108	26	424
PM	5:45 PM	5	1	1	19	4	8	12	179	15	14	100	19	377
PM	VOLUMES	40	12	14	225	12	58	99	1,502	61	88	886	189	3,343
PM	APPROACH %	61%	18%	21%	76%	4%	20%	6%	90%	4%	8%	76%	16%	
PM	APP/DEPART	68	/	300	295	/	163	1,722	/	1,836	1,258	/	1,044	0
PM	BEGIN PEAK HR		4:45 PM											
PM	VOLUMES	21	9	5	135	4	31	54	817	32	55	471	103	1,737
PM	APPROACH %	60%	26%	14%	79%	2%	18%	6%	90%	4%	9%	75%	16%	
PM	PEAK HR FACTOR		0.673			0.654			0.925			0.874		0.905
PM	APP/DEPART	35	/	166	170	/	91	903	/	957	629	/	523	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	SC0519
Tue, Jan 13, 15	NORTH & SOUTH:	I-215 SB	LOCATION #:	3
	EAST & WEST:	University	CONTROL:	SIGNAL

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		NORTHBOUND I-215 SB			SOUTHBOUND I-215 SB			EASTBOUND University			WESTBOUND University			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	X	X	X	1.5	0.5	1	X	1.5	1.5	1	2	X	
AM	7:00 AM	0	0	0	35	0	36	0	37	37	8	56	0	209
AM	7:15 AM	0	0	0	49	0	43	0	47	49	11	62	0	261
AM	7:30 AM	0	0	0	83	0	74	0	59	51	10	90	0	367
AM	7:45 AM	0	0	0	135	0	88	0	76	43	10	82	0	434
AM	8:00 AM	0	0	0	69	0	54	0	71	43	15	81	0	333
AM	8:15 AM	0	0	0	49	0	56	0	41	49	10	57	0	262
AM	8:30 AM	0	0	0	54	1	52	0	44	63	11	89	0	314
AM	8:45 AM	0	0	0	66	1	62	0	53	62	12	100	0	356
AM	VOLUMES	0	0	0	540	2	465	0	428	397	87	617	0	2,537
AM	APPROACH %	0%	0%	0%	54%	0%	46%	0%	52%	48%	12%	88%	0%	
AM	APP/DEPART	0	/	0	1,007	/	486	825	/	969	705	/	1,082	0
AM	BEGIN PEAK HR		7:30 AM											
AM	VOLUMES	0	0	0	336	0	272	0	247	186	45	310	0	1,396
AM	APPROACH %	0%	0%	0%	55%	0%	45%	0%	57%	43%	13%	87%	0%	
AM	PEAK HR FACTOR		0.000			0.682			0.910			0.888		0.804
AM	APP/DEPART	0	/	0	608	/	231	433	/	583	355	/	582	0
PM	4:00 PM	0	0	0	15	0	26	0	89	136	20	132	0	418
PM	4:15 PM	0	0	0	16	1	41	0	89	112	27	105	0	391
PM	4:30 PM	0	0	0	18	0	37	0	98	125	34	100	0	412
PM	4:45 PM	0	0	0	26	1	33	0	117	129	22	135	0	463
PM	5:00 PM	0	0	0	17	0	25	0	127	151	37	154	0	511
PM	5:15 PM	0	0	0	15	3	22	0	125	154	62	165	0	546
PM	5:30 PM	0	0	0	10	3	40	0	116	158	26	126	0	479
PM	5:45 PM	0	0	0	22	2	36	0	79	129	20	109	0	397
PM	VOLUMES	0	0	0	139	10	260	0	840	1,094	248	1,026	0	3,618
PM	APPROACH %	0%	0%	0%	34%	2%	64%	0%	43%	57%	19%	81%	0%	
PM	APP/DEPART	0	/	0	409	/	1,352	1,934	/	980	1,275	/	1,286	0
PM	BEGIN PEAK HR		4:45 PM											
PM	VOLUMES	0	0	0	68	7	120	0	485	592	147	580	0	1,999
PM	APPROACH %	0%	0%	0%	35%	4%	62%	0%	45%	55%	20%	80%	0%	
PM	PEAK HR FACTOR		0.000			0.813			0.965			0.801		0.915
PM	APP/DEPART	0	/	0	195	/	746	1,077	/	553	727	/	700	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	SC0519
Tue, Jan 13, 15	NORTH & SOUTH:	I-215 NB	LOCATION #:	4
	EAST & WEST:	University	CONTROL:	SIGNAL

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		NORTHBOUND I-215 NB			SOUTHBOUND I-215 NB			EASTBOUND University			WESTBOUND University			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	X	X	X	2	X	1	1	2	X	X	2	0	
AM	7:00 AM	0	0	0	8	0	42	22	52	0	0	28	14	166
AM	7:15 AM	0	0	0	15	0	49	17	84	0	0	30	19	214
AM	7:30 AM	0	0	0	22	0	63	29	116	0	0	43	27	300
AM	7:45 AM	0	0	0	25	0	48	31	182	0	0	49	21	356
AM	8:00 AM	0	0	0	13	0	49	26	118	0	0	53	30	289
AM	8:15 AM	0	0	0	16	0	39	23	70	0	0	34	15	197
AM	8:30 AM	0	0	0	15	0	65	18	84	0	0	40	12	234
AM	8:45 AM	0	0	0	8	0	68	19	104	0	0	49	13	261
AM	VOLUMES	0	0	0	122	0	423	185	810	0	0	326	151	2,017
AM	APPROACH %	0%	0%	0%	22%	0%	78%	19%	81%	0%	0%	68%	32%	
AM	APP/DEPART	0	/	336	545	/	0	995	/	932	477	/	749	0
AM	BEGIN PEAK HR		7:15 AM											
AM	VOLUMES	0	0	0	75	0	209	103	500	0	0	175	97	1,159
AM	APPROACH %	0%	0%	0%	26%	0%	74%	17%	83%	0%	0%	64%	36%	
AM	PEAK HR FACTOR		0.000			0.835			0.708			0.819		0.814
AM	APP/DEPART	0	/	200	284	/	0	603	/	575	272	/	384	0
PM	4:00 PM	0	0	0	20	0	69	36	68	0	0	83	47	323
PM	4:15 PM	0	0	0	11	0	55	36	69	0	0	77	27	275
PM	4:30 PM	0	0	0	17	0	54	34	82	0	0	80	53	320
PM	4:45 PM	0	0	0	25	0	93	38	106	0	0	65	31	358
PM	5:00 PM	0	0	0	24	0	66	55	89	0	0	125	87	446
PM	5:15 PM	0	0	0	22	0	68	63	77	0	0	159	74	463
PM	5:30 PM	0	0	0	14	0	65	58	68	0	0	87	41	333
PM	5:45 PM	0	0	0	11	0	52	23	78	0	0	77	48	289
PM	VOLUMES	0	0	0	144	0	522	343	637	0	0	753	408	2,807
PM	APPROACH %	0%	0%	0%	22%	0%	78%	35%	65%	0%	0%	65%	35%	
PM	APP/DEPART	0	/	751	666	/	0	980	/	781	1,161	/	1,275	0
PM	BEGIN PEAK HR		4:45 PM											
PM	VOLUMES	0	0	0	85	0	292	214	340	0	0	436	233	1,600
PM	APPROACH %	0%	0%	0%	23%	0%	77%	39%	61%	0%	0%	65%	35%	
PM	PEAK HR FACTOR		0.000			0.799			0.962			0.718		0.864
PM	APP/DEPART	0	/	447	377	/	0	554	/	425	669	/	728	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	SC0519
Tue, Jan 13, 15	NORTH & SOUTH:	Campus	LOCATION #:	5
	EAST & WEST:	University	CONTROL:	SIGNAL

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		NORTHBOUND Campus			SOUTHBOUND Campus			EASTBOUND University			WESTBOUND University		
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1.5	X	0.5	X	X	X	X	1	1	1	2	0	
AM	7:00 AM	13	0	20	0	0	0	0	35	27	14	30	0	139
AM	7:15 AM	18	0	20	0	0	0	0	66	39	20	32	0	195
AM	7:30 AM	36	0	37	0	0	0	0	82	58	25	37	0	275
AM	7:45 AM	27	0	58	0	0	0	0	121	88	55	46	0	395
AM	8:00 AM	36	0	62	0	0	0	0	61	72	36	48	0	315
AM	8:15 AM	19	0	38	0	0	0	0	54	35	34	32	0	212
AM	8:30 AM	17	0	14	0	0	0	0	60	41	18	38	0	188
AM	8:45 AM	25	0	22	0	0	0	0	57	60	25	40	0	229
AM	VOLUMES	191	0	271	0	0	0	0	536	420	227	303	0	1,948
AM	APPROACH %	41%	0%	59%	0%	0%	0%	0%	56%	44%	43%	57%	0%	
AM	APP/DEPART	462	/	0	0	/	647	956	/	807	530	/	494	0
AM	BEGIN PEAK HR		7:30 AM											
AM	VOLUMES	118	0	195	0	0	0	0	318	253	150	163	0	1,197
AM	APPROACH %	38%	0%	62%	0%	0%	0%	0%	56%	44%	48%	52%	0%	
AM	PEAK HR FACTOR		0.798			0.000			0.683			0.775		0.758
AM	APP/DEPART	313	/	0	0	/	403	571	/	513	313	/	281	0
PM	4:00 PM	46	0	38	0	0	0	0	46	42	39	84	0	295
PM	4:15 PM	41	0	29	0	0	0	0	37	43	26	63	0	239
PM	4:30 PM	48	0	31	0	0	0	0	60	39	45	85	0	308
PM	4:45 PM	47	0	31	0	0	0	0	58	73	61	49	0	319
PM	5:00 PM	96	0	61	0	0	0	0	63	50	77	116	0	463
PM	5:15 PM	93	0	56	0	0	0	0	61	38	45	140	0	433
PM	5:30 PM	48	0	31	0	0	0	0	49	33	41	80	0	282
PM	5:45 PM	57	0	30	0	0	0	0	55	34	54	68	0	298
PM	VOLUMES	476	0	307	0	0	0	0	429	352	388	685	0	2,641
PM	APPROACH %	61%	0%	39%	0%	0%	0%	0%	55%	45%	36%	64%	0%	
PM	APP/DEPART	786	/	0	0	/	743	781	/	737	1,074	/	1,161	0
PM	BEGIN PEAK HR		4:30 PM											
PM	VOLUMES	284	0	179	0	0	0	0	242	200	228	390	0	1,523
PM	APPROACH %	61%	0%	39%	0%	0%	0%	0%	55%	45%	37%	63%	0%	
PM	PEAK HR FACTOR		0.737			0.000			0.844			0.801		0.822
PM	APP/DEPART	463	/	0	0	/	428	442	/	421	618	/	674	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:				
Wed, Mar 18, 15	LOCATION:	Riverside	PROJECT #:	UC1503
	NORTH & SOUTH:	Iowa	LOCATION #:	6
	EAST & WEST:	Everton	CONTROL:	STOP W

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		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND Everton			WESTBOUND Everton			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	X	1	1	1	1	X	X	X	X	0	X	0	
AM	7:00 AM	0	96	4	1	39	0	0	0	0	1	0	1	142
	7:15 AM	0	110	3	1	69	0	0	0	0	1	0	4	188
	7:30 AM	0	166	8	2	63	0	0	0	0	0	0	4	243
	7:45 AM	0	168	6	7	79	0	0	0	0	1	0	2	263
	8:00 AM	0	105	9	2	49	0	0	0	0	1	0	4	170
	8:15 AM	0	87	4	9	66	0	0	0	0	3	0	6	175
	8:30 AM	0	103	15	2	42	0	0	0	0	11	0	4	177
	8:45 AM	0	73	4	2	49	0	0	0	0	0	0	2	130
	VOLUMES	0	908	53	26	456	0	0	0	0	18	0	27	1,489
	APPROACH %	0%	94%	6%	5%	94%	0%	0%	0%	0%	40%	0%	60%	
	APP/DEPART	961	/	936	483	/	474	0	/	79	45	/	0	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	0	549	26	12	260	0	0	0	0	3	0	14	865
	APPROACH %	0%	95%	5%	4%	95%	0%	0%	0%	0%	18%	0%	82%	
	PEAK HR FACTOR		0.826			0.794			0.000			0.850		0.822
	APP/DEPART	575	/	564	273	/	263	0	/	38	17	/	0	0
PM	4:00 PM	0	77	1	2	95	0	0	0	0	12	0	14	201
	4:15 PM	0	63	5	6	97	0	0	0	0	4	0	3	178
	4:30 PM	0	67	8	4	139	0	0	0	0	4	0	7	229
	4:45 PM	0	78	6	4	164	1	0	0	0	4	0	3	260
	5:00 PM	0	81	1	2	149	0	0	0	0	19	0	17	269
	5:15 PM	0	81	3	7	195	0	0	0	0	9	0	5	300
	5:30 PM	0	87	2	3	190	0	0	0	0	6	0	6	294
	5:45 PM	0	68	3	2	134	0	0	0	0	2	0	2	211
	VOLUMES	0	602	29	30	1,163	1	0	0	0	60	0	57	1,946
	APPROACH %	0%	95%	5%	3%	97%	0%	0%	0%	0%	51%	0%	49%	
	APP/DEPART	631	/	663	1,198	/	1,223	0	/	59	117	/	1	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	0	327	12	16	698	1	0	0	0	38	0	31	1,125
	APPROACH %	0%	96%	4%	2%	97%	0%	0%	0%	0%	55%	0%	45%	
	PEAK HR FACTOR		0.952			0.887			0.000			0.479		0.938
	APP/DEPART	339	/	360	717	/	736	0	/	28	69	/	1	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Riverside	PROJECT #:	UC1503
Wed, Mar 18, 15	NORTH & SOUTH:	Everton	LOCATION #:	7
	EAST & WEST:	Dwy (Parking Lot)	CONTROL:	none

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		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		Everton			Everton			Dwy (Parking Lot)			Dwy (Parking Lot)			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	1	1	2	0	2	2	1	1	2	1	
AM	7:00 AM	0	0	0	0	0	0	6	2	0	0	2	0	10
	7:15 AM	0	0	0	0	0	0	4	1	0	0	1	0	6
	7:30 AM	0	0	0	0	1	1	9	0	0	0	5	1	17
	7:45 AM	0	0	0	0	0	0	14	2	2	0	4	0	22
	8:00 AM	0	0	0	0	0	1	12	3	2	0	2	0	20
	8:15 AM	4	1	0	0	5	4	11	2	0	0	3	1	31
	8:30 AM	0	0	0	0	0	12	24	1	0	0	3	0	40
	8:45 AM	0	0	0	0	0	8	13	3	0	0	4	0	28
	VOLUMES	4	1	0	0	6	26	93	14	4	0	24	2	174
	APPROACH %	80%	20%	0%	0%	19%	81%	84%	13%	4%	0%	92%	8%	
	APP/DEPART	5	/	96	32	/	10	111	/	14	26	/	54	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	4	1	0	0	5	25	60	9	2	0	12	1	119
	APPROACH %	80%	20%	0%	0%	17%	83%	85%	13%	3%	0%	92%	8%	
	PEAK HR FACTOR		0.250			0.625			0.710			0.813		0.744
	APP/DEPART	5	/	62	30	/	7	71	/	9	13	/	41	0
PM	4:00 PM	0	0	0	0	0	11	9	3	0	0	10	1	34
	4:15 PM	0	0	0	0	0	4	4	3	1	0	4	0	16
	4:30 PM	1	0	0	0	0	10	8	0	2	0	3	0	24
	4:45 PM	2	1	0	0	0	12	6	3	3	0	1	0	28
	5:00 PM	2	1	0	0	1	12	7	0	0	0	8	0	31
	5:15 PM	3	0	0	0	1	6	6	2	1	0	0	1	20
	5:30 PM	0	0	0	0	0	10	8	1	1	0	1	0	21
	5:45 PM	0	1	0	0	0	5	12	3	2	0	0	0	23
	VOLUMES	8	3	0	0	2	70	60	15	10	0	27	2	200
	APPROACH %	73%	27%	0%	0%	3%	97%	71%	18%	12%	0%	84%	6%	
	APP/DEPART	11	/	65	72	/	12	85	/	18	32	/	105	0
	BEGIN PEAK HR		4:30 PM											
	VOLUMES	8	2	0	0	2	40	27	5	6	0	12	1	106
	APPROACH %	80%	20%	0%	0%	5%	95%	71%	13%	16%	0%	75%	6%	
	PEAK HR FACTOR		0.833			0.808			0.792			0.500		0.855
	APP/DEPART	10	/	30	42	/	8	38	/	8	16	/	60	0

APPENDIX B
LOS Analysis Sheets

Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	288	44	39	196	98	43	513	67	93	216	117
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	175	347	53	47	236	118	52	618	81	112	260	141
Adj No. of Lanes	2	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	742	498	186	674	302	186	1281	573	304	962	506
Arrive On Green	0.12	0.21	0.21	0.10	0.19	0.19	0.10	0.36	0.36	0.17	0.43	0.43
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	3539	1583	1774	2244	1180
Grp Volume(v), veh/h	175	347	53	47	236	118	52	618	81	112	203	198
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1655
Q Serve(g_s), s	4.9	9.0	1.7	2.6	6.1	4.8	2.8	14.2	3.6	5.9	7.8	8.1
Cycle Q Clear(g_c), s	4.9	9.0	1.7	2.6	6.1	4.8	2.8	14.2	3.6	5.9	7.8	8.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.71
Lane Grp Cap(c), veh/h	426	742	498	186	674	302	186	1281	573	304	758	709
V/C Ratio(X)	0.41	0.47	0.11	0.25	0.35	0.39	0.28	0.48	0.14	0.37	0.27	0.28
Avail Cap(c_a), veh/h	426	742	498	186	674	302	186	1281	573	304	758	709
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	36.4	12.9	43.2	36.9	17.9	43.3	25.9	22.5	38.5	19.4	19.5
Incr Delay (d2), s/veh	2.9	2.1	0.4	3.2	1.4	3.8	3.7	1.3	0.5	3.4	0.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.6	0.8	1.4	3.1	2.4	1.6	7.1	1.7	3.2	4.0	3.9
LnGrp Delay(d),s/veh	45.4	38.5	13.4	46.5	38.3	21.7	47.1	27.2	23.0	41.9	20.2	20.4
LnGrp LOS	D	D	B	D	D	C	D	C	C	D	C	C
Approach Vol, veh/h		575			401			751			513	
Approach Delay, s/veh		38.3			34.4			28.1			25.0	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	42.0	15.0	26.0	15.0	49.0	17.0	24.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	18.0	38.0	11.0	22.0	11.0	45.0	13.0	20.0
Max Q Clear Time (g_c+I1), s	7.9	16.2	4.6	11.0	4.8	10.1	6.9	8.1
Green Ext Time (p_c), s	1.8	4.1	1.1	1.7	0.0	2.6	0.3	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	382	24	94	308	152	13	0	2	17	1	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	22	439	28	108	354	175	15	0	2	20	1	15
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	1341	600	486	1788	800	372	0	350	364	22	331
Arrive On Green	0.15	0.38	0.38	0.27	0.51	0.51	0.22	0.00	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1342	0	1583	1409	100	1498
Grp Volume(v), veh/h	22	439	28	108	354	175	15	0	2	20	0	16
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1342	0	1583	1409	0	1598
Q Serve(g_s), s	1.0	8.4	1.1	4.5	5.2	5.8	0.8	0.0	0.1	1.1	0.0	0.7
Cycle Q Clear(g_c), s	1.0	8.4	1.1	4.5	5.2	5.8	1.6	0.0	0.1	2.7	0.0	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	261	1341	600	486	1788	800	372	0	350	364	0	353
V/C Ratio(X)	0.08	0.33	0.05	0.22	0.20	0.22	0.04	0.00	0.01	0.05	0.00	0.05
Avail Cap(c_a), veh/h	261	1341	600	486	1788	800	372	0	350	364	0	353
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.0	20.9	18.7	26.7	12.9	13.1	29.7	0.0	28.9	30.5	0.0	29.1
Incr Delay (d2), s/veh	0.6	0.7	0.1	1.1	0.2	0.6	0.2	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.2	0.5	2.3	2.6	2.7	0.3	0.0	0.0	0.5	0.0	0.4
LnGrp Delay(d),s/veh	35.6	21.6	18.8	27.7	13.2	13.7	29.9	0.0	28.9	30.8	0.0	29.4
LnGrp LOS	D	C	B	C	B	B	C		C	C		C
Approach Vol, veh/h		489			637			17			36	
Approach Delay, s/veh		22.0			15.8			29.8			30.1	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.0	30.0	40.0		25.0	18.0	52.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		21.0	26.0	36.0		21.0	14.0	48.0
Max Q Clear Time (g_c+I1), s		3.6	6.5	10.4		4.7	3.0	7.8
Green Ext Time (p_c), s		0.1	0.3	3.0		0.1	0.2	3.0

Intersection Summary		
HCM 2010 Ctrl Delay		19.0
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	0	247	186	45	310	0	336	0	272	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		1863	1583	1770	1863		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		1863	1583	1770	1863		1770		1583			
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	309	232	56	388	0	420	0	340	0	0	0
RTOR Reduction (vph)	0	0	54	0	0	0	0	0	189	0	0	0
Lane Group Flow (vph)	0	309	178	56	388	0	420	0	151	0	0	0
Turn Type		NA	custom	Prot	NA		D.Pm		Perm			
Protected Phases		4	6	3	8							
Permitted Phases			4				6		6			
Actuated Green, G (s)		29.0	69.0	9.0	42.0		40.0		40.0			
Effective Green, g (s)		29.0	69.0	9.0	42.0		40.0		40.0			
Actuated g/C Ratio		0.32	0.77	0.10	0.47		0.44		0.44			
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Grp Cap (vph)		600	1283	177	869		786		703			
v/s Ratio Prot		c0.17	0.06	0.03	c0.21							
v/s Ratio Perm			0.05				c0.24		0.10			
v/c Ratio		0.52	0.14	0.32	0.45		0.53		0.21			
Uniform Delay, d1		24.8	2.7	37.6	16.2		18.2		15.4			
Progression Factor		1.00	1.00	0.83	0.71		1.00		1.00			
Incremental Delay, d2		3.1	0.2	4.4	1.6		2.6		0.7			
Delay (s)		27.9	3.0	35.6	13.1		20.8		16.1			
Level of Service		C	A	D	B		C		B			
Approach Delay (s)		17.2			16.0			18.7			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	103	500	175	97	75	209
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	127	617	216	120	93	258
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	355	1159	704	598	994	457
Arrive On Green	0.40	1.00	0.38	0.38	0.29	0.29
Sat Flow, veh/h	1774	1863	1863	1583	3442	1583
Grp Volume(v), veh/h	127	617	216	120	93	258
Grp Sat Flow(s),veh/h/ln	1774	1863	1863	1583	1721	1583
Q Serve(g_s), s	4.5	0.0	7.3	4.6	1.8	12.5
Cycle Q Clear(g_c), s	4.5	0.0	7.3	4.6	1.8	12.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	355	1159	704	598	994	457
V/C Ratio(X)	0.36	0.53	0.31	0.20	0.09	0.56
Avail Cap(c_a), veh/h	355	1159	704	598	994	457
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	19.7	18.9	23.4	27.2
Incr Delay (d2), s/veh	2.8	1.8	1.1	0.8	0.2	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.6	4.0	2.1	0.9	11.6
LnGrp Delay(d),s/veh	25.8	1.8	20.8	19.6	23.6	32.2
LnGrp LOS	C	A	C	B	C	C
Approach Vol, veh/h		744	336		351	
Approach Delay, s/veh		5.9	20.4		29.9	
Approach LOS		A	C		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				60.0		30.0	22.0	38.0
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				56.0		26.0	18.0	34.0
Max Q Clear Time (g_c+I1), s				2.0		14.5	6.5	9.3
Green Ext Time (p_c), s				6.8		1.0	0.2	6.1

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	318	253	150	163	118	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	
Frt	1.00	0.85	1.00	1.00	0.91	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	1863	1583	1770	1863	3215	
Flt Permitted	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (perm)	1863	1583	1770	1863	3215	
Peak-hour factor, PHF	0.76	0.76	0.76	0.76	0.76	0.76
Adj. Flow (vph)	418	333	197	214	155	257
RTOR Reduction (vph)	0	226	0	0	180	0
Lane Group Flow (vph)	418	107	197	214	232	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	4		3	8	2	
Permitted Phases		4				
Actuated Green, G (s)	16.0	16.0	7.0	27.0	15.0	
Effective Green, g (s)	16.0	16.0	7.0	27.0	15.0	
Actuated g/C Ratio	0.32	0.32	0.14	0.54	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	596	506	247	1006	964	
v/s Ratio Prot	c0.22		c0.11	0.11	c0.07	
v/s Ratio Perm		0.07				
v/c Ratio	0.70	0.21	0.80	0.21	0.24	
Uniform Delay, d1	14.9	12.4	20.8	6.0	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.8	0.9	22.9	0.5	0.6	
Delay (s)	21.7	13.3	43.8	6.5	13.8	
Level of Service	C	B	D	A	B	
Approach Delay (s)	18.0			24.3	13.8	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	3	16	639	30	14	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	55	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	16	639	30	14	303

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	970	639	0	0	639	0
Stage 1	639	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	281	476	-	-	945	-
Stage 1	526	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	277	476	-	-	945	-
Mov Cap-2 Maneuver	277	-	-	-	-	-
Stage 1	526	-	-	-	-	-
Stage 2	717	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.8	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	428	945	-
HCM Lane V/C Ratio	-	-	0.044	0.015	-
HCM Control Delay (s)	-	-	13.8	8.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	70	10	2	0	14	1	5	1	0	0	6	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	10	2	0	14	1	5	1	0	0	6	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	15	0	0	12	0	0	183	166	11	167	167	15
Stage 1	-	-	-	-	-	-	151	151	-	15	15	-
Stage 2	-	-	-	-	-	-	32	15	-	152	152	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1603	-	-	1607	-	-	778	727	1070	797	726	1065
Stage 1	-	-	-	-	-	-	851	772	-	1005	883	-
Stage 2	-	-	-	-	-	-	984	883	-	850	772	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1603	-	-	1607	-	-	727	695	1070	769	694	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	727	695	-	769	694	-
Stage 1	-	-	-	-	-	-	814	738	-	961	883	-
Stage 2	-	-	-	-	-	-	951	883	-	811	738	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.3	0	10	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	721	1603	-	-	1607	-	-	976
HCM Lane V/C Ratio	0.008	0.044	-	-	-	-	-	0.036
HCM Control Delay (s)	10	7.3	0	-	0	-	-	8.8
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	222	582	113	94	321	101	101	328	98	226	657	179
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	241	633	123	102	349	110	110	357	107	246	714	195
Adj No. of Lanes	2	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	402	885	594	192	855	383	222	1032	462	384	1054	288
Arrive On Green	0.12	0.25	0.25	0.11	0.24	0.24	0.13	0.29	0.29	0.22	0.38	0.38
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	3539	1583	1774	2749	751
Grp Volume(v), veh/h	241	633	123	102	349	110	110	357	107	246	460	449
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1730
Q Serve(g_s), s	8.0	19.6	4.2	6.5	10.0	4.3	6.9	9.5	6.2	15.1	26.0	26.0
Cycle Q Clear(g_c), s	8.0	19.6	4.2	6.5	10.0	4.3	6.9	9.5	6.2	15.1	26.0	26.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	402	885	594	192	855	383	222	1032	462	384	678	663
V/C Ratio(X)	0.60	0.72	0.21	0.53	0.41	0.29	0.50	0.35	0.23	0.64	0.68	0.68
Avail Cap(c_a), veh/h	402	885	594	192	855	383	222	1032	462	384	678	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	41.1	12.6	50.6	38.3	14.5	49.0	33.5	32.3	42.7	30.8	30.8
Incr Delay (d2), s/veh	6.5	4.9	0.8	10.1	1.4	1.9	7.7	0.9	1.2	7.9	5.4	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	10.2	2.0	3.7	5.0	2.1	3.9	4.8	2.9	8.2	13.6	13.4
LnGrp Delay(d),s/veh	56.8	46.0	13.4	60.7	39.7	16.4	56.7	34.4	33.5	50.7	36.2	36.3
LnGrp LOS	E	D	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		997			561			574			1155	
Approach Delay, s/veh		44.6			39.0			38.5			39.3	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.0	39.0	17.0	34.0	19.0	50.0	18.0	33.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	26.0	35.0	13.0	30.0	15.0	46.0	14.0	29.0
Max Q Clear Time (g_c+I1), s	17.1	11.5	8.5	21.6	8.9	28.0	10.0	12.0
Green Ext Time (p_c), s	4.0	2.4	1.2	2.9	0.1	5.9	0.3	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	40.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	54	817	32	55	471	103	21	9	5	135	4	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	59	898	35	60	518	113	23	10	5	148	4	34
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	1573	704	197	1612	721	373	150	493	485	53	448
Arrive On Green	0.10	0.44	0.44	0.22	0.91	0.91	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	979	484	1583	1393	169	1439
Grp Volume(v), veh/h	59	898	35	60	518	113	33	0	5	148	0	38
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1463	0	1583	1393	0	1609
Q Serve(g_s), s	2.8	17.0	1.1	2.5	1.7	0.7	0.3	0.0	0.2	7.6	0.0	1.5
Cycle Q Clear(g_c), s	2.8	17.0	1.1	2.5	1.7	0.7	1.8	0.0	0.2	9.4	0.0	1.5
Prop In Lane	1.00		1.00	1.00		1.00	0.70		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	177	1573	704	197	1612	721	523	0	493	485	0	500
V/C Ratio(X)	0.33	0.57	0.05	0.30	0.32	0.16	0.06	0.00	0.01	0.31	0.00	0.08
Avail Cap(c_a), veh/h	177	1573	704	197	1612	721	523	0	493	485	0	500
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.7	18.6	14.2	32.1	2.3	2.2	21.8	0.0	21.4	25.3	0.0	21.9
Incr Delay (d2), s/veh	5.0	1.5	0.1	3.9	0.5	0.5	0.2	0.0	0.0	1.6	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	8.6	0.5	1.4	0.8	0.3	0.6	0.0	0.1	3.1	0.0	0.7
LnGrp Delay(d),s/veh	42.7	20.1	14.3	36.0	2.8	2.7	22.1	0.0	21.5	26.9	0.0	22.2
LnGrp LOS	D	C	B	D	A	A	C		C	C		C
Approach Vol, veh/h		992			691			38			186	
Approach Delay, s/veh		21.3			5.6			22.0			26.0	
Approach LOS		C			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		32.0	14.0	44.0		32.0	13.0	45.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		28.0	10.0	40.0		28.0	9.0	41.0
Max Q Clear Time (g_c+I1), s		3.8	4.5	19.0		11.4	4.8	3.7
Green Ext Time (p_c), s		0.8	0.1	6.4		0.7	0.1	4.1

Intersection Summary	
HCM 2010 Ctrl Delay	16.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	0	485	592	147	580	0	68	0	127	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		1863	1583	1770	1863		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		1863	1583	1770	1863		1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	527	643	160	630	0	74	0	138	0	0	0
RTOR Reduction (vph)	0	0	83	0	0	0	0	0	95	0	0	0
Lane Group Flow (vph)	0	527	560	160	630	0	74	0	43	0	0	0
Turn Type		NA	custom	Prot	NA		D.Pm		Perm			
Protected Phases		4	6	3	8							
Permitted Phases			4				6		6			
Actuated Green, G (s)		36.0	64.0	14.0	54.0		28.0		28.0			
Effective Green, g (s)		36.0	64.0	14.0	54.0		28.0		28.0			
Actuated g/C Ratio		0.40	0.71	0.16	0.60		0.31		0.31			
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Grp Cap (vph)		745	1196	275	1117		550		492			
v/s Ratio Prot		c0.28	c0.15	0.09	c0.34							
v/s Ratio Perm			0.21				0.04		0.03			
v/c Ratio		0.71	0.47	0.58	0.56		0.13		0.09			
Uniform Delay, d1		22.6	5.6	35.3	10.9		22.3		22.0			
Progression Factor		0.47	1.87	1.00	1.00		1.00		1.00			
Incremental Delay, d2		5.0	1.2	8.7	2.1		0.5		0.3			
Delay (s)		15.5	11.7	44.0	12.9		22.8		22.3			
Level of Service		B	B	D	B		C		C			
Approach Delay (s)		13.4			19.2			22.5			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	214	340	436	233	85	292
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	249	395	507	271	99	340
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	402	1242	720	612	780	359
Arrive On Green	0.23	0.67	0.39	0.39	0.23	0.23
Sat Flow, veh/h	1774	1863	1863	1583	3442	1583
Grp Volume(v), veh/h	249	395	507	271	99	340
Grp Sat Flow(s),veh/h/ln	1774	1863	1863	1583	1721	1583
Q Serve(g_s), s	9.5	6.7	17.2	9.5	1.7	15.9
Cycle Q Clear(g_c), s	9.5	6.7	17.2	9.5	1.7	15.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	402	1242	720	612	780	359
V/C Ratio(X)	0.62	0.32	0.70	0.44	0.13	0.95
Avail Cap(c_a), veh/h	402	1242	720	612	780	359
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	5.3	19.4	17.0	23.1	28.6
Incr Delay (d2), s/veh	7.0	0.7	5.7	2.3	0.3	35.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	3.6	9.9	4.5	0.8	16.0
LnGrp Delay(d),s/veh	33.1	6.0	25.1	19.3	23.4	64.5
LnGrp LOS	C	A	C	B	C	E
Approach Vol, veh/h		644	778		439	
Approach Delay, s/veh		16.4	23.1		55.2	
Approach LOS		B	C		E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				54.0		21.0	21.0	33.0
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				50.0		17.0	17.0	29.0
Max Q Clear Time (g_c+I1), s				8.7		17.9	11.5	19.2
Green Ext Time (p_c), s				3.3		0.0	1.6	3.0

Intersection Summary		
HCM 2010 Ctrl Delay		28.4
HCM 2010 LOS		C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	242	200	228	390	284	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	1863	1583	1770	1863	3303	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	1863	1583	1770	1863	3303	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	295	244	278	476	346	218
RTOR Reduction (vph)	0	176	0	0	158	0
Lane Group Flow (vph)	295	68	278	476	406	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	4		3	8	2	
Permitted Phases		4				
Actuated Green, G (s)	18.0	18.0	17.0	39.0	18.0	
Effective Green, g (s)	18.0	18.0	17.0	39.0	18.0	
Actuated g/C Ratio	0.28	0.28	0.26	0.60	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	515	438	462	1117	914	
v/s Ratio Prot	c0.16		c0.16	0.26	c0.12	
v/s Ratio Perm		0.04				
v/c Ratio	0.57	0.15	0.60	0.43	0.44	
Uniform Delay, d1	20.2	17.8	21.0	7.0	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	0.7	5.7	1.2	1.6	
Delay (s)	24.8	18.5	26.7	8.2	20.9	
Level of Service	C	B	C	A	C	
Approach Delay (s)	21.9			15.0	20.9	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	51	41	435	16	21	929
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	55	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	41	435	16	21	929

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1406	435	0	0	435	0
Stage 1	435	-	-	-	-	-
Stage 2	971	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	153	621	-	-	1125	-
Stage 1	653	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	150	621	-	-	1125	-
Mov Cap-2 Maneuver	150	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	360	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	31.3	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	227	1125	-
HCM Lane V/C Ratio	-	-	0.405	0.019	-
HCM Control Delay (s)	-	-	31.3	8.3	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	1.8	0.1	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	36	7	8	0	16	1	11	3	0	0	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	7	8	0	16	1	11	3	0	0	3	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	17	0	0	15	0	0	128	100	11	102	104	17
Stage 1	-	-	-	-	-	-	83	83	-	17	17	-
Stage 2	-	-	-	-	-	-	45	17	-	85	87	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1600	-	-	1603	-	-	845	790	1070	879	786	1062
Stage 1	-	-	-	-	-	-	925	826	-	1002	881	-
Stage 2	-	-	-	-	-	-	969	881	-	923	823	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1600	-	-	1603	-	-	786	772	1070	861	768	1062
Mov Cap-2 Maneuver	-	-	-	-	-	-	786	772	-	861	768	-
Stage 1	-	-	-	-	-	-	904	807	-	979	881	-
Stage 2	-	-	-	-	-	-	918	881	-	898	804	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.2	0	9.7	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	783	1600	-	-	1603	-	-	1041
HCM Lane V/C Ratio	0.018	0.023	-	-	-	-	-	0.054
HCM Control Delay (s)	9.7	7.3	0	-	0	-	-	8.7
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Forecast Existing Plus Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	290	44	38	197	97	43	514	63	90	220	117
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	175	349	53	46	237	117	52	619	76	108	265	141
Adj No. of Lanes	2	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	742	498	186	674	302	186	1281	573	304	968	500
Arrive On Green	0.12	0.21	0.21	0.10	0.19	0.19	0.10	0.36	0.36	0.17	0.43	0.43
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	3539	1583	1774	2260	1167
Grp Volume(v), veh/h	175	349	53	46	237	117	52	619	76	108	206	200
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1657
Q Serve(g_s), s	4.9	9.1	1.7	2.5	6.1	4.7	2.8	14.2	3.4	5.6	7.9	8.2
Cycle Q Clear(g_c), s	4.9	9.1	1.7	2.5	6.1	4.7	2.8	14.2	3.4	5.6	7.9	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	426	742	498	186	674	302	186	1281	573	304	758	710
V/C Ratio(X)	0.41	0.47	0.11	0.25	0.35	0.39	0.28	0.48	0.13	0.36	0.27	0.28
Avail Cap(c_a), veh/h	426	742	498	186	674	302	186	1281	573	304	758	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	36.4	12.9	43.2	36.9	17.9	43.3	25.9	22.5	38.4	19.4	19.5
Incr Delay (d2), s/veh	2.9	2.1	0.4	3.2	1.4	3.7	3.7	1.3	0.5	3.2	0.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.6	0.8	1.4	3.1	2.4	1.6	7.1	1.6	3.0	4.0	4.0
LnGrp Delay(d),s/veh	45.4	38.5	13.4	46.4	38.3	21.6	47.1	27.2	22.9	41.6	20.3	20.5
LnGrp LOS	D	D	B	D	D	C	D	C	C	D	C	C
Approach Vol, veh/h		577			400			747			514	
Approach Delay, s/veh		38.3			34.4			28.2			24.8	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	42.0	15.0	26.0	15.0	49.0	17.0	24.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	18.0	38.0	11.0	22.0	11.0	45.0	13.0	20.0
Max Q Clear Time (g_c+I1), s	7.6	16.2	4.5	11.1	4.8	10.2	6.9	8.1
Green Ext Time (p_c), s	1.8	4.0	1.1	1.7	0.0	2.6	0.3	1.5

Intersection Summary			
HCM 2010 Ctrl Delay			31.1
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	356	45	148	299	152	23	0	2	17	1	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	22	409	52	170	344	175	26	0	2	20	1	15
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	243	1118	500	560	1751	783	402	0	383	386	24	363
Arrive On Green	0.14	0.32	0.32	0.32	0.49	0.49	0.24	0.00	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1347	0	1583	1409	100	1498
Grp Volume(v), veh/h	22	409	52	170	344	175	26	0	2	20	0	16
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1347	0	1583	1409	0	1598
Q Serve(g_s), s	1.0	8.5	2.2	6.9	5.2	6.0	1.4	0.0	0.1	1.1	0.0	0.7
Cycle Q Clear(g_c), s	1.0	8.5	2.2	6.9	5.2	6.0	2.1	0.0	0.1	3.2	0.0	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	243	1118	500	560	1751	783	402	0	383	386	0	387
V/C Ratio(X)	0.09	0.37	0.10	0.30	0.20	0.22	0.06	0.00	0.01	0.05	0.00	0.04
Avail Cap(c_a), veh/h	243	1118	500	560	1751	783	402	0	383	386	0	387
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.8	25.1	23.0	24.6	13.4	13.6	28.4	0.0	27.3	29.3	0.0	27.6
Incr Delay (d2), s/veh	0.7	0.9	0.4	1.4	0.3	0.7	0.3	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.3	1.0	3.6	2.6	2.7	0.6	0.0	0.0	0.4	0.0	0.3
LnGrp Delay(d),s/veh	36.6	26.1	23.4	26.0	13.7	14.3	28.7	0.0	27.3	29.6	0.0	27.8
LnGrp LOS	D	C	C	C	B	B	C		C	C		C
Approach Vol, veh/h		483			689			28			36	
Approach Delay, s/veh		26.3			16.9			28.6			28.8	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	34.0	34.0		27.0	17.0	51.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		23.0	30.0	30.0		23.0	13.0	47.0
Max Q Clear Time (g_c+I1), s		4.1	8.9	10.5		5.2	3.0	8.0
Green Ext Time (p_c), s		0.2	0.5	2.6		0.2	0.3	2.9

Intersection Summary			
HCM 2010 Ctrl Delay			21.2
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	0	235	190	41	313	0	298	0	314	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		1863	1583	1770	1863		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		1863	1583	1770	1863		1770		1583			
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	294	238	51	391	0	372	0	392	0	0	0
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	215	0	0	0
Lane Group Flow (vph)	0	294	180	51	391	0	372	0	177	0	0	0
Turn Type		NA	custom	Prot	NA		D.Pm		Perm			
Protected Phases		4	6	3	8							
Permitted Phases			4				6		6			
Actuated Green, G (s)		29.0	68.0	10.0	43.0		39.0		39.0			
Effective Green, g (s)		29.0	68.0	10.0	43.0		39.0		39.0			
Actuated g/C Ratio		0.32	0.76	0.11	0.48		0.43		0.43			
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Grp Cap (vph)		600	1266	196	890		767		685			
v/s Ratio Prot		c0.16	0.06	0.03	c0.21							
v/s Ratio Perm			0.05				c0.21		0.11			
v/c Ratio		0.49	0.14	0.26	0.44		0.49		0.26			
Uniform Delay, d1		24.5	3.0	36.6	15.5		18.3		16.3			
Progression Factor		1.00	1.00	0.80	0.74		1.00		1.00			
Incremental Delay, d2		2.8	0.2	3.0	1.5		2.2		0.9			
Delay (s)		27.4	3.2	32.2	13.0		20.5		17.2			
Level of Service		C	A	C	B		C		B			
Approach Delay (s)		16.6			15.2			18.8			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	118	436	162	84	64	221
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	146	538	200	104	79	273
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	394	1076	580	493	1147	528
Arrive On Green	0.44	1.00	0.31	0.31	0.33	0.33
Sat Flow, veh/h	1774	1863	1863	1583	3442	1583
Grp Volume(v), veh/h	146	538	200	104	79	273
Grp Sat Flow(s),veh/h/ln	1774	1863	1863	1583	1721	1583
Q Serve(g_s), s	4.9	0.0	7.5	4.4	1.4	12.5
Cycle Q Clear(g_c), s	4.9	0.0	7.5	4.4	1.4	12.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	394	1076	580	493	1147	528
V/C Ratio(X)	0.37	0.50	0.35	0.21	0.07	0.52
Avail Cap(c_a), veh/h	394	1076	580	493	1147	528
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	23.9	22.9	20.5	24.2
Incr Delay (d2), s/veh	2.7	1.7	1.6	1.0	0.1	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.5	4.1	2.0	0.7	11.8
LnGrp Delay(d),s/veh	23.5	1.7	25.6	23.8	20.6	27.8
LnGrp LOS	C	A	C	C	C	C
Approach Vol, veh/h		684	304		352	
Approach Delay, s/veh		6.3	25.0		26.2	
Approach LOS		A	C		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				56.0		34.0	24.0	32.0
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				52.0		30.0	20.0	28.0
Max Q Clear Time (g_c+I1), s				2.0		14.5	6.9	9.5
Green Ext Time (p_c), s				5.7		1.1	0.3	4.7

Intersection Summary		
HCM 2010 Ctrl Delay		15.8
HCM 2010 LOS		B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	277	219	150	149	106	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	
Frt	1.00	0.85	1.00	1.00	0.90	
Flt Protected	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	1863	1583	1770	1863	3206	
Flt Permitted	1.00	1.00	0.95	1.00	0.98	
Satd. Flow (perm)	1863	1583	1770	1863	3206	
Peak-hour factor, PHF	0.76	0.76	0.76	0.76	0.76	0.76
Adj. Flow (vph)	364	288	197	196	139	257
RTOR Reduction (vph)	0	196	0	0	180	0
Lane Group Flow (vph)	364	92	197	196	216	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	4		3	8	2	
Permitted Phases		4				
Actuated Green, G (s)	16.0	16.0	7.0	27.0	15.0	
Effective Green, g (s)	16.0	16.0	7.0	27.0	15.0	
Actuated g/C Ratio	0.32	0.32	0.14	0.54	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	596	506	247	1006	961	
v/s Ratio Prot	c0.20		c0.11	0.11	c0.07	
v/s Ratio Perm		0.06				
v/c Ratio	0.61	0.18	0.80	0.19	0.22	
Uniform Delay, d1	14.4	12.3	20.8	5.9	13.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	0.8	22.9	0.4	0.5	
Delay (s)	19.0	13.1	43.8	6.3	13.7	
Level of Service	B	B	D	A	B	
Approach Delay (s)	16.4			25.1	13.7	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	4	17	635	34	18	302
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	55	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	17	635	34	18	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	973	635	0	0	635	0
Stage 1	635	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	280	478	-	-	948	-
Stage 1	528	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	275	478	-	-	948	-
Mov Cap-2 Maneuver	275	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	708	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	419	948	-
HCM Lane V/C Ratio	-	-	0.05	0.019	-
HCM Control Delay (s)	-	-	14	8.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	78	10	2	0	14	1	5	1	0	0	6	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	78	10	2	0	14	1	5	1	0	0	6	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	15	0	0	12	0	0	201	182	11	183	183	15
Stage 1	-	-	-	-	-	-	167	167	-	15	15	-
Stage 2	-	-	-	-	-	-	34	15	-	168	168	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1603	-	-	1607	-	-	757	712	1070	778	711	1065
Stage 1	-	-	-	-	-	-	835	760	-	1005	883	-
Stage 2	-	-	-	-	-	-	982	883	-	834	759	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1603	-	-	1607	-	-	702	677	1070	748	676	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	702	677	-	748	676	-
Stage 1	-	-	-	-	-	-	794	723	-	956	883	-
Stage 2	-	-	-	-	-	-	946	883	-	792	722	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	6.4	0	10.2	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	698	1603	-	-	1607	-	-	976
HCM Lane V/C Ratio	0.009	0.049	-	-	-	-	-	0.039
HCM Control Delay (s)	10.2	7.4	0	-	0	-	-	8.8
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	222	583	113	90	324	98	101	333	97	225	658	179
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	241	634	123	98	352	107	110	362	105	245	715	195
Adj No. of Lanes	2	2	1	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	402	885	594	192	855	383	222	1032	462	384	1054	287
Arrive On Green	0.12	0.25	0.25	0.11	0.24	0.24	0.13	0.29	0.29	0.22	0.38	0.38
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	3539	1583	1774	2750	750
Grp Volume(v), veh/h	241	634	123	98	352	107	110	362	105	245	460	450
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1730
Q Serve(g_s), s	8.0	19.6	4.2	6.3	10.1	4.1	6.9	9.7	6.0	15.1	26.0	26.0
Cycle Q Clear(g_c), s	8.0	19.6	4.2	6.3	10.1	4.1	6.9	9.7	6.0	15.1	26.0	26.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	402	885	594	192	855	383	222	1032	462	384	678	663
V/C Ratio(X)	0.60	0.72	0.21	0.51	0.41	0.28	0.50	0.35	0.23	0.64	0.68	0.68
Avail Cap(c_a), veh/h	402	885	594	192	855	383	222	1032	462	384	678	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	41.1	12.6	50.5	38.3	14.5	49.0	33.5	32.2	42.7	30.8	30.8
Incr Delay (d2), s/veh	6.5	5.0	0.8	9.3	1.5	1.8	7.7	0.9	1.1	7.9	5.4	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	10.2	2.0	3.6	5.1	2.0	3.9	4.9	2.8	8.2	13.7	13.4
LnGrp Delay(d),s/veh	56.8	46.1	13.4	59.8	39.8	16.3	56.7	34.5	33.4	50.6	36.2	36.3
LnGrp LOS	E	D	B	E	D	B	E	C	C	D	D	D
Approach Vol, veh/h		998			557			577			1155	
Approach Delay, s/veh		44.6			38.8			38.5			39.3	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.0	39.0	17.0	34.0	19.0	50.0	18.0	33.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	26.0	35.0	13.0	30.0	15.0	46.0	14.0	29.0
Max Q Clear Time (g_c+I1), s	17.1	11.7	8.3	21.6	8.9	28.0	10.0	12.1
Green Ext Time (p_c), s	4.0	2.4	1.3	2.9	0.1	5.9	0.3	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	40.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	54	808	40	65	429	103	68	9	5	135	4	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	59	888	44	71	471	113	75	10	5	148	4	34
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	1534	686	217	1612	721	441	54	493	433	53	448
Arrive On Green	0.10	0.43	0.43	0.24	0.91	0.91	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1176	175	1583	1393	169	1439
Grp Volume(v), veh/h	59	888	44	71	471	113	85	0	5	148	0	38
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1351	0	1583	1393	0	1609
Q Serve(g_s), s	2.8	17.1	1.5	3.0	1.5	0.7	3.7	0.0	0.2	8.0	0.0	1.5
Cycle Q Clear(g_c), s	2.8	17.1	1.5	3.0	1.5	0.7	5.2	0.0	0.2	13.2	0.0	1.5
Prop In Lane	1.00		1.00	1.00		1.00	0.88		1.00	1.00		0.89
Lane Grp Cap(c), veh/h	177	1534	686	217	1612	721	496	0	493	433	0	500
V/C Ratio(X)	0.33	0.58	0.06	0.33	0.29	0.16	0.17	0.00	0.01	0.34	0.00	0.08
Avail Cap(c_a), veh/h	177	1534	686	217	1612	721	496	0	493	433	0	500
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.7	19.3	14.9	31.0	2.2	2.2	23.5	0.0	21.4	28.1	0.0	21.9
Incr Delay (d2), s/veh	5.0	1.6	0.2	4.0	0.5	0.5	0.8	0.0	0.0	2.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	8.6	0.7	1.7	0.8	0.3	1.7	0.0	0.1	3.3	0.0	0.7
LnGrp Delay(d),s/veh	42.7	20.9	15.0	35.0	2.7	2.7	24.2	0.0	21.5	30.2	0.0	22.2
LnGrp LOS	D	C	B	C	A	A	C		C	C		C
Approach Vol, veh/h		991			655			90			186	
Approach Delay, s/veh		21.9			6.2			24.1			28.6	
Approach LOS		C			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		32.0	15.0	43.0		32.0	13.0	45.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		28.0	11.0	39.0		28.0	9.0	41.0
Max Q Clear Time (g_c+I1), s		7.2	5.0	19.1		15.2	4.8	3.5
Green Ext Time (p_c), s		1.1	0.1	6.2		0.9	0.1	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	0	504	611	130	542	0	63	0	134	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		1863	1583	1770	1863		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		1863	1583	1770	1863		1770		1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	548	664	141	589	0	68	0	146	0	0	0
RTOR Reduction (vph)	0	0	85	0	0	0	0	0	102	0	0	0
Lane Group Flow (vph)	0	548	579	141	589	0	68	0	44	0	0	0
Turn Type		NA	custom	Prot	NA		D.Pm		Perm			
Protected Phases		4	6	3	8							
Permitted Phases			4				6		6			
Actuated Green, G (s)		38.0	65.0	13.0	55.0		27.0		27.0			
Effective Green, g (s)		38.0	65.0	13.0	55.0		27.0		27.0			
Actuated g/C Ratio		0.42	0.72	0.14	0.61		0.30		0.30			
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Grp Cap (vph)		786	1213	255	1138		531		474			
v/s Ratio Prot		c0.29	c0.14	0.08	c0.32							
v/s Ratio Perm			0.22				0.04		0.03			
v/c Ratio		0.70	0.48	0.55	0.52		0.13		0.09			
Uniform Delay, d1		21.3	5.3	35.8	10.0		22.9		22.7			
Progression Factor		0.45	1.96	1.00	1.00		1.00		1.00			
Incremental Delay, d2		4.6	1.2	8.4	1.7		0.5		0.4			
Delay (s)		14.3	11.6	44.2	11.6		23.4		23.1			
Level of Service		B	B	D	B		C		C			
Approach Delay (s)		12.8			17.9			23.2			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	242	326	377	208	82	296
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	281	379	438	242	95	344
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	449	1217	646	549	826	380
Arrive On Green	0.25	0.65	0.35	0.35	0.24	0.24
Sat Flow, veh/h	1774	1863	1863	1583	3442	1583
Grp Volume(v), veh/h	281	379	438	242	95	344
Grp Sat Flow(s),veh/h/ln	1774	1863	1863	1583	1721	1583
Q Serve(g_s), s	10.5	6.6	15.1	8.8	1.6	15.8
Cycle Q Clear(g_c), s	10.5	6.6	15.1	8.8	1.6	15.8
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	449	1217	646	549	826	380
V/C Ratio(X)	0.63	0.31	0.68	0.44	0.12	0.91
Avail Cap(c_a), veh/h	449	1217	646	549	826	380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	5.7	20.9	18.9	22.3	27.7
Incr Delay (d2), s/veh	6.4	0.7	5.7	2.6	0.3	27.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	3.6	8.7	4.2	0.8	15.4
LnGrp Delay(d),s/veh	31.3	6.3	26.6	21.5	22.6	55.2
LnGrp LOS	C	A	C	C	C	E
Approach Vol, veh/h		660	680		439	
Approach Delay, s/veh		16.9	24.8		48.1	
Approach LOS		B	C		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				53.0		22.0	23.0	30.0
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				49.0		18.0	19.0	26.0
Max Q Clear Time (g_c+I1), s				8.6		17.8	12.5	17.1
Green Ext Time (p_c), s				3.3		0.0	1.7	2.4

Intersection Summary		
HCM 2010 Ctrl Delay		27.6
HCM 2010 LOS		C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	236	189	228	361	229	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	
Frt	1.00	0.85	1.00	1.00	0.93	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	1863	1583	1770	1863	3284	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	1863	1583	1770	1863	3284	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	288	230	278	440	279	218
RTOR Reduction (vph)	0	166	0	0	158	0
Lane Group Flow (vph)	288	64	278	440	339	0
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	4		3	8	2	
Permitted Phases		4				
Actuated Green, G (s)	18.0	18.0	17.0	39.0	18.0	
Effective Green, g (s)	18.0	18.0	17.0	39.0	18.0	
Actuated g/C Ratio	0.28	0.28	0.26	0.60	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	515	438	462	1117	909	
v/s Ratio Prot	c0.15		c0.16	0.24	c0.10	
v/s Ratio Perm		0.04				
v/c Ratio	0.56	0.15	0.60	0.39	0.37	
Uniform Delay, d1	20.1	17.7	21.0	6.8	19.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	0.7	5.7	1.0	1.2	
Delay (s)	24.4	18.4	26.7	7.9	20.1	
Level of Service	C	B	C	A	C	
Approach Delay (s)	21.8			15.2	20.1	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	56	46	434	17	22	925
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	55	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	46	434	17	22	925

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1403	434	0	0	434	0
Stage 1	434	-	-	-	-	-
Stage 2	969	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	154	622	-	-	1126	-
Stage 1	653	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	151	622	-	-	1126	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	361	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.8	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	229	1126	-
HCM Lane V/C Ratio	-	-	0.445	0.02	-
HCM Control Delay (s)	-	-	32.8	8.3	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	2.1	0.1	-

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	38	7	8	0	16	1	11	3	0	0	3	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	7	8	0	16	1	11	3	0	0	3	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	17	0	0	15	0	0	136	104	11	106	108	17
Stage 1	-	-	-	-	-	-	87	87	-	17	17	-
Stage 2	-	-	-	-	-	-	49	17	-	89	91	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1600	-	-	1603	-	-	835	786	1070	873	782	1062
Stage 1	-	-	-	-	-	-	921	823	-	1002	881	-
Stage 2	-	-	-	-	-	-	964	881	-	918	820	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1600	-	-	1603	-	-	770	767	1070	854	763	1062
Mov Cap-2 Maneuver	-	-	-	-	-	-	770	767	-	854	763	-
Stage 1	-	-	-	-	-	-	899	803	-	978	881	-
Stage 2	-	-	-	-	-	-	905	881	-	893	800	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.2	0	9.8	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	769	1600	-	-	1603	-	-	1043
HCM Lane V/C Ratio	0.018	0.024	-	-	-	-	-	0.062
HCM Control Delay (s)	9.8	7.3	0	-	0	-	-	8.7
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

APPENDIX C
24-Hour Project Site Count Data

Tuesday, January 13, 2015 CITY: Riverside PROJECT: SC0519

Driveway ADT1 **Prepared by AimTD LLC tel. 951 249 3226**

AM Period	In		Out			PM Period	In		Out		
00:00	0		0			12:00	8		11		
00:15	0		0			12:15	6		7		
00:30	0		0			12:30	5		1		
00:45	0	0	0	0		12:45	6	25	4	23	48
01:00	0		0			13:00	4		4		
01:15	0		1			13:15	5		1		
01:30	0		0			13:30	6		3		
01:45	0	0	0	1	1	13:45	3	18	3	11	29
02:00	0		0			14:00	6		7		
02:15	0		0			14:15	3		6		
02:30	0		0			14:30	5		0		
02:45	0	0	0	0		14:45	2	16	3	16	32
03:00	0		0			15:00	3		5		
03:15	0		0			15:15	2		0		
03:30	0		0			15:30	2		7		
03:45	0	0	0	0		15:45	7	14	8	20	34
04:00	0		0			16:00	3		5		
04:15	0		0			16:15	2		5		
04:30	1		0			16:30	1		5		
04:45	0	1	0	0	1	16:45	1	7	3	18	25
05:00	0		0			17:00	1		11		
05:15	0		0			17:15	7		6		
05:30	0		0			17:30	2		8		
05:45	0	0	0	0		17:45	3	13	5	30	43
06:00	0		0			18:00	2		4		
06:15	0		0			18:15	3		2		
06:30	2		0			18:30	1		5		
06:45	6	8	0	0	8	18:45	0	6	5	16	22
07:00	10		0			19:00	0		2		
07:15	3		0			19:15	0		2		
07:30	15		0			19:30	1		2		
07:45	22	50	1	1	51	19:45	0	1	0	6	7
08:00	17		1			20:00	3		1		
08:15	8		1			20:15	2		4		
08:30	16		2			20:30	1		1		
08:45	18	59	0	4	63	20:45	1	7	4	10	17
09:00	12		4			21:00	1		0		
09:15	15		4			21:15	1		0		
09:30	7		3			21:30	1		2		
09:45	6	40	1	12	52	21:45	0	3	2	4	7
10:00	4		1			22:00	0		0		
10:15	8		2			22:15	0		0		
10:30	13		6			22:30	0		0		
10:45	10	35	7	16	51	22:45	0	0	0	0	
11:00	6		10			23:00	0		0		
11:15	4		3			23:15	0		0		
11:30	5		3			23:30	0		0		
11:45	8	23	2	18	41	23:45	0	0	0	0	
Total Vol.		216		52	**268**			110		154	**264**

Daily Totals

In	Out	Combined
326	206	**532**

	AM			**PM**		
Split %	80.6%	19.4%	**50.4%**	41.7%	58.3%	**49.6%**
Peak Hour	07:45	10:30	**08:30**	12:00	17:00	**12:00**
Volume	63	26	**71**	25	30	**48**
P.H.F.	0.72	0.65	**0.93**	0.75	0.68	**0.63**

pacific@aimtd.com Tell. 951 249 3226

Driveway ADT2

AM Period	In		Out			PM Period	In		Out		
00:00	0		0			12:00	8		11		
00:15	0		0			12:15	6		7		
00:30	0		0			12:30	5		1		
00:45	0	0	0	0		12:45	6	25	4	23	48
01:00	0		0			13:00	4		4		
01:15	0		1			13:15	5		1		
01:30	0		0			13:30	6		3		
01:45	0	0	0	1	1	13:45	3	18	3	11	29
02:00	0		0			14:00	6		7		
02:15	0		0			14:15	3		6		
02:30	0		0			14:30	5		0		
02:45	0	0	0	0		14:45	2	16	3	16	32
03:00	0		0			15:00	3		5		
03:15	0		0			15:15	2		0		
03:30	0		0			15:30	2		7		
03:45	0	0	0	0		15:45	7	14	8	20	34
04:00	0		0			16:00	3		5		
04:15	0		0			16:15	2		5		
04:30	1		0			16:30	1		5		
04:45	0	1	0	0	1	16:45	1	7	3	18	25
05:00	0		0			17:00	1		11		
05:15	0		0			17:15	7		6		
05:30	0		0			17:30	2		8		
05:45	0	0	0	0		17:45	3	13	5	30	43
06:00	0		0			18:00	2		4		
06:15	0		0			18:15	3		2		
06:30	2		0			18:30	1		5		
06:45	6	8	0	0	8	18:45	0	6	5	16	22
07:00	10		0			19:00	0		2		
07:15	3		0			19:15	0		2		
07:30	15		0			19:30	1		2		
07:45	22	50	1	1	51	19:45	0	1	0	6	7
08:00	17		1			20:00	3		1		
08:15	8		1			20:15	2		4		
08:30	16		2			20:30	1		1		
08:45	18	59	0	4	63	20:45	1	7	4	10	17
09:00	12		4			21:00	1		0		
09:15	15		4			21:15	1		0		
09:30	7		3			21:30	1		2		
09:45	6	40	1	12	52	21:45	0	3	2	4	7
10:00	4		1			22:00	0		0		
10:15	8		2			22:15	0		0		
10:30	13		6			22:30	0		0		
10:45	10	35	7	16	51	22:45	0	0	0	0	
11:00	6		10			23:00	0		0		
11:15	4		3			23:15	0		0		
11:30	5		3			23:30	0		0		
11:45	8	23	2	18	41	23:45	0	0	0	0	
Total Vol.		216		52	**268**			110		154	**264**

Daily Totals

In	Out	Combined
326	206	**532**

	AM			PM		
Split %	80.6%	19.4%	**50.4%**	41.7%	58.3%	**49.6%**
Peak Hour	07:45	10:30	**08:30**	12:00	17:00	**12:00**
Volume	63	26	**71**	25	30	**48**
P.H.F.	0.72	0.65	**0.93**	0.75	0.68	**0.63**