DS #: 4951

APN: 125-07-501-004

PROJECT: Skye Canyon Park Drive (Prev. Indian Hills Park)

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS NEVADA

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 27, 2018
TO: **Land Development Services** Department of Building & Safety				FROM: Jennifer Shinn Flood Control Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for: **Skye Canyon Park Drive (Previously Indian Hills Park)**			**COPIES TO:** Slater-Hanifan
Cross Streets:	Skye Canyon Park Drive & Iron Mountain			Ninety-Five Management, LLC
File Number:	F:\Depot\DSMemos\DS4951A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-07-501-004			Fred Solis, Planning
Zoning Action:	VAR-55892			
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	2/8/2018	2/27/2018	See Comments Below	$400.00	493367: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. As stated in the report, this study does not address the Alyn Beck Park improvements and therefore does not update DS4263. An update to the previously approved drainage study for the park improvements is required. The proposed park improvements necessitate extension/reconstruction of the existing storm drain at the intersection of Skye Canyon Park Drive and Brent Lane to accommodate park drainage.
2. The existing 18" RCP lateral connecting into the existing drop inlet on the northwest corner of Skye Canyon Park Drive and Brent Lane shall be upsized to accommodate the proposed storm drain system from the park (Alyn Beck Park formerly Indian Hills Park). Provide supporting calculations to adequately size the facility.
3. Due to the cross fall section of Skye Canyon Park Drive, the capacity of the street section is significantly decreased. This results in a flow depth at Skye Canyon Park Drive as it enters Brent Lane of 0.67' (D10), which is greater than 6-inches. Extend a lateral and provide a drop inlet in Skye Canyon Park Drive before the cross fall transition section to mitigate the impacts at the intersection. Provide supporting calculations to adequately size the facilities.
4. It appears from the drainage basin map that the flows that impact Skye Canyon Park Drive North from the west will be contained on the west side of Skye Canyon Park Drive. Revise the FlowMaster models to reflect this condition.

5. Provide calculations to demonstrate the dry lane criteria is satisfied.

6. Label the Q10/Q100 flow rates for CP3* on Exhibit D Ultimate Conditions Drainage Exhibit.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Update and accepted by the *City of Las Vegas Flood Control Section.* Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
jks

T/R/S: T19S/R60E/07
AREA G-07

TECHNICAL DRAINAGE STUDY UPDATE No.1

Skye Canyon Park Drive
(Previously Indian Hills Park)

City of Las Vegas, Nevada

Job No.: OLY1726.000
Date: February 2018

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 ▪ Fax: 702-220-6566

Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted by: Nicholas Stafford, P.E. (AZ)

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon Park Drive Date: 02/08/2018

Location of Development: a) Descriptive (Cross Streets): North/South: Skye Canyon Park Drive

East/West: Iron Mountain Road and Brent Lane

b) Section: 07 Township: 19 S Range: 60 E

c) APN: 125-07-501-004

Name of Owner: City of Las Vegas Lease/Ninety-Five Management, LLC.

Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com

Address:

Contact Person – Name: Stanley Okey Amadi, P.E. Telephone No.: (702) 284-5327

*E-mail Address: samadi@shg-inc.com Fax No.: (702) 284-5399

Firm: Slater Hanifan Group

Address: 5740 S. Arville #216 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivison Map	☐	Clearing and grading Only
☐	Parcel Map	☐	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☐	Building Permit	☐	

1. Total Owned Land Area: At Site: +/- 10 ac Being Developed/Disturbed: +/- 3.70 ac

2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes** ☒ No

4. Proposed type of development (Residential, Commercial, Etc.): Offsite roadway improvements

5. Approximate upstream land area which drains to the subject site: +/- 62 ac

6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation:

Technical Drainage Study for Indian Hills Park (DS4263)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Flows will discharge north into Iron Mountain Road and south into Brent Lane

8. Briefly describe your proposed schedule for the subject project: As soon as possible

PROFESSIONAL ENGINEER, STATE OF NEVADA
STANLEY OKEY AMADI
EXP. 12/31/18
CIVIL
No.21724

02/07/18

Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over The subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*Newly Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required

Revision	Date

Local Entity File No.

REFERENCE: STANDARD FORM 1

Updated 05/01/2008

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (CCRFCD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT		
Yes	No	
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
-	N/A	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X	-	An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. S.O.A. by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
N/A	-	(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
N/A	-	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
N/A	-	Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

II. GRADING PLAN INFORMATION		
Yes	No	
-	N/A	Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
-	N/A	All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X	-	Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
-	N/A	Back of lot elevations and lot drainage pattern for all lots including common lots.
-	N/A	Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
-	N/A	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
-	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
-	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
-	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
-	N/A	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
-	N/A	Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
-	N/A	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Lots with "B and C Type Drainage" that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16" x 24" minimum block wall openings are required for both options.
-	N/A	Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

This document is intended as an **aid** in preparing Technical Drainage Studies for the City of Las Vegas. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all-inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Skye Canyon Park Drive	Map ID:
Firm Name: Slater Hanifan Group	Engineer: Stanley Okey Amadi, P.E.
Address: 5740 S. Arville #216	
City: Las Vegas	State: NV Zip: 89118
Phone Number: (702) 284-5327	Fax Number: (702) 284-5399
Property Owner: City of Las Vegas Lease/Ninety-Five Management, LLC.	
Address:	
City:	State: Zip:

Reviewed By:	Date Received:	Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

Yes	No	
X	-	Design Manual **Standard Form 1** with the engineer's seal and signature.
-	N/A	Design Manual **Standard Form 4**.
X	-	2 copies of the 24" x 36" Drainage Plan.
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
X	-	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X	-	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

Yes	No	
X	-	Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
X	-	On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
X	-	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
X	-	Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
X	-	Minimum scale: 1" = 60'.
X	-	Project name.
X	-	Vicinity Map with local and major cross streets.
X	-	Revision box.
X	-	North arrow and bar scale.
X	-	Engineer's/consultant's address and phone number.
X	-	Elevation datum and benchmark.
X	-	Legend for symbols and abbreviations.
X	-	Cut/fill scarps, where applicable.
X	-	Street names, grades, widths.
-	-	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.
X	-	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
-	N/A	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
X	-	Proposed typical street sections.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
-	N/A	Streets with off-set crowns.
X	-	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	-	Property lines.
X	-	Right-of-way lines and widths, existing and proposed.
X	-	Existing improvements and their elevations.
-	N/A	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
-	N/A	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
-	N/A	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X	-	Location and cross-section of street capacity calculations.
-	N/A	Cross-sectional detail for channels, including cutoff wall locations.
X	-	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
-	N/A	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
-	N/A	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
-	N/A	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
-	N/A	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
-	N/A	Building and/or lot numbers.
-	N/A	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
-	N/A	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
-	N/A	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
-	N/A	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X	-	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
-	N/A	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
X	X	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
-	N/A	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
-	N/A	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
-	N/A	Use of correct precipitation values in and around the McCarran Airport rainfall area.
X	-	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
-	N/A	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
X	-	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X	-	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
-	N/A	Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
-	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	-	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
-	N/A	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
-	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
-	N/A	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
-	N/A	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, whichever is greater.
-	N/A	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
-	N/A	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
-	N/A	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
X	-	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
-	N/A	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:	**STANDARD FORM 2**

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

OLY1726.000

February 6, 2018

Albert Sung, P.E.
Flood Control Project Engineer
City of Las Vegas Department of Public Works
333 N. Rancho Drive
Las Vegas, Nevada 89106

Subject: Technical Drainage Study Update No.1 for Skye Canyon Park Drive (Previously DS 4263 – Indian Hills Park)

Dear Mr. Sung:

Submitted for your review is this *Technical Drainage Study Update No.1 for Skye Canyon Park Drive* (hereinafter referred to as the Study Update 1). The site had been previously analyzed and designed as addressed in the Technical Drainage Study for Indian Hills Park (CLV DS4263, hereinafter referred to as the Park Study), prepared by L.R. Nelson Consulting Engineers. The Indian Hills Park Study was approved on February 25, 2008 and addressed the development of the proposed Alyn Beck Park (previously Indian Hills Park) to the west of the half-street improvements proposed in this study. The previous study assumed interim roadway and infrastructure improvements necessary to tie into the proposed Alyn Beck Park improvements to the east of the James H. Bilbray Elementary School and the William and Mary Scherkenback Elementary School. Both the Proposed and Ultimate Conditions modeling and calculations assume full-street improvements in Skye Canyon Park Drive (previously Fort Apache Road) necessary to tie into the proposed grading for the Alyn Beck Park improvements. The approval letter for the Park Study has been included in **Appendix A** of this Study Update 1. It should be noted that this study does not address the Alyn Beck Park improvements, only the half-street improvements within Skye Canyon Park Drive to tie into the future Park improvements.

Overview, Location, and Purpose

This submittal addresses the impacts of proposed half-street improvements within the western half of Skye Canyon Park Drive between Brent Lane and Iron Mountain Drive. Hence, the existing conditions previously established remain the same, and the interim and ultimate conditions previously established have remained the same. As a result, the hydrology, inlet hydraulics, and storm drain hydraulics within the Park Study have remained unchanged, and the necessary reference information from the previous study has been included, along with the proposed grading plans for the half-street improvements, to show that criteria is met and that the approved facilities are still adequate.

The Site is located within the north half of the Northeast Quarter (NE ¼) of Section 7, Township 19 South, Range 60 East, Mount Diablo Meridian, City of Las Vegas, Nevada. The project is generally bounded by the undeveloped parcel to the west which is expected to be developed as the Alyn Beck Park in the future, Iron Mountain Road to the north, Brent Lane to the south, and an existing residential development to the east. This study update encompasses only the west half-street improvements to Skye Canyon Park Drive and is intended to provide roadway and infrastructure improvements to tie into the future Alyn Beck Park improvements to the west.

The hydrologic impacts due to the half-street improvements have been accounted for with the Park Study as Interim Conditions with Full-Street Improvements, and there are no proposed changes to the Park Study for Land Use, Curve Numbers, Hydrologic criteria. This update will specifically address the following:

- Minor revisions to existing topographic information based on a more recent survey of the existing road, as well as proposed grading in the half-street improvements for the west half of Skye Canyon Park Drive, both of which were incorporated into street section hydraulic calculations included in this Study Update.

- Revision to the Interim and Future Conditions street capacity assessment as the Skye Canyon Park Drive half-street improvements have been updated with new proposed grading to tie into the future Alyn Beck Park improvements (previously Indian Hills Park).

The following has been provided for the reassessment of the Alyn Beck Park (previously Indian Hills Park) improvements and the previous Park Study.

FEMA Flood Zone Information

The project site boundary has been delineated on current FEMA FIRM Panel Map 32003C1735E, dated September 27, 2002, as Exhibit B included in **Appendix B**. Per the FIRM Panel, the project site is located within a FEMA designated Zone 'X' (unshaded). Zone 'X' (unshaded) is described by FEMA as *areas determined to be outside the 0.2% annual chance floodplain*.

CCRFCD and CLV MPU Information

Figure F-13 from the 2013 Las Vegas Valley Flood Control Master Plan Update (MPU) shows that the project site is not adjacent nor crossed by any existing or future CCRFCD flood control facilities. However, both existing and proposed Local Facilities exist adjacent to the site. This project will not impact those facilities which have been designed to convey the ultimate conditions flows expected in the area. Exhibits C1 and C2 identifies the project site on the MPU facilities and hydrology maps and have been included in **Appendix B** for reference. Exhibits C4 and C5 have also been provided in **Appendix B** to indicate the project location on the local City of Las Vegas City-Wide Hydrology Analysis and Master Plan.

Previous Drainage Studies

As stated in the Park Study, the site was previously assessed as an undeveloped basin as part of two separate upstream Elementary School studies: the *Technical Drainage Study for James H. Bilbray Elementary School* (Reference #2) and the *William and Mary Scherkenbach Elementary School* (Reference #3). These studies were also reviewed as a part of this Study Update and appear to meet the City of Las Vegas minimum requirements. It should be noted that the James H. Bilbray Elementary School was constructed prior to the William and Mary Scherkenbach Elementary School, thus the William and Mary Study contains referenced information from the James H. Bilbray Study. All pertinent basin and flow rate information has been provided with the reference material.

Hydrology references for the approved *Technical Drainage Study for Indian Hills Park* (Reference #1), as well as the two elementary schools have been included as **Appendix A**.

Existing Drainage Description

The existing drainage condition of Skye Canyon Park Drive (previously Fort Apache Drive) is developed from the median to the east right-of-way, and contains a curb and gutter for drainage conveyance, as well as drop inlets previously designed and installed by others near the intersection of Skye Canyon Park Drive and Brent Lane as well as Skye Canyon Park Drive and Iron Mountain Drive. The west half-street is currently partially paved with an unpaved gravel shoulder, and drop inlets, previously designed and installed by others for ultimate condition flows, at the north and south intersections similar to the east improved half-street. The Existing Conditions Drainage Exhibit from the approved Park Study has been included in **Appendix A** of this Study Update for reference.

It is acknowledged that there are several ongoing improvements within the Skye Canyon Master Plan Community that impacts the culverts underneath the US 95 highway. The improvements are required by the City to not increase flows over existing conditions to the downstream parcels. Thus, the flows in the alignments of Iron Mountain Road and Brent Lane referenced from the prior approved studies remain valid and conservative for the design of the proposed street improvements. It should be noted that the flows from the culvert across US 95 highway do not directly impact Skye Canyon Drive. It is also acknowledged that the soil survey of the Las Vegas area has been updated (2016) since the approval of the Park Study. However, per the Park Study, the soil type for the site is 100% hydrologic soil group (HSG) "D". Therefore, regardless of the components in the updated soil survey, the 100% HSG "D" utilized by the Park Study is still the most conservative. Therefore, a revised hydrologic analysis due to the updated soil survey is not necessary and has not been provided.

The undeveloped parcel to the west of Skye Canyon Park Drive, the future site of Alyn Beck Park, remains undeveloped in existing conditions as Skye Canyon Park Drive is expected to be constructed prior to the construction of the park.

The existing conditions street hydraulics have been assessed with more recent topographic information based on a recent survey. The hydraulic calculations have been provided in **Appendix C** and summarized in ***Table 1 – Existing Conditions Street Hydraulics*** below.

Table 1 – Existing Conditions Street Hydraulics

10-Year and 100-Year Street Flow Summary					
Cross Section	**Slope (%)**	**Q_{10}/Q_{100} (cfs)**	**D_{10}/D_{100} (ft)**	**V_{10}/V_{100} (fps)**	**DxV**
Skye Canyon North	1.09	4/11	0.48/0.59	2.4/2.9	1.2/1.7
Skye Canyon South	0.85	24/58	0.47/0.68	3.4/3.5	1.6/2.4

Interim Drainage Description

In the interim condition, Skye Canyon Park Drive will be a fully developed street with curb and gutter systems on both the east and west portions of the street, as well as the necessary transitions to drive entrances on the west half-street for access to the future Alyn Beck Park. It should be noted that in the interim conditions for this Study Update 1, Alyn Beck Park will not be constructed yet. While grading changes may alter the location where offsite flows from the parcel reach Skye Canyon Park Drive, ultimately the drainage patterns will be maintained and the high point in Skye Canyon Park Drive will remain in place.

The interim conditions street hydraulics have been assessed with more recent topography as well as updated proposed grading for the half-street improvements. Hydraulic calculations have been provided in **Appendix C** and summarized in ***Table 2 – Interim Conditions Street Hydraulics*** below.

Table 2 – Interim Conditions Street Hydraulics

10-Year and 100-Year Street Flow Summary					
Cross Section	**Slope (%)**	**Q_{10}/Q_{100} (cfs)**	**D_{10}/D_{100} (ft)**	**V_{10}/V_{100} (fps)**	**DxV**
Skye Canyon North	1.09	4/11	0.45/0.54	2.2/2.9	1.0/1.6
Skye Canyon South	0.85	24/58	0.47/0.67	3.4/4.2	1.6/2.8

Ultimate Drainage Description

In the ultimate conditions, as was the case in the Park Study, both the proposed half-street improvements to Skye Canyon Park Drive's west half will be constructed, and the future Alyn Beck Park will be constructed and graded similar to the previously approved Indian Hills Park grading and drainage scheme. No changes are proposed to the previously approved Study's Ultimate Conditions hydrology or hydraulics; thus, the Interim Conditions Street Hydraulics are still applicable for Ultimate Conditions as flows will not be altered and the street will be fully improved on the east and west half. The only change occurring in the ultimate conditions is the location where the park subbasins discharge into Skye Canyon Park Drive. However, because the street capacity calculations assume the full flows have reached the street corners and conservatively use the concentration points at the northern and southern extents (CP1 and CP2 from the Park Study), the discharge points to Skye Canyon Park Drive are not relevant.

The Ultimate Conditions Drainage Exhibit from the previously approved Park Study has been included in **Appendix A** of this study for referenced flows and street section locations, annotated to reflect the change in name of Fort Apache Drive to Skye Canyon Park Drive. Included in **Appendix B** are updated typical figures necessary for Technical Drainage Study submittals.

Conclusions

- All drainage basins and flows have been referenced from the Park Study which references previously approved basins and flows from both the James H. Bilbray Elementary School Study and the William and Mary Scherkenbach Elementary School Study and utilized to assess the street capacity for the proposed improvements.

- The update proposes no changes to ultimate condition hydrology basin and flow rates from previously approved studies.

- The revised analysis shows that the previously approved street capacity does not exhibit a significant change and still meets all CCRFCD design criteria. No changes are proposed to the previously approved drop inlet or storm drain facilities.

The revised improvement plans for the half-street improvements to Skye Canyon Park Drive have been included as **Appendix D**.

If you have any questions or require additional information, please do not hesitate to contact us at 702-284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

Nicholas Stafford, P.E., CFM
Flood Control Division

cc: Mark Failla, P.E., CFM
Stanley Okey Amadi, P.E.
Caitlyn Alcantara, EI

APPENDIX

- **Appendix A** – Reference Material
  Technical Drainage Study for Indian Hills Park,
  by L.R. Nelson Consulting Engineers
  - Approval Letter
  - Hydrology Reference Information
  - Existing Condition Basin Exhibit
  - Onsite Basin (Developed Conditions) Exhibit

  Technical Drainage Study for James H. Bilbray Elementary School
  by G.C. Wallace, Inc.
  Approval Letter
  Drainage Exhibits
  Summary of Subbasin Characteristics (Standard Form 4)

  Technical Drainage Study for William and Mary Scherkenbach Elementary School
  by G.C. Wallace, Inc.
  Approval Letter
  Drainage Exhibits
  Summary Table of Flows

- **Appendix B** – Updated Standard Exhibits
  - Exhibit A – Location Map
  - Exhibit B – FEMA FIRM Map
  - Exhibit C1 – 2013 CCRFCD MPU Facilities Map
  - Exhibit C2 – 2013 CCRFCD MPU Facilities Inventory
  - Exhibit C3 – 2008 CCRFCD MPU Hydrologic Facilities Map
  - Exhibit C4 – Northwest Neighborhood Study Existing Conditions
  - Exhibit C5 – City of Las Vegas City-Wide Hydrology
  - Exhibit D – Ultimate Conditions Drainage Map

- **Appendix C** – Street Capacity Calculations
  - Skye Canyon North (Existing and Interim/Proposed Conditions)
  - Skye Canyon South (Existing and Interim/Proposed Conditions)

- **Appendix D** – Improvement Plans

- **Appendix E** – Electronic Copy of Study Update (CD)

REFERENCES

1. *Technical Drainage Study for Indian Hills Park, Addendum #1, Addendum #2, and Addendum #3.* L.R. Nelson Consulting Engineers, February 2008.
2. *Technical Drainage Study for James H. Bilbray Elementary School.* G.C. Wallace, Inc., January 2002.
3. *Technical Drainage Study for William and Mary Scherkenbach Elementary School.* G.C. Wallace, Inc., August 2002.
4. *Hydrologic Criteria and Drainage Design Manual.* Clark County Regional Flood Control District, 1999.
5. *Flood Insurance Rate Map, Panel 32003C1735E.* Federal Emergency Management Agency (FEMA), September 2002.

- **Appendix A** – Reference Material

  Technical Drainage Study for Indian Hills Park,
  by L.R. Nelson Consulting Engineers
  - Approval Letter
  - Hydrology Reference Information
  - Existing Condition Basin Exhibit
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  - Approval Letter
  - Drainage Exhibits
  - Summary Table of Flows

DS4263
12/11/2007
#400- G-07

TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK

City of Las Vegas, Nevada
Project Number: 1531-001-72
December 2007

Prepared For:

City of Las Vegas Public Works
400 Stewart Avenue
Las Vegas, Nevada 89101
Phone: (702) 229-1046
Fax: (702) 464-5702

Prepared By:

David W. Trushaw, P.E.
L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

Received
1/9/08
DS42163
$4000
G-07

ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK

CITY OF LAS VEGAS, NEVADA
Project Number: 1531-001-072
January 2008

Prepared For:

City of Las Vegas Public Works
400 Stewart Avenue
Las Vegas, Nevada 89101
Phone: (702) 229-1046
Fax: (702) 464-5702

Prepared By:

David W. Trushaw, P.E.
L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

DS4263
REC'D: 01/30/2008
#400- G-07

ADDENDUM #2 TO THE TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK

CITY OF LAS VEGAS, NEVADA
Project Number: 1531-001-072
January 2008

Prepared For:

City of Las Vegas Public Works
400 Stewart Avenue
Las Vegas, Nevada 89101
Phone: (702) 229-1046
Fax: (702) 464-5702

Prepared By:

David W. Trushaw, P.E.
L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

DS4263
REC'D: 02-22-2008
$400- G-07

ADDENDUM #3 TO THE TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK

CITY OF LAS VEGAS, NEVADA
Project Number: 1531-001-072
February 2008

Prepared For:

City of Las Vegas Public Works
400 Stewart Avenue
Las Vegas, Nevada 89101
Phone: (702) 229-1046
Fax: (702) 464-5702

Prepared By:

David W. Trushaw, P.E.
L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 25, 2008
TO: **Land Development Services** Department of Public Works				FROM: Oh Sang Kwon, P.E. Flood Control Department of Public Works
SUBJECT:	Drainage Study for: **Indian Hills Park**			**COPIES TO:** L.R. Nelson Consulting Engineers, Inc.
Cross Streets:	Fort Apache and Iron Mountain			Patrick H. Batte', Architectural Project Manager
FILE NO.:	F:\Depot\DSMEMOS\DS4263D.doc			Bart Anderson, P.E., DEVCO
Parcel Number:	125-07-501-004			
Zoning Action:	SDR-24452			
FEMA Flood Zone	YES		No X	
Proposed Storm Drain	YES X		No	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Trn. #
1st Submittal	12/11/2007	12/19/2007	Not Approved	$400.00	83982: $400
2nd Submittal	1/9/2008	1/11/2008	Not Approved	$400.00	85451: $400
3rd Submittal	1/30/2008	2/13/2008	Not Approved	$400.00	87040: $400
4th Submittal	2/22/08 & 2/26/07	2/27/2008	Conditionally Approved	$400.00	88789: $400
			TOTAL FEES (LDDRS):	**$1600.00**	**----**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

X	is approved subject to conformance to all City standards and the following conditions.
	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

1. Please note that any revision to the proposed project site must be submit to the *City of Las Vegas Flood Control Section* and must be approved prior to final approval of improvement plan.
2. Structural plans for the storm drain improvements must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to final acceptance of the drainage study.
3. The grading plan indicates offsite grading and installation of drop inlet on the Clark County School District property. Secure a notarized letter of permission from the property owner allowing the grading. This letter is required prior to final acceptance of the drainage study.
4. The proposed improvement plans show drainage facilities of a size that must be reviewed for Maintenance and Access concerns. The engineer must submit a set of improvement plans to Street and Sanitation Department for their review. Streets & Sanitation approval must be secured prior to drainage study approval.

5. This site accepts offsite flows and conveys them through the site. Public drainage easements must be recorded by separate document prior to the final acceptance of the improvement plans unless they are to be recorded by parcel or final map.

6. Grading Plan Comments:

A. Sheet C3.03:

   a. Callout future drop inlet by other on Brent Lane north of Fort Apache Road.

B. Sheet C4.01:

   a. Show 3-ft concrete valley gutter connecting the drop inlets on "Stairs and Drop Inlets Detail"

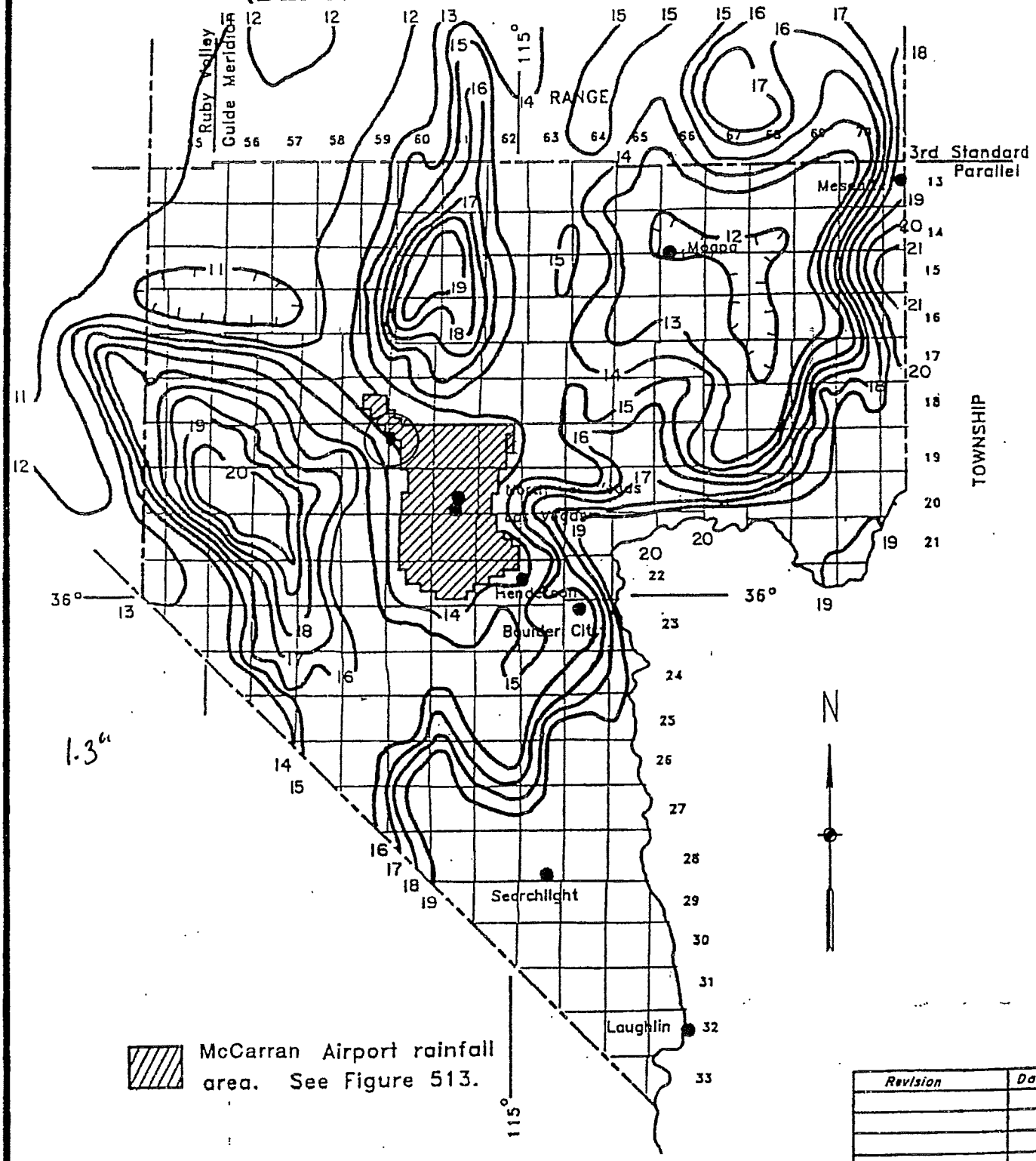
NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the *City of Las Vegas Flood Control Section*. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
OSK

T/R/S: T19S/R61E/07
AREA G-07

RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



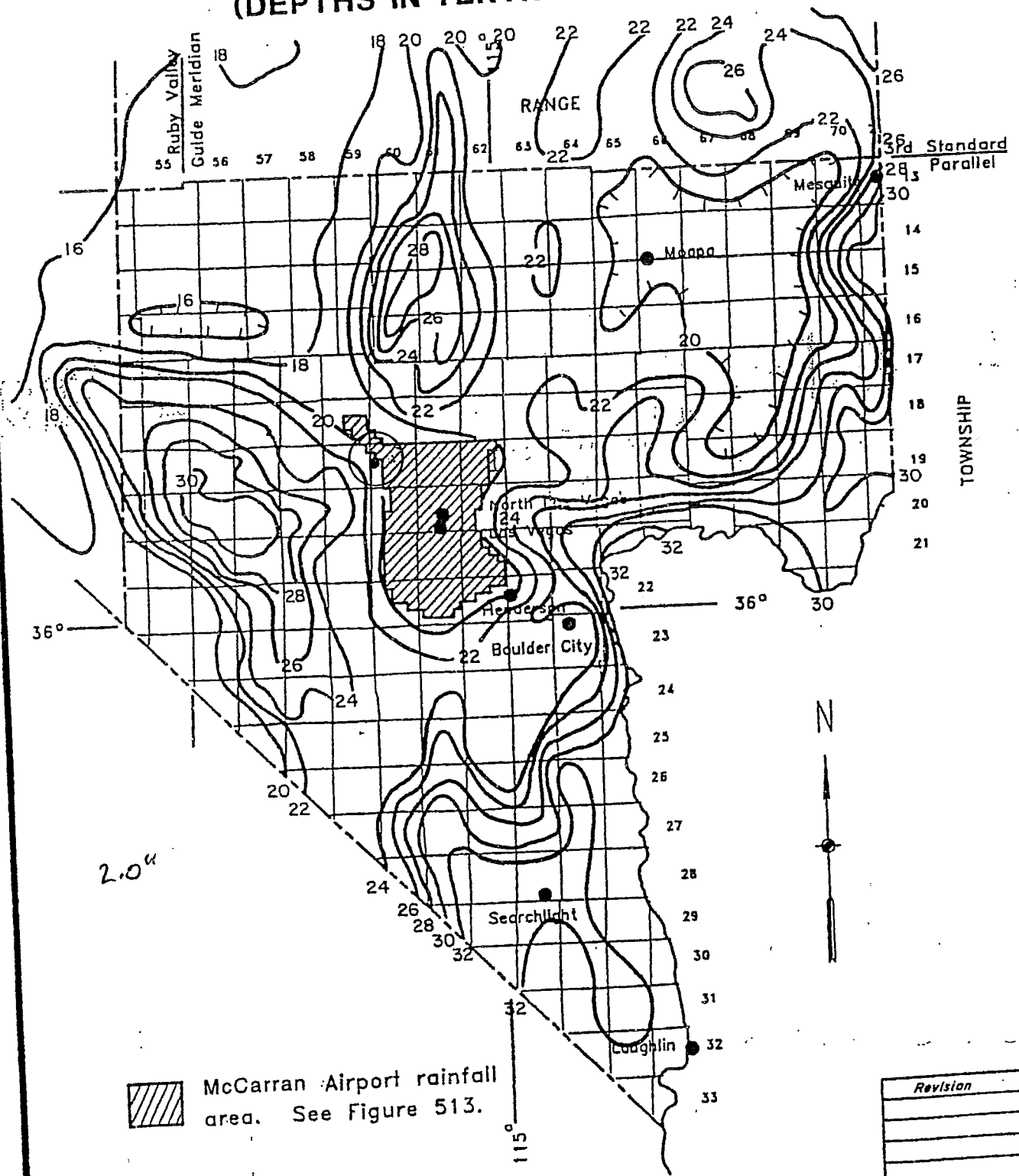
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

SIX-HOUR STORM DISTRIBUTIONS

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5	Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5
0	0.0	0.0	0.0	185	32.2	37.6	43.0
5	2.0	2.0	2.0	190	35.2	41.5	47.7
10	5.7	5.8	5.9	195	40.9	46.2	51.4
15	7.0	7.5	8.0	200	49.9	53.0	56.1
20	8.7	9.9	11.0	205	59.0	61.0	63.0
25	10.8	12.6	14.4	210	71.0	71.0	71.0
30	12.4	13.7	15.0	215	74.4	73.2	72.0
35	13.0	14.5	16.0	220	78.1	75.6	73.1
40	13.0	14.9	16.8	225	81.2	78.2	75.2
45	13.0	15.1	17.1	230	81.9	79.9	77.9
50	13.0	15.5	18.0	235	83.5	81.3	79.0
55	13.0	15.6	18.2	240	85.1	82.3	79.5
60	13.0	15.9	18.7	245	85.6	83.0	80.4
65	13.3	16.2	19.0	250	86.0	83.5	81.0
70	14.0	16.9	19.7	255	86.8	84.4	82.0
75	14.2	17.2	20.2	260	87.6	85.1	82.6
80	14.8	17.9	21.0	265	88.8	86.4	84.0
85	15.8	18.9	22.0	270	91.0	88.5	85.9
90	17.2	20.1	23.0	275	92.6	90.8	88.9
95	18.1	21.1	24.1	280	93.7	92.4	91.0
100	19.0	22.0	25.0	285	95.0	94.4	93.8
105	19.7	22.8	25.9	290	97.0	96.8	96.6
110	19.9	23.2	26.5	295	97.6	97.3	97.0
115	20.0	24.0	28.0	300	98.2	97.8	97.4
120	20.1	24.6	29.0	305	98.5	98.2	97.9
125	20.4	25.2	30.0	310	98.7	98.4	98.1
130	21.4	26.0	30.5	315	98.9	98.6	98.3
135	22.9	26.9	30.9	320	99.0	98.8	98.5
140	24.1	27.6	31.0	325	99.3	99.1	98.9
145	24.9	28.3	31.7	330	99.3	99.2	99.0
150	25.1	28.6	32.1	335	99.4	99.3	99.2
155	25.6	29.2	32.7	340	99.5	99.4	99.3
160	27.0	30.2	33.3	345	99.8	99.7	99.6
165	27.8	31.2	34.6	350	99.8	99.8	99.7
170	28.1	32.1	36.1	355	99.9	99.9	99.9
175	28.3	33.2	38.1	360	100.0	100.0	100.0
180	29.5	35.2	40.8				

Notes:
1. For drainage areas less than 8 square miles in size, use SDN 3.
2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
4. A graphical representation of these values is presented on **Figure 515.**

Revision	Date

REFERENCE:

TABLE 503

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

Revision	Date

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition[2]	A[3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3]Curve numbers for group A have been developed only for desert shrub.

Revision	Date

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		~~68~~	~~79~~	86	~~89~~
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		~~39~~	~~61~~	74	~~80~~
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
See Table 602A					
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

SOIL TYPE CALCULATED CURVE NUMBER

Soil Type #400 – Tencee very gravelly fine sandy loam

Soil	Percent(%)	Soil Type	Undeveloped CN	Dev. CN Open Space
Tencee	90	D	88	84
Dalian	10	B	77	69
Total	100		86.9 use 87	82.5 use 83

Soil Type #540 – Weiser extremely gravelly fine sandy loam

Soil	Percent(%)	Soil Type	Undeveloped CN	Dev. CN Open Space
Weiser	85	B	77	69
Goodsprings	10	D	88	84
Arizo	5	A	63	49
Total	100		77.4 use 77	69.5 use 70

CALCULATED CURVE NUMBER VALUES

Basin SITEN – 90% #400 + 10% #540
Undeveloped CN = 0.9*87 + 0.1*77 = 86

Basin SITES – 100% #400
Undeveloped CN = 87

Basin ONI – 90% #400 + 10% #540
Developed CN = 0.9*83 + 0.1*70 = 81.7 Use 82

Basins ONF and ONB – 100% #400
Developed CN = 83

Basins FN and FS – 100% #400
Existing CN = 0.5*87 + 0.5*98 = 93
Developed CN = 98

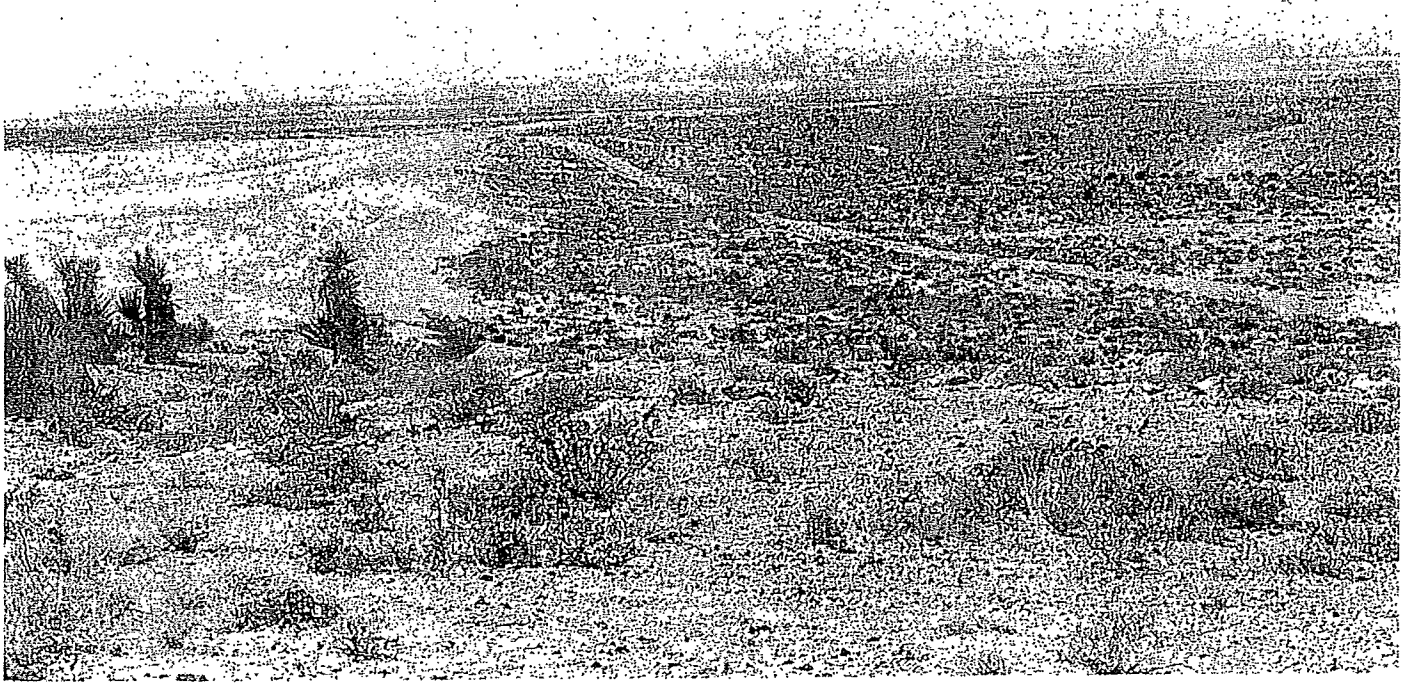
United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of the Interior, Bureau of Land Management, and University of Nevada Agricultural Experiment Station

Soil Survey of Las Vegas Valley Area Nevada

Part of Clark County



Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected for lawns and landscaping. Because of the underlying hardpan, deep cuts should be avoided on this soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 6.

390—Spring clay loam. This very deep, moderately well drained soil is on alluvial flats. It formed in gypsiferous lacustrine sediment. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown clay loam about 5 inches thick. The underlying material to a depth of 60 inches or more is stratified, light brown to pink silt loam to silty clay, averaging silty clay loam, and contains many gypsum crystals.

Included in this unit are about 10 percent Land soils on alluvial flats and 5 percent Las Vegas soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of the Spring soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is strongly affected by salts to a depth of 5 inches, and it is moderately affected below this depth.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability. Special design of septic tank absorption fields is needed. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

The Spring soil is limited for roads because of limited ability to support a load. Roads and streets should be designed to compensate for the instability of the soil.

The main limitation for lawns and landscaping is the excess soluble salts in the soil. Intensive management is required to reduce the salinity and maintain soil productivity. Excess salts in the soil can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected.

This map unit is in capability subclasses VIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, 75 percent of the surface is covered with a well developed desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The next layer is light brown very gravelly fine sandy loam and very gravelly sandy loam and is weakly cemented with lime to a depth of about 15 inches. An indurated, lime-cemented hardpan is at a depth of about 15 inches. Depth to the hardpan ranges from 7 to 20 inches.

Included in this unit are small areas of Dalian soils on side slopes of fan remnants and on inset fans. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Tencee soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 7 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

415—Aztec very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, 80 percent of the surface is covered with pebbles. The surface layer is light yellowish brown very gravelly sandy loam about 2 inches thick. The underlying material to a depth of 63 inches is stratified, light yellowish brown, light brown, and light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Included in this unit are about 5 percent Bracken soils on pediment remnants, 5 percent Rock outcrop on isolated ridges, and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high

varies from one area to another. About 500 acres, east of Henderson, is mostly an Akela soil that has slopes of 8 to 15 percent. About 40 acres of Rock outcrop, gypsum, shown by symbols, is in an area in the northeastern corner of sec. 33, T. 21 S., R. 63 E.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

Rock outcrop consists of exposed areas of undifferentiated volcanic rock.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the areas of Rock outcrop, steepness of slopes, and shallow depth to bedrock. Roads should be designed to minimize cuts. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Akela soil is in horticultural group 6.

540—Welser extremely gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on summits and side slopes of erosional fan remnants (fig. 1). It formed in alluvium derived from various kinds of rock that have a high content of lime.

Typically, 80 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed. Some pedons have an indurated, lime-cemented hardpan at a depth of 40 to 60 inches or more.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields generally function well in this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

542—Welser-Aztec complex, 2 to 8 percent slopes. This map unit is on erosional fan remnants.

This unit is 55 percent Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, and 30 percent Aztec very gravelly fine sandy loam, 2 to 8 percent slopes. The Weiser soil is on summits and side slopes of the fan remnants, and the Aztec soil is on side slopes of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
182*:											
Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.
Arizo	(A)	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
183--- Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
184--- Caliza	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
187--- Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
190--- Dalian	B	None	---	>6.0	---	>60	---	---	---	High	Low.
191--- Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
192*:											
Dalian	(B)	Rare	---	>6.0	---	>60	---	---	---	High	Low.
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
200--- Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	Moderate.
206--- Glencarb	C	Occasional	Jul-Sep	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
222--- Glencarb	C	Rare	---	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
236--- Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
237--- Glencarb	B	Rare	---	>6.0	---	>60	---	40-60	Thick	High	Low.
240--- Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
252, 255--- Grapevine	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
260--- Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
262*:											
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	Rare	---	>6.0	---	>60	---	9-20	Thick	High	Low.
263*:											
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
264--- Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
270---------- Land	B	Rare---------	---	3.5-6.0	Mar-Sep	>60	---	---	---	High------	High.
278---------- Land	D	Rare---------	---	1.5-3.0	Jan-Dec	>60	---	---	---	High------	High.
282---------- Land	C	Rare---------	---	3.0-3.5	Jan-Dec	>60	---	---	---	High------	High.
300, 301---------- Las Vegas	D	Rare---------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
302*:											
Las Vegas---------	D	Rare---------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
McCarran----------	B	Rare---------	---	>6.0	---	>60	---	---	---	High------	High.
Grapevine---------	B	Rare---------	---	>6.0	---	>60	---	---	---	High------	High.
305*:											
Las Vegas---------	D	Rare---------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
Destazo----------	B	Rare---------	---	>6.0	---	>60	---	---	---	High------	High.
307*:											
Las Vegas---------	D	Rare---------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
Skyhaven----------	C	Rare---------	---	>6.0	---	>60	---	24-40	Thick	High------	High.
325, 326---------- McCarran	B	Rare---------	---	>6.0	---	>60	---	---	---	High------	High.
341---------- Paradise	C	Rare---------	---	3.0-5.0	Dec-Mar	>60	---	---	---	High------	Low.
360*:											
Rock outcrop.											
St. Thomas--------	D	None---------	---	>6.0	---	4-20	Hard	---	---	High------	Low.
380---------- Skyhaven	C	Rare---------	---	>6.0	---	>60	---	24-40	Thick	High------	High.
390---------- Spring	C	Rare---------	---	>6.0	---	>60	---	---	---	High------	High.
400---------- Tencee	D	None---------	---	>6.0	---	>60	---	7-20	Thick	High------	Low.
415---------- Aztec	B	None---------	---	>6.0	---	>60	---	---	---	High------	High.
417*:											
Aztec----------	B	None---------	---	>6.0	---	>60	---	---	---	High------	High.
Rock outcrop.											
418*:											
Aztec----------	B	None---------	---	>6.0	---	>60	---	---	---	High------	High.
Nickel----------	B	None---------	---	>6.0	---	40-60	Hard	---	---	High------	Low.
Knob Hill---------	B	None---------	---	>6.0	---	>60	---	---	---	High------	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
419*:											
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
430 Knob Hill	B	None	---	>6.0	---	>60	---	---	---	High	Low.
440 Nickel	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
450 Cave Variant	D	None	---	>6.0	---	>60	---	5-18	Thick	High	High.
481, 484 Hobog	D	None	---	>6.0	---	8-20	Hard	---	---	High	Low.
500*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
501 Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
502*:											
Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
505*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
510*:											
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
Rock outcrop.											
540 Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
542*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
545*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
600*. Slickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
630*. Badlands											
635*, 640*. Rock outcrop											
645*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

SOIL TYPE CALCULATED CURVE NUMBER

Soil Type #400 – Tencee very gravelly fine sandy loam

Soil	Percent(%)	Soil Type	Undeveloped CN	Dev. CN Open Space
Tencee	90	D	88	84
Dalian	10	B	77	69
Total	100		86.9 use 87	82.5 use 83

Soil Type #540 – Weiser extremely gravelly fine sandy loam

Soil	Percent(%)	Soil Type	Undeveloped CN	Dev. CN Open Space
Weiser	85	B	77	69
Goodsprings	10	D	88	84
Arizo	5	A	63	49
Total	100		77.4 use 77	69.5 use 70

CALCULATED CURVE NUMBER VALUES

Basin SITEN – 90% #400 + 10% #540
Undeveloped CN = 0.9*87 + 0.1*77 = 86

Basin SITES – 100% #400
Undeveloped CN = 87

Basin ONI – 90% #400 + 10% #540
Developed CN = 0.9*83 + 0.1*70 = 81.7 Use 82

Basin ONF – 100% #400
Developed CN = 98

Basin ONB – 100% #400
Developed CN = 83

Basins FN and FS – 100% #400
Existing CN = 0.5*87 + 0.5*98 = 93

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

L.R. NELSON
CONSULTING ENGINEERS

PROJECT NO. : 1531-001-072 **DEVELOPMENT : INDIAN HILLS PARK**

FILE : FORM4.XLS **CALCULATED BY: RM** **DATE : 12/21/07**

Sub-Basin Data					Initial/Overland Time (T_i)			Travel Time (T_t)					T_c	T_c Check (Urbanized Basins)		Final T_c	T_{lag}	Remarks
DESIG	CN	K	AREA (acres)	AREA (mi^2)	LENGTH (ft)	SLOPE (%)	T_i (min)	LENGTH (ft)	SLOPE (%)	V_1 (fps)	V_2 (fps)	T_t (min)	$T_c=T_i+T_t$ (min)	TOTAL (ft)	T_c (min)	T_c (min)	T_{lag} (hrs)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
EXISTING (UNDEVELOPED) BASINS																		
SITEN	86	0.745	2.4	0.0038	10	7.7	1.0	315	3.6	2.81	N/A	1.9	2.9	N/A	N/A	2.9	0.100	Undev.
SITES	87	0.758	6.0	0.0094	10	5.0	1.1	290	3.1	2.61	N/A	1.9	3.0	N/A	N/A	3.0	0.100	Undev.
FN	93	0.838	0.9	0.0014	120	2.0	4.1	310	1.0	1.48	N/A	3.5	7.6	N/A	N/A	7.6	0.100	Undev.
FS	93	0.838	2.8	0.0044	120	2.0	4.1	960	1.0	1.48	2.94	8.2	12.3	N/A	N/A	12.3	0.123	Undev.
DEVELOPED BASINS																		
ON!	82	0.692	2.8	0.0044	110	1.0	7.7	425	1.0	2.02	N/A	3.5	11.2	535.0	13.0	11.2	0.112	Dev.
ONF	98	0.904	2.9	0.0045	117	1.0	3.8	350	0.5	1.43	N/A	4.1	7.9	467.0	12.6	7.9	0.079	Dev.
ONB	83	0.706	2.8	0.0044	110	1.0	7.4	425	1.0	2.02	N/A	3.5	11.0	535.0	13.0	11.0	0.110	Dev.

$T_i=(1.8(1.1-K)L^{(1/2)})/(S^{1/3})$

$T_c=T_i+T_t$

$K=0.0132(CN)-.39$

$T_{lag}=0.6T_c$

For the travel time (T_t) calculations,
V_1 applies to the first 500 feet of travel distance;
V_2 applies to the remaining travel distance.

Travel Time Velocity Formulas

Existing	Developed
$V_1 = 14.8*(S/100)^{1/2}$	$V_1 = 20.2*(S/100)^{1/2}$
$V_2 = 29.4*(S/100)^{1/2}$	$V_2 = 30.6*(S/100)^{1/2}$

All basins over one square mile are calculated by the equation $T_{lag}=20Kn(L*L_c/S^{0.5})^{0.33}$ and denoted by shaded gray (See Worksheet).

REFERENCE: **STANDARD FORM 4**

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   21NOV07  TIME  12:01:57   *
*                                       *
*****************************************
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```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID
   2          ID      TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK
   3          ID                  CITY OF LAS VEGAS, NEVADA
   4          ID
   5          ID     PREPARED BY:  RYAN MORGAN
   6          ID                   L.R. NELSON CONSULTING ENGINEERS, INC.
   7          ID                   6765 W. RUSSELL RD, SUITE 200
   8          ID                   LAS VEGAS, NV  89118
   9          ID
  10          ID   EXISTING CONDITION
  11          ID   FILENAME:IHP.DAT
  12          ID   JOB#1531-001-072
  13          ID
              *DIAGRAM
  14          IT       5       0       0     300
  15          IO       5
  16          IN       5
  17          JR    PREC    0.54    0.56     1.0

  18          KK  JHBES3
  19          KM   REFERENCED OFFSITE BASIN 3 FROM JAMES H. BILBRAY ELEMENTARY SCHOOL STUDY
  20          BA  0.00213
  21          PB    3.00
  22          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
  23          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
  24          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
  25          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
  26          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
  27          PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
  28          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
  29          PC    .998    .999   1.00
  30          LS       0      95
  31          UD   0.083

  32          KK  JHBES4
  33          KM   REFERENCED OFFSITE BASIN 4 FROM JAMES H. BILBRAY ELEMENTARY SCHOOL STUDY
  34          BA  0.00894
  35          LS       0      84
  36          UD   0.102

  37          KK  WMSES7
  38          KM   REFERENCED OFFSITE BASIN 7 FROM WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHO
  39          BA  0.00245
  40          LS       0      95
  41          UD   0.083

  42          KK  WMSES8
  43          KM   REFERENCED OFFSITE BASIN 8 FROM WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHO
  44          BA  0.00853
  45          LS       0      80
  46          UD   0.112
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  47          KK    COM3
```

```
48          KM   REFERENCED COMBINATION POINT COM3
49          HC       4

50          KK  JHBES2
51          KM   REFERENCED OFFSITE BASIN 2 FROM JAMES H. BILBRAY ELEMENTARY SCHOOL STUDY
52          BA  0.00194
53          LS       0       95
54          UD   0.087

55          KK   SITES
56          KM   UNDEVELOPED BASIN SITES
57          BA  0.0094
58          LS       0       87
59          UD   0.100

60          KK      FS
61          KM   OFFSITE BASIN FS
62          BA  0.0044
63          LS       0       93
64          UD   0.123

65          KK     CP2
66          KM   COMBINATION POINT 2
67          HC       4

68          KK  WMSES6
69          KM   REFERENCED OFFSITE BASIN 6 FROM WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHO
70          BA  0.00225
71          LS       0       92
72          UD   0.100

73          KK   SITEN
74          KM   UNDEVELOPED BASIN SITEN
75          BA  0.0038
76          PB    2.86
77          LS       0       86
78          UD   0.100

79          KK      FN
80          KM   OFFSITE BASIN FS
81          BA  0.0014
82          LS       0       93
83          UD   0.100

84          KK     CP1
85          KM   COMBINATION POINT 1
86          HC       3
87          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

    18      JHBES3
              .
              .
    32        .      JHBES4
              .         .
              .         .
    37        .         .      WMSES7
              .         .         .
              .         .         .
    42        .         .         .      WMSES8
              .         .         .         .
              .         .         .         .
    47       COM3.....................................
              .
              .
    50        .      JHBES2
              .         .
              .         .
    55        .         .       SITES
              .         .         .
              .         .         .
    60        .         .         .          FS
              .         .         .           .
              .         .         .           .
    65       CP2.....................................
              .
              .
    68        .      WMSES6
              .         .
              .         .
    73        .         .       SITEN
              .         .         .
              .         .         .
    79        .         .         .          FN
              .         .         .           .
              .         .         .           .
    84        .        CP1.....................

  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                    ****************************************
```

```
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN  1998              *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   21NOV07  TIME  12:01:57   *
*                                       *
*****************************************
```


```
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104               *
*                                       *
*****************************************
```


TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK
CITY OF LAS VEGAS, NEVADA

PREPARED BY: RYAN MORGAN
L.R. NELSON CONSULTING ENGINEERS, INC.
6765 W. RUSSELL RD, SUITE 200
LAS VEGAS, NV 89118

EXISTING CONDITION
FILENAME:IHP.DAT
JOB#1531-001-072

```
  15 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2   0  ENDING DATE
                      NDTIME       0055  ENDING TIME
                       ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .54       .56      1.00
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .54	RATIO 2 .56	RATIO 3 1.00
HYDROGRAPH AT							
+	JHBES3	.00	1	FLOW	2.	2.	5.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	JHBES4	.01	1	FLOW	4.	4.	12.
				TIME	3.58	3.58	3.50
HYDROGRAPH AT							
+	WMSES7	.00	1	FLOW	3.	3.	5.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	WMSES8	.01	1	FLOW	3.	3.	10.
				TIME	3.58	3.58	3.58
4 COMBINED AT							
+	COM3	.02	1	FLOW	11.	12.	31.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	JHBES2	.00	1	FLOW	2.	2.	4.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							

+	SITES	.01	1	FLOW	5.	6.	15.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	FS	.00	1	FLOW	4.	4.	8.
				TIME	3.58	3.58	3.58
4 COMBINED AT							
+	CP2	.04	1	FLOW	22.	23.	58.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	WMSES6	.00	1	FLOW	2.	2.	4.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	SITEN	.00	1	FLOW	2.	2.	5.
				TIME	3.58	3.58	3.50
HYDROGRAPH AT							
+	FN	.00	1	FLOW	1.	1.	3.
				TIME	3.50	3.50	3.50
3 COMBINED AT							
+	CP1	.01	1	FLOW	5.	5.	12.
				TIME	3.50	3.50	3.50

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   21DEC07  TIME  11:30:55   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X                X
XXXXXXX  XXXX    X       XXXXX    X
X     X  X       X                X
X     X  X       X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID
   2          ID      TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK
   3          ID                CITY OF LAS VEGAS, NEVADA
   4          ID
   5          ID      PREPARED BY:  RYAN MORGAN
   6          ID                    L.R. NELSON CONSULTING ENGINEERS, INC.
   7          ID                    6765 W. RUSSELL RD, SUITE 200
   8          ID                    LAS VEGAS, NV  89118
   9          ID
  10          ID    DEVELOPED CONDITION
  11          ID    FILENAME:IHP.DAT
  12          ID    JOB#1531-001-072
  13          ID
              *DIAGRAM
  14          IT       5       0       0     300
  15          IO       5
  16          IN       5
  17          JR     PREC    0.54    0.56     1.0

  18          KK  JHBES3
  19          KM   REFERENCED OFFSITE BASIN 3 FROM JAMES H. BILBRAY ELEMENTARY SCHOOL STUDY
  20          BA  0.00213
  21          PB    3.00
  22          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
  23          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
  24          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
  25          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
  26          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
  27          PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
  28          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
  29          PC    .998    .999   1.00
  30          LS       0      95
  31          UD   0.083

  32          KK  JHBES4
  33          KM   REFERENCED OFFSITE BASIN 4 FROM JAMES H. BILBRAY ELEMENTARY SCHOOL STUDY
  34          BA  0.00894
  35          LS       0      84
  36          UD   0.102

  37          KK  WMSES7
  38          KM   REFERENCED OFFSITE BASIN 7 FROM WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHO
  39          BA  0.00245
  40          LS       0      95
  41          UD   0.083

  42          KK  WMSES8
  43          KM   REFERENCED OFFSITE BASIN 8 FROM WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHO
  44          BA  0.00853
  45          LS       0      80
  46          UD   0.112
```



```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  47          KK    COM3
```

```
 48          KM   REFERENCED COMBINATION POINT COM3
 49          HC       4

 50          KK  JHBES2
 51          KM   REFERENCED OFFSITE BASIN 2 FROM JAMES H. BILBRAY ELEMENTARY SCHOOL STUDY
 52          BA  0.00194
 53          LS       0       95
 54          UD   0.087

 55          KK     ONB
 56          KM   DEVELOPED ONSITE BASIN ONB
 57          BA  0.0044
 58          PB    2.86
 59          LS       0       83
 60          UD   0.110

 61          KK     CP3
 62          KM   COMBINATION POINT 3
 63          HC       2

 64          KK     ONF
 65          KM   DEVELOPED ONSITE BASIN ONF
 66          BA  0.0045
 67          LS       0       98
 68          UD   0.079

 69          KK      FS
 70          KM   OFFSITE BASIN FS
 71          BA  0.0044
 72          LS       0       93
 73          UD   0.123

 74          KK     CP2
 75          KM   COMBINATION POINT 2
 76          HC       4

 77          KK  WMSES6
 78          KM   REFERENCED OFFSITE BASIN 6 FROM WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHO
 79          BA  0.00225
 80          LS       0       92
 81          UD   0.100

 82          KK     ONI
 83          KM   DEVELOPED ONSITE BASIN ONI
 84          BA  0.0044
 85          LS       0       82
 86          UD   0.112
1                                        HEC-1 INPUT                                    PAGE  3

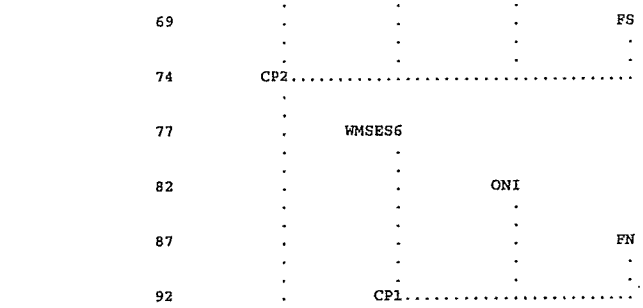
      LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 87          KK      FN
 88          KM   OFFSITE BASIN FS
 89          BA  0.0014
 90          LS       0       93
 91          UD   0.100

 92          KK     CP1
 93          KM   COMBINATION POINT 1
 94          HC       3
 95          ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT                                    /
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

    18      JHBES3
              .
              .
    32        .      JHBES4
              .          .
              .          .
    37        .          .      WMSES7
              .          .          .
              .          .          .
    42        .          .          .      WMSES8
              .          .          .          .
              .          .          .          .
    47       COM3.....................................
              .
              .
    50        .      JHBES2
              .          .
              .          .
    55        .          .         ONB
              .          .          .
              .          .          .
    61        .         CP3.........
              .          .
              .          .
    64        .          .         ONF
              .          .          .
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN  1998                *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   21DEC07  TIME  11:30:55   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

TECHNICAL DRAINAGE STUDY FOR INDIAN HILLS PARK
CITY OF LAS VEGAS, NEVADA

PREPARED BY: RYAN MORGAN
L.R. NELSON CONSULTING ENGINEERS, INC.
6765 W. RUSSELL RD, SUITE 200
LAS VEGAS, NV 89118

DEVELOPED CONDITION
FILENAME:IHP.DAT
JOB#1531-001-072

```
  15 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     2    0  ENDING DATE
                      NDTIME          0055  ENDING TIME
                      ICENT            19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .54       .56      1.00
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .54	RATIO 2 .56	RATIO 3 1.00
HYDROGRAPH AT							
+	JHBES3	.00	1	FLOW	2.	2.	5.
				TIME	3.50	3.50	3.50

HYDROGRAPH AT

+	JHBES4	.01	1	FLOW	4.	4.	12.
				TIME	3.58	3.58	3.50
HYDROGRAPH AT							
+	WMSES7	.00	1	FLOW	3.	3.	5.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	WMSES8	.01	1	FLOW	3.	3.	10.
				TIME	3.58	3.58	3.58
4 COMBINED AT							
+	COM3	.02	1	FLOW	11.	12.	31.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	JHBES2	.00	1	FLOW	2.	2.	4.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	ONB	.00	1	FLOW	2.	2.	5.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	CP3	.01	1	FLOW	3.	4.	9.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	ONF	.00	1	FLOW	5.	5.	10.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	FS	.00	1	FLOW	3.	4.	8.
				TIME	3.58	3.58	3.58
4 COMBINED AT							
+	CP2	.04	1	FLOW	23.	24.	58.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	WMSES6	.00	1	FLOW	2.	2.	4.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	ONI	.00	1	FLOW	2.	2.	5.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	FN	.00	1	FLOW	1.	1.	3.
				TIME	3.50	3.50	3.50
3 COMBINED AT							
+	CP1	.01	1	FLOW	4.	4.	11.
				TIME	3.58	3.58	3.50

*** NORMAL END OF HEC-1 ***

LEGEND

- BASIN LINE
- FLOW DIRECTION
- 5 — BASIN NAME
- 1.4 AC. — SIZE OF BASIN
- 1/4 — 10/100 YR FLOW
- ● — CONCENTRATION POINT
- CV — CONCENTRATION POINT NAME
- * — REFERENCED FLOWS

TABLE 5
STREET FLOW CALCULATIONS

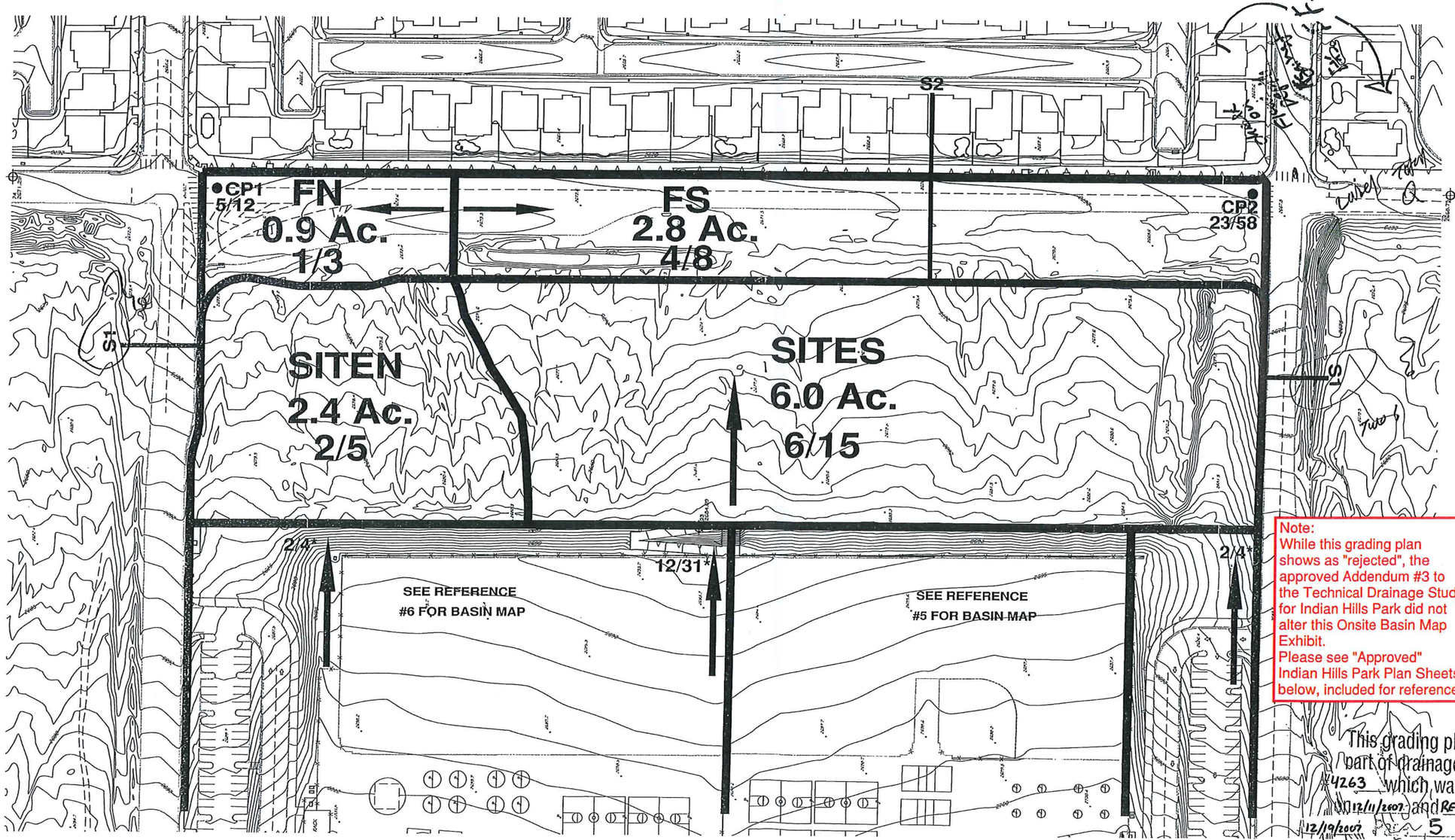
STREET	SECTION	SLOPE (%)	Q_{10}/Q_{100} (cfs)	D_{10}/D_{100} (ft)	V_{10}/V_{100} (ft/s)	V x D
EXISTING CONDITION						
Iron Mountain	S1	3.10	301/737	0.90/1.28	9.4/13.1	8.5/16.8
Brent	S2	3.66	319/1024	1.16/1.75	8.9/13.1	10.3/22.9

NORTH

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.



Note:
While this grading plan shows as "rejected", the approved Addendum #3 to the Technical Drainage Study for Indian Hills Park did not alter this Onsite Basin Map Exhibit.
Please see "Approved" Indian Hills Park Plan Sheets below, included for reference.

This grading plan is a part of drainage study #4263 which was received on 12/11/2007 and REJECTED on 12/19/2007

5 5

DESIGNED BY: | DRAWN BY: dt | CHKD BY:
JOB NUMBER: 1531-001-072 | DATE: 10/07
NO. | REVISION | DATE | APPL

L. R. NELSON CONSULTING ENGINEERS, INC.
STRUCTURAL
CIVIL
SURVEY
6765 West Russell Road, Suite 200
Las Vegas, Nevada 89118
(702) 798-7978
(702) 451-2296 FAX

EXISTING BASIN MAP
FIGURE 7

INDIAN HILLS PARK

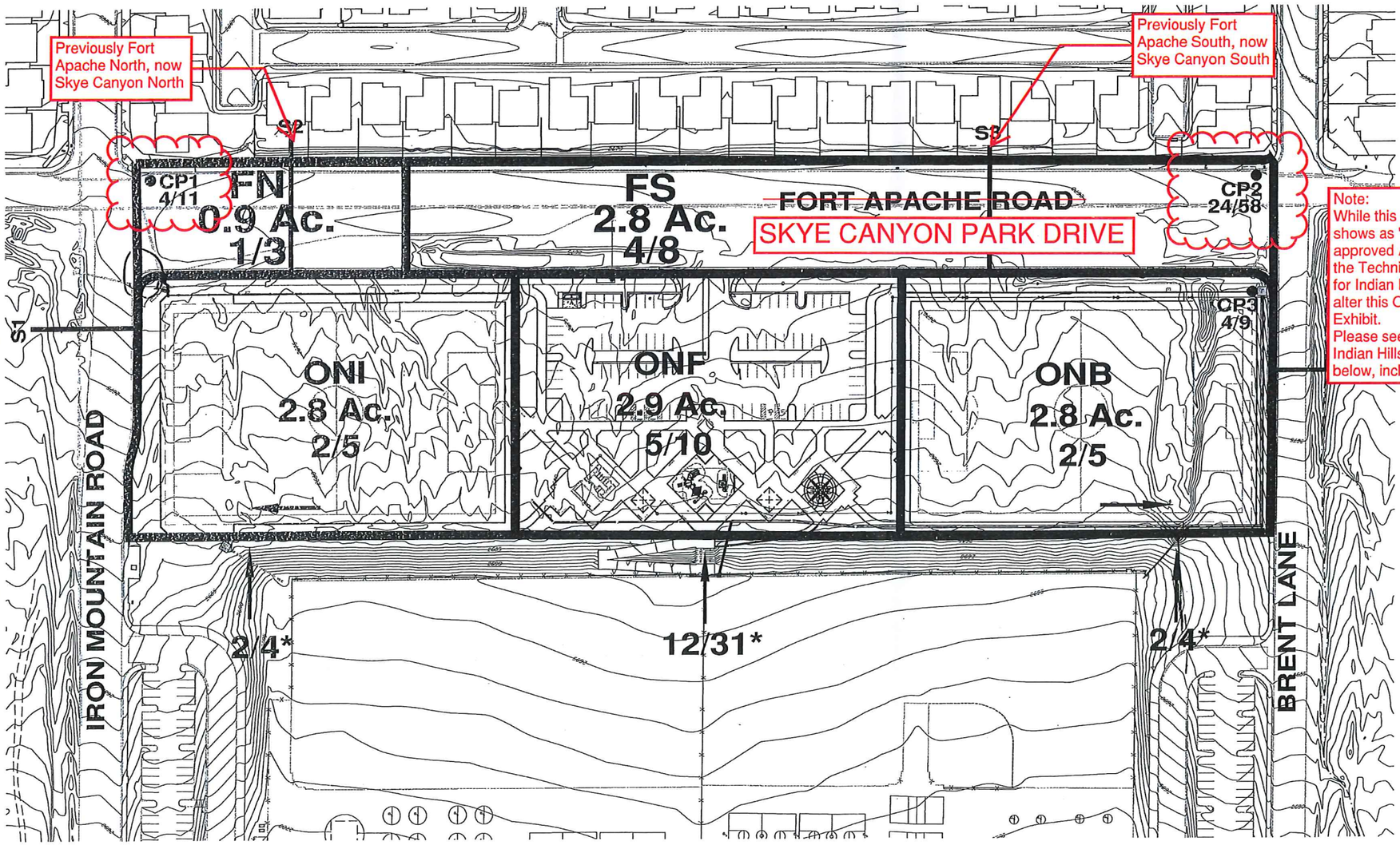
CITY OF LAS VEGAS PARKS
CITY OF LAS VEGAS NEVADA

SHEET NUMBER
1
OF 1 SHEETS
1531-001-072

H:\Land Projects\1531\01\01\DWG\Hydrology\existing basin map.dwg, 12/7/2007 11:15:07 AM, Ryan.Morgan

STREET FLOW CALCULATIONS

Interim Condition					
Iron Mountain	3.10	301/737	0.86/1.21	10.2/14.6	8.8/17.7
Fort Apache North	1.00	4/11	0.41/0.52	1.7/2.0	0.7/1.0
Fort Apache South	3.10	24/58	0.55/0.75	5.5/4.8	3.0/3.6
Brent	3.66	319/1024	1.19/1.81	9.9/15.3	11.8/27.7
Interim Condition w/ Full Street Improvements					
Iron Mountain	3.10	301/737	0.89/1.24	10.4/2.1	9.3/2.6
Fort Apache North	1.00	4/11	0.31/0.40	2.4/3.0	0.7/1.2
Fort Apache South	3.10	24/58	0.42/0.55	5.6/6.5	2.4/3.6
Brent	3.66	319/1024	0.89/1.39	11.0/17.4	9.8/24.2
CITY WIDE STUDY FLOWS					
Interim Condition					
Iron Mountain	3.10	483/1255	1.07/1.62	11.5/16.7	12.3/27.1
Fort Apache	No Flows are shown on City Wide Figures (Existing, Interim and Future)				
Brent	3.66	408/1301	1.28/2.00	10.9/16.6	14.0/33.2
Interim Condition w/ Full Street Improvements					
Iron Mountain	3.10	483/1255	1.05/1.56	12.5/18.2	13.1/28.4
Brent	3.66	408/1301	0.96/1.53	12.3/19.4	11.8/29.7
Future Condition					
Iron Mountain	3.10	0/137	-/0.71	-/7.6	-/5.4
Brent	3.66	0/79	-/0.61	-/6.5	-/4.0



Note:
While this grading plan shows as "rejected", the approved Addendum #3 to the Technical Drainage Study for Indian Hills Park did not alter this Onsite Basin Map Exhibit.
Please see "Approved" Indian Hills Park Plan Sheets below, included for reference.

This grading plan is a part of drainage study # 4263 which was received on 1/9/2008 and rejected on 1/11/2008. Page 1 of 9.

NORTH

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

LEGEND

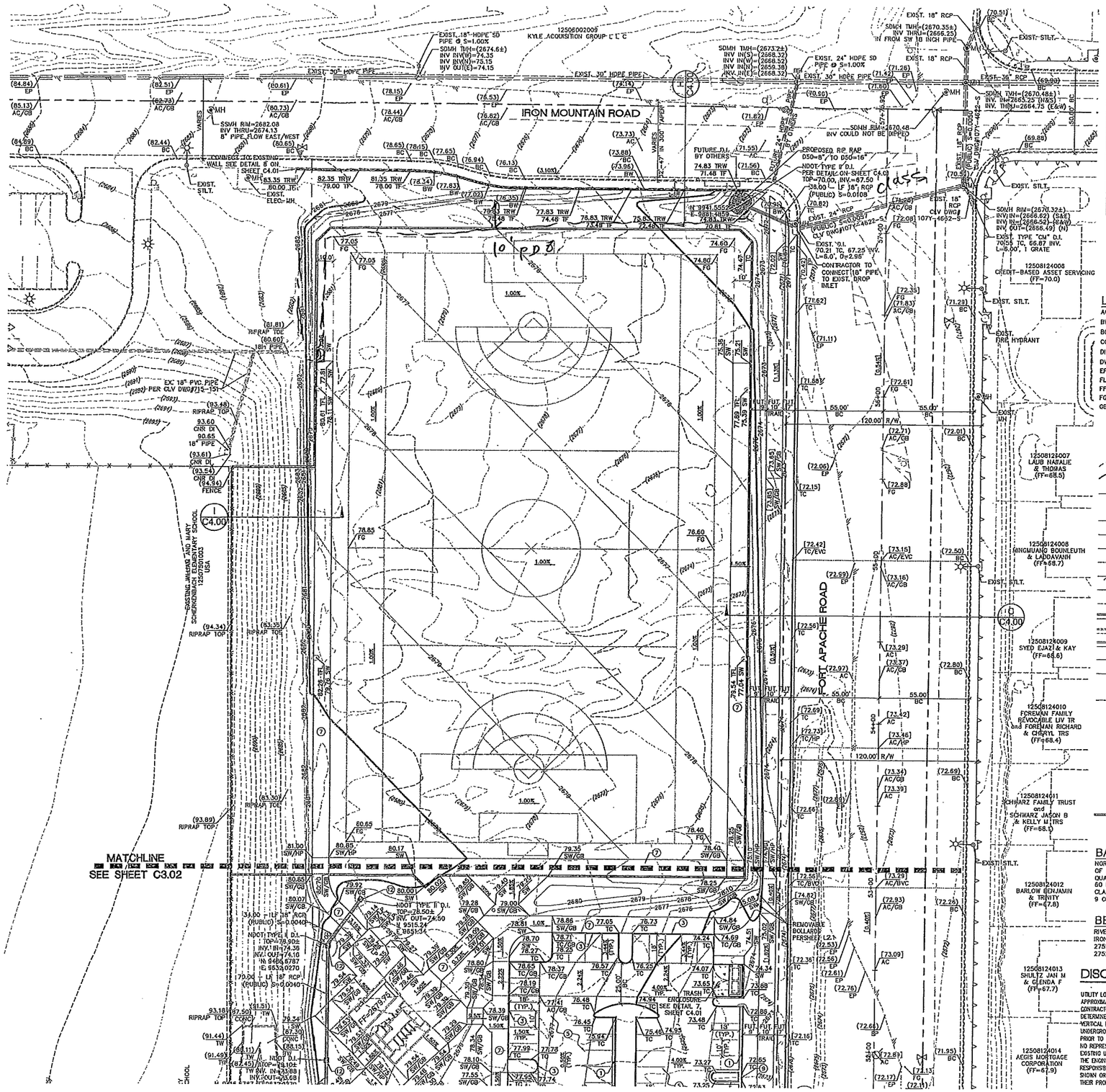
- BASIN LINE
- FLOW DIRECTION
- 5 BASIN NAME
- 1.4 AC. SIZE OF BASIN
- 1/4 10/100 YR FLOW
- CONCENTRATION POINT
- CV CONCENTRATION POINT NAME
- * REFERENCED FLOWS

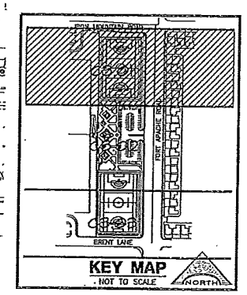
DESIGNED BY:	rm	DRAWN BY:	rm	CHKD BY:	
JOB NUMBER:	1531-001-072	DATE:	11-12-07		
NO.	REVISION			DATE	APPL

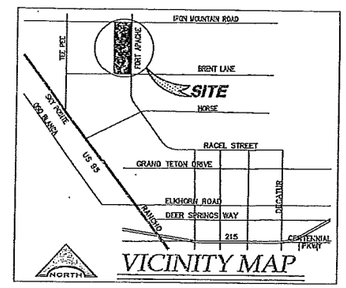
L. R. NELSON CONSULTING ENGINEERS, INC.
STRUCTURAL
CIVIL
SURVEY
6765 West Russell Road, Suite 200
Las Vegas, Nevada 89118
(702) 798-7978
(702) 451-2296 FAX

ONSITE BASIN MAP
FIGURE 8
INDIAN HILLS PARK
CITY OF LAS VEGAS NEVADA

SHEET NUMBER
1
OF 1 SHEETS
1531-001-072







NORTH

GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

LEGEND AND ABBREVIATIONS

AC	ASPHALT CONCRETE	HP	HIGH POINT
BW	BACK OF WALL	LP	LOW POINT
BC	BACK OF CURB	SW	SIDEWALK
CONC	CONCRETE	PL	PROPERTY LINE
DI	DROP INLET	TC	TOP OF CURB
DW	DRIVEWAY	TF	TOP OF FOOTING
EP	EDGE OF PAVEMENT	TFL	TOP OF FIELD LIGHT FOOTING
FL	FLOWLINE	TRW	TOP OF RETAINING WALL
FF	FINISH FLOOR	TW	TOP OF WALL
FG	FINISH GRADE	VG	VALLEY GUTTER
GB	GRADE BREAK		

- 00.00 FG — PROPOSED ELEVATION
- (00.00) EG — EXISTING ELEVATION
- [00.00] EG — FUTURE ELEVATION
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXIST. WALL
- ① CONSTRUCTION NOTE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- STREET CENTERLINE
- GRADE BREAK
- MATCH EXISTING
- EDGE OF PROPOSED PAVEMENT
- EXISTING EDGE OF PAVEMENT
- PROPOSED "L" CURB & GUTTER
- EXIST. "L" CURB & GUTTER
- FUTURE "L" CURB & GUTTER
- EXIST. FENCE
- PROPOSED FENCE
- DIRECTION OF FLOW
- PROPOSED SWALE
- 0.50% PROPOSED GRADE
- (0.50%) EXISTING GRADE
- ⊙MH EXISTING MANHOLE
- EXISTING STREETLIGHT
- EXISTING TRAFFIC SIGNAL
- EXISTING SIGN
- FIRE HYDRANT
- RETAINING WALL

CONSTRUCTION NOTES

1. CONSTRUCT "L" TYPE CURB & GUTTER PER USDCCA DWG. #216.
2. CONSTRUCT SIDEWALK RAMP PER USDCCA DWG. No. CASE I.
3. CONSTRUCT "A" TYPE CURB PER DETAIL 1, SHEET C4.00
4. CONSTRUCT 8' WDE CROSS GUTTER PER USDCCA. DWG. #228
5. CONSTRUCT ASPHALT PER PAVEMENT DETAIL 2, SHEET C4.00
6. INSTALL CONCRETE BUMPERS PER USDCCA DWG #238 (HC STALLS ONLY)
7. CONSTRUCT CONCRETE SIDEWALK PER USDCCA DWG. #234, REFER TO LANDSCAPE ARCHITECTURAL DRAWINGS FOR SIDEWALK THICKNESS AND LOCATIONS.
8. CONSTRUCT 9 STEPS REFER TO LANDSCAPE ARCHITECTURAL DRAWINGS.
9. CONSTRUCT 30" U-GUTTER PER DETAIL 3, SHEET C4.00
10. CONSTRUCT DROP INLET PER DETAIL ON SHEET C7.01
11. CONSTRUCT 48" TYPE III MANHOLE W/OPEN GRATE MODEL R-1792-FG
12. CONSTRUCT NDOT TYPE II DROP INLET PER DETAIL 7, SHEET C4.01
13. CONTRACTOR TO REMOVE EXISTING STUB. CONNECT 12" RCP TO EXISTING STORM DRAIN MANHOLE. GROUT AS REQUIRED.

GEOTECHNICAL EVALUATION

REPORT BY: NINYO & MOORE
DATED: NOVEMBER 16, 2006
UPDATED: NOVEMBER 15, 2007
PROJECT No.: 301631001

FEMA FLOOD PLAIN INFORMATION
ACCORDING TO THE FEMA FIRM PANEL 32000C1735D, REVISED SEPTEMBER 22, 2002, THE SITE IS LOCATED IN A ZONE X. A ZONE X IS DESCRIBED BY FEMA AS AREA OUTSIDE OF THE 500 YEAR FLOOD PLAIN.

ENGINEER'S OPINION OF CUT AND FILL QUANTITIES

TOTAL . . . . . CUT 13,341 CUBIC YARDS
FILL 8,792 CUBIC YARDS
NET CUT 4,549 CUBIC YARDS

NOTE: THIS OPINION OF CUT & FILL QUANTITIES IS PROVIDED AS REQUIRED BY THE CITY OF LAS VEGAS BUILDING CODE AND SHOULD NOT BE USED FOR BIDDING PURPOSES. ALL CONTRACTORS ARE RESPONSIBLE FOR THEIR OWN QUANTITIES. (DATE) ALL GRADING SHALL CONFORM TO RECOMMENDATIONS OF THE SOILS ENGINEER AS CONTAINED IN THE GEOTECHNICAL EVALUATION REPORTS PREPARED BY NINYO AND MOORE.

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS4283).

GUY RUDDY, PE — No. 12848 — DATE

BASIS OF BEARING

NORTH 89°39'07" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, 60 EAST M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY NEVADA RECORDER'S OFFICE AS FILE 87, PAGE 9 OF SURVEYS.

BENCHMARK

RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. ELV90 7N4 838.8366(m) 2752.08(ft) AND GRAND CANYON. ELV90 7N4 838.8366(m) 2752.08(ft)

DISCLAIMER NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Call before you Dig
Avoid cutting underground utility lines. It's costly.
811
1-800-227-2600
OR
1-702-455-7544
CLARK COUNTY TRAFFIC OPERATIONS

Avoid overhead power line contact
Call before you OVERHEAD
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID HITING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEM CONDUITS IT'S COSTLY
CALL BEFORE YOU DO UNDERGROUND
Call before you Underground
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CLARK COUNTY TRAFFIC OPERATIONS
OR
1-702-229-6611
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

This grading plan is a part of drainage study #DS4283 which was received on 2-22-08 and approved on 2/25/08. Page 1 of 9

L.R. NELSON CONSULTING ENGINEERS, INC.
• STRUCTURAL
• CIVIL
• PLANNING
• SURVEY
6705 West Russell Road
Las Vegas, NV 89118
(702) 798-7978
(702) 451-2286 FAX

CONSULTANT

INDIAN HILLS PARK
S.W. CORNER OF FORT APACHE AND IRON MOUNTAIN
CITY OF LAS VEGAS

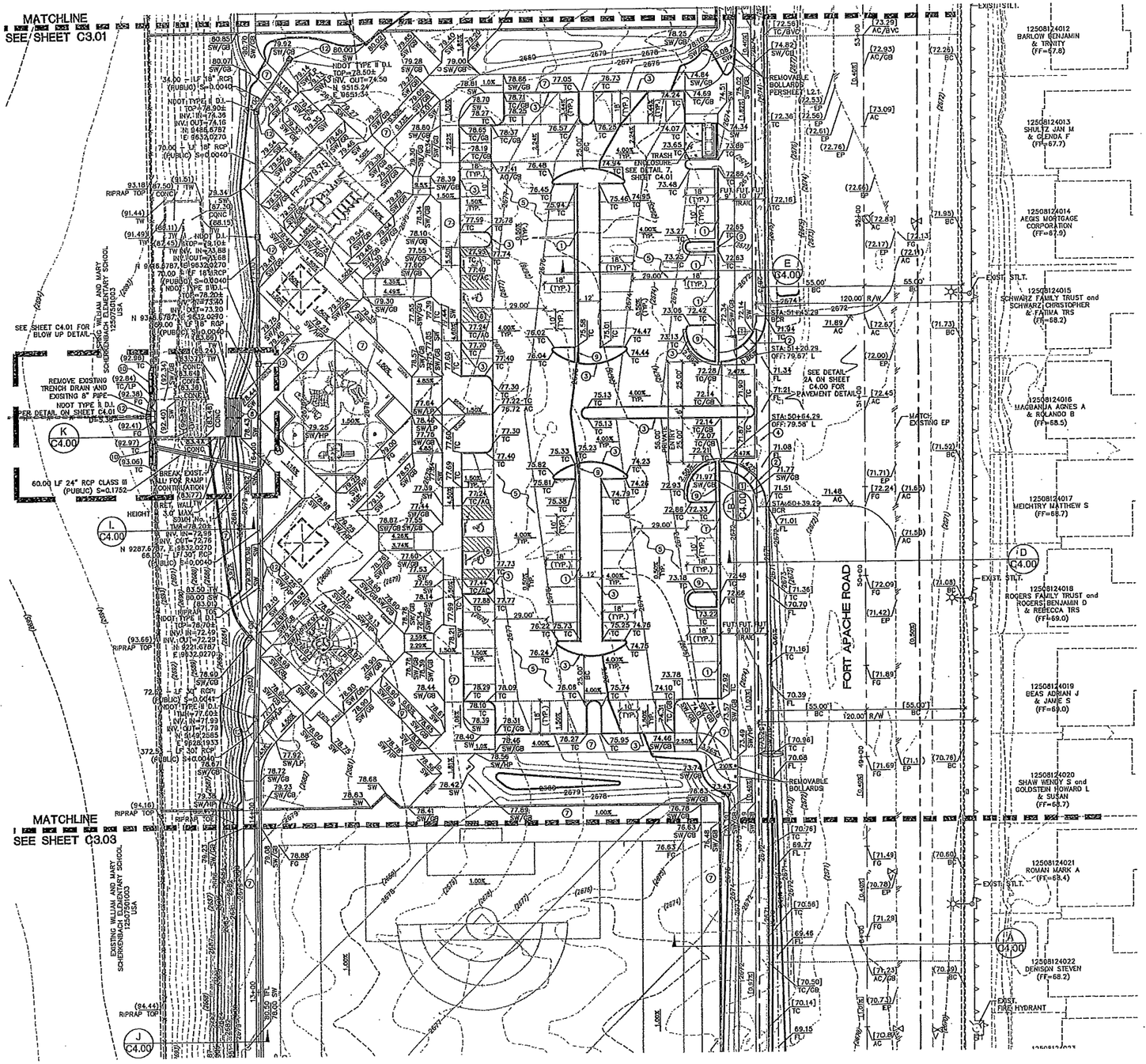
GRADING PLAN I

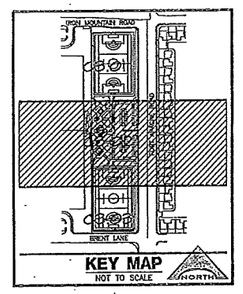
STONE

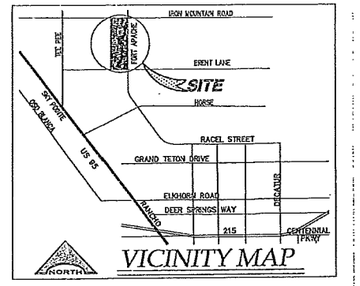
OWNER: CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS,
ARCHITECTURAL SERVICES
400 EAST STEWART AVENUE
LAS VEGAS, NEVADA 89101
PHONE: (702) 229-6535
FAX: (702) 384-4046
TDD: (702) 386-9108

DRAWN	TP
FILE	1581001
DATE	FEB. '08
SCALE	1"=30'
LDD NO	
CLV DWG NO	650.89
SHT NO	C3.01

REVISED 6/27/13







GRAPHIC SCALE

30 0 15 30 60

(IN FEET)
1 inch = 30 ft.

WHEELCHAIR RAMP DATA

NO.	"A"	"B"
[1]	8.0'	8.0'

LEGEND AND ABBREVIATIONS

AC	ASPHALT CONCRETE	GB	GRADE BREAK
BW	BACK OF WALL	HP	HIGH POINT
BC	BACK OF CURB	LP	LOW POINT
CONC	CONCRETE	SW	SIDEWALK
DI	DROP INLET	PL	PROPERTY LINE
DW	DRIVEWAY	TC	TOP OF CURB
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FF	FINISH FLOOR	TW	TOP OF WALL
FG	FINISH GRADE	VG	VALLEY GUTTER

- 00.00 FG — PROPOSED ELEVATION
- (00.00) EG — EXISTING ELEVATION
- (00.00) FG — FUTURE ELEVATION
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXIST. WALL
- (1) CONSTRUCTION NOTE
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- MATCH EXISTING
- EDGE OF PROPOSED PAVEMENT
- EXISTING EDGE OF PAVEMENT
- PROPOSED "L" CURB & GUTTER
- EXIST. "L" CURB & GUTTER
- FUTURE "L" CURB & GUTTER
- EXIST. FENCE
- PROPOSED FENCE
- DIRECTION OF FLOW
- PROPOSED SWALE
- 0.50% PROPOSED GRADE
- (0.50%) EXISTING GRADE
- EXISTING MANHOLE
- EXISTING STREETLIGHT
- EXISTING TRAFFIC SIGNAL
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CONSTRUCTION NOTES

1. CONSTRUCT "L" TYPE CURB & GUTTER PER USDCCA DWG. #216.
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13. CONTRACTOR TO REMOVE EXISTING STUB. CONNECT 12" RCP TO EXISTING STORM DRAIN MANHOLE. GROUT AS REQUIRED.

GEOTECHNICAL EVALUATION

REPORT BY: NINYO & MOORE
DATED: NOVEMBER 18, 2004
UPDATED: NOVEMBER 15, 2007
PROJECT No.: 301631001

FEMA FLOOD PLAIN INFORMATION ACCORDING TO THE FEMA FIRM PANEL 32000C1730, REVISED SEPTEMBER 22, 2002, THE SITE IS LOCATED IN A ZONE X. A ZONE X IS DESCRIBED BY FEMA AS AREA OUTSIDE OF THE 500 YEAR FLOOD PLAIN.

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS4263).

GUY RUDDY, PE — No. 12848 — DATE

BASIS OF BEARING

NORTH 89°39'07" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, 60 EAST M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY NEVADA RECORDER'S OFFICE AS FILE 87, PAGE 9 OF SURVEYS.

BENCHMARK

RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. BLV90 7N4 838.8366(m) 2752.08(ft) AND GRANDCANYON. BLV90 7N4 838.8366(m) 2752.08(ft)

DISCLAIMER NOTE

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NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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AND
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LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

This grading plan is a part of drainage study #DS4263 which was received on 2-22-08 and approved on 2/25/08 Page 2 of 9

L.R. NELSON CONSULTING ENGINEERS, INC.
• STRUCTURAL • CIVIL • PLANNING • SURVEY
6785 West Russell Road Suite 200
Las Vegas, Nevada 89118
(702) 798-7979
(702) 451-2266 FAX
CONSULTANT

INDIAN HILLS PARK
S.W. CORNER OF FORT APACHE AND IRON MOUNTAIN
CITY OF LAS VEGAS

GRADING PLAN 2

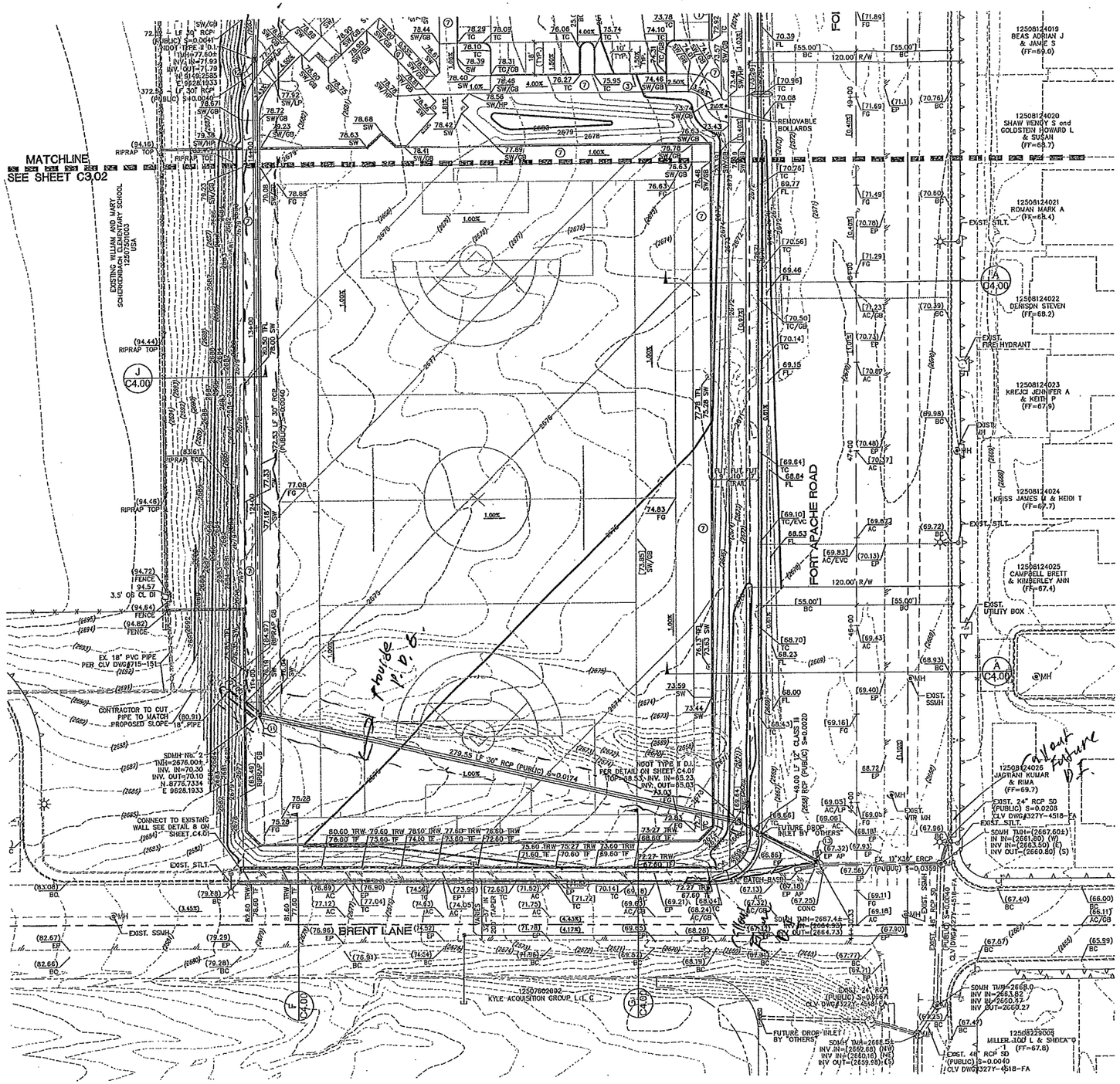
STOP

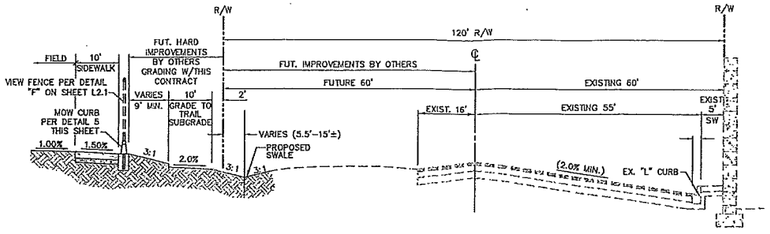
GUY F. RUDDY EXP 12/31/09 CIVIL No. 12848 — 2/22/08

OWNER: CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
ARCHITECTURAL SERVICES
400 EAST STEWART AVENUE
LAS VEGAS, NEVADA 89101
PHONE: (702) 229-6335
FAX: (702) 386-4846
TDD: (702) 386-9108

DRAWN	TP
FILE	1531001
DATE	FEB. '08
SCALE	1"=30'
JOB NO	
CITY BASIS NO	650.89
SHEET NO	C3.02

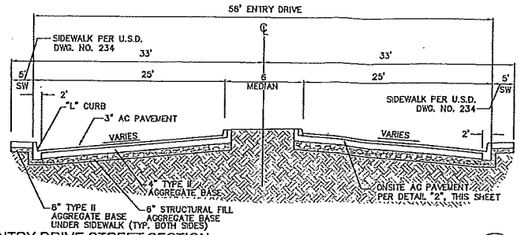
REVISED 6/27/13


MATCHLINE
SEE SHEET C3.02
EXISTING WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL 125075010.03 USA
FORT APACHE ROAD
BRENT LANE
KYLE ACQUISITION GROUP, L.L.C.
12508124019 BEAS ADRIAN J & JAMIE S (FF=69.0)
12508124020 SHAW WENDY S and GOLDSTEIN HOWARD L & SUSAN (FF=69.7)
12508124021 ROMAN MARK A (FF=68.4)
12508124022 DENISON STEVEN (FF=68.2)
12508124023 KREJCI JENNIFER A & KEITH P (FF=67.9)
12508124024 KRISS JAMES W & HEIDI T (FF=67.7)
12508124025 CAMPBELL BRETT & KIMBERLEY ANN (FF=67.4)
12508124026 JAGTIANI KUMAR & RIMA (FF=69.7)
12508229006 MILLER-JOO L & SHEIDA (FF=67.8)
REMOVABLE BOLLARDS
EXIST. FIRE HYDRANT
EXIST. UTILITY BOX
EXIST. SSMH
EXIST. VTR MH
EXIST. CATCH BASIN
FUTURE DROP INLET BY OTHERS
CONNECT TO EXISTING WALL SEE DETAIL 8 ON SHEET C4.01
CONTRACTOR TO CUT PIPE TO MATCH PROPOSED SLOPE 18" PIPE
SDMH No. 2 TM=2676.00± INV. IN=70.30 INV. OUT=70.10 N. 8776.7334 E 9628.1933
279.55 LF 30" RCP (PUBLIC) S=0.0174
NDOT TYPE II D.I. PER DETAIL ON SHEET C4.01 TOP=68.53 INV. IN=65.23 INV. OUT=65.03
46.00 LF 24" CLASS III RCP (PUBLIC) S=0.0020
372.50 LF 30" RCP (PUBLIC) S=0.0040
172.53 LF 30" RCP (PUBLIC) S=0.0040
3.5' OS CL DI
EX. 18" PVC PIPE PER CLV DWG#715-15
SDMH TM=2667.60± IN IN=2661.80 (W) INV IN=2663.50 (E) INV OUT=2660.80 (S)
SDMH TM=2668.0 INV IN=2663.82 INV IN=2660.92 INV OUT=2660.27
SDMH TM=2668.51 INV IN=2662.85 (NW) INV IN=2660.16 (NE) INV OUT=2659.91 (S)
EXIST. 24" RCP SD (PUBLIC) S=0.0208 CLV DWG#327Y-4518-FA
EXIST. 48" RCP SD (PUBLIC) S=0.0067 CLV DWG#327Y-4518-FA
EXIST. 24" RCP SD (PUBLIC) S=0.0040 CLV DWG#327Y-4518-FA
EXIST. 12"x18" ERCP (PUBLIC) S=0.0350
EXIST. SSMH
EXIST. SILT
EXIST. 6" WATER
EXIST. 8" WATER
EXIST. 12" WATER
EXIST. 8" SEWER
EXIST. 12" SEWER
EXIST. 18" SEWER
EXIST. 24" SEWER
EXIST. 8" GAS
EXIST. 12" GAS
EXIST. 4" GAS
EXIST. 6" GAS
EXIST. 2" GAS
EXIST. 3" GAS
EXIST. 4" GAS
EXIST. 6" GAS
EXIST. 8" GAS
EXIST. 12



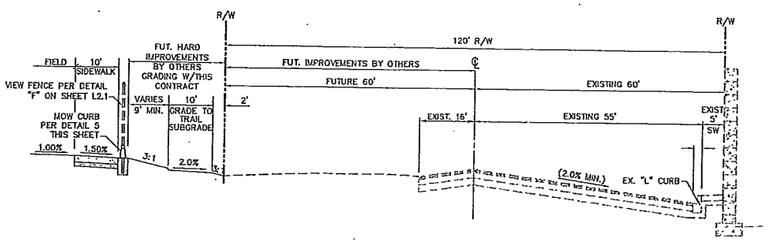
FORT APACHE ROAD — A

NOT TO SCALE



ENTRY DRIVE STREET SECTION — B

NOT TO SCALE



FORT APACHE ROAD — C

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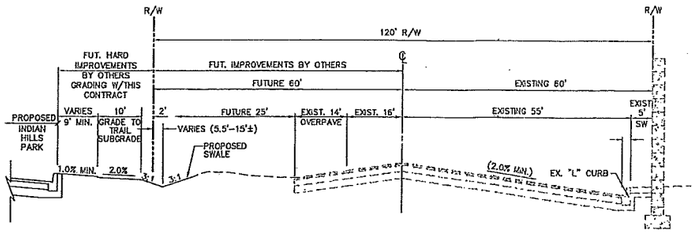
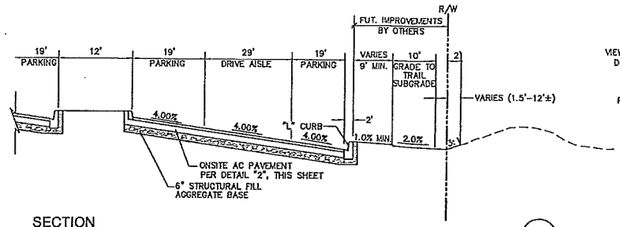


FORT APACHE ROAD — D

NOT TO SCALE



SECTION — E

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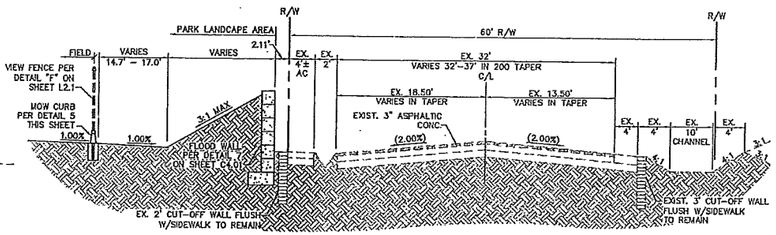

BRENT LANE — F

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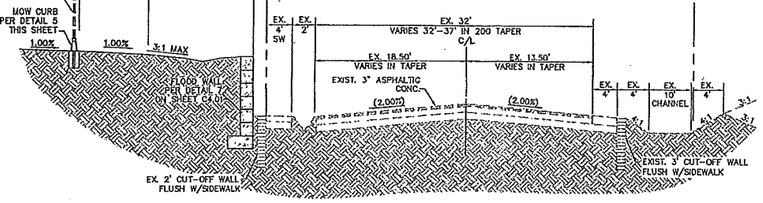

BRENT LANE — G

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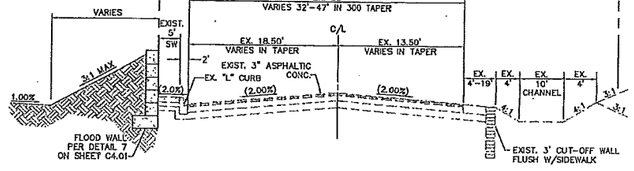
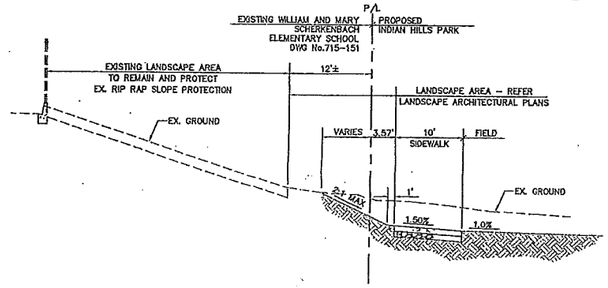


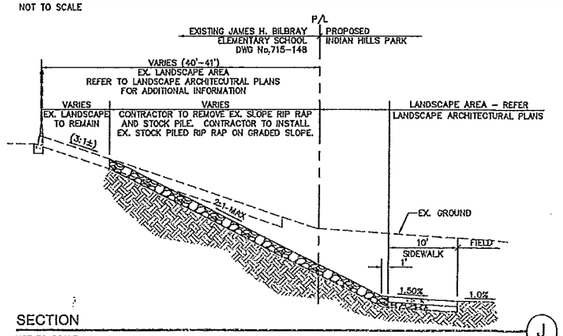
IRON MOUNTAIN ROAD — H

NOT TO SCALE



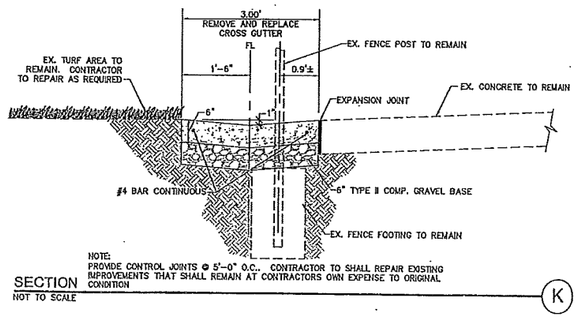
SECTION — I

NOT TO SCALE



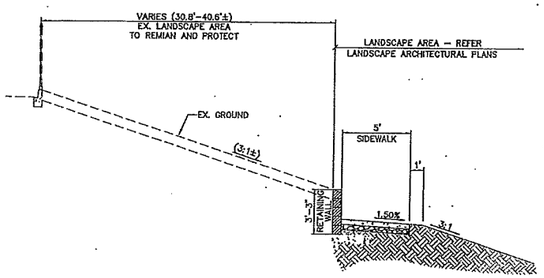
SECTION — J

NOT TO SCALE



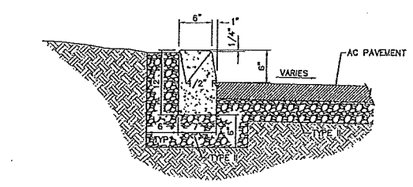
SECTION — K

NOT TO SCALE



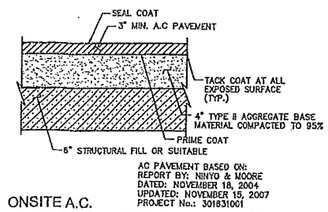
SECTION — L

NOT TO SCALE



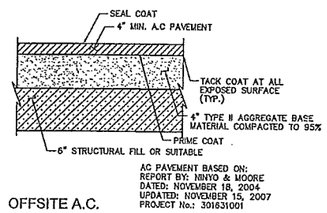
"A" CURB DETAIL — 1

NOT TO SCALE



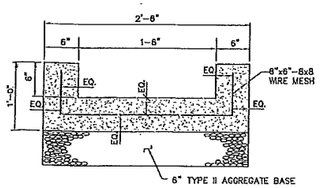
ONSITE A.C. PAVEMENT SECTION — 2

NOT TO SCALE



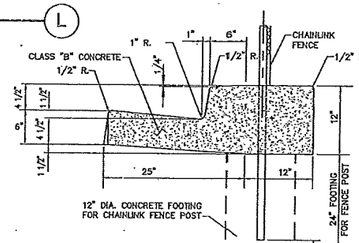
OFFSITE A.C. PAVEMENT SECTION — 2A

NOT TO SCALE



30" U-TYPE GUTTER — 3

NOT TO SCALE



MODIFIED L-TYPE CURB AND CHAIN LINK FENCE — 4

NOT TO SCALE

This grading plan is a part of drainage study #1542.63 which was received on 2-22-08 and approved on 2/25/08 Page 4 of 9

L.R. NELSON CONSULTING ENGINEERS, INC.
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• STRUCTURAL
• CIVIL
• PLANNING
• SURVEY

INDIAN HILLS PARK
S.W. CORNER OF FORT APACHE AND IRON MOUNTAIN
CITY OF LAS VEGAS

DETAILS SHEET I

STAMP

GARY S. RUDDY EXP 12/31/09 CIVIL No. 12848 — 02.22.08

OWNER: CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
ARCHITECTURAL SERVICES

400 EAST STEWART AVENUE
LAS VEGAS, NEVADA 89101
PHONE: (702) 229-6535
FAX: (702) 384-4845
TDD: (702) 386-9108

DESIGN: TP
FILE: 1531001
DATE: FEB. '08
SCALE: N/A
BID NO:
CLV DWG NO: 650.89
SHEET NO: C4.00

REVISED 6/27/03

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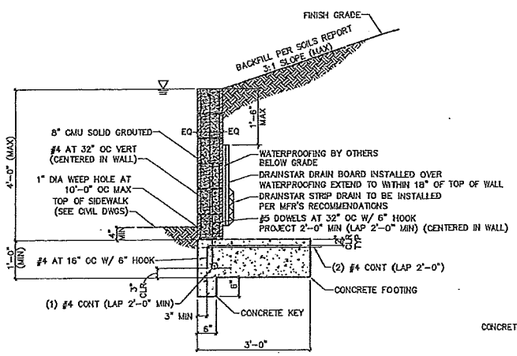
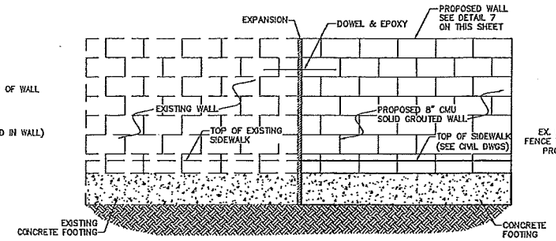


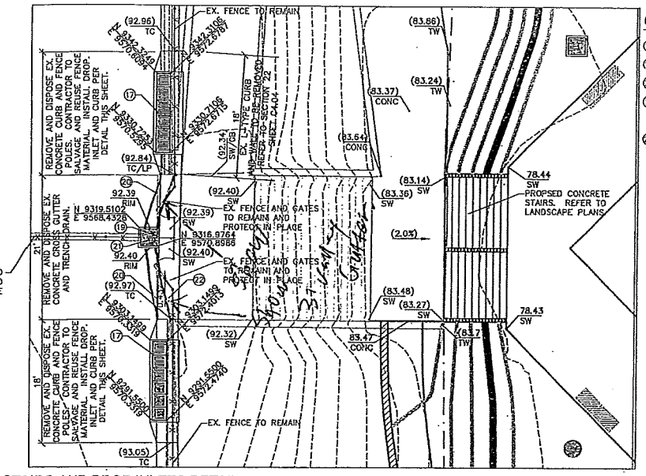
3'-0" FLOOD WALL (5)

NOT TO SCALE



WALL CONNECTION DETAIL (6)

NOT TO SCALE



STAIRS AND DROP INLETS DETAIL (7)

SCALE: 1"=10'

CONSTRUCTION NOTES

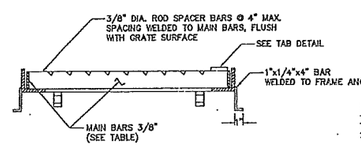
17 CONSTRUCT DROP INLET PER DETAIL THIS SHEET.

19 CONSTRUCT NDOT TYPE II DROP INLET PER DETAIL THIS SHEET

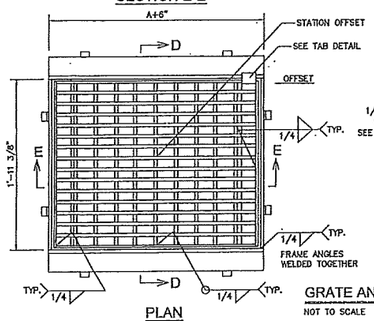
20 CONSTRUCT 3' WIDE CROSS GUTTER PER DETAIL SHEET C4.00.

21 CONTRACTOR TO REMOVE EXISTING MOW CURB AND FENCE AS NEEDED FOR INSTALLATION OF NDOT TYPE II DROP INLET. CONTRACTOR TO REPLACE FENCE AND MOW CURB AS REQUIRED.

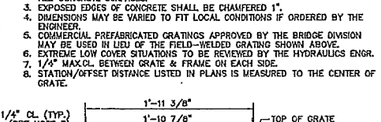
22 CONTRACTOR TO REMOVE AND DISPOSE EX. CROSS GUTTER AND TRENCH DRAIN. EXISTING CONCRETE LANDING, GATES AND FENCING TO REMAIN AND PROTECT IN PLACE. CONTRACTOR RESPONSIBLE TO REPLACE EXISTING IMPROVEMENTS DAMAGED DURING CONSTRUCTION AT CONTRACTORS EXPENSE.



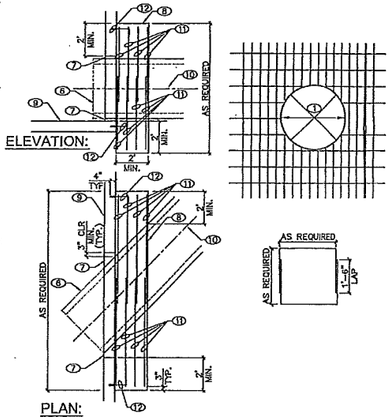
SECTION E-E



PLAN



SECTION D-D

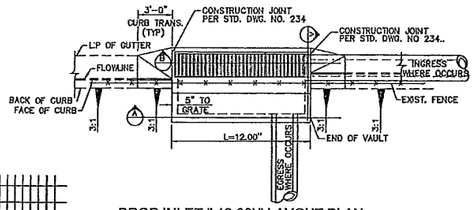


KEY NOTES

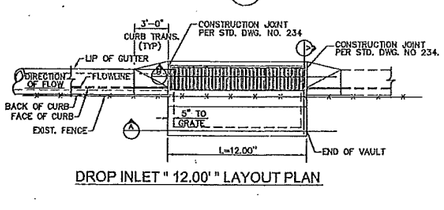
1. OPENING DIAMETER 4'-0" MAXIMUM
2. NOT USED
3. NOT USED
4. NOT USED
5. NOT USED
6. CUT RCP FLUSH WITH EXISTING DROP INLET WALL OR SLIGHTLY RECESSED.
7. APPLY BONDING AGENT TO ALL CONCRETE SURFACES PER MANUFACTURERS INSTRUCTIONS. FILL WITH NON-SHRINK GROUT AND TROWEL ARCH SURFACE SMOOTH.
8. PIPE COLLAR
9. EXISTING REINFORCED DROP INLET
10. 18" RCP STORM DRAIN
11. 4 SETS OF #5 BARS EQUALLY SPACED
12. #5 DOWEL @ 10" O.C., 4 SIDES TYPICAL

MANHOLE PENETRATION DETAIL

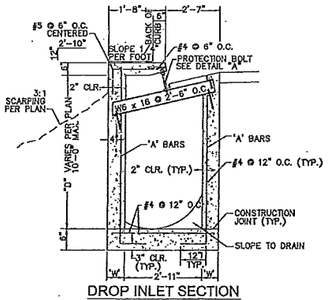
NOT TO SCALE



DROP INLET " 12.00' " LAYOUT PLAN



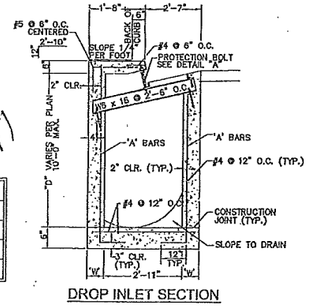
DROP INLET " 12.00' " LAYOUT PLAN



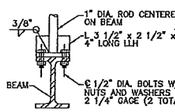
DROP INLET SECTION

D (MAX)	DIM. 'W'	(A) BARS
4'-0"	6"	#4 @ 12" O.C.
6'-0"	6"	#4 @ 12" O.C.
8'-0"	8"	#5 @ 12" O.C.
10'-0"	8"	#5 @ 6" O.C.

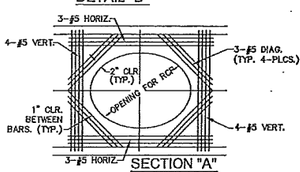
Need Structural calc 8/20/07



DROP INLET SECTION



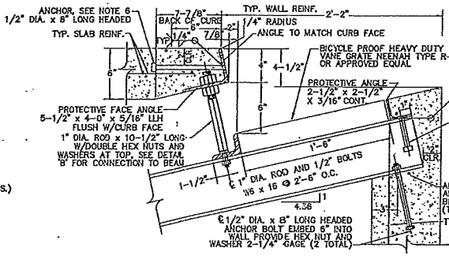
DETAIL "B"



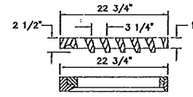
SECTION "A"

NOTES:

1. ALL EXPOSED METALS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
2. PROVIDE 1/2" (MIN.) CLEARANCE ALL AROUND THE STEEL BEAM, DRY PACK AFTER INSTALLATION.
3. WHEN REQUIRED BY LENGTH OF OPENING, PLATE ANGLE MAY BE DELIVERED IN SECTIONS AND BUTT WELDED IN PLACE.
4. ALL GALVANIZED DAMAGED BY WELDING SHALL RECEIVE TWO COATS OF GALVALLOY OR EQUAL.
5. CONCRETE SHALL BE MODIFIED CLASS DA 4000 PSI, SEE SPECIAL PROVISIONS SECTION 501.
6. ANGLE ANCHORS SHALL BE EMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED, (MAXIMUM SPACING OF 2').



PROTECTIVE FACE & ROD - DETAIL "A"



GRATE
MODEL No. R-3250-CV

NOT TO SCALE

DROP INLET DETAIL

L 3" x 3" x 1/2" x 2'-0" LONG

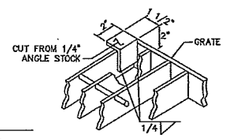
1/2" DIA. x 4" LONG HEADED ANCHOR BOLT @ 2'-0" O.C. (TYPICAL ENDS OF DROP INLET)

TYP. WALL REINF. SEE SECTION "B"

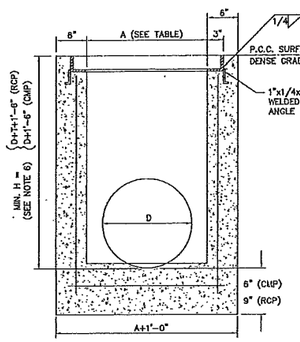
This grading plan is a part of drainage study Case No. 2-0000-07 approved on 2-22-08 Received on 2/25/08. Page 5 of 7

GRATE AND FRAME DETAIL

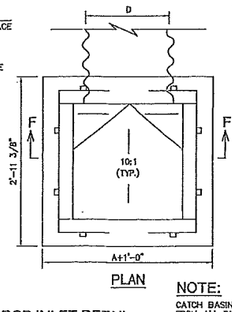
NOT TO SCALE



TAB DETAIL



SECTION F-F



PLAN

TYPE 2 - DROP INLET DETAIL

NOT TO SCALE

NOTE:

CATCH BASIN FLOORS SHALL HAVE A MINIMUM SLOPE OF 10:1 FROM ALL DIRECTIONS TOWARD OUTLET PIPE. IF BASIN IS USED AS A JUNCTION, SHAPE FLOWLINE(S) TO OUTLET PIPE. AND PROVIDE A MINIMUM SLOPE OF 10:1 TO FLOWLINE(S).

NOTE:

1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE No.4 BARS WITH MAXIMUM SPACING AT 18" CENTERS, WIRED TIGHTLY AT ALL INTERSECTIONS AND EMBEDDED 2" CLEAR OF ALL CONCRETE SURFACES.
3. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1".
4. DIMENSIONS MAY BE VARIED TO FIT LOCAL CONDITIONS IF ORDERED BY THE ENGINEER.
5. COMMERCIAL PREFABRICATED GRATINGS APPROVED BY THE BRIDGE DIVISION MAY BE USED IN LIEU OF THE FIELD-WELDED GRATING SHOWN ABOVE.
6. EXTREME LOW COVER SITUATIONS TO BE REVIEWED BY THE HYDRAULICS ENGR.
7. 1/4" MAX.CL. BETWEEN GRATE & FRAME ON EACH SIDE.
8. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO THE CENTER OF GRATE.

BILLS OF MATERIALS

	PIPE SIZE (INCH)	A=D+2+*	H (FT.)	CONCRETE CU. YD.	REINF. LB.	MAIN BARS (INCH)	FRAME ANGLES (INCH)	GRATE LB.	FRAME LB.	TOTAL LB.
R C P	15	1'-7 1/2"	2.94	0.67	41	3x3/8	3 1/2x3x3/8	152	67	219
	18	1'-11"	3.21	0.78	44	3x3/8	3 1/2x3x3/8	170	72	242
	24	2'-6"	3.75	0.95	53	3x3/8	3 1/2x3x3/8	204	81	285
	30	3'-1"	4.29	1.15	59	3 1/2x3/8	4x3x3/8	279	97	376
	36	3'-6"	4.83	1.35	71	4 1/2x3/8	5x3x3/8	422	123	545
	42	4'-3"	5.38	1.59	82	4 1/2x3/8	5x3x3/8	478	134	612

* (T=WALL THICKNESS OF RCP)

	PIPE SIZE (INCH)	A	H (FT.)	CONCRETE CU. YD.	REINF. LB.	MAIN BARS (INCH)	FRAME ANGLES (INCH)	GRATE LB.	FRAME LB.	TOTAL LB.
C M P	15	2'-0"	2.75	0.67	36	3x3/8	3 1/2x3x3/8	171	73	244
	18	2'-0"	3.00	0.65	37	3x3/8	3 1/2x3x3/8	171	73	244
	24	2'-6"	3.50	0.80	51	3x3/8	3 1/2x3x3/8	203	81	284
	30	3'-0"	4.00	0.96	56	3 1/2x3/8	4x3x3/8	273	95	368
	36	3'-6"	4.50	1.12	60	4 1/2x3/8	5x3x3/8	395	119	514
	42	4'-0"	5.00	1.30	77	4 1/2x3/8	5x3x3/8	442	129	571

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REVISIONS

CONSULTANT

INDIAN HILLS PARK
S.W. CORNER OF FORT APACHE AND IRON MOUNTAIN
CITY OF LAS VEGAS

DETAILS SHEET 2

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STAMP

GUY F. RUDDY EXP 12/31/09 CIVIL NO. 12848

6-12-08

OWNER: CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
ARCHITECTURAL SERVICES

400 EAST STEWART AVENUE
LAS VEGAS, NEVADA 89101
PHONE: (702) 229-6535
FAX: (702) 384-4846
TODD: (702) 386-9105

DRAWN	TP
FILE	1591001
DATE	FEB. '08
SCALE	N/A
JOB NO.	
CLV DWG NO	650.89
SHT NO	C4.01

REVISED 6/12/08

TECHNICAL DRAINAGE STUDY
FOR
JAMES H. BILBRAY ELEMENTARY SCHOOL

619.287

January 2002

Prepared for:

JMA Architecture
10150 Covington Cross Drive
Las Vegas, Nevada 89144
Phone: (702) 731-2033
FAX: (702) 731-2039

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: April 1, 2002
TO: **Land Development Services** Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
James H. Bilbray Elementary School				JMA Architecture
Cross Streets:	NEC of Brent Lane & Tee Pee Lane			G.C. Wallace
FILE NO.	F:\Depot\DSMEMOS\DS3062C.doc			Cheri Edelman, DEVCO
Parcel Number:	125-07-501-002			Leni Skaar, Council Liaison Councilman Mack Office, Ward 6
Zoning Action:				
FEMA Flood Zone	YES	No	X	
Proposed Storm Drain	YES X	No		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	1/15/2002	1/29/2002	Not Acceptable	$250.00
2nd Submittal	2/22/2002	3/8/2002	Not Acceptable	$250.00
3rd Submittal	3/18/2002	4/1/2002	See Comments Below	$250.00
			TOTAL FEES (LDDRS):	**$750.00**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

X	is acceptable in concept subject to conformance to all City standards and the following conditions.
	must be resubmitted or supplemented including the following:
	Must have Clark County Regional Flood Control District concurrence

1. *Further development of the site will require an update to this drainage study.*

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

END OF REMARKS
Wld/ssn

T/R/S: T19S/R60E/07
AREA G-07

The total combined 100-year runoff from Subbasins ON1A, ON1B, and ON1C is 19 cfs. This runoff will exit the site to Brent Lane at Point COM2A.

The 100-year runoff generated in Subbasin ON2 is 4 cfs. This runoff will be intercepted by 36-inch by 36-inch grate inlet located at the southeast corner of Subbasin ON2. A 12-inch HDPE at 15 percent slope will convey this flow to the local onsite storm drain system. Hydraulic calculations are included in Appendix B.

Runoff in the local onsite drain system (4± cfs) will be discharged onto the BLM land just east of the school site (Subbasin OF2). Rip rap (d_{50} = 7-inch, thickness = 14 inches) will be provided at the outlet of the pipe.

FLOW @ SW CORNER OF SITE

Runoff generated in Subbasin ON3 (Q_{100} = 5 cfs) will sheet flow to offsite Subbasin ONF1P, and will be conveyed east in the existing wash.

Runoff generated in Subbasin ON4 (Q_{100}= 12 cfs) will sheet flow onto the BLM land just east of the school site (Subbasin OF2). A concrete pad will be provided for slope protection at the discharge location. The concrete pad is located at the northeast corner of Subbasin ON4.

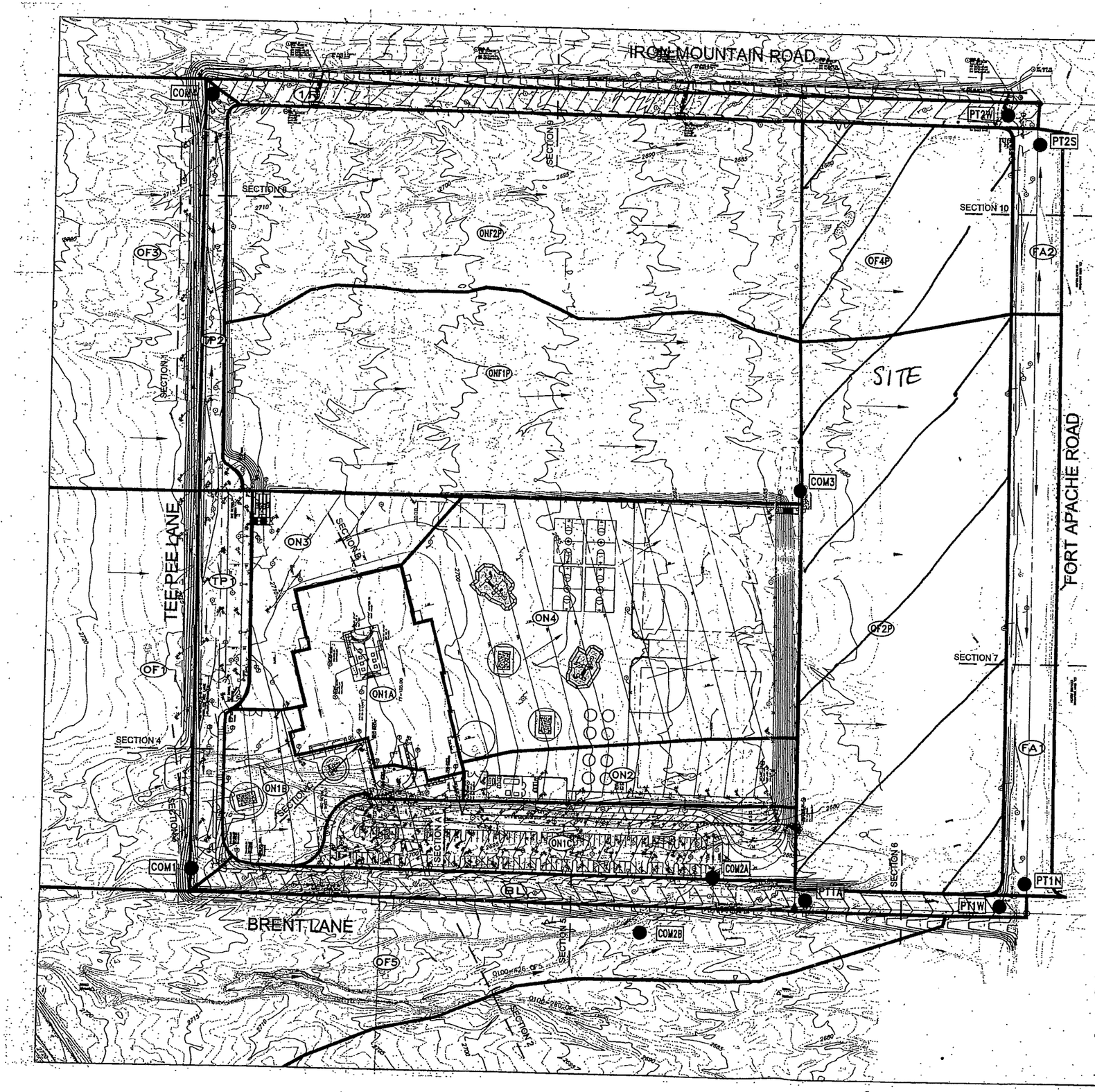
PORTION OF FLOW @ MIDDLE OF SITE

The requirement for the finished floor elevation to be set at a minimum vertical distance above the onsite driveway flowline equal to twice the depth of the 100-year flow in driveway gutter will not be met. However, a grouted block wall/berm will be constructed along the building to the elevation where the twice the depth of 100-year flow is met.

VIII. ULTIMATE CONDITIONS

Under ultimate conditions, the CCRFCD facility LVMR 0000 will be in place. Runoff generated west of the US 95 will be intercepted by this facility and will not impact the project site. The offsite Subbasins OF1U and OF3U is assumed to be developed as a high density residential or commercial site. The offsite Subbasins OF2U and OF4U is assumed to be developed as a park.

The runoff impacting Iron Mountain Road and Brent Lane are taken from the Northwest Neighborhood Study Phase 2. The total 10-year and 100-year in Brent Lane just east of Fort Apache Road is 65 cfs and 144 cfs, respectively.



N

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

SUMMARY OF HEC-1 MODEL UNDER PROPOSED CONDITIONS

Subbasin/Combination Point*	Q10 (CFS)	Q100 (CFS)
CULV1**	155	516
OF1	13	34
TP1	2	4
COM1 (CULV1+OF1+TP1)	169	553
ON1A	3	8
ON1B	2	4
ON1C	4	8
COM2A (ON1A+B+C)	10	19
BL	3	5
PT1A (COM1+COM2A+BL)	178	571
CULV3***	130	428
OF5	11	28
COM2B (CULV3+OF5)	141	454
PT1W (PT1A+COM2B)	319	1024
ON2	2	4
ON3	2	5
ON4	4	12
ONF1P	6	15
COM3 (ON3+ON4+ONF1P)	11	31
OF2P	6	16
FA1	3	6
PT1N (ON2+COM3+OF2P+FA1)	22	56
CULV2**	275	673
OF3	17	49
TP2	1	2
COM4 (CULV2+OF3+TP2)	293	723
IR	1	2
PT2W (COM4+IR)	294	725
ONF2P	3	8
OF4P	1	4
FA2	1	2
PT2S (ONF2P+OF4P+FA2)	5	17

* SEE FIGURE 6A AND 6B

** FLOWS TAKEN FROM THE NORTHWEST NEIGHBORHOOD STUDY-PHASE 2

*** PRORATED FLOWS

DEPTH OF FLOW CALCULATIONS

Street/Section Name	WIDTH(ft)	SLOPE(%)	Q100(cfs)	DEPTH(ft)	VELOCITY(fps)	Vxd
SECTION 1 (EXISTING WASH)	–	3.0	723	1.2	7.0 (0.8 ft Vel Head)	8.4
SECTION 3 (EXISTING WASH)	–	3.0	550	2.0	11.3 (2.0 ft Vel Head)	22.6
SECTION 4** TEE PEE LANE SOUTH	30	0.4	553	3.9	5.0	19.4
SECTION 5*** BRENT LANE @ PT1A	30	3.5	570	1.5	12.8	19.2
SECTION 6*** BRENT LANE @ PT1W	30	2.5	1024	2.0	14.4	28.9
SECTION 7 FORT APACHE RD SOUTH	60	0.5	56	0.7	3.0	2.1
SECTION 8** TEE PEE LANE NORTH	30	0.4	723	4.1	5.5	22.6
SECTION 9*** IRON MOUNTAIN ROAD	40	3.6	725	1.4	13.6	19.6
SECTION 10 FORT APACHE RD NORTH	60	0.5	17	0.5	2.1	1.1
SECTION A	–	3.6	19	0.3	4.4	1.1
SECTION B	–	0.5	5	0.3	1.7	0.5
SECTION C	–	0.4	4	0.2	1.2	0.2
BRENT LANE**	30	3.6	650	1.8	18.5	29.6

* SEE FIGURE 6B

** HALF STREET SECTION, V-DITCH

*** HALF STREET SECTION, TRAPEZOIDAL SWALE

LEGEND

- ON1 — DRAINAGE SUBBASIN
- PT1N — CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION
- CROSS SECTION

LEGAL DESCRIPTION:

A PORTION OF GOVERNMENT LOT 8 OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 63 EAST, M.D.M., CLARK COUNTY, NEVADA, DESCRIBED AS FOLLOWS:

THE WEST 990 FEET OF GOVERNMENT LOT 8 AS SHOWN BY MAP THEREOF ON FILE IN FILE 82, PAGE 8 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:

NORTH 00°14'49" WEST, BEING THE BEARING OF THE WEST LINE OF GOVERNMENT LOT 8 OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 63 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN FILE 82, PAGE 8 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK #0090 THE:

BENCHMARK NO. 0090 PER AS PER CLARK COUNTY BENCH BOOK, A SPIKE AND WASHER ALIGNING A PLATE IN TOP CENTER OF HEADWALL ON THE WEST SIDE OF U.S. 95 NEAR MILE MARKER 86.
SECTION 7, TOWNSHIP 19 SOUTH, RANGE 63 EAST
ELEVATION: 2033.64 METERS / 6668.83 FEET
DATUM: NAD 83 (1983)

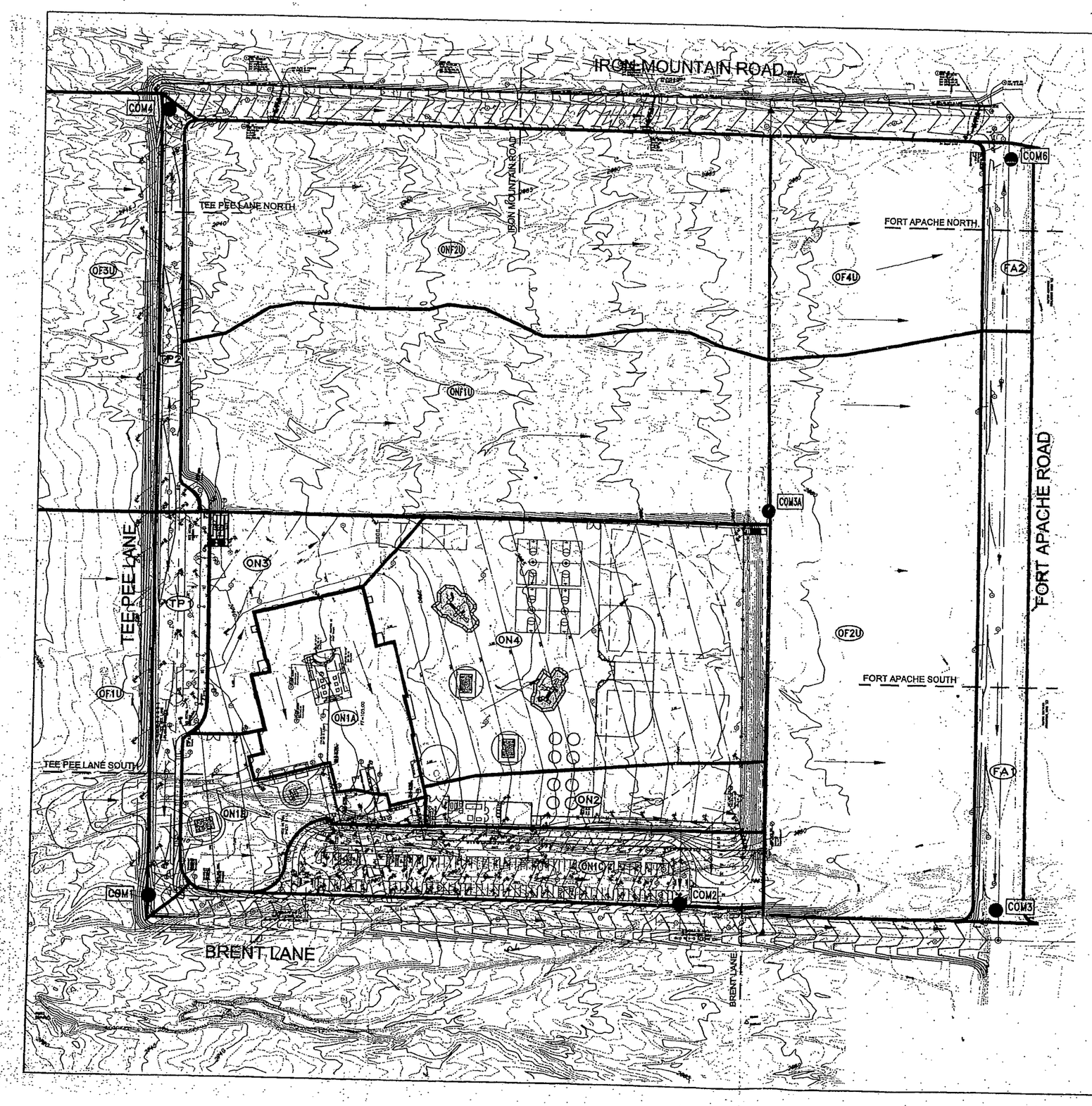
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
100 NORTH STEPHANIE STREET, SUITE 111, HENDERSON, NEVADA 89074
(702) 895-0028 FAX (702) 895-0031

JAMES H. BILBRAY ELEMENTARY SCHOOL

PROPOSED CONDITIONS ONSITE DRAINAGE MAP

FIGURE 6B

SHEET 1 OF 1 SHTS



N

GRAPHIC SCALE

(IN FEET)

1 inch = 80 ft.

SUMMARY OF HEC-1 MODEL UNDER ULTIMATE CONDITIONS

BASIN OR LOC.	Q10 (CFS)	Q100 (CFS)
CULV1*	0	0
OF1U	21	44
TP1	2	4
COM1 (CULV1+OF1U+TP1)	23	47
ON1A	3	6
ON1B	2	4
ON1C	4	8
COM2 (ON1A+B+C)	10	19
ON2	2	4
ON3	2	5
ON4	4	12
ONF1U	10	21
COM3A (ON3+ON4+ONF1U)	16	36
OF2U	5	14
FA1	3	6
COM3 (ON2+COM3A+OF2U+FA1)	25	59
CULV2*	0	0
OF3U	32	66
TP2	1	2
COM4 (CULV2+OF3U+TP2)	33	68
ONF2U	9	20
OF4U	0	3
FA2	1	2
COM5 (ONF2P+OF4P+FA2)	10	24

* RUNOFF VALUES COMPUTED FROM NORTHWEST NEIGHBORHOOD STUDY PHASE 2 BY PBS&J

ULTIMATE CONDITIONS STREET FLOW CALCULATIONS

Street/Section Name	WIDTH(ft)	SLOPE(%)	Q100(cfs)	DEPTH(ft)	VELOCITY(fps)	Vxd
BRENT LANE	60	3.6	88	0.6	6.5	3.9
IRON MOUNTAIN ROAD	80	3.6	77	0.6	6.2	3.8
TEE PEE LANE NORTH	60	0.4	68	0.8	3.0	2.4
TEE PEE LANE SOUTH	60	0.4	47	0.7	2.6	1.8
FORT APACHE RD NORTH	60	0.5	24	0.6	2.2	1.3
FORT APACHE RD SOUTH	60	0.5	56	0.7	3.0	2.1

LEGEND

- ON1 — DRAINAGE SUBBASIN
- COM1 — CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION

LEGAL DESCRIPTION

A PORTION OF GOVERNMENT LOT 6 OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.B.&M., CLARK COUNTY, NEVADA, DESCRIBED AS FOLLOWS:

THE WEST 996 FEET OF GOVERNMENT LOT 6 AS SHOWN BY MAP THEREOF ON FILE IN FILE 89, PAGE 9 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS

NORTH, 00°08'48" WEST, BEING THE BEARING OF THE WEST LINE OF GOVERNMENT LOT 6 OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.B.&M., CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN FILE 89, PAGE 9 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

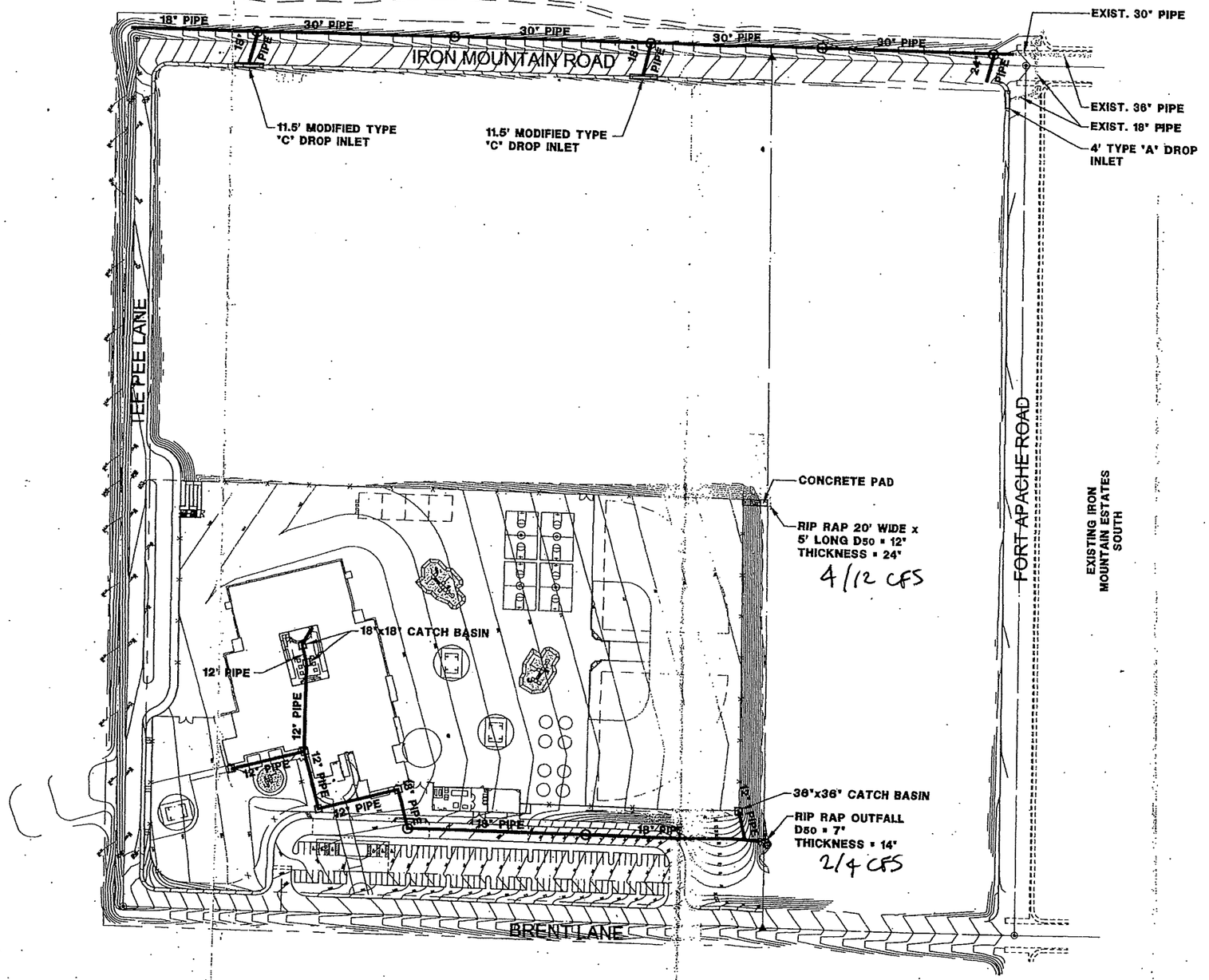
BENCHMARK 2003 TNB

BENCHMARK NO. 2003 TNB AS PER CLARK COUNTY BENCH BOOK, A BRASS AND ALUMINUM CAP FLUSH IN TOP CURB OF HEADWALL ON THE WEST SIDE OF U.S. 93 NEAR SILA AVENUE IN SECTION 7, T. 20 S., R. 61 E., M.D.B.&M.
ELEVATION = 3,513.244 (NGVD 29) / 3,518.02 FEET
DATED '98 RANGE

JAMES H. GILBRAY ELEMENTARY SCHOOL
ROUTE 7
ULTIMATE CONDITIONS DRAINAGE MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BOULEVARD, LAS VEGAS, NEVADA 89146
(702) 804-8000 FAX (702) 804-8008

SHEET
FIG 7
SHT OF SHTS



N

GRAPHIC SCALE

(IN FEET)

1 inch = 80 ft.

LEGEND

- STORM DRAIN MANHOLE
- DROP INLET
- STORM DRAIN (RCP)
- CATCH BASIN

LEGAL DESCRIPTION

A PORTION OF GOVERNMENT LOT 6 OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, DESCRIBED AS FOLLOWS:

THE WEST 990 FEET OF GOVERNMENT LOT 5 AS SHOWN BY MAP THEREOF ON FILE IN FILE 87, PAGE 9 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS

NORTH 00°16'49" WEST, BEING THE BEARING OF THE WEST LINE OF GOVERNMENT LOT 5 OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN FILE 87, PAGE 9 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK 60CS0 7N8

BENCHMARK NO. 0CS0 7N8 AS PER CLARK COUNTY BENCH BOOK. A RIVET AND SQUARE ALUMINUM PLATE IN TOP CENTER OF HEADWALL ON THE WEST SIDE OF U.S. 95 NEAR MILE MARKER #1.0.
SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST.
ELEVATION: 833.944 METERS / 2734.03 FEET
NAVD '88 DATUM.

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-14-02
PLOT TIME: 11:58:15
Dbhanson
G:\615-297\drahnge\VA\0a8.dwg

DATE: DESCRIPTION: DATE: AGEN. APP.: DATE: ENGN. APP.:

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD. • LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2199

JAMES H. BILBRAY ELEMENTARY SCHOOL

FIGURE 8

FACILITIES MAP

SHEET
FIG 8
SHT OF SHTS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

G.C.Wallace Inc.
File: sf4.xls
Project No.: 619.287

James H. Bilbray Elementary School
Hydrology

BY: AT
DATE: 28-Nov-01

SUBBASIN DATA							INITIAL / OVERLAND TIME (TI)			TRAVEL TIME (TT)					Tc CHECK URBANNIZED BASINS		Tc	Tlag	REMARKS
Subbasin Name (1)	DEV./EX. (D or E)	Soil Type	CN	K	Area (a.c.) (3)	Area mi2	Initial Length (ft) (4)	Slope % (5)	TI min (6)	Travel Length (ft) (7)	Slope % (8)	V1 Velocity fps (8a)	V2 Velocity fps (9b)	TT min (10)	Total Length ft (11)	Tc= (L/180+10) min (12)	Tc Calc. (13)	Tlag= 0.6Tc/60 hours	Rainfall inches 100/10year
OF1	E	400	88	0.7716	14.23	0.02223	430	1.90	9.8	1000	3.00	2.56	5.09	4.9	N/A	N/A	14.6	0.148	3.00/1.61
OF2	E	400	88	0.7716	8.53	0.01333	350	2.90	7.8	950	0.50	1.05	2.08	11.8	N/A	N/A	19.3	0.193	3.00/1.61
OF3	E	400/540	87	0.7524	22.07	0.03448	500	3.60	9.1	1245	1.60	1.87	3.72	7.8	N/A	N/A	16.9	0.169	3.00/1.61
OF4	E	400/540	79	0.6528	3.39	0.00530	380	2.80	10.8	285	0.50	1.05	2.08	4.2	N/A	N/A	15.1	0.151	3.00/1.61
OF5	E	400	88	0.7716	9.84	0.01538	0	1.00	0.0	1700	3.00	2.56	5.09	7.2	N/A	N/A	7.2	0.072	3.00/1.61
EON1	E	400	88	0.7716	15.00	0.02344	445	0.50	15.7	955	3.60	2.81	5.58	4.3	N/A	N/A	20.0	0.200	3.00/1.61
EONF1	E	400	88	0.7716	7.07	0.01105	350	0.50	13.9	980	3.60	2.81	5.58	4.4	N/A	N/A	18.3	0.183	3.00/1.61
EONF2	E	400/540	80	0.6720	8.43	0.01317	195	0.50	13.6	930	3.20	2.65	5.26	4.5	N/A	N/A	18.1	0.181	3.00/1.61
ON1A	D	400	98	0.9036	1.59	0.00248	360	1.00	6.7	0	1.00	2.02	3.06	0.0	360	12.0	6.7	0.067	3.00/1.61
ON1B	D	400	95	0.8640	1.22	0.00191	100	2.00	3.4	210	0.40	1.28	1.94	2.7	310	11.7	6.1	0.061	3.00/1.61
ON1C	D	400	98	0.9036	2.14	0.00334	90	2.00	2.7	540	3.60	3.83	5.81	2.3	630	13.5	5.0	0.050	3.00/1.61
ON2	D	400	95	0.8640	1.24	0.00194	500	2.00	7.5	100	0.50	1.43	2.16	1.2	600	13.3	8.7	0.087	3.00/1.61
ON3	D	400	95	0.8640	1.38	0.00213	70	1.70	3.0	460	0.50	1.43	2.16	5.4	530	12.9	8.3	0.083	3.00/1.61
ON4	D	400	84	0.7188	5.72	0.00894	170	2.00	7.1	540	2.00	2.86	4.33	3.1	710	13.9	10.2	0.102	3.00/1.61
TP1	D	400	98	0.9036	1.04	0.00163	30	2.00	1.5	640	0.40	1.28	1.94	7.7	670	13.7	9.3	0.093	3.00/1.61
TP2	D	400/540	98	0.9036	0.60	0.00094	30	2.00	1.5	640	0.40	1.28	1.94	7.7	670	13.7	9.3	0.093	3.00/1.61
IR	D	540	98	0.9036	1.35	0.00211	30	2.00	1.5	1365	3.60	3.83	5.81	4.7	1395	17.8	6.2	0.062	3.00/1.61
BL	D	400	98	0.9036	1.40	0.00219	30	2.00	1.5	1365	3.60	3.83	5.81	4.7	1395	17.8	6.2	0.062	3.00/1.61
FA1	D	400	98	0.9036	1.80	0.00281	30	2.00	1.5	965	0.50	1.43	2.16	9.4	995	15.5	11.0	0.110	3.00/1.61
FA2	D	400/540	98	0.9036	0.57	0.00089	30	2.00	1.5	350	0.50	1.43	2.16	4.1	380	12.1	5.6	0.056	3.00/1.61
OF2P	E	400	88	0.7716	7.32	0.01144	350	2.90	7.8	950	0.50	1.05	2.08	11.8	N/A	N/A	19.3	0.193	3.00/1.61
OF4P	E	400/540	79	0.6528	2.74	0.00428	380	2.80	10.8	285	0.50	1.05	2.08	4.2	N/A	N/A	15.1	0.151	3.00/1.61
ONF1P	E	400	88	0.7716	6.90	0.01078	350	0.50	13.9	980	3.60	2.81	5.58	4.4	N/A	N/A	18.3	0.183	3.00/1.61
ONF2P	E	400/540	81	0.6792	7.06	0.01103	195	0.50	13.3	930	3.20	2.65	5.26	4.5	N/A	N/A	17.8	0.178	3.00/1.61
OF1U	D	400	95	0.8640	14.23	0.02223	430	1.90	7.1	1000	3.00	3.50	5.30	4.0	1430	17.9	11.1	0.111	3.00/1.61
OF2U	D	400	84	0.7188	7.32	0.01144	350	2.90	9.0	950	0.50	1.43	2.16	9.3	1300	17.2	18.3	0.172	3.00/1.61
OF3U	D	400/540	85	0.6576	22.07	0.03448	500	3.60	8.4	1245	1.60	2.56	3.87	6.5	1745	19.7	12.8	0.128	3.00/1.61
OF4U	D	400/540	69	0.5208	2.74	0.00428	360	2.80	14.0	285	0.50	1.43	2.16	3.1	625	13.5	17.1	0.135	3.00/1.61
ONF1U	D	400	95	0.8640	6.90	0.01078	350	0.50	10.0	980	3.60	3.83	5.81	3.6	1330	17.4	13.6	0.136	3.00/1.61
ONF2U	D	400/540	93	0.8376	7.06	0.01103	195	0.50	8.3	930	3.20	3.61	5.47	3.6	1125	16.3	11.9	0.119	3.00/1.61

Tc = Ti + Tt
Ti = 1.8 (1.1 - K) L^1/2/S^1/3
K = 0.0132 (CN) - 0.39

For the travel time (TI) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Existing V1 = 14.8*(S/100)^1/2
Existing V2 = 29.4*(S/100)^1/2

Developed V1 = 20.2(S/100)^1/2
Developed V2 = 30.6*(S/100)^1/2

REFERENCE:

STANDARD FORM 4

TECHNICAL DRAINAGE STUDY
FOR
WILLIAM AND MARY SCHERKENBACH
ELEMENTARY SCHOOL

619.290

August 2002

Prepared for:

JMA Architecture
Under contract by the:
Clark County School District
10150 Covington Cross Drive
Las Vegas, Nevada 89144
Phone: (702) 731-2033
FAX: (702) 731-2039

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: October 9, 2002

TO:
Land Development Services
Department of Public Works

FROM:
Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works

SUBJECT:	Drainage Study for: William & Mary Scherkenbach Elementary School
Cross Streets:	SEC Iron Mountain Road & Tee Pee Lane
FILE NO.:	DS3200B
Parcel Number:	125-07-501-002
Zoning Action:	

FEMA Flood Zone	YES	No	X
Proposed Storm Drain	YES	No	X

COPIES TO:
G.C. Wallace
JMA Architecture
Bart Anderson, P.E., DEVCO
B&H

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R.#
1st Submittal	8/30/2002	9/13/2002	See Comments Below	N/C	—
2nd Submittal	09/25/2002	10/09/2002	See Comments Below	NC	—
			TOTAL FEES (LDDRS):	**N/C**	—

REMARKS:

The Drainage Study for the subject project has been reviewed and:

X	is approved subject to conformance to all City standards and the following conditions.
	must be resubmitted or supplemented including the following:
	must have Clark County Regional Flood Control District concurrence

1. It is noted that the top of grate in the courtyard is only two inches below the finish floor. A freeboard of at least six inches should be provided above the headwater surface at the inlet grates.
2. Pursuant to the above Comment #4, it is also noted that an overflow path has not been, and should be, provided for the courtyard.

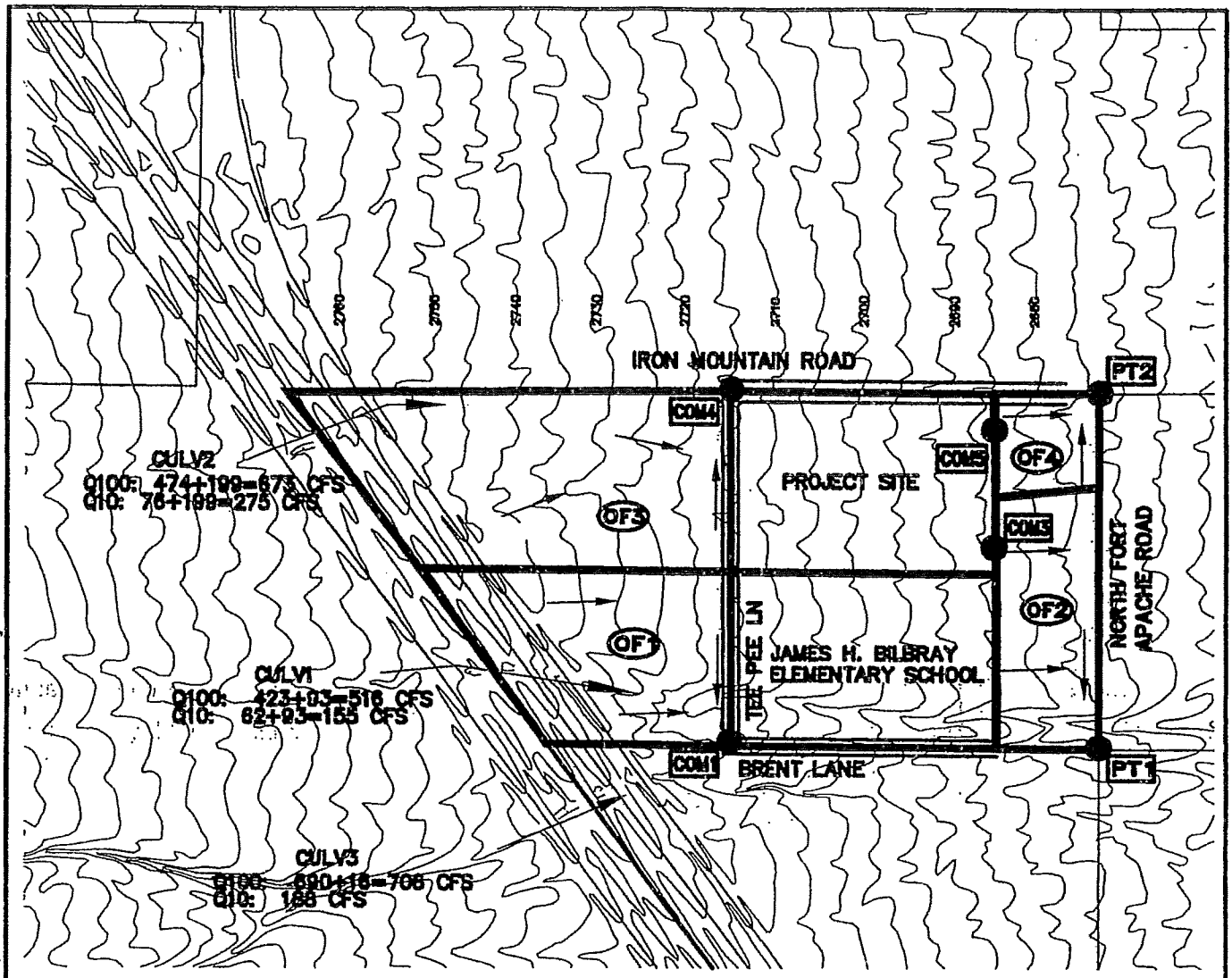
NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

END OF REMARKS

T/R/S: T19S/R60E/07

B&H/jwb

Post-it® Fax Note 7671		Date 10-9	# of pages ▶
To William Mayo		From Albert Sung	
Co./Dept.		Co. CLV	
Phone #		Phone # 229-200	
Fax # 804-7919		Fax #	



LEGEND

- OF1 — DRAINAGE SUBBASIN
- PT1 — CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION

N

GRAPHIC SCALE

600 0 300 600

(IN FEET)

1 inch = 600 ft.

WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL

FIGURE 5

OFFSITE DRAINAGE MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors

G:\619-29U\drainage\fig\FIG5.dwg 08-26-02 7:11:32 pmeyer

TABLE 1 SUMMARY OF HEC-1 MODEL - PROPOSED CONDITIONS		
Subbasin/ Combination Point*	Q_{10} (cfs)	Q_{100} (cfs)
CULV1**	155	516
OF1*	13	34
TP1*	2	4
COM1(CULV1+OF1+TP1)*	169	553
ON1A*	3	6
ON1B*	2	4
ON1C*	4	8
COM2A (ON1A+B+C)*	10	19
BL*	3	5
PT1A (COM1+COM2A+BL)*	178	570
CULV3***	130	426
OF5*	11	28
COM2B (CULV3+OF5)*	141	454
PT1W (PT1A+COM2B)*	319	1024
ON2*	2	4
ON3*	2	5
ON4*	4	12
ON7	3	5
ON8	3	10
COM3 (ON2+ON3+ON7+ON8)	11	31 *
OF2P	6	16
FA1*	3	6
PT1N (ON2+COM3+OF2P+FA1)*	21	55
CULV2*	275	673
OF3*	17	49
TP2	1	2
COM4(CULV2+OF3+TP2)*	293	723
ON5A	3	6
ON5B	2	5
ON5C	5	9
COM (ON5A+ON5B+ON5C)	10	20
IR*	3	5
PT2W (COM4+IR+COM5A)	301	737 *
ON6	2	4
OF4P	1	4
FA2*	1	2
PT2S (ON6+OF4P+FA2)	4	10

*Subbasins and concentration points taken from approved *Technical Drainage Study for James H. Bilbray Elementary School.*

* REFERENCED FLOWS

IRON MOUNTAIN ROAD

WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL

JAMES H. BILBRAY ELEMENTARY SCHOOL

TEE PEE LANE

FORT APACHE ROAD

COM4 COM5 COM3 PT2W PT2S PT1N

IR ON1 ON1A ON1B ON2 ON3 ON4 ON5A ON5B ON5C ON6 ON7 ON8

OF1 OF2P OF3 OF4P FA1 FA2 TP1 TP2

SECTION 1 SECTION 2 SECTION A SECTION B SECTION C

SUMMARY OF HEC-1 MODEL UNDER PROPOSED CONDITIONS

Subbasin/Combination Point*	Q10 (CFS)	Q100 (CFS)
CULV1*	155	515
OF1*	13	34
TP1*	2	4
COM1 (CULV1+OF1+TP1)*	169	553
ON1A*	3	6
ON1B*	2	4
ON1C*	4	8
COM2A (ON1A+B+C)*	10	19
BL*	3	5
PT1A (COM1+COM2A+BL)*	178	570
CULV3***	130	426
OF5*	11	28
COM2B (CULV3+OF5)*	141	454
PT1W (PT1A+COM2B)*	318	1024
ON2*	2	4
ON3*	2	5
ON4*	4	12
ON7	3	5
ON8	3	10
COM3 (ON2+ON3+ON7+ON8)	11	31
OF2P	6	16
FA1*	3	6
PT1N (ON2+COM3+OF2P+FA1)*	21	55
CULV2*	275	673
OF3*	17	49
TP2	1	2
COM4 (CULV2+OF3+TP2)*	293	723
ON5A	3	6
ON5B	2	5
ON5C	5	9
COM5 (ON5A+ON5B+ON5C)	10	20
IR*	3	5
PT2W (COM4+IR+COM5A)	301	737
ON6	2	4
OF4P	1	4
FA2*	1	2
PT2S (ON8+OF4P+FA2)	4	10

* SUBBASINS AND CONCENTRATION POINTS TAKEN FROM APPROVED TECHNICAL DRAINAGE STUDY FOR JAMES H. BILBRAY ELEMENTARY SCHOOL

N

GRAPHIC SCALE
0 100 200
(IN FEET)
1 inch = 200 ft.

LEGEND

- ON1 — DRAINAGE SUBBASIN
- PT1N — CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION
- CROSS SECTION

*PT1N 21/55

DESIGN:
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ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 08-28-02
PLOT TIME: 08:25:17

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G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL

PROPOSED CONDITIONS ONSITE DRAINAGE MAP

SHEET: FIG 6
SHT OF SHTS

IRON MOUNTAIN ROAD

COM4

COM5

PT2S

COM3

ON5B

ON5C

ON6

ON5A

WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL

ON8

ON7

ON3

ON4

ON1A

JAMES H. BILBRAY ELEMENTARY SCHOOL

ON2

ON1B

TP2

TP1

OF3U

OF1U

OF4U

OF2U

FA2

FA1

TEE PEE LANE

FORT APACHE ROAD

SUMMARY OF HEC-1 MODEL UNDER ULTIMATE CONDITIONS

Subbasin/Combination Point*	Q10 (CFS)	Q100 (CFS)
OF1U*	21	44
TP1*	2	4
COM1 (OF1U+TP1)*	23	47
ON1A*	3	8
ON1B*	2	4
ON1C*	4	8
COM2 (ON1A+ON1B+ON1C)*	10	19
ON2*	2	4
ON3*	2	5
ON4*	4	12
ON7	3	5
ON8	3	10
COM3 (ON3+ON4+ON7+ON8)	11	31
OF2U	5	15
FA1*	3	8
PT1N (ON2+COM3+OF2U+FA1)*	20	53
OF3U*	32	66
TP2*	1	2
COM4 (OF3U+TP2)*	33	68
ON5A	3	6
ON5B	2	5
ON5C	5	9
COM5 (ON5A+ON5B+ON5C)	10	20
ON8	2	4
OF4U	<1	2
FA2*	1	2
PT2S (ON8+OF4U+FA2)	3	8

* SUBBASINS AND CONCENTRATION POINTS TAKEN FROM APPROVED TECHNICAL DRAINAGE STUDY FOR JAMES H. BILBRAY ELEMENTARY SCHOOL

N

GRAPHIC SCALE

(IN FEET)

1 inch = 250 ft.

LEGEND

- ON1 — DRAINAGE SUBBASIN
- COM1 — CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION

DESIGN:
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WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL

FIGURE 7

ULTIMATE CONDITION DRAINAGE MAP

SHEET FIG-7 1 OF SHTS

IRON MOUNTAIN ROAD

EXIST PIPE
EXIST. PIPE
EXIST. PIPE
EXIST. PIPE
EXIST. PIPE
EXIST. PIPE
EXIST PIPE

EXIST. 11.5' MODIFIED TYPE 'C' DROP INLET
EXIST. 11.5' MODIFIED TYPE 'C' DROP INLET

18" PIPE

12" PIPE
12" PIPE
12" PIPE
18" PIPE

RIP RAP OUTFALL
D50 = 7"
THICKNESS = 14"

36" X 36" GRATE

WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL

18" X 18" GRATE

TEE PEE LANE

JAMES H. BILBRAY ELEMENTARY SCHOOL

FORT APACHE ROAD

GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.

N

LEGEND

- ON1 — DRAINAGE SUBBASIN
- PT1N — CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION
- CROSS SECTION

DESIGN:
DRAWN:
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ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 08-26-05
PLOT TIME: 08:30:07

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WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL
FIGURE 8
FACILITIES MAP

SHEET
FIG-8
OF SHTS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

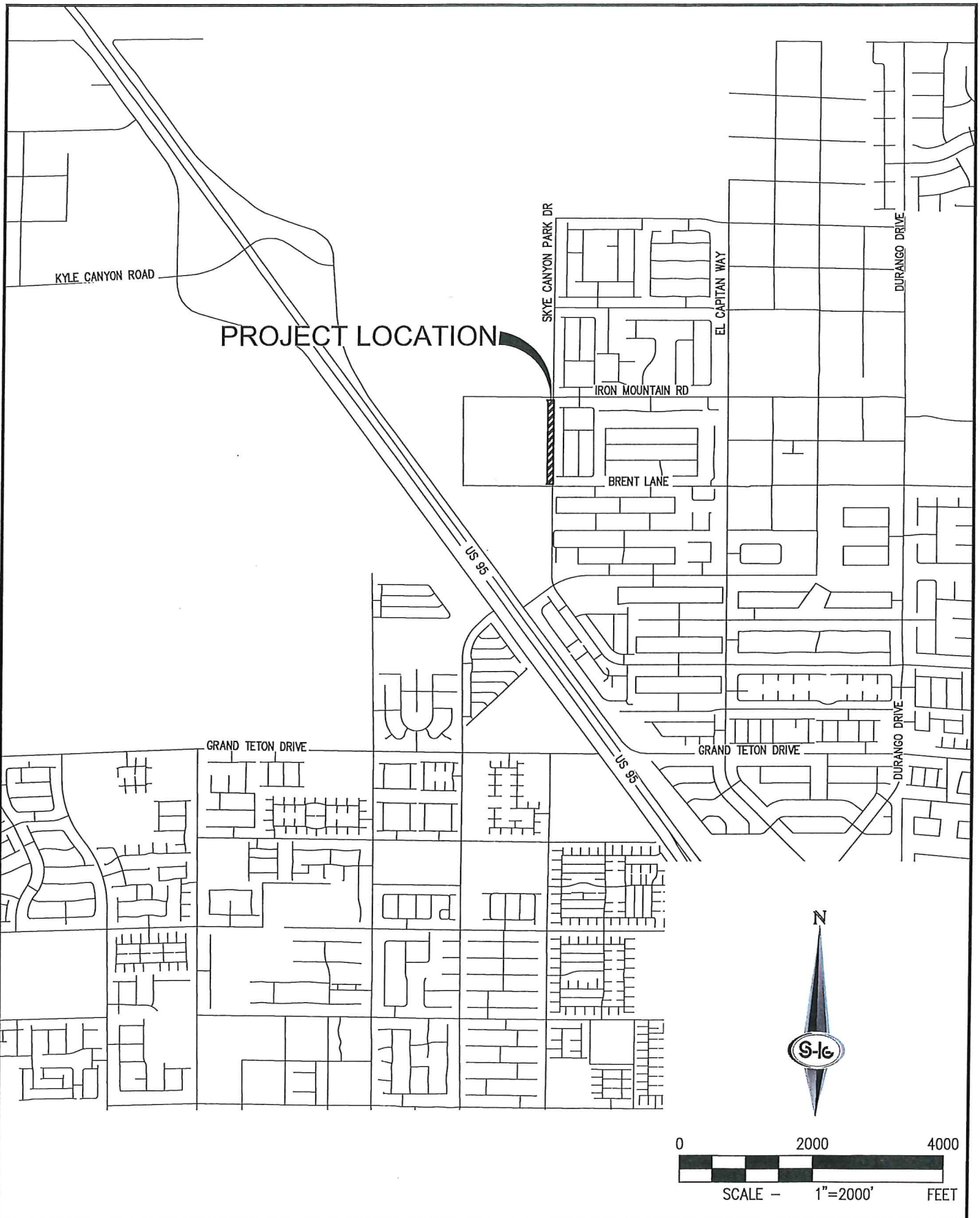
G.C.Wallace Inc.
File: 619-290-sf4.xls
Project No.: 619.290

William and Mary Scherkenbach Elementary School
Standard Form 4

BY: AT/WJM
DATE: 21-Aug-02

SUBBASIN DATA							INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANNIZED BASINS		Tc	Tlag	REMARKS
Subbasin Name (1)	DEV./EX. (D or E)	Soil Type	CN	K	Area (a.c.) (3)	Area mi2	Initial Length (ft) (4)	Slope % (5)	Ti min (6)	Travel Length (ft) (7)	Slope % (8)	V1 Velocity fps (9a)	V2 Velocity fps (9b)	Tt min (10)	Total Length ft (11)	Tc= (L/180+10) min (12)	Tc Calc. (13)	Tlag= 0.6Tc/60 hours	Rainfall inches 100/10year
ON5A	D	400/540	98	0.9036	1.55	0.00242	360	1.00	6.7	0	1.00	2.02	3.06	0.0	360	12.0	6.7	0.067	3.00/1.61
ON5B	D	400/540	92	0.8244	1.48	0.00228	100	2.00	3.9	210	0.40	1.28	1.94	2.7	310	11.7	6.7	0.067	3.00/1.61
ON5C	D	540	98	0.9036	2.28	0.00358	90	2.00	2.7	540	3.60	3.83	5.81	2.3	630	13.5	5.0	0.050	3.00/1.61
ON6	D	540	92	0.8244	1.44	0.00225	500	2.00	8.8	100	0.50	1.43	2.16	1.2	600	13.3	10.0	0.100	3.00/1.61
ON7	D	400	95	0.8640	1.57	0.00245	70	1.70	3.0	460	0.50	1.43	2.16	5.4	530	12.9	8.3	0.083	3.00/1.61
ON8	D	400/540	80	0.6660	5.46	0.00853	170	2.00	8.1	540	2.00	2.86	4.33	3.1	710	13.9	11.2	0.112	3.00/1.61
OF2P	E	400	88	0.7716	7.59	0.01186	350	2.90	7.8	950	0.50	1.05	2.08	11.6	N/A	N/A	19.3	0.193	3.00/1.61
OF4P	E	400/540	79	0.6528	2.44	0.00381	360	2.80	10.8	265	0.50	1.05	2.08	4.2	N/A	N/A	15.1	0.151	3.00/1.61
OF2U	D	400	84	0.7188	7.59	0.01186	350	2.90	9.0	950	0.50	1.43	2.16	9.3	1300	17.2	18.3	0.172	3.00/1.61
OF4U	D	400/540	69	0.5208	2.44	0.00381	360	2.80	14.0	265	0.50	1.43	2.16	3.1	625	13.5	17.1	0.135	3.00/1.61

- **Appendix B** – Updated Standard Exhibits
  - Exhibit A – Location Map
  - Exhibit B – FEMA FIRM Map
  - Exhibit C1 – 2013 CCRFCD MPU Facilities Map
  - Exhibit C2 – 2013 CCRFCD MPU Facilities Inventory
  - Exhibit C3 – 2008 CCRFCD MPU Hydrologic Facilities Map
  - Exhibit C4 – Northwest Neighborhood Study Existing Conditions
  - Exhibit C5 – City of Las Vegas City-Wide Hydrology
  - Exhibit D – Ultimate Conditions Drainage Map



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SLATER HANIFAN GROUP
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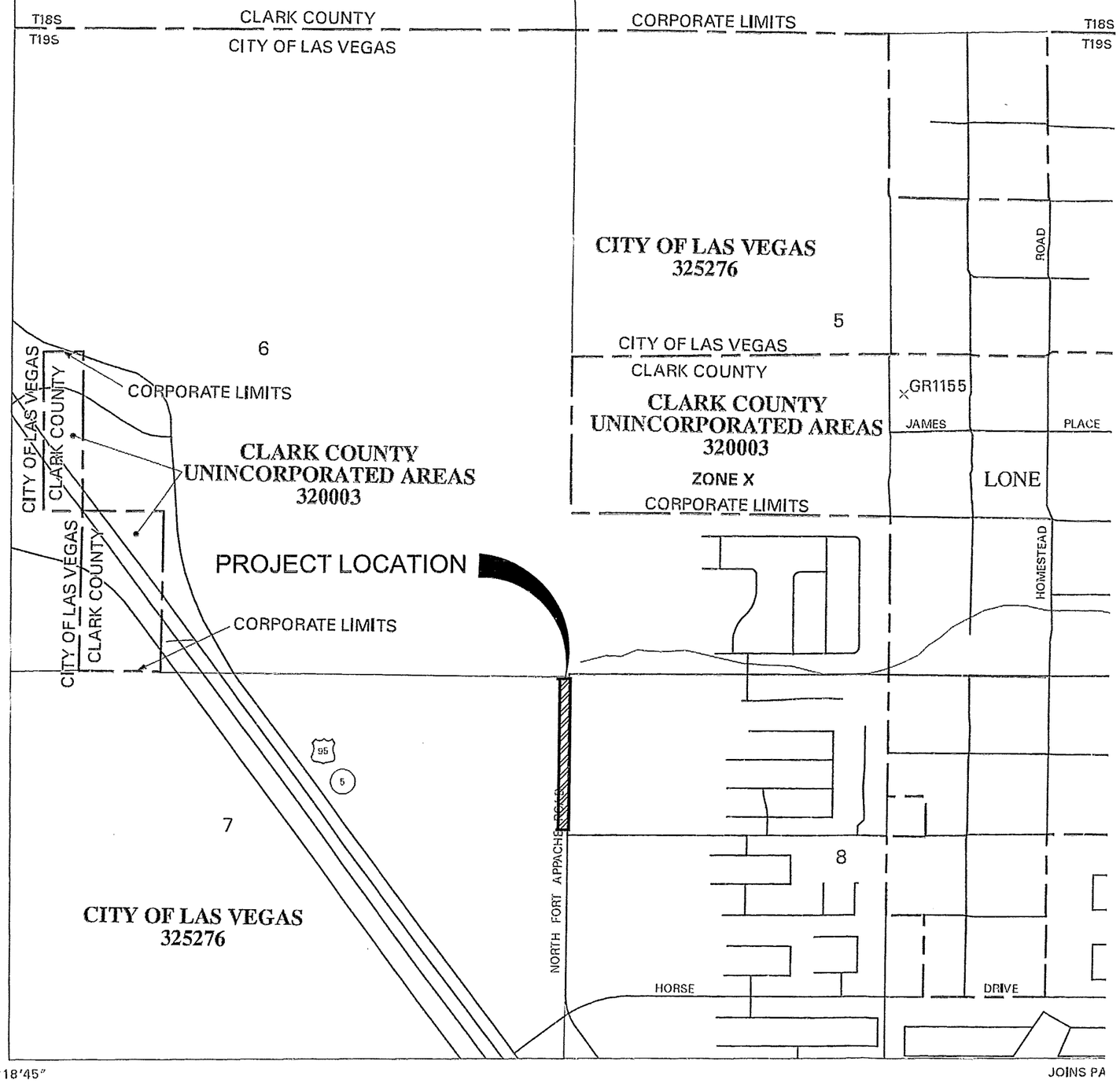
PHONE (702) 284-5300 FAX (702) 284-5399

KAG PROPERTY, LLC

ALYN BECK PARK OFFSITES

LOCATION MAP

DATE: DEC 2017	PROJECT NO. OLY1726.000
DRAFTER: CAA	
DESIGNER: CAA	EXHIBIT A
CHECKED: SOA	SHEET 1 OF 1



PANEL 1735 E

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 1735 OF 4090

MAP NUMBER
32003C1735 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Coastal Barrier Boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross Section Line
- Transect Line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000M — 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT — 5000-foot grid ticks
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel).
- M1.5 — River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
AUGUST 16, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 27, 2002: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to delete special flood hazard areas, to change zone designations, to add roads and road names, to incorporate previously issued letters of map revision, to incorporate previously issued letters of map amendment, and to change floodway.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

KAG PROPERTY, LLC

ALYN BECK PARK OFFSITES
FEMA FIRM MAP

DATE: DEC 2017
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO.
OLY1726.000

EXHIBIT B
SHEET 1 OF 1

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PROJECT LOCATION

LOG CABIN WY
KYLE CANYON RD
IRON MOUNTAIN RD
FORT APACHE RD
EL CAPITAN WY
DURANGO DR
GRAND TETON DR
GILCREASE AV
FARM RD
SEVERENCE LA
EGAN CREST DR
HUALAPAI WY
ELKHORN RD
GRAND CANYON DR
CAMPBELL RD
DORRELL LA
DEER SPRINGS WY
RILEY ST
CIMARRON RD
BUFFALO DR
TENAYA WY
OSO BLANCA RD
CENTENNIAL PKWY
95
215

MOKC 0000
MOSM 0000
MOSM 0064
MOHU 0000
MOIR 0000
MOHU 0116
MOHU 0085
MOHU 0100
CNKC 0050
CNKC 0024
CNKC 0007
CNKC 0000
CNGT 0118
CNGT 0043
CNGT 0000
CN95 0423
CN95 0318
CN95 0313
CN95 0259
CN95 0257
CN95 0216
CN95 0199
CN95 0167
CN95 0102
CN95 0065
CN95 0000
BRDB 0157
BRDB 0107
BRDB 0043
BRDB 0033
BRDB 0032
BRDB 0000
MSNV 0126
MSNV 0005
RACO 0064
RACO 0007
RACO 0000
LVMD 2739
LVMD 2738
LVMD 2737
LVMD 2711
LVMD 2661
LVMD 2632
TSDB 0059
TSDB 0023
TSDB 0012
TSDB 0011
TSDB 0002
TSDB 0000
EKHU 0023
EKHU 0009
EKHU 0003
EKHU 0020
EKHU 0001
RCHB 0295
RCHB 0275
RCHB 0250
BCHU 0042
BCHU 0054
BCHU 0040
BCHU 0017
BCHU 0000
RCBC 0004
RCBC 0007
RCBC 0012
RCBC 0009
RCBC 0002
RCBC 0100
RCBC 0051
RCBC 0095
RCBC 0048
RCBC 0000
RCHB 0227
RCHB 0198
RCHB 0175
RCHB 0171
RCHB 0151
RCHB 0149
RCHB 0130
RCHB 0122
RCHB 0120
RCHB 0073
RCHB 0064
RCHB 0063
RCHB 0054
RCHB 0053
RCHB 0074
RCHB 0052
RCHB 0044
RCHB 0033
GONO 0511
GOEC 0176
CNWE 0325
CNWE 0314
CNWE 0304
CNWE 0301
CNWE 0287
CNWE 0277
CNWE 0274
CNWE 0271
CNWE 0261
CNWE 0241
EKDB 0000
EKDB 0049
EKDB 0026
EKDB 0070
EKDB 0025

REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 13

FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

Refer to Figure G-2 for Aerial Source(s)

US95 I-15 I-215

| | | |

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BCHU		BELTWAY CHANNEL - HUALAPAI						
0000	E	12' X 5' RCAP	853	501	CBA3-C	WEST3	0.84	1.11
0017	E	8' X 5' RCAP	1216	501	CBA3-C	WEST3	0.84	1.33
0040	E	66" RCP	60	222	DNW26-C	WEST3	0.51	1.04
0042	E	60" RCP	615	222	DNW26-C	WEST3	0.51	1.42
0054	E	54" RCP	770	222	DNW26-C	WEST3	0.51	1.23
BRDB		BRENT DRAINAGE SYSTEM						
0000	E	36" RCP with 18" Orifice Plate	2170	37	BRDB	WEST3	2.48	0.40
0031	E	45,080 cfs PMF Spillway		45080	CBRDB	WEST3	2.48	
0032	E	450 ac-ft South Environmental Enhancement Area		1902	CBRDB	WEST3	2.48	
0033	E	Energy Dissipator	100	957	CNW113-C	WEST3	1.58	
0043	P1	8' X 6' RCB	2920	957	CNW113-C	WEST3	1.58	2.10
0107	P1	8' X 6' RCB	2660	957	CNW113-C	WEST3	1.58	2.40
0157	P1	12' X 6' RCB	1260	741	CNW96-C	WEST3	0.95	0.25
CN95		CENTENNIAL PKWY CHANNEL WEST / U.S 95 BRANCH						
0000	P1	Conc Chnl 22'W 10'D 0:1 SS	2690	3340	CNWBB3-C	WEST3	3.36	2.17
0068	P1	3: 8' X 7' RCB	3380	3216	CNW103-C	WEST3	3.05	2.12
0102	P1	3: 8' X 6' RCB	1710	2888	2CNW89-C	WEST3	2.66	2.09
0167	P1	2: 10' X 6' RCB	1580	2160	2CNW71-E	WEST3	1.64	1.50
0199	E	2: 10' X 6' RCB	320	1423	2CNW72-C	WEST3	1.14	0.82
0218	E	15' X 9' RCB	1127	1423	2CNW72-C	WEST3	1.14	0.82
0257	E	Transition Structure	59	1423	2CNW72-C	WEST3	1.14	0.77
0259	E	15' X 9' RCB	290	653	CNW74-C	WEST3	0.44	0.77
0313	E	10' X 6' RCB	2680	653	CNW74-C	WEST3	0.44	2.50
0318	E	Transition Structure	60	653	CNW74-C	WEST3	0.44	1.50
0333	E	5' X 5' RCB	670	339	NW62-S	WEST3	0.22	1.50
CNGT		CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH						
0000	E	10' X 5' RCB	2376	600	CNW71-E	WEST3	0.47	2.58
0043	P0	6' X 6' RCB	3980	600	CNW71-E	WEST3	0.47	3.00
0118	E	6' X 5' RCAP	5472	363	KYLEDET*	KYLEDB	57.73	3.72
CNKC		CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH						
0000	E	12' X 4' RCB	377	999	CNW72-C	WEST3	0.71	4.58
0007	E	10' X 5' RCB	874	999	CNW72-C	WEST3	0.71	3.28
0024	E	8' X 5' RCB	1385	999	CNW72-C	WEST3	0.71	2.40
0050	P0	84" RCP	2610	854	CNW72-C	WEST3	0.71	3.60
CNWE		CENTENNIAL PKWY CHANNEL WEST						
0150	E	Conc Chnl 40'W 9.5'D 0:1 SS	2279	4233	CNW3B3-C	WEST3	5.64	0.42
0173	E	3: 18' X 8' RCBC @ Torrey Pines	200	4233	CNW3B3-C	WEST3	5.64	0.42
0176	E	Conc Chnl 40'W 9'D 0:1 SS	150	4233	CNW3B3-C	WEST3	5.64	0.41
0189	E	Conc Chnl 36'W 10'D 0:1 SS	1200	4067	CNW2D4-C	WEST3	5.15	0.42
0200	E	Conc Chnl 36'W 9'D 0:1 SS	2470	4067	CNW2D4-C	WEST3	5.15	1.00
0226	E	2: 18' X 8.5' RCBC @ Rio Vista	100	4067	CNW2D4-C	WEST3	5.15	0.51
0241	E	Conc Chnl 36'W 9.5'D 0:1 SS	405	3951	CNW2D3-C	WEST3	4.65	0.51
0251	E	Conc Chnl 36'W 9'D 0:1 SS	575	3951	CNW2D3-C	WEST3	4.65	0.51
0271	E	Conc Chnl 32'W 10'D 0:1 SS	229	3951	CNW2D3-C	WEST3	4.65	0.51
0274	E	32' X 10' RCBC @ Tenaya	142	3951	CNW2D3-C	WEST3	4.65	0.51
0277	E	Conc Chnl 32'W 9'D 0:1 SS	579	3951	CNW2D3-C	WEST3	4.65	0.64
0287	E	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	3259	3593	CNW2B2-C	WEST3	3.84	1.79
0314	E	22' X 7' RCB	785	3593	CNW2B2-C	WEST3	3.84	1.79
0325	P1	32' X 10' RCB	2200	3593	CNW2B2-C	WEST3	3.84	1.75
EKBU		ELKHORN SPRINGS AND BUFFALO						
0000	E	60" RCP	1046	375	NW134-C	WEST3	0.46	1.00
EKDB		ELKHORN SPRINGS DETENTION BASIN						
0000	E	Grass Chnl 15'W 5.8'D 3.5:1 SS	2575	238	CNW150-C	WEST3	1.41	0.39
0025	E	4' X 3' RCB	160	120	ELKBASIN	WEST3	0.84	0.50
0026	E	48" RCP	1270	120	ELKBASIN	WEST3	0.84	1.23
0049	E	60" RCP	1095	120	ELKBASIN	WEST3	0.84	0.13
0070	E	48 ac-ft Elkhorn Springs Detention Basin		629	CNW133-C	WEST3	0.84	

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
EKHU		ELKHORN AND HUALAPAI						
0000	E	6' X 5' RCB Overflow Structure	48	638	CNW26-C	WEST3	0.51	0.91
0001	E	6' X 5' RCAP	72	638	CNW26-C	WEST3	0.51	0.91
0003	E	6' X 4' RCAP	980	638	CNW26-C	WEST3	0.51	3.61
0020	E	6' X 5' RCAP	150	638	CNW26-C	WEST3	0.51	3.61
0023	E	8' X 5' RCAP	1200	638	CNW26-C	WEST3	0.51	0.90
GOEC		GOWAN NORTH - EL CAPITAN BRANCH						
0176	P1	78" RCP	1320	363	CCPFR-C	ALLGOW3	0.46	1.15
GONO		GOWAN NORTH SYSTEM						
0511	P1	7' X 6' RCB	1320	546	CCPHW-C	ALLGOW3	0.60	1.14
LVMD		LAS VEGAS WASH - MIDDLE						
2490	E	2: 13' X 7' RCB	2555	2278	CNW168-C	CWEST3	4.69	0.40
2507	E	2: 13' X 9' RCB	2831	2278	CNW168-C	CWEST3	4.69	0.36
2525	E	24' X 8' RCB	1140	1913	CNW159-C	CWEST3	3.91	0.40
2550	E	24' X 8' RCB	1445	1664	CD161-C	CWEST3	3.41	0.40
2574	E	24' X 8' RCB	1430	1664	CD161-C	CWEST3	3.41	0.40
2599	E	Conc Chnl 24'W 7'D 2:1 SS	1577	1585	CNW162-C	CWEST3	3.08	0.50
2632	E	18' X 5' RCB	1580	968	CNW138-C	WEST3	1.16	0.46
2661	E	18' X 5' RCB	2640	968	CNW138-C	WEST3	1.16	0.46
2711	E	10' X 5' RCB	1320	968	CNW138-C	WEST3	1.16	1.54
2737	E	10' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	2.22
2763	E	6' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	1.79
2789	E	6' X 5' RCB	1470	818	CNW139-C	WEST3	0.93	2.17
MOHU		MOCCASIN - HUALAPAI BRANCH						
0000	P0	14' X 8' RCB	1920	761	2CNW45-N	LOWER3	2.10	0.50
0036	P0	10' X 8' RCB	2590	368	CNW45-N	LOWER3	1.15	0.50
0085	P0	72" RCP	790	368	CNW45-N	LOWER3	1.15	3.00
0100	P0	Natural Wash	850	65	DMODB1	LOWER3	0.81	3.00
0116	P0	60" RCPC	12	65	DMODB1	LOWER3	0.81	3.00
0118	P0	Natural Wash	3485	65	DMODB1	LOWER3	0.81	3.00
MOIR		MOCCASIN - IRON MOUNTAIN BRANCH						
0000	P0	66" RCP	2770	446	2CNW33-C	LOWER3	1.76	3.60
MOKC		MOCCASIN AND KYLE CANYON						
0000	P1	11' X 8' RCB	5450	2662	CNW35-C	LOWER3	2.69	3.40
MOSM		MOCCASIN AND SHEEP MOUNTAIN PARKWAY						
0000	P0	14' X 9' RCB	3370	3778	CNW64-C	LOWER3	5.32	2.40
0064	P0	14' X 8' RCB	880	3505	CNW50-C	LOWER3	4.99	3.00
0080	P0	14' X 8' RCB	710	3325	2CNW35-C	LOWER3	4.80	3.00
MSNV		MOUNTAIN SPA/VISTA RANCH						
0000	E	6: 12' X 5' RCBC @ Grand Teton	273	679	CNW163-C	CWEST3	1.67	0.40
0005	E	Grass Chnl 100'W 4.5'D 10:1 SS	6325	679	CNW163-C	CWEST3	1.67	0.40
0125	E	Grass Chnl 100'W 4.5'D 10:1 SS	1300	116	CNW147E	WEST3	1.54	0.40
RACO		RACEL STREET COLLECTOR						
0000	E	96" RCP Baffled Energy Dissipator	54	497	CNW111S	WEST3	0.55	4.20
0001	E	78" RCP	3245	497	CNW111S	WEST3	0.55	2.46
0064	E	78" RCP	2650	423	DNW111S	WEST3	0.44	2.09
RCBC		RANCHO ROAD SYSTEM - BELTWAY CHANNEL						
0000	E	6' X 5' RCB	1062	222	FADB	WEST3	1.60	1.04
0002	E	54" RCP Outlet with 41" Orifice	503	222	FADB	WEST3	1.60	2.38
0003	E	2,341 cfs PMF Spillway		2341	FADBIN	WEST3	1.60	
0004	E	76 ac-ft Fort Apache Detention Basin		1255	FADBIN	WEST3	1.60	
0007	E	Energy Dissipator	100	1255	FADBIN	WEST3	1.60	
0009	E	12' X 6' RCBC @ Fort Apache Detention Basin	133	1255	FADBIN	WEST3	1.60	1.79
0012	E	Conc Chnl 12'W 6'-7'D 0:1 SS	1937	1255	FADBIN	WEST3	1.60	3.15
0048	E	12' X 6' RCBC @ Grand Canyon	140	1040	CMNA1	WEST3	1.32	3.15
0051	E	Conc Chnl 12'W 6'-8'D 0:1 SS	2660	1040	CMNA1	WEST3	1.32	3.44
0096	E	1: 10' X 6' and 1: 6' X 6' RCBC @ Hualapai Way	190	1040	CMNA1	WEST3	1.32	1.93
0100	E	Conc Chnl 12'W 5.5'D 0:1 SS	2085	598	CDMNA1	WEST3	0.48	2.88
0140	E	Conc Chnl 10'W 5'D 0:1 SS	2155	598	CDMNA1	WEST3	0.48	1.65

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCHB		RANCHO ROAD SYSTEM - BELTWAY						
0034	E	Conc Chnl 21'W 8'D 0:1 SS	1000	2631	CNW1C-W	WEST3	4.68	1.19
0053	E	2: 12' X 8' RCBC @ South Ramp Connector	85	2304	CDW1C1	WEST3	4.31	1.40
0054	E	Conc Chnl 21'W 8'D 0:1 SS	432	2304	CDW1C1	WEST3	4.31	1.51
0062	E	Transition Structure	130	2304	CDW1C1	WEST3	4.31	1.51
0065	E	24' X 7' RCB	480	2304	CDW1C1	WEST3	4.31	0.30
0074	E	24' X 6' RCB	50	2226	CNWBC6-C	WEST3	4.17	0.30
0075	E	20' X 6' RCBC @ Beltway	428	2226	CNWBC6-C	WEST3	4.17	2.81
0083	P1	20' X 6' RCB	950	2226	CNWBC6-C	WEST3	4.17	2.49
0101	P1	Conc Chnl 20'W 7'D 0:1 SS	980	2226	CNWBC6-C	WEST3	4.17	2.38
0120	E	20' X 6' RCBC @ Grand Montecito	120	2226	CNWBC6-C	WEST3	4.17	1.00
0122	P1	Conc Chnl 16'-20'W 6'D 0:1 SS	350	2226	CNWBC6-C	WEST3	4.17	1.84
0130	P1	Conc Chnl 16'W 6'D 0:1 SS	1012	2226	CNWBC6-C	WEST3	4.17	2.67
0149	P1	Conc Chnl 16'W 6'-7'D 0:1 SS	87	1888	CNWBC3	WEST3	3.75	2.27
0151	P1	Conc Chnl 16'W 7'D 0:1 SS	1255	1888	CNWBC3	WEST3	3.75	2.65
0171	E	16' X 6' RCBC @ El Capitan Way	234	1888	CNWBC3	WEST3	3.75	1.75
0175	E	Conc Chnl 14'W 7'D 0:1 SS	1220	1888	CNWBC3	WEST3	3.75	2.93
0198	E	Conc Chnl 14'W 7'D 0:1 SS	225	1402	CNWBA6-C	WEST3	3.61	2.93
0227	E	12' X 6' RCB	1885	1402	CNWBA6-C	WEST3	3.61	1.02
0250	E	12' X 6' RCB	3200	1402	CNWBA6-C	WEST3	3.61	1.00
0275	P1	7' X 6' RCB	2650	973	CNW66-C	WEST3	1.75	3.30
0295	P1	7' X 6' RCB	2875	973	CNW66-C	WEST3	1.75	3.30
TSDB		TULE SPRINGS DRAINAGE SYSTEM						
0000	E	2: 10' X 4' RCBC @ Echo Grande	100	26	TULEDB	WEST3	1.35	1.04
0002	E	36" RCP with 22" Orifice Plate	320	26	TULEDB	WEST3	1.35	0.33
0010	E	14,013 cfs PMF Spillway		14013	CTULEDB	WEST3	1.35	
0011	E	117 ac-ft North Environmental Enhancement Area		804	CTULEDB	WEST3	1.35	
0012	E	Energy Dissipator	260	376	CNW148-C	WEST3	0.52	
0023	P1	84" RCP	1320	376	CNW148-C	WEST3	0.52	0.80
0059	P1	78" RCP	2640	376	CNW148-C	WEST3	0.52	1.03

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F - 13

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
- Category B..... P0
- Master Plan..... P1
- Preliminary Design..... P2
- Design..... P3

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe..... CIPCP	Reinforced Concrete Arch Culvert..... RCAC
Corrugated Metal Arch Pipe Culvert..... CMAP	Reinforced Concrete Box..... RCB
Corrugated Metal Pipe Culvert..... CMPC	Reinforced Concrete Box Culvert..... RCBC
High Density Polyethylene..... HDPE	Reinforced Concrete Pipe..... RCP
Horizontal Elliptical Reinforced Concrete Pipe..... HERCP	Reinforced Concrete Pipe Culvert..... RCPC
Reinforced Concrete Arch Pipe..... RCAP	Storm Sewer Pipe..... SSP

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

KAG PROPERTY, LLC

ALYN BECK PARK OFFSITES
CCRFCD MPU FACILITIES INVENTORY

DATE: DEC 2017
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA

PROJECT NO.
OLY1726.000

EXHIBIT C2
SHEET 1 OF 1

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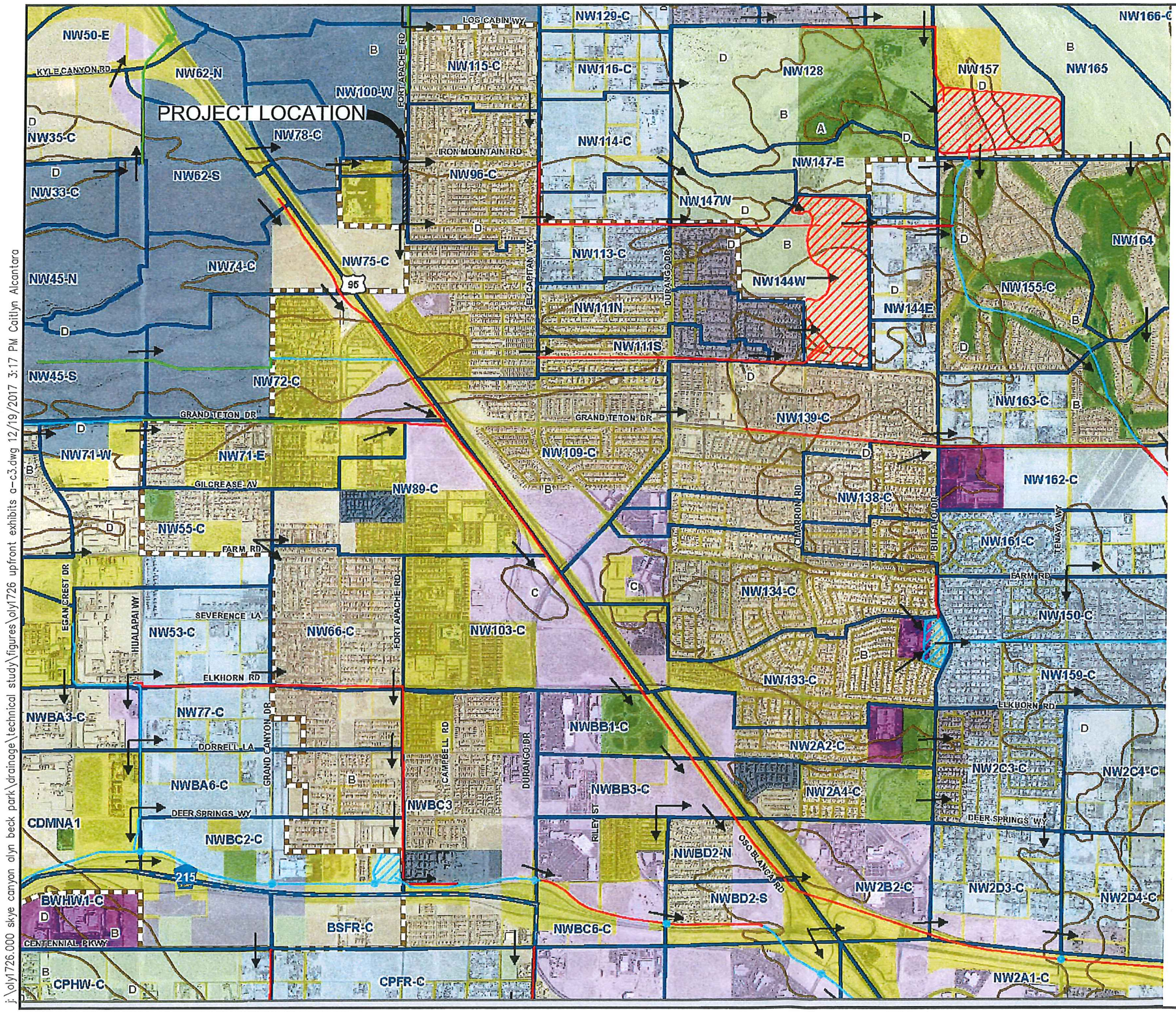

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REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H-13
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subbasin Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/ Parallel Facilities
- Category B Remove & Replace/ Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

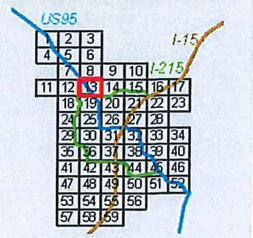
Typical Land Use

- 1 Undeveloped Land, Open Desert
- 2 Parks, Golf Courses
- 3 Rural
- 4 / 14* Low Density Residential
- 5 / 15* Medium Density Residential
- 6 / 16* High Density Residential
- 7 / 17* Public Facility, Residential
- 8 / 18* Very High Density Residentia
- 9 / 19* Commerical, Retail, Casino, High Rise Condominiums
- 10 / 20* Light Industrial
- 11 / 21* Heavy Industrial
- 12 / 22* Schools
- 13 Lakes

* Drought Ordinance Applied

N

0 500 1,000 2,000 3,000
Feet
Scale: 1 inch = 2,000 feet
Refer to Figure G-2 for Aerial Source(s)



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CCRFCD MPU HYDROLOGIC FACILITIES

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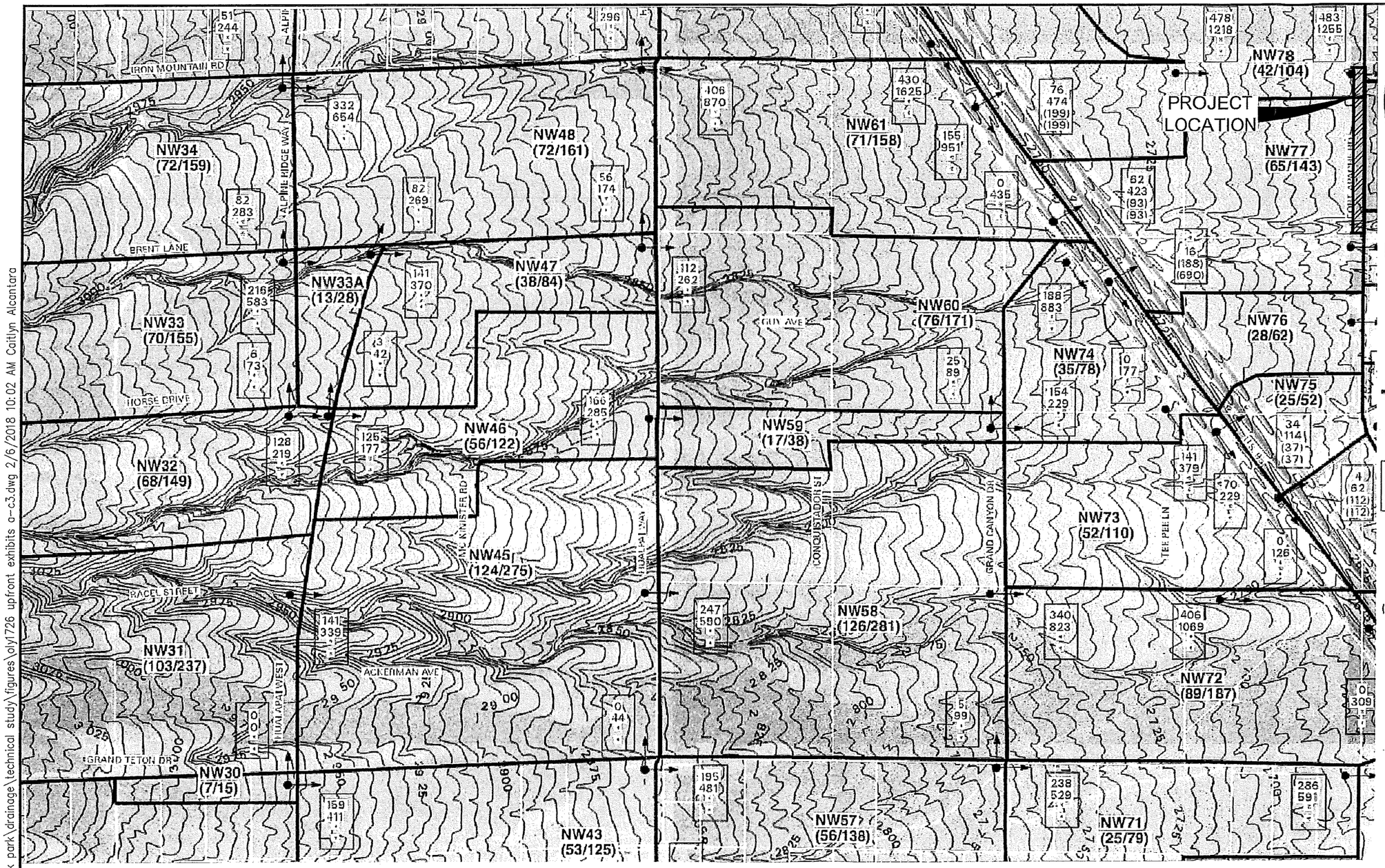
PROJECT NO.	OLY1726.000

EXHIBIT C3
SHEET 1 OF 1



CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY PHASE 2

LEGEND

- SUB-BASIN BOUNDARY
- FLOW ARROW

250	10-YEAR STREET FLOW
500	100-YEAR STREET FLOW
300	10-YEAR FACILITY FLOW
800	100-YEAR FACILITY FLOW

(FLOWS IN CFS)

BWJS — Basin-ID

(13 / 59) — Contributing flow (10-Year / 100-Year) from the basin (cfs)

PHOTO DATE: SEPTEMBER 1998

N W E S

(IN FEET)
SCALE: 1 INCH = 800 FEET

FIGURE E-7

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

KAG PROPERTY, LLC

ALYN BECK PARK OFFSITES

NORTHWEST NEIGHBORHOOD STUDY EXISTING CONDITION

DATE:	DEC 2017
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PROJECT NO.	OLY1726.000

EXHIBIT C4
SHEET 1 OF 1

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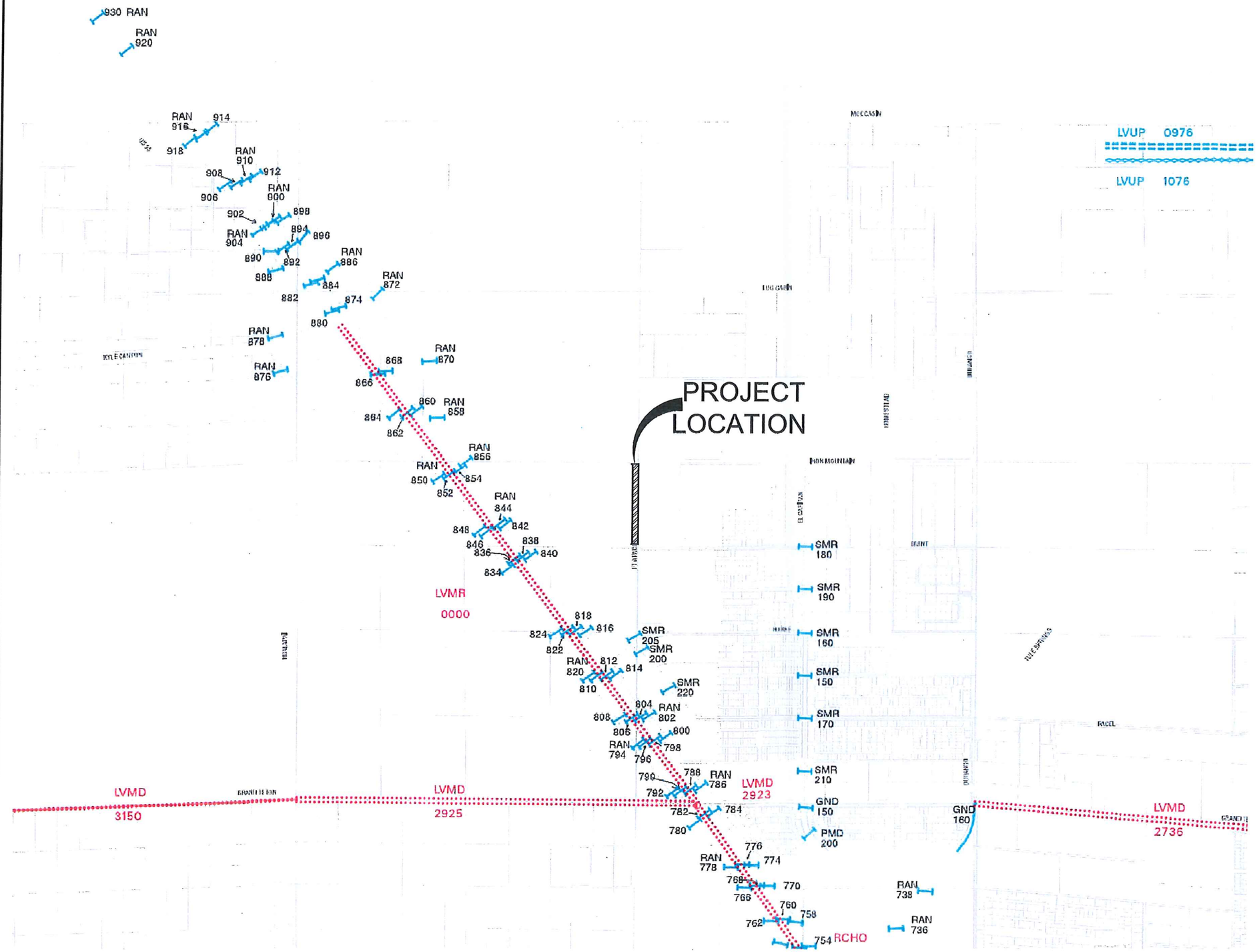


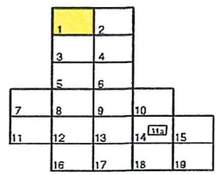
City of Las Vegas

CITY - WIDE HYDROLOGY ANALYSIS

LEGEND

- EXISTING REGIONAL DETENTION BASINS
- PROPOSED REGIONAL DETENTION BASINS
- EXISTING LOCAL DETENTION BASINS
- EXISTING REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES
- EXISTING LOCAL BRIDGES
- EXISTING REGIONAL CULVERT
- PROPOSED REGIONAL CULVERT
- EXISTING LOCAL CULVERT
- EXISTING REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE
- EXISTING LOCAL PIPELINE
- EXISTING REGIONAL CHANNEL
- PROPOSED REGIONAL CHANNEL
- EXISTING LOCAL CHANNEL
- EXISTING REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE
- EXISTING LOCAL DIKE/LEVEE
- EXISTING STORMWATER PUMPING STATION
- PROPOSED BELTWAY ALIGNMENT

FIGURE F-1



Scale: 1 Inch = 1600 feet

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ALYN BECK PARK OFFSITES

CITY-WIDE HYDROLOGY ANALYSIS

DATE:	DEC 2017
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PROJECT NO.	OLY1726.000

EXHIBIT C5

SHEET 1 OF 1

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REFERENCED STUDIES
* REFERENCED FROM THE INDIAN HILLS PARK STUDY
** REFERENCED FROM THE WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL STUDY
*** REFERENCED FROM THE JAMES H BILBRAY ELEMENTARY SCHOOL STUDY

LEGEND

CP1* 4/11 — CONCENTRATION POINT Q_{10}/Q_{100}

FN* 1/3 — SUBBASIN ID Q_{10}/Q_{100}

SCS — STREET CROSS SECTION

FLOW DIRECTION

$Q_{10/100}$ 12/31** — OFFSITE FLOWS

BASIN DELINEATION LINE

STREET CROSS SECTION HYDRAULICS SUMMARY TABLE

Section ID [-]	Slope [%]	10-Year Q_{10} [cfs]	10-Year D_{10} [ft]	10-Year V_{10} [ft/s]	10-Year D x V [-]	100-Year Q_{100} [cfs]	100-Year D_{100} [ft]	100-Year V_{100} [ft/s]	100-Year D x V [-]
Existing Conditions									
Skye Canyon North	1.09	4	0.48	2.41	1.2	11	0.59	2.94	1.7
Skye Canyon South	0.85	24	0.47	3.40	1.6	58	0.68	3.49	2.4
Proposed Conditions									
Skye Canyon North	1.09	4	0.45	2.19	1.0	11	0.54	2.88	1.6
Skye Canyon South	0.85	24	0.47	3.40	1.6	58	0.67	4.2	2.8

N

0 25 50 100 150
1"= 50' HORIZ.

CP1* 4/11
FN* 1/3
SCN
SKYE CANYON PARK DRIVE
FS* 4/8
24/58
CP2*
SCS
CP3*
ONI* 2/5
ONF* 5/10
ONB* 2/5
IRON MOUNTAIN ROAD
BRENT LANE
$Q_{10/100}$ 2/4**
$Q_{10/100}$ 12/31**
$Q_{10/100}$ 2/4***
WILLIAM AND MARY SCHERKENBACH ELEMENTARY SCHOOL
JAMES H BILBRAY ELEMENTARY SCHOOL

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LAS VEGAS, NV

KAG PROPERTY, LLC

ALYN BECK PARK OFFSITES

ULTIMATE CONDITIONS DRAINAGE EXHIBIT

DATE: FEB 2018
DRAFTER: NAS
DESIGNER: NAS
CHECKED: SOA
PROJECT NO.
OLY1726.000

EXHIBIT D
SHEET 1 OF 1

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- **Appendix C** – Street Capacity Calculations
  - Skye Canyon North (Existing and Interim/Proposed Conditions)
  - Skye Canyon South (Existing and Interim/Proposed Conditions)

Skye Canyon Drive North - Existing Conditions (10-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Existing Conditions
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	010900	ft/ft
Discharge	4.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.015	
Water Surface Elev	2,671.97	ft
Elevation Range	71.49 to 2,674.72	
Flow Area	1.7	ft²
Wetted Perimeter	14.13	ft
Top Width	13.77	ft
Actual Depth	0.48	ft
Critical Elevation	2,672.00	ft
Critical Slope	0.007173	ft/ft
Velocity	2.41	ft/s
Velocity Head	0.09	ft
Specific Energy	2,672.06	ft
Froude Number	1.22	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+07	0+34	0.027
0+34	1+15	0.016
1+15	1+22	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+07	2,674.72
0+10	2,674.56
0+27	2,672.79
0+34	2,671.92
0+34	2,671.96
0+44	2,672.23
0+62	2,672.70
0+72	2,672.55
1+15	2,671.77
1+16	2,671.55
1+17	2,671.49

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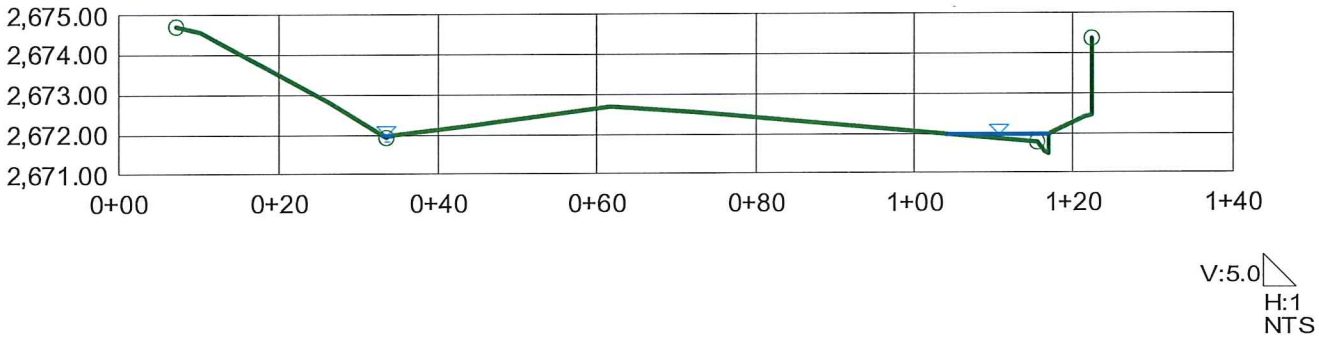
Skye Canyon Drive North - Existing Conditions (10-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+17	2,671.99
1+21	2,672.43
1+22	2,672.48
1+22	2,674.39

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Existing Conditions
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.015	
Channel Slope	0.010900	ft/ft
Water Surface Elev	2,671.97	ft
Elevation Range	71.49 to 2,674.72	
Discharge	4.00	cfs



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Skye Canyon North - Existing Conditions (100-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Existing Conditions
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	010900	ft/ft
Discharge	11.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.015	
Water Surface Elev	2,672.08	ft
Elevation Range	71.49 to 2,674.72	
Flow Area	3.7	ft²
Wetted Perimeter	25.69	ft
Top Width	25.30	ft
Actual Depth	0.59	ft
Critical Elevation	2,672.12	ft
Critical Slope	0.005777	ft/ft
Velocity	2.94	ft/s
Velocity Head	0.13	ft
Specific Energy	2,672.21	ft
Froude Number	1.35	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+07	0+34	0.027
0+34	1+15	0.016
1+15	1+22	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+07	2,674.72
0+10	2,674.56
0+27	2,672.79
0+34	2,671.92
0+34	2,671.96
0+44	2,672.23
0+62	2,672.70
0+72	2,672.55
1+15	2,671.77
1+16	2,671.55
1+17	2,671.49

Skye Canyon North - Existing Conditions (100-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+17	2,671.99
1+21	2,672.43
1+22	2,672.48
1+22	2,674.39

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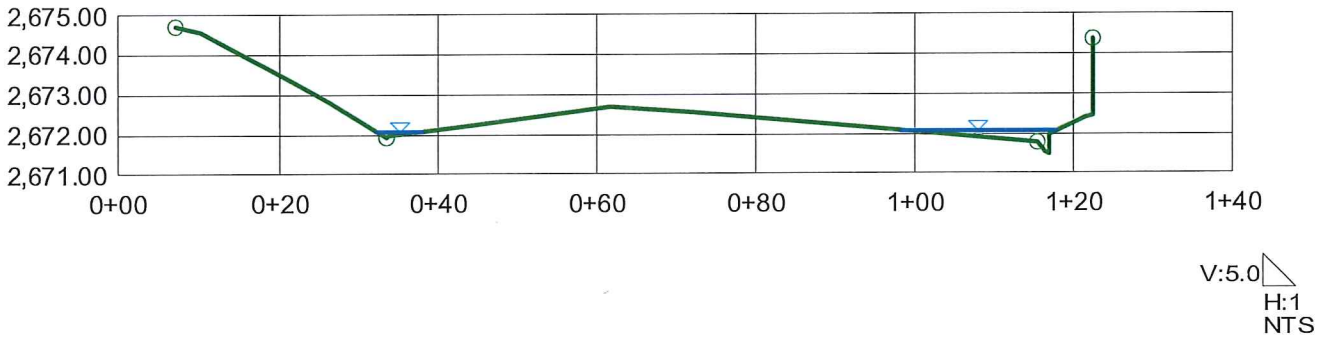
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Existing Conditions
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.015	
Channel Slope	0.010900	ft/ft
Water Surface Elev	2,672.08	ft
Elevation Range	71.49 to 2,674.72	
Discharge	11.00	cfs



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Skye Canyon North - Proposed Conditions (10-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Proposed Conditio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	010900	ft/ft
Discharge	4.00	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.015	
Water Surface Elev	2,671.94	ft
Elevation Range	71.49 to 2,674.72	
Flow Area	1.8	ft²
Wetted Perimeter	18.66	ft
Top Width	18.20	ft
Actual Depth	0.45	ft
Critical Elevation	2,671.96	ft
Critical Slope	0.007147	ft/ft
Velocity	2.19	ft/s
Velocity Head	0.07	ft
Specific Energy	2,672.01	ft
Froude Number	1.22	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+07	0+17	0.027
0+17	0+18	0.013
0+18	1+15	0.016
1+15	1+22	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+07	2,674.72
0+10	2,674.56
0+17	2,671.99
0+17	2,671.98
0+17	2,671.74
0+18	2,671.82
0+62	2,672.70
0+72	2,672.55
1+15	2,671.77
1+16	2,671.55

Skye Canyon North - Proposed Conditions (10-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+17	2,671.49
1+17	2,671.99
1+21	2,672.43
1+22	2,672.48
1+22	2,674.39

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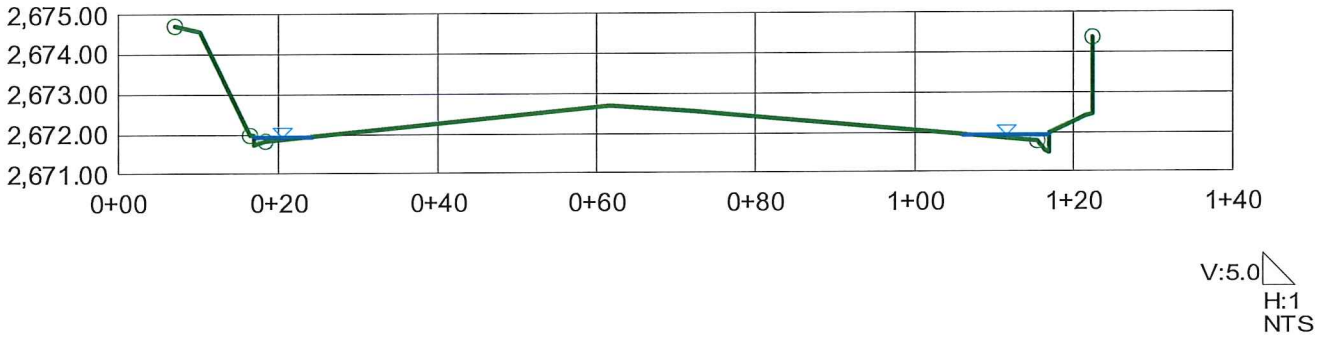
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Proposed Conditio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.015	
Channel Slope	0.010900	ft/ft
Water Surface Elev	2,671.94	ft
Elevation Range	71.49 to 2,674.72	
Discharge	4.00	cfs



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Skye Canyon North - Proposed Conditions (100-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Proposed Conditior
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	010900	ft/ft
Discharge	11.00	cfs

Options	
Current Roughness Meth	›ved Lotter's Method
Open Channel Weighting	›ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.014	
Water Surface Elev	2,672.03	ft
Elevation Range	71.49 to 2,674.72	
Flow Area	3.8	ft²
Wetted Perimeter	28.75	ft
Top Width	28.22	ft
Actual Depth	0.54	ft
Critical Elevation	2,672.06	ft
Critical Slope	0.005514	ft/ft
Velocity	2.88	ft/s
Velocity Head	0.13	ft
Specific Energy	2,672.16	ft
Froude Number	1.38	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+07	0+17	0.027
0+17	0+18	0.013
0+18	1+15	0.016
1+15	1+22	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+07	2,674.72
0+10	2,674.56
0+17	2,671.99
0+17	2,671.98
0+17	2,671.74
0+18	2,671.82
0+62	2,672.70
0+72	2,672.55
1+15	2,671.77
1+16	2,671.55

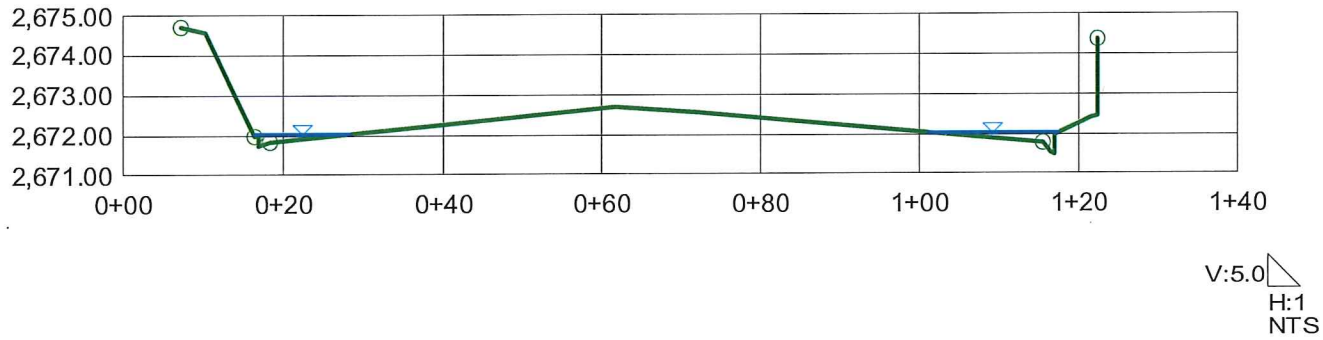
Skye Canyon North - Proposed Conditions (100-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+17	2,671.49
1+17	2,671.99
1+21	2,672.43
1+22	2,672.48
1+22	2,674.39

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon North - Proposed Conditior
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficiei	0.014	
Channel Slope	0.010900	ft/ft
Water Surface Elev	2,672.03	ft
Elevation Range	71.49 to 2,674.72	
Discharge	11.00	cfs



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Skye Canyon South - Existing Conditions (10-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Existing Condition:
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	008500	ft/ft
Discharge	24.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.016	
Water Surface Elev	2,670.36	ft
Elevation Range	69.89 to 2,673.72	
Flow Area	7.1	ft²
Wetted Perimeter	29.20	ft
Top Width	28.98	ft
Actual Depth	0.47	ft
Critical Elevation	2,670.41	ft
Critical Slope	0.005781	ft/ft
Velocity	3.40	ft/s
Velocity Head	0.18	ft
Specific Energy	2,670.54	ft
Froude Number	1.22	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+27	0+34	0.013
0+34	1+17	0.016
1+17	1+47	0.027

Natural Channel Points

Station (ft)	Elevation (ft)
0+27	2,672.68
0+27	2,670.56
0+33	2,670.56
0+33	2,670.06
0+34	2,669.89
0+63	2,670.39
0+89	2,670.80
1+02	2,670.52
1+17	2,670.37
1+36	2,672.80
1+38	2,673.17
1+45	2,673.65
1+47	2,673.72

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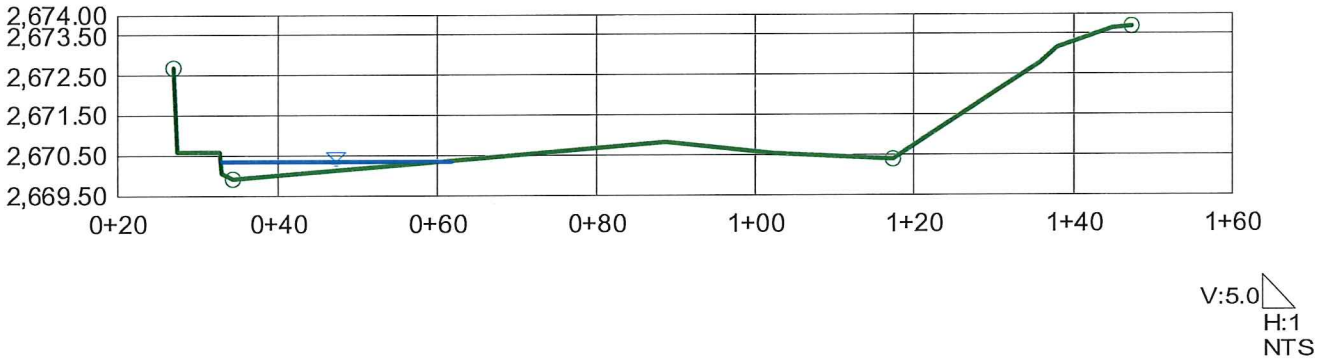
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Existing Condition:
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.016	
Channel Slope	0.008500	ft/ft
Water Surface Elev	2,670.36	ft
Elevation Range	39.89 to 2,673.72	
Discharge	24.00	cfs



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Skye Canyon South - Existing Conditions (100-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Existing Conditions
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	008500	ft/ft
Discharge	58.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.016	
Water Surface Elev	2,670.57	ft
Elevation Range	39.89 to 2,673.72	
Flow Area	16.6	ft²
Wetted Perimeter	66.69	ft
Top Width	66.31	ft
Actual Depth	0.68	ft
Critical Elevation	2,670.61	ft
Critical Slope	0.005459	ft/ft
Velocity	3.49	ft/s
Velocity Head	0.19	ft
Specific Energy	2,670.76	ft
Froude Number	1.23	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+27	0+34	0.013
0+34	1+17	0.016
1+17	1+47	0.027

Natural Channel Points

Station (ft)	Elevation (ft)
0+27	2,672.68
0+27	2,670.56
0+33	2,670.56
0+33	2,670.06
0+34	2,669.89
0+63	2,670.39
0+89	2,670.80
1+02	2,670.52
1+17	2,670.37
1+36	2,672.80
1+38	2,673.17

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Skye Canyon South - Existing Conditions (100-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+45	2,673.65
1+47	2,673.72

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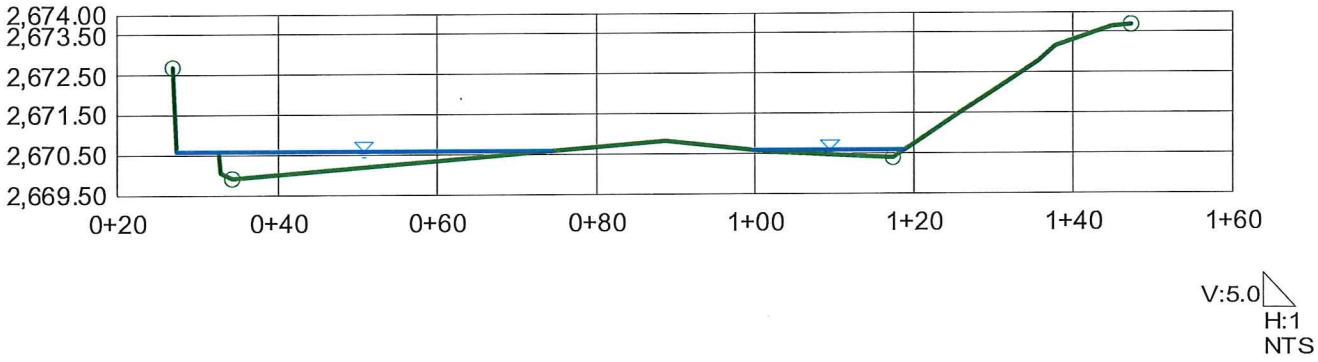
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Existing Conditions
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.016	
Channel Slope	0.008500	ft/ft
Water Surface Elev	2,670.57	ft
Elevation Range	69.89 to 2,673.72	
Discharge	58.00	cfs



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Skye Canyon South - Proposed Conditions (10-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Proposed Conditic
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	008500	ft/ft
Discharge	24.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.016	
Water Surface Elev	2,670.36	ft
Elevation Range	39.89 to 2,673.72	
Flow Area	7.1	ft²
Wetted Perimeter	29.20	ft
Top Width	28.98	ft
Actual Depth	0.47	ft
Critical Elevation	2,670.40	ft
Critical Slope	0.005609	ft/ft
Velocity	3.40	ft/s
Velocity Head	0.18	ft
Specific Energy	2,670.54	ft
Froude Number	1.22	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+27	0+34	0.013
0+34	1+30	0.016
1+30	1+32	0.013
1+32	1+47	0.027

Natural Channel Points

Station (ft)	Elevation (ft)
0+27	2,672.68
0+27	2,670.56
0+33	2,670.56
0+33	2,670.06
0+34	2,669.89
0+63	2,670.39
0+89	2,670.80
1+30	2,670.87
1+32	2,670.79
1+32	2,671.03
1+32	2,671.04
1+36	2,672.80
1+38	2,673.17

Skye Canyon South - Proposed Conditions (10-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+45	2,673.65
1+47	2,673.72

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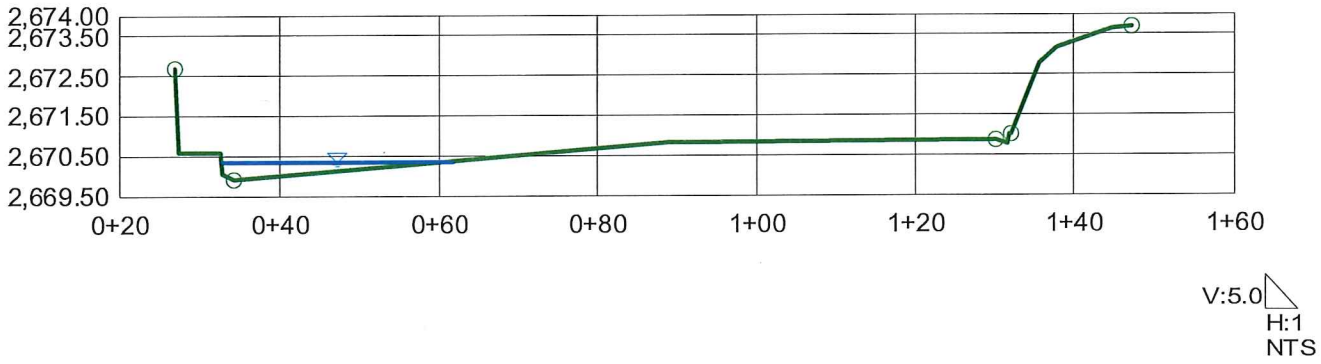
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Proposed Conditic
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.016	
Channel Slope	0.008500	ft/ft
Water Surface Elev	2,670.36	ft
Elevation Range	69.89 to 2,673.72	
Discharge	24.00	cfs



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Skye Canyon South - Proposed Conditions (100-year)
Worksheet for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Proposed Conditior
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Sl	008500	ft/ft
Discharge	58.00	cfs

Options	
Current Roughness Metho	oved Lotter's Method
Open Channel Weighting	oved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.016	
Water Surface Elev	2,670.56	ft
Elevation Range	39.89 to 2,673.72	
Flow Area	13.8	ft²
Wetted Perimeter	41.20	ft
Top Width	40.85	ft
Actual Depth	0.67	ft
Critical Elevation	2,670.63	ft
Critical Slope	0.005194	ft/ft
Velocity	4.20	ft/s
Velocity Head	0.27	ft
Specific Energy	2,670.83	ft
Froude Number	1.28	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+27	0+34	0.013
0+34	1+30	0.016
1+30	1+32	0.013
1+32	1+47	0.027

Natural Channel Points

Station (ft)	Elevation (ft)
0+27	2,672.68
0+27	2,670.56
0+33	2,670.56
0+33	2,670.06
0+34	2,669.89
0+63	2,670.39
0+89	2,670.80
1+30	2,670.87
1+32	2,670.79
1+32	2,671.03
1+32	2,671.04
1+36	2,672.80
1+38	2,673.17

Skye Canyon South - Proposed Conditions (100-year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+45	2,673.65
1+47	2,673.72

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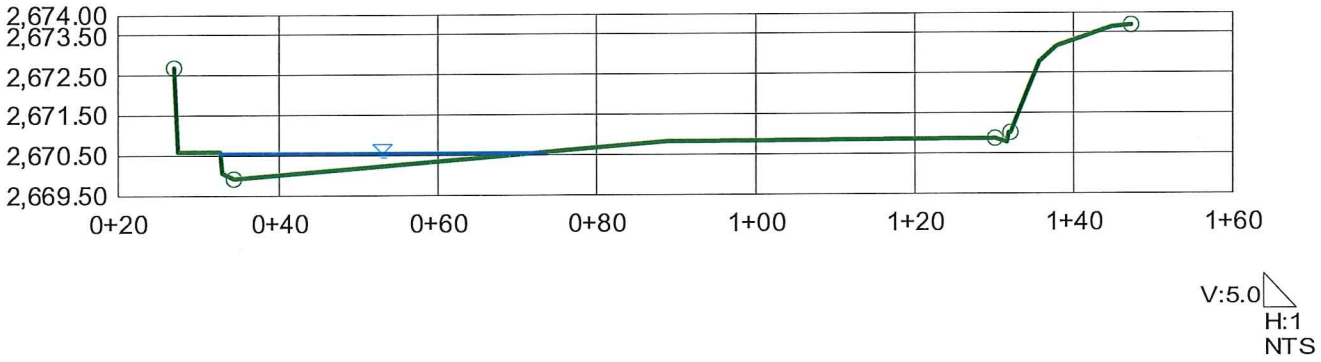
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Skye Canyon South - Proposed Condition
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.008500	ft/ft
Water Surface Elev	2,670.56	ft
Elevation Range	69.89 to 2,673.72	
Discharge	58.00	cfs



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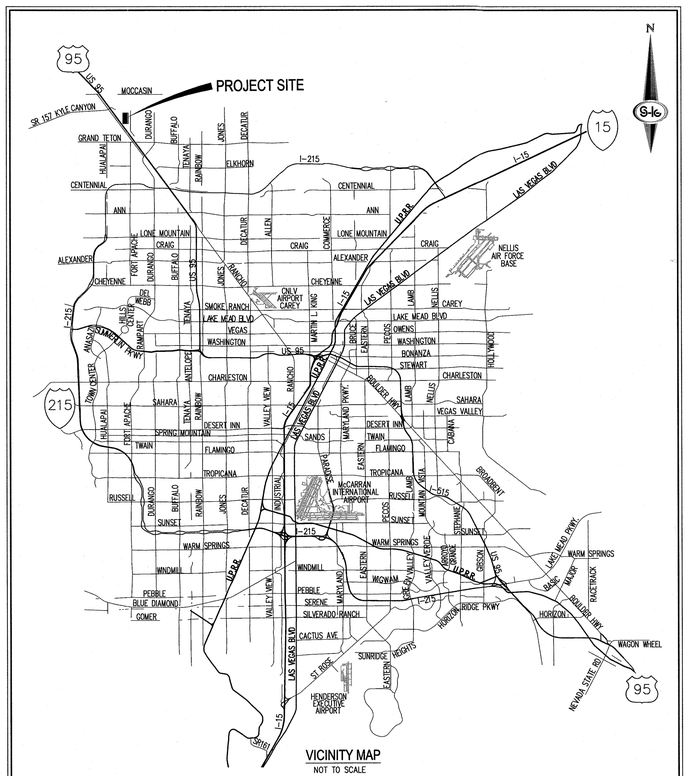
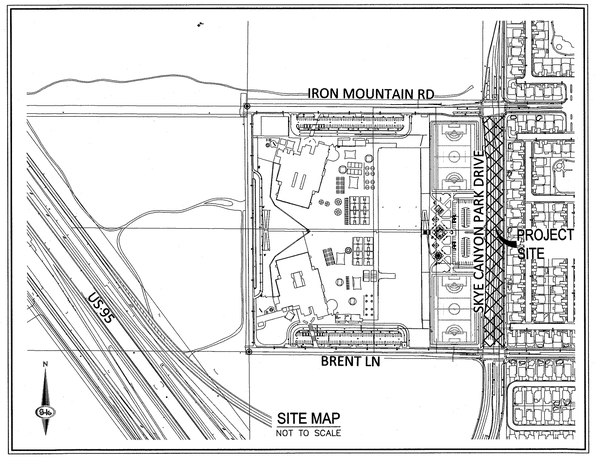
- **Appendix D** – Improvement Plans

- **Appendix E** – Electronic Copy of Study Update (CD)



IMPROVEMENT PLANS
FOR
SKYE CANYON PARK DRIVE

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION
APN: 125-07-501-004



SHEET INDEX

Sheet Number	Sheet Description	Sheet Title
1	C-1	COVER SHEET
2	C-2	NOTES SHEET I
3	C-3	NOTES SHEET II
4	PP-1	SKYE CANYON PARK DRIVE PLAN & PROFILE I
5	PP-2	SKYE CANYON PARK DRIVE PLAN & PROFILE II
6	PP-3	SKYE CANYON PARK DRIVE PLAN & PROFILE III
7	D-1	DETAIL SHEET

DEVIATIONS FROM STANDARDS

NONE

SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED FROM THE WEB SITE: HTTP://WWW.STATE.NV.US/BWPC/STORM01.HTM PROJECTS THAT DISTURB MORE THEN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILLING FEE.

APPROVALS

CITY ENGINEER--ALLEN PAVELKA PE, #9029 DATE

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED OF RIGHT-OF-WAY, AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIALLY LISTED UNDER DEVIATIONS FORM STANDARDS. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.

LAS VEGAS FIRE AND RESCUE DATE

CITY OF LAS VEGAS – DATE
PLANNING DEPARTMENT

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

CENTRAL TELEPHONE CO. DBA CENTURYLINK DATE

THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT No.: ADD FIELD FIRST APPROVED DATE:
LVVWD APPROVED FIRE FLOW ADD FIELD GPM AT 20 PSI RESIDUAL
SHEETS: ADD FIELD

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.

NV ENERGY DATE

NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

OWNER/DEVELOPER	ENGINEER
NINETY FIVE MANAGEMENT, LLC 11411 SOUTHERN HIGHLANDS PKWY SUITE 300 PH: 702-220-6565 FX: 702-220-6566 CONTACT: BOBBY WILLIAMSON	SLATER HANIFAN GROUP, INC. 5740 S. ARVILLE STREET, SUITE 216 LAS VEGAS, NV 89118 PH: (702) 284-5300 FX: (702) 284-5399 CONTACT: EFRAIM BALIZAN

BENCHMARK

RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. 8LV90 7N4 838.8366(m) 2752.08(ft)

BASIS OF BEARINGS

NORTH 89°39'07" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 87, PAGE 9 OF SURVEYS.

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (AREA OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN), PER THE FEMA FIRM PANELS 32003C1735E.
EFFECTIVE DATE: SEPTEMBER 27, 2002

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CALL BEFORE YOU DO OVERHEAD
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FAST
Call before you
UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

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Call 811
OR
1-800-227-2600

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

NINETY FIVE MANAGEMENT LLC

SKYE CANYON PARK DRIVE IMPROVEMENT PLANS

COVER SHEET

DATE: 2/07/18
DRAFTER: JMP
DESIGNER: EB
CHECKED: EB

PROJECT NO.
OLY1726.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
EFRAIM BALIZAN
Exp. 12/31/2018
CIVIL
No. 22644
2/7/18

C-1
SHEET 1 OF 7

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STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT ,MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

BENCHMARK

RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. 8LV90 7N4 838.8366(m) 2752.08(ft)

BASIS OF BEARINGS

NORTH 89°39'07" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NW PRIVATE CLAIMS #37 (NE 1/4A) IN THE NORTHEAST QUARTER (NE 1/4) OF SECTION 9, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 87, PAGE 9 OF SURVEYS.

2.2 CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT #_ADD FIELD_ (REVISED 01/09/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES. LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

    ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

IS NO LEAD COMPLIANCE NOTE:
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE USED.

GRADING NOTES

1. INDICATED GRADES OTHER THAN T.C., F.G. & GUTTER F.L. ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLANS WILL RESULT IN QUANTITY CHANGES.
3. CARE SHALL BE EXERCISED IN GRADING CORNER LOTS.
4. ROUGH PAD ELEVATIONS SHALL BE GRADED TO WITHIN 0.1' OF THE PAD ELEVATIONS SHOWN ON THE PLANS. WHEN GRADING IS COMPLETE PER THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE LOTS CAN BE INSPECTED. AT THAT TIME THE ENGINEER SHALL ALSO DECIDE IF ANY ADDITIONAL DITCHES OR BERMS ARE REQUIRED. THE CONTRACTOR IS REQUESTED NOT TO REMOVE ANY OF HIS ROUGH GRADING EQUIPMENT UNTIL HE RECEIVES GRADING APPROVAL FROM THE ENGINEER.
5. SOILS REPORT PREPARED BY ?????, PROJECT NO. ####.##, DATED ##/##/####.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325, FOR HYDRANT SPECIFICATIONS, AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S – **APPROVED PRODUCTS LIST** ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR ALL INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK [IFC 105.7.12]
4. ON ANT RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC 3310, 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC C102]
    - RESIDENTIAL- 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL- 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1,000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [IFC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT. FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE FLOW LINE TO FLOW LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW LINE TO FLOW LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THE DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FEET ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC 503.6 AND IFC APPENDIX M.

2.5 CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL	VERTICAL COMPACTION	
A. PAVEMENT AREA SUBGRADE	0.1'+	+0.0' TO -0.1'	SEE SOILS REPORT
B. ENGINEERED FILL	0.5'+	+0.1' TO -0.1'	SEE SOILS REPORT

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

UTILITY LOCATION NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: 1 (800) 227-2600; SOUTHWEST GAS CORPORATION: 702-400-1789 (STANDBY CONTACT NUMBER)

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE, AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON THESE PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY _ADD GEO_ REPORT #ADD FIELD_, _ADD FIELD_ APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOC

ABBREVIATIONS

AC	ASPHALTIC CONCRETE OR ACRE	FH	FIRE HYDRANT	PVC	POLYVINYL CHLORIDE
AGG	AGGREGATE BASE	FL	FLOWLINE	PVI	POINT OF VERTICAL INTERSECTION
APN	ASSESSORS PARCEL NUMBER	FT	FEET OR FOOT	QTY	QUANTITY
APPROX OR ~	APPROXIMATE	FUT	FUTURE	R	RADIUS
AVE	AVENUE	GRD	GRADE OR GROUND	RCA	REINFORCED CONCRETE ARCH
@	AT	GB	GRADE BREAK OR GRADE CHANGE	RCB	REINFORCED CONCRETE BOX
BC	BEGIN CURVE OR BACK OF CURB	GV	GATE VALVE	RCP	REINFORCED CONCRETE PIPE
BCR	BEGINNING OF CURB RETURN	HDPE	HIGH DENSITY POLYETHYLENE	RD	ROAD
BHW	BOTTOM OF HEADWALL	HOA	HOME OWNERS ASSOCIATION	ROWY ESMT	ROADWAY EASEMENT
BLDG	BUILDING	HORZ	HORIZONTAL	REQD	REQUIRED
BLVD	BOULEVARD	HP	HIGH POINT	REV	REVISION
BM	BENCHMARK	HWL	HIGH WATER LEVEL	RG	ROUGH GRADE
BVC	BEGIN VERTICAL CURVE	HDWL OR HW	HEADWALL	RT OR R	RIGHT
BWV	BACK WATER VALVE	HYD	HYDRAULIC OR HYDRANT	R/W, ROW	RIGHT OF WAY
CC	CLARK COUNTY	ID	INSIDE DIAMETER	S	SLOPE
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS	IN	INCH	SCH	SCHEDULE
CCPW	CLARK COUNTY PUBLIC WORKS	INT	INTERSECTION	SD	STORM DRAIN
CCRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT	INV	INVERT ELEVATION	SDDI	STORM DRAIN DROP INLET
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	IP	IRON PIPE	SDMH	STORM DRAIN MANHOLE
CE	COMMON ELEMENT	IRRG	IRRIGATION	SEC	SECTION
CL,C/L,C	CENTERLINE	LF	LINEAR FEET	SF	SQUARE FEET
CLR	CLEAR OR CLEARANCE	LP	LOW POINT	SHT	SHEET
CLSM	CONTROLLED LOW STRENGTH MATERIAL	LT OR L	LEFT	SNWA	SOUTHERN NEVADA WATER AUTHORITY
CLV	CITY OF LAS VEGAS	LVVWD	LAS VEGAS VALLEY WATER DISTRICT	SPECS	SPECIFICATIONS
CMU,MC	CEMENT MORTAR LINED AND COATED	LWL	LOW WATER LEVEL	ST	STREET
CMU	CONCRETE MASONRY UNIT	MAX	MAXIMUM	SSMH	SANITARY SEWER MANHOLE
CNLV	CITY OF NORTH LAS VEGAS	MECH	MECHANICAL	STA	STATION
COH	CITY OF HENDERSON	MH	MANHOLE	STD	STANDARD
CONC	CONCRETE	MIN	MINIMUM	STL	STEEL OR STREET LIGHT
CT	COURT	MISC	MISCELLANEOUS	SW	SIDEWALK
CY OR CU YD	CUBIC YARD	MUE	MUNICIPAL UTILITY EASEMENT	SWG	SOUTHWEST GAS
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	SWR OR SS	SANITARY SEWER
		NPC	NEVADA POWER COMPANY	SY	SQUARE YARD
DET	DETAIL	NTS	NOT TO SCALE	TAN	TANGENT
DI	DUCTILE IRON OR DRAIN INLET	NUE	NONEXCLUSIVE UTILITY EASEMENT	TC	TOP OF CURB
DIA, ø	DIAMETER	OC	ON CENTER	TF	TOP OF FLOOR OR TOP OF FOOTING
DIP	DUCTILE IRON PIPE	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	TG	TOP OF GRATE
DR	DRIVE	OFF	OFFSET	THRU	THROUGH
DWG(S)	DRAWING	ORIG	ORIGINAL	THW	TOP OF HEADWALL
DWY	DRIVEWAY	PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	TP	TOP OF PIPE
EA	EACH	PB	PULL BOX	TW	TOP OF WALL
ECR	END CURB RETURN	PC	POINT OF CURVE	TRW	TOP OF RETAINING WALL
EG	EXISTING GROUND	PCC	POINT OF COMPOUND CURVE	TSW	TOP OF SCREEN WALL
EL	ELEVATION	PDE	PUBLIC DRAINAGE EASEMENT	TYP	TYPICAL
ESMT	EASEMENT	P, E OR PL	PROPERTY LINE	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
EP	EDGE OF PAVEMENT	POB	POINT OF BEGINNING		
ERU	EQUIVALENT RESIDENTIAL UNIT	POC	POINT OF CURVATURE	VC	VERTICAL CURVE
EVC	END VERTICAL CURVE	PDE	POINT OF ENDING	VERT	VERTICAL
EX OR EXIST	EXISTING	PRC	POINT OF REVERSE CURVATURE	VG	VALLEY GUTTER
FC	FACE OF CURB	PRELIM	PRELIMINARY		WROUGHT IRON
FF	FINISHED FLOOR	PROP	PROPOSED	WL	WATER LINE
FG	FINISHED GRADE	PRV	PRESSURE REDUCING VALVE	WPZ	WATER PRESSURE ZONE
FGH	FINISHED GRADE, HIGH SIDE	PUE	PUBLIC UTILITY EASEMENT	WT	WEIGHT
FGL	FINISHED GRADE, LOW SIDE	PT	POINT OF TANGENT OR POINT	WTR	WATER LINE

SPECIAL NOTE

IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED WHICH IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CLARK COUNTY DEPT. OF PUBLIC WORKS. TEMPORARY CONSTRUCTION ITEMS INCLUDE: PAVEMENT TRANSITIONS, PROTECTIVE DITCHES AND BERMS, ROAD SIGNS AND BARRICADES, ETC.

NOTICE TO CONTRACTOR

-QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

-EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: (800) 227-2600

LEGEND

EXISTING	PROPOSED	DESCRIPTION
(1900)	1900	5' CONTOUR
		1' CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
EX 8" PVC SS	8" PVC SS	SANITARY SEWER PIPE AND FLOW ARROW
EX 8" PVC WTR	8" PVC WTR	WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
PAD= XXX.X FF = XXX.X	PAD= XXX.X FF = XXX.X	PAD ELEVATION FINISHED FLOOR ELEVATION
(00.00) TC	00.00 TC	ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE

	EXISTING GAS GATE VALVE
@MH	EXISTING UNKNOWN MANHOLE
GAS	EXISTING GAS, SIZE PER PLAN
	EXISTING POWER POLE
EXISTING TRAFFIC SIGNAL	EXISTING TRAFFIC SIGNAL
	EXISTING WALL
	WATER PIPE FITTING
POC	WATER POINT OF CONNECTION
POC	SEWER POINT OF CONNECTION
	DAYLIGHT LINE
	STREET CENTERLINE
	RIGHT-OF-WAY
	MATCHLINE
	BOUNDARY LINE
	PHASE LINE
	PROPERTY LINE
	FLOWLINE
	SAWCUT
FILL / CUT	CUT/FILL TRANSITION LINE
	SIDEWALK
	EX STRIPING TO BE OBLITERATED
	GRADE BREAK LINE
	REFLECTIVE RAISED PAVEMENT MARKERS
BWV	BACK WATER VALVE
	WROUGHT IRON FENCE
	PONY WALL
	DECORATIVE PERIMETER WALL
	DECORATIVE PERIMETER RETAINING WALL
	PROPOSED CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
	EXISTING CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
	FUTURE CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB

	PROPOSED SCARP AREA
	DRIVEWAY
	PROPOSED RIP RAP
	SIGHT VISIBILITY ZONE PER STD DWG NO. 201.2
	HANDICAP RAMP

QUANTITIES

		PRIVATE		PUBLIC
DRAINAGE				
1.	60" TYPE III STORM DRAIN MANHOLE	EA	–	–
2.	5.0' TYPE "CM2" DROP INLET	EA	–	–
3.	10.0' TYPE "CM2" DROP INLET	EA	–	–
4.	12.5' TYPE "CM2" DROP INLET	EA	–	–
5.	20.0' TYPE "CM2" DROP INLET	EA	–	–
6.	18" RCP CLASS IV STORM DRAIN	LF	–	–
7.	24" RCP CLASS IV STORM DRAIN	LF	–	–
8.	30" RCP CLASS IV STORM DRAIN	LF	–	–
9.	36" RCP CLASS IV STORM DRAIN	LF	–	–
10.	RIPRAP D50=8", THK=16"	SF	–	–
11.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	–	–
12.	SIDEWALK UNDER DRAIN	SF	–	–
13.				
SEWER SYSTEM				
1.	4" PVC SEWER LATERAL (PRIVATE)	LF	–	–
2.	8" PVC SEWER PIPE (PUBLIC)	LF	–	–
3.	STANDARD 48" SEWER MANHOLE (PUBLIC)	EA	–	–
4.	8" SEWER PIPE CAP	EA	–	–
5.	BACK WATER VALVE	EA	–	–
6.	8" C-900 WATER QUALITY SEWER PIPE (PUBLIC)	EA	–	–
7.				
WATER SYSTEM				
1.	FIRE HYDRANT ASSEMBLY W/6" GATE VALVE PER UDACS PLATE NO. 40	EA	–	–
2.	6" PVC WATER PIPE (CLASS 150)	LF	–	–
3.	8" PVC WATER PIPE (CLASS 150)	LF	–	–
4.	8" DIP WATER PIPE (CLASS 53)	LF	–	–
5.	8" GATE VALVE WITH VALVE BOX PER UDACS PLATE NO. 30 & 39	EA	–	–
6.	8" X 6" TEE PER UDACS PLATE NO. 31	EA	–	–
7.	8" X 8" TEE PER UDACS PLATE NO. 31	EA	–	–
8.	8" 5 DEGREE BEND WITH RESTRAINED JOINTS	EA	–	–
9.	8" 11.25 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
10.	8" 22.5 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
11.	8" 45 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
12.	8" 90 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
13.	CAP AND 2" BLOW-OFF ASSEMBLY W/CAP PER UDACS PLATE NO. 36	EA	–	–
14.	1" COPPER SERVICE W/ 3/4" METER PER UDACS PLATE NO. 2	EA	–	–
15.	1" COPPER SERVICE W/ 1" METER PER UDACS PLATE NO. 4	EA	–	–
16.	1" COPPER SERVICE W/ 3/4" METER & 1" RPPA PER UDACS PLATE NO. 4 & 8	EA	–	–
		EA	–	
STREET IMPROVEMENTS				
1.	2" A.C. PAVEMENT W/ 4" TYPE II OVER 6" TYPE I AGGREGATE BASE	SY	–	–
2.	STANDARD 18" TYPE "L" ISLAND CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	–	–
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	–	–
4.	STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	–	–
5.	4' WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	–	–
6.				–
7.				
TRAFFIC SIGNALS				
1.	30" STOP SIGN WITH POST (R1-1)	EA	–	–
2.	9" STREET NAME SIGN (D-3, BROWN W/ WHITE LETTERS)(6 POLES x 2 PER POLE=12)	EA	–	–
3.	BLUE COLORED REFLECTIVE RAISED PAVEMENT MARKER	EA	–	–
4.	CROSSWALK MARKINGS	LF	–	–
5.				
6.				
7.				
8.				
DRY UTILITIES				
1.	100W H.P.S. LUMINAIRE STREET LIGHT W/DECORATIVE POLE	EA	–	–
2.	1-1/4" PVC STREET LIGHT CONDUIT WITH (2) #4 AND (1) #8 CONDUCTORS	LF	–	–
3.	NO. 3-1/2 PULL BOX W/METAL COVER	EA	–	–
4.	150 AMP SERVICE PEDESTAL (IRR)	EA	–	–
5.	200 AMP SERVICE PEDESTAL (STLT)	EA	–	–
6.				

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT No._____ FIRST APPROVED DATE:_____

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.

CITY OF LAS VEGAS, NEVADA

NINETY FIVE MANAGEMENT LLC
SKYE CANYON PARK DRIVE IMPROVEMENT PLANS
NOTES SHEET II

DATE: 2/07/18
DRAFTER: JMP
DESIGNER: EB
CHECKED: EB

PROJECT NO.
OLY1726.000

C-3
SHEET 3 OF 7

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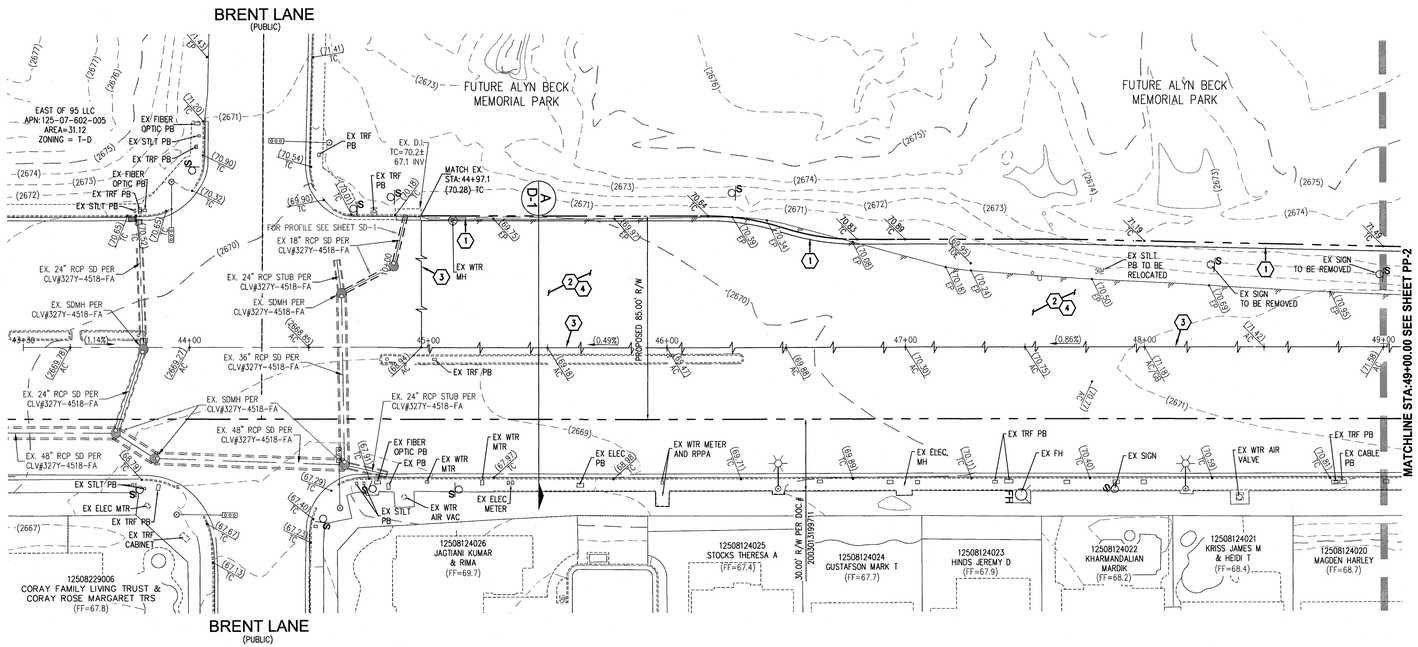
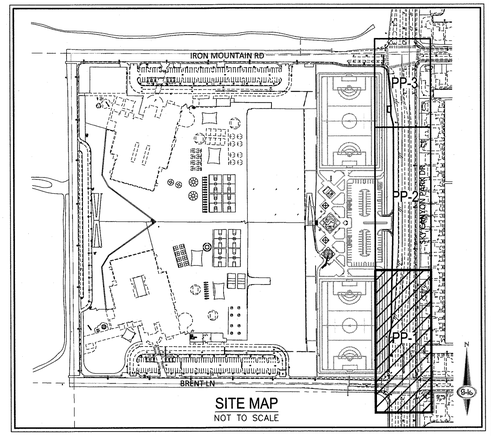


SKYE CANYON PARK DRIVE - PLAN VIEW
(PUBLIC)

SCALE – 1"=30' (0, 30, 60 FEET)



SITE MAP
NOT TO SCALE

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SURVEY NOTE
OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION.

DISCLAIMER NOTE
1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

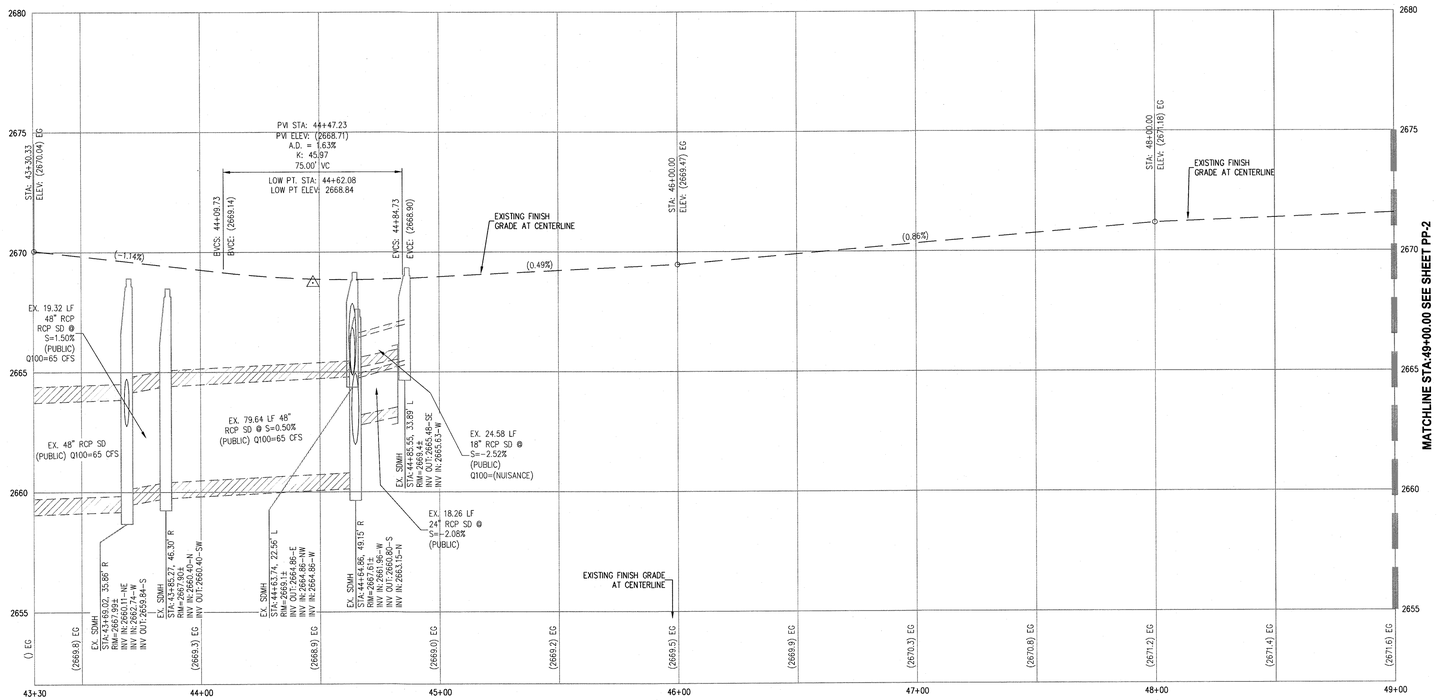
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES
(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FEMA FLOOD ZONE INFORMATION
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (AREA OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN), PER THE FEMA FIRM PANELS 32003C1735E.
EFFECTIVE DATE: SEPTEMBER 27, 2002

GRADING NOTES
1. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD #216
2. INSTALL 4" ASPHALT PAVEMENT OVER 6" TYPE II AGGREGATE BASE
3. SAWCUT AND MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 500.1 & 500.2
4. REMOVE AND REPLACE EXISTING PAVEMENT

GRADING NOTES
1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.



SKYE CANYON PARK DRIVE - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'

BENCHMARK
RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. 8LV90 7N4 838.8366(m) 2752.08(ft)

BASIS OF BEARINGS
NORTH 89°39'07" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 87, PAGE 9 OF SURVEYS.

FLOOD CERTIFICATION
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XXXXXX ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

Not Approved.

EFRAIM BALIZAN, P.E. 22644 — DATE

FAST — Call before you UnderGround 1-702-432-5300 FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

Call before you Dig — AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO. | DESCRIPTION | DATE | BY | APP.

CITY OF LAS VEGAS, NEVADA

NINETY FIVE MANAGEMENT LLC

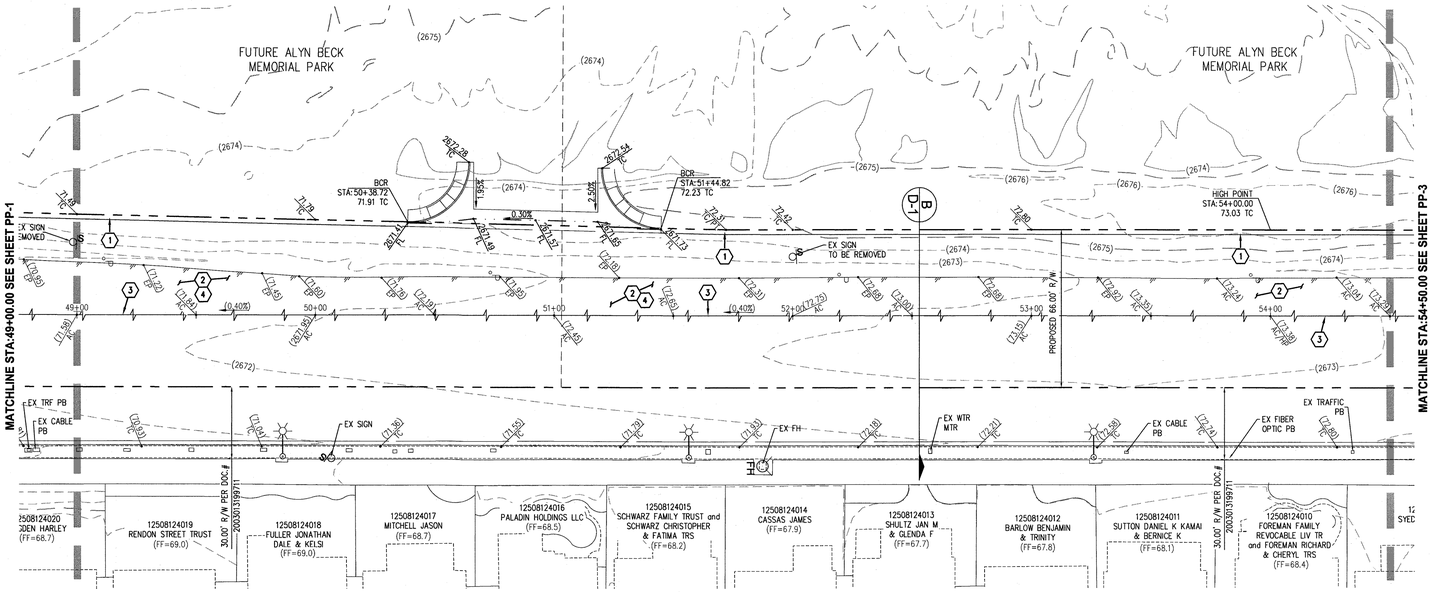
SKYE CANYON PARK DRIVE IMPROVEMENT PLANS
SKYE CANYON PARK DRIVE PLAN & PROFILE I
STA:43+00.00 TO 49+00.00

DATE: 2/07/18
DRAFTER: JMP
DESIGNER: EB
CHECKED: EB
PROJECT NO. OLY1726.000

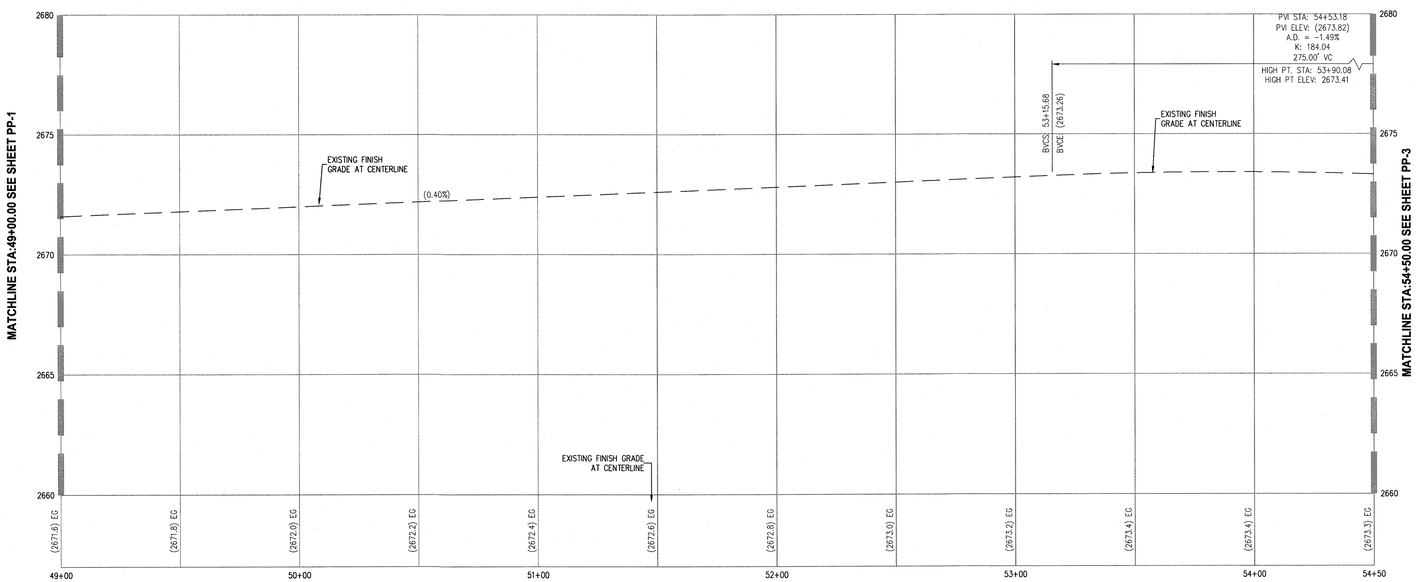
PROFESSIONAL ENGINEER - STATE OF NEVADA — EFRAIM BALIZAN — Exp. 12/31/2018 — CIVIL — No. 22644 — 2/7/18

PP-1
SHEET 4 OF 7

I:\oly1726.000 skye canyon dr\e_bal\ dwg\cad\plan\oly1726.000 pp1.dwg, 2/7/2018 1:52 PM, Jimmy Pippin

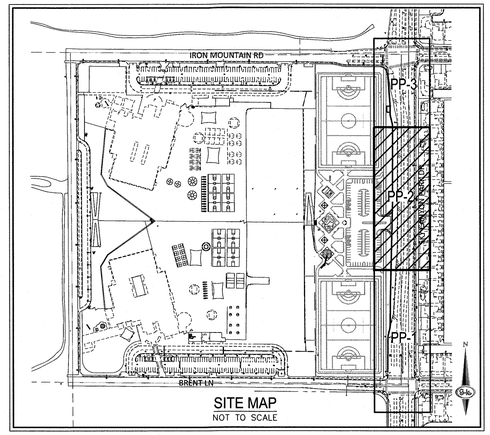


SKYE CANYON PARK DRIVE - PLAN VIEW
(PUBLIC)



SKYE CANYON PARK DRIVE - PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 3'

0 30 60
SCALE - 1"=30' FEET



SITE MAP
NOT TO SCALE

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SURVEY NOTE

OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION.

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (AREA OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN), PER THE FEMA FIRM PANELS 32003C1735E. EFFECTIVE DATE: SEPTEMBER 27, 2002

GRADING NOTES

1. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD #216
2. INSTALL 4" ASPHALT PAVEMENT OVER 6" TYPE II AGGREGATE BASE
3. SAWCUT AND MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 500.1 & 500.2
4. REMOVE AND REPLACE EXISTING PAVEMENT

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEEING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

BENCHMARK

RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. 8LV90 7N4 838.8366(m) 2752.08(ft)

BASIS OF BEARINGS

NORTH 89°39'07" WEST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 87, PAGE 9 OF SURVEYS.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XXXXXX ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

Not Approved.

EFRAIM BALIZAN, P.E. 22644 DATE

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

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OR
1-800-227-2600

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.

CITY OF LAS VEGAS, NEVADA

NINETY FIVE MANAGEMENT LLC

SKYE CANYON PARK DRIVE IMPROVEMENT PLANS
SKYE CANYON PARK DRIVE PLAN & PROFILE II
STA:49+00.00 TO 54+50.00

DATE: 2/07/18
DRAFTER: JMP
DESIGNER: EB
CHECKED: EB
PROJECT NO.
OLY1726.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
EFRAIM BALIZAN
Exp. 12/31/2018
CIVIL
No. 22644
2/7/18

PP-2
SHEET 5 OF 7

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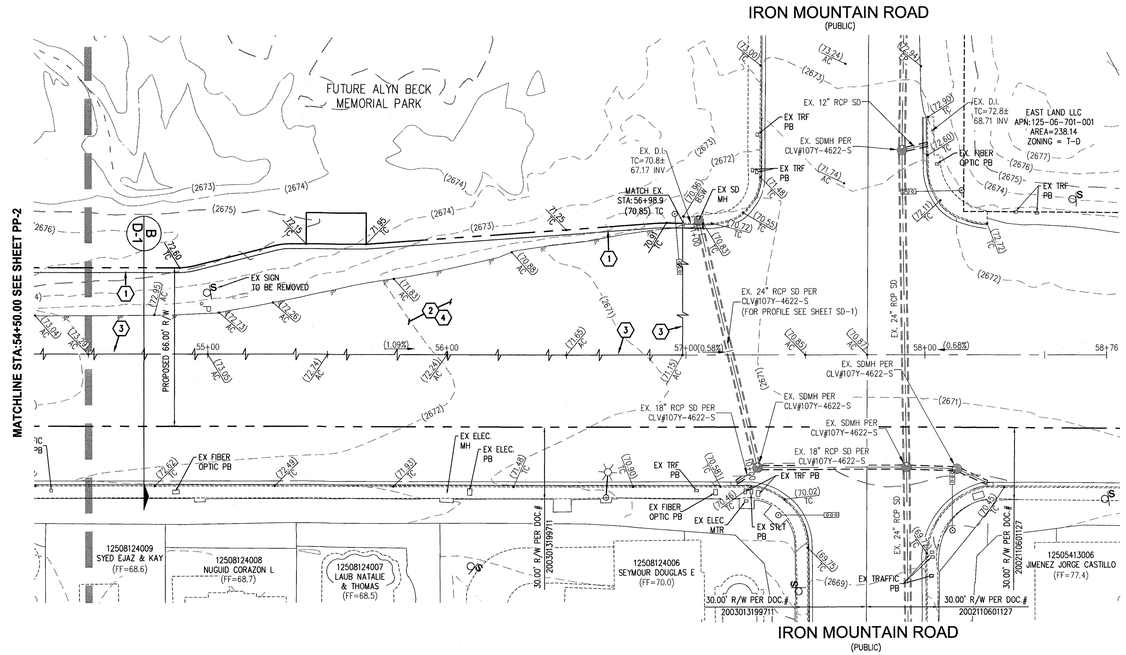
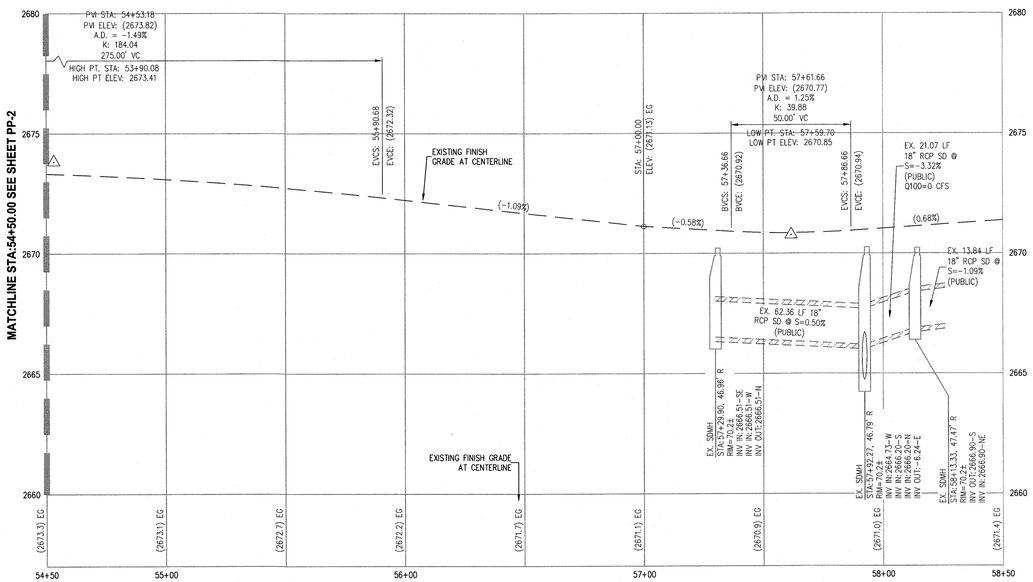


SKYE CANYON PARK DRIVE - PLAN VIEW
(PUBLIC)



SKYE CANYON PARK DRIVE - PROFILE VIEW
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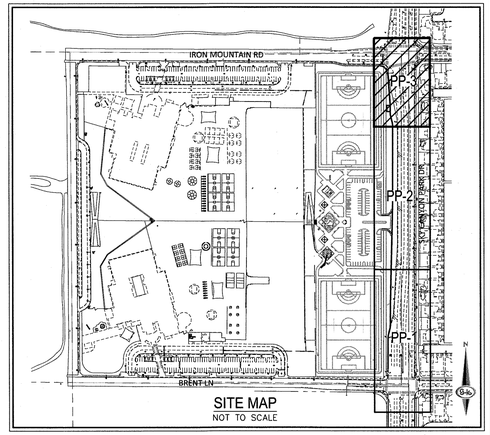

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FEMA FLOOD ZONE INFORMATION

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EFFECTIVE DATE: SEPTEMBER 27, 2002

GRADING NOTES

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3. SAWCUT AND MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 500.1 & 500.2
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BENCHMARK

RIVET & PLATE IN TOP OF HEADWALL SE CORNER OF IRON MOUNTAIN AND GRAND CANYON. 8LV90 7N4 838.8366(m) 2752.08(ft)

BASIS OF BEARINGS

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FLOOD CERTIFICATION

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EFRAIM BALIZAN, P.E. 22644 — Not Approved — DATE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.

CITY OF LAS VEGAS, NEVADA

NINETY FIVE MANAGEMENT LLC

SKYE CANYON PARK DRIVE IMPROVEMENT PLANS
SKYE CANYON PARK DRIVE PLAN & PROFILE III
STA:54+50.00 TO 58+50.00

DATE: 2/07/18
DRAFTER: JMP
DESIGNER: EB
CHECKED: EB

PROJECT NO.
OLY1726.000

PROFESSIONAL ENGINEER — STATE OF NEVADA — EFRAIM BALIZAN — Exp. 12/31/2018 — CIVIL — No. 22644 — 2/7/18

PP-3
SHEET 6 OF 7

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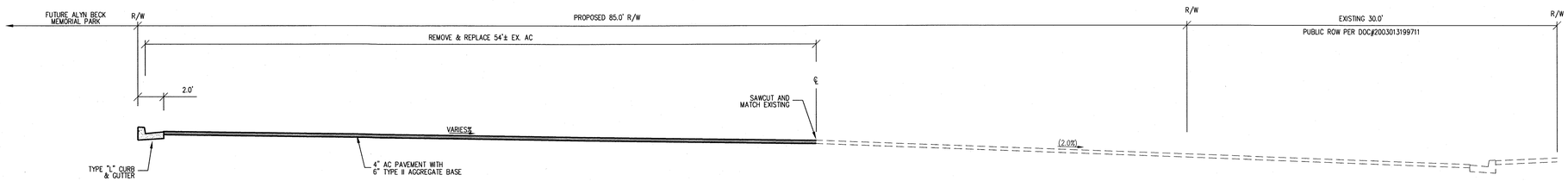
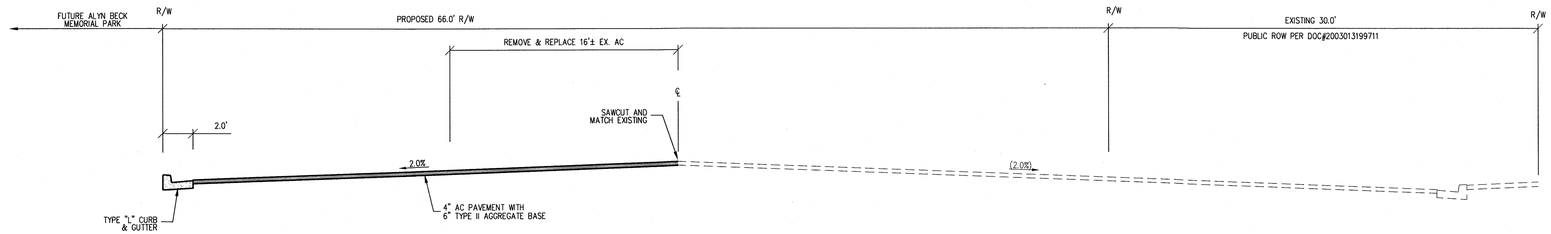


A **SKYE CANYON PARK DRIVE**

115.0' PUBLIC STREET SECTION

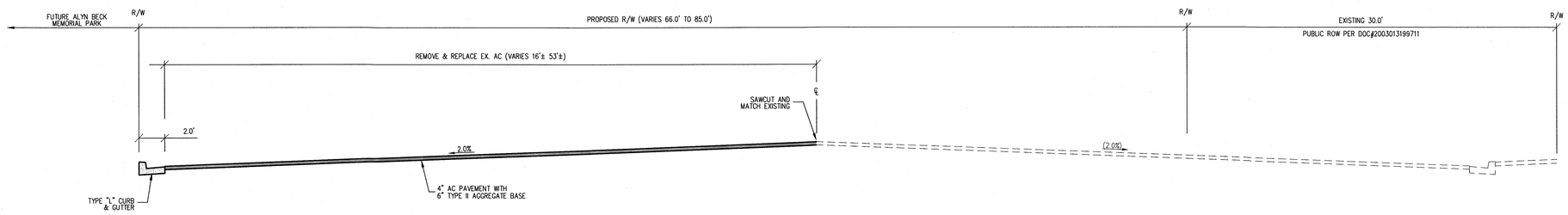
NOT TO SCALE



B **SKYE CANYON PARK DRIVE**

96.0' PUBLIC STREET SECTION

NOT TO SCALE



C **SKYE CANYON PARK DRIVE**

115.0' PUBLIC STREET SECTION

NOT TO SCALE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

NINETY FIVE MANAGEMENT LLC

SKYE CANYON PARK DRIVE IMPROVEMENT PLANS

DETAIL SHEET

DATE: 2/07/18

DRAFTER: JMP

DESIGNER: EB

CHECKED: EB

PROJECT NO.
OLY1726.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
EFRAIM BALIZAN
Exp. 12/31/2018
CIVIL
No. 22644
2/7/18

D-1

SHEET 7 OF 7

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