

DS #: 4854

APN: 124-23-000-001

PROJECT: 3090 Zone North Interim Trak

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: January 3, 2017		
TO: Land Development Services Department of Building & Safety			FROM: Albert Sung, P.E.  Flood Control Project Engineer Department of Public Works		
SUBJECT: Drainage Study for: 3090 Zone North Interim Tank			COPIES TO: Slater Hanifan Group Ninety-Five Management, LLC Bart Anderson, P.E., DevCo		
Cross Streets:	NWC of Centennial Parkway and Puli Road				
File Number:	F:\Depot\DSMemos\DS4854A.doc				
Parcel Number:	126-23-000-001				
Zoning Action:	SDR-xxxxx				
FEMA Flood Zone	YES	NO			
Proposed Storm Drain	YES	NO	X		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	12/15/2016	01/03/2017	See Comments Below	\$400.00	467949: \$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. The proposed water reservoir outfall/discharge pipe is not connected to the permanent storm drain facility. Please connect the outfall pipe to the existing storm drain facility in Centennial Parkway at Puli Road alignment.
2. Please coordinate with Greg McDermott with City of Las Vegas Roadway Planning Department at 702-229-2143 regarding the location of the reservoir and outfall pipe.

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

ays

T/R/S: T19S/R59E/23

AREA F-23



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. <u>E. R.</u> 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	
X		(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.
X		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.)

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
X		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.
X		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.
X		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 publicROW.

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.
X		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.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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.

TRANSMITTAL

To: Albert Sung, P.E. **Date:** December 15, 2016
City of Las Vegas **Project No.:** OLY1606-000
333 N. Rancho Drive
Las Vegas, NV 89106

From: Jonathan Rocha, E.I.

Subject: Technical Drainage Study for 3090 Zone North Interim Tank (HTE#16-49921)

CC: Fred Retzlaff, SHG **CC:** Steve Jones, SHG
CC: David Haile, SHG **CC:** Mark Failla, SHG
CC: Jerry Slater, SHG **CC:** Chelsea Jensen, SHG

Transmitting Via:

- ☐ Mail
☒ Messenger / MDS
☐ Federal Express
☐ Pickup

For:

- ☒ Review & Comment
☐ Per your Request
☐ Information/File

Acknowledgement of Receipt:

- ☐ Not Required
☒ Acknowledgement Required
Received By: _____
Date: _____ Time: _____

Copies	Description
<u>1</u>	<u>Subject Study</u>
<u>1</u>	<u>Stamped and Signed Standard Form 1</u>
<u>1</u>	<u>\$400 Submittal Fee (Check)</u>
<u>1</u>	<u>CD containing PDF of submittal documents</u>

Comments:

Please contact us if there are any questions at 702-284-5300. Thanks.

Signed: _____
Jonathan Rocha, E.I.
Flood Control Division

Please, notify us at (702) 284-5300 if there are any problems receiving this transmission.



Department of Public Works

500 S Grand Central Pky • Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

Denis Cederburg, P.E., Director • E-Mail: dlc@ClarkCountyNV.gov

Drainage Study Approval Letter

Date: December 7, 2016
Firm: Slater Hanifan Group
Engineer: Fred Retzlaff, P.E.
Address: 5740 South Arville, # 216, Las Vegas, NV 89118
Phone: (702) 284-5300
Fax: (702) 284-5399
E-mail: fretzlaff@shg-inc.com

Subject: Technical Drainage Study for 3090 Zone North Interim Tank
Location: NWC West Centennial Parkway and North Shaumber Road
APN: 126-23-000-001
Sec, Township, Range: S23, T19S, R59E
Flood Zone & Panel: Zone X (and Zone A), 1750E, Dated September 27, 2002
Application Number: 16-49921

Submittals	Date Received	Date Returned	Reviewer	Miscellaneous
Technical	11/04/2016	12/07/2016	PR	

Concurrence Required: (Must be obtained prior to permit issuance)		Reason Concurrence is Required
	Boulder City	Adjacent to or Impacts Jurisdiction
	City of Mesquite	Adjacent to or Impacts Jurisdiction
	City of Henderson	Adjacent to or Impacts Jurisdiction
X	City of Las Vegas	Adjacent to or Impacts Jurisdiction
	City of North Las Vegas	Adjacent to or Impacts Jurisdiction
	Nevada Department of Transportation	Adjacent to or Impacts NDOT Facility
	Union Pacific Rail Road	Adjacent to or Impacts a UPRR Facility
	US Army Corps of Engineers	Impacts a USACE Facility
X	Clark County Regional Flood Control District	Regional Significance, Adjacent to or Impacts CCRFCD MPU Facility or in a SFHA

The referenced **Technical Drainage Study** has been reviewed and is accepted as complying with minimum improvement standards. As set forth in the subject drainage study, the following measures will be taken to mitigate flood hazards.

The site shall be graded with respect to drainage as shown on "**3090 Zone North Interim Tank**", grading plan sheets G1, G3, C1 and CD1, signed and sealed by David B. Haile, P.E., on November 3, 2016.

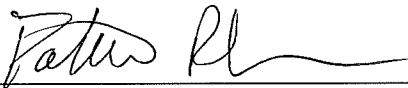
Check appropriate conditions

	Retaining/screen wall combination may be in excess of current Clark County Unified Development Code, Chapter 30.64.050.
	A FEMA Elevation Certificate, completed by a licensed surveyor, must be submitted to and approved by CCPW Development Review Plan Check prior to the issuance of Certificates of Occupancy for those structures.
X	Mylars of the grading plan must be submitted to the CCPW Development Review Plan Check for approval signatures prior to map recordation (residential) or permit issuance (commercial).
	An administrative variance to allow the finished floor elevation(s) to be set below the current Clark County criteria must be approved. The finished floor variance must be submitted to CCPW Development Review front counter after drainage study approval and prior to offsite final review.
X	The grading plan will be reviewed by the Building Office Operations Division to ensure compliance with the ADA access requirements. Revisions to the grading plan may be required if the site accessibility design does not comply with the requirements set forth in the Accessibility Chapter of the Clark County Building Code.
	The plans show work is proposed on another property. Notarized written permission must be obtained prior to plan approval. A grading permit must be obtained from Building Dept prior to grading.
X	Right-of-way dedication must be verified.
	Any previously approved drainage easements that are not being used must be vacated.
	Per <i>Regional Flood Control District policies and Procedures manual, Section VIII. D. 13. Uniform Regulations for the Control of Drainage</i> , the Engineer of Record shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have regional flood control significance.
	Structural calculations are required. The structural calculations, plans, and details must be approved prior to "Offsite" submittal and prior to CCRFCD submittal, if applicable.
X	Plan revisions can be found on the red-lined plans and must be addressed.
	Prepare drainage easement documents as shown on the grading plans.

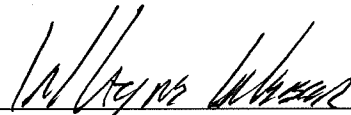
Additional Conditions:

1. While the vicinity map shows the tank location offset from the east property line of parcel 126-23-000-001, no specific dimensions are provided to what is assumed to be a BLM easement line, currently labeled as "Property Line" on the grading plan. Exhibit E shows the existing Gowan Channel approximately 380 feet from the project site; provide that information and the distance to the east property line on the grading plan.
2. Any improvements not depicted on the above mentioned grading plans may require an Update to this Technical Drainage Study.

The County's review is solely based on the information submitted by the Engineer of Record. The County's review is strictly limited to compliance with minimum County Codes and Standards. The Engineer of Record is responsible for researching and addressing situations that may require designs above and beyond the minimum codes for issues of public safety and impacts to upstream, downstream and adjacent properties. The County assumes no liability for information data, designs or conclusions of the Engineer of Record.



Patrick Robinson, P.E.
Associate Engineer
Development Review
Patrick.Robinson@ClarkCountyNV.gov



W. Layne Weber, P.E., CFM
Principal Engineer
Development Review
wlweber@ClarkCountyNV.gov

TECHNICAL DRAINAGE STUDY

3090 Zone North Interim Tank

Unincorporated Clark County, Nevada

Job No.: OLY1606.000

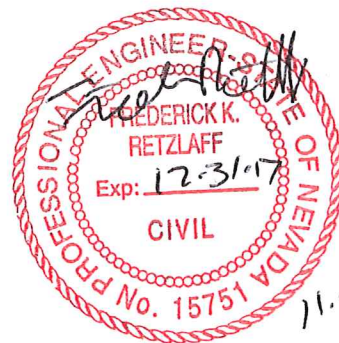
Date: November 2016

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



Fred Retzlaff, P.E.
NV Professional Engineer No. 15751

Assisted by: Jonathan S Rocha, E.I.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: 3090 Zone North Interim Tank Date: November 2016
 Location of Development: a) Descriptive (Cross Streets): North/South: Shaumber Road
East/West: Centennial Parkway
 b) Section: 23 Township: 19 South Range: 59 East
 c) APN: Portion of 126-23-000-001

Name of Owner: Ninety-Five Management, LLC
 Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com
 Address: 11411 Southern Highlands Parkway, Suite 300 Las Vegas NV 89141

Contact Person – Name: Fred Retzlaff, P.E. Telephone No.: (702) 284-5300
 *E-mail Address: fretzlaff@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	☐ Subdivision 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 Acres Being Developed/Disturbed: +/- 3 Acres

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.): Reservoir

5. Approximate upstream land area which drains to the subject site: +/- 6 Acres

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

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Southeast of site towards undeveloped land.

8. Briefly describe your proposed schedule for the subject project: 1 Phase, ASAP.



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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: 3090 Zone North Interim Tank		Map ID:	
Firm Name: Slater Hanifan Group		Engineer: Fred Retzlaff, P.E.	
Address: 5740 S. Arville #216			
City: Las Vegas		State: NV	Zip: 89118
Phone Number: (702) 284-5300		Fax Number: (702) 284-5399	
Property Owner: Olympia Companies, LLC			
Address: 11411 Southern Highlands Parkway, Suite 300			
City: Las Vegas		State: NV	Zip: 89141
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	
☒	☐	Design Manual Standard Form 1 with the engineer's seal and signature.
☒	☐	Design Manual Standard Form 4 .
☒	☐	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	
☒	☐	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
☒	☐	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
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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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.
-	N/A	Right-of-way lines and widths, existing and proposed.
X	-	Existing improvements and their elevations.
X	-	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.
X	-	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
-	N/A	Location and cross-section of street capacity calculations.
X	-	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.
X	-	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.
X	-	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.
X	-	Building and/or lot numbers.
X	-	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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>-</u>	<u>N/A</u>	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.
<u>-</u>	<u>N/A</u>	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.
<u>-</u>	<u>N/A</u>	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
<u>-</u>	<u>N/A</u>	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
<u>-</u>	<u>N/A</u>	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
<u>-</u>	<u>N/A</u>	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. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
<u>-</u>	<u>N/A</u>	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.
<u>X</u>	<u>-</u>	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
<u>-</u>	<u>N/A</u>	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.
<u>-</u>	<u>N/A</u>	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.
<u>-</u>	<u>N/A</u>	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.
<u>-</u>	<u>N/A</u>	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
<u>-</u>	<u>N/A</u>	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.
<u>X</u>	<u>-</u>	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
<u>-</u>	<u>N/A</u>	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2



Department of Public Works

Development Review Division

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(702) 455-4600 | Fax (702) 388-2550
www.ClarkCountyNV.gov/PubWorks

Drainage Study Submittal Sheet

(Each Submittal must have a separate sheet and check)

HTE # _____

Date Submitted: November 2016

Previous HTE Number _____

Type of Submittal: ☒ Initial ☐ Addendum ☐ Supplement

Number of Acres: ☐ up to 5 acres ☒ up to 40 acres ☐ up to 320 acres ☐ over 320 acres

Project Name: 3090 Zone North Interim Tank

Assessor's Parcel Numbers (APN's): Portion of 126-23-000-001 (BLM Grant N-61413/A)

Street Location: East/West Centennial Parkway North/South Shaumber Road

Land Use Applications: _____

Project Type: (Check any that apply)

☐ Update ☐ List previous Tracking Number _____

☐ Concurrence Review

☐ Grading Plan Review

☐ Structural Review

Engineering Firm/Responsible Engineer Slater Hanifan Group/Fred Retzlaff, P.E.

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Owner/Developer Ninety-Five Management, LLC

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Fax number (702) 285-5300

City/State/Zip Las Vegas, NV 89141

E-mail Address (Required) mbolduc@olympiacompanies.com

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- Exhibit C1 – CCRFCD 2013 MPU Facilities Map
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- Exhibit E – Existing Condition Drainage Map
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- Curve Number and Soils Data
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1 INTRODUCTION

1.1 Project Overview & Study Purpose

Ninety-Five Management, LLC is proposing a reservoir, identified as *3090 Zone North Interim Tank*, (hereafter referred to as the project site or 3090 Tank) within unincorporated Clark County, Nevada. The total area of the easement on BLM land is less than 10 acres and proposed development is approximately 3 acres in area, and located west of the intersection of Shaumber Road and Centennial Parkway. The proposed improvements include a reservoir, surrounding block wall and entry access road.

The purpose of this study is to provide a detailed hydrologic and hydraulic analysis for the project site in order to protect the property from onsite and offsite runoff in accordance with local drainage criteria as well as to support the finished floor elevation design of the proposed water tank. This study will also provide an inventory of the existing storm water facilities in the vicinity as well as provide recommendations for site specific facilities necessary to control runoff impacting the Project Site. This study is an accompaniment to the civil improvement plans for the project.

The project consists of construction of a water storage tank along with an onsite paved entry road, a road around the tank, and other ancillary facilities. The following is a summary of proposed improvements with this project:

- Site grading
- Water tank with its appurtenances
- Catchment area to be utilized for tank overflow
- Tank road, which encircles the water tank
- Access road from Centennial Parkway to the tank road
- Perimeter ditch and boundary screen wall

1.2 Site Description

The project is located within Township 19 South, Range 59 East and Section 23, within APN 126-23-000-001. The project is to be constructed on the north side of Centennial Parkway and west of Shaumber Road. A location map identifying the site in relation to major streets in the vicinity has been prepared as Exhibit A, included in Appendix A.

1.3 FEMA Flood Zone Designation

The project site boundary has been delineated on current FEMA FIRM Panel Map 32003C1750E, dated September 27, 2002, as Exhibit B included in Appendix A. Per the FIRM Panel, the project site is located within a FEMA designated unshaded Zone 'X', described as areas to be outside the 0.2% annual chance floodplain.

1.4 CCRFCD Facility Information

Figure F-12 from the 2013 Las Vegas Valley Flood Control Master Plan Update (2013 MPU, Reference 1) shows that the project site is just downstream of an existing CCRFCD MPU regional facility labeled as GOAN-0127. Exhibit C1, identifying the project site on the 2013 MPU facilities figure, has been included in Appendix A for reference.

Figure H-12 from the 2008 Las Vegas Valley Flood Control Master Plan Update (2008 MPU, Reference 1) shows that the project site is located within a Public Facility/Residential land use inside the drought ordinance boundary.

Exhibits C1 and C2 identify the project site on the CCRFCD 2008 MPU facilities and hydrology maps have been included in Appendix A for reference.

1.5 Referenced Studies

No other drainage studies were referenced in developing the flow rates in this study.

2 METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic and Drainage Design Manual (CCRFCD Manual, Reference 2). The site was analyzed for existing, interim, and ultimate conditions, for the 100-year, 6-hour storm, and also the 10-year, 6-hour storm.

2.2 Hydrologic Modeling Methodology

Modeling:

The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers HEC-1 Flood Hydrograph Package program was utilized to model the drainage basins analyzed by this study.

Precipitation:

The site is located outside of the McCarran Rainfall Area. Per CCRFCD Manual precipitation exhibits, the precipitation values utilized in this study's HEC-1 models are 3.15 and 1.74 inches for the 100-year and 10-year storm event, respectively. No drainage area exceeds 8 square miles; therefore, a SDN 3 design storm distribution referenced from Table 503 of the CCRFCD Manual is used. Relevant tables and figures from the CCRFCD Manual have been included in Appendix B.

Curve Number:

The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information within the watershed was obtained from the 2014 NRCS Natural Resources Conservation Service of the Las Vegas Valley Area, Nevada, Part of Clark County (Soil Survey, Reference 3). The delineated drainage basins lie within the following soil type on Exhibit D, included in Appendix A. Soil Type 400 is described as Tencee very gravelly fine sandy loam, 2 to 8 percent slopes. This soil is classified as 100% Hydrologic Soil Group 'D'.

Runoff curve numbers were taken from Table 602 of the CCRFCD Manual. An existing conditions curve number of 88.0 representing “Desert Shrub Poor” ground cover was used for undeveloped conditions and a runoff curve number of 93.0 was used for developed conditions representing an “Industrial” land cover. Industrial is the best fit land use category for the site and yields and this results in a high curve number, which should be conservative, since the onsite cut slopes will eventually become vegetated and reduce runoff from this area to the “Desert Shrub Poor” land cover category. Therefore, the proposed project site development is in conformance with the MPU planned land use since the onsite runoff curve number of 93 used in the model is less than the value of 94 that is prescribed for public facility/Residential the curve number matrix.

A table summarizing the curve number for the land used in the hydrologic modeling is included in Appendix B.

Lag Time:

The lag time is defined as the time measured from the center of mass of rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a basin to the outlet point of the basin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for basins modeled. The lag time computations have been included in Appendix B.

2.3 Hydraulic Modeling & Criteria

Flow depths have been analyzed utilizing Flowmaster Version 7.0 software by Haestad Methods.

Street Flow:

The interior tank road and access road were not analyzed for compliance with the street flow criteria from the CCRFCD Manual since they are private roads. The 100-year flows adjacent to these roads are relatively minor and access to the site during a storm event of this size should not be a problem.

Tank Road:

Normal depths were calculated for the tank road ditch, which is on the side of the road opposite to the water tank, to demonstrate that the finished floor elevation of the water tank is higher than twice the flow depth in the ditch. These calculations are provided in Appendix C.

Perimeter Ditches:

Printouts of the results are included in Appendix C. In accordance with the CCRFCD Manual:

- The velocities in the earthen portions of the ditches are less than 5 feet per second.
- The velocities in the riprap portions of the ditches are less than 10 feet per second.

Block Wall Openings:

The block wall opening has been analyzed utilizing weir and orifice equations. A 50% clogging factor was assumed. The calculations are included in Appendix C.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Condition

The project site is currently undeveloped, as is all of the offsite watershed as well. The project watershed generally slopes from west to east. For the existing condition hydrologic model, the project watershed was assumed to be undeveloped, consisting of typical sparse desert shrub.

3.2 Discussion of Existing Condition

Exhibit E in Appendix A is the existing condition drainage map showing the basin delineations and summarizing the flow rates from the HEC-1 model. The project site is located just downstream of the existing collector channel for the Ann Road Detention Basin (GOAN 0127 and GOAN 0070). Consequently, all runoff west of this facility is captured and directed into the Ann Road Detention Basin before reaching the project site. The HEC-1 was modeled with the parameters corresponding to the existing condition offsite and onsite.

There are two existing washes that run through the project site, from northwest to southeast. High points have been designed in the perimeter ditches and tank road ditches so that onsite and offsite flow under proposed conditions generally follow the same drainage patterns as under existing conditions. Basins OFF1 and EX1 represent the northern existing wash and combine at concentration point CP1. Basins OFF2 and EX2 represent the southern existing wash and combine at concentration point CP2.

3.3 Summary of Existing Condition

A summary of flow rates from the existing condition HEC-1 model is presented in Table 1. For reference, a printout of the model is included in Appendix B.

Table 1: Existing Condition Flow Rate Summary			
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1	3.4	9	4
OFF2	2.7	7	3
EX1	1.3	3	1
EX2	1.3	3	1
CP1 Q = OFF1 + EX1	4.7	13	5
CP2 Q = OFF2 + EX2	4.0	11	4

4 PROPOSED DRAINAGE CONDITION

4.1 Definition of Proposed Condition

The proposed condition HEC-1 model builds upon the existing condition model as the base case and assumes that the project improvements have been constructed, which includes:

- The site grading
- The water tank with its appurtenances
- The tank road
- The access road
- The perimeter ditch and perimeter wall

4.2 Discussion of Proposed Condition

Exhibit F in Appendix A is the proposed condition drainage map showing the basin delineations and summarizing the flow rates from the HEC-1 model. The HEC-1 was modeled with the parameters corresponding to the existing condition offsite and developed condition onsite.

Two ditches have been provided along the perimeter of the screen wall to direct the offsite flows around the proposed improvements and back to historic drainage patterns, one on the north side of the project and one on the south. The north segment of the perimeter ditch along the screen wall captures offsite flow from Basin OFF1 from the west and directs it back to its natural drainage to the east. Combination point CP1 represents the combination of OFF1 and ON1 downstream of the project. The south segment of the perimeter ditch along the screen wall captures offsite flow from Basin OFF2 from the west and directs it to the access road where it combines with onsite flow from Basin ON2 that is collected in the south tank road ditch. These combine downstream of the project at combination point CP2. Further discussion of the hydraulics of the perimeter ditches will follow in Section 4.5 of this report.

The tank road has a constant cross slope away from the tank that directs flow into the ditch alongside the tank road. The north segment of the ditch collects onsite flow from Basin ON1 and discharges into a block wall opening in the screen wall on the east side of the perimeter wall and back to its natural drainage to the east. The south segment collects onsite flow from Basin ON2 and discharges through the main gate to the west side of the access road where it combines with offsite flow from the west from Basin OFF2. The access road has a dip section to convey offsite flows to the east and back to their natural drainage.

A catchment area has been designed east of the access road and north of Centennial Parkway to receive the discharge in the unlikely event of tank overflow.

4.3 Summary of Proposed Condition Flows

A summary of flow rates from the proposed condition HEC-1 model is presented in Table 2. For reference, a printout of the model is included in Appendix B.

Table 2: Proposed Condition Flow Rate Summary			
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1	3.4	9	4
OFF2	2.7	7	3
ON1	1.2	4	2
ON2	1.2	4	2
CP1 Q = OFF1 + ON1	4.6	13	6
CP2 Q = OFF2 + ON2	3.9	12	5

In order to simplify the model, the basin flow from the proposed condition HEC-1 model was prorated to obtain design flows for the ditches. A summary of these prorated design flow rates are presented in Table 3. The onsite flows are the same for both proposed and ultimate condition. Therefore, the flows from Table 3 are used to analyze the tank road ditch. For further discussion, see Section 5 of the report.

Table 3: Prorated Flow Summary			
Basin	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON1	4	1.17	3.4
Subbasin	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON1 (a)	1	0.39	3.4
ON1 (b)	3	0.78	3.4
TOTAL	4	1.17	

4.4 Summary of Drainage Facilities

The drainage facilities were analyzed for ultimate condition flow rates. See Section 5 of the report for further discussion.

5 ULTIMATE DRAINAGE CONDITION

5.1 Definition of Ultimate Condition

The project site is assumed to be developed in the same manner as under proposed conditions. Runoff curve numbers for “industrial” development were used in the hydrologic modeling. The offsite areas are assumed to be industrial development, similar to the onsite areas. Although the property boundary extends past the perimeter wall, there is no plan for any development of the area other than similar facilities to the water tank.

5.2 Discussion of Ultimate Condition

Exhibit G in Appendix A is the ultimate condition drainage map showing the basin delineations and summarizing the flow rates from the HEC-1 model. The HEC-1 was modeled with the parameters corresponding to developed conditions both onsite and offsite. The basic drainage patterns are assumed to be the same as under proposed conditions as discussed in Section 4.2.

Under ultimate development conditions, it is assumed that the triangular area southwest of basin OFF2 will ultimately drain southward across Centennial Parkway and not impact the project site. Therefore, runoff from this area was not included in the Ultimate Condition HEC-1 model.

5.3 Discussion of Ultimate Condition Flows

A summary of flow rates from the proposed condition HEC-1 model is presented in Table 4. For reference, a printout of the HEC-1 model is included in Appendix B.

Table 4: Ultimate Condition Flow Rate Summary			
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1	3.4	13	6
OFF2	2.7	10	5
ON1	1.2	4	2
ON2	1.2	4	2
CP1 Q = OFF1 + ON1	4.6	17	8
CP2 Q = OFF2 + ON2	3.9	14	7

5.4 Summary of Drainage Facilities

Normal depth calculations for flows overtopping the access road at the dip section are provided by Section 8 in Table 5. Ultimate condition flow rates were used in the calculations. Normal depth calculations were used because the road is not crowned, but has a constant

cross slope from west to east. Detailed calculations are included in Appendix C. The calculations show a flow depth of 0.28 feet and a velocity of 3.29 feet per second. This yields a depth times velocity (DxV) of 0.9, which is within acceptable limits.

A block wall opening has been provided to release the onsite flow from the north tank ditch back into its historic drainage pattern. The 48-inch wide by 16-inch high opening is located along the east perimeter wall.

For the block wall calculations, a clogging factor of 50% was assumed. The calculations assume weir flow with the height of the water equal to the height of the opening. A printout of the computations for the block wall opening are included in Appendix C. The onsite flow (Basin ON1) through the block wall opening is 4 cfs. Since the capacity of the opening is 5.9 cfs, the opening is adequate to handle the design flow.

Two perimeter ditches have been proposed to convey flows around the perimeter of the proposed screen wall, one on the north side of the screen wall and one on the south. Table 5 below summarizes the normal depth flows for each ditch segment. Refer to Exhibit G, in Appendix A, for the location of each ditch section. The calculations demonstrate that the velocities are less than 5 feet per second in all cases, which is acceptable.

Two ditches adjacent to the tank road have been proposed to convey flows around and away from the water tank. For earthen ditches, a Manning's roughness of 0.022 was used. For riprap a value of 0.037, which represents the value for a D50 of 8 inches. See Sections 2, 3, and 6 in Table 5 for a summary of the normal depth hydraulics. See Exhibit G for the location of the Sections. Detailed printouts for all sections are included in Appendix C.

Table 5 - Onsite Hydraulic Section Summary					
Section ID	Description	Q ₁₀₀ (cfs)	Min/Max Slope (%)	Depth (ft)	Velocity (fps)
Section 1 (Q = OFF1)	Earthen Trap 3:1 SS 10' Bottom Width	13	1.50	0.33	3.84
			2.59	0.28	4.54
Section 2 (Q = ON1)	Earthen V-Ditch 3:1 SS	4	0.50	0.75	2.39
			1.76	0.59	3.83
Section 3 (Q = ON2)	Earthen V-Ditch 3:1 SS	4	0.50	0.75	2.39
			1.34	0.62	3.46
Section 4 (Q = OFF2)	Natural Earthen Trap 18' Bottom Width	10	2.60	0.17	3.14
Section 5 (Q = CP2)	Earthen V-Ditch 3:1 SS	14	0.81	0.84	3.38
Section 6 (Q = ON1(a))	Earthen V-Ditch 3:1 SS	1	0.50	0.44	1.69
Section 7 (Q = OFF2)	Earthen Trap 3:1 SS 10' Bottom Width	10	1.46	0.29	3.44
			4.67	0.20	4.91
Section 8 (Q = CP2)	Maintenance Road	14	2.00	0.28	3.29
Section 9 (Q = OFF1)	Rip-rap Lined Trap 3:1 SS 10' Bottom Width	13	5.50	0.31	4.16
			6.58	0.29	4.39
Section 10 (Q = OFF2)	Rip-rap Lined Trap 3:1 SS 10' Bottom Width	10	7.04	0.24	4.05

5.5 Summary of Finished Floor

The floor elevation of the tank of 3070.5 feet was set so that it is higher than twice the flow depth in the tank road ditches. The effective Water Surface Elevation (WSE) is determined by adding the maximum flow line elevation to twice the flow depth. In all cases the maximum effective surface elevation is less than the tank finished floor elevation of 3070.5 feet and also less than the pad elevation of 3070.0 feet. Table 6 is a summary of the calculated effective WSE's for the north tank road ditch. Since the geometry (0.5 percent slope) and flow rates (ON1 versus ON2) of the south tank road ditch are essentially a mirror image of the north tank road ditch, there is adequate freeboard between the finished floor elevation and the effective WSE in the south tank road ditch also.

Table 6 – Tank Road Ditch Flow Depths				
Section ID	Flow Depth	Flow Depth x 2	Max. Flow Line Elev.	Effective WSE Col. (3) + Col. (4)
(1)	(2)	(3)	(4)	(5)
Section 2	0.75	1.50	3068.44	3069.94
Section 6	0.44	0.88	3069.00	3069.00

The tank is protected from flow in the perimeter ditch since the maximum flow depth in Section 1 is 0.33 feet. The minimum depth of the ditch is 0.5 feet. The bottom course of the adjacent perimeter screen wall acts as a floodwall since it is solid grouted to a height of 8 inches (0.67 feet). This gives a total height of 1.17 feet, which is higher than twice the flow depth, or 0.66 feet.

6 CONCLUSIONS & RECOMMENDATIONS

1. The proposed improvements are not located within a FEMA designated SFHA.
2. Proposed access road flow and drainage facilities satisfy local criteria.
3. Finish Floor Elevation of the tank has been elevated at least at a height of two times the depth of flow in the adjacent ditches.
4. The grading plan and detail sheets for this project have been included with this study. These plans support the drainage patterns and conclusions detailed in this study.
5. The project site is adjacent to existing regional facility, the collector channel for the Ann Road Detention Basin (GOAN 0127), and does not affect this facility.

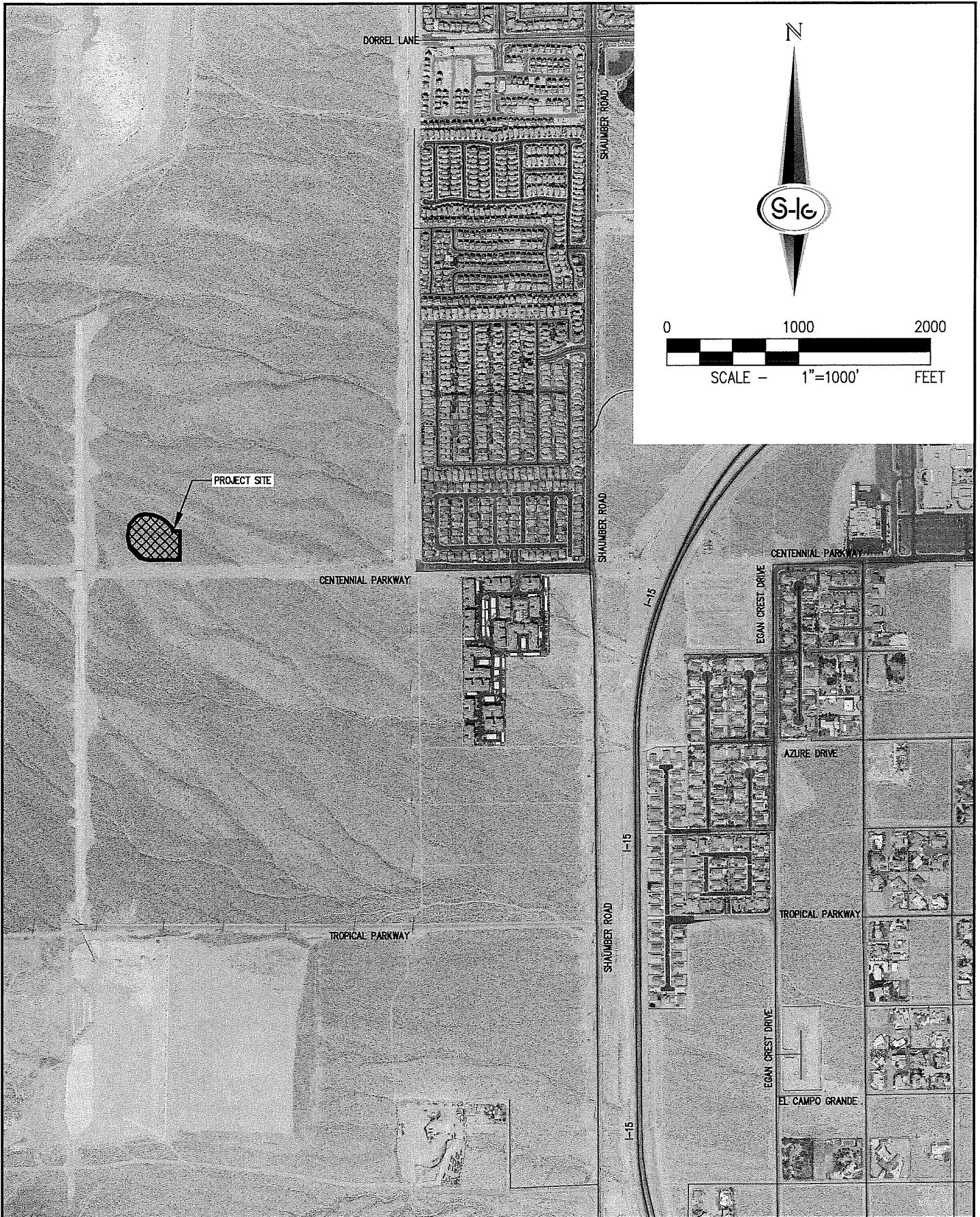
7 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*. PBS&J, Louis Berger Group and Parsons Brinckerhoff, 2013.
2. *Hydrologic Criteria and Drainage Design Manual*. Clark County Regional Flood Control District, 1990.
3. *Soil Survey of Las Vegas Valley Area, Nevada*. U.S. Department of Agriculture, National Resources Conservation Services, August 2014.

APPENDIX A

Drainage Exhibits

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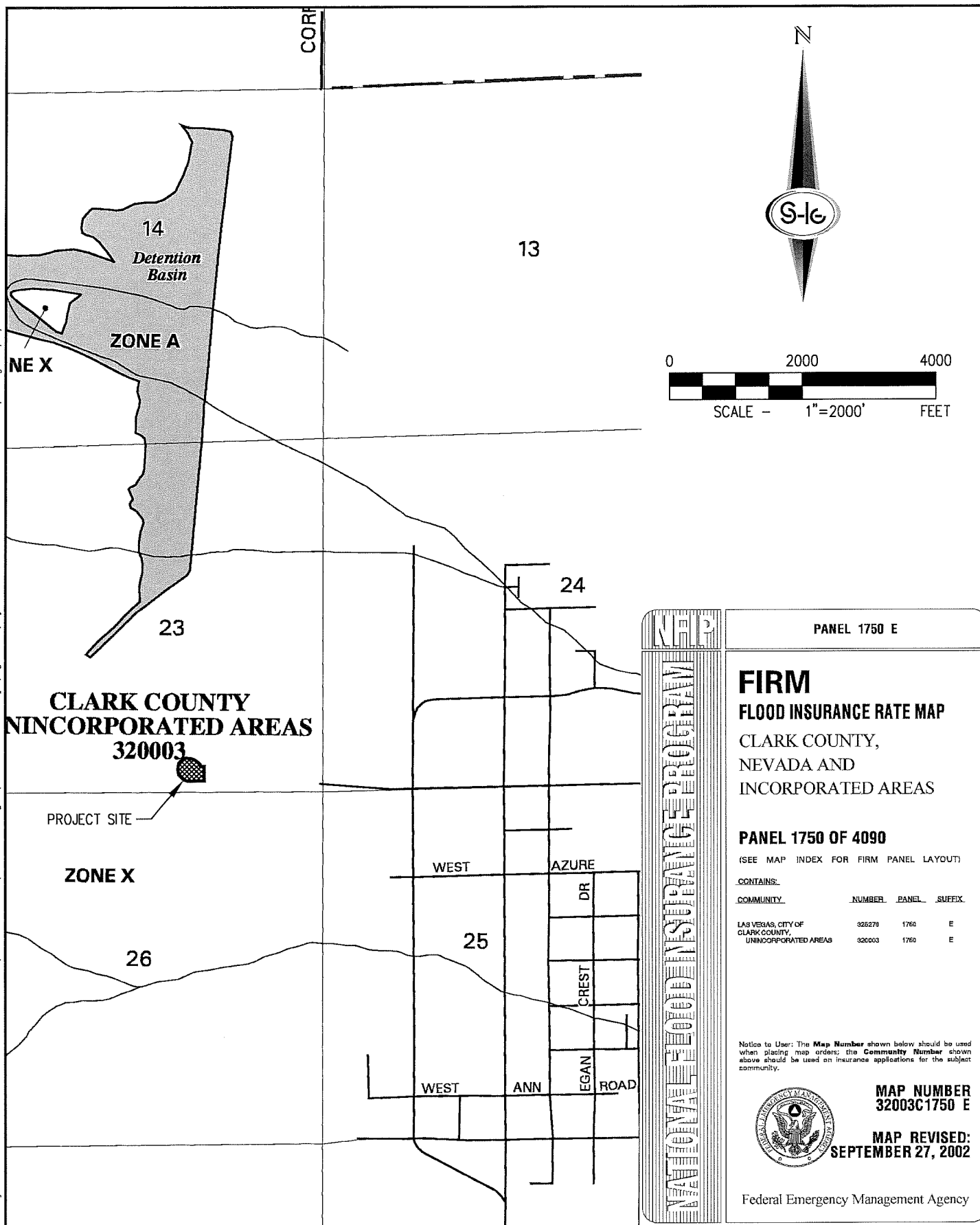


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OLYMPIA COMPANIES, LLC
3090 ZONE NORTH INTERIM TANK
LOCATION MAP

DATE: NOV 2016	PROJECT NO. OLY1606-000
DRAFTER: JSR	EXHIBIT A SHEET 1 OF 1
DESIGNER: JSR	
CHECKED: FR	

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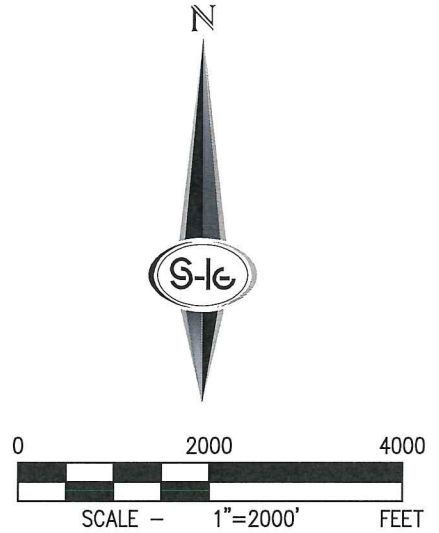
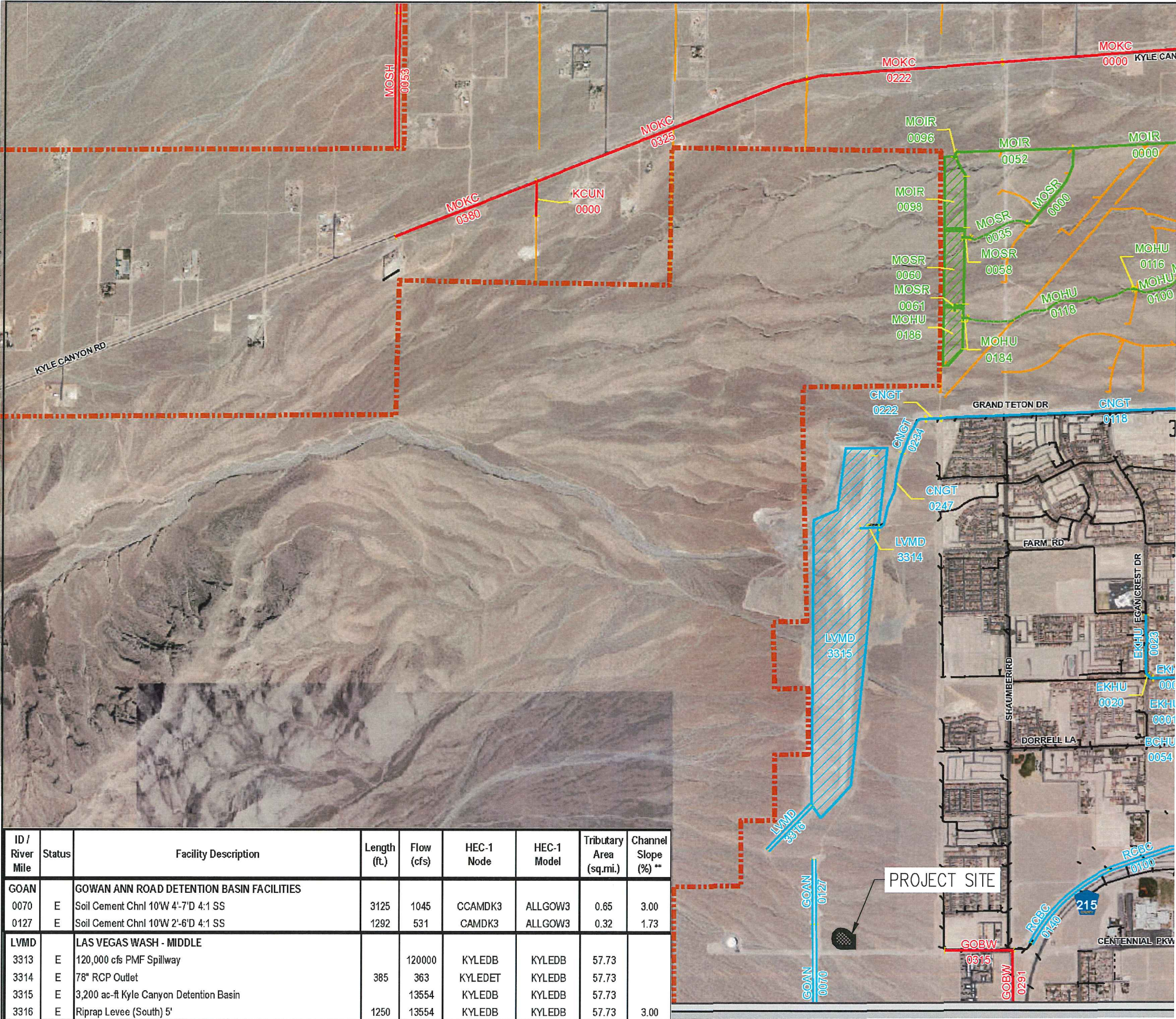


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OLYMPIA COMPANIES, LLC
3090 ZONE NORTH INTERIM TANK
FEMA FIRM MAP

DATE: NOV 2016	PROJECT NO. OLY1606-000
DRAFTER: JSR	EXHIBIT B SHEET 1 OF 1
DESIGNER: JSR	
CHECKED: FR	

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2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE
FIGURE F- 12
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 |

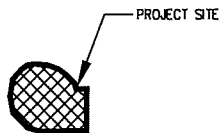
APP. DATE	BY	DATE	DESCRIPTION	NO.

OLYMPIA COMPANIES, LLC
3090 ZONE NORTH INTERIM TANK
CCRFD 2013 MPU FACILITIES MAP



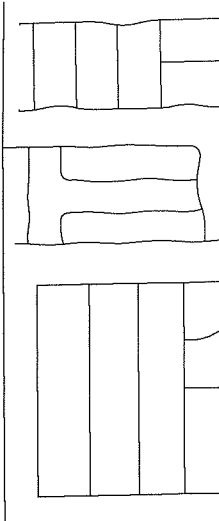
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400



CENTENNIAL PARKWAY

DORREL LANE



191

190

190

I-15

I-15

I-15

SHAUMBER ROAD

SHAUMBER ROAD

CENTENNIAL PARKWAY

EGAN CREST DRIVE

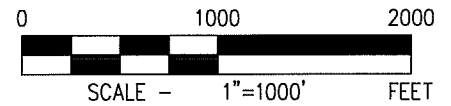
AZURE DRIVE

TROPICAL PARKWAY

EGAN CREST DRIVE

EL CAMPO GRANDE

N



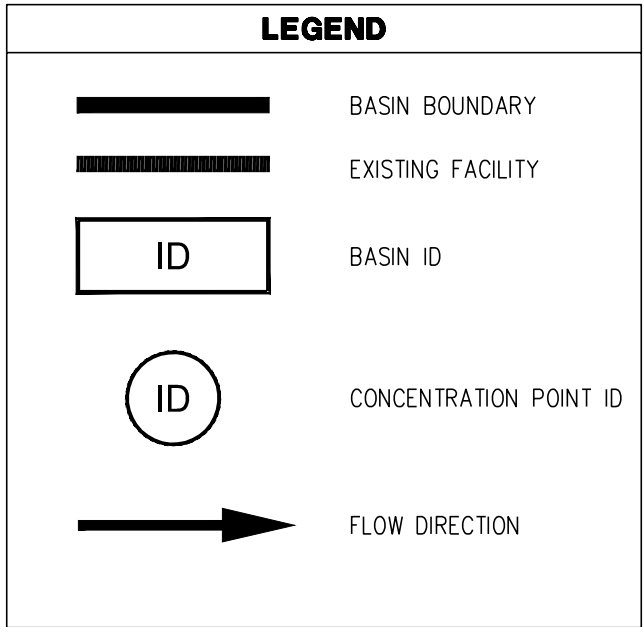
S-I-G
SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

OLYMPIA COMPANIES, LLC
3090 ZONE NORTH INTERIM TANK
SOILS MAP

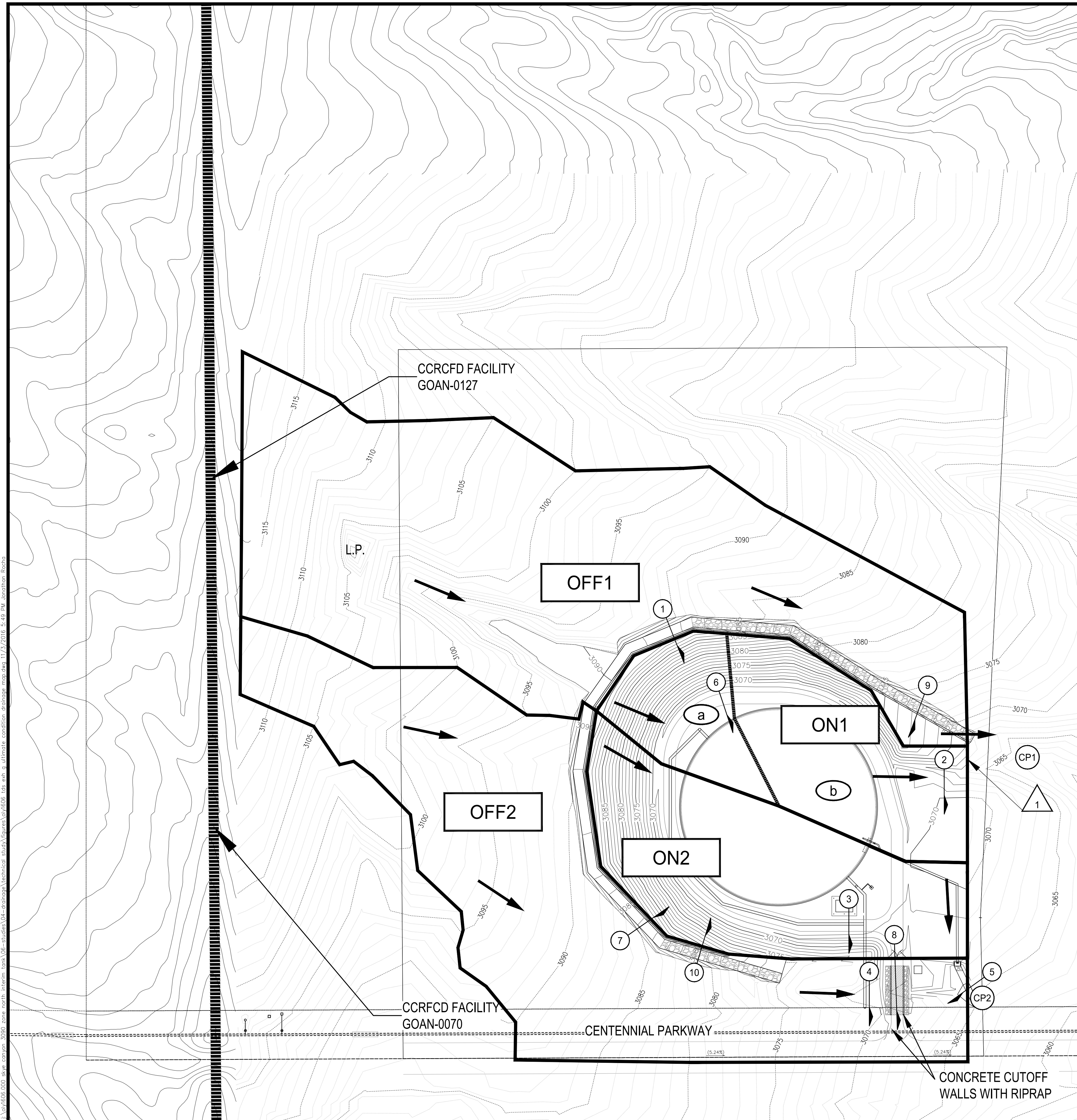
DATE: NOV 2016
DRAFTER: JSR
DESIGNER: JSR
CHECKED: FR

PROJECT NO.
OLY1606-000
EXHIBIT D
SHEET 1 OF 1

This topographic map illustrates a proposed fire station layout. The map features contour lines indicating elevation, with labels such as 3115, 3110, 3105, 3100, 3095, 3080, and 3075. A thick black line represents a proposed boundary or road. Two existing fire stations are marked: CCRCFD Facility GOAN-0127 and CCRCFD Facility GOAN-0070. A local peak is labeled L.P. The proposed layout includes several key areas: OFF1 (Officer's Office), OFF2 (Officer's Office), EX1 (Extinguisher Room), EX2 (Extinguisher Room), CP1 (Control Panel), and CP2 (Control Panel). Arrows indicate the flow of traffic or the direction of travel between these areas. The map also shows a dashed line representing a proposed road or boundary on the left side.



Existing Condition Flow Rate Summary			
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1	3.4	9	4
OFF2	2.7	7	3
EX1	1.2	3	1
EX2	1.2	3	1
CP1 Q = OFF1 + EX1	4.6	13	5
CP2 Q = OFF2 + EX2	3.9	11	4



LEGEND	
	BASIN BOUNDARY
	PRO-RATED SUBBASIN BOUNDARY
	EXISTING FACILITY
	BASIN ID
	PRO-RATED SUBBASIN ID
	CONCENTRATION POINT ID
	FLOW DIRECTION
	FLOWMASTER SECTION
	FACILITY ID



Ultimate Condition Flow Rate Summary			
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1	3.4	13	6
OFF2	2.7	10	5
ON1	1.2	4	2
ON2	1.2	4	2
CP1 Q = OFF1 + ON1	4.6	17	8
CP2 Q = OFF2 + ON2	3.9	14	7

Prorated Flow Summary			
Basin	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON1	4	1.17	3.4
Subbasin	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON1 (a)	1	0.39	3.4
ON1 (b)	3	0.78	3.4
TOTAL	4	1.17	

Section ID	Description	Q ₁₀₀ (cfs)	Min/Max Slope (%)	Depth (ft)	Velocity (fps)
Section 1 (Q = OFF1)	Earthen Trap 3:1 SS 10' Bottom Width	13	1.50	0.33	3.84
			2.59	0.28	4.54
Section 2 (Q = ON1)	Earthen V-Ditch 3:1 SS	4	0.50	0.75	2.39
			1.76	0.59	3.83
Section 3 (Q = ON2)	Earthen V-Ditch 3:1 SS	4	0.50	0.75	2.39
			1.34	0.62	3.46
Section 4 (Q = OFF2)	Natural Earthen Trap 18' Bottom Width	10	2.60	0.17	3.14
Section 5 (Q = CF2)	Earthen V-Ditch 3:1 SS	14	0.81	0.84	3.38
Section 6 (Q = ON1(a))	Earthen V-Ditch 3:1 SS	1	0.50	0.44	1.69
Section 7 (Q = OFF2)	Earthen Trap 3:1 SS 10' Bottom Width	10	1.46	0.29	3.44
			4.67	0.20	4.91
Section 8 (Q = CF2)	Maintenance Road	14	2.00	0.28	3.29
Section 9 (Q = OFF1)	Rip-rap Lined Trap 3:1 SS 10' Bottom Width	13	5.50	0.31	4.16
			6.58	0.29	4.39
Section 10 (Q = OFF2)	Rip-rap Lined Trap 3:1 SS 10' Bottom Width	10	7.04	0.24	4.05

Recommended Flood Control Facility Summary					
Facility ID	Facility Description	Total/Approaching Flow (cfs) Q ₁₀₀	Facility Flow (cfs) Q ₁₀₀	Surface/Bypass Flow (cfs) Q ₁₀₀	Notes
1	Proposed 16" X 48" Block Wall Opening	4	4	0	Q = ON1

APPENDIX B

Hydrologic Analysis

Precipitation Data,

Rainfall and Precipitation Computation

Project Name: 3090 Zone North Interim Tank

Date: 10/6/2016

File Name: OLY1606 TDS Precipitation Calcs.xls

By: JSR

Data:

Project is located in: Township: 19 S. Range: 59 E. Section: 23

Reference:

APN Map

Site is NOT located in the McCarran Airport Rainfall Area

Figure 513*

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.40 inches

Figure 503*

Rainfall Depth-Duration-Frequency 100-Year, 6-Hour: 2.20 inches

Figure 506*

Precipitation Adjustment Ratios:

10-Year: 1.24

Table 501*

100-Year: 1.43

Table 501*

Six Hour Depth Area Reduction Factors (DARF):

Area (gross acres): 6.0 = 0.0094 square miles

Table 502*

DARF = 1.00

Calculations:

$P_{10} = 1.74$ 10-Year Precipitation (in)

$P_{100} = 3.15$ 100-Year Precipitation (in)

$P_{10}/P_{100} = 0.55$ HEC-1 Multiple Ratio Value

Equations:

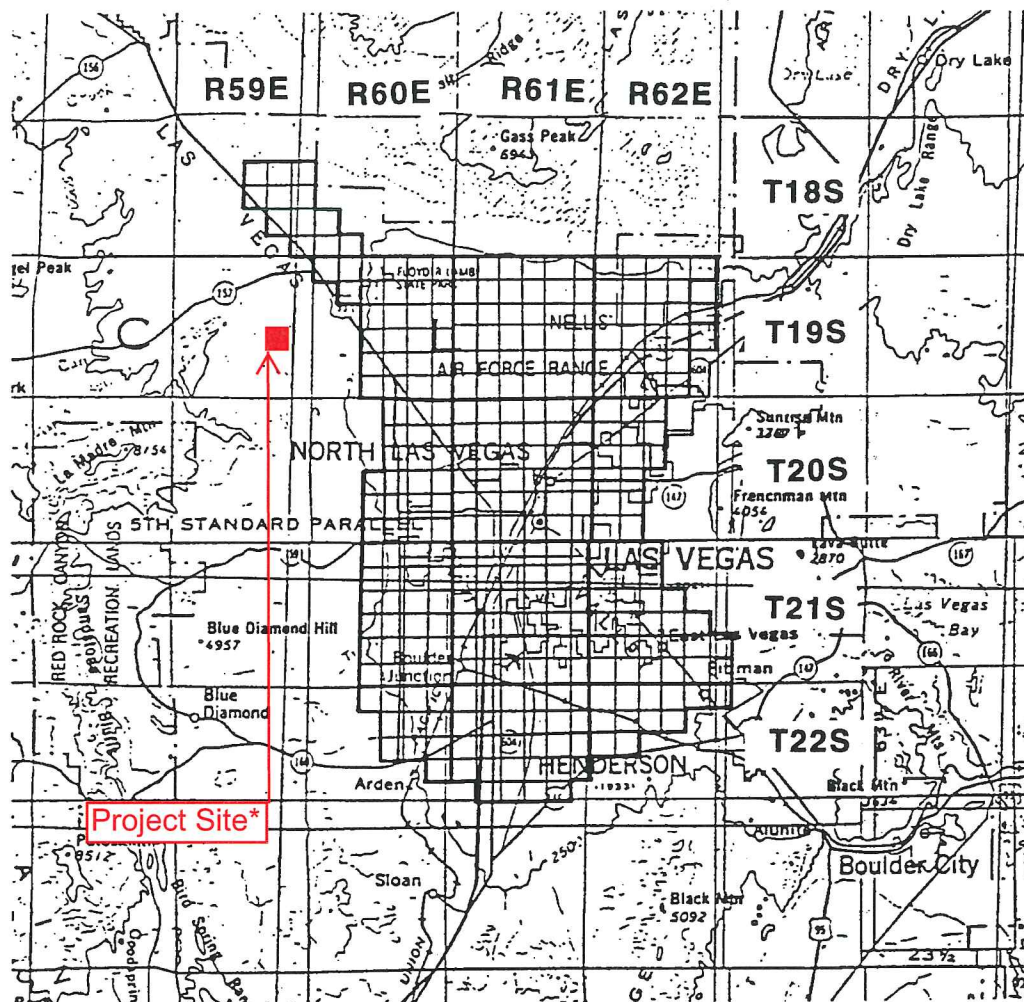
$P = (\text{Rainfall}) * (\text{Precipitation Adjustment Ratio}) * (\text{Depth Area Reduction Factor})$

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

OK

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



*Project site not located within the McCarran Rainfall area (T19S-R59E-S23)

TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

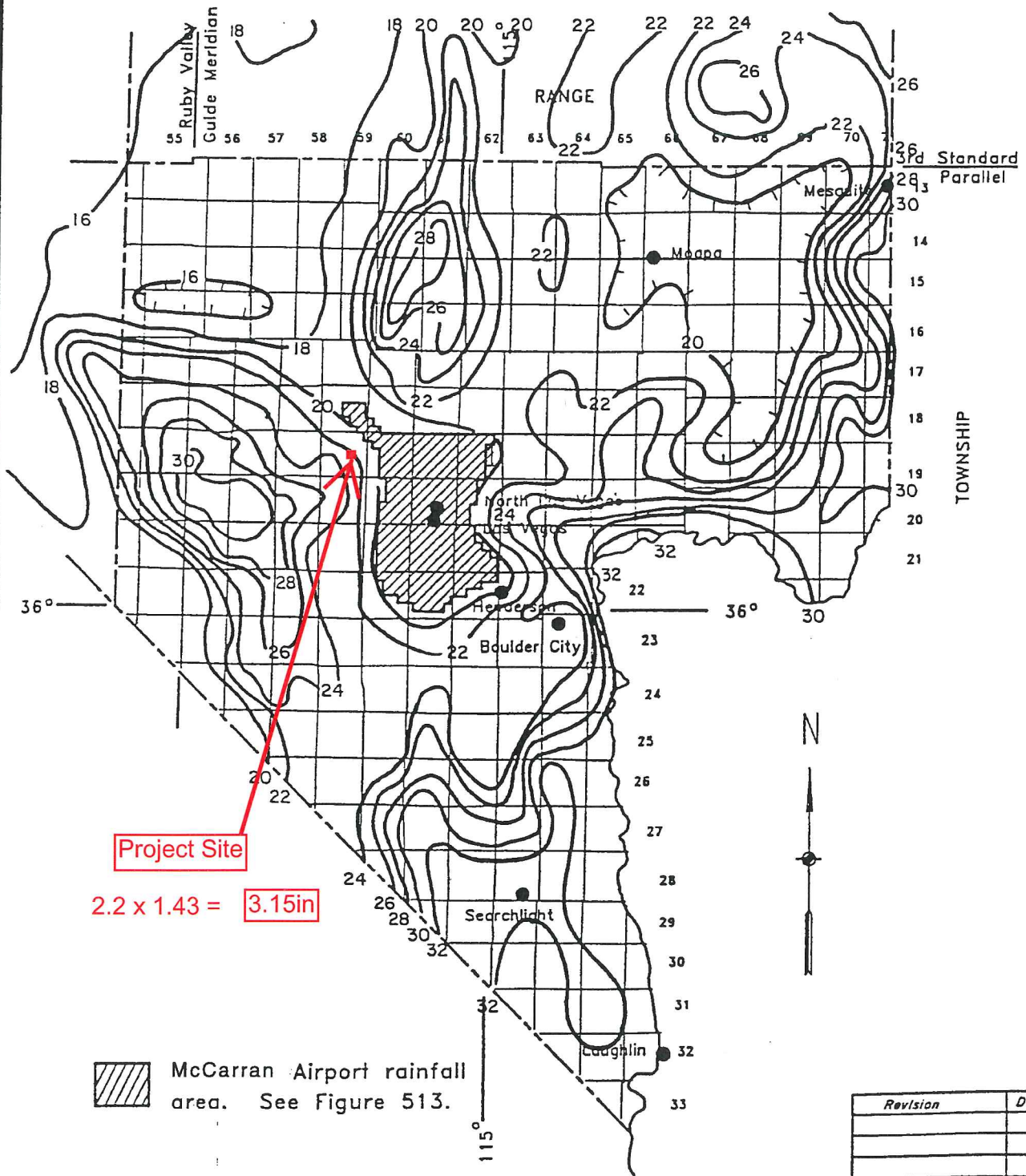
Notes:

1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

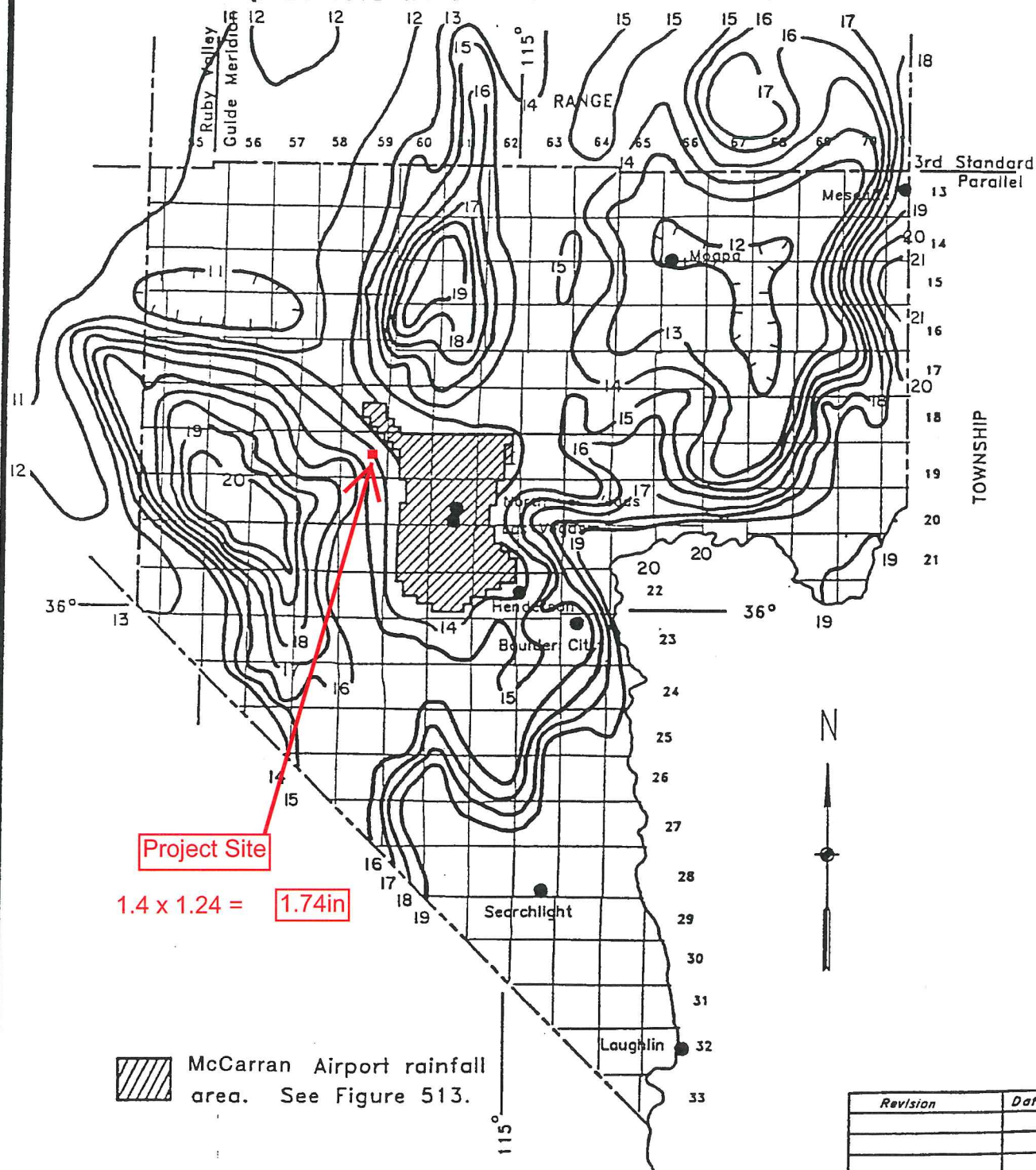
HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

PRECIPITATION ADJUSTMENT RATIOS

<u>Recurrence Interval</u>	<u>Ratio to NOAA Atlas 2</u>
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.

<i>Revision</i>	<i>Date</i>

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

Percent of Total Storm Depth				Percent of Total Storm Depth			
Storm Time (In Minutes)	SDN3	SDN4	SDN5	Storm Time (In Minutes)	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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX HOUR DEPTH-AREA REDUCTION FACTORS

<u>Drainage Area (Square Miles)</u>	<u>Six-Hour Depth-Area Reduction Factor</u>
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

- NOTES: 1. A graphical representation of these factors is presented in Figure 514.
2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

<i>Revision</i>	<i>Date</i>

Curve Number & Soils Data

Soil Data & Curve Number Computation

Project Name: 3090 Zone North Interim Tank

Date: 11/1/2016

File Name: OLY1606 TDS Curve Number Calcs.xlsx

By: JSR

Data:

Reference:

Exhibit D
NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	400	Las Vegas Valley 2014	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	0%	0%	0%	100%

Land Use	A	B	C	D
Desert Shrub (poor)	63	77	85	88
Industrial	81	88	91	93

EXISTING CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
OFF1	LV	400	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	3.42	88.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								3.42	88.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
OFF2	LV	400	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	2.70	88.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								2.70	88.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
EX1	LV	400	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	1.21	88.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								1.21	88.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
EX2	LV	400	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	1.20	88.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								1.20	88.0

ULTIMATE CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
OFF1	LV	400	100.0%	Industrial	0%	0%	0%	100%	81	88	91	93	3.42	93.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								3.42	93.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
OFF2	LV	400	100.0%	Industrial	0%	0%	0%	100%	81	88	91	93	2.70	93.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								2.70	93.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
ON1	LV	400	100.0%	Industrial	0%	0%	0%	100%	81	88	91	93	1.17	93.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								1.17	93.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
ON2	LV	400	100.0%	Industrial	0%	0%	0%	100%	81	88	91	93	1.24	93.00
TOTAL PERCENT				100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:								1.24	93.0

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
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 $I_p = 0.2S$.

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (SEMIARID RANGELANDS¹)

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

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

²Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: >70% ground cover.

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

Revision	Date



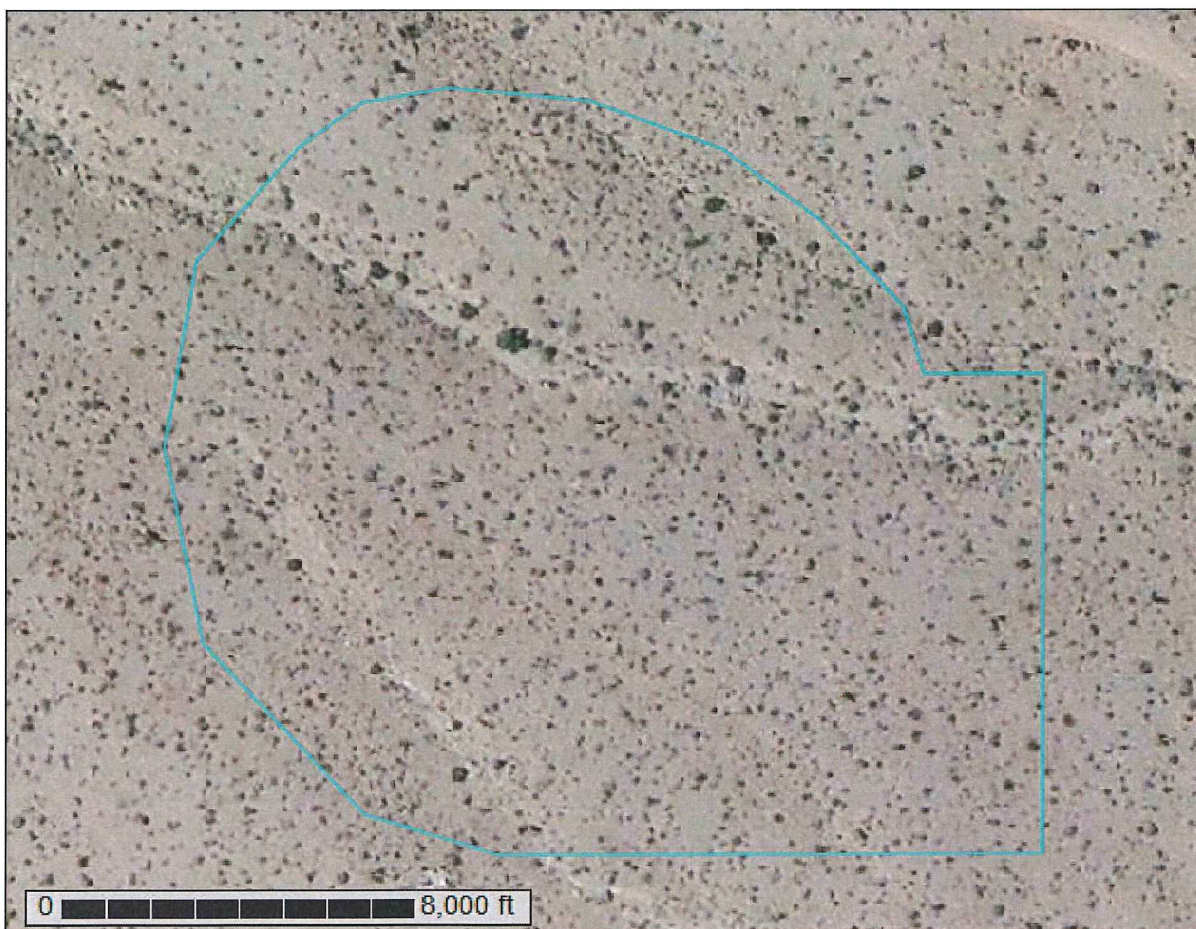
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

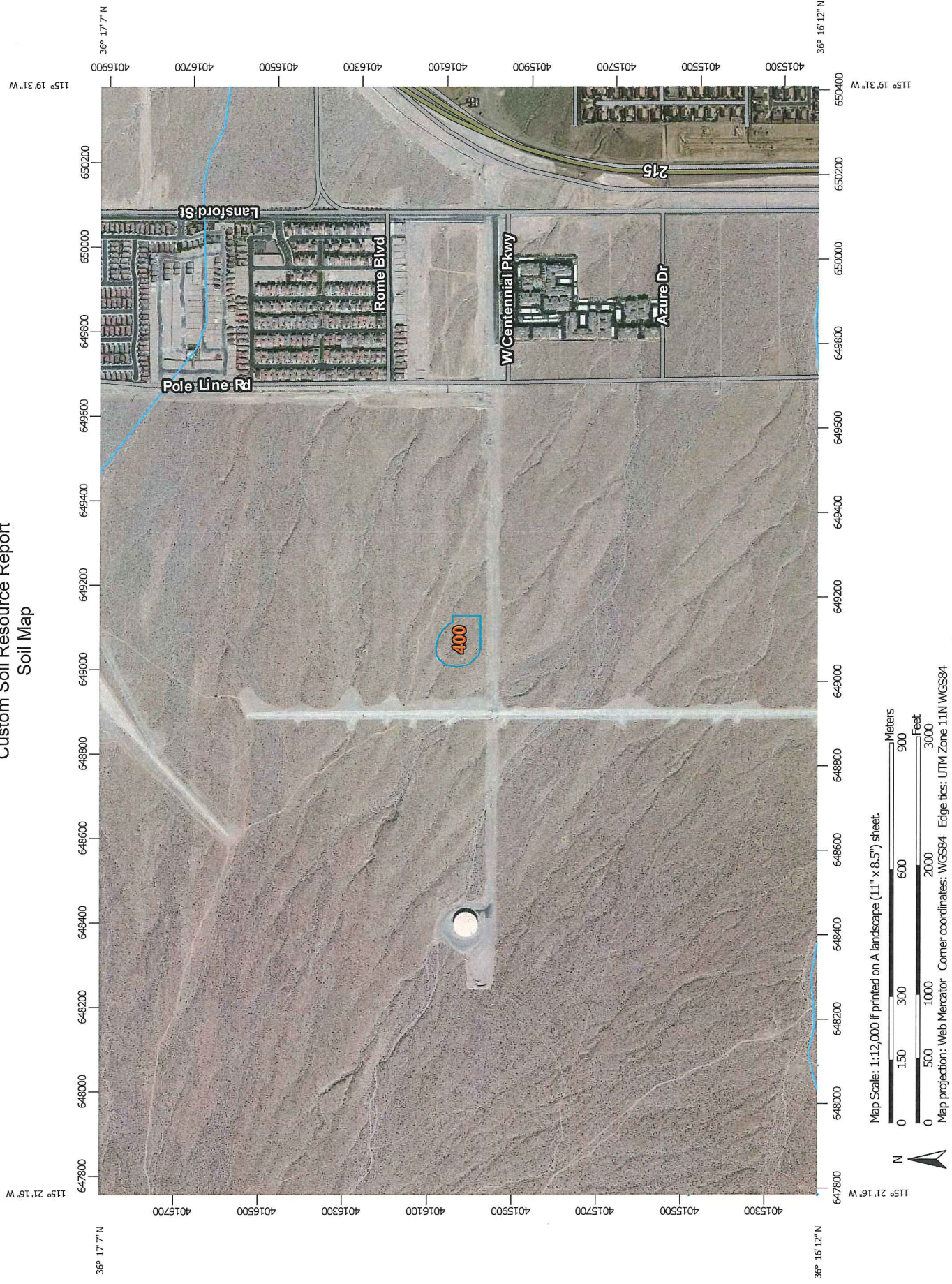
A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Las Vegas Valley Area, Nevada, Part of Clark County



September 30, 2016

Custom Soil Resource Report Soil Map



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spill Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 10, Aug 22, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 7, 2011—Jun 2, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Las Vegas Valley Area, Nevada, Part of Clark County (NV788)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	2.6	100.0%
Totals for Area of Interest		2.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Las Vegas Valley Area, Nevada, Part of Clark County

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrc1
Elevation: 2,400 to 5,700 feet
Mean annual precipitation: 4 to 10 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 180 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Tencee and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tencee

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolomite

Typical profile

H1 - 0 to 9 inches: very gravelly fine sandy loam
H2 - 9 to 15 inches: very gravelly sandy loam
H3 - 15 to 19 inches: indurated

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Custom Soil Resource Report

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff—Las Vegas Valley Area, Nevada, Part of Clark County			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes			
Tencee	100	Very high	D

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Lag Time Data

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

Project Name: 3090 Zone North Interim Tank
Description: Standard Form 4
File Name: OLY1606 TDS Lag Time Standard Form 4.xls
By: JSR
Date: 11/3/2016

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc		Tc Check		Tag	
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA Mi^2	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	VELOCITY FPS	V1	V2	Tt Min	Tc Calc.	Total Length Feet	Tc Check	Tag Hours	
			[1]		[2]			[3]				[4]		[5]	[6]	[7]	[8]	[9]	[10]
EXISTING CONDITION																			
OFF1	E	88.0	0.772	3.42	0.0053	145	11.03	3.20	475	6.95	3.90	7.75		2.03	5.23				0.100
OFF2	E	88.0	0.772	2.70	0.0042	125	7.20	3.42	395	6.08	3.65	7.25		1.80	5.23				0.100
EX1	E	88.0	0.772	1.21	0.0019	170	7.06	4.02	380	5.00	3.31	6.57		1.91	5.93				0.100
EX2	E	88.0	0.772	1.20	0.0019	75	8.00	2.56	480	4.58	3.17	6.29		2.52	5.08				0.100
DEVELOPED CONDITION																			
OFF1	D	93.0	0.838	3.42	0.0053	145	11.03	2.55	915	5.46	4.72	7.15		2.73	5.29	1060	15.889	0.053	
OFF2	D	93.0	0.838	2.70	0.0042	125	7.20	2.73	900	5.33	4.66	7.07		2.73	5.46	1025	15.694	0.055	
ON1	D	93.0	0.838	1.17	0.0018	60	25.00	1.25	420	0.50	1.43	2.16		4.90	6.15	480	12.667	0.062	
ON2	D	93.0	0.838	1.24	0.0019	75	25.33	1.39	450	0.50	1.43	2.16		5.25	6.64	525	12.917	0.066	

[1] $K = 0.0132 (CN) - 0.39$
 [2] $A = \text{Area}/640$
 [3] $Ti = (1.8 (1.1-K) L^{0.5})/S^{0.33}$
 [4] For Existing Conditions: $V1 = 14.8 * (S/100)^{0.5}$
 For Developed Conditions: $V1 = 20.2 * (S/100)^{0.5}$
 [5] For Existing Conditions: $V2 = 29.4 * (S/100)^{0.5}$
 For Developed Conditions: $V2 = 30.6 * (S/100)^{0.5}$
 [6] $Tt = L/(60*V)$
 [7] $Tc = Ti + Tt$
 [8] Total L = Initial L + Travel L
 [9] $Tc = (L/180) + 10$
 [10] $\text{Tag} = (0.6*Tc)/60$
 [11] Min Tag = 0.05
 Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

REFERENCE :
STANDARD FORM 4

Existing Condition HEC-1 Analysis

EX.OUT

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 26OCT16 TIME 10:18:06
*
*****

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

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      X   X  XXXXXXX XXXXX      X
      X   X  X      X   X      XX
      X   X  X      X   X      X
      XXXXXX XXXX  X   XXXXX  X
      X   X  X      X   X      X
      X   X  X      X   X      X
      X   X  XXXXXXX XXXXX      XXX

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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

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

*DIAGRAM
1      ID      SLATER HANIFAN GROUP
2      ID      3090 ZONE NORTH INTERIM TANK
3      ID      TECHNICAL DRAINAGE STUDY
4      ID      NOVEMBER 2016
5      ID      EXISTING DRAINAGE CONDITION
6      ID
7      ID      RETURN PERIOD ----- 100 & 10-YEAR
8      ID      DISTRIBUTION ----- 6-HOUR SDN3
9      ID      PROJECT NO. ----- OLY1606.000
10     ID      FILENAME ----- EX.H1
11     ID      DATE ----- 10/04/16
12     ID      MODELED BY ----- JSR
13     ID
14     ID      PRECIPITATION STORM EVENT RATIOS
15     ID      STORM EVENT          RATIO
16     ID      100-YR              1.00
17     ID      10-YR              0.55
18     ID
19     IT      5      0      0      300
20     IO      5      0      0
21     IN      5      0      0
22     JR      PREC      1.00      0.55
*

23     KK      OFF1
24     KM      EXISTING OFFSITE BASIN
25     BA      .0053
26     PB      3.15
27     PC      0      0.020      0.057      0.070      0.087      0.108      0.124      0.130      0.130      0.130
28     PC      0.130      0.130      0.130      0.133      0.140      0.142      0.148      0.158      0.172      0.181
29     PC      0.190      0.197      0.199      0.200      0.201      0.204      0.214      0.229      0.241      0.249
30     PC      0.251      0.256      0.270      0.278      0.281      0.283      0.295      0.322      0.352      0.409
31     PC      0.499      0.590      0.710      0.744      0.781      0.812      0.819      0.835      0.851      0.856
32     PC      0.860      0.868      0.876      0.888      0.910      0.926      0.937      0.950      0.970      0.976
33     PC      0.982      0.985      0.987      0.989      0.990      0.993      0.993      0.994      0.995      0.998
34     PC      0.998      0.999      1
35     LS      0      88.0
36     UD      0.100
*

37     KK      EX1
38     KM      EXISTING ONSITE BASIN
39     BA      .0019
40     LS      0      88.0
41     UD      0.100
*

42     KK      CP1
43     HC      2
*

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1

HEC-1 INPUT

PAGE 2

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

44     KK      OFF2
45     KM      EXISTING OFFSITE BASIN
46     BA      .0042
47     LS      0      88.0
48     UD      0.100
*

49     KK      EX2
50     KM      EXISTING ONSITE BASIN
51     BA      .0019
52     LS      0      88.0
53     UD      0.100

```

EX.OUT

*

54 KK CP2
55 HC 2
56 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
23 OFF1
37 . EX1
42 CP1
44 . OFF2
49 . EX2
54 . CP2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 26OCT16 TIME 10:18:06 *

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

SLATER HANIFAN GROUP
3090 ZONE NORTH INTERIM TANK
TECHNICAL DRAINAGE STUDY
NOVEMBER 2016
EXISTING DRAINAGE CONDITION

RETURN PERIOD ----- 100 & 10-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- OLY1606.000
FILENAME ----- EX.H1
DATE ----- 10/04/16
MODELED BY ----- JSR

PRECIPITATION STORM EVENT RATIOS
STORM EVENT RATIO
100-YR 1.00
10-YR 0.55

20 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
1.00 .55

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 RATIO 2
1.00 .55
Page 2

EX.OUT

HYDROGRAPH AT						
+	OFF1	.01	1	FLOW	9.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	EX1	.00	1	FLOW	3.	1.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP1	.01	1	FLOW	13.	5.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OFF2	.00	1	FLOW	7.	3.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	EX2	.00	1	FLOW	3.	1.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP2	.01	1	FLOW	11.	4.
				TIME	3.50	3.50

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

Proposed Condition HEC-1 Analysis

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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 21OCT16 TIME 15:59:00
*
*****
PRO.OUT
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
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X X XXXXXX XXXX X
X X X X X XX
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XXXXXX XXXX X XXXX
X X X X X X
X X X X X X
X X XXXXXX XXXX XXX

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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 -AMSK- 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

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1
HEC-1 INPUT
PAGE 1
LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
1 ID SLATER HANIFAN GROUP
2 ID 3090 ZONE NORTH INTERIM TANK
3 ID TECHNICAL DRAINAGE STUDY
4 ID NOVEMBER 2016
5 ID PROPOSED DRAINAGE CONDITION
6 ID
7 ID RETURN PERIOD ----- 100 & 10-YEAR
8 ID DISTRIBUTION ----- 6-HOUR SDN3
9 ID PROJECT NO. ----- OLY1606.000
10 ID FILENAME ----- PRO.H1
11 ID DATE ----- 10/12/16
12 ID MODELED BY ----- JSR
13 ID
14 ID PRECIPITATION STORM EVENT RATIOS
15 ID STORM EVENT RATIO
16 ID 100-YR 1.00
17 ID 10-YR 0.55
18 ID
19 IT 5 0 0 300
20 IO 5 0 0
21 IN 5 0 0
22 JR PREC 1.00 0.55
23 KK OFF1
24 KM EXISTING OFFSITE BASIN
25 BA .0053
26 PB 3.15
27 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
28 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
29 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
30 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
31 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
32 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
33 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
34 PC 0.998 0.999 1
35 LS 0 88.0
36 UD 0.100
*
37 KK ON1
38 KM PROPOSED ONSITE BASIN
39 BA .0018
40 LS 0 93.0
41 UD 0.062
*
42 KK CP1
43 HC 2
*

```

```

1
HEC-1 INPUT
PAGE 2
LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
44 KK OFF2
45 KM EXISTING OFFSITE BASIN
46 BA .0042
47 LS 0 88.0
48 UD 0.100
*
49 KK ON2
50 KM PROPOSED ONSITE BASIN
51 BA .0019
52 LS 0 93.0
53 UD 0.066

```

PRO.OUT

*

54 KK CP2
55 HC 2
*
56 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
23 OFF1
.
37 . ON1
.
42 CP1
.
44 . OFF2
.
49 . ON2
.
54 . CP2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 21OCT16 TIME 15:59:00 *

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

SLATER HANIFAN GROUP
3090 ZONE NORTH INTERIM TANK
TECHNICAL DRAINAGE STUDY
NOVEMBER 2016
PROPOSED DRAINAGE CONDITION

RETURN PERIOD ----- 100 & 10-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- OLY1606.000
FILENAME ----- PRO.H1
DATE ----- 10/12/16
MODELED BY ----- JSR

PRECIPITATION STORM EVENT RATIOS
STORM EVENT RATIO
100-YR 1.00
10-YR 0.55

20 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
1.00 .55

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 RATIO 2
1.00 .55
Page 2

						PRO. OUT
HYDROGRAPH AT						
+	OFF1	.01	1	FLOW TIME	9. 3.50	4. 3.50
HYDROGRAPH AT						
+	ON1	.00	1	FLOW TIME	4. 3.50	2. 3.50
2 COMBINED AT						
+	CP1	.01	1	FLOW TIME	13. 3.50	6. 3.50
HYDROGRAPH AT						
+	OFF2	.00	1	FLOW TIME	7. 3.50	3. 3.50
HYDROGRAPH AT						
+	ON2	.00	1	FLOW TIME	4. 3.50	2. 3.50
2 COMBINED AT						
+	CP2	.01	1	FLOW TIME	12. 3.50	5. 3.50

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

Ultimate Condition HEC-1 Analysis

ULT.OUT

 * FLOOD HYDROGRAPH PACKAGE (HEC-1) *
 * JUN 1998 *
 * VERSION 4.1 *
 * RUN DATE 21OCT16 TIME 15:59:29 *

 * 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  X  XX
      X  X  X  X  X  X  X
      XXXXXXX  XXXX  X  XXXXX  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

23          *DIAGRAM
24          ID      SLATER HANIFAN GROUP
25          ID      3090 ZONE NORTH INTERIM TANK
26          ID      TECHNICAL DRAINAGE STUDY
27          ID      NOVEMBER 2016
28          ID      ULTIMATE DRAINAGE CONDITION
29          ID
30          ID      RETURN PERIOD ----- 100 & 10-YEAR
31          ID      DISTRIBUTION ----- 6-HOUR SDN3
32          ID      PROJECT NO. ----- OLY1606.000
33          ID      FILENAME ----- ULT.H1
34          ID      DATE ----- 10/14/16
35          ID      MODELED BY ----- JSR
36          ID
37          ID      PRECIPITATION STORM EVENT RATIOS
38          ID      STORM EVENT          RATIO
39          ID      100-YR          1.00
40          ID      10-YR          0.55
41          ID
42          IT      5      0      0      300
43          IO      5      0      0
44          IN      5      0      0
45          JR      PREC      1.00      0.55
46          *
47          KK      OFF1
48          KM      DEVELOPED OFFSITE BASIN
49          BA      .0053
50          PB      3.15
51          PC      0      0.020      0.057      0.070      0.087      0.108      0.124      0.130      0.130      0.130
52          PC      0.130      0.130      0.130      0.133      0.140      0.142      0.148      0.158      0.172      0.181
53          PC      0.190      0.197      0.199      0.200      0.201      0.204      0.214      0.229      0.241      0.249
54          PC      0.251      0.256      0.270      0.278      0.281      0.283      0.295      0.322      0.352      0.409
55          PC      0.499      0.590      0.710      0.744      0.781      0.812      0.819      0.835      0.851      0.856
56          PC      0.860      0.868      0.876      0.888      0.910      0.926      0.937      0.950      0.970      0.976
57          PC      0.982      0.985      0.987      0.989      0.990      0.993      0.993      0.994      0.995      0.998
58          PC      0.998      0.999      1
59          LS      0      93.0
60          UD      0.053
61          *
62          KK      ON1
63          KM      PROPOSED ONSITE BASIN
64          BA      .0018
65          LS      0      93.0
66          UD      0.062
67          *
68          KK      CP1
69          HC      2
70          *
  
```

1 HEC-1 INPUT PAGE 2

```

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

71          KK      OFF2
72          KM      DEVELOPED OFFSITE BASIN
73          BA      .0042
74          LS      0      93.0
75          UD      0.055
76          *
77          KK      ON2
78          KM      PROPOSED ONSITE BASIN
79          BA      .0019
80          LS      0      93.0
81          UD      0.066
  
```


ULT.OUT

*

54 KK CP2
55 HC 2
56 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
23 OFF1
37 . ON1
42 CP1
44 . OFF2
49 . ON2
54 . CP2

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 21OCT16 TIME 15:59:29 *

* U.S. ARMY CORPS OF ENGINEERS *
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* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
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SLATER HANIFAN GROUP
3090 ZONE NORTH INTERIM TANK
TECHNICAL DRAINAGE STUDY
NOVEMBER 2016
ULTIMATE DRAINAGE CONDITION
RETURN PERIOD ----- 100 & 10-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- OLY1606.000
FILENAME ----- ULT.H1
DATE ----- 10/14/16
MODELED BY ----- JSR

PRECIPITATION STORM EVENT RATIOS
STORM EVENT RATIO
100-YR 1.00
10-YR 0.55

20 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
1.00 .55

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 RATIO 2
1.00 .55
Page 2

ULT.OUT

HYDROGRAPH AT						
+	OFF1	.01	1	FLOW	13.	6.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON1	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP1	.01	1	FLOW	17.	8.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OFF2	.00	1	FLOW	10.	5.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON2	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP2	.01	1	FLOW	14.	7.
				TIME	3.50	3.50

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

APPENDIX C

Hydraulic Analysis

Access Road Flow Computations

Worksheet for Section 2 Min% @ ON1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022
Channel Slope	0.50 %
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Discharge	4.00 ft ³ /s

Results

Normal Depth	0.75 ft
Flow Area	1.67 ft ²
Wetted Perimeter	4.72 ft
Hydraulic Radius	0.35 ft
Top Width	4.48 ft
Critical Depth	0.64 ft
Critical Slope	1.10402 %
Velocity	2.39 ft/s
Velocity Head	0.09 ft
Specific Energy	0.84 ft
Froude Number	0.69
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.75 ft
Critical Depth	0.64 ft
Channel Slope	0.50 %
Critical Slope	1.10402 %

Cross Section for Section 2 Min% @ ON1

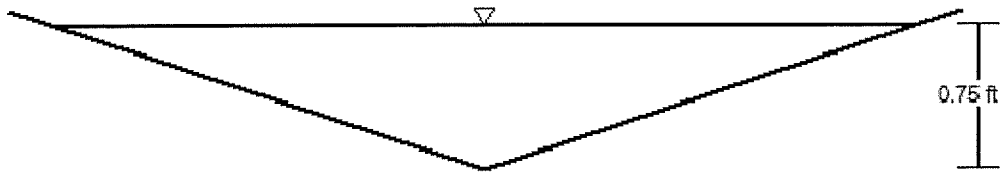
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.022
Channel Slope	0.50 %
Normal Depth	0.75 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Discharge	4.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for Section 2 Max% @ ON1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	1.76	%
Left Side Slope	3.00	H:V
Right Side Slope	3.00	H:V
Discharge	4.00	ft ³ /s

Results

Normal Depth	0.59	ft
Flow Area	1.04	ft ²
Wetted Perimeter	3.73	ft
Hydraulic Radius	0.28	ft
Top Width	3.54	ft
Critical Depth	0.64	ft
Critical Slope	1.10402	%
Velocity	3.83	ft/s
Velocity Head	0.23	ft
Specific Energy	0.82	ft
Froude Number	1.24	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.59	ft
Critical Depth	0.64	ft
Channel Slope	1.76	%
Critical Slope	1.10402	%

Cross Section for Section 2 Max% @ ON1

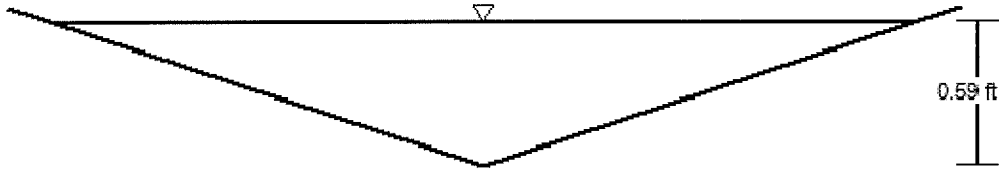
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.022
Channel Slope	1.76 %
Normal Depth	0.59 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Discharge	4.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for Section 3 Min% @ ON2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.50	%
Left Side Slope	3.00	H:V
Right Side Slope	3.00	H:V
Discharge	4.00	ft³/s

Results

Normal Depth	0.75	ft
Flow Area	1.67	ft²
Wetted Perimeter	4.72	ft
Hydraulic Radius	0.35	ft
Top Width	4.48	ft
Critical Depth	0.64	ft
Critical Slope	1.10402	%
Velocity	2.39	ft/s
Velocity Head	0.09	ft
Specific Energy	0.84	ft
Froude Number	0.69	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.64	ft
Channel Slope	0.50	%
Critical Slope	1.10402	%

Cross Section for Section 3 Min% @ ON2

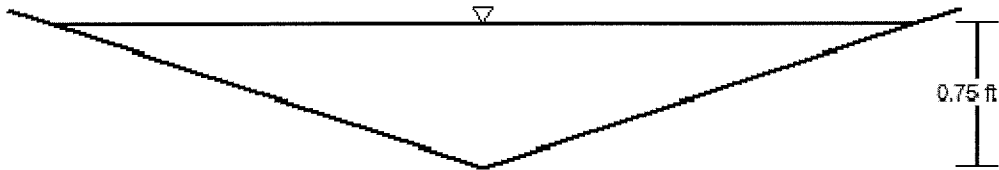
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.022
Channel Slope	0.50 %
Normal Depth	0.75 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Discharge	4.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for Section 3 Max% @ ON2

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	1.34	%
Left Side Slope	3.00	H:V
Right Side Slope	3.00	H:V
Discharge	4.00	ft ³ /s

Results

Normal Depth	0.62	ft
Flow Area	1.16	ft ²
Wetted Perimeter	3.93	ft
Hydraulic Radius	0.29	ft
Top Width	3.72	ft
Critical Depth	0.64	ft
Critical Slope	1.10403	%
Velocity	3.46	ft/s
Velocity Head	0.19	ft
Specific Energy	0.81	ft
Froude Number	1.10	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.62	ft
Critical Depth	0.64	ft
Channel Slope	1.34	%
Critical Slope	1.10403	%

Cross Section for Section 3 Max% @ ON2

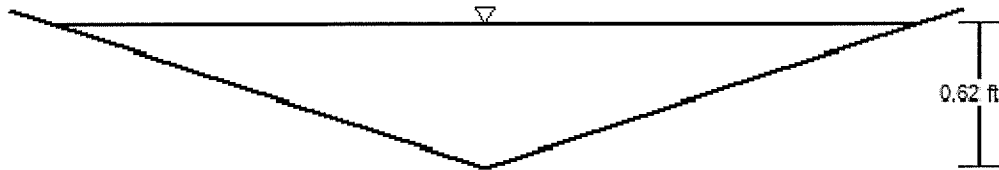
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.022
Channel Slope	1.34 %
Normal Depth	0.62 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Discharge	4.00 ft ³ /s

Cross Section Image



v: 1
H: 1

Worksheet for Section 6 @ ON1(a)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient 0.022 ✓
Channel Slope 0.50 %
Left Side Slope 3.00 H:V
Right Side Slope 3.00 H:V
Discharge 1.00 ft³/s

Results

Normal Depth 0.44 ft
Flow Area 0.59 ft²
Wetted Perimeter 2.81 ft
Hydraulic Radius 0.21 ft
Top Width 2.66 ft
Critical Depth 0.37 ft
Critical Slope 1.32819 %
Velocity 1.69 ft/s
Velocity Head 0.04 ft
Specific Energy 0.49 ft
Froude Number 0.63
Flow Type Subcritical

GVF Input Data

Downstream Depth 0.00 ft
Length 0.00 ft
Number Of Steps 0

GVF Output Data

Upstream Depth 0.00 ft
Profile Description
Profile Headloss 0.00 ft
Downstream Velocity Infinity ft/s
Upstream Velocity Infinity ft/s
Normal Depth 0.44 ft
Critical Depth 0.37 ft
Channel Slope 0.50 %
Critical Slope 1.32819 %

Cross Section for Section 6 @ ON1(a)

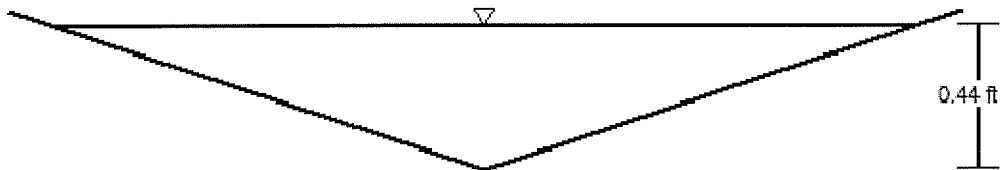
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.022
Channel Slope	0.50 %
Normal Depth	0.44 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Discharge	1.00 ft ³ /s

Cross Section Image



V: 1
H: 1

Perimeter Ditch Flow Computations

Worksheet for Section 1 Max% @ OFF1

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.59 %
Discharge 13.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3.00
0+01.00	0.00
0+11.00	0.00
0+12.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3.00)	(0+12.00, 3.00)	0.022

Options

Current roughness weighted Improved Lotter's Method
Method
Open Channel Weighting Method Improved Lotter's Method
Closed Channel Weighting Method Horton's Method

Results

Normal Depth 0.28 ft
Elevation Range 0.00 to 3.00 ft
Flow Area 2.86 ft²
Wetted Perimeter 10.60 ft
Hydraulic Radius 0.27 ft
Top Width 10.19 ft
Normal Depth 0.28 ft
Critical Depth 0.37 ft
Critical Slope 1.05313 %

Worksheet for Section 1 Max% @ OFF1

Results

Velocity	4.54	ft/s
Velocity Head	0.32	ft
Specific Energy	0.60	ft
Froude Number	1.51	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.37	ft
Channel Slope	2.59	%
Critical Slope	1.05313	%

Project Description

Solve For	Normal Depth
-----------	--------------

Input Data

Discharge	13.00	ft ³ /s
-----------	-------	--------------------

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3.00
0+01.00	0.00
0+11.00	0.00
0+12.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3.00)	(0+12.00, 3.00)	0.022

Options

Closed Channel Weighting Method	Horton's Method
1. Compute the peak flow rate for each subcatchment using the unit hydrograph method. 2. Compute the peak flow rate for the entire watershed by summing the peak flow rates for each subcatchment.	1. Compute the peak flow rate for each subcatchment using the unit hydrograph method. 2. Compute the peak flow rate for the entire watershed by summing the peak flow rates for each subcatchment.

Results

Critical Slope	1.05317	%
----------------	---------	---

Worksheet for Section 1 Min% @ OFF1

Results

Velocity	3.84	ft/s
Velocity Head	0.23	ft
Specific Energy	0.56	ft
Froude Number	1.18	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.37	ft
Channel Slope	1.50	%
Critical Slope	1.05317	%

Messages

Notes

Cross Section for Section 1 Min% @ OFF1

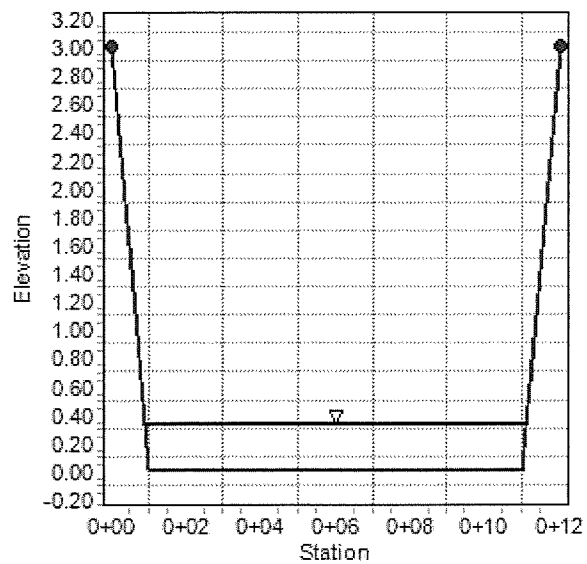
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.50 %
Normal Depth 0.33 ft
Discharge 13.00 ft³/s

Cross Section Image



Worksheet for Section 4 @ OFF2

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.60 %
Discharge 10.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.00
0+05.00	0.00
0+23.00	0.00
0+28.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.00)	(0+28.00, 0.50)	0.022

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.17 ft
Elevation Range 0.00 to 1.00 ft
Flow Area 3.18 ft²
Wetted Perimeter 20.51 ft
Hydraulic Radius 0.16 ft
Top Width 20.48 ft
Normal Depth 0.17 ft
Critical Depth 0.21 ft
Critical Slope 1.22666 %

Worksheet for Section 4 @ OFF2

Results

Velocity	3.14	ft/s
Velocity Head	0.15	ft
Specific Energy	0.32	ft
Froude Number	1.40	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.21	ft
Channel Slope	2.60	%
Critical Slope	1.22666	%

Project Description

Input Data

Section Definitions

Roughness Segment Definitions

Options

Results

11/3/2016 5:40:21 PM 27 Siemens Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Bentley Systems, Inc. Bentley FlowMaster V8i (SELECTseries 1) [08.11.01.03] Page 1 of 2

Worksheet for Section 7 Max% @ OFF2

Results

Velocity	4.91	ft/s
Velocity Head	0.38	ft
Specific Energy	0.58	ft
Froude Number	1.93	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.20	ft
Critical Depth	0.31	ft
Channel Slope	4.67	%
Critical Slope	1.10386	%

Cross Section for Section 7 Max% @ OFF2

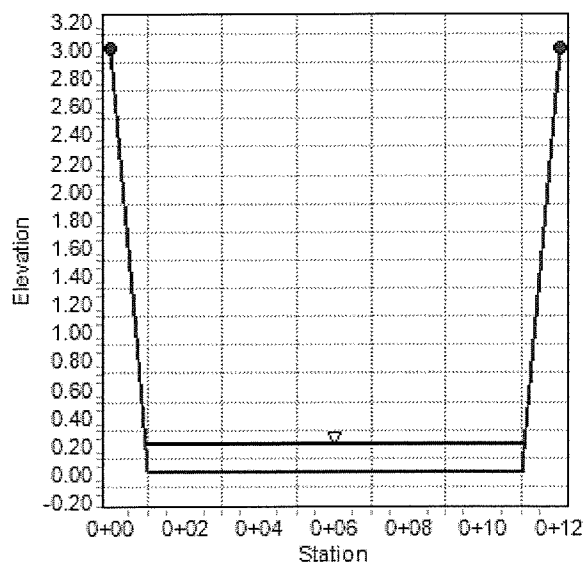
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 4.67 %
Normal Depth 0.20 ft
Discharge 10.00 ft³/s

Cross Section Image



Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Channel Slope	1.46	%
Discharge	10.00	ft ³ /s

Station (ft)	Elevation (ft)
0+00.00	3.00
0+01.00	0.00
0+11.00	0.00
0+12.00	3.00

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3.00)	(0+12.00, 3.00)	0.022

Current Roughness Weighted Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Normal Depth	0.29	ft
Elevation Range	0.00 to 3.00	ft
Flow Area	2.91	ft²
Wetted Perimeter	10.61	ft
Hydraulic Radius	0.27	ft
Top Width	10.19	ft
Normal Depth	0.29	ft
Critical Depth	0.31	ft
Critical Slope	1.10404	%

Worksheet for Section 7 Min% @ OFF2

Results

Velocity	3.44	ft/s
Velocity Head	0.18	ft
Specific Energy	0.47	ft
Froude Number	1.14	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

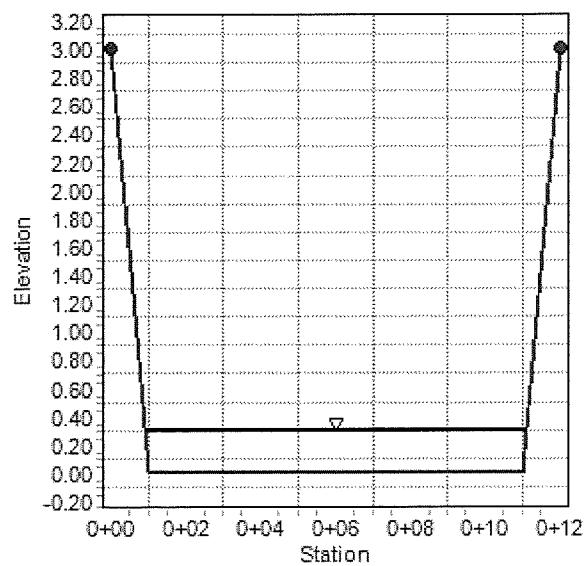
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.29	ft
Critical Depth	0.31	ft
Channel Slope	1.46	%
Critical Slope	1.10404	%

Project Description

Input Data

Cross Section Image



Worksheet for Section 9 Max% @ OFF1

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 6.58 %
Discharge 13.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3.00
0+01.00	0.00
0+11.00	0.00
0+12.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3.00)	(0+12.00, 3.00)	0.037

Options

Current Roughness weighted Method Improved Lotter's Method
Open Channel Weighting Method Improved Lotter's Method
Closed Channel Weighting Method Horton's Method

Results

Normal Depth 0.29 ft
Elevation Range 0.00 to 3.00 ft
Flow Area 2.96 ft²
Wetted Perimeter 10.62 ft
Hydraulic Radius 0.28 ft
Top Width 10.20 ft
Normal Depth 0.29 ft
Critical Depth 0.37 ft
Critical Slope 2.97942 %

Worksheet for Section 9 Max% @ OFF1

Results

Velocity	4.39	ft/s
Velocity Head	0.30	ft
Specific Energy	0.59	ft
Froude Number	1.44	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.29	ft
Critical Depth	0.37	ft
Channel Slope	6.58	%
Critical Slope	2.97942	%

Worksheet for Section 9 Min% @ OFF1

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 5.50 %
Discharge 13.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3.00
0+01.00	0.00
0+11.00	0.00
0+12.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3.00)	(0+12.00, 3.00)	0.037

Options

Current Roughness Weighted Method Improved Lotter's Method
Open Channel Weighting Method Improved Lotter's Method
Closed Channel Weighting Method Horton's Method

Results

Normal Depth 0.31 ft
Elevation Range 0.00 to 3.00 ft
Flow Area 3.13 ft²
Wetted Perimeter 10.65 ft
Hydraulic Radius 0.29 ft
Top Width 10.21 ft
Normal Depth 0.31 ft
Critical Depth 0.37 ft
Critical Slope 2.97901 %

Worksheet for Section 9 Min% @ OFF1

Results

Velocity	4.16	ft/s
Velocity Head	0.27	ft
Specific Energy	0.58	ft
Froude Number	1.32	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.37	ft
Channel Slope	5.50	%
Critical Slope	2.97901	%

Messages

Notes

Project Description

Solve For	Normal Depth
-----------	--------------

Channel Slope	5.50	%
Normal Depth	0.31	ft
Discharge	13.00	ft ³ /s

Worksheet for Section 10 @ OFF2

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 7.04 %
Discharge 10.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3.00
0+01.00	0.00
0+11.00	0.00
0+12.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3.00)	(0+12.00, 3.00)	0.037

Options

Current Roughness Weighted Method Improved Lotter's Method
Open Channel Weighting Method Improved Lotter's Method
Closed Channel Weighting Method Horton's Method

Results

Normal Depth 0.24 ft
Elevation Range 0.00 to 3.00 ft
Flow Area 2.47 ft²
Wetted Perimeter 10.52 ft
Hydraulic Radius 0.23 ft
Top Width 10.16 ft
Normal Depth 0.24 ft
Critical Depth 0.31 ft
Critical Slope 3.12224 %

Worksheet for Section 10 @ OFF2

Results

Velocity	4.05	ft/s
Velocity Head	0.26	ft
Specific Energy	0.50	ft
Froude Number	1.45	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.31	ft
Channel Slope	7.04	%
Critical Slope	3.12224	%

Cross Section for Section 10 @ OFF2

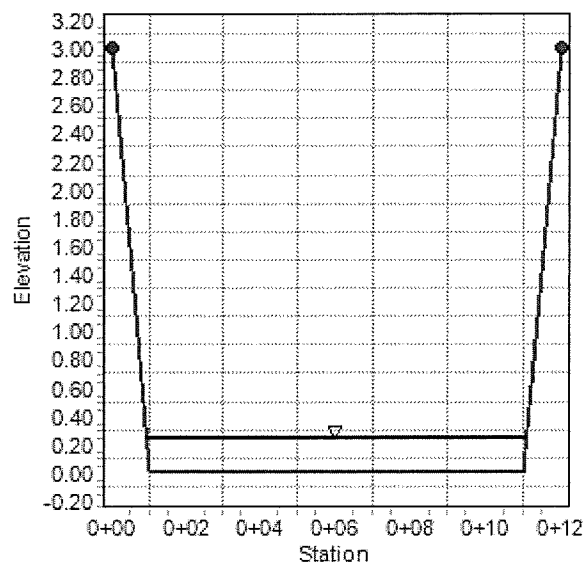
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	7.04	%
Normal Depth	0.24	ft
Discharge	10.00	ft ³ /s

Cross Section Image



Tank Road Ditch Flow Computations

Worksheet for Section 5 @ CP2 Discharge

Results

Velocity Head	0.18	ft
Specific Energy	1.02	ft
Froude Number	0.92	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.84	ft
Critical Depth	0.81	ft
Channel Slope	0.81	%
Critical Slope	0.97085	%

Cross Section for Section 5 @ CP2 Discharge

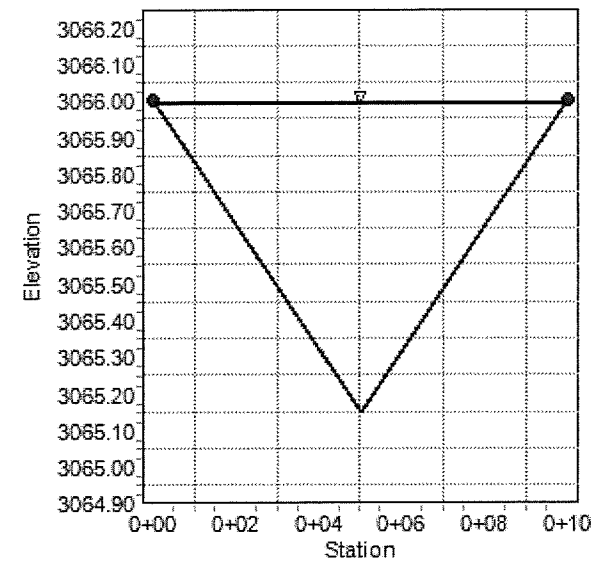
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.81	%
Normal Depth	0.84	ft
Discharge	14.00	ft ³ /s

Cross Section Image



Project Description

Input Data

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	3068.21
0+05.77	3068.00
0+32.28	3067.00
0+41.55	3067.00
0+56.67	3068.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 3068.20)	(0+56.67, 3068.00)	0.022

Options

Current Roughness vveighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.28	ft
Elevation Range	3067.00 to 3068.20	ft
Flow Area	4.25	ft²
Wetted Perimeter	20.99	ft
Hydraulic Radius	0.20	ft
Top Width	20.97	ft
Normal Depth	0.28	ft
Critical Depth	0.32	ft

Worksheet for Section 8 Maintenance Road @ OFF2

Results

Critical Slope	1.15627	%
Velocity	3.29	ft/s
Velocity Head	0.17	ft
Specific Energy	0.45	ft
Froude Number	1.29	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.32	ft
Channel Slope	2.00	%
Critical Slope	1.15627	%

Cross Section for Section 8 Maintenance Road @ OFF2

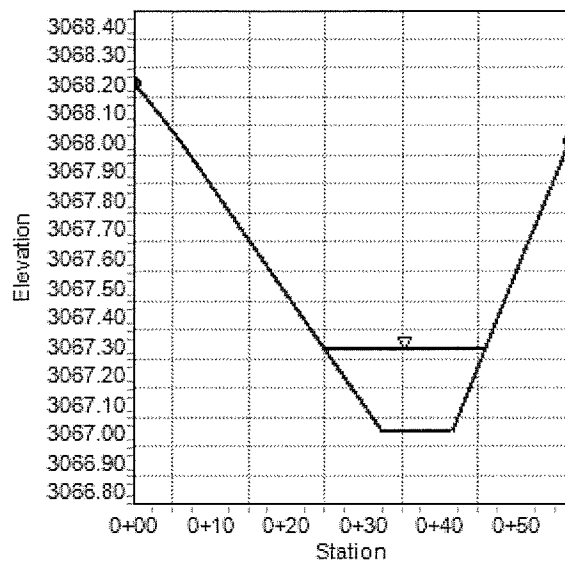
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.00	%
Normal Depth	0.28	ft
Discharge	14.00	ft ³ /s

Cross Section Image



Block Wall Opening

Block Wall Opening Computation

FACILITY DESCRIPTION

Project Name: 3090 Zone North Interim Tank

Date: 10/13/2016

File Name: OLY1606 TDS Block Wall Opening.xlsx

By: JSR

Location: Basin ON1

Known Information:

H = Height of Opening (ft)	1.33
L = Length of Opening (ft)	4.00
Cf = Clogging Factor (%)	50

Weir Conditions:

$$Q = C_w * L * H_{clg}^{3/2}$$

Cw = Weir Coefficient	2.70
H _{clg} = Height with clogging	0.7
Q = Flow allowed through opening	5.9

Orifice Conditions:

$$Q = C_o * A_{clg} * (2gH_{clg})^{1/2}$$

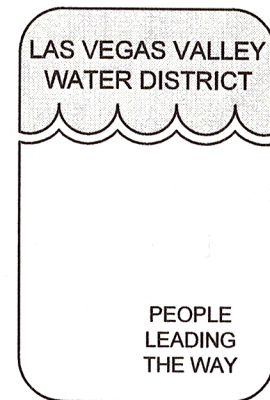
Co = Orifice Coefficient	0.67
A _{clg} = Area with clogging	2.67
Q = Flow allowed through opening	8.3

Worst Case Scenario Occurs Under Weir Conditions

Allowed Flow Through Opening = 5.9 cfs

APPENDIX D

Grading Plan and Detail Sheets



LAS VEGAS VALLEY WATER DISTRICT

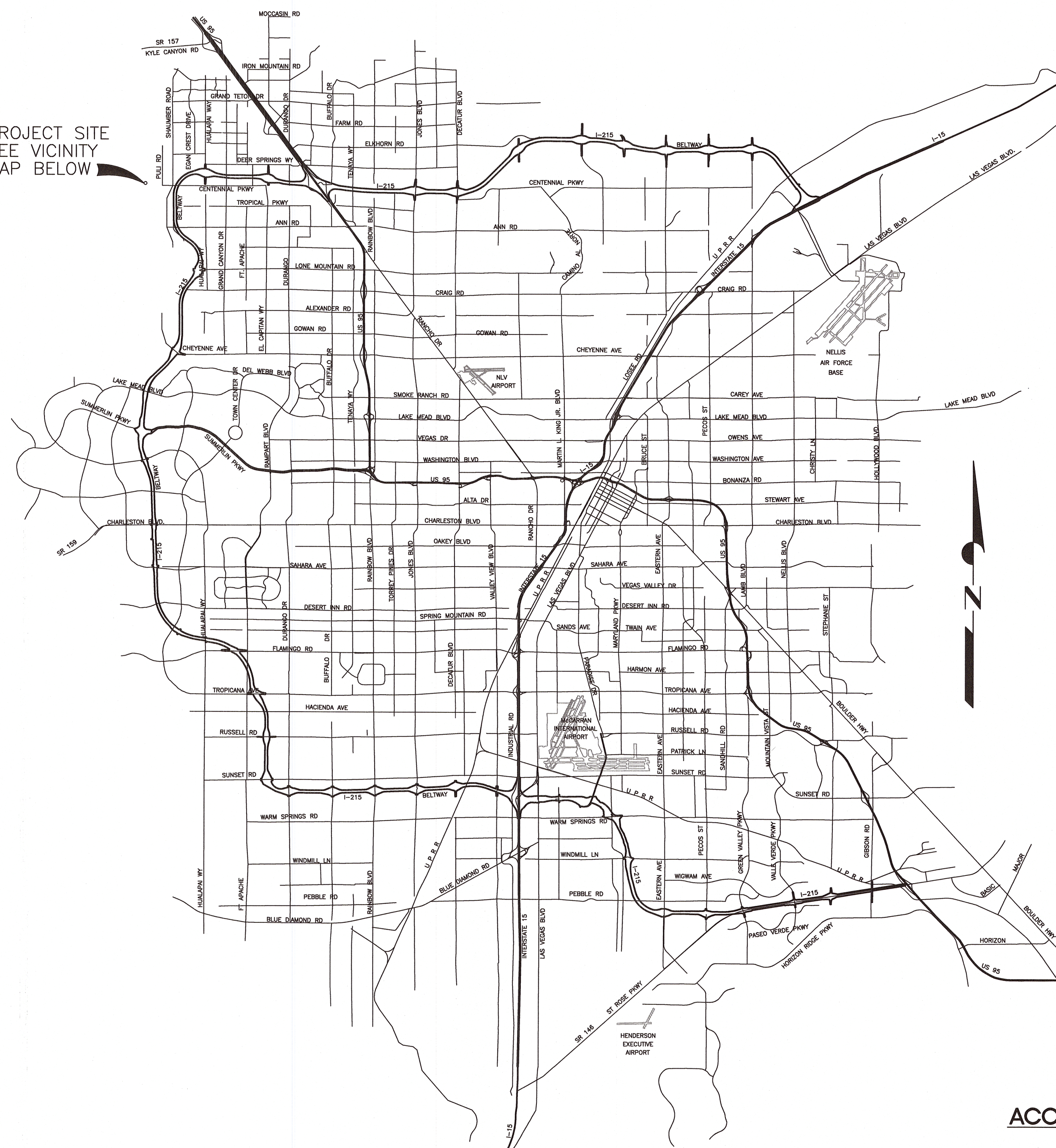
CONTRACT NO. C1453 3090 ZONE NORTH INTERIM TANK



LIST OF DRAWINGS

SHEET NO	DRAWING NO	DESCRIPTION
1	G1	COVER SHEET
2	G2	CLARK COUNTY GENERAL NOTES I
3	C1	GRADING PLAN
4	CD1	DETAILS & SECTIONS

PROJECT SITE
SEE VICINITY
MAP BELOW



LEGEND

- ROADWAY CENTERLINE
- EASEMENT LINE
- PROPERTY LINE
- FLOWLINE
- EDGE OF PAVEMENT (EP)
- PROPOSED ELEVATION
- EXISTING ELEVATION
- FUTURE ELEVATION
- EXISTING CONTOUR (5-FT)
- EXISTING CONTOUR (1-FT)
- PROPOSED CONTOUR (5-FT)
- PROPOSED CONTOUR (1-FT)
- CMU WALL OR TUBULAR STEEL FENCE

OWNER/DEVELOPER ENGINEER

DEVELOPER
NINETY-FIVE MANAGEMENT LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141
PH: 702-220-8565
FX: 702-220-6566
CONTACT:

SLATER HANIFAN GROUP, INC.
5740 S. ARVILLE STREET,
SUITE 216
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: DAVID HAILE

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 10LV9925NNW6
RIVET AND PLATE IN TOP OF CURB SOUTHWEST CORNER OF
NORTH SHAMBER ROAD AND WEST CENTENNIAL PARKWAY
ELEVATION = 2916.81 FEET, 889.045 METERS
PER THE CITY OF LAS VEGAS BENCHMARK BOOK -
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS

SOUTH 89°00'28" WEST, BEING THE BEARING OF THE
SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF
SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST,
MOUNT DIABLO MAERIDAN, CITY OF LAS VEGAS, CLARK
COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN
BOOK 144, PAGE 77 OF PLATS IN THE CLARK COUNTY
RECORDER'S OFFICE, NEVADA.

GEOTECHNICAL ENGINEER

PREPARED BY: GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 SOUTH ESCONDIDO ST, SUITE B,
LAS VEGAS, NV 89119
PHONE: (702)897-1424
PROJECT No. 12208-LVR
DATED: OCTOBER 25, 2016

ACCEPTED BY:

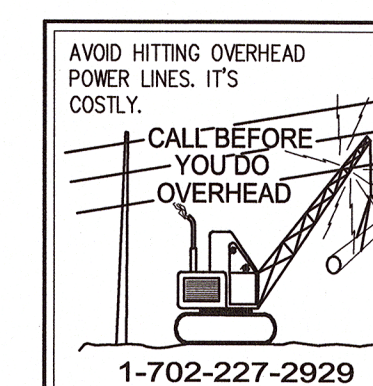
PETER J. JAUCH, P.E. DIRECTOR OF ENGINEERING DATE

LOCATION MAP

NOT TO SCALE

CAUTION TO CONTRACTOR:

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE
ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES
AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.



LAS VEGAS VALLEY WATER DISTRICT

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

VERIFY SCALE

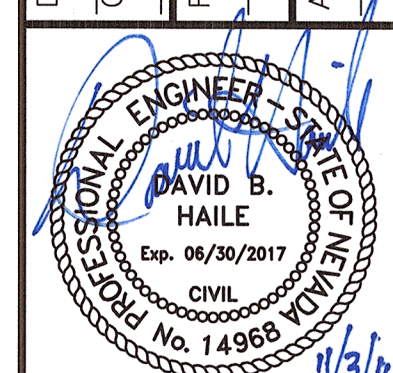


BAR REPRESENTS
ONE AND ONE-HALF
INCHES ON ORIGINAL

3090 ZONE NORTH INTERIM TANK

COVER SHEET

DRAWN BY: SE
CHECKED BY: DBH
RECOMMENDED BY: RYAN PEARSON
ACCEPTED BY: DAVID HAILE
DESIGN MANAGER



CONTRACT NUMBER

C1453

REVISIONS:

DRAWING NUMBER G1
SHEET 1 OF 4

J:\JULY1608-000 Sive Canyon 3090 Zone North Interim Tank\dwg\improv\Reservoir1/2/2016 8:32 AM Sergio Elizondo

CLARK COUNTY TRAFFIC NOTES

1. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
2. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. ALL CONSTRUCTION SIGNING, BARRICADING AND PAVEMENT MARKINGS SHALL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK – 1986 AND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION.
4. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGNPOSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE CLASS VI SHEETING.
6. IF A PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN HEREON TO BE MOUNTED ON A SIGN POST, CHANGE SIGN MOUNTING TO ONE ON THE STREETLIGHT STANDARD.
7. PRIOR TO CONSTRUCTION, THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE CURRENT PLANNING DIVISION OF THE DEPARTMENT OF COMPREHENSIVE PLANNING.
8. ALL TRAFFIC SIGNAL POLE ASSEMBLIES, STEEL PEDESTAL FOR CABINETS AND STREET LIGHT POLES SHALL BE GALVANIZED PER ASTM A.123.
9. ALL STREET LIGHTING INSTALLATIONS EXCEPT NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE UNIFORM STANDARD DRAWINGS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA, LATEST EDITION OF EACH.
10. THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA: STREET LIGHTING, TRAFFIC SIGNALS, AND FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.) INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT 455-6000 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF "CALL BEFORE YOU DIG" (UNDERGROUND SERVICE ALERT), AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
11. F.A.S.T. INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE WHILE PERMANENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO F.A.S.T. ANY DAMAGE TO THIS CABLE IS DEEMED IN EMERGENCY BY F.A.S.T., CITY OF LAS VEGAS, CLARK COUNTY AND NDOT AND MUST BE REPAIRED IMMEDIATELY TO F.A.S.T. ACCEPTANCE. \$2,500 PER DAY DAMAGES MAY BE ASSESSED AFTER 24 HOURS HAS ELAPSED FROM TIME OF BREAK OR DAMAGE.
12. ALL NEW OR REPLACEMENT TRAFFIC SIGNAL LOOPS SHALL BE INSTALLED USING CABLE-IN-DUCT WIRING, SHALL HAVE INDEPENDENT LEAD-IN WIRES FOR EACH LOOP FROM THE CONTROLLER TO THE PULL-BOX, AND EACH LEAD-IN SHALL BE INDIVIDUALLY TAGGED.
13. TRAFFIC SIGNAL PEDESTRIAN HEADS SHALL BE THE L.E.D. TYPE.
14. ELECTRICAL POWER SERVICE POINT LOCATION(S) FOR STREET LIGHTING AND TRAFFIC SIGNALS MUST BE INDICATED ON THE PLANS. IF CONNECTING TO AN EXISTING CIRCUIT, INDICATE LOCATION OF EXISTING SERVICE POINT FOR EACH CIRCUIT.
15. WHEN STREETLIGHTS ARE TO BE CONNECTED TO AN EXISTING CIRCUIT, THE ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD.
16. CLARK COUNTY RESERVES THE RIGHT TO REJECT STREET LIGHT AND TRAFFIC SIGNAL POLES AND ASSEMBLIES WHICH HAVE A "STRIPED" APPEARANCE.
17. TWO WEEKS PRIOR TO BEGINNING OF CONSTRUCTION, MODIFICATION OR RELOCATION OF ANY TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION OF THE DATE THAT WORK WILL BEGIN.
18. THREE (3) NORMAL WORKING DAYS PRIOR TO TURN-ON OR COMPLETION OF MODIFICATION(S) TO A TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION THAT WORK IS BEING COMPLETED AND THE PROPOSED DATE OF COMPLETION.

STORM WATER MANAGEMENT NOTES

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 COUNTY OF CLARK 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 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 ANY 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.

DEVIATIONS FROM STANDARDS

THERE ARE NO DEVIATIONS FROM APPLICABLE CLARK COUNTY STANDARDS, UNLESS STATED IN THE SPECIFICATIONS.

CLARK COUNTY GENERAL NOTES

1. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITION BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND OF INGRESS AND EGRESS TO SAID CONSTRUCTION. EXTENT OF TRANSITIONS TO BE DETERMINED BY THE COUNTY ENGINEER.
2. EXISTING UTILITIES ARE LOCATED ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR THE PROTECTION OF UTILITIES AND THE ENGINEER BEARS NO RESPONSIBILITY FOR UTILITIES NOT SHOWN ON PLANS OR NOT IN THE LOCATION SHOWN ON THE PLANS. (CALL BEFORE YOU DIG 800-227-2600).
3. CONSTRUCTION SURVEY: GRADES ARE GIVEN FROM TOP OF STAKES OR NAILS. THE CONTRACTORS ARE CAUTIONED TO OBSERVE THE FOLLOWING RULE IN USING THE GRADE STAKES GIVEN BY THIS OFFICE. THREE CONSECUTIVE POINTS THAT ARE SHOWN TO BE ON THE SAME RATE OF SLOPE MUST BE USED IN COMMON IN ORDER THAT ANY VARIATION OUT OF A PERFECT STRAIGHT GRADE MAY BE DETECTED. IN CASE ANY SUCH DISCREPANCY IS FOUND, THE SAME MUST BE REPORTED OTHERWISE THIS OFFICE WILL NOT BE RESPONSIBLE FOR ANY ERROR IN THE GRADE OF THE FINISH WORK.
4. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY THE EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITIES REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA AND AS PROVIDED IN THE SPECIFICATIONS. THE CONTRACTOR SHALL USE EXTREME CARE WORKING OVER OR NEAR ANY EXISTING GAS MAINS.
5. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS, WHICH ARE TO REMAIN IN PLACE FROM DAMAGE. ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED TO THE SATISFACTION OF THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
6. FENCES, SIGNS, STRUCTURES, LIGHTS AND OTHER EXISTING IMPROVEMENTS WITHIN STREET R/W SHALL BE REMOVED WHERE SHOWN ON THE CONTRACT DRAWINGS, AND AS REQUIRED BY THE ENGINEER.
7. REPLACEMENT, RELOCATION OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING FENCES, WALL SIGNS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE AS REQUIRED BY THE ENGINEER.
8. THE CONTRACTOR SHALL BACKFILL AND FINAL GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL EXISTING SANITARY, WATER AND STORM SEWER MANHOLES TO THE FINAL FINISH GRADES IN ACCORDANCE WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS AND IN ACCORDANCE WITH SECTION 609 OF THE "STANDARD SPECIFICATIONS".
10. 48 HOURS PRIOR TO START OF CONSTRUCTION THE CONTRACTOR SHALL CONTACT:
NV ENERGY PHONE – (702) 402-8400
CENTURYLINK TELEPHONE COMPANY PHONE – (702) 244-7055
SOUTHWEST GAS CORPORATION PHONE – (702) 651-2111
LAS VEGAS VALLEY WATER DISTRICT PHONE – (702) 870-2011
11. PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
12. WHEELCHAIR RAMPS SHALL BE CONSTRUCTED AT ALL STREET INTERSECTIONS PER CLARK COUNTY STANDARD DRAWING 235 EXACT LOCATION OF RAMP TO BE DETERMINED IN FIELD BY A CLARK COUNTY INSPECTOR.
13. STANDARD STREET SECTIONS PER CLARK COUNTY STANDARD DRAWINGS UNLESS OTHERWISE NOTED.
14. CURB AND GUTTER WITH A GRADE OF LESS THAN FOUR TENTHS OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
15. VALLEY GUTTER WITH A GRADE OF FOUR TENTHS OF ONE PERCENT OR LESS SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE PROPER DRAINAGE ACROSS ALL VALLEY GUTTERS.
16. ALL BARRICADING AND TEMPORARY TRAFFIC CONTROL DEVICES OR METHODS USED DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "NEVADA TRAFFIC CONTROL MANUAL, 1986 PUBLISHED BY THE STATE OF NEVADA, DEPARTMENT OF TRANSPORTATION, EXCEPT AS OTHERWISE PROVIDED IN THE CONTRACT DRAWINGS.
17. ALL GRADING SHALL BE IN ACCORDANCE WITH THE SPECIFICATION MANUAL AND THE SOILS REPORT AS PREPARED BY ADD FIELD WHERE CONFLICTS OCCUR THE MOST RESTRICTIVE SHALL GOVERN.
18. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL OVERHEAD AND UNDERGROUND 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 OR UNDERGROUND FACILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COSTS AND LIABILITY IN CONNECTION THEREWITH.
19. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY ALTERATIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.
20. THE CONTRACTOR SHALL APPLY FOG SEAL ONLY AFTER ALL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
21. THE CONTRACTOR SHALL NOT BACKFILL ANY TRENCHES IN WHICH WATERLINES HAVE BEEN UNCOVERED UNTIL THE WATERLINES HAVE BEEN INSPECTED BY THE LAS VEGAS VALLEY WATER DISTRICT.
22. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND VALLEY GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY.
23. TYPE V CEMENT SHALL BE USED IN ALL CONCRETE WORK.
24. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ALL MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.550.

REGIONAL TRANSPORTATION COMMITTEE
CITIZENS AREA TRANSIT ACCESS NOTES

1. UNLESS OTHERWISE SPECIFIED IN THE SPECIAL PROVISIONS, NO PUBLIC BUS OR TRANSIT STOP SHALL BE TEMPORARILY CLOSED WITHOUT THE WRITTEN CONSENT OF THE REGIONAL TRANSPORTATION COMMISSION (RTC) DIRECTOR OR HIS DESIGNEE. THE RTC SHALL BE NOTIFIED AT LEAST TEN (10) WORKING DAYS PRIOR TO THE PROPOSED TEMPORARY CLOSURE OF ANY BUS OR TRANSIT STOP, INCLUDING THOSE LISTED IN THE SPECIAL PROVISIONS.
2. NO BUS STOPS AT TRANSFER POINTS SHALL BE CLOSED DURING CONSTRUCTION. BUS STOPS AT TRANSFER POINTS CAN, HOWEVER, BE TEMPORARILY RELOCATED WITH THE APPROVAL OF THE RTC DIRECTOR OR HIS DESIGNEE.
3. IF BUS OR TRANSIT STOP IS TEMPORARILY RELOCATED, THE EXISTING BUS OR TRANSIT STOP SIGN PANELS SHALL BE RELOCATED TO TEMPORARY BUS OR TRANSIT STOPS AND SHALL REMAIN UNTIL TEMPORARY STOP IS REMOVED. TEMPORARY RELOCATION OF SIGN PANELS SHALL CONFORM TO SUBSECTION 627.03.05, "RELOCATION."
4. THE CONTRACTOR SHALL MAINTAIN ACCESS WHICH IS IN CONFORMANCE TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT TO AND FROM BUS OR TRANSIT STOPS WHICH REMAIN OPEN AT ALL TIMES DURING CONSTRUCTION.

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.

PRE-DEVELOPMENT NOTE

A PRE-DEVELOPMENT MEETING WITH THE DEPARTMENT OF PUBLIC WORKS DEVELOPMENT REVIEW DIVISION, OFF-SITE INSPECTOR IS REQUIRED. PLEASE CONTACT INSPECTOR AT 455-4610

SWPPP 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](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.

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

CLARK COUNTY PUBLIC WORKS DEVELOPMENT REVIEW

1. INSPECTIONS ARE REQUIRED. CALL 24 HOURS IN ADVANCE, 455-4610. YOUR PERMIT, APPROVED PLANS, AND BARRICADE PLANS FOR THIS WORK MUST BE ON THE JOB SITE AT ALL TIMES.
2. EXACT LOCATION OF ALL SAW-CUT LINES SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
3. CURB AND GUTTER WITH A GRADE OF LESS THAT 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
4. FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF (1/2") INCH ABOVE THE LIP OF THE GUTTER (INCLUDING OPEN GRADE).
5. ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA NEVADA AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, LATEST REVISION.
6. PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
7. WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
8. PROPER SIGNS, BARRIERS, BARRICADES AND LIGHTS SHALL BE PLACED AND MAINTAINED IN ACCORDANCE WITH THE LATEST "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS". TRAFFIC, SCHOOL, OR STREET SIGNS OF ANY KIND ARE NOT TO BE MOVED FOR ANY REASON WITHOUT FIRST COORDINATING WITH THE DEPARTMENT OF PUBLIC WORKS INSPECTIONS AT 702-455-4610.
9. THIS PLAN DOES NOT AUTHORIZE CLOSURE OF ANY ROAD OR STREET.
10. NO OPEN TRENCH SHALL BE ALLOWED ACROSS ANY STREET OR WITHIN TEN (10') OF ANY TRAVEL-WAY, EXCEPT WHEN WORK IS IN ACTUAL PROGRESS. AREAS COVERED BY ACCEPTABLE STEEL PLATE ARE NOT TO BE CONSTRUED AS A TRENCH. NO OPEN TRENCH IS PERMITTED IN EXCESS OF 500 FEET OR LENGTH NECESSARY TO ACCOMMODATE PIPE INSTALLATION IN A SINGLE DAY, WHICH EVER IS GREATER. ALL TRENCH CROSSINGS AND BACKFILL SHALL MEET THE STANDARD SPECIFICATION UNLESS OTHERWISE STATED.
11. A TEMPORARY PATCH IS TO BE IN PLACE AT THE END OF EACH WORK DAY WHERE THE BACKFILL IN THE TRENCH HAS BEEN COMPLETED AND PRIOR TO OPENING THE WORK AREA BACK TO TRAFFIC AND IS TO BE MAINTAINED BY THE PERMITEE. A PERMANENT PATCH IS TO BE IN PLACE WITHIN THIRTY (30) DAYS AFTER THE INSTALLATION OF THE TEMPORARY PATCH.
12. COMPACTION TESTS ARE REQUIRED.

ABBREVIATIONS

AC	ASPHALTIC CONCRETE OR ACRE	HDPE	HIGH DENSITY POLYETHYLENE	RCB	REINFORCED CONCRETE BOX
AGG	AGGREGATE BASE	HOA	HOME OWNERS ASSOCIATION	RCP	REINFORCED CONCRETE PIPE
APN	ASSESSORS PARCEL NUMBER	HORIZ	HORIZONTAL	RD	ROAD
APPROX OR ~	APPROXIMATE	HP	HIGH POINT	RDMV ESMT	ROADWAY EASEMENT
AVE	AVENUE	HWL	HIGH WATER LEVEL	RCD	REQUIRED
Ø	AT	HDWL OR HW	HEADWALL	REV	REVISION
BC	BEGIN CURVE OR BACK OF CURB	HSS	HOLLOW STRUCTURAL STEEL	REV	REVISION
BGR	BEGINNING OF CURB RETURN	HYD	HYDRAULIC OR HYDRANT	RT OR R	RIGHT
BHW	BOTTOM OF HEADWALL	ID	INSIDE DIAMETER	R/W, ROW	RIGHT OF WAY
BLDG	BUILDING	IN	INCH	SCH	SCHEDULE
BLVD	BOULEVARD	INT	INTERSECTION	SD	STORM DRAIN
BW	BENCHMARK	INV	INVERT ELEVATION	SDMH	STORM DRAIN MANHOLE
BVC	BEGIN VERTICAL CURVE	IP	IRON PIPE	SEC	SECTION
BWV	BACK WATER VALVE	IRRIG	IRRIGATION	SFS	SERVICE ENTRANCE SECTION
CC	CLARK COUNTY	LP	LINEAR FEET	SF	SQUARE FEET
CLAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS	LT OR L	LEFT	SHT	SHEET
CRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT	LWL	LOW WATER LEVEL	SL	SLOPE
CE	COMMON ELEMENT	MAX	MAXIMUM	SLTC	STREET LIGHT AND TRAFFIC CONTROL EASEMENT
CLC/A,C	CENTERLINE	MECH	MECHANICAL	SNWA	SOUTHERN NEVADA WATER AUTHORITY
CLR	CLEAR OR CLEARANCE	MH	MANHOLE	SPECS	SPECIFICATIONS
CLSM	CONTROLLED LOW STRENGTH MATERIAL	MIN	MINIMUM	ST	STREET
CLM&C	CEMENT MORTAR LINED AND COATED	MISC	MISCELLANEOUS	SDMH	SANITARY SEWER MANHOLE
CMU	CONCRETE MASONRY UNIT	MUE	MUNICIPAL UTILITY EASEMENT	STA	STATION
CONC	CONCRETE	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	STD	STANDARD
CT	COURT	NTE	NOT TO SCALE	STL	STREET LIGHT
CUY OR CU YD	CURB YARD	NUE	NONEXCLUSIVE UTILITY EASEMENT	SW	SIDEWALK
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS	OC	ON CENTER	SWG	SOUTHWEST GAS
DET	DETAIL	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	SWR OR SS	SANITARY SEWER
DI	DUCTILE IRON OR DRAIN INLET	OFF	OFF	SY	SQUARE YARD
DIA, Ø	DIAMETER	ORIG	ORIGINAL	TAN	TANGENT
DIP	DUCTILE IRON PIPE	PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	TC	TOP OF CURB
DR	DRAIN	PB	PULL BOX	TF	TOP OF FOOTING
DWG(S)	DRAWING	PC	POINT OF CURVE	TG	TOP OF GRATE
EA	EACH	PCC	POINT OF COMPOUND CURVE	THRU	THROUGH
ECR	END CURB RETURN	PDE	PUBLIC DRAINAGE EASEMENT	THW	TOP OF HEADWALL
EG	EXISTING GROUND	R OR PL	PROPERTY LINE	TP	TOP OF PIPE
EL	ELEVATION	POB	POINT OF BEGINNING	TW	TOP OF WALL
ESMT	EASEMENT	POC	POINT OF CURVATURE	TRW	TOP OF RETAINING WALL
EP	EDGE OR PAVEMENT	POE	POINT OF ENDING	TYPC	TYPICAL
EX OR EXIST	EXISTING	PRC	POINT OF REVERSE CURVATURE	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
FC	FACE OF CURB	PRELIM	PRELIMINARY	VC	VERTICAL CURVE
FF	FINISHED FLOOR	PROP	PROPOSED	VERT	VERTICAL
FG	FINISHED GRADE	PRV	PRESSURE REDUCING VALVE	VG	VALLEY GUTTER
FH	FIRE HYDRANT	PUE	PUBLIC UTILITY EASEMENT	WI	WROUGHT IRON
FL	FLOWLINE	PT	POINT OF TANGENT OR POINT	WL	WATER LINE
FUT	FEET OR FOOT	PVC	POLYVINYL CHLORIDE	WPZ	WATER PRESSURE ZONE
FUT	FUTURE	PW	POINT OF VERTICAL INTERSECTION	WT	WEIGHT
GRD	GRADE OR GROUND	QTY	QUANTITY	WTR	WATER LINE
GB	GRADE BREAK OR GRADE CHANGE	R	RADIUS		
GV	GATE VALVE	RCA	REINFORCED CONCRETE ARCH		

VERIFY SCALE



BAR REPRESENTS ONE AND ONE-HALF INCHES ON ORIGINAL

3090 ZONE NORTH INTERIM TANK

CLARK COUNTY GENERAL NOTES I

SCALE
HORIZONTAL
VERT. SCALE
AS NOTED

DRAWN BY: SE
CHECKED BY: DBH

11/2/2016
11/2/2016

RECOMMENDED BY: RYAN PEARSON

DATE: DATE: DATE: DATE:

ACCEPTED BY: DESIGN MANAGER



CONTRACT NUMBER

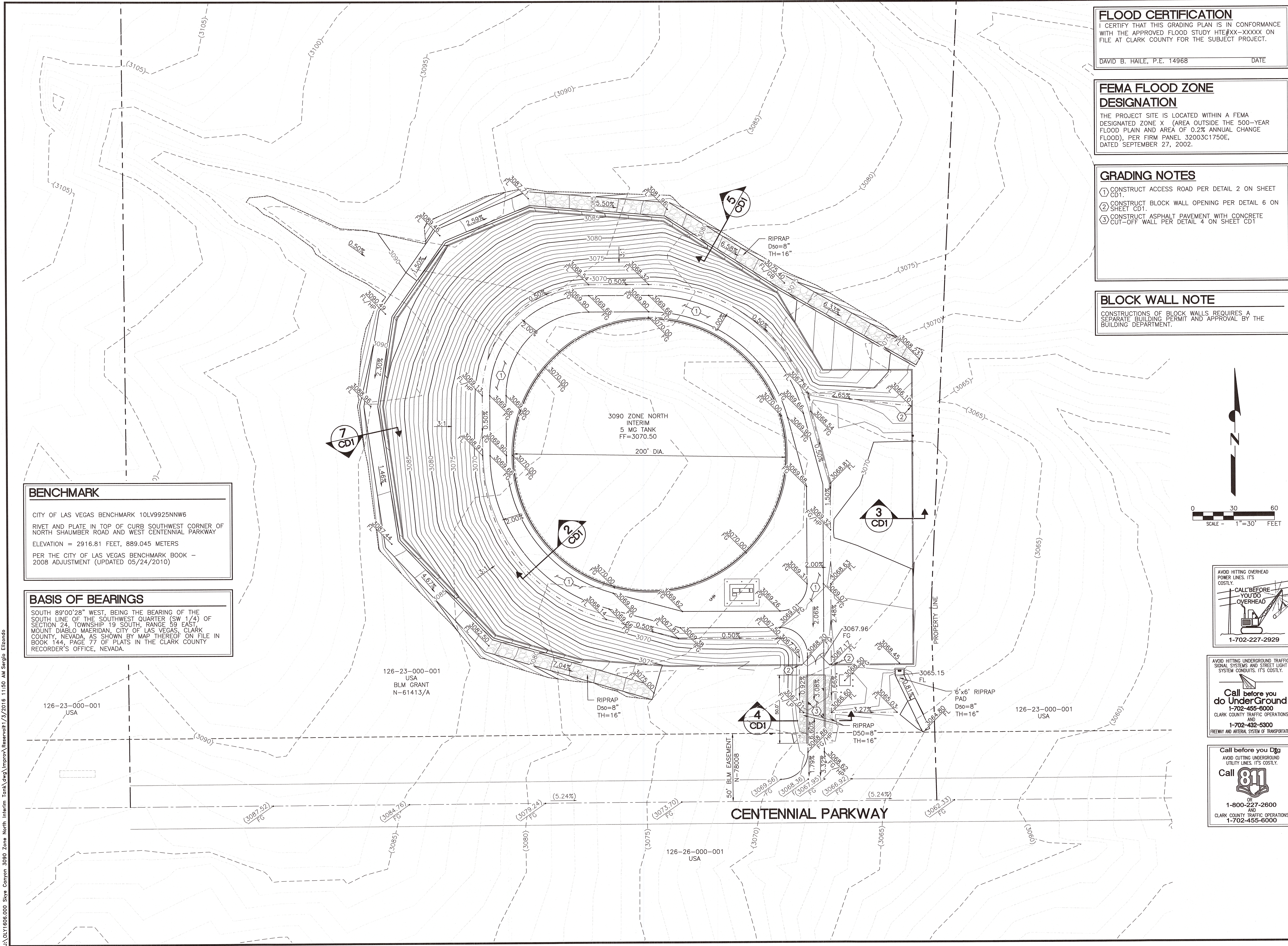
C1453

DRAWING NUMBER 63

SHEET 3 OF 4

NOT FOR CONSTRUCTION

J:\01\1606\000 Sky Canyon 3090 Zone North Interim Tank\dwg\Improv\Reservoir\1/3/2016 11:50 AM Sergio Elizondo



BENCHMARK

CITY OF LAS VEGAS BENCHMARK 10LV9925NNW6
RIVET AND PLATE IN TOP OF CURB SOUTHWEST CORNER OF
NORTH SHAUMBER ROAD AND WEST CENTENNIAL PARKWAY
ELEVATION = 2916.81 FEET, 889.045 METERS
PER THE CITY OF LAS VEGAS BENCHMARK BOOK -
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS

SOUTH 89°00'28" WEST, BEING THE BEARING OF THE
SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF
SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST,
MOUNT DIABLO MERIDIAN, CITY OF LAS VEGAS, CLARK
COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN
BOOK 144, PAGE 77 OF PLATS IN THE CLARK COUNTY
RECORDER'S OFFICE, NEVADA.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE
WITH THE APPROVED FLOOD STUDY HTE#XX-XXXXX ON
FILE AT CLARK COUNTY FOR THE SUBJECT PROJECT.

DAVID B. HAILE, P.E. 14968

DATE

FEMA FLOOD ZONE DESIGNATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA
DESIGNATED ZONE X (AREA OUTSIDE THE 500-YEAR
FLOOD PLAIN AND AREA OF 0.2% ANNUAL CHANGE
FLOOD), PER FIRM PANEL 32003C1750E,
DATED SEPTEMBER 27, 2002.

GRADING NOTES

1. CONSTRUCT ACCESS ROAD PER DETAIL 2 ON SHEET
CD1.
2. CONSTRUCT BLOCK WALL OPENING PER DETAIL 6 ON
SHEET CD1.
3. CONSTRUCT ASPHALT PAVEMENT WITH CONCRETE
CUT-OFF WALL PER DETAIL 4 ON SHEET CD1

BLOCK WALL NOTE

CONSTRUCTIONS OF BLOCK WALLS REQUIRES A
SEPARATE BUILDING PERMIT AND APPROVAL BY THE
BUILDING DEPARTMENT.

0 30 60
SCALE - 1"=30' FEET



LAS VEGAS VALLEY WATER DISTRICT

VERIFY SCALE

1 1/2 0 1/2 1

BAR REPRESENTS
ONE AND ONE-HALF
INCHES ON ORIGINAL

3090 ZONE NORTH INTERIM TANK

GRADING PLAN

SCALE
HORIZ. SCALE
AS NOTED
VERT. SCALE
AS NOTED

DRAWN BY: CHDBH
CHECKED BY: CHDBH
RECOMMENDED BY: RYAN PEARSON
ACCEPTED BY: RYAN PEARSON
DESIGN MANAGER: RYAN PEARSON

DATE: 11/3/2016
DATE: 11/3/2016
DATE: 11/3/2016
DATE: 11/3/2016

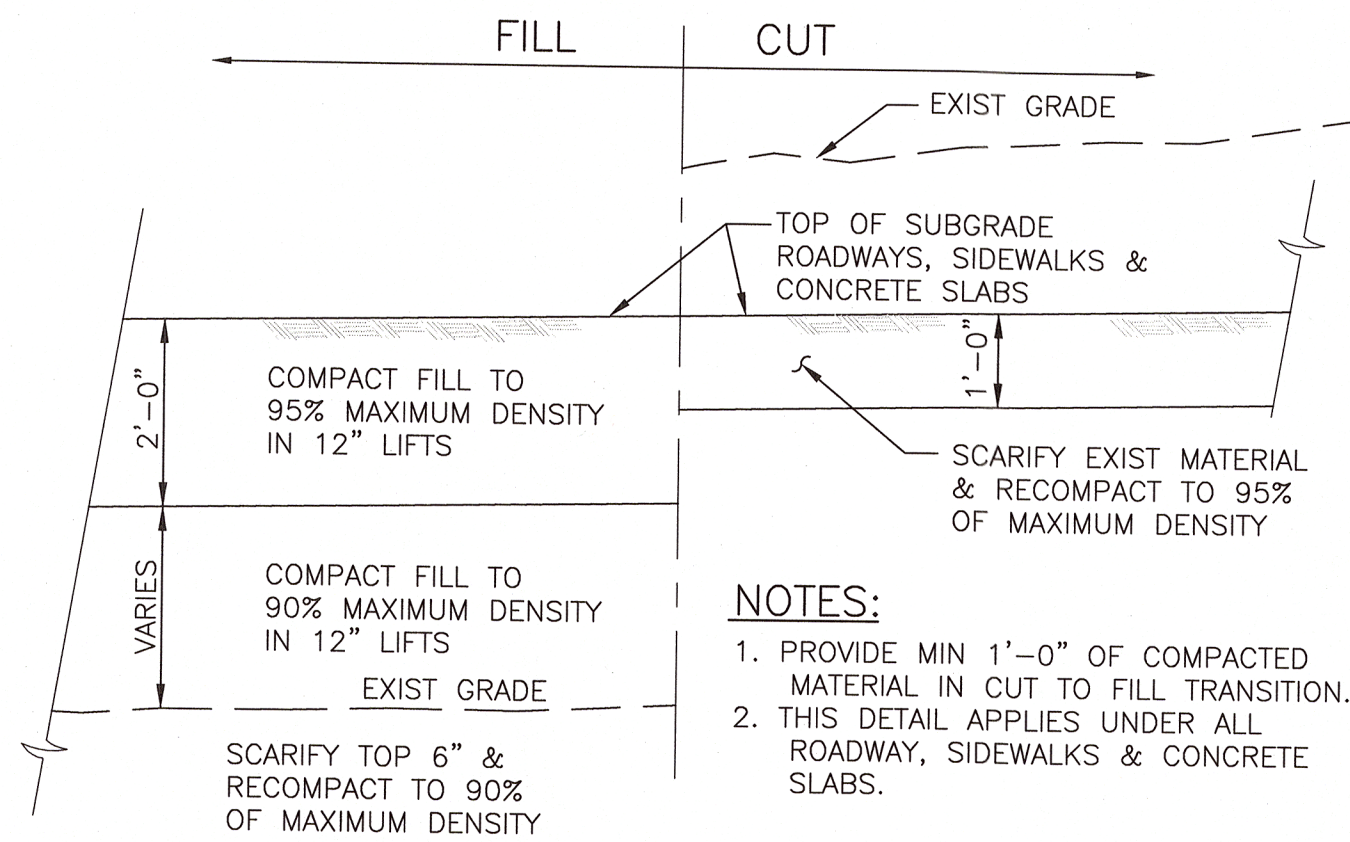


CONTRACT NUMBER

C1453

DRAWING NUMBER C1
SHEET 3 OF 4

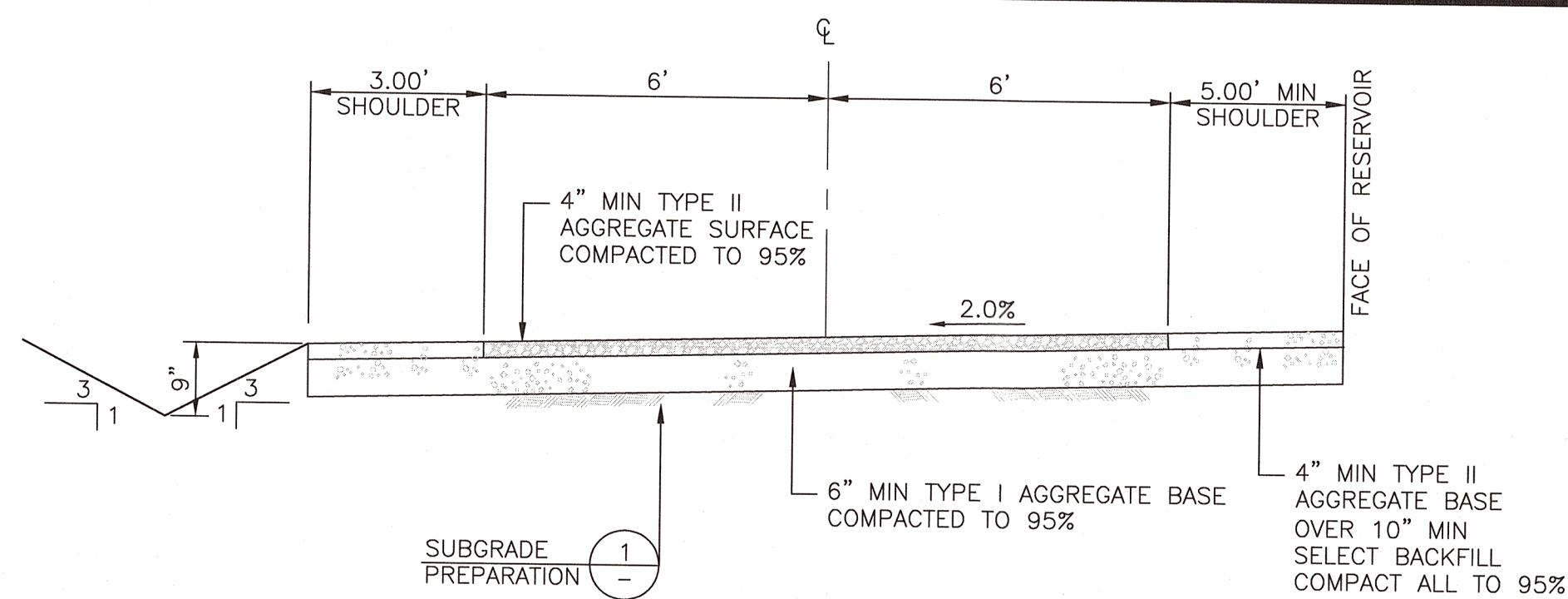
NOT FOR CONSTRUCTION



**SUB-GRADE PREPARATION
SECTIONAL DETAIL (TYPICAL)**

NOT TO SCALE

1
CD1



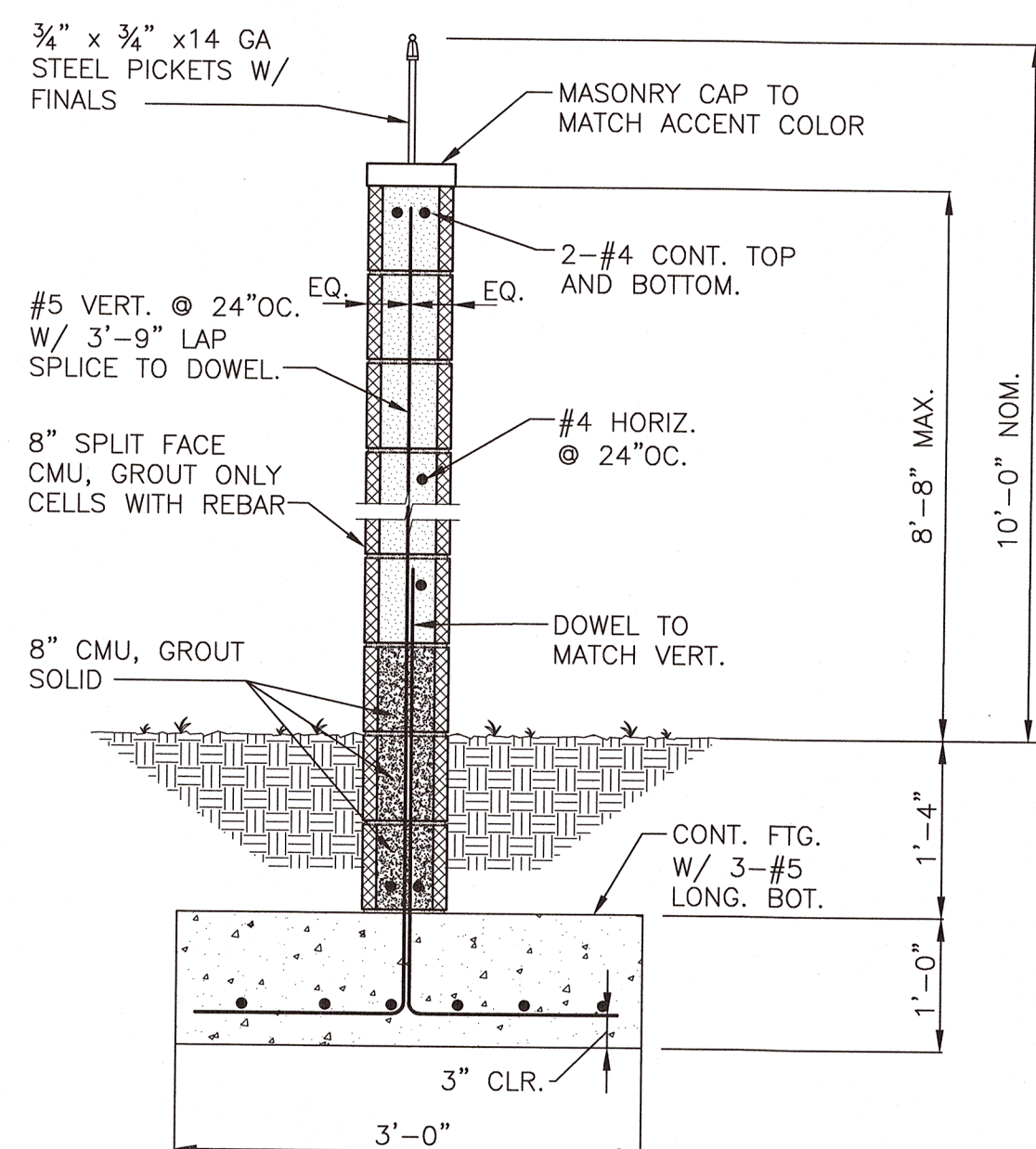
NOTES:

- INTERSECTIONS SHALL HAVE A MINIMUM 25 FOOT RADIUS TO EDGE OF AC PAVEMENT.
- COMPACTION OF AGGREGATE BASE AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS".
- STRUCTURAL SECTION SHOWN IS BASED ON A SUBGRADE "R" VALUE OF 20. OTHER STRUCTURAL SECTIONS MAY BE APPROVED IF BASED ON ENGINEERING ANALYSIS BASED ON "R" OR "CBR" VALUES DETERMINED BY SOIL TESTING. IN NO CASE SHALL THE AC THICKNESS BE LESS THAN THAT SHOWN, NOR SHALL THE BASE BE LESS THAN 4".
- CLARK COUNTY LAB TESTING IS REQUIRED

SITE ACCESS ROAD - SECTION

SCALE: NTS

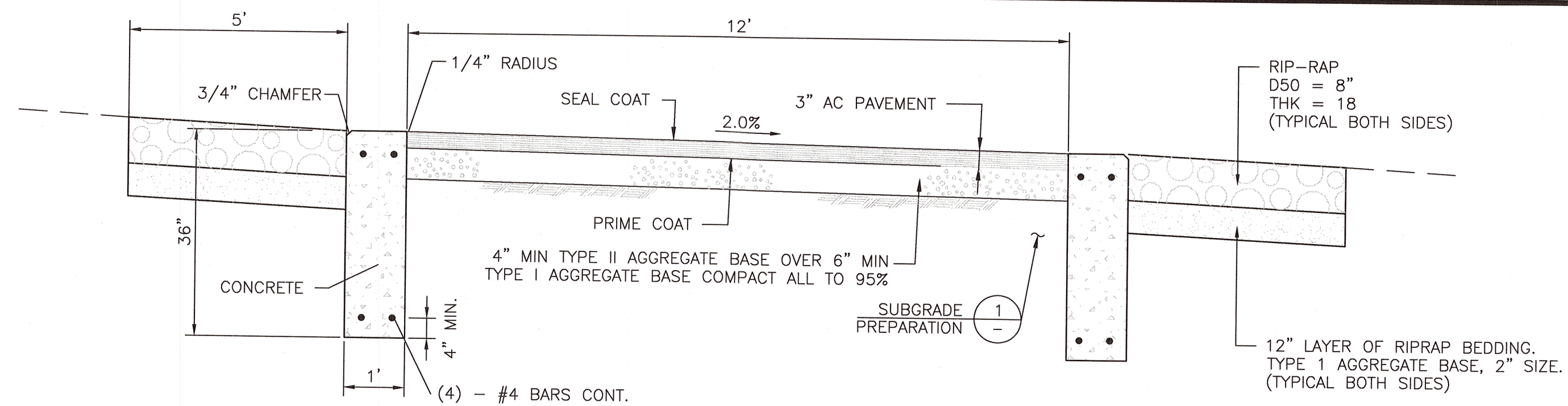
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CD1



CMU WALL SECTION

SCALE: NTS

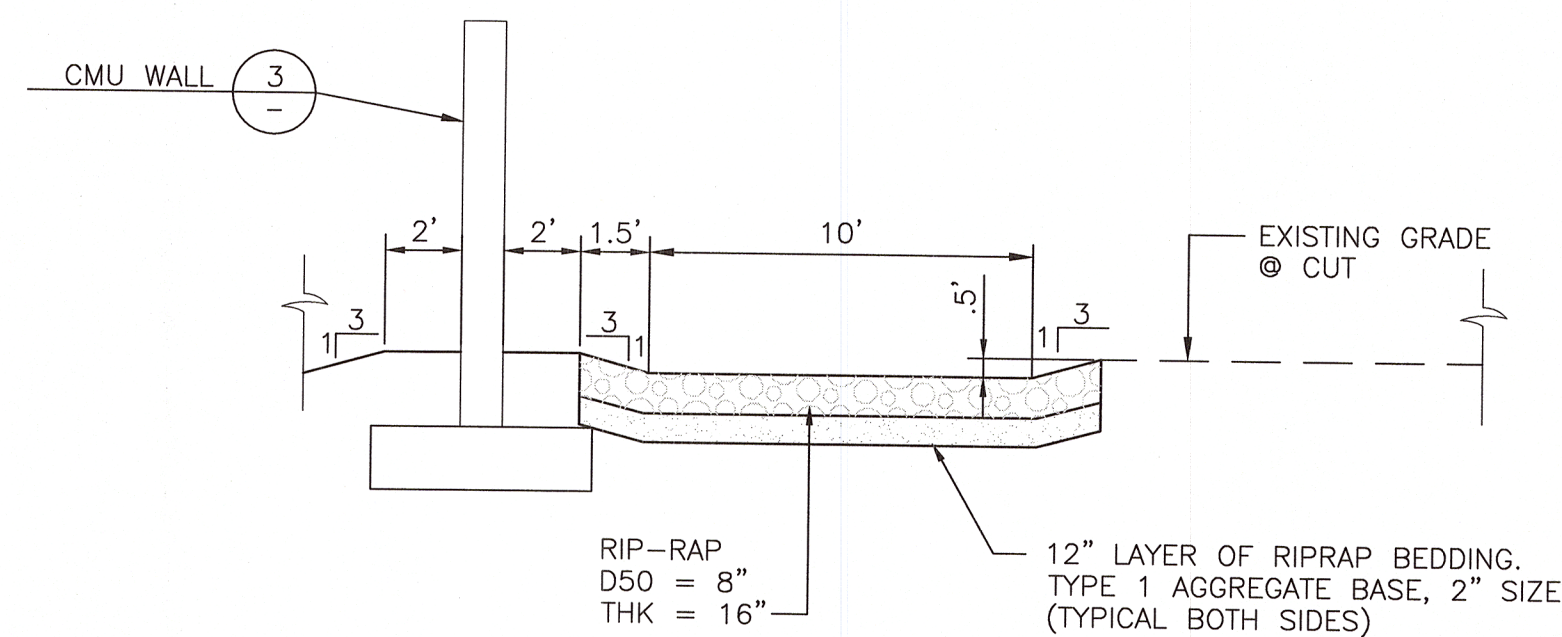
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CD1



AC PAVEMENT WITH CUT-OFF WALL SECTION

NOT TO SCALE

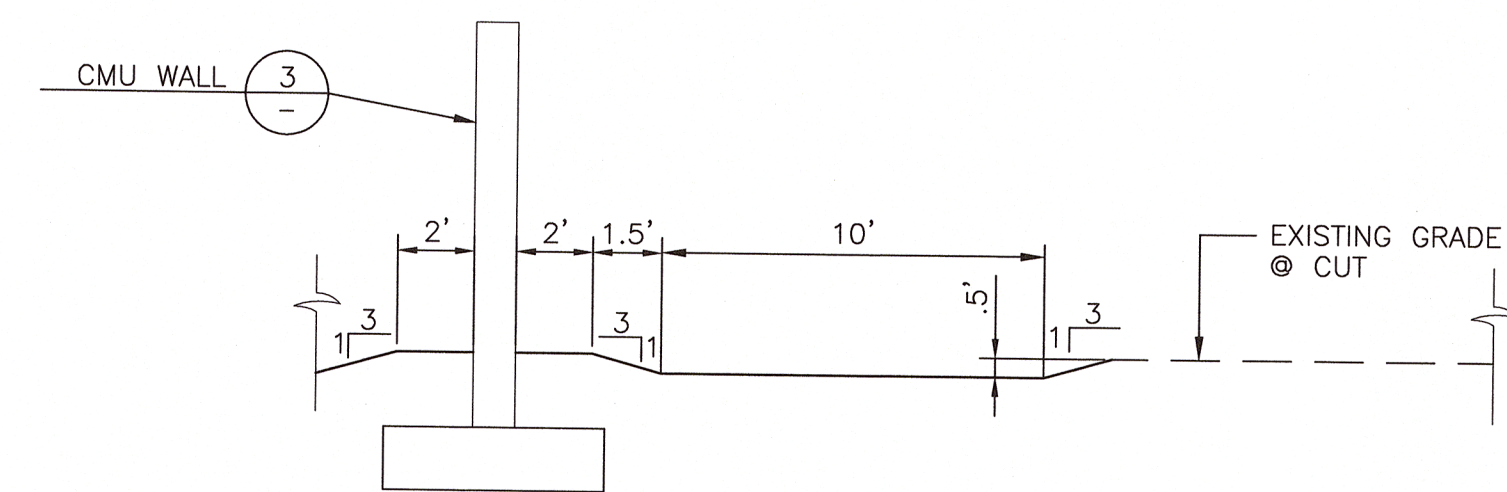
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CD1



DRAINAGE DITCH W/ RIPRAP SECTION

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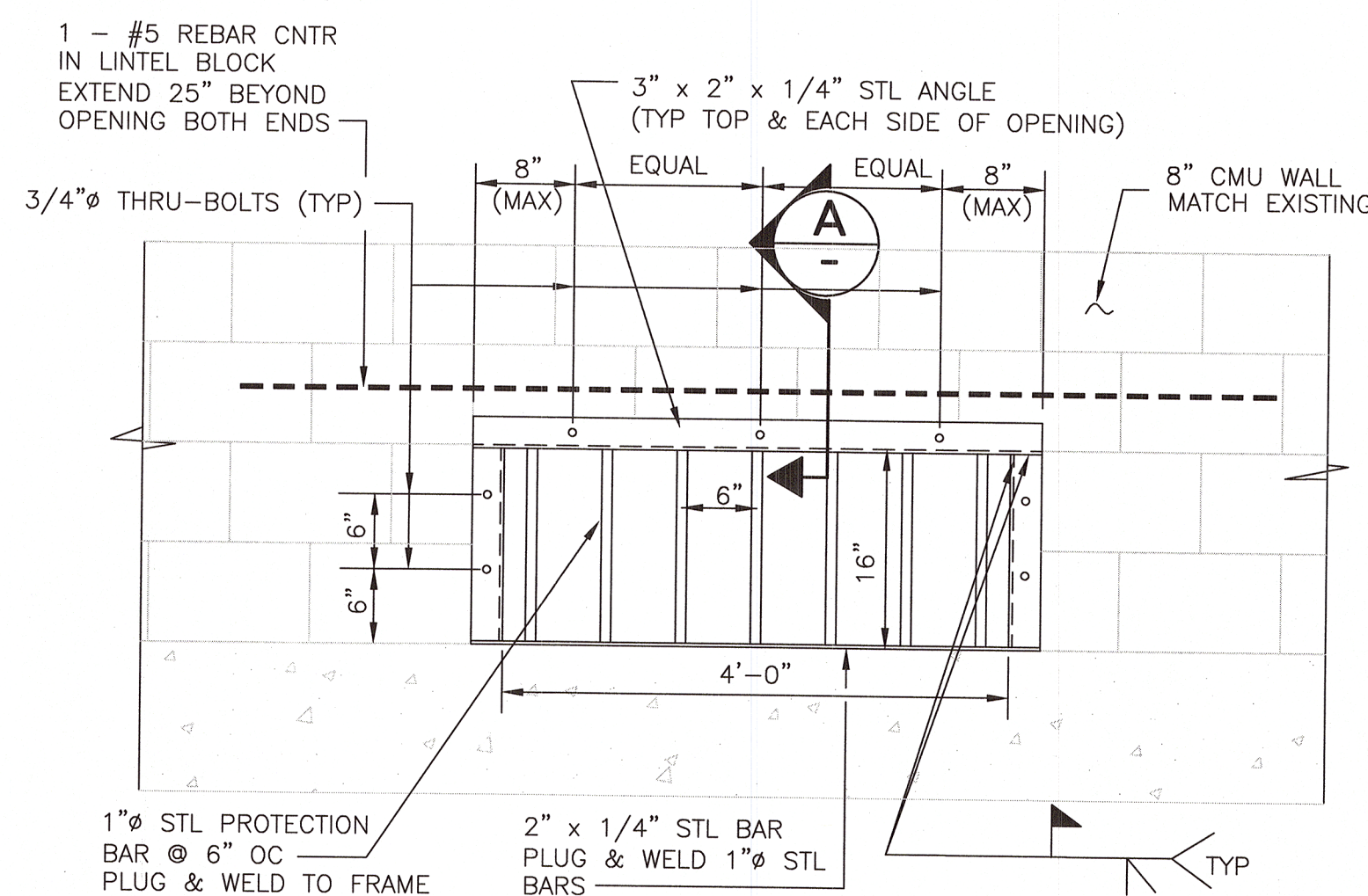
5
CD1



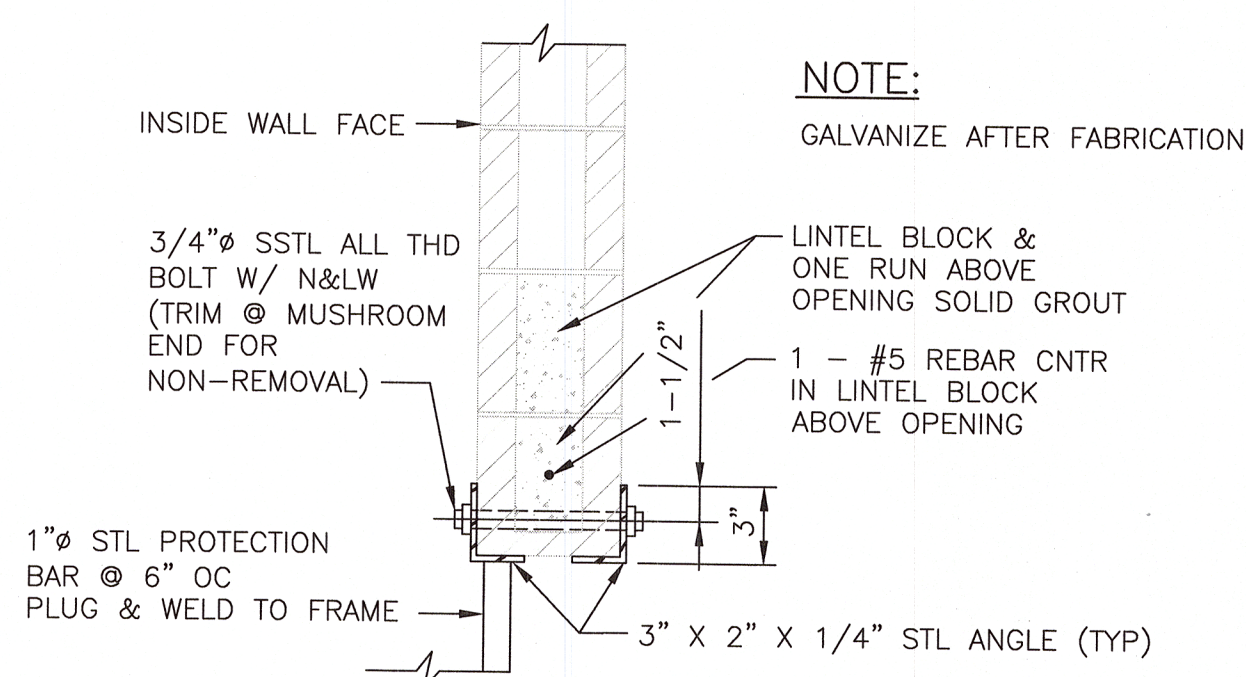
DRAINAGE DITCH SECTION

SCALE: NTS

7
CD1



ELEVATION



SECTION

WALL OPENING DETAIL

SCALE: NTS

6
CD1

LAS VEGAS VALLEY WATER DISTRICT

S-I-G
SLATER
HANIFAN
GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #16, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5389

VERIFY SCALE
1/2" = 1'
0" = 0'
1/2" = 1'

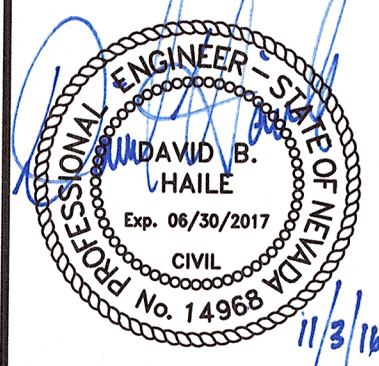
BAR REPRESENTS
ORIGINAL SCALE
INCHES ON ORIGINAL

SCALE
HORIZ. SCALE
VERT. SCALE
AS NOTED

3090 ZONE NORTH INTERIM TANK

GRADING DETAILS

DRAWN BY: 11/3/2016
SE
CHECKED BY: 11/3/2016
DBH
RECOMMENDED BY:
RYAN PEARSON
ACCEPTED BY:
DESIGN MANAGER

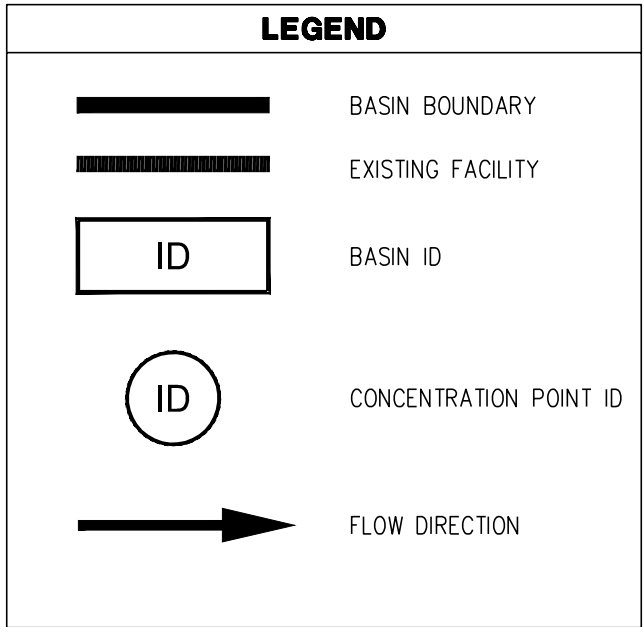


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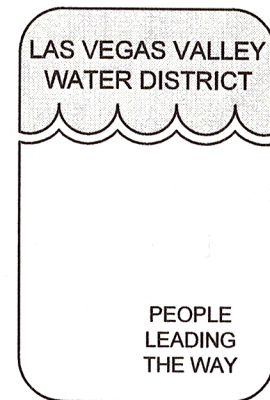
C1453
DRAWING NUMBER CD 1
SHEET 4 OF 4

NOT FOR CONSTRUCTION

This topographic map illustrates a proposed fire station layout. The map features contour lines indicating elevation, with labels such as 3115, 3110, 3105, 3100, 3095, 3090, 3085, 3080, and 3075. A thick black line represents a proposed boundary or road. Two existing fire stations are marked: CCRCFD Facility GOAN-0127 and CCRCFD Facility GOAN-0070. A local peak is labeled L.P. The proposed layout includes several key areas: OFF1 (Officer's Office), OFF2 (Officer's Office), EX1 (Exit), EX2 (Exit), CP1 (Control Panel), and CP2 (Control Panel). Arrows indicate the flow of traffic or movement between these areas. The map also shows a dashed line representing a proposed road or boundary on the left side.



Existing Condition Flow Rate Summary			
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
OFF1	3.4	9	4
OFF2	2.7	7	3
EX1	1.2	3	1
EX2	1.2	3	1
CP1 Q = OFF1 + EX1	4.6	13	5
CP2 Q = OFF2 + EX2	3.9	11	4



LAS VEGAS VALLEY WATER DISTRICT

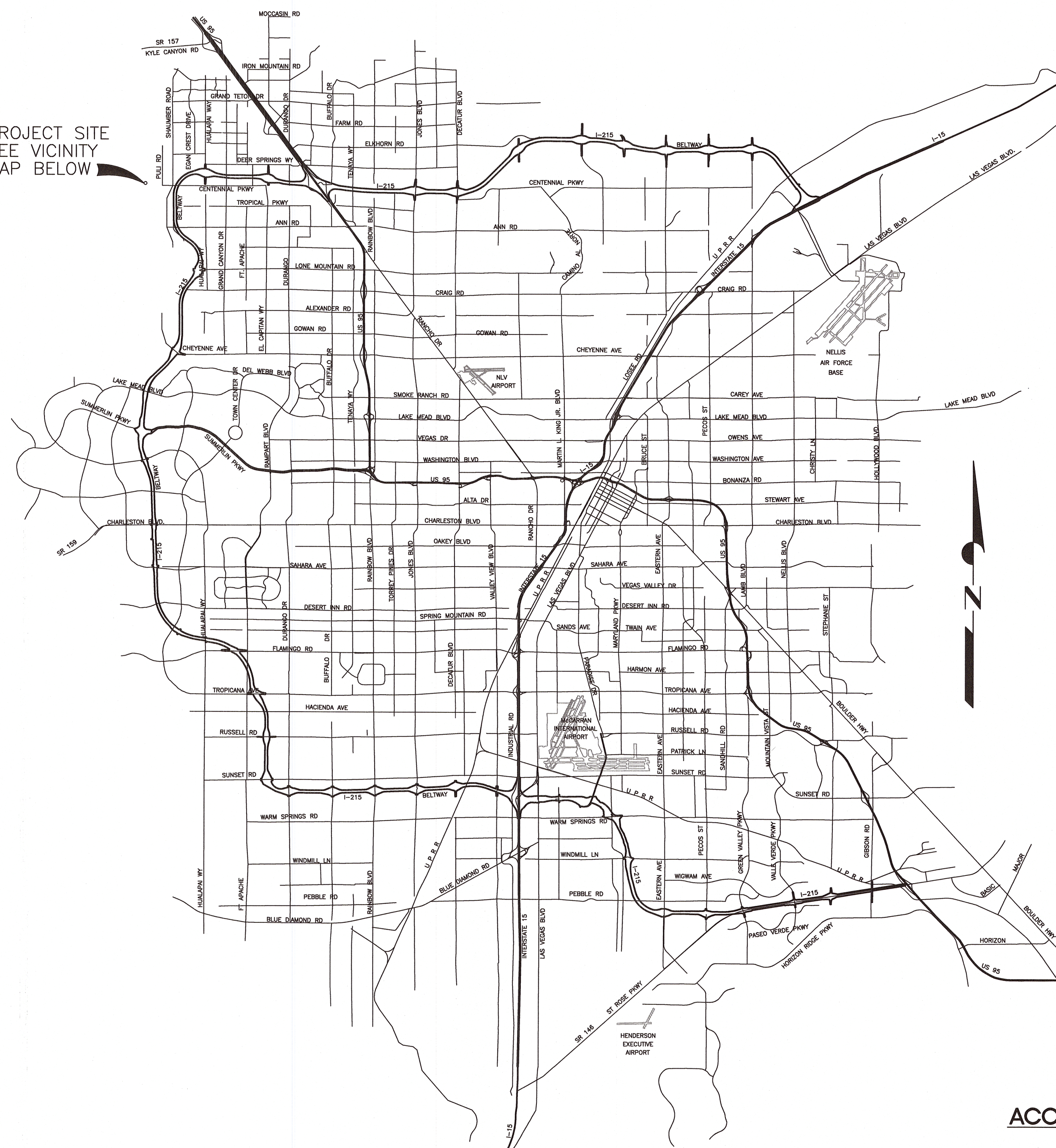
CONTRACT NO. C1453 3090 ZONE NORTH INTERIM TANK



LIST OF DRAWINGS

SHEET NO	DRAWING NO	DESCRIPTION
1	G1	COVER SHEET
2	G2	CLARK COUNTY GENERAL NOTES I
3	C1	GRADING PLAN
4	CD1	DETAILS & SECTIONS

PROJECT SITE
SEE VICINITY
MAP BELOW



LEGEND

- ROADWAY CENTERLINE
- EASEMENT LINE
- PROPERTY LINE
- FLOWLINE
- EDGE OF PAVEMENT (EP)
- PROPOSED ELEVATION
- EXISTING ELEVATION
- FUTURE ELEVATION
- EXISTING CONTOUR (5-FT)
- EXISTING CONTOUR (1-FT)
- PROPOSED CONTOUR (5-FT)
- PROPOSED CONTOUR (1-FT)
- CMU WALL OR TUBULAR STEEL FENCE

OWNER/DEVELOPER ENGINEER

DEVELOPER
NINETY-FIVE MANAGEMENT LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141
PH: 702-220-8565
FX: 702-220-6566
CONTACT:

SLATER HANIFAN GROUP, INC.
5740 S. ARVILLE STREET,
SUITE 216
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: DAVID HAILE

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 10LV9925NNW6
RIVET AND PLATE IN TOP OF CURB SOUTHWEST CORNER OF
NORTH SHAMBER ROAD AND WEST CENTENNIAL PARKWAY
ELEVATION = 2916.81 FEET, 889.045 METERS
PER THE CITY OF LAS VEGAS BENCHMARK BOOK -
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS

SOUTH 89°00'28" WEST, BEING THE BEARING OF THE
SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF
SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST,
MOUNT DIABLO MAERIDAN, CITY OF LAS VEGAS, CLARK
COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN
BOOK 144, PAGE 77 OF PLATS IN THE CLARK COUNTY
RECORDER'S OFFICE, NEVADA.

GEOTECHNICAL ENGINEER

PREPARED BY: GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 SOUTH ESCONDIDO ST, SUITE B,
LAS VEGAS, NV 89119
PHONE: (702)897-1424
PROJECT No. 12208-LVR
DATED: OCTOBER 25, 2016

ACCEPTED BY:

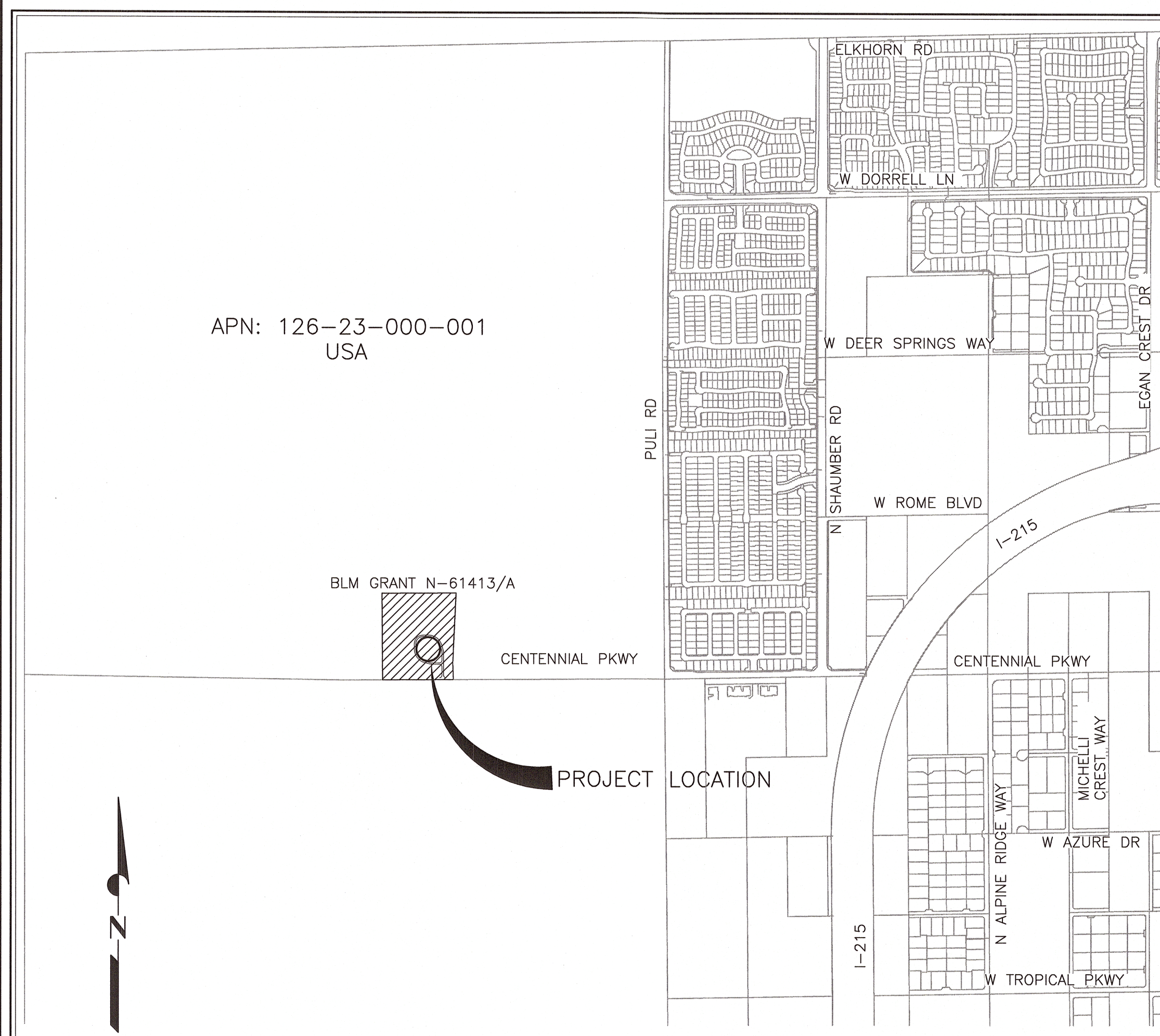
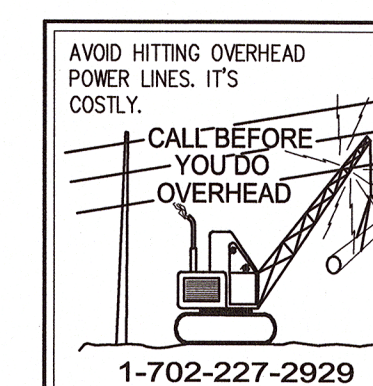
PETER J. JAUCH, P.E. DIRECTOR OF ENGINEERING DATE

LOCATION MAP

NOT TO SCALE

CAUTION TO CONTRACTOR:

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE
ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES
AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.



VICINITY MAP

NOT TO SCALE

LAS VEGAS VALLEY WATER DISTRICT

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

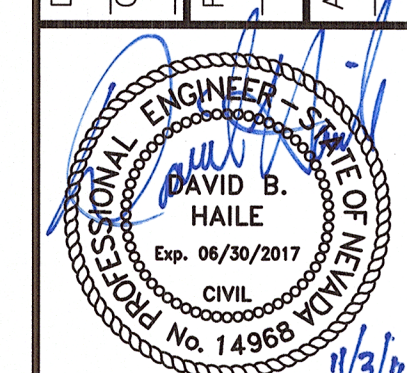
VERIFY SCALE

1/2 0 1/2
BAR REPRESENTS
ONE AND ONE-HALF
INCHES ON ORIGINAL

3090 ZONE NORTH INTERIM TANK

COVER SHEET

DRAWN BY: SE
CHECKED BY: DBH
RECOMMENDED BY: RYAN PEARSON
ACCEPTED BY: DAVID HAILE
DATE: 11/3/2016
DATE: 11/3/2016
DATE: 11/3/2016
DATE: 11/3/2016



CONTRACT NUMBER

C1453

DRAWING NUMBER G1
SHEET 1 OF 4

NOT FOR CONSTRUCTION

J:\01\1608-000-Sive Canyon-3090-Zone North Interim-Tank\dwg\improv\Reservoir\1/2/2016 8:32 AM Sergio Elizondo

CLARK COUNTY TRAFFIC NOTES

1. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
2. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. ALL CONSTRUCTION SIGNING, BARRICADING AND PAVEMENT MARKINGS SHALL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK – 1986 AND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION.
4. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGNPOSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE CLASS VI SHEETING.
6. IF A PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN HEREON TO BE MOUNTED ON A SIGN POST, CHANGE SIGN MOUNTING TO ONE ON THE STREETLIGHT STANDARD.
7. PRIOR TO CONSTRUCTION, THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE CURRENT PLANNING DIVISION OF THE DEPARTMENT OF COMPREHENSIVE PLANNING.
8. ALL TRAFFIC SIGNAL POLE ASSEMBLIES, STEEL PEDESTAL FOR CABINETS AND STREET LIGHT POLES SHALL BE GALVANIZED PER ASTM A.123.
9. ALL STREET LIGHTING INSTALLATIONS EXCEPT NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE UNIFORM STANDARD DRAWINGS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA, LATEST EDITION OF EACH.
10. THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA: STREET LIGHTING, TRAFFIC SIGNALS, AND FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.) INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT 455-6000 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF "CALL BEFORE YOU DIG" (UNDERGROUND SERVICE ALERT), AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
11. F.A.S.T. INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE WHILE PERMANENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO F.A.S.T. ANY DAMAGE TO THIS CABLE IS DEEMED IN EMERGENCY BY F.A.S.T., CITY OF LAS VEGAS, CLARK COUNTY AND NDOT AND MUST BE REPAIRED IMMEDIATELY TO F.A.S.T. ACCEPTANCE. \$2,500 PER DAY DAMAGES MAY BE ASSESSED AFTER 24 HOURS HAS ELAPSED FROM TIME OF BREAK OR DAMAGE.
12. ALL NEW OR REPLACEMENT TRAFFIC SIGNAL LOOPS SHALL BE INSTALLED USING CABLE-IN-DUCT WIRING, SHALL HAVE INDEPENDENT LEAD-IN WIRES FOR EACH LOOP FROM THE CONTROLLER TO THE PULL-BOX, AND EACH LEAD-IN SHALL BE INDIVIDUALLY TAGGED.
13. TRAFFIC SIGNAL PEDESTRIAN HEADS SHALL BE THE L.E.D. TYPE.
14. ELECTRICAL POWER SERVICE POINT LOCATION(S) FOR STREET LIGHTING AND TRAFFIC SIGNALS MUST BE INDICATED ON THE PLANS. IF CONNECTING TO AN EXISTING CIRCUIT, INDICATE LOCATION OF EXISTING SERVICE POINT FOR EACH CIRCUIT.
15. WHEN STREETLIGHTS ARE TO BE CONNECTED TO AN EXISTING CIRCUIT, THE ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD.
16. CLARK COUNTY RESERVES THE RIGHT TO REJECT STREET LIGHT AND TRAFFIC SIGNAL POLES AND ASSEMBLIES WHICH HAVE A "STRIPED" APPEARANCE.
17. TWO WEEKS PRIOR TO BEGINNING OF CONSTRUCTION, MODIFICATION OR RELOCATION OF ANY TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION OF THE DATE THAT WORK WILL BEGIN.
18. THREE (3) NORMAL WORKING DAYS PRIOR TO TURN-ON OR COMPLETION OF MODIFICATION(S) TO A TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION THAT WORK IS BEING COMPLETED AND THE PROPOSED DATE OF COMPLETION.

STORM WATER MANAGEMENT NOTES

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 COUNTY OF CLARK 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 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 ANY 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.

DEVIATIONS FROM STANDARDS

THERE ARE NO DEVIATIONS FROM APPLICABLE CLARK COUNTY STANDARDS, UNLESS STATED IN THE SPECIFICATIONS.

CLARK COUNTY GENERAL NOTES

1. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITION BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND OF INGRESS AND EGRESS TO SAID CONSTRUCTION. EXTENT OF TRANSITIONS TO BE DETERMINED BY THE COUNTY ENGINEER.
2. EXISTING UTILITIES ARE LOCATED ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR THE PROTECTION OF UTILITIES AND THE ENGINEER BEARS NO RESPONSIBILITY FOR UTILITIES NOT SHOWN ON PLANS OR NOT IN THE LOCATION SHOWN ON THE PLANS. (CALL BEFORE YOU DIG 800-227-2600).
3. CONSTRUCTION SURVEY: GRADES ARE GIVEN FROM TOP OF STAKES OR NAILS. THE CONTRACTORS ARE CAUTIONED TO OBSERVE THE FOLLOWING RULE IN USING THE GRADE STAKES GIVEN BY THIS OFFICE. THREE CONSECUTIVE POINTS THAT ARE SHOWN TO BE ON THE SAME RATE OF SLOPE MUST BE USED IN COMMON IN ORDER THAT ANY VARIATION OUT OF A PERFECT STRAIGHT GRADE MAY BE DETECTED. IN CASE ANY SUCH DISCREPANCY IS FOUND, THE SAME MUST BE REPORTED OTHERWISE THIS OFFICE WILL NOT BE RESPONSIBLE FOR ANY ERROR IN THE GRADE OF THE FINISH WORK.
4. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY THE EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITIES REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA AND AS PROVIDED IN THE SPECIFICATIONS. THE CONTRACTOR SHALL USE EXTREME CARE WORKING OVER OR NEAR ANY EXISTING GAS MAINS.
5. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS, WHICH ARE TO REMAIN IN PLACE FROM DAMAGE. ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED TO THE SATISFACTION OF THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
6. FENCES, SIGNS, STRUCTURES, LIGHTS AND OTHER EXISTING IMPROVEMENTS WITHIN STREET R/W SHALL BE REMOVED WHERE SHOWN ON THE CONTRACT DRAWINGS, AND AS REQUIRED BY THE ENGINEER.
7. REPLACEMENT, RELOCATION OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING FENCES, WALL SIGNS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE AS REQUIRED BY THE ENGINEER.
8. THE CONTRACTOR SHALL BACKFILL AND FINAL GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL EXISTING SANITARY, WATER AND STORM SEWER MANHOLES TO THE FINAL FINISH GRADES IN ACCORDANCE WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS AND IN ACCORDANCE WITH SECTION 609 OF THE "STANDARD SPECIFICATIONS".
10. 48 HOURS PRIOR TO START OF CONSTRUCTION THE CONTRACTOR SHALL CONTACT:
NV ENERGY PHONE – (702) 402-8400
CENTURYLINK TELEPHONE COMPANY PHONE – (702) 244-7055
SOUTHWEST GAS CORPORATION PHONE – (702) 651-2111
LAS VEGAS VALLEY WATER DISTRICT PHONE – (702) 870-2011
11. PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
12. WHEELCHAIR RAMPS SHALL BE CONSTRUCTED AT ALL STREET INTERSECTIONS PER CLARK COUNTY STANDARD DRAWING 235 EXACT LOCATION OF RAMP TO BE DETERMINED IN FIELD BY A CLARK COUNTY INSPECTOR.
13. STANDARD STREET SECTIONS PER CLARK COUNTY STANDARD DRAWINGS UNLESS OTHERWISE NOTED.
14. CURB AND GUTTER WITH A GRADE OF LESS THAN FOUR TENTHS OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
15. VALLEY GUTTER WITH A GRADE OF FOUR TENTHS OF ONE PERCENT OR LESS SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE PROPER DRAINAGE ACROSS ALL VALLEY GUTTERS.
16. ALL BARRICADING AND TEMPORARY TRAFFIC CONTROL DEVICES OR METHODS USED DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "NEVADA TRAFFIC CONTROL MANUAL, 1986 PUBLISHED BY THE STATE OF NEVADA, DEPARTMENT OF TRANSPORTATION, EXCEPT AS OTHERWISE PROVIDED IN THE CONTRACT DRAWINGS.
17. ALL GRADING SHALL BE IN ACCORDANCE WITH THE SPECIFICATION MANUAL AND THE SOILS REPORT AS PREPARED BY ADD FIELD WHERE CONFLICTS OCCUR THE MOST RESTRICTIVE SHALL GOVERN.
18. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL OVERHEAD AND UNDERGROUND 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 OR UNDERGROUND FACILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COSTS AND LIABILITY IN CONNECTION THEREWITH.
19. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY ALTERATIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.
20. THE CONTRACTOR SHALL APPLY FOG SEAL ONLY AFTER ALL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
21. THE CONTRACTOR SHALL NOT BACKFILL ANY TRENCHES IN WHICH WATERLINES HAVE BEEN UNCOVERED UNTIL THE WATERLINES HAVE BEEN INSPECTED BY THE LAS VEGAS VALLEY WATER DISTRICT.
22. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND VALLEY GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY.
23. TYPE V CEMENT SHALL BE USED IN ALL CONCRETE WORK.
24. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ALL MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.550.

REGIONAL TRANSPORTATION COMMITTEE
CITIZENS AREA TRANSIT ACCESS NOTES

1. UNLESS OTHERWISE SPECIFIED IN THE SPECIAL PROVISIONS, NO PUBLIC BUS OR TRANSIT STOP SHALL BE TEMPORARILY CLOSED WITHOUT THE WRITTEN CONSENT OF THE REGIONAL TRANSPORTATION COMMISSION (RTC) DIRECTOR OR HIS DESIGNEE. THE RTC SHALL BE NOTIFIED AT LEAST TEN (10) WORKING DAYS PRIOR TO THE PROPOSED TEMPORARY CLOSURE OF ANY BUS OR TRANSIT STOP, INCLUDING THOSE LISTED IN THE SPECIAL PROVISIONS.
2. NO BUS STOPS AT TRANSFER POINTS SHALL BE CLOSED DURING CONSTRUCTION. BUS STOPS AT TRANSFER POINTS CAN, HOWEVER, BE TEMPORARILY RELOCATED WITH THE APPROVAL OF THE RTC DIRECTOR OR HIS DESIGNEE.
3. IF BUS OR TRANSIT STOP IS TEMPORARILY RELOCATED, THE EXISTING BUS OR TRANSIT STOP SIGN PANELS SHALL BE RELOCATED TO TEMPORARY BUS OR TRANSIT STOPS AND SHALL REMAIN UNTIL TEMPORARY STOP IS REMOVED. TEMPORARY RELOCATION OF SIGN PANELS SHALL CONFORM TO SUBSECTION 627.03.05, "RELOCATION."
4. THE CONTRACTOR SHALL MAINTAIN ACCESS WHICH IS IN CONFORMANCE TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT TO AND FROM BUS OR TRANSIT STOPS WHICH REMAIN OPEN AT ALL TIMES DURING CONSTRUCTION.

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.

PRE-DEVELOPMENT NOTE

A PRE-DEVELOPMENT MEETING WITH THE DEPARTMENT OF PUBLIC WORKS DEVELOPMENT REVIEW DIVISION, OFF-SITE INSPECTOR IS REQUIRED. PLEASE CONTACT INSPECTOR AT 455-4610

SWPPP 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](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.

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

CLARK COUNTY PUBLIC WORKS DEVELOPMENT REVIEW

1. INSPECTIONS ARE REQUIRED. CALL 24 HOURS IN ADVANCE, 455-4610. YOUR PERMIT, APPROVED PLANS, AND BARRICADE PLANS FOR THIS WORK MUST BE ON THE JOB SITE AT ALL TIMES.
2. EXACT LOCATION OF ALL SAW-CUT LINES SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
3. CURB AND GUTTER WITH A GRADE OF LESS THAT 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
4. FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF (1/2") INCH ABOVE THE LIP OF THE GUTTER (INCLUDING OPEN GRADE).
5. ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA NEVADA AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, LATEST REVISION.
6. PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
7. WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
8. PROPER SIGNS, BARRIERS, BARRICADES AND LIGHTS SHALL BE PLACED AND MAINTAINED IN ACCORDANCE WITH THE LATEST "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS". TRAFFIC, SCHOOL, OR STREET SIGNS OF ANY KIND ARE NOT TO BE MOVED FOR ANY REASON WITHOUT FIRST COORDINATING WITH THE DEPARTMENT OF PUBLIC WORKS INSPECTIONS AT 702-455-4610.
9. THIS PLAN DOES NOT AUTHORIZE CLOSURE OF ANY ROAD OR STREET.
10. NO OPEN TRENCH SHALL BE ALLOWED ACROSS ANY STREET OR WITHIN TEN (10') OF ANY TRAVEL-WAY, EXCEPT WHEN WORK IS IN ACTUAL PROGRESS. AREAS COVERED BY ACCEPTABLE STEEL PLATE ARE NOT TO BE CONSTRUED AS A TRENCH. NO OPEN TRENCH IS PERMITTED IN EXCESS OF 500 FEET OR LENGTH NECESSARY TO ACCOMMODATE PIPE INSTALLATION IN A SINGLE DAY, WHICH EVER IS GREATER. ALL TRENCH CROSSINGS AND BACKFILL SHALL MEET THE STANDARD SPECIFICATION UNLESS OTHERWISE STATED.
11. A TEMPORARY PATCH IS TO BE IN PLACE AT THE END OF EACH WORK DAY WHERE THE BACKFILL IN THE TRENCH HAS BEEN COMPLETED AND PRIOR TO OPENING THE WORK AREA BACK TO TRAFFIC AND IS TO BE MAINTAINED BY THE PERMITEE. A PERMANENT PATCH IS TO BE IN PLACE WITHIN THIRTY (30) DAYS AFTER THE INSTALLATION OF THE TEMPORARY PATCH.
12. COMPACTION TESTS ARE REQUIRED.

ABBREVIATIONS

AC	ASPHALTIC CONCRETE OR ACRE	HDPE	HIGH DENSITY POLYETHYLENE	RCB	REINFORCED CONCRETE BOX
AGG	AGGREGATE BASE	HOA	HOME OWNERS ASSOCIATION	RCP	REINFORCED CONCRETE PIPE
APN	ASSESSORS PARCEL NUMBER	HORIZ	HORIZONTAL	RD	ROAD
APPROX OR ~	APPROXIMATE	HP	HIGH POINT	RDMY ESMT	ROADWAY EASEMENT
AVE	AVENUE	HWL	HIGH WATER LEVEL	RCD	REQUIRED
Ø	AT	HDWL OR HW	HEADWALL	REV	REVISION
BC	BEGIN CURVE OR BACK OF CURB	HSS	HOLLOW STRUCTURAL STEEL	REV	REVISION
BGR	BEGINNING OF CURB RETURN	HYD	HYDRAULIC OR HYDRANT	RT OR R	RIGHT
BHW	BOTTOM OF HEADWALL	ID	INSIDE DIAMETER	R/W, ROW	RIGHT OF WAY
BLDG	BUILDING	IN	INCH	SCH	SCHEDULE
BLVD	BOULEVARD	INT	INTERSECTION	SD	STORM DRAIN
BW	BENCHMARK	INV	INVERT ELEVATION	SDMH	STORM DRAIN MANHOLE
BVC	BEGIN VERTICAL CURVE	IP	IRON PIPE	SEC	SECTION
BWV	BACK WATER VALVE	IRRIG	IRRIGATION	SFS	SERVICE ENTRANCE SECTION
CC	CLARK COUNTY	LP	LINEAR FEET	SF	SQUARE FEET
CAUSAID	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS	LT OR L	LEFT	SHT	SHEET
CRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT	LWL	LOW WATER LEVEL	SL	SLOPE
CE	COMMON ELEMENT	MAX	MAXIMUM	SLTC	STREET LIGHT AND TRAFFIC CONTROL EASEMENT
CLC/A,C	CENTERLINE	MECH	MECHANICAL	SNWA	SOUTHERN NEVADA WATER AUTHORITY
CLR	CLEAR OR CLEARANCE	MH	MANHOLE	SPECS	SPECIFICATIONS
CLSM	CONTROLLED LOW STRENGTH MATERIAL	MIN	MINIMUM	ST	STREET
CLM&C	CEMENT MORTAR LINED AND COATED	MISC	MISCELLANEOUS	SDMH	SANITARY SEWER MANHOLE
CMU	CONCRETE MASONRY UNIT	MUE	MUNICIPAL UTILITY EASEMENT	STA	STATION
CONC	CONCRETE	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	STD	STANDARD
CT	COURT	NTE	NOT TO SCALE	STL	STREET LIGHT
CU OR CU YD	CURB YARD	NUE	NONEXCLUSIVE UTILITY EASEMENT	SW	SIDEWALK
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS	OC	ON CENTER	SWG	SOUTHWEST GAS
DET	DETAIL	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	SWR OR SS	SANITARY SEWER
DI	DUCTILE IRON OR DRAIN INLET	OFF	OFF	SY	SQUARE YARD
DIA, Ø	DIAMETER	ORIG	ORIGINAL	TAN	TANGENT
DIP	DUCTILE IRON PIPE	PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	TC	TOP OF CURB
DR	DRAIN	PB	PULL BOX	TF	TOP OF FOOTING
DWG(S)	DRAWING	PC	POINT OF CURVE	TG	TOP OF GRATE
EA	EACH	PCC	POINT OF COMPOUND CURVE	THRU	THROUGH
ECR	END CURB RETURN	PDE	PUBLIC DRAINAGE EASEMENT	THW	TOP OF HEADWALL
EG	EXISTING GROUND	R OR PL	PROPERTY LINE	TP	TOP OF PIPE
EL	ELEVATION	POB	POINT OF BEGINNING	TW	TOP OF WALL
ESMT	EASEMENT	POC	POINT OF CURVATURE	TRW	TOP OF RETAINING WALL
EP	EDGE OR PAVEMENT	POE	POINT OF ENDING	TYPC	TYPICAL
EX OR EXIST	EXISTING	PRC	POINT OF REVERSE CURVATURE	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
FC	FACE OF CURB	PRELIM	PRELIMINARY	VC	VERTICAL CURVE
FF	FINISHED FLOOR	PROP	PROPOSED	VERT	VERTICAL
FG	FINISHED GRADE	PRV	PRESSURE REDUCING VALVE	VG	VALLEY GUTTER
FH	FIRE HYDRANT	PUE	PUBLIC UTILITY EASEMENT	WI	WROUGHT IRON
FL	FLOWLINE	PT	POINT OF TANGENT OR POINT	WL	WATER LINE
FT	FEET OR FOOT	PVC	POLYVINYL CHLORIDE	WPZ	WATER PRESSURE ZONE
FUT	FUTURE	PW	POINT OF VERTICAL INTERSECTION	WT	WEIGHT
GRD	GRADE OR GROUND	QTY	QUANTITY	WTR	WATER LINE
GB	GRADE BREAK OR GRADE CHANGE	R	RADIUS		
GV	GATE VALVE	RCA	REINFORCED CONCRETE ARCH		

LAS VEGAS VALLEY WATER DISTRICT

VERIFY SCALE



BAR REPRESENTS ONE AND ONE-HALF INCHES ON ORIGINAL

S-LG
SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89146
PHONE (702) 254-0200 FAX (702) 254-0339

3090 ZONE NORTH INTERIM TANK

CLARK COUNTY GENERAL NOTES I

SCALE
HORIZONTAL
VERT. SCALE
AS NOTED

DRAWN BY: SE
CHECKED BY: DBH
RECOMMENDED BY: RYAN PEARSON
ACCEPTED BY: DESIGN MANAGER

11/2/2016
11/2/2016
DATE
DATE



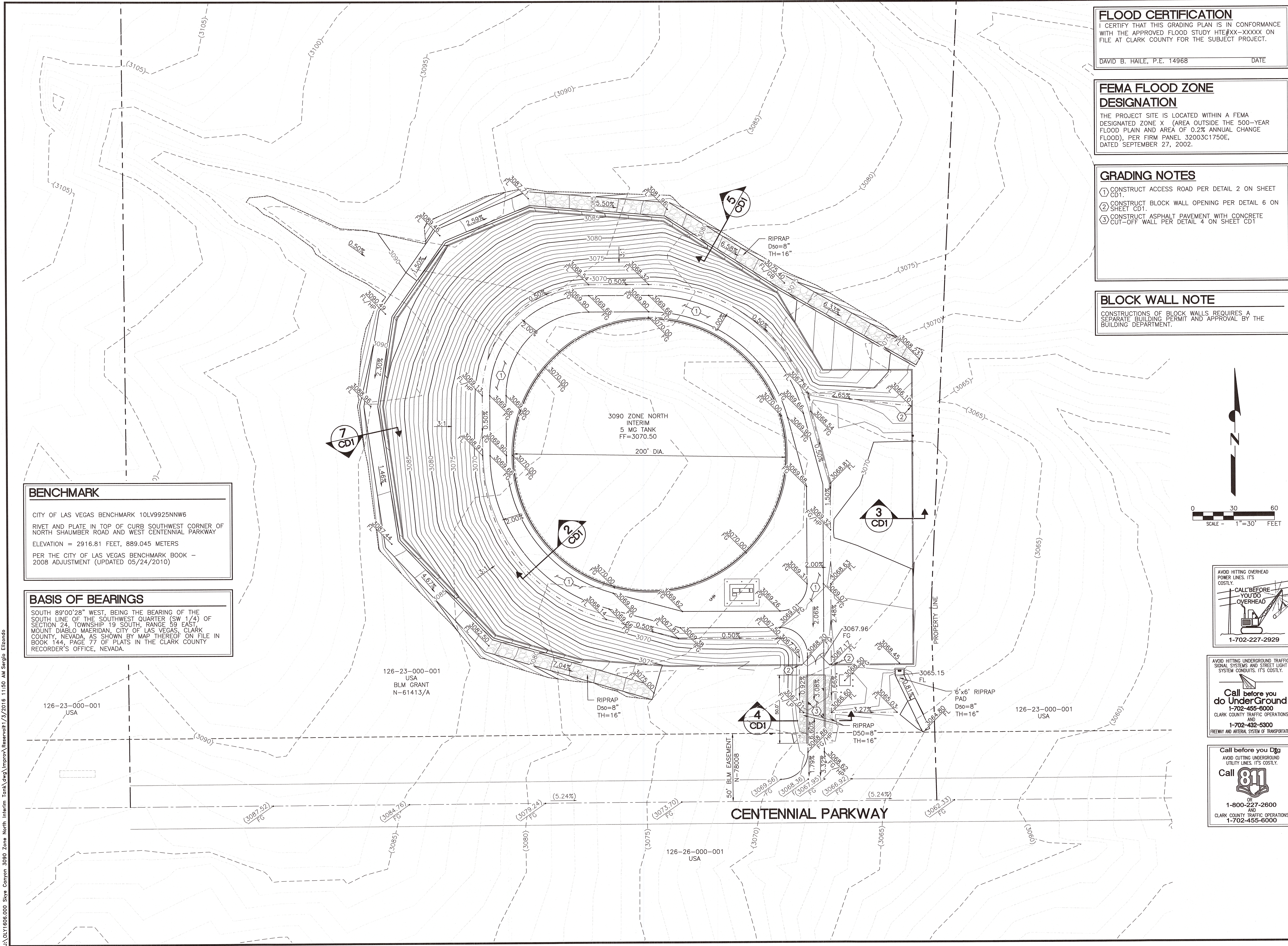
CONTRACT NUMBER

C1453

DRAWING NUMBER 63
SHEET 3 OF 4

NOT FOR CONSTRUCTION

J:\01\1606\000 Sky Canyon 3090 Zone North Interim Tank\dwg\Improv\Reservoir\1/3/2016 11:50 AM Sergio Elizondo



BENCHMARK

CITY OF LAS VEGAS BENCHMARK 10LV9925NNW6
RIVET AND PLATE IN TOP OF CURB SOUTHWEST CORNER OF
NORTH SHAUMBER ROAD AND WEST CENTENNIAL PARKWAY
ELEVATION = 2916.81 FEET, 889.045 METERS
PER THE CITY OF LAS VEGAS BENCHMARK BOOK -
2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS

SOUTH 89°00'28" WEST, BEING THE BEARING OF THE
SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF
SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST,
MOUNT DIABLO MERIDIAN, CITY OF LAS VEGAS, CLARK
COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN
BOOK 144, PAGE 77 OF PLATS IN THE CLARK COUNTY
RECORDER'S OFFICE, NEVADA.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE
WITH THE APPROVED FLOOD STUDY HTE#XX-XXXXX ON
FILE AT CLARK COUNTY FOR THE SUBJECT PROJECT.

DAVID B. HAILE, P.E. 14968

DATE

FEMA FLOOD ZONE DESIGNATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA
DESIGNATED ZONE X (AREA OUTSIDE THE 500-YEAR
FLOOD PLAIN AND AREA OF 0.2% ANNUAL CHANGE
FLOOD), PER FIRM PANEL 32003C1750E,
DATED SEPTEMBER 27, 2002.

GRADING NOTES

1. CONSTRUCT ACCESS ROAD PER DETAIL 2 ON SHEET
CD1.
2. CONSTRUCT BLOCK WALL OPENING PER DETAIL 6 ON
SHEET CD1.
3. CONSTRUCT ASPHALT PAVEMENT WITH CONCRETE
CUT-OFF WALL PER DETAIL 4 ON SHEET CD1

BLOCK WALL NOTE

CONSTRUCTIONS OF BLOCK WALLS REQUIRES A
SEPARATE BUILDING PERMIT AND APPROVAL BY THE
BUILDING DEPARTMENT.

0 30 60
SCALE - 1"=30' FEET



LAS VEGAS VALLEY WATER DISTRICT

VERIFY SCALE

1 1/2 0 1/2 1

BAR REPRESENTS
ONE AND ONE-HALF
INCHES ON ORIGINAL

3090 ZONE NORTH INTERIM TANK

GRADING PLAN

SCALE
HORIZ. SCALE
AS NOTED
VERT. SCALE
AS NOTED

DRAWN BY: 11/3/2016
CHECKED BY: 11/3/2016

RECOMMENDED BY: DATE
RYAN PEARSON

ACCEPTED BY: DATE
DESIGN MANAGER

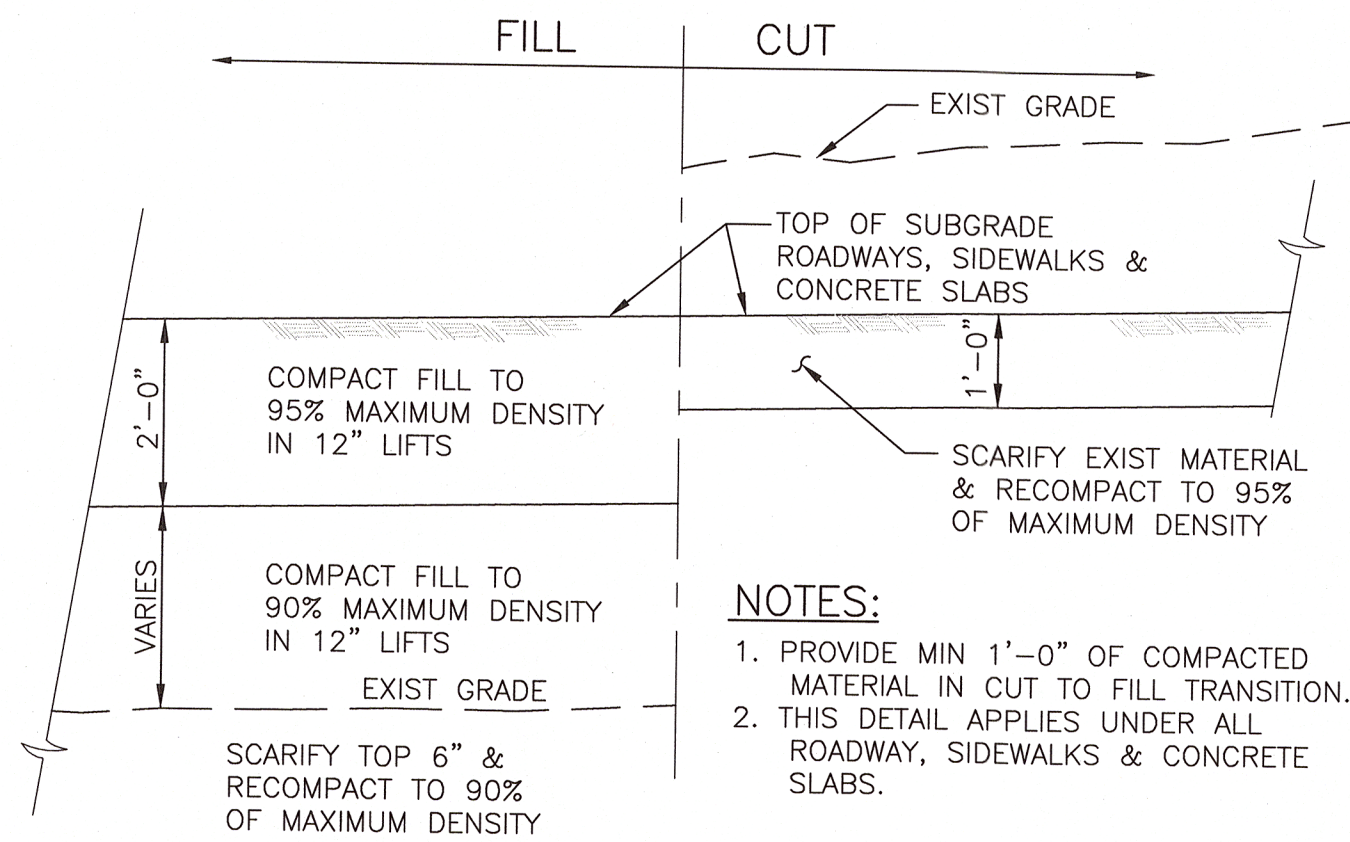


CONTRACT NUMBER

C1453

DRAWING NUMBER C1
SHEET 3 OF 4

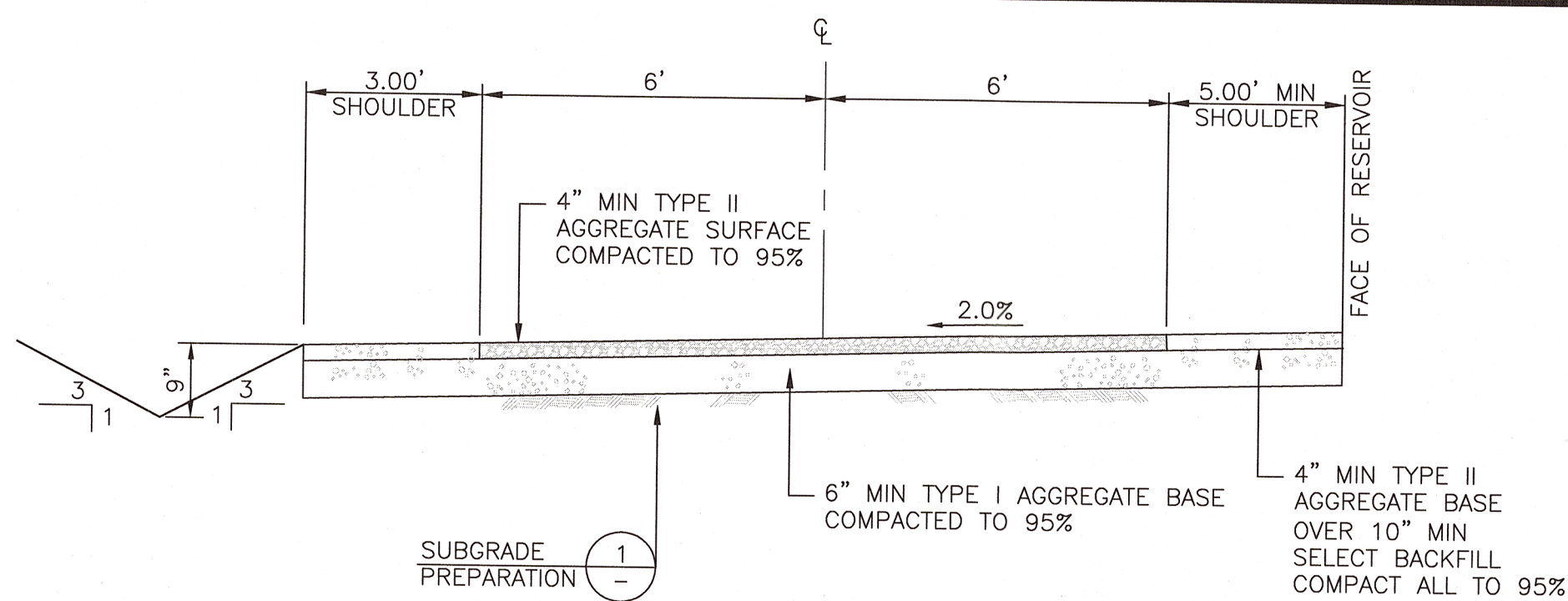
NOT FOR CONSTRUCTION



**SUB-GRADE PREPARATION
SECTIONAL DETAIL (TYPICAL)**

NOT TO SCALE

1
CD1



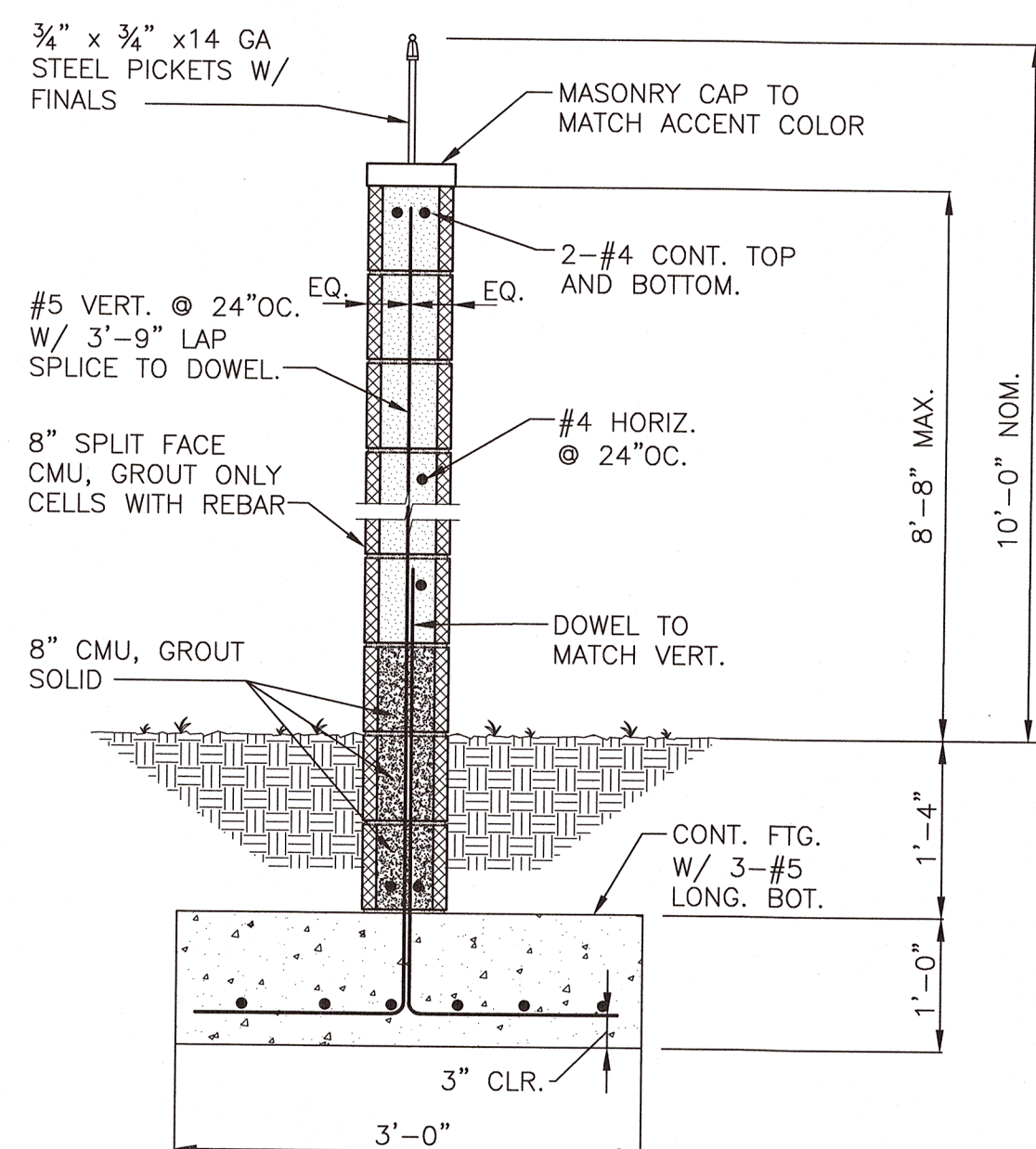
NOTES:

- INTERSECTIONS SHALL HAVE A MINIMUM 25 FOOT RADIUS TO EDGE OF AC PAVEMENT.
- COMPACTION OF AGGREGATE BASE AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS".
- STRUCTURAL SECTION SHOWN IS BASED ON A SUBGRADE "R" VALUE OF 20. OTHER STRUCTURAL SECTIONS MAY BE APPROVED IF BASED ON ENGINEERING ANALYSIS BASED ON "R" OR "CBR" VALUES DETERMINED BY SOIL TESTING. IN NO CASE SHALL THE AC THICKNESS BE LESS THAN THAT SHOWN, NOR SHALL THE BASE BE LESS THAN 4".
- CLARK COUNTY LAB TESTING IS REQUIRED

SITE ACCESS ROAD - SECTION

SCALE: NTS

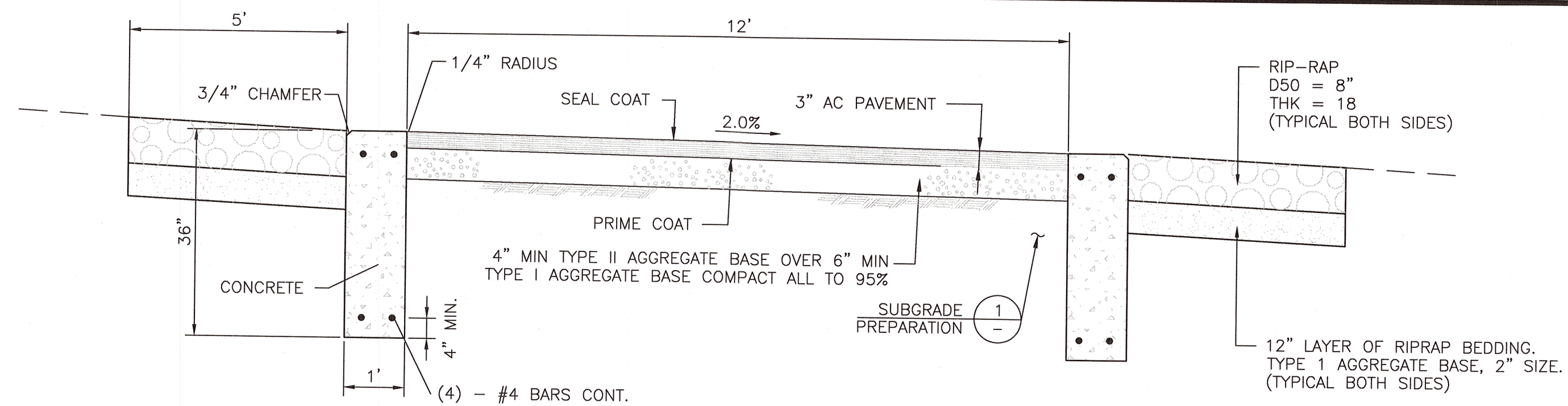
2
CD1



CMU WALL SECTION

SCALE: NTS

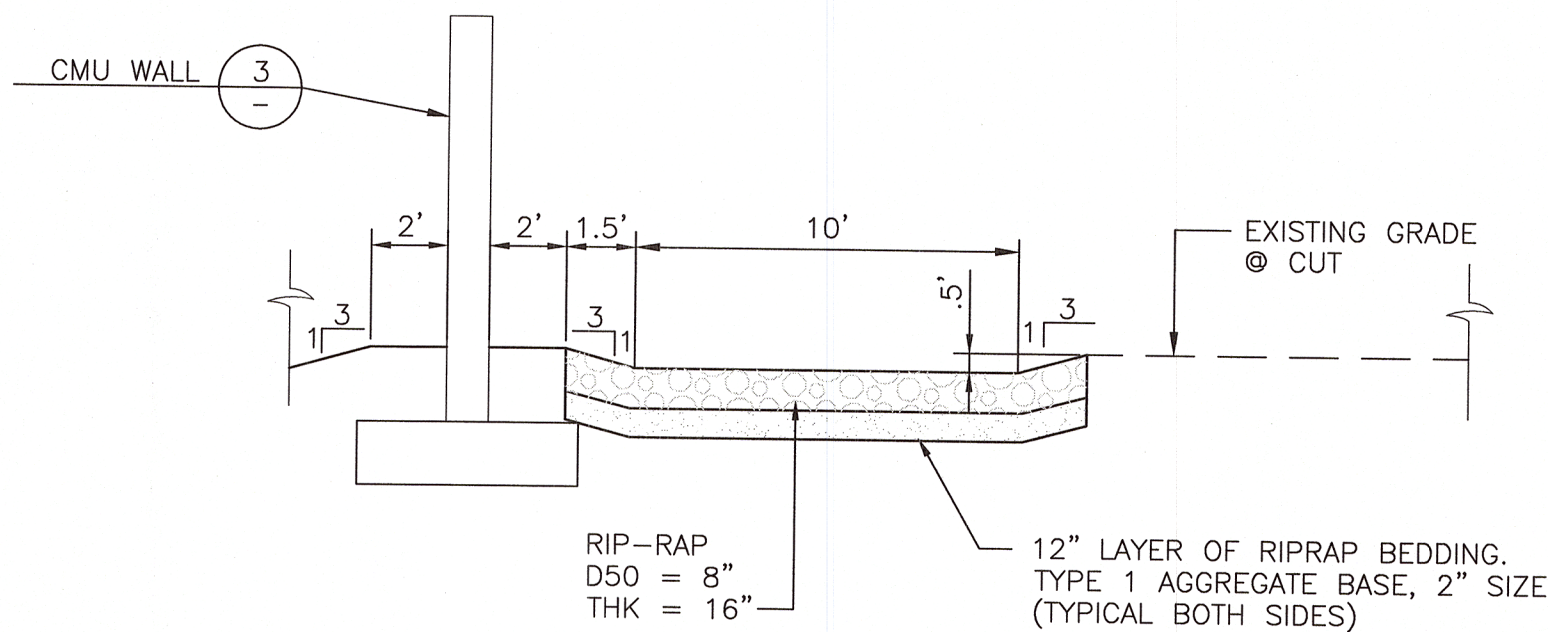
3
CD1



AC PAVEMENT WITH CUT-OFF WALL SECTION

NOT TO SCALE

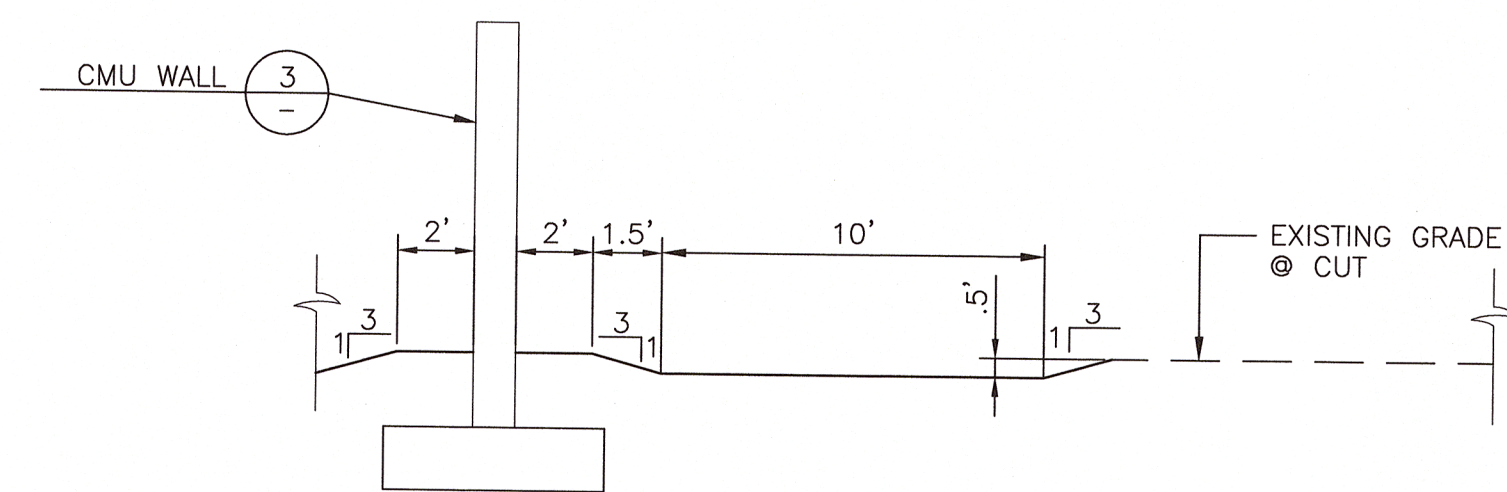
4
CD1



DRAINAGE DITCH W/ RIPRAP SECTION

SCALE: NTS

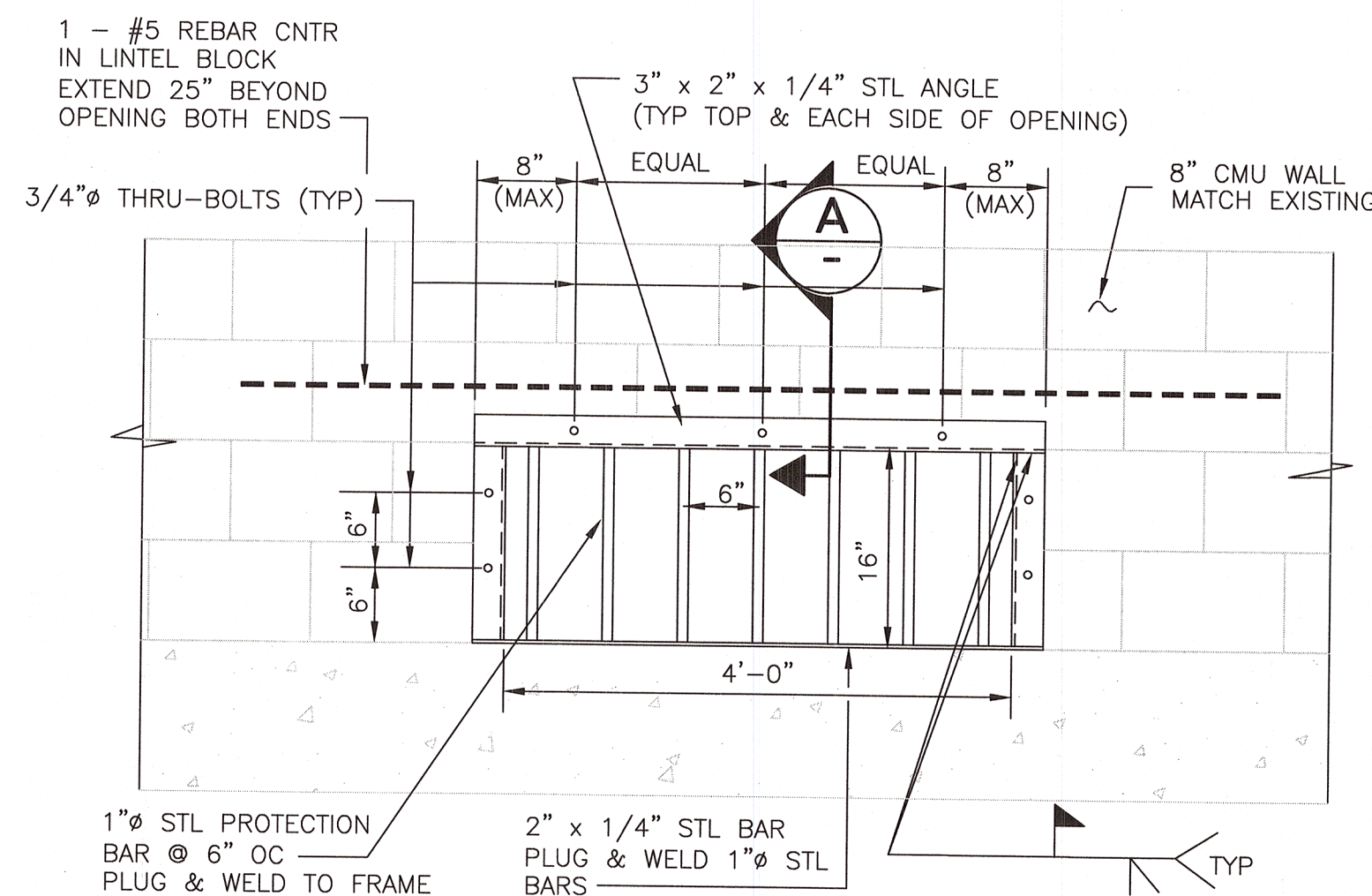
5
CD1



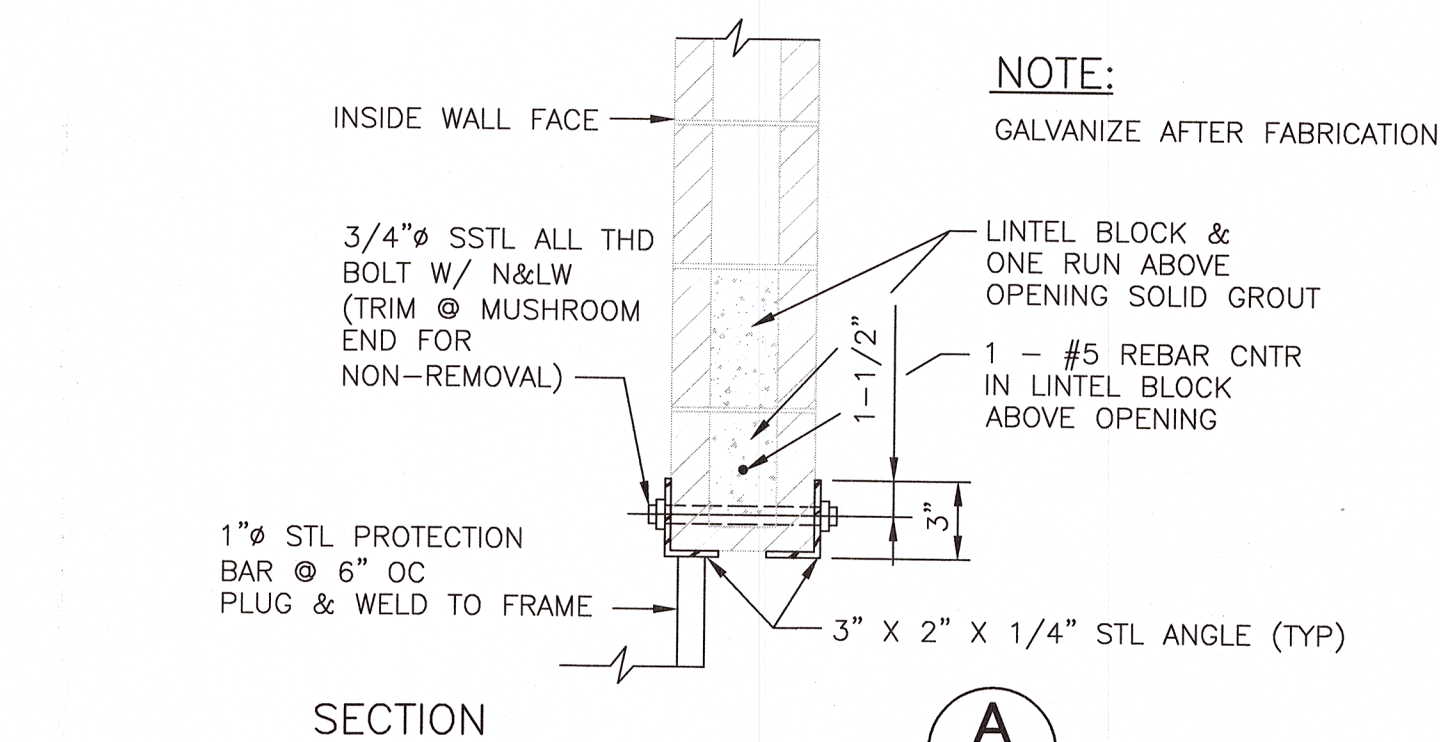
DRAINAGE DITCH SECTION

SCALE: NTS

7
CD1



ELEVATION



WALL OPENING DETAIL

SCALE: NTS

6
CD1

LAS VEGAS VALLEY WATER DISTRICT

S-I-G
SLATER
HANIFAN
GROUP
CONSULTING ENGINEERS & PLANNERS
7740 S. ARVILLE STREET #16, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5389

VERIFY SCALE

1/2" = 1'
0" = 0'
1/2" = 1'
BAR REPRESENTS
ORIGINAL SCALE
INCHES ON ORIGINAL

3090 ZONE NORTH INTERIM TANK

GRADING DETAILS

DRAWN BY: 11/3/2016
SE: 11/3/2016
CHECKED BY: DBH
RECOMMENDED BY: RYAN PEARSON
ACCEPTED BY: DESIGN MANAGER
DATE: DATE

PROFESSIONAL ENGINEER
STATE OF NEVADA
No. 14968
Exp. 06/30/2017
11/3/16

CONTRACT NUMBER
C1453
DRAWING NUMBER CD 1
SHEET 4 OF 4

NOT FOR CONSTRUCTION