07-09-0594P

Request for Letter of Map Revision

U.S. 95 Widening
Rancho Roadway Improvements

Located
Between I-515 and Washington Avenue
City of Las Vegas
Clark County, Nevada

Prepared for:

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
600 South Grand Central Parkway, Suite 300
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Prepared by:

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April 2006

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1.0 INTRODUCTION

PBS&J has prepared a request for a Letter of Map Revision (LOMR) for the Rancho Lateral on behalf of the Clark County Regional Flood Control District (CCRFCD). The purpose of the study is to evaluate the removal of an existing Zone A flood zone based on the recently completed flood control facility for the U.S 95 Widening Project (see Figure 1-Vicinity Map & Figure 3A). Please note that the Rancho Lateral is one component of the overall drainage improvements associated with the on-going freeway widening project.

The Rancho Lateral is within the right-of-way of Rancho Drive that runs northwest-southeast between U.S. 95 and Washington Avenue. Also, the upstream portion of the Rancho Lateral extends approximately 300 feet west into Washington Avenue. The system will convey the 100-year flow within a box culvert ranging in size as described below. The Rancho Lateral ties-in to an existing box culvert facility south of U.S. 95 referred to as the Main Line Channel. Although not a channel, the Main Line facility consists primarily of dual 14'x7' RCB's and extends easterly from the Meadows Detention basin outfall to the U.S. 95/I-15 interchange as shown on Figure 5. It should be noted that the Main Line facility is not specifically addressed in this report nor is specifically responsible for collecting the flow required to remove the flood zone. However, it is the primary drainage component of the overall U.S. 95 widening project and the tie-in point for the Rancho Lateral. Therefore, the WSPG model and other pertinent calculations for the Main Line facility have been included. Note that the plans provided by Nevada Department of Transportation (NDOT) were prepared in metric units. However, for this report both metric and its English unit equivalent will be listed. The Rancho Lateral was designed by VTN Nevada (VTN) and consists of the following primary components:

1. Main Line facility south of U.S. 95 – Dual 14'x7' RCB's (4200mm x 2100mm).
2. Confluence & transition structure between Rancho Lateral and Main Line facility.
3. Approximately 186.2 feet (56.75 meters) of 12'x8' RCB (3600mm x 2400mm).
4. (2) Transition Structures – 8 feet (2.4 meters) of variable size RCB.
5. Approximately 1,952.1 feet (595 meters) of 12'x6' RCB (3600mm x 1800mm).
6. Approximately 173.9 feet (53 meters) of 8'x6' RCB (2400mm x 1800mm).
7. Eighteen (18) RCP connections of various size to the Rancho Lateral.
8. One (1) trench drain on the north side of Washington Avenue.
9. One (1) trench drain on the south side of Washington Avenue.
10. Fifteen (15) drop inlets draining to the Rancho Lateral.

As described in the VTN Design Report (2003), the system allows for the adequate collection and conveyance of the 100-year flow. Additional details on the Rancho Lateral can be found in the approved as-built plans located in Appendix E and reference material located in Appendix C. Please note that the figures show a facility called the North Channel that is located immediately north of U.S. 95 between Rancho Drive and Martin Luther King Blvd. This existing facility is part of the overall U.S. 95 widening project and consists of a storm drain system ranging in size from 24" to 42" RCP and numerous field inlets. The North

Channel ties-in to the Main Line and was designed to collect flow immediately north of U.S 95 in what has been historically a drainage problem area. Although this system is existing, it did not make it into the as-built plans for the Rancho Lateral provided in Appendix E. At the time this report was prepared NDOT had not yet surveyed and prepared as-built plans for the North Channel system. The analysis presented in this report does not account for any flow that may be collected by the North Channel system and thus the results presented herein are more conservative.

2.0 PURPOSE AND SITE DESCRIPTION

2.1 PURPOSE

Prior to the completion of the Rancho Lateral a relatively minor storm drain system was located in Rancho Drive and consisted of RCP ranging in size from 24" to 42". The previous storm drain system had insufficient capacity to collect the 100-year event thus flooding would result in the area immediately north of U.S.95 between Rancho Drive and Martin Luther King Boulevard. Prior to the Rancho Lateral flow from a 100-year event would be conveyed east in Washington Avenue and split at the intersection with Rancho Drive. The flow conveyed south in Rancho Drive would turn east onto Bonanza Road and cause flooding to the commercial properties within the effective flood zone. Also, the freeway widening would encroach into the effective Zone A flood zone located immediately north of U.S. 95. Thus, the Rancho Lateral was constructed first to mitigate the flood source described above. Therefore, this LOMR has been prepared to address the newly constructed facility that collects the 100-year flow in Washington Avenue and Rancho Drive for the purpose of flood zone removal.

2.2 LOCATION

The subject facility is located in the City of Las Vegas within Sections 28, 29, 32 & 33, Township 20 South, Range 61 East and specifically the R.O.W. of Rancho Drive between U.S.95 (aka I-515) and Washington Avenue. Please refer to Figure 1 – Vicinity Map.

2.3 EXISTING FLOOD CONTROL FACILITIES

The 2002 Master Plan Update (MPU) serves as a planning tool for the implementation of existing and proposed flood control facilities within the Las Vegas Valley. The MPU shows the alignment of the Rancho Lateral (see Figure 2). As previously discussed, the flows collected by the Rancho Lateral drains to dual 14'x7' RCB's (Main Line) that is located along the south side of U.S.95. Refer to the table immediately following Figure 2 that provides the detailed information on each existing and proposed facility discussed in this section.

2.4 FEMA FLOOD ZONE INFORMATION

Figure 3 is a reproduction of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Clark County, Nevada, Community Panel No. 32003C2170 E, dated September 27, 2002. Figure 3 shows the Zone A flood zone in relation to the proposed facility. Also refer to Figure 3A that shows the DFIRM flood zone delineations for the subject area.

3.0 HYDROLOGY

Note that two independent hydrologic models will be presented in this report. One model has been referenced from the VTN Design Report and creates the design flows for the Rancho Lateral and Main Line facilities. The second hydrologic model was prepared by PBS&J to show what is currently tributary to the flood zone with the Rancho Lateral facility in-place. Additional details on the hydrology referenced from VTN's Design Report and hydrology created for this project will be discussed below.

3.1 REFERENCE HYDROLOGY

The hydrology associated with the design of the Rancho Lateral and Main Line facility is included in the *Final Overall Project Drainage Design Report, May 2003,* prepared by VTN can be found in Appendix C. The report contains the HEC-1 model, watershed map, flow summary table, hydrologic parameters and other pertinent data related to the development of the hydrologic model. Prior to the completion of the Rancho Lateral the VTN hydrology showed a 100-year flow of 1,103 cfs draining east in Washington Avenue. A portion of the flow (68 cfs) splits off to the south prior to reaching the intersection of Rancho Drive. The remaining flow of 1,035 cfs will split at the intersection of Rancho and Washington. A total of 630 cfs splits south onto Rancho Drive and 405 cfs continues east in Washington Avenue. The Rancho Lateral facility will collect a portion of the flow in Washington Avenue east of Rancho Drive with two trench drains and two drop inlets. The Rancho Lateral will then collect the remainder of the flow that splits south onto Rancho Drive through numerous drop inlets located between Washington Avenue and U.S. 95. A more detailed discussion of the hydrology associated with the design of the Rancho Lateral can be found in Appendix C.

3.2 PROJECT HYDROLOGY

With the Rancho Lateral facility in-place, new hydrology was prepared to show what is currently tributary to the Zone A flood zone. Two basins (RCHO1 & RCHO2) were delineated to quantify the 100-year flow at the downstream end of the subject flood zone. The basins were delineated using the Clark County GIS 5' contours and verified with field reconnaissance. In general, the watershed slopes from west to east at approximately 0.7% and consists predominantly of commercial land use. Flow from basin RCHO1 drains south to Bonanza Road and is then conveyed in the street to Martin Luther King Blvd. A normal depth cross-section (Section A) shows the entire flow from basin RCHO1 (49 cfs) is contained in the north half-street of Bonanza Road. A portion of the flow from basin RCHO1 reaching the intersection of Martin Luther King Blvd would most likely continue east based on field observations of the intersection grading. However, as a conservative assumption, it was assumed all of the flow from basin RCHO1 turns south onto Martin Luther King Blvd. Flow from basin RCHO2 drains east through the commercial developments and a portion

drains to Bonanza Road and combines with basin RCHO1 at combination point C1 for a total 100-year flow of 124 cfs. Please refer to Figure 5 Work Map that shows the basin delineations and cross-section locations.

The hydrologic model utilized to calculate the 100-year runoff is the HEC-1 Flood Hydrograph Package, Version 4.1, developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. The HEC-1 input parameters and soils information is discussed n detail below.

3.3 HYDROLOGIC PARAMETERS

The methodology and calculations used to determine the hydrologic parameters in the HEC-1 modeling are included in Appendix C. The local parameters for computing runoff have been developed in accordance with CCRFCD's Hydrologic Criteria and Drainage Design Manual (HCDDM) and are described below.

Design Storm

The design storm for this study is the 100-year, 6-hour frequency flood event. The rainfall used for hydrologic modeling in this study is intended to produce runoff discharges with an expected 100-year recurrence interval. A 100-year recurrence interval is defined as having a 1.0 percent chance of being equaled or exceeded in any given year.

Precipitation

Rainfall data published by the National Oceanic and Atmospheric Administration (NOAA) in NOAA Atlas 2, Precipitation–Frequency Atlas of the Western United States, Volume VII–Nevada (NOAA 1973) and their subsequent modification by the USACE Los Angeles District (1988) were used for this study. An adjustment factor of 1.43 (HCDDM) is multiplied by all rainfall depths obtained from the NOAA Atlas, see Table 501 in Appendix C. The adjusted 100-year, 6-hour rainfall depths range from approximately 2.3 inches to 4.3 inches in the Las Vegas Valley watershed. Most areas have a rainfall depth of 2.77 inches or higher except for the extreme northwest portion of the Valley between the Sheep and Spring Mountains. The central part of the Las Vegas Valley is known as they McCarran Airport Rainfall Area with a 100-year, 6-hour precipitation of 2.77 inches as shown on Figure 506 and Table 505 in Appendix C. The subbasins delineated for this project are within the McCarran Airport Rainfall Area as shown on Figure 513 in Appendix C. These rainfall depths were then used in the HEC-1 input files.

Storm Distribution

The rainfall depths discussed in the previous section are distributed over the 6-hour design storm period using three different storm distribution numbers (SDN). SDNs 3,

4, and 5 are applied to a HEC-1 model and associated concentration points depending on the tributary area to each concentration point of interest. For drainage areas less than 8 square miles in size, SDN 3 is used. For drainage areas greater than or equal to 8 and less than 12 square miles in size, SDN 4 is used. SDN 5 is used for drainage areas greater than or equal to 12 square miles in size (see CCRFCD Design Manual). All subbasins delineated for this LOMR are less than 8 square miles, thus an SDN 3 was used. See Table 503 in Appendix C for six-hour storm distributions.

Soils & Curve Numbers

Rainfall losses due to soil infiltration, depression storage, and other factors were calculated using the National Resource Conservation Service curve number method, which is a function of soil type, land cover, and antecedent moisture conditions. Based on the CCRFCD Design Manual, the average antecedent moisture condition (AMC II) is used for computing losses. Soils information for the drainage basins was obtained from the Soil Conservation Service (SCS) Soil Survey of Las Vegas Valley Area, Nevada, 1985. An SCS survey map is included in Appendix C, Soils Map. The hydrologic group classification for each soil in the soil composite was read from Table 15 of the SCS survey, included in Appendix C. The soil types were matched to the corresponding SCS Curve Number (CN) for use in the Standard Form 4 and the HEC-1 analysis. The corresponding CN's for these soils are found on Table 602 of the HCDDM, see Appendix C.

Table C-1, Curve Number Calculations, in Appendix C, summarizes the computation of the Curve Numbers for the subbasins.

Lag Times

For subbasins less than 1 square mile, lag times are calculated using the time of concentration (velocity method) per the CCRFCD Design Manual as described below.

Time of Concentration Method

For drainage basins with less than 1 square mile, the time of concentration is calculated as follows:

$$T_c = T_i + T_t$$

Where:

T_c	=	Time of concentration (minutes)
T_i	=	Initial, inlet, or overland flow time (minutes)
T_t	=	Travel time in the ditch, gutter, etc. (minutes)

The lag time for basins less than 1 square mile is calculated as follows:

$$T_{lag} = 0.6T_c \text{ (hours)}$$

Initial flow time is calculated as follows:

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

Where:

T_i	=	Initial overland flow time (minutes)
K	=	0.0132 * CN - 0.39
CN	=	Curve number
L_o	=	Length of overland flow (maximum 500 feet)
S	=	Average basin slope (percent)

Travel time is calculated as follows:

$$T_t = L_t/(V*60)$$

Where:

T_t	=	Travel time in the ditch, gutter, etc. (minutes)
L_t	=	Travel length (feet)
V	=	Average velocity of flow computed using the total flow from the basin and an approximated channel geometry (feet/second)

In urbanized areas, the time of concentration calculated above should not exceed the time of concentration calculated by the following equation:

$$T_c = (L / 180) + 10$$

Where:

Tc	=	Time of concentration at the first design point in an urban watershed (minutes)
L	=	Watershed length (feet)

The smaller of the two calculations for Time of Concentration controls. Minimum T_c for any watershed is limited to 5 minutes.

Please refer to Standard Form 4 in Appendix C that shows the time of concentration calculations for basins under 1 square mile in the study area. Velocity estimates used in column 9 of Standard Form 4 are also included in Appendix C.

3.4 HYDROLOGIC RESULTS

The HEC-1 model submitted in this LOMR was prepared with the following assumptions:

1. Existing condition land use.

2. The Rancho Lateral facility is existing.

Therefore, subbasins RCHO1 and RCHO2 have been delineated to show what is currently tributary to the flood zone using the above assumptions (see Figure 5). A summary of the results of the HEC-1 modeling is shown below in Table C1.

Table C1
Hydrologic Summary

HEC-1 Basin	100-Yr Discharge (cfs)	Drainage Area (acres)	Drainage Area (sq miles.)	Normal Flow Depth in MLK Boulevard (ft)
RCHO1	49	27.3	0.0427	NA
RCHO2	75	42.6	0.0666	NA
C1	124	NA	NA	0.81

4.0 HYDRAULICS

4.1 COMPUTER MODELING

The Water Surface Pressure Gradient for Windows™ (WSPGW) modeling program, Civil Design software Version 12.99, was used to analyze the Rancho Lateral and Main Line facilities.

FlowMaster, version 8 was used for normal depth analysis of right-of-way cross-sections.

Both hydraulic models conform to local standards specified in the CCRFCD Hydrologic Criteria and Drainage Design Manual. The models are based on the North American Vertical Datum of 1988 (NAVD88).

4.2 MODEL DESCRIPTION

A single WSPG model was prepared for both the Rancho Lateral and the Main Line facility. A more detailed discussion of the WSPG models and design criteria can be found in the reference drainage report in Appendix C. The hydraulic models were prepared by VTN and can be found in Appendix D. Also, the electronic input and output files can be found in Appendix F.

Please refer to Appendix D for the following calculations prepared by VTN for the Rancho Lateral and Main Line facilities:

1. Confluence Calculations
2. Flow Split Calculations for the intersection of Rancho/Washington
3. Drop Inlet Calculations
4. Storm Drain Lateral Calculations

4.3 NORMAL DEPTH CALCULATIONS

The effective flood zone within the project area was analyzed with a normal depth cross-section based on the hydrology established in Section 3 of this report. As previously discussed in Section 3 the flow from basins RCHO1 and RCHO2 combine at combination point C1 for a 100-year flow of 124 cfs. Combination point C1 is located within Martin Luther King Blvd which consists of an 80' right-of-way. The exact slope for Martin Luther King Blvd could not be determined from the 5' topography; thus, the Clark County minimum roadway slope of 0.4% was applied to the calculation. The cross-section consists of a standard roadway section in Clark County with a centerline crown and 2% cross-slopes, curb and gutter and a 5 foot sidewalk on each side. A normal depth section within Martin Luther King Blvd (Section B) shows a depth of 0.81' and a corresponding hydraulic depth of 0.33'.

Please refer to Appendix D for the Flowmaster normal depth cross-section worksheets. It should be noted that all of the cross-sections show subcritical flow.

5.0 RESULTS

The results of the Rancho Lateral facility are based on the hydrology/hydraulics prepared by VTN. The system shows adequate collection and containment of the 100-year flood. Also, Cross-Section B shows a normal flow depth and hydraulic flow depth of less than one foot. The hydrologic analysis shows a tributary area of less than one square mile. Please refer to Appendix D for the hardcopy output of the WSPG models and Appendix F for the digital WSPG input/output files.

6.0 CONCLUSION

The proposed flood zone removal requested within this Letter of Map Revision is based on the best available data, as-built plans, and supporting calculations. Based on this information, we believe the flood zone removal is warranted. Please refer to Figure 3, FEMA Flood Zone Map, and Figure 4, Annotated FEMA Flood Zone Map.

Figure 4 shows the proposed removal of the current effective Zone A flood zone. Based upon the findings of this analysis, the removal of the Zone A flood zone in accordance with Figure 4 is requested.

7.0 REFERENCES

HCDDM — *Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual.* Prepared for: Clark County Regional Flood Control District. Adopted August 12, 1999.

MPU 02 — *CCRFCD Master Plan Update of the Las Vegas Valley 2002.* Prepared for Clark County Regional Flood Control District. Prepared by PBS&J and GC Wallace, Inc., 2002.

VTN — *Final Overall Project Drainage Design Report for U.S.95 Widening.* Prepared for Nevada Department of Transportation. Prepared by VTN Nevada, May 2003.

VTN — *Improvement Plans for U.S.95 Widening – Rancho Lateral Facility.* Prepared for Nevada Department of Transportation. Prepared by VTN Nevada, May 2003 (as-built by Nevada Department of Transportation).

APPENDIX A

FEMA MT-2 Forms

MT-2 FORM 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

☐ CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
320003	City of Las Vegas	NV	32003C	2170E	09/27/02

2. Flooding Source: Urban Runoff

3. Project Name/Identifier: Request for Letter of Map Revision for US 95 Widening - Rancho Lateral

4. FEMA zone designations affected: A (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. *Basis for Request and Type of Revision:*

a. The basis for this revision request is (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

Types of Flooding:	☐ Riverine	☐ Coastal	☐ Shallow Flooding (e.g., Zones AO and AH)
	☐ Alluvial fan	☐ Lakes	☒ Other (Attach Description)
Structures:	☐ Channelization	☐ Levee/Floodwall	☒ Bridge/Culvert
	☐ Dam	☐ Fill	☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☐ Yes Fee amount: $4,000

☒ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/fhm/frm_fees.shtm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Brian K. Loffman, CFM	Company: PBS&J	
Mailing Address: 2270 Corporate Circle Suite 100 Henderson, NV 89074	Daytime Telephone No.: (702) 263-7275	Fax No.: (702) 263-7200
	E-Mail Address: bloffman@pbsj.com	
Signature of Requester (required):		Date: 4/17/06

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Randy Fultz, P.E., CFM, Assistant City Engineer		Telephone No.: (702) 229-6541
Community Name: City of Las Vegas	Community Official's Signature (required):	Date: 5.24.06

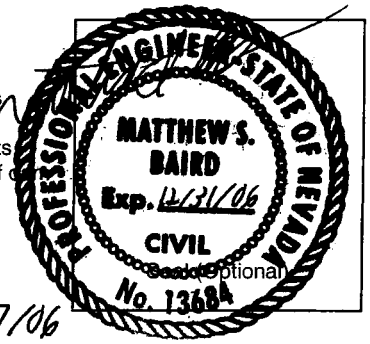
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Mathew S. Baird, P.E., CFM	License No.: NV 13684	Expiration Date: 12/31/06
Company Name: PBS&J	Telephone No.: (702) 263-7275	Fax No.: (702) 263-7200
Signature:		Date: 4/17/06

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans



4/17/06

Statement of Explanation for following sections:

1. MT-2 Form 1, Section B, 5b.

Types of Flooding: Flooding type is characterized by fully urbanized runoff consisting predominantly of commercial land use. Flow is primarily contained and conveyed within public right-of-way.

2. MT-2 Form 1, Section C.

Payment: Clark County Regional Flood Control District will submit the appropriate fee upon receiving an invoice from FEMA.

MT-2 FORM 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Urban Runoff
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☒ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)
US 95 @ Rancho Drive	0.11	na	124

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section *	Water-Surface Elevations (ft.) *	
			Effective	Proposed/Revised
Downstream Limit	Main Line Channel	20+30.50	n/a	2070.95
Upstream Limit	Washington Avenue	9+10.00	n/a	2096.48

2. Hydraulic Method Used

Hydraulic Analysis WSPG [HEC-2 , HEC-RAS, Other (Attach description)] * See Explanation

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/frm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☐ Yes ☒ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name: na	Floodway File Name: na
Corrected Effective Model*	Natural File Name: na	Floodway File Name: na
Existing or Pre-Project Conditions Model	Natural File Name: na	Floodway File Name: na
Revised or Post-Project Conditions Model	Natural File Name: Rancho1TS.dat	Floodway File Name: na
Other - (attach description)	Natural File Name: na	Floodway File Name: na

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:

- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

Statement of Explanation for the following sections:

1. MT-2 Form 2, Section A5.

Sediment Transport: The tributary watershed analyzed for this project is fully urbanized; thus, sediment transport was not considered.

2. MT-2 Form 2, Section B1.

Note that Rancho Road and Washington Avenue are on different roadway stationing. The upstream station for the Rancho Lateral facility within Washington Avenue is 9+10.00 and the corresponding upstream station in Rancho Road is 29+26.65

Also note the WSEL's presented in the WSPG model are in metric units. The downstream and upstream WSEL's are listed as 631.227 and 639.01 meters with a corresponding WSEL of 2070.95 feet and 2096.48 feet, respectively.

MT-2 FORM 3

Riverine Structures Form

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Urban Runoff
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization .....complete Section B
Bridge/Culvert .....complete Section C
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: Main Line Channel (dual 14' x 7' RCB's)**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: South of U.S. 95 between the Meadows Detention Basin and Martin L. King Boulevard

   Downstream Limit/Cross Section: 7+52.20

   Upstream Limit/Cross Section: 84+39.36

2. **Name of Structure: Rancho Lateral (12' x 6' RCB)**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: Rancho Drive ROW between Washington Avenue and the Main Line Channel

   Downstream Limit/Cross Section: 18+57.60

   Upstream Limit/Cross Section: 11+27.40

3. **Name of Structure: Transition Structure 1**

   Type (check one) ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: Near the downstream end of the Rancho Lateral

   Downstream Limit/Cross Section: 18+60.00

   Upstream Limit/Cross Section: 18+57.60

NOTE: For more structures, attach additional pages as needed.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
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PAPERWORK REDUCTION ACT

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Flooding Source: Urban Runoff
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization .....complete Section B
Bridge/Culvert .....complete Section C
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

4. **Name of Structure: Transition Structure 2**

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: In Rancho Drive approximately 200 feet south of Washington Avenue

Downstream Limit/Cross Section: 11+27.40

Upstream Limit/Cross Section: 11+25.00

5. **Name of Structure: Rancho Lateral (8' x 6' RCB)**

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Washington Avenue and Rancho Drive

Downstream Limit/Cross Section: 11+25.00

Upstream Limit/Cross Section: 10+32.50

6. **Name of Structure: Rancho Lateral (12' x 8' RCB)**

Type (check one) ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Near the downstream end of the Rancho Lateral

Downstream Limit/Cross Section: 19+16.80

Upstream Limit/Cross Section: 18+60.00

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe):
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Hydraulic Considerations

The channel was designed to carry (cfs) and/or the -year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Urban Runoff

Name of Structure: Rancho Lateral - Main Line Facility

1. This revision reflects (check one):

- ☒ New bridge/culvert not modeled in the FIS
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☐ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): WSPG
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☐ Beveling or Rounding
- ☐ Wing Wall Angle
- ☒ Skew Angle
- ☐ Distances Between Cross Sections
- ☐ Erosion Protection
- ☐ Low Chord Elevations – Upstream and Downstream
- ☐ Top of Road Elevations – Upstream and Downstream
- ☒ Structure Invert Elevations – Upstream and Downstream
- ☐ Stream Invert Elevations – Upstream and Downstream
- ☐ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☒ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:

2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:

3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:

4. A layout detail for the embankment protection measures. Sheet Numbers:

5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance *stillwater surge elevation or maximum wave runup* (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☒ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☒ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. *Stability analysis submitted provides for:*

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: *Extend table on an added sheet as needed and reference*)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☒ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☒ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

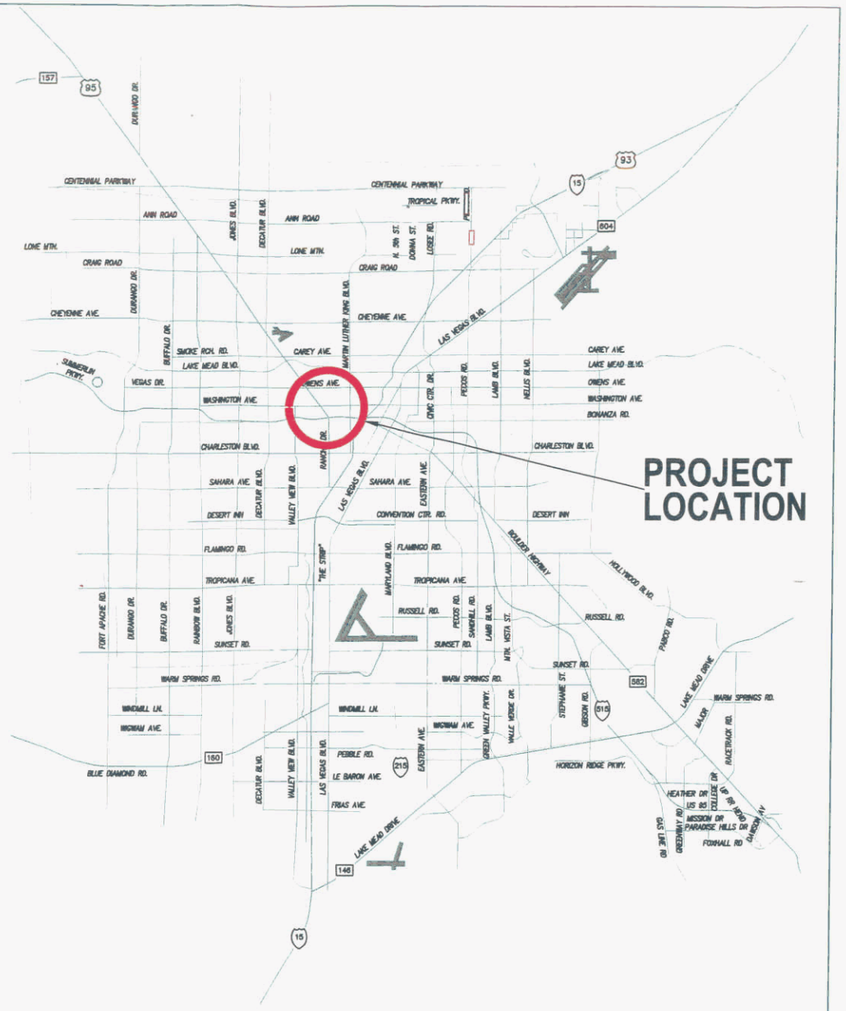
Statement of Explanation for following sections:

1. MT-2 Form 3, Section C4

Sediment Transport: The tributary watershed analyzed for this project is fully urbanized; thus, sediment transport was not considered.

APPENDIX B

Figures



LEGEND

- Rancho Lateral Facility Alignment
- Main Line Facility Alignment
- North Channel Facility Alignment

GRAPHIC SCALE

800 0 400 800 1600 3200

(IN FEET)

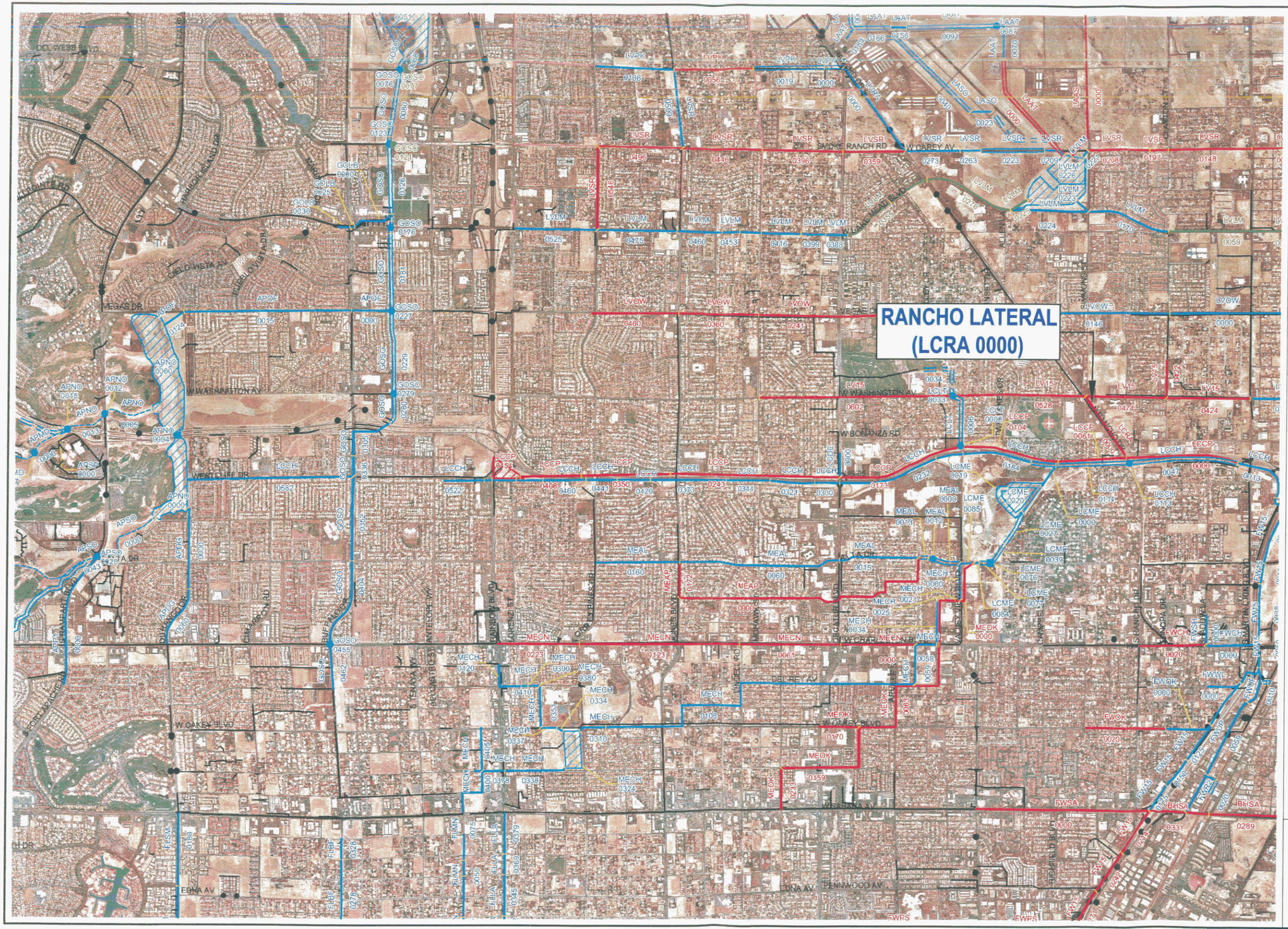
1 inch = 800 ft.

AREA - VICINITY MAP

U.S. 95 Widening - Rancho Lateral
Letter of Map Revision

PBSJ
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

FIGURE 1

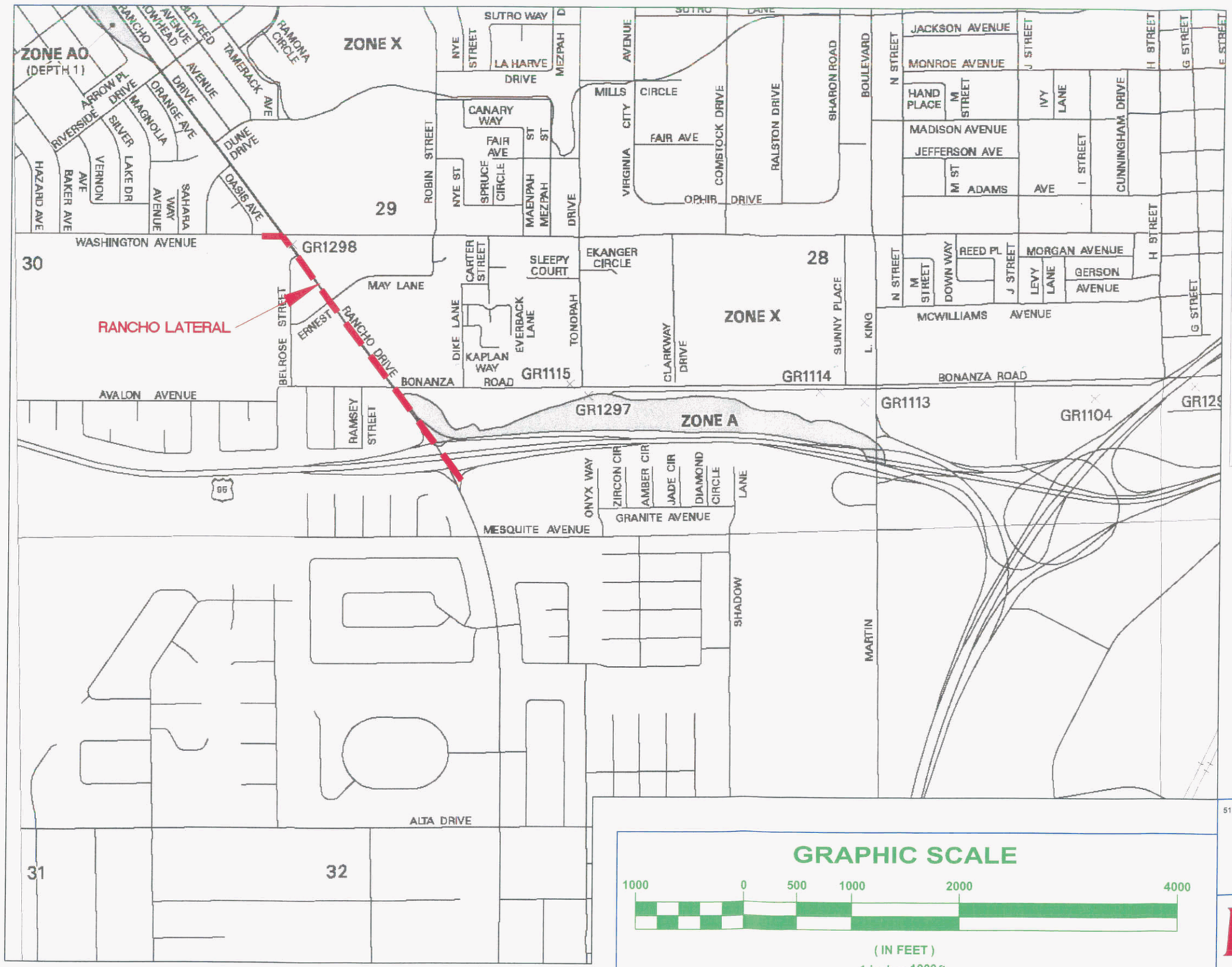

RANCHO LATERAL
(LCRA 0000)
W WASHINGTON AV
W BONANZA RD
W CAREY AV
W OAKEY BLVD
VEGAS DR
EDNA AV
PENNWOOD AV
SMOKE RANCH RD
DEL REY AV
WESTCLIFF DR
DECATUR BLVD
RAINBOW BLVD
JONES BLVD
HUALAPAI WAY
TORREY PINES DR
BUFFALO DR
CIMARRON RD
ANTIETAM WY
S FORT APACHE RD
S HUALAPAI WAY
S JONES BLVD
S RAINBOW BLVD
S DECATUR BLVD
S VALLEY VIEW BLVD
S EASTERN AVE
S MARYLAND PKWY
S NELLIS BLVD
S SUNRISE WAY
S HIGHLAND DR
S PECOS RD
S PARADISE RD
S MARTIN LUTHER KING BLVD
S LAMB BLVD
S SPENCER ST
S NELLIS BLVD
DESERT INN RD
CHEYENNE AV
CHEYENNE RD
CHEYENNE WY
CHEYENNE RANCH DR
CHEYENNE RIDGE DR
CHEYENNE TRAIL DR
CHEYENNE VISTA AV
CHEYENNE VISTA DR
CHEYENNE WOODS DR
CHEYENNE WOODS LN
CHEYENNE WOODS PL
CHEYENNE WOODS ST
CHEYENNE WOODS WY
CHEYENNE WOODS CT

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APDG		**ANGEL PARK - DURANGO**						
0000	E	84" RCP	2600	839	C38B	GW3SC	0.79	0.70
0060	E	72" RCP	1901	374	38A	GW3SC	0.35	0.96
APMD		**ANGEL PARK - MIDDLE BRANCH**						
0000	E	Natural Wash	1200	5780	C11A-3"	GW3SC	4.87	2.90
0027	E	1: 12' X 10' & 2: 12' X 2' RCBC	170	5780	C11A-3"	GW3SC	4.87	3.00
0030	E	Natural Wash	7000	5780	C11A-3"	GW3SC	4.87	3.00
APNO		**ANGEL PARK NORTH**						
0000	E	1400 ac-ft Angel Park Detention Basin		8623	ANGLPKDB	ALLGOW5	22.21	
0001	E	42" RCP Emergency Outlet	200	8623	ANGLPKDB	ALLGOW5	22.21	
0002	E	33" RCP Emergency Outlet	189	8623	ANGLPKDB	ALLGOW5	22.21	
0003	E	33" RCP Emergency Outlet	185	8623	ANGLPKDB	ALLGOW5	22.21	
0004	E	14' X 12' RCBC	380	1560	ANGLPKDB	ALLGOW5	22.21	1.00
0005	E	Natural Wash	1800	6743	CSF2-C	GW4SC	8.27	2.00
0012	E	3: 12' X 10' RCBC @ Rampart	220	6743	CSF2-C	GW4SC	8.27	1.00
0013	E	Natural Wash	1400	6743	CSF2-C	GW4SC	8.27	1.40
0015	E	2: 14' X 14' RCBC	150	6743	CSF2-C	GW4SC	8.27	1.00
APOF		**ANGEL PARK OUTFALL**						
0000	E	66" RCP	1297	451	CGD34AB	ALLGOW5	22.48	1.90
0015	E	60" RCP	5472	451	CGD34AB	ALLGOW5	22.48	2.20
0124	E	54" RCP	810	441	ANGLPKDB	ALLGOW5	22.21	2.50
APP1		**ANGEL PARK - PECCOLE 1**						
0000	E	2: 60" RCP	4430	435	PIC-B	GW3SC	0.44	2.40
APP2		**ANGEL PARK - PECCOLE 2**						
0000	E	Grass Chnl 10'W 5'D 2:1 SS	4773	1952	C57B-1	GW3SC	1.93	2.10
APSO		**ANGEL PARK - SOUTH BRANCH**						
0000	E	Natural Wash	2500	4425	CC57B-4	GW3SC	5.19	2.00
0020	E	2: 12' X 12' RCBC @ Rampart	350	4425	CC57B-4	GW3SC	5.19	1.80
0043	E	Natural Wash	500	4082	C57B-4	GW3SC	4.74	1.84
0067	E	Natural Wash	8300	2060	C57B-3	GW3SC	2.25	2.10
APSP		**ANGEL PARK - SUMMERLIN PARKWAY**						
0000	E	Concrete Chute Drop		2758	C3B-2B	GW3SC	2.67	3.00
0001	E	Unlined Chnl with Gabion Drops 20'W Depth Varies 2:1 SS	3750	2758	C3B-2B	GW3SC	2.67	3.00
BHSA		**BOULDER HIGHWAY SAHARA AVENUE**						
0289	P1	14' X 12' RCB	2300	3462	CSA11	SW3SC	7.76	0.87
0331	P1	12' X 12' RCB	2000	3152	CSA10-2	SW3SC	7.36	1.00
FLBF		**FLAMINGO WASH - BUFFALO**						
0278	E	90° RCP	2640	495	LF8	FLAM3SC	0.50	0.50
0328	E	54" RCP	660					0.30
FLLA		**FLAMINGO WASH - LATERAL DRAIN (FLAMINGO/RAINBOW)**						
0322	E	81" RCP	1370					0.50
0345	E	81" RCP	1340					0.50
0369	E	72" RCP	670					0.50
0379	E	66" RCP	1320					0.50
FLMN		**FLAMINGO WASH - MONTESSOURI NORTH**						
0000	E	78" RCP	1340					0.50
0025	E	72" RCP	1330					0.50
0050	E	66" RCP	500					0.50
0060	E	54" RCP	800					0.50
0075	E	48" RCP	30					0.50
FLSM		**SPRING MOUNTAIN DRAIN**						
0125	E	96" RCP	3040	748	CLF6N	FLAM3SC	0.87	0.80
0180	E	90" RCP	2350	523	LF5	FLAM3SC	0.49	0.50
FW15		**FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY**						
0000	E	3: 12' X 10' RCB	2074	3366	CAL96	SW4SC	10.22	0.17
0010	E	3: 12' X 10' RCB	677	3366	CAL96	SW4SC	10.22	0.17
0038	E	3: 12' X 10' RCB	1893	3284	CCCH22	SW4SC	10.04	0.17
0050	E	3: 12' X 10' RCB	812	3284	CCCH22	SW4SC	10.04	0.17
0089	E	3: 12' X 10' RCB	922	2156	COK11-C	SW3SC	7.78	0.17
0100	E	3: 12' X 9' RCB	1669	2156	COK11-C	SW3SC	7.78	0.17
0125	E	2: 10' X 8' RCB	1379	2156	COK11-C	SW3SC	7.78	0.80
0150	E	2: 10' X 8' RCB	1067	1450	DCCSA08	SW3SC	6.88	0.80
0175	E	2: 10' X 8' RCB	985	1450	DCCSA08	SW3SC	6.88	0.75
0214	P1	2: 12' X 10' RCB	1500	3946	CED10-C	SW3SC	6.28	0.73
0242	P1	2: 12' X 9' RCB	1500	3835	CCPS08	SW3SC	6.06	0.93
0271	P1	2: 12' X 8' RCB	1700	2574	CRCPS06	SW3SC	4.20	0.59
FWCH		**WEST CHARLESTON DRAINS**						
0000	E	84" RCP	1600	1051	CCH22	SW3SC	1.54	0.93
0020	P1	2: 90" RCP	2200	1051	CCH22	SW3SC	1.54	0.68
FWOK		**OAKEY DRAIN**						
0000	E	10' X 8' RCB	1300	805	1COK11C	SW3SC	0.90	0.62
0020	P1	10' X 7' RCB	2700	805	1COK11C	SW3SC	0.90	0.62
FWR2		**FREEWAY CHANNEL - RAILROAD CHANNEL**						
0000	E	5' X 5' RCBC	310					1.60
0010	E	Conc Chnl 8'W 4'D 2:1 SS	50					0.95
0020	E	Earth Chnl 8'W 4'D 2:1 SS	600					0.95
FWRR		**FREEWAY CHANNEL BYPASS FACILITY RR**						
0000	E	48" RCP	35					1.22
0010	E	Conc Chnl 5'W 5'D 0:1 SS	215					1.22

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FWSA		**FREEWAY CHANNEL - SAHARA**						
0000	P1	7' X 6' RCB	5700	593	CSA08	SW3SC	0.60	1.49
FWSH		**SHADOW LANE DRAIN**						
0000	E	7' X 4' RCB	1034	253	CH22-C	SW3SC	0.23	0.20
FWUP		**FREEWAY CHANNEL BYPASS FACILITY**						
0000	E	12' X 9' RCB	426	221	CH50	SW3SC	0.26	0.37
0010	E	10' X 8' RCB	804	221	CH50	SW3SC	0.26	0.37
0059	E	6' X 5' RCB	2680	221	CH50	SW3SC	0.48	0.56
0100	E	6' X 5' RCB	1400	221	CH50	SW3SC	0.20	0.56
FWWL		**FREEWAY CHANNEL-WALDMAN AVENUE**						
0000	E	6' X 6' RCB	1110	497	CWAL2	SW3SC	0.54	0.20
GOLB		**GOWAN LAKE MEAD-BUFFALO**						
0000	E	12' X 6' RCB	1294	1221	CCVILL23	ALLGOW3	1.46	1.50
0025	E	10' X 7' RCB	55	781	CVILL2-2	ALLGOW3	0.79	0.50
0030	E	2: 8' X 4' RCB	600	781	CVILL2-2	ALLGOW3	0.79	0.50
GOSO		**GOWAN SOUTH FACILITIES**						
0050	E	39,030 cfs PMF Spillway		39030	GWNSIN	GW5SC	12.50	
0051	E	700 ac-ft Gowan South Detention Basin		5820	GWNSIN	GW5SC	12.50	0.00
0068	E	Conc Chnl 15'W 7'D 2:1 SS	400	3928	CBUF01-C	GW3SC	4.88	0.40
0076	E	2: 10' X 7' RCBC	80	3928	CBUF01-C	GW3SC	4.88	0.56
0077	P0	Add 2: 14' X 7' RCBC	80	1807	CBUF01-C	GW3SC	4.88	0.56
0078	E	Conc Chnl 22'W 10'D 0:1 SS	70	3928	CBUF01-C	GW3SC	4.88	0.56
0080	E	Conc Chnl 12'W 7'D 2:1 SS	2078	3928	CBUF01-C	GW3SC	4.88	0.56
0119	E	Conc Chnl 22'W 10'D 0:1 SS	198	3712	CCCVIL23	GW3SC	4.53	0.95
0123	E	2: 10' X 7' RCBC @ Smoke Ranch	100	3712	CCCVIL23	GW3SC	4.53	0.62
0124	P0	Add 2: 12' X 7' RCBC @ Smoke Ranch	100	1483	CCCVIL23	GW3SC	4.53	0.62
0125	E	Conc Chnl 22'W 9'D 0:1 SS	57	3712	CCCVIL23	GW3SC	4.53	0.62
0126	E	Conc Chnl 12'W 7'D 2:1 SS	2282	3712	CCCVIL23	GW3SC	4.53	0.62
0170	E	Conc Chnl 12'W 7'D 2:1 SS	200	2649	CGD34AC	GW3SC	3.06	0.62
0173	E	Conc Chnl 22'W 7'D 0:1 SS	158	2649	CGD34AC	GW3SC	3.06	0.62
0176	E	2: 10' X 7' RCBC @ Lake Mead	100	2649	CGD34AC	GW3SC	3.06	0.62
0178	E	Conc Chnl 22'W 7'D 0:1 SS	166	2649	CGD34AC	GW3SC	3.06	1.00
0181	E	Conc Chnl 12'W 7'D 2:1 SS	2429	2649	CGD34AC	GW3SC	3.06	0.58
0227	E	2: 10' X 7' RCBC @ Vegas Drive	100	2082	CGD34AA	GW3SC	2.40	1.36
0229	E	Conc Chnl 12'W 7'D 1:1 SS	2640	2082	CGD34AA	GW3SC	2.40	1.36
0279	E	1: 12' X 7' RCBC	60	2082	CGD34AA	GW3SC	2.40	1.36
0280	E	Conc Chnl 12'W 7'D 1:1 SS	993	2082	CGD34AA	GW3SC	2.40	1.01
0305	E	1: 12' X 7' RCB	2100	1845	CW1BB-C	GW3SC	2.13	3.40
0336	E	1: 12' X 7' RCB	700	1624	C1-WEST-C	GW3SC	1.83	3.40
0352	E	2: 8' X 5' RCB	2740	1403	C1-DUCHC	GW3SC	1.60	0.73
0404	E	2: 8' X 4' RCB	2800	1146	C1-ALTAC	GW3SC	1.31	0.80
0455	E	2: 12' X 4' RCBC @ Charleston Blvd	350	685	C1-HOLMC	GW3SC	0.81	0.30
0462	E	1: 12' X 4' RCB u/s of Charleston Blvd	1200	685	C1-HOLMC	GW3SC	0.81	0.30
LAAS		**NORTH LAS VEGAS AIR TERMINAL - SIMMONS ST.**						
0000	P1	84" RCP	5500	504	R-C	NW3SC	0.55	1.00
LAAT		**NORTH LAS VEGAS AIR TERMINAL**						
0000	E	Earth Chnl 12'W 6'D 1.5:1 SS	4000	1425	CB3-1	NW3SC	4.71	1.00
0000	P1	Conc Chnl 12'W 6'D 1.5:1 SS	4000	1425	CB3-1	NW3SC	4.71	1.00
0070	E	10' X 6' RCBC	1145	1188	CB3-2	NW3SC	3.85	1.00
0087	E	10' X 4' RCBC	195	1097	CFN5-C	NW3SC	3.73	0.58
0091	E	Conc Chnl 6'W 4'D 1.5:1 SS	2800	1097	CFN5-C	NW3SC	3.73	0.64
0156	E	60" RCPC	528	674	CCA1-C	NW3SC	3.08	0.75
0166	E	Conc Chnl 6'W 3'D 1.5:1 SS	1214	479	CA1-C	NW3SC	2.77	0.83
0189	E	60" RCPC	475	293	A1-C	NW3SC	0.31	0.37
LANO		**NORTH LAS VEGAS AIR TERMINAL NORTH**						
0000	E	Conc Chnl 0'W 3'D 1.5:1 SS	475	293	A1-C	NW3SC	0.31	0.83
LASO		**NORTH LAS VEGAS AIR TERMINAL SOUTH**						
0000	E	Earth Chnl 14'W 3'D 3:1 SS	2400	296	B3-1	NW3SC	0.31	1.10
0023	E	54" RCPC	700	296	B3-1	NW3SC	0.31	0.40
0040	E	Conc Chnl 0'W 3'D 1.5:1 SS	3700	296	B3-1	NW3SC	0.31	0.80
LCCH		**LAS VEGAS CREEK CHANNEL**						
0000	E	2: 12' X 7' RCB	655	2689	CLC20-C	MEADOWS4	9.47	1.28
0013	E	2: 12' X 6' RCB	2152	2689	CLC20-C	MEADOWS4	9.47	0.82
0047	E	Conc Chnl 9'W 8'D 3:1 SS	3485	2689	CLC20-C	MEADOWS4	9.47	0.80
0113	E	2: 8' X 7' RCBC @ Rancho	100	1896	CCLC16-C	MEADOWS4	9.31	0.84
0114	E	Conc Chnl 9'W 7'D 1:1 SS	2400	2515	CCLC16-C	MEADOWS4	9.31	0.84
0176	E	Conc Chnl 11'W 7'D	800	2362	CCLC14-C	SW3SC	2.60	2.14
0184	E	8' X 6' RCB	2200	1284	CCLC14-C	SW3SC	2.60	2.27
0232	E	54" RCP	898	209	CLC14-C	SW3SC	2.17	1.13
0249	E	60" RCP	3300	277	CLC11-C	SW3SC	1.90	1.13
0300	E	48" RCP	1109	153	CWA02-C	SW3SC	1.43	1.13
0321	E	48" RCP	1214	153	CWA02-C	SW3SC	1.43	1.13
0344	E	48" RCP	1531	117	CWA02-C	SW3SC	1.43	0.66
0373	E	60" RCP	2482	212	CWA02-C	SW3SC	1.43	0.66
0420	E	60" RCP	1109	319	CAL01B	SW3SC	1.15	1.50
0441	E	48" RCP	1003	176	CAL01B	SW3SC	1.15	1.50
0460	E	36" RCP	1392	85	CAL01B	SW3SC	1.15	1.62
0486	E	42" RCP	845	106	RAINBWIN	SW3SC	0.75	1.10
0502	E	36" RCP	792	70	RAINBWIN	SW3SC	0.75	1.10
0517	E	30" RCP	264	43	RAINBWIN	SW3SC	0.73	1.10
0522	E	24" RCP	1350	31	AL00A-C	SW3SC	0.42	1.90
0582	E	24" RCP	5400	257	1-WEST-C	GW3SC	0.23	1.67

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LCCP		**LAS VEGAS CREEK CHANNEL - PARALLEL**						
0000	P2	2: 13' X 7' RCB	3600	2689	CLC20-C	MEADOWS4	9.47	0.58
0061	P2	2: 13' X 6' RCB	2300	2593	CCLC16-C	MEADOWS4	9.31	0.31
0104	P2	2: 12' X 6' RCB	3650	1408	CLC14-C	SW3SC	2.17	1.22
0173	P2	2: 12' X 6' RCB	3690	1224	CLC11-C	SW3SC	1.90	0.58
0243	P2	2: 8' X 6' RCB	5658	1224	CLC11-C	SW3SC	1.90	1.03
0350	P2	60" RCP	3050	768	CWA02-C	SW3SC	1.43	1.00
0408	P2	36" RCP	2452	85	RAINBWDB	SW3SC	0.75	1.86
0452	P2	8,260 cfs PMF Spillway		8260	RAINBWIN	SW3SC	0.75	
0453	P2	36" RCP Outlet Pipe	100	85	RAINBWDB	SW3SC	0.75	1.86
0454	P2	55 ac-ft Rainbow Detention Basin		826	RAINBWIN	SW3SC	0.75	
LCDE		**LAS VEGAS CREEK - DECATUR**						
0000	E	72" RCP	720	494	LC11-C	SW3SC	0.47	0.50
LCLT		**LAS VEGAS CREEK - LATERAL**						
0000	E	6' X 6' RCBC @ US95	100	250	WA10D	SW3SC	0.45	0.29
0006	E	Conc Chnl 10'W 2.5'D	1800	250	WA10D	SW3SC	0.45	0.29
0033	E	8' X 4' RCBC @Washington	100	474	WA10-C	SW3SC	0.45	0.51
0034	E	Earth Chnl 12'W 5'D	1954	474	WA10-C	SW3SC	0.45	0.51
LCME		**LAS VEGAS CREEK - MEADOWS**						
0000	E	14' X 8' RCB	1540	1355	MEADOWDB	SW3SC	5.54	0.90
0017	E	3,300 cfs Spillway		3300	MEADOWIN	SW3SC	5.54	
0018	E	1: 11.5' X 5' RCB and 1: 11' X 5' RCB Outlet	100	1355	MEADOWDB	SW3SC	5.54	0.81
0019	E	200 ac-ft Meadows Detention Basin		4761	MEADOWIN	SW3SC	5.54	
0020	E	Upgrade to 226 ac-ft Meadows Detention Basin		4761	MEADOWIN	SW3SC	5.54	
0027	E	Conc Chnl 30'W 8.5'D 0:1 SS	1000	4761	MEADOWIN	SW3SC	5.54	0.40
0039	E	Conc Chnl 18'W 8'D 1:1 SS	950	4634	CCAL16-C	SW3SC	5.24	0.92
0076	E	Free Span Bridge 18'W 8'D @ Alta	100	4634	CCAL16-C	SW3SC	5.24	1.89
0077	E	Conc Chnl 18'W 8'D 1:1 SS	370	4634	CCAL16-C	SW3SC	5.24	1.89
0084	E	2: 10' X 6' RCBC @ Valley View	174	1345	CAL16-C	SW3SC	1.45	1.89
0085	E	2: 10' X 6' RCBC @ Valley View	464	1345	CAL16-C	SW3SC	1.45	1.89
LCRA		**LAS VEGAS CREEK - RANCHO**						
0000	P2	8' X 6' RCB	2500	773	CLC16-C	SW3SC	1.60	0.50
LV15		**FREEWAY CHANNEL**						
0337	E	9' X 6' RCB	4500	1067	CWA20C	NW3SC	4.48	0.66
0422	P1	2: 66" RCP	1200	267	WA15A-C	NW3SC	0.37	0.42
0424	P1	8' X 7' RCB	2750	627	CWA15-C	NW3SC	3.69	0.73
0474	P1	8' X 7' RCB	2750	627	CWA15-C	NW3SC	3.69	0.73
0528	P1	8' X 7' RCB	3900	925	CWA13-C	NW3SC	1.34	1.19
0602	P1	2: 66" RCP	6300	656	CWA10NW	NW3SC	0.98	1.59
LVLM		**LAS VEGAS WASH - LAKE MEAD**						
0059	E	66" RCP	5952	1005	CLM20-C	NW3SC	1.36	1.07
0059	P0	8' X 8' RCB	5952	1005	CLM20-C	NW3SC	1.36	1.07
0170	E	78" RCP	2819	380	CLM16A-C	NW4	10.73	1.17
0221	E	48" RCP Outlet	270	155	DR2	NW4	10.35	
0222	E	48" RCP Outlet	500	205	DCAREY	NW4	10.35	
0223	E	515 ac-ft Carey-Lake Mead Detention Basin		4764	CARYLMDB	NW4	10.35	
0224	E	36" RCP	2429	49				0.53
0225	E	90° RCP	641	1472	CLM10-C	NW3SC	1.76	1.13
0225	P0	2: 10' X 7' RCB	641	1472	CLM10-C	NW3SC	1.76	0.50
0226	E	Upgrade to 607 ac-ft Carey-Lake Mead Detention Basin		4764	CARYLMDB	NW4	10.35	
0227	E	10,000 cfs PMF Spillway		10000	CARYLMDB	NW4	10.35	
0270	E	90° RCP	3300	1472	CLM10-C	NW3SC	1.76	1.44
0270	P0	10' X 8' RCB	3300	1472	CLM10-C	NW3SC	1.76	1.44
0336	E	84" RCP	1400	1110	CLM06-C	NW3SC	1.35	1.16
0336	P0	10' X 7' RCB	1400	1110	CLM06-C	NW3SC	1.35	1.16
0355	E	90° RCP	1742	1110	CLM06-C	NW3SC	1.35	0.40
0355	P0	10' X 10' RCB	1742	1110	CLM06-C	NW3SC	1.35	0.40
0388	E	84" RCP	703	872	CLM05-C	NW3SC	0.99	1.40
0399	E	78" RCP	803	872	CLM05-C	NW3SC	0.99	1.07
0416	E	72" RCP	1320	872	CLM05-C	NW3SC	0.99	1.00
0442	E	60" RCP	674	557	CLM03-C	NW3SC	0.63	1.28
0453	E	54" RCP	538	557	CLM03-C	NW3SC	0.63	2.37
0460	E	54" RCP	1464	235	LM02-C	NW3SC	0.29	2.05
0475	E	48" RCP	2632	235	LM02-C	NW3SC	0.29	1.24
0525	E	48" RCP	2600	526	CLM01-C	NW3SC	0.64	1.24
LVOW		**OWENS AVENUE SYSTEM**						
0000	E	96" RCP	7700	1506	CLM16B-C	NW3SC	2.36	0.70
0146	E	84" RCP	4800	1506	CLM16B-C	NW3SC	2.36	0.90
0241	P1	2: 8' X 6' RCB	8600	1473	CVG20-C	NW3SC	1.98	1.45
0360	P1	8' X 6' RCB	2700	799	CVG04-C	NW3SC	1.18	1.48
0460	P1	7' X 6' RCB	2700	617	CVG03-C	NW3SC	0.94	1.48
LVPK		**PEAK DRIVE SYSTEM**						
0000	E	Conc Chnl 15'W 6'D 0:1 SS	700	1007	CPD04B-C	NW3SC	1.59	1.22
0019	E	Conc Chnl 20'W 5.5'D 0:1 SS	2300	1007	CPD04B-C	NW3SC	1.59	0.98
0056	P1	9' X 6' RCB	2730	687	CCY04A-C	NW3SC	1.12	0.98
0106	E	8' X 6' RCB	2600	687	CCY04A-C	NW3SC	1.12	0.54
LVRA		**LAS VEGASWASH - RANCHO**						
0000	E	12' X 8' RCB	3300	1297	CCPD04B	NW3SC	2.69	0.58

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVSR		**LAS VEGASWASH - SMOKE RANCH**						
0070	E	66" RCP	4118	1126	CS	NW3SC	1.12	0.73
0070	P1	10' X 8' RCB	4118	1126	CS	NW3SC	1.12	0.73
0148	E	54" RCP	2587	1126	CS	NW3SC	1.12	0.58
0148	P1	11' X 8' RCB	2587	1126	CS	NW3SC	1.12	0.58
0197	E	30" RCP	581	651	CR2-C	NW3SC	0.55	0.86
0197	P1	9' X 6' RCB	581	651	CR2-C	NW3SC	0.55	0.86
0208	E	54" RCP	3000	651	CR2-C	NW3SC	0.55	1.41
0208	P1	7' X 6' RCB	2700	651	CR2-C	NW3SC	0.55	1.41
0209	E	14' X 8' RCB	750	2855	CB1-C	NW3SC	6.34	0.70
0223	E	Conc Chnl 14'W 8'D 1.5:1 SS	2100	2855	CB1-C	NW3SC	6.34	0.52
0263	E	14' X 8' RCB	550	2855	CB1-C	NW3SC	6.34	0.55
0273	E	11' X 11' RCB	1800	2855	CB1-C	NW3SC	6.34	0.92
0359	E	66" RCP	2000	1578	CSR05B	NW3SC	2.30	0.67
0359	P1	10' X 10' RCB	2000	1578	CSR05B	NW3SC	2.3	0.75
0396	E	60" RCP	2600	1432	CSR05D	NW3SC	1.94	1.14
0396	P1	10' X 9' RCB	2640	1432	CSR05D	NW3SC	1.94	0.87
0446	E	54" RCP	2600	1432	CSR05D	NW3SC	1.94	1.14
0446	P1	10' X 8' RCB	2640	1432	CSR05D	NW3SC	1.94	1.25
0496	P1	10' X 7' RCB	2600	1218	CSR02E-C	NW3SC	1.64	1.27
0500	E	60" RCP	2770	191				0.54
0546	P1	8' X 8' RCB	2640	741	CSR00A	NW3SC	1.01	0.57
MEAL		**MEADOWS ALTA**						
0000	E	Conc Chnl 8'W 11'D 1:1 SS	800	1345	CAL16-C	SW3SC	1.45	1.58
0012	E	12' X 6' RCBC @ Red Sky	158	1345	CAL16-C	SW3SC	1.45	3.03
0013	E	Conc Chnl 8'W 11'D 1:1 SS	317	1345	CAL16-C	SW3SC	1.45	3.03
0015	E	72" RCP	2500	461	CAL08-C	SW3SC	0.77	1.94
0060	E	60" RCP	5200	461	CAL08-C	SW3SC	0.77	2.81
0160	E	36" RCP	2600	418	CAL01A	SW3SC	0.36	1.22
MEAP		**MEADOWS ALTA PARALLEL**						
0000	P1	8' X 6' RCB	8400	747	CAL09-C	SW3SC	0.87	1.25
0172	P1	8' X 7' RCB	1100	507	CAL04-C	SW3SC	0.53	0.30
MECH		**EXTENSION OF MEADOWS / CHARLESTON**						
0000	E	10' X 6' RCB	1109	820	CAL13-C	SW3SC	3.52	0.50
0021	E	6' X 5' RCB	211	487	CAL13-C	SW3SC	3.52	1.16
0025	E	78" RCP	475	565	CAL13-C	SW3SC	3.52	1.16
0034	E	84" RCP	1267	424	CCH13-C	SW3SC	3.01	0.44
0058	E	72" RCP	700	274	CCH13-C	SW3SC	3.01	0.42
0059	E	36" RCP	1280	43	OAKEYOT	SW3SC	1.82	0.42
0108	E	30" RCP	11400	31	OAKEYOT	SW3SC	1.82	1.43
0310	E	24" RCP	860	31	OAKEYOT	SW3SC	1.82	1.43
0323	E	15" RCP Outlet	200	31	OAKEYOT	SW3SC	1.82	
0324	E	180 ac-ft Oakey Detention Basin		1503	OAKEYIN	SW3SC	1.82	
0334	E	11' X 6' RCB	142	530	C5-OAK-C	SW3SC	0.51	0.50
0337	E	9' X 6' RCB	540	530	C5-OAK-C	SW3SC	0.51	0.50
0338	E	10' X 8' RCB	2118	1072	C3A-OAKC	SW3SC	1.31	2.00
0351	E	90° RCP	1393	530	C5-OAK-C	SW3SC	0.51	0.50
0378	E	10' X 8' RCB	475	1072	C3A-OAKC	SW3SC	1.31	2.00
0380	E	66" RCP	482	284	3-HOLM-C	SW3SC	0.28	2.00
0387	E	66" RCP	325	284	3-HOLM-C	SW3SC	0.28	3.08
0390	E	83" X 53" RCP	32	284	3-HOLM-C	SW3SC	0.28	2.00
0400	E	10' X 6' RCB	1853	850	C3-ELP-C	SW3SC	0.96	1.43
0405	E	66" RCP	1244	284	3A-OAK-C	SW3SC	1.31	1.00
0410	E	66" RCP	182	284	3-HOLM-C	SW3SC	0.28	2.00
0420	E	66" RCP	1168	284	3-HOLM-C	SW3SC	0.28	2.00
MECN		**MEADOWS - CHARLESTON**						
0000	P1	10' X 9' RCB	3200	1547	CCH13-C	SW3SC	1.49	1.09
0061	P1	8' X 8' RCB	3300



PANEL 2170 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2170 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2170	E
NORTH LAS VEGAS, CITY OF	320007	2170	E
LAS VEGAS, CITY OF	320276	2170	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2170 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

N

PBSJ

GRAPHIC SCALE

1000 0 500 1000 2000 4000

(IN FEET)

1 inch = 1000 ft.

511606 February 2006

FIGURE 3
FEMA MAP

US 95 Widening - Rancho Lateral LOMR

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200

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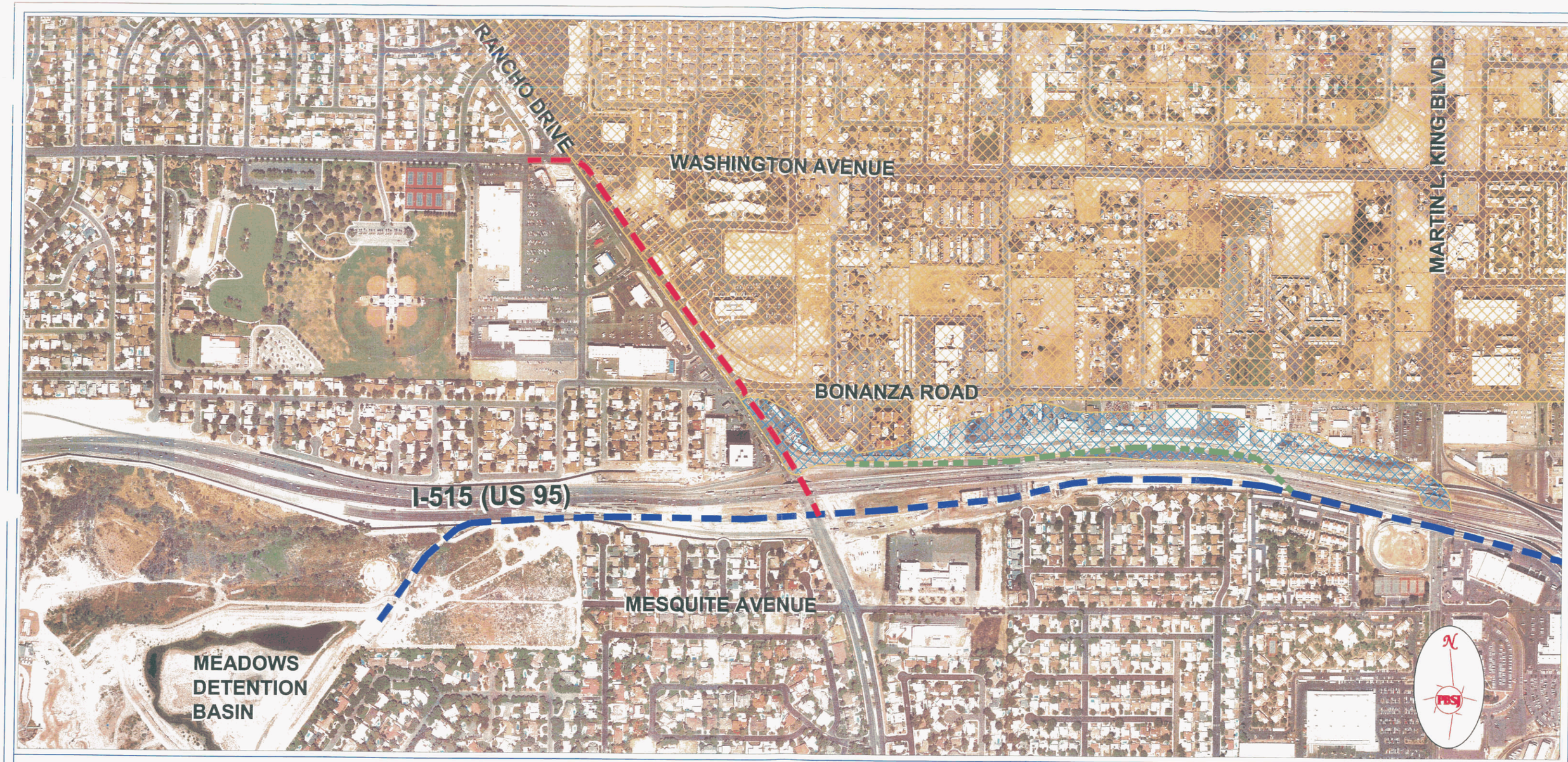

GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)

1 inch = 600 ft.

FIGURE 3A: DFIRM FLOOD ZONE MAP

U.S. 95 Widening - Rancho Lateral
Letter of Map Revision

Shaded Zone X Flood Zone

Zone A Flood Zone

Rancho Lateral Facility Alignment

Main Line Facility Alignment

North Channel Facility Alignment

PBSJ
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200
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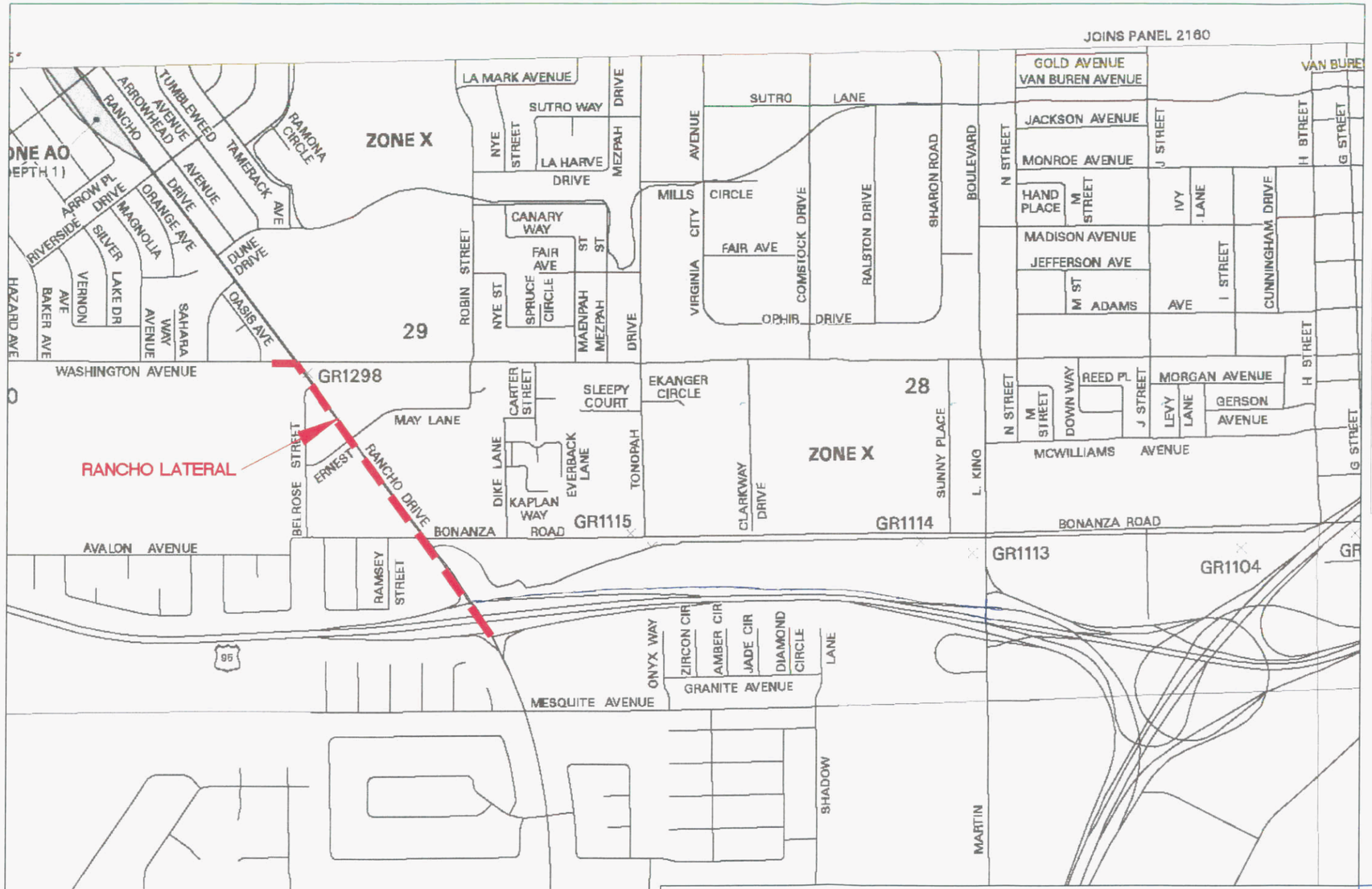
FIGURE 3A



PANEL 2170 E

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

PANEL 2170 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2170	E
NORTH LAS VEGAS, CITY OF	320017	2170	E
LAS VEGAS, CITY OF	325276	2170	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2170 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

N

PBSJ

GRAPHIC SCALE

1000 0 500 1000 2000 4000

(IN FEET)

1 inch = 1000 ft.

511606 February 2006

FIGURE 4
ANNOTATED FEMA MAP

US 95 Widening - Rancho Lateral LOMR

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Suite 100
Henderson, Nevada 89074-6382
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Fax: 702/263-7200
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C:\Documents and Settings\15019\My Documents\FIGURE_FOLDER\Rancho LOMR\Fig_4 ANNOTATED MAP.dwg Feb 23, 2006 - 7:52am 15019

NOTE

AERIAL PHOTO AS OF OCTOBER 2005.
TOPOGRAPHIC DATA AS OF 1996.

LEGEND

- BASIN BOUNDARY
- CROSS-SECTION LOCATION
- 5' CONTOUR
- FLOW DIRECTION ARROW
- ZONE A FLOOD ZONE
- COMBINATION POINT
- MAIN LINE FACILITY
- RANCHO LATERAL FACILITY
- NORTH CHANNEL FACILITY

100-Year Basin Flow Summary
Existing Conditions

BASIN NAME/ COMBINATION POINT	BASIN AREA (acres)	BASIN AREA (sq mi)	Q_{100} (cfs)
RCHO1	27.30	0.0427	43
RCHO2	42.60	0.0666	75
C1	NA	NA	124

100-Year Normal Flow Depth at Section A = 0.81'

N

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300ft.

FIGURE 5
U.S. 95 WIDENING - RANCHO LATERAL WORK MAP

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Nevada 89014
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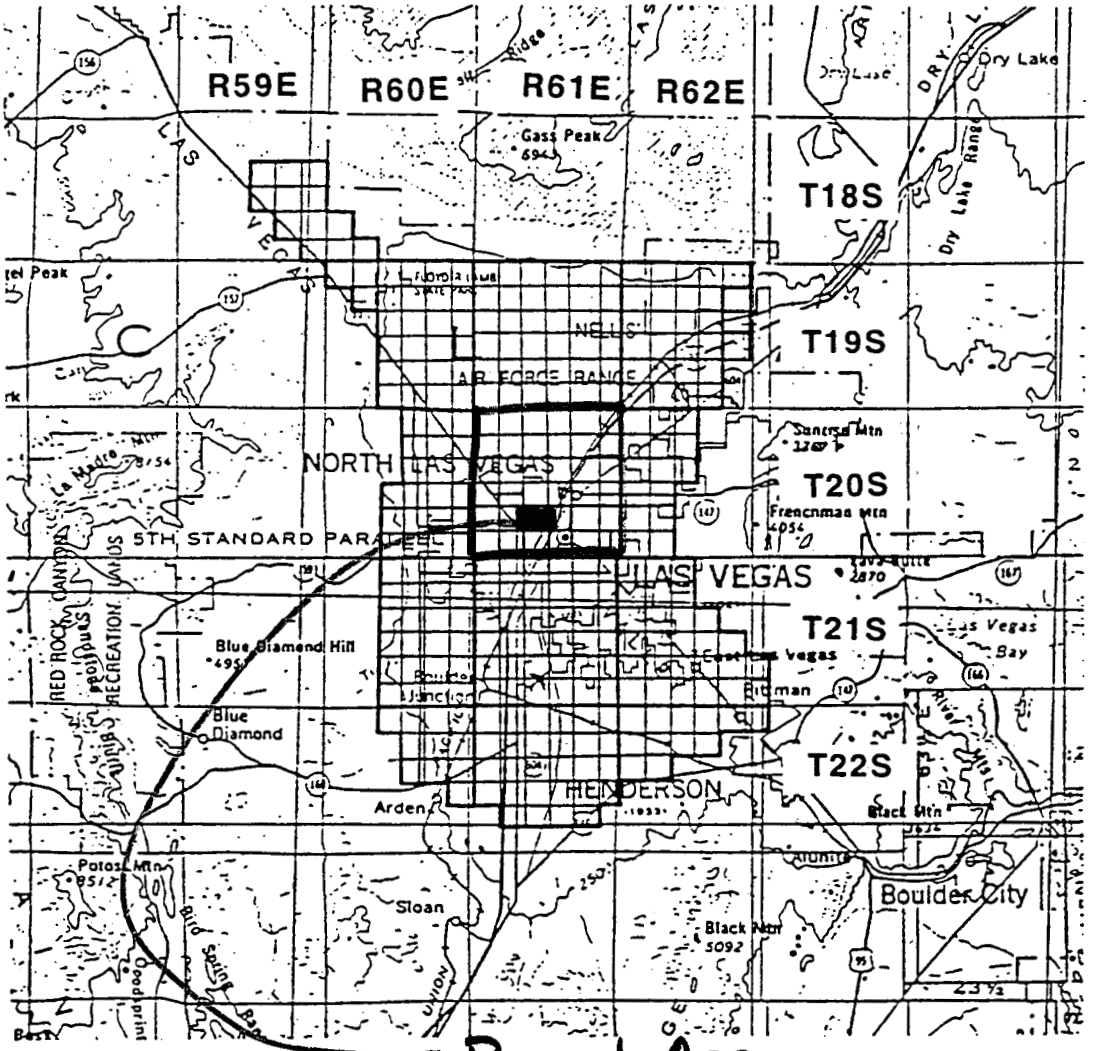
FIGURE 5

APPENDIX C

Hydrology

Hydrologic Parameters

McCARRAN AIRPORT RAINFALL AREA



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

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

TIME	RECURRENCE INTERVAL 2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5 min.	0.15	0.27	0.35	0.46	0.54	0.63
10 min.	0.25	0.44	0.57	0.74	0.89	1.02
15 min.	0.33	0.57	0.74	0.97	1.15	1.32
30 min.	0.44	0.78	1.01	1.31	1.55	1.79
1 hour	0.52	0.89	1.15	1.50	1.78	2.06
2 hour	0.59	1.01	1.30	1.70	2.01	2.30
3 hour	0.64	1.08	1.39	1.82	2.15	2.48
6 hour	0.72	1.22	1.58	2.05	2.41	2.77
24 hour (TR-55)	1.20	1.60	1.80	2.40	2.70	2.96

NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.

2. The 24 hour values presented above are for use with TR-55 only.

3. Table 501 adjustments not required.

Revision	Date

WRC ENGINEERING

REFERENCE: USACE, Los Angeles District, 1988

TABLE 505

SIX-HOUR STORM DISTRIBUTIONS

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

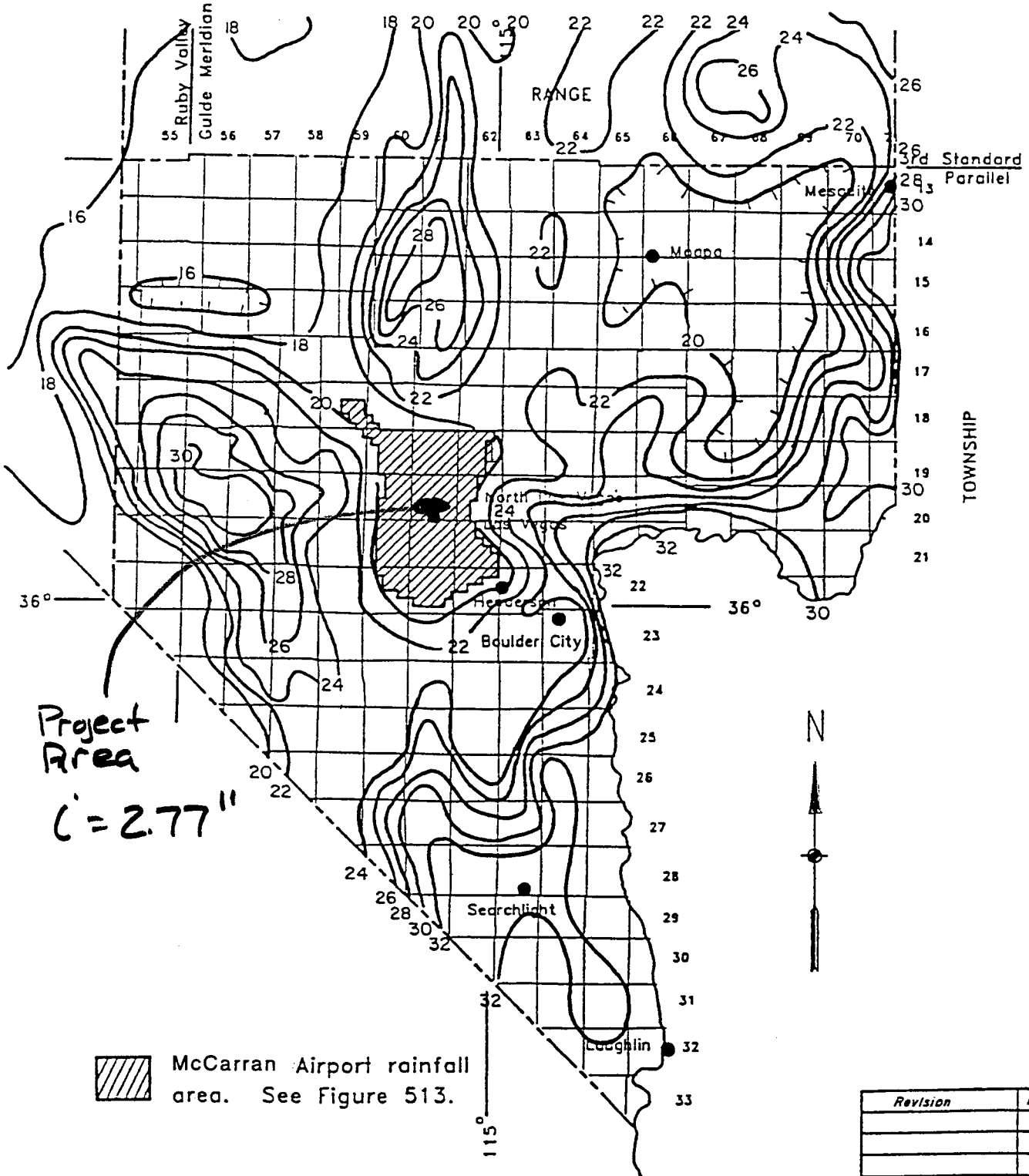
Notes:
1. For drainage areas less than 8 square miles in size, use SDN 3.
2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
4. A graphical representation of these values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

Revision	Date

REFERENCE:

TABLE 503

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



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

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

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

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

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

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

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage[1]	Percent Impervious[2]	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less[3]	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
14,000 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.

2 Actual percent impervious value should be compared to selected land use type.

3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

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

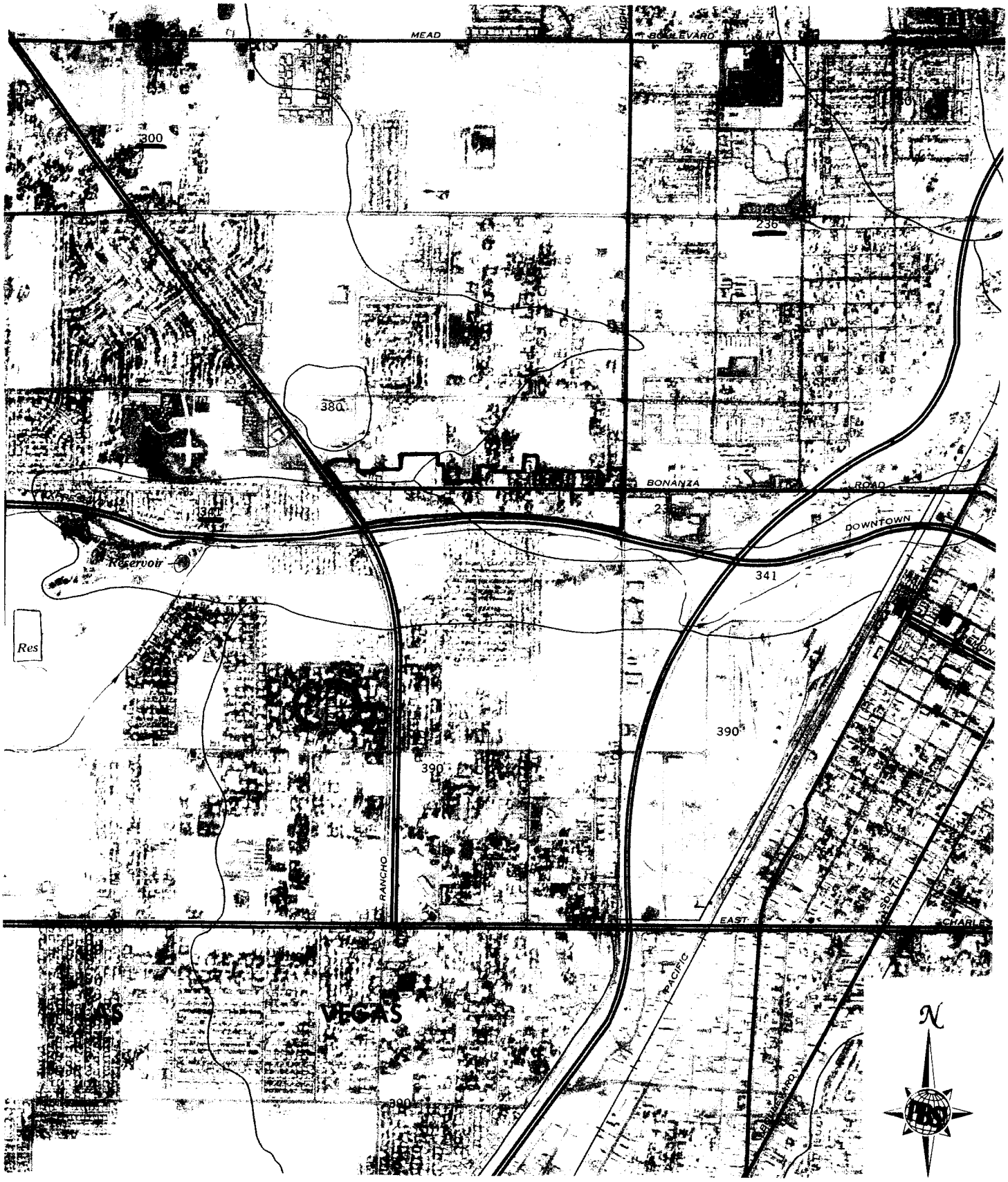
[1]Average runoff condition, and $I_a = 0.2S$.

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

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

Revision	Date

Soils Data & Curve Number Calculations



1" = 2,000'

US 95 WIDENING
RANCHO LATERAL

LETTER OF MAP REVISION

SOILS–MAP

PBSJ
2270 CORPORATE CIRCLE
SUITE 100
HENDERSON, NEVADA 89074
TELEPHONE: 702/263-7275
FAX: 702/263-7200

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Table C-1
Curve Number Calculations

Insert | Delete

Existing 100-Year Condition

Basin Name	Soil Type	Hydrologic Group	Land Use	Curve No.	% of Composition	Composite Curve No.
RCHO1	300	0 %A 10 %B 0 %C 90 %D	Commercial and Business (85% Imp)	94.70	16.0%	--
	300	0 %A 10 %B 0 %C 90 %D	Commercial and Business (85% Imp)	94.70	20.0%	--
	236	0 %A 100 %B 0 %C 0 %D	Commercial and Business (85% Imp)	92.00	40.0%	--
	236	0 %A 100 %B 0 %C 0 %D	Urban Open Space Fair Cond. Grass Cover	69.00	4.0%	--
	236	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	9.0%	--
	236	0 %A 100 %B 0 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	11.0%	**92.2**
RCHO2	341	0 %A 0 %B 100 %C 0 %D	Commercial and Business (85% Imp)	94.00	22.0%	--
	341	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	13.0%	--
	341	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	11.0%	--
	236	0 %A 100 %B 0 %C 0 %D	Commercial and Business (85% Imp)	92.00	35.00%	--
	236	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	19.00%	**91.8**

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

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

See footnote at end of table.

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

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

See footnote at end of table.

high-intensity storms. Channeling and deposition are common along streambanks. This soil is strongly affected by salts.

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

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Some areas of this unit may be subject to salt heaving because of the expansion of sodium sulfate salts. This action may cause concrete slab floors, driveways, and sidewalks to crack. Removal of the sodium sulfate salts by mechanical means, deep leaching, or chemical treatment can alleviate this problem. Sodium sulfate in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

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

This unit is limited for roads because of limited ability of the soil to support a load and because of the presence of sodium sulfate salts. Roads and streets should be designed to compensate for the instability of the soil. Local roads and streets may require a special base to avoid damage from the expansion of sodium sulfate salts.

The main limitations for lawns and landscaping are excessive soluble salts in the soil. Because of the content of sodium sulfate and other salts in the soil, salt-tolerant plants should be selected. Content of toxic salts can be reduced by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil.

This map unit is in capability subclasses VIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

300—Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes. This shallow, well drained soil is on basin floor remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Included in this unit are about 5 percent Destazo soils, 0 to 4 percent slopes, and 5 percent Grapevine soils, 0 to 4 percent slopes, on erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

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

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitation for septic tank absorption fields is the limited depth to the hardpan. Special design of septic tank absorption fields is needed. Excavation is limited by the hardpan. Heavy equipment is needed for excavation.

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

The main limitation for lawns and landscaping is the limited depth to the hardpan. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

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

301—Las Vegas gravelly fine sandy loam, 2 to 4 percent slopes. This shallow, well drained soil is on deeply dissected basin floor remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 30 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Included in this unit is about 5 percent Destazo soils, 8 to 15 percent slopes, on side slopes of erosional fan remnants.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of

occasional periods of brief, high velocity flooding from July through September. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected below this depth.

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

The main limitations for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for septic tank absorption fields are the hazard of flooding, the high water table, and the restricted permeability. Flooding can be controlled only by use of major flood control structures. Restricted permeability and the high water table increase the possibility of failure of septic tank absorption fields.

This unit is limited for roads because of low soil strength and the hazard of flooding. Roads and streets should be designed to compensate for the instability of the soil. Flooding can be controlled only by use of major flood control structures.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

222—Glencarb silty clay loam, wet. This very deep, well drained soil is on recent alluvial flats. The drainage has been altered by seepage. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silty clay loam about 6 inches thick. The underlying material to a depth of 60 inches or more is pink silt loam and silty clay loam.

Included in this unit are about 5 percent Bluepoint soils on sand sheets and 5 percent Land soils on recent alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from July through June. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected below this depth.

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

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is the high water table and the restricted permeability. Restricted permeability and the high water table increase the possibility of failure of septic tank absorption fields.

This unit is limited for roads because of low soil strength. Roads and streets should be designed to compensate for the instability of the soil.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

236—Glencarb very fine sandy loam, saline. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is light brownish gray very fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches or more is grayish brown, stratified clay loam to very fine sandy loam and contains some crystalline gypsum. In some areas of similar included soils, the surface layer is silty clay loam.

Included in this unit on relict alluvial flats are about 5 percent McCarran soils and on recent alluvial flats 10 percent Land soils that are affected by sodium sulfate.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 6 inches, and it is moderately affected by salts below this depth.

Most areas of this unit are used for urban development. A few areas are used for irrigated cropland, desert wildlife habitat, or recreation.

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

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and

Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected for lawns and landscaping. Application of excess water may dissolve enough gypsum in the soil to cause soil subsidence. Excessive irrigation can dissolve gypsum in the soil and cause subsidence.

Irrigation water for other crops and pasture should be applied at a rate that insures optimum production without increasing deep percolation, runoff, and erosion. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Crops respond to nitrogen and phosphorus. Content of toxic salts is reduced by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

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

326—McCarran very cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and lacustrine sediment that has a high content of gypsum.

Typically, about 60 percent of the surface is covered with a desert pavement of cobbles and pebbles. The face layer is pink very cobbly fine sandy loam about 9 inches thick. The upper 39 inches of the underlying material is pinkish white sandy loam that generally is weakly cemented with gypsum and lime. The lower part to a depth of 62 inches is pinkish white gravelly loam that is weakly cemented with gypsum and lime.

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

Permeability of this McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 9 inches, and it is moderately affected by salts below this depth.

This unit is used as habitat for desert wildlife and for recreation. It can be used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the gypsum in the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

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

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the desert pavement. The desert pavement interferes with the use of equipment. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in the soil and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 4.

341—Paradise silt loam. This very deep, poorly drained soil is on recent alluvial flats. The drainage has been altered through pumping. The soil formed in alluvium derived from various kinds of rock that has a high content of lime. Slope is 0 to 2 percent.

Typically, the surface layer is gray silt loam and loam, averaging silt loam, about 10 inches thick. The upper 29 inches of the underlying material is light gray and gray sandy loam, fine sandy loam, and loam, averaging loam, and the lower part to a depth of 61 inches is white and light gray silt loam.

Permeability of the Paradise soil is moderate. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from December through March. The water table provides supplemental moisture for plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is moderately affected by salts to a depth of 10 inches, and it is not affected by salts below this depth.

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

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is depth to the water table. The seasonal high water table increases the possibility of failure of septic tank absorption fields. Special design of septic tank absorption fields is needed.

HEC-1 MODEL

- Standard Form 4

Table 2: TIME OF CONCENTRATION

PBS&J
File: FORM4.XLS

US 95 WIDENING - RANCHO LATERAL
LETTER OF MAP REVISION
Ultimate Conditions 100-Year Model

BY: BKL
DATE: 3/9/06

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours
RCHO1	D	92.2	0.8270	27.33	0.0427	200	1.0	6.9	4100	0.7	1.7	2.6	28.4	35.3	33.9	**0.339**
RCHO2	D	91.8	0.8218	42.62	0.0666	250	1.0	7.9	4100	0.7	1.7	2.6	28.4	36.3	34.2	**0.342**

Tc = Ti + Tt Tlag = 0.6 Tc
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
K = 0.0132 (CN) - 0.39
Tc Check = L/180+10

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

Existing V1 = 14.8*(S/100)^1/2 Developed V1 = 20.2*(S/100)^1/2
Existing V2 = 29.4*(S/100)^1/2 Developed V2 = 30.6*(S/100)^1/2

REFERENCE : **2002 Las Vegas Valley Flood Control Master Plan Update**

STANDARD FORM 4

Note:
Travel time slope for basins RCHO1 & RCHO2 obtained from the Clark County GIS 5-foot contours for Bonanza Road

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   09MAR06  TIME  14:27:59   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

                        *DIAGRAM
 *** FREE ***
              1         ID   US 95 WIDENING RANCHO LATERAL LETTER OF MAP REVISION
              2         ID   ULTIMATE CONDITIONS 100-YEAR MODEL
              3         ID   INPUT FILE = RANCHO.DAT
              4         ID   INPUT FILE DATE = MARCH 2006
              5         ID   DESIGN STORM = 100-YEAR 6-HR STORM
              6         ID   STORM DISTRIBUTION = SDN #3
              7         ID   MODELED BY PBS&J (BRIAN LOFFMAN)
              8         ID
              9         ID
             10         ID   100-YEAR,  6-HOUR STORM,  SDN3
             11         ID
             12         IT       5       0       0     300
             13         IO       5       0       0
             14         IN       5       0       0
             15         JR    PREC    1.00
                        *
                        *
                        *
                        *
                        *
                        *

             16         KK   RCHO1
             17         KM   EXISTING CONDITIONS BASIN
             18         BA  0.0427
             19         PB    2.77
             20         PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
             21         PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
             22         PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
             23         PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
             24         PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
             25         PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
             26         PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
             27         PC    .998    .999   1.00
             28         LS       0   92.2
             29         UD   0.339
                        *

             30         KK   RCHO2
             31         KM   EXISTING CONDITION BASIN
             32         BA  0.0666
             33         LS       0    91.8
             34         UD   0.342
                        *

             35         KK      C1
             36         KM   COMBINE BASINS
             37         HC       2
                        *
             38         ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

     16      RCHO1
              .
              .
     30       .       RCHO2
              .         .
              .         .
     35       C1.............
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   09MAR06  TIME  14:27:59   *
*                                       *
*****************************************
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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

US 95 WIDENING RANCHO LATERAL LETTER OF MAP REVISION
ULTIMATE CONDITIONS 100-YEAR MODEL
INPUT FILE = RANCHO.DAT
INPUT FILE DATE = MARCH 2006
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY PBS&J (BRIAN LOFFMAN)

100-YEAR, 6-HOUR STORM, SDN3

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                       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
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 1.00
HYDROGRAPH AT					
+	RCHO1	.04	1	FLOW	49.
				TIME	3.75
HYDROGRAPH AT					
+	RCHO2	.07	1	FLOW	75.
				TIME	3.75
2 COMBINED AT					
+	C1	.11	1	FLOW	124.
				TIME	3.75

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

Reference Hydrology

Final Overall Project Drainage Design Report by VTN

Hydrology and Hydraulics Analysis For The

US-95 Widening Project

Martin L. King Boulevard To Washington Avenue

Final Overall Project Drainage Design Report

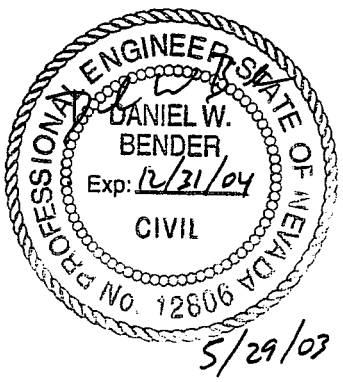
May 2003

E.A. NO. 72807

Prepared for:

NEVADA DEPARTMENT OF TRANSPORTATION

Prepared by:
VTN Nevada
2727 South Rainbow Boulevard
Las Vegas, NV 89146



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1.0 INTRODUCTION AND PURPOSE

This report is a final summary of the hydrologic and hydraulic analysis performed for the US-95 Widening Project From MARTIN L. KING Boulevard To Washington Avenue. VTN Nevada (VTN) was contracted by the Nevada Department of Transportation (NDOT) to provide hydrologic and hydraulic analysis for the Regional Flood Control Channel (Las Vegas Creek Lateral), and provide drainage facilities design for the US-95 Widening Project. The purpose of this analysis is to design a storm water system that collects the 100-year event off-site flows and conveys them through the project limits.

1.1 Project Description

The US-95 Widening project from Martin L. King Boulevard to Washington Avenue is located within the City of Las Vegas, Clark County, Nevada, in Township 20 South, Range 60 East across Sections 25-27 and Sections 34-36 and Range 61 East across Sections 28-31 (see Figure 1.0, Vicinity Map).

The overall US-95 Widening Project from Martin L. King Boulevard to Washington Avenue is being designed as five individual projects. The following is a brief overview of the individual project limits:

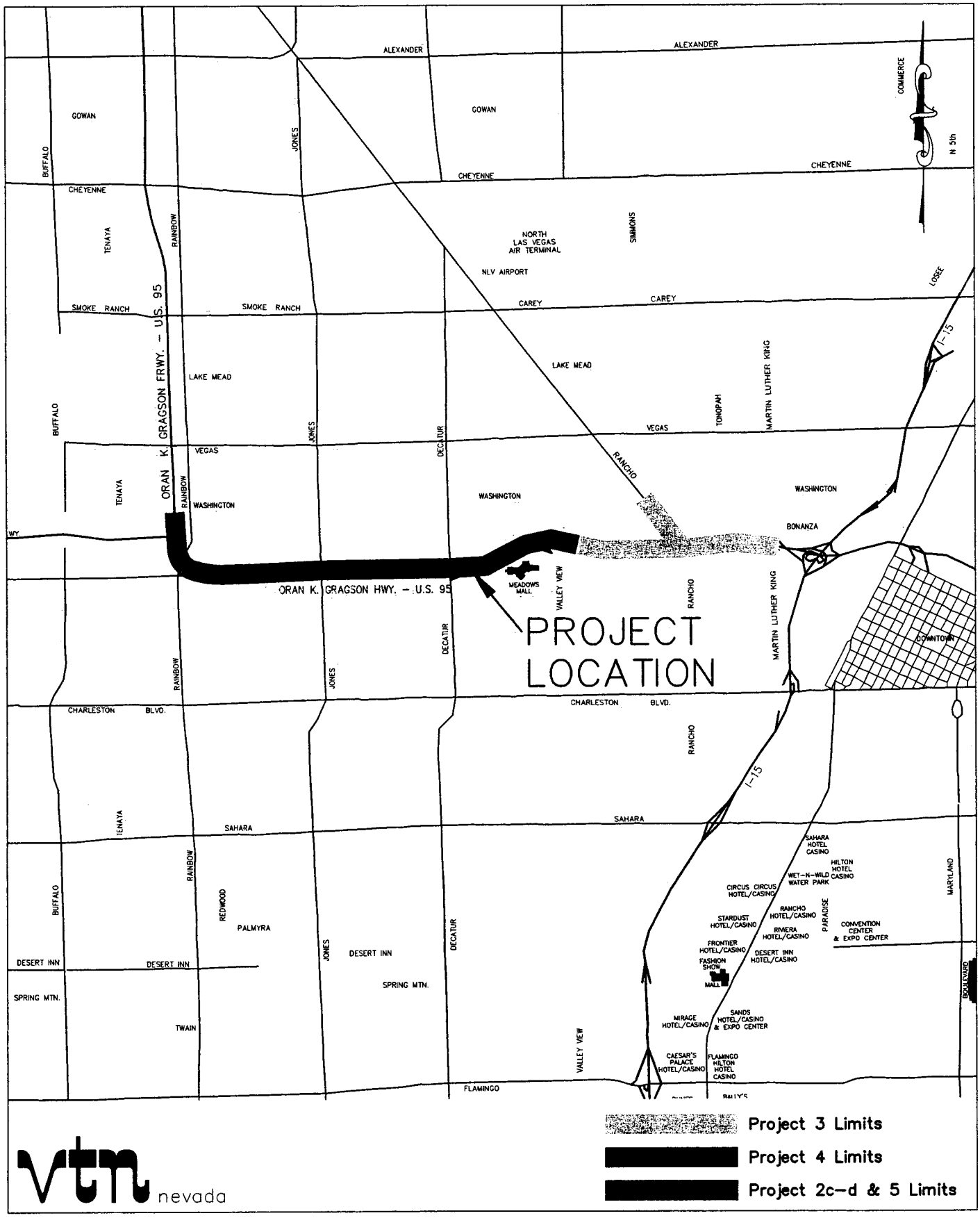
Project 3 includes the segment from Martin L. King to approximately 600 meters east of Valley View Boulevard.

Rancho Lateral (Project 3A) includes the drainage and associated roadway restoration improvements on Rancho Drive. These improvements were split out from Project 3 because FEMA regulations required that the Rancho Lateral must be built before the freeway can be widened, and because NDOT was concerned that the Project 3 right-of-way could be delayed longer than expected.

Project 4 includes the segment from the western limit of Project 3 to approximately 500 meters west of Jones Boulevard.

Project 5 picks up from the western limit of Project 4 and extends westward to Washington Avenue.

Project 2C & D is located within the limits of Project 5, and includes the lowering of the northbound lanes around the "Rainbow Curve". Project 2C & D also includes all of the Rainbow Interchange improvements (including the Rainbow Detention Basin). Project 2C & D must be constructed before Project 5 because the Rainbow Bridge must be widened before the freeway expansion, and the detention basin must be in place to provide flood protection for the rest of the project downstream of Rainbow Boulevard.



U.S. 95 Widening Project
M.L.K. to Washington
Vicinity Map

Figure 1.0

The freeway design responsibilities are divided among three separate design consultants: Project 3 is being designed by Parsons Brinkerhoff Quade &Douglas; Project 4 is being designed by Parsons Transportation Group; and Projects 5 and 2C & D are being designed by Post Buckley Shuh & Jernigan. A geotechnical report for this project was completed by Kleinfelder, Inc., titled *"Results Of Geotechnical Exploration Proposed US 95 Drainage Project Martin Luther King Boulevard To Washington Avenue Las Vegas, Nevada 31-110037" (March 18, 2002).*

This final report includes an updated set of drainage plans, hydrologic and hydraulic calculations, geotechnical report, cost estimate, and utility conflict summary. This document, together with the attached plans and calculations, summarizes the findings of the off-site drainage design for the US-95 Widening from Martin L. King Boulevard to Washington Avenue.

1.2 Previous Studies

As part of the engineering services performed, VTN obtained and reviewed previous hydrologic and hydraulic reports and studies prepared for areas surrounding, tributary to, or adjacent to this segment of US-95. Table 1.2 lists the reports and studies reviewed during the preparation of this report.

TABLE 1.2 PREVIOUS STUDIES

PREVIOUS STUDIES		
1	2002 CCRFCD Flood Control Master Plan Update of the Las Vegas Valley, by PBS&J	November 2002
2	City of Las Vegas City Wide Hydrology Analysis, by PBS&J	1997
3	Preliminary Hydraulic Design Report for the US-95 Widening Project, by Louis Berger and Associates	April 2000
4	US-95/Summerlin Parkway/Rainbow Boulevard Hydraulic Design Report, by G.C. Wallace	March 2000
5	Meadows Detention Basin Improvements & Las Vegas Springs Preserve Cienaga Grading-100% Design Report, by VTN Nevada	May 2001
6	Oakey Storm Sewer Conveyance System Corridor Study, by Carter-Burgess	February 2000
7	30% Overall Project Drainage Design Report – US-95 Widening MARTIN L. KING Blvd to Washington Ave, VTN Nevada	August 2001
8	60% Project 2C On-Site Drainage Design Report – US-95 Widening, Summerlin Pkwy to Washington Ave, VTN Nevada	February 2002
9	Geotechnical Exploration – US-95 Drainage Project, MARTIN L. KING to Washington Ave, Kleinfelder	March 2002
10	Checking Submittal Project 2C On-Site Drainage Design Report – US-95 Widening, Summerlin Pkwy to Washington, VTN Nevada	April 2002
11	60% Project 3 Drainage Design Report – US-95 Widening, M.L.K to Valley View Boulevard, VTN Nevada	May 2002
12	60% Project 2D Drainage Design Report – US-95 Widening, Rainbow Boulevard SPUI, VTN Nevada	June 2002
13	60% Project 2C/2D Drainage Design Report – US-95 Widening, Summerlin Pkwy to Washington Ave, VTN Nevada	August 2002

1.3 Drainage Design Scope

VTN Nevada has been retained by The Nevada Department of Transportation (Hydraulics Engineering) to perform engineering services for drainage design of the US-95 Widening Project, Martin L. King Boulevard to Washington Avenue. In general, the scope of work includes on-site and off-site drainage design for the entire project. The freeway design consultants will prepare grading plans and structural details for the drainage facilities. The specifics of the drainage design scope is as follows:

Off-site Drainage Design – The off-site hydrology was initially performed by Louis Berger and Associates and documented in the *Preliminary Hydraulic Design Report for the US-95 Widening Project* (reference Previous Study 3). VTN was contracted to utilize the previous study as much as possible, and only modify the off-site hydrology models as necessary to address the details of final design. The scope includes hydraulic modeling of the off-site flows and design of the facilities that pass the off-site flows through the project. The deliverables for this scope include plans, specification notes, calculations, reports and construction cost estimates for the drainage facilities in each phase of the project.

On-site Drainage Design – The on-site drainage scope includes hydrology and hydraulic analysis for the entire project. The deliverables for the on-site design includes plans, specification notes, calculations, reports and construction cost estimates for the drainage facilities in each phase of the project. The on-site drainage design is not presented in this report, but is captured in separate on-site drainage design reports for each individual project.

1.4 CCRFCD MPU Drainage System

There is an existing Clark County Regional Flood Control Channel along US-95 from MARTIN L. KING Boulevard to Washington Avenue that is part of the Las Vegas Creek Channel System. The 2002 Flood Control Master Plan of the Las Vegas Valley shows the existing Las Vegas Creek Channel (designated LCCH) and a proposed parallel system (LCCP 0000, 0182, and 0286, See Figure F-12 on the following two pages). Since US-95 will be widened and realigned with this project, a single flood control facility, hereafter referred to as the "Main Line Channel", is proposed in lieu of the parallel systems recommended in the 2002 MPU. The design of this facility is discussed in detail in Section 7 of this report.

The Main Line Channel is comprised of many individual features, including a detention basin, some storm drain systems, and confluence structures. The following is a brief description of each of these features:

1.4.1 Rainbow Detention Basin (Project 2C & D)

The Rainbow Detention Basin is located on the northeast corner of Rainbow Boulevard and Westcliff Drive. The purpose of this facility is to collect and detain the peak flows from the 100-year storm event, and release them at a lower flow rate, which will protect the main line channel from being over burdened during major storm events. In addition, the detention basin provides protection for the freeway facility and adjacent developments along US-95. Because this basin must serve the purposes stated above, it has been designed to detain the 500-year storm event to provide additional protection. As required by CCRFCD, the detention basin features a PMF spillway to protect the structure from an overtopping failure. The Rainbow Detention Basin will be discussed in greater detail in Section 6 of this report.

1.4.2 Jones Lateral (Project 4)

The Jones Lateral is located on Jones Boulevard, south of US-95. The lateral begins at Elton Avenue, where is collects a large amount of off-site flows and conveys them north to US-95. In addition, there is a small watershed north of US-95 on Clarice Avenue that is collected by the Jones Lateral and conveyed to US-95 system. The purpose of this system is to collect the100-year storm event runoff that normally flows to the low point in Jones Boulevard. This system is designed to eliminate the ponding problem that currently exists in Jones Boulevard, directly under US-95.

1.4.3 Decatur Lateral (Project 4)

The majority of the Decatur Lateral collection system will be constructed with the Decatur Bridge Widening, prior to Project 4 construction. It has been designed to collect off-site flows on Kansas Avenue and Nebraska Avenue that normally flow south on Decatur Boulevard and then east along the north side of US-95 as overland flow. The Decatur Lateral will be extended into the US-95 Main Line Channel system with Project 4. Because the off-site flows are large, a confluence has been designed where the Decatur Lateral joins the Main Line Channel.

1.4.4 Las Vegas Creek Lateral (Project 4)

The Las Vegas Creek Lateral is an existing facility that conveys storm water runoff to the existing Las Vegas Creek Channel located under US-95. This lateral is located immediately east of Valley View, on the north side of US-95. Minor modifications to this system will be made to connect the Las Vegas Creek Lateral to the Main Line Channel.

1.4.5 Western High School (Project 4)

Western High School is located on the north side of US-95, immediately east of Decatur Boulevard. Rainfall runoff from the watershed upstream of the high school drains across the ball fields to the southeast corner of the school, where it drains into the US-95 right-of-way. Surface drainage facilities have been designed to collect this water and drain it into the Main

Line Channel.

1.4.6 Meadows Detention Basin (Project 3)

The Meadows Detention Basin is an existing facility that is currently being expanded (to increase its capacity) by the Las Vegas Valley Water District. With that project, the outfall channel has been redesigned and reconstructed to convey the revised flows. The hydrology analysis performed for the newly constructed Meadows Detention Basin was incorporated into the US-95 Widening hydrology analysis to ensure there is enough capacity in the Main Line Channel. A new confluence structure has been designed in Project 3 where the Meadows Outfall joins with the Main Line Channel.

1.4.7 Ramsey Storm Drain (Project 3)

The Ramsey Storm Drain system collects off-site runoff on the north side of US-95, just west of Rancho Drive. There is an existing system that collects off-site runoff and conveys it into the existing Las Vegas Creek Channel. This project will reconstruct the existing collection system to accommodate freeway widening and alleviate existing flooding that occurs at this location.

1.4.8 Rancho Lateral (Project 3)

The Rancho Lateral is a large storm drain collection and conveyance system that extends north on Rancho Drive from US-95 to Washington Avenue. The purpose of this system is to collect a large amount of off-site flows that impact US-95. Currently these flows approach the Washington/Rancho intersection from west on Washington and split at the intersection. The majority of the flow heads south on Rancho, and the rest continue east on Washington toward Martin Luther King and exits the drainage system. The flows that head down Rancho turn east on Bonanza Drive and contribute flood waters to an existing FEMA flood zone on the north side of US-95 between Rancho Drive and MARTIN L. KING Boulevard. The Rancho Lateral is designed to collect the storm water that flows down Rancho Drive. This system will not eliminate the flood zone, but it will make the freeway widening possible, without increasing the existing flood flow depth or the flood zone limits.

1.4.9 North Channel (Ahern) (Project 3)

The North Channel is located immediately north of US-95 between Rancho Drive and MARTIN L. KING Boulevard. The purpose of this system is to collect storm water runoff that would have a negative impact to the existing FEMA flood zone. Although the Rancho Lateral collects most of the water that impacts this area coming from Rancho Drive, there is still enough storm water runoff generated between Washington Avenue and US-95 (between Rancho Drive and MARTIN L. KING Boulevard) that would increase the existing 100-year flood depth to unacceptable levels. Therefore, a pipe and drop inlet system is designed to collect these flows and convey them into the Main Line Channel System. This underground

pipe alternative was selected over an open channel alternative due to maintenance access considerations. There is a limited amount of right-of-way available in this area. With the open channel alternative, maintenance crews would have to access the project by driving on the invert of the channel. With the underground pipe alternative, maintenance access is improved and storm water collection and conveyance is adequate for the project needs.

2.0 DESIGN PROCEDURES AND CRITERIA

2.1 Introduction

The drainage design associated with the US-95 widening project will be in accordance with applicable criteria presented in the Nevada Department of Transportation (NDOT) *Draft Drainage Design Manual* (latest version) and Clark County Regional Flood Control District's *Hydrologic Criteria and Drainage Design Manual*, August 1999. In addition to the criteria taken directly from these manuals, project-specific criteria and procedures for implementation were developed and are listed below by design category. If drainage criteria presented in the NDOT Draft Drainage Design Manual is in conflict with the project-specific criteria, the project-specific criteria will be utilized. For each category listed below, the project criteria and methods of implementation are described. The most current edition of the reference documents listed below shall be the one followed.

2.2 Off-Site Hydrology

2.2.1 Criteria

The off-site hydrology was performed in accordance to Clark County Regional Flood Control District's (CCRFCD) *Hydrologic Criteria and Drainage Design Manual (August 1999)*. The 100-year, 6-hour storm event was analyzed for the off-site hydrology analysis. The off-site collection points are designed to collect the 100-year storm event runoff. A list of the off-site collection points is found in Appendix E.

2.2.2 Method

The HEC-1 model developed by Louis Berger & Associates was utilized as the base off-site hydrology model for the project. Modifications to this model were made to accurately model the collection of the off-site flows at specific design collection points.

2.3 Off-site Drop Inlet Design

2.3.1 Criteria

The Drop inlet design for the facilities located in the City of Las Vegas will follow the criteria established in the CCRFCD *Hydrologic Criteria and Drainage Design Manual.*

2.3.2 Method

A clogging factor or 50% was used for the City of Las Vegas drop inlets. Inlets were sized and located to capture the storm water runoff as required to meet the RTC criteria for 10-year and 100-year storms. Off-site critical areas (such as sump areas) and master planned facilities were designed to capture the 100-year storm event.

2.4 Storm Drain Systems

2.4.1 Criteria

Since the mainline storm drain system is identified as a CCRFCD Master Planned Facility, it was designed in accordance with the CCRFCD *Hydrologic Criteria and Drainage Design Manual,* except as modified by the following: Velocities of flow will not be less than 1 meter per second at design flow rate, minimum slope shall be 0.25%, the minimum pipe size for down drains shall be 375mm (15-inches), and the minimum pipe size for the lateral connectors and storm drain trunk line shall be 450mm (18-inches). Side drains into the storm drain from flood control facilities will be located as close to the invert of the storm drain as possible to provide the maximum amount of submergence. Side drains 600mm (24-inches) and smaller may penetrate the storm drain wall at a 90-degree angle. Side drains between 600mm (24-inches) and 1050mm (42-inches) must enter the storm drain at a 45-degree angle, and side drains larger than 1050mm (42-inches) must enter the storm drain at a 30-degree angle (or less). When the side drain flow rate exceeds 10% of the main storm drain flow rate, a confluence with a zero-degree entry angle must be designed.

2.4.2 Method

The main line storm drain system was modeled using the Water Surface Pressure Gradient (WSPG) software. The smaller lateral systems were modeled using CCRFCD methodology. The hydraulic gradient shall remain at least 0.3 meters (1-foot) below the ground surface during design flow for on-site systems. Junctions were modeled separately using momentum calculations. This procedure is discussed in detail in Section 7.7. Pre-cast pipe and RCB are used in segments of the project where minimizing construction duration is critical. Cast-in-place RCB structures are used where the construction schedule will allow it.

2.4.3 Manholes

Manholes are located at all junctions, change in pipe grade, and change in pipe direction (angle points or PC and PT of curves). Manhole spacing is as follows:

Size of Pipe (mm)	Maximum Distance (meters)
All Pipes	120

2.4.4 Method

Calculate manhole head loss with the HEC-22 Energy method and the benching method will be flat. Use NDOT manhole detail to determine appropriate manhole loss coefficient. Maintain minimum spacing of 150 mm between multiple pipes penetrating a common manhole. Vertical offset between inflow and outflow pipes in a manhole or flow-through drop inlet shall be a minimum 50 mm.

2.5 Detention Basin Design

2.5.1 Criteria

The detention basin design and analysis was performed in accordance with the procedures established in the CCRFCD Hydrologic Criteria & Drainage Design Manual. In Clark County, detention basins are typically designed to provide storage for the 100-year storm event. In this case, the City of Las Vegas and NDOT agreed to size the basin storage in excess of the 500-year storm event since an overtopping of the spillway will flood US-95. The spillway was designed to discharge the PMF flow rate. The low-level discharge will drain into the mainline storm drainage system. HMR-49 was used to calculate the Probable Maximum Precipitation (PMP). The inlets into the detention basin require energy dissipators for erosion protection. Rip rap has been designed in accordance to criteria established in Design of Rip rap Revetment, HEC-11. Energy dissipators were designed per HEC-14 Hydraulic Design of Energy Dissipators For Culverts and Channels.

2.5.2 Method

The HEC-1 software was used to model the storage and routing characteristics of the detention basin. A grading plan has been developed to maximize the basin storage using the available right-of-way. The low-level discharge rate has been optimized to ensure that the flow rates in the downstream facilities do not exceed their design capacity. The PMF spillway and basin design have been coordinated with the State Engineer, CCRFCD, CLV and NDOT.

2.6 Ditch Design

2.6.1 Criteria

Ditch design will be based on Normal Depth Calculations for the 50-year storm flows with 0.3 meter (1 foot) of freeboard, or the 100-year storm flows without freeboard. The physical ditch characteristics will be designed to meet the criteria provided in AASHTO's *Roadside Design Guide (January 1996)*. Criteria established in FHWA's *Design of Roadside Drainage Channels*, HDS #4, and *Design of Roadside Channels with Flexible Linings*, HEC-15 shall also be followed.

2.6.2 Method

Ditches will be hydraulically modeled using FHWA's Integrated Drainage Design Computer System, *HYDRAIN*. A maximum rainfall runoff velocity of 1.14 mps (3.75 fps) for unlined ditches was used in the design process. Based on project design guidelines, this method was used to estimate the capacity of the roadside and median ditches for the 50-year event, at a velocity that should maintain a stable channel. The capacity of the ditch is determined

by either the maximum allowable velocity or the depth of the ditch, whichever yields a lower flow capacity will control. Velocity and depth calculations are performed twice for each ditch, once for the section with the steepest slope to check for stability, and once for the section with the flattest slope to check for capacity. Roadside ditch design calculations are found in the onsite design reports.

2.7 Erosion Control

2.7.1 Criteria

Erosion potential associated with roadside ditches, open channels, detention basin and any other surface disturbed with project construction have been designed as part of this project. Sediment from erodable surfaces should not leave the project site. This project includes design of necessary temporary hydraulic facilities to allow passage of the existing 5-year flows through the project during construction.

2.7.2 Method

Silt fence shall be used at the toe of disturbed or graded slopes to ensure sediment does not travel downstream. Temporary structural controls such as rip rap and drop structures shall be employed where large volumes of water could cause erosion to ditches or channel. Chemical soils stabilizers will be applied to all disturbed soil slopes to protect from wind and water erosion until the future landscape project is constructed. Inlet protection shall be provided at the field inlets, and silt rolls will be used to prevent erosion in roadside ditches.

2.8 Compliance With Federal, State, & Local Regulations

2.8.1 Compliance with Nevada Drainage Laws

This project is in compliance with all Nevada Drainage Laws.

2.8.2 Compliance with NDOT Standards

As previously mentioned, the drainage design associated with the US-95 Widening Project will be performed in accordance with applicable design criteria presented in the NDOT *Draft Drainage Design Manual* and formulated specifically for this project. These criteria will be used to design roadway surface and subsurface drain systems, and other associated drainage features. In some situations, physical constraints require deviation from the established standards. The deviations from standards, or exceptions, are listed in Section 2.8.6 of this report.

2.8.3 Compliance with FEMA Regulations

A FEMA flood zone has been identified on the north side of US-95 between Martin L. King Boulevard and Rancho Drive. The southern boundary of this flood zone is the existing US-

95 highway. The proposed widening of US-95 will encroach into the existing flood zone. FEMA regulations state that the proposed widening cannot cause the existing 100-year water surface elevation to raise more than 300mm (1-foot). To comply with this regulation, the Rancho Lateral will be constructed in advance of the proposed US-95 widening to reduce the amount of floodwater that reaches this flood zone. In addition, a facility known as the North Channel will be constructed with this project. The North Channel is a closed conduit storm drain system that collects rainfall runoff along the north side of US-95 between Martin L. King Boulevard and Rancho Drive (in the flood zone area). As a result, this project will be in compliance with FEMA regulations. A HEC-RAS analysis has been performed to model the existing condition and the proposed widened condition. The results are included in Appendix B.

2.8.4 Compliance with Local Regulatory Requirements

The design of this project is in compliance with the local regulatory requirements as set forth by the City of Las Vegas and all utility regulatory agencies.

2.8.5 Compliance with Local Flood Control Master Plan

The Clark County Regional Flood Control District currently has a flood control master plan for the region surrounding the project. The major drainage facilities in this project are identified on CCRFCD's Flood Control Master Plan (October, 2002), and these facilities will be designed to meet the criteria established in CCRFCD's *Hydrologic Criteria and Drainage Design Manual.*

2.8.6 Design Exceptions To Applicable Regulations

There are no design exceptions required for the proposed design of the Las Vegas Creek Channel and the adjoining off-site collection facilities.

3.0 HYDROLOGY

3.1 Introduction

The off-site hydrology analysis included in this report is based on the analysis found in the Preliminary Hydraulic Design Report (See Table 1.2, #3 & #4). The scope defined for this project did not include a detailed hydrologic analysis as it had already been developed in the Preliminary Hydraulic Design report. However, the analysis in that report was checked and updated, as necessary, to provide storm runoff values at specific points needed in this study. A list of revisions to the HEC-1 parameters of the Hydraulic Design Report are included in Appendix B. The information provided in this section of the report is applicable to the revised portions of the revised hydrology analysis. For all other hydrologic concerns, refer to the Preliminary Hydraulic Design Report mentioned above.

The hydrologic analysis is intended to provide the site-specific runoff/frequency relationship for the project area. As recommended by the MPU hydrology model and the CCRFCD Hydrologic Criteria and Drainage Design Manual, the Soil Conservation Service (SCS) Unit Hydrograph Method was used to model subbasin storm hydrographs, and the kinematic wave method was used for channel routing. The model computes the hydrograph for each subbasin, and either combines or routes the computed hydrograph according to the flow paths and concentration points that are entered. Channel routing accounts for the time required for the hydrograph to travel from one design point to another. The following hydrologic information was collected from watershed areas contributing to US-95 between MARTIN L. KING and Washington and MPU facilities within the project area.

3.2 Physical Basin Characteristics

Several physical characteristics of a watershed are required for the SCS unit hydrograph method. This section describes the measurements of these parameters and drainage characteristics. The models created for this drainage study incorporate and/or modify the parameters established in previous studies.

3.2.1 Basin Area

The watershed for a specific drainage basin is divided into subbasins to allow for the identification of the local drainage characteristics within the watershed. For the SCS unit hydrograph method adopted by CCRFCD, the basin area is one of the four parameters input to the HEC-1 computer model. The subbasin areas included in the Preliminary Hydraulic Design Report were checked and updated as necessary. A list of revised areas in the HEC-1 model is included in Appendix B.

The drainage design points are defined along US-95 where the off-site flows are conveyed into the Main Line Channel, and are labeled DP1 through DP16C on the Subbasin Maps, in Figures 3.1 and 3.2. The subbasin map has been split into two separate maps. Figure 3.1 is the overall map, and Figure 3.2 is a more detailed map showing the subbasin delineation in the vicinity of the Rainbow Interchange.

3.2.2 Basin Slope

The watershed area tributary to design points along the project typically has slopes ranging from 1.0-4.0 percent throughout the watershed. Subbasin slope is an important drainage parameter that determines the runoff flow time through the subbasin. When a subbasin has an area greater that 1.0 mi^2 (259 Ha), the lag time for the storm hydrograph may be governed by the concentrated flow such as channel flow. When the subbasin area is less than 1.0 mi^2 (259 Ha), both overland flow time and channel flow time will be used to determine the lag time. The lag times included in the Preliminary Hydraulic Design Report were checked and updated as necessary (see Appendix B for calculations).

3.2.3 Basin Centroid

The subbasin centroid locations were determined and used to determine the point precipitation for each subbasin. When subbasin areas exceed 1.0 mi^2 (259 Ha), the subbasin centroid is also used to calculate lag times.

3.2.4 Channel Characteristics

Channel characteristics that are important to the hydrologic parameters of the watershed include: 1) the main channel length; 2) the length along the main channel to a point opposite each subbasin centroid; 3) the main channel slope; 4) the main channel width; and 5) the channel roughness. These channel characteristics are used to determine lag times and they are used by the model to calculate channel routing characteristics.

3.2.5 Lag Times

Lag times for each subbasin were calculated using the procedure outlined in the CCRFCD Hydrologic Criteria and Drainage Design Manual. The following lag time and time of concentration equations are used for drainage basins with areas less than 1.0 mi^2 (259 Ha):

$$TLAG = 0.6\,T_c$$

$$T_c = T_i + T_t$$

$$T_i = \frac{1.8(1.1 - K)L_0^{1/2}}{S^{1/3}}$$

$$K = 0.0132\,CN - 0.39$$

Where:

T_c = Time of concentration using the above equations

T_i = Initial or overland flow time (minutes)

T_t = Travel time through the subbasin in the channel

L_o = Overland flow length (500 ft. maximum for rural areas, 300 ft. maximum for urban areas)

K = Flow resistance coefficient

S = Average basin slope (percent)

3.3 Geology and Soil

For purposes of hydrologic analysis, infiltration losses are related to the SCS Soil Classifications. The SCS methodology divides soils into four hydrological groups: Group A, Group B, Group C, and Group D, which were developed based on infiltration rates. SCS Group A Soil has a high infiltration rate, such as for sands and gravels. SCS Group D Soil has a low infiltration rate, such as for clay soil or rock. The SCS Soil types within the study area, and their corresponding hydrologic soil groups, were identified from the Soil Survey of Las Vegas Valley Area, Clark County, Nevada, and are shown in Table 3.1. Infiltration losses will be discussed in more detail in section 3.6 of this report.

TABLE 3.1 SOIL HYDROLOGIC CLASSIFICATIONS

Soil Map Unit	SCS Soil Name	Hydrologic Soil Group
152	Cave	D
236	Glencarb	B
240	Goodsprings	D
264	Jean	A
300	Las Vegas	D
341	Paradise	C
380	Skyhaven	C
610	Gravel Pits	D
615	Urban Land	D

3.4 Land Use

The majority of the land tributary to US-95 from MARTIN L. KING to Washington is developed. Developed land throughout the watershed consists of primarily single-family residential, multi-family residential, commercial, industrial, and open space. Existing vegetation in undeveloped areas is sparse, and consists predominantly of creosote bush, White Bursage, Alkali Sacaton, and Inland Saltgrass. The models included in this report assume that the watershed will be fully developed, except in specific areas designated as parks and open space.

3.5 Rainfall Analysis

3.5.1 Point Precipitation Values

The hydrograph analysis was based on a six hour precipitation value from the National Oceanic and Atmospheric Administration (NOAA) Atlas Volume 2, Precipitation Frequency Atlas of the Western United States, dated 1973, as referenced in the CCRFCD *Hydrologic Criteria and Drainage Design Manual.* The entire area tributary to US-95 from MARTIN L. KING to Washington falls within the McCarran Airport Rainfall Area. For six-hour storm duration, the point precipitation for the various storm events was determined from Table 505 in the CCRFCD *Hydrologic Criteria and Drainage Design Manual.*

3.5.2 Area Reduction

The point precipitation depths are related to rainfall intensity at an isolated point. A Depth Area Reduction Factor (DARF) is used to convert the point precipitation to an average depth of rainfall over the entire storm area. DARF ratios used for this study were obtained from Table 502 in the CCRFCD Hydrologic Criteria and Drainage Design Manual.

Due to the number of diversions and the fact that tributary area is not carried with a diverted flow, care must be used to determine the correct DARF. However, as a general rule, tributary area was manually carried with the diverted flow, or estimated based on the size of the upstream watershed and the quantity of flow.

3.5.3 Rainfall Pattern

The rainfall distributions for the Las Vegas Valley were determined using the Percent of Total Depth tabulation from the USACE, Los Angeles District, 1988. Based on the revised CCRFCD *Hydrologic Criteria and Drainage Design Manual*, the storm distributions used for this study consist of the SDN3 and SDN4. An SDN3 distribution is used when the total drainage basin area is less than 8 mi^2 (2072 Ha) and an SDN4 distribution is used for drainage basins with areas between 8 and 12 mi^2 (2072 and 3108 Ha). If the area equals 8 square miles, both SDN3 and SDN4 storm distributions are used and the one generating larger runoff will be adopted.

3.6 Precipitation Losses

Precipitation losses consist of infiltration and interception/depression storage. Infiltration occurs throughout the storm event while interception on vegetation and in local depressions on the land surface occur during the initial period of the storm. The difference between the precipitation volume and the precipitation loss volume is the runoff volume from the land surface for a computational interval. The SCS curve number method is used to compute both types of precipitation losses. This method uses a curve number (CN) index to relate precipitation losses to soil types, land use, and vegetative cover conditions.

3.7 Unit Hydrograph Parameters

The unit hydrograph used in the HEC-1 model for this analysis is the SCS dimensionless unit hydrograph. Input for the unit hydrograph consists of a single parameter, the lag time between the center of mass of rainfall excess and the peak of the unit hydrograph. The input variables for this method consist of basin lag time, area in square miles, curve number, rainfall distribution, and precipitation values in inches.

3.8 Hydrograph Routing

Storm hydrographs generated by subbasins have to be conveyed downstream through a drainage network that may consist of channels, detention basins, basin conversions, etc. Channel routing methods are numerical simulations of flood wave movements along a drainage network. In this study, the kinematic wave routing procedures were used to model storm water movements in improved channel reaches and street sections. This method is recommended for flow modeling in uniform channels such as pipes and well-defined channels, as it translates the hydrograph downstream without significant attenuation of the peak discharge. The parameters used for this method are the shape of the channel cross-section, channel reach length, channel slope, and channel roughness.

3.9 Summary of HEC-1 Flood Hydrograph Program Input

The HEC-1 Flood Hydrograph Package Computer Model is used to simulate the surface runoff response of a basin or system of subbasins to precipitation. Each basin is described by a set of parameters, which specify the basin and storm characteristics. These basin parameters as previously discussed include precipitation, basin area, curve number, and lag time. These parameters were incorporated from the Preliminary Hydraulic Design Report and were modified as necessary for this study. Calculations for the parameters modified from the Preliminary Hydraulic Design Report are included in Appendix B.

Hydrographs are computed for each subbasin within the drainage area. These hydrographs are then routed or combined according to the basin drainage network configuration. The DARF is known at each design point and is used to determine the peak flow at this design point.

3.10 HEC-1 Model Description

In the previous 30% Drainage Design Report (see Table 1.2, #7), VTN developed six off-site hydrology models. Those six models were derivations of the combination between the model included in the Preliminary Hydraulic Design Report (see Table 1.2, #3) and the Model included in the Meadows Detention Basin Report (see Table 1.2, #5). The drainage basin and subbasins in those models were based on 1996 MPU and 1997 City Wide Hydrology Analysis (see Table 1.2, #1 & #2). In the conclusions and recommendations section of the Updated Overall Drainage Design Report, VTN recommended two of the six models (Alternatives 2A or 2B) as most representative of the proposed drainage facility design. Based on the current drainage patterns, it has become evident that the previous Alternative 2B Hec-1 model is the most representative of the proposed drainage facility designs. However, some modifications to the Alternative 2B Hec-1 model

(henceforth referred to as "hydrology model") had to be incorporated. These revisions include an update of the Rainbow Detention Basin parameters, and minor adjustments to routing and combinations in the vicinity of the Rainbow SPUI.

In accordance with the CCRFCD *Hydrologic Criteria and Drainage Design Manual*, an SDN3 rainfall distribution should be used for drainage areas less than or equal to 8 mi^2 and an SDN4 rainfall distribution should be used for drainage areas between 8 and 12 mi^2. For the hydrology model in this report, two HEC-1 runs are required, one with SDN3 rainfall distribution and the other with SDN4 rainfall distribution. The HEC-1 output files are included in Appendix B. Paper copies of the hydrology model output files are also included in Appendix B for ease of review.

3.11 Off-site Hydrology Summary

A summary of the peak flows is included in Table 3.2, and Figure 3.3 illustrates 100-year flow values and collection facility locations.

3.12 Historic Drainage Patterns

The watershed tributary to this project is very large and drainage paths meander throughout the project. However, the runoff flow path generally slopes from west to east across the watershed. There is an existing storm drain conveyance facility in the US-95 right-of-way that currently carries water from the western limits of this project to the far east end where it discharges into the existing RCB that was constructed with the "Spaghetti Bowl Project" (US-95/I-15 Interchange). In addition, there are a number of locations along the project where off-site runoff impacts US-95. The locations where the larger off-site flows impacts US-95 were discussed in section 1.4 of this report.

3.13 Flow Splits

There is only one major flow split/diversion that is noteworthy. That flow split is located at the intersection of Rancho Drive and Washington Avenue. There is approximately 1100 cfs approaching the intersection from the west. At the intersection, approximately 400 cfs proceed easterly on Washington, and the rest turn south on Rancho Drive. A flow split calculation was preformed for this intersection and it is included in Appendix B.

One other flow split was analyzed in this study and it is located at the intersection of Washington Avenue and Valley View Drive. A flow split analysis was performed at this location, but the analysis indicated that the majority of the storm water that splits off from Washington and heads south on Valley View Drive is naturally routed back to Washington Avenue. Through this analysis, the original assumptions in the HEC-1 model were verified, and accordingly, the model was not changed.

4.0 EXITING FACILITIES

There is an existing storm water conveyance facility (the Las Vegas Creek Channel) that runs along or underneath the existing freeway between Rainbow Boulevard and Martin L. King Boulevard. At the west end, the existing facility starts as a 600mm (24") RCP where the Summerlin Parkway meets with US-95. The facility increases in size as it proceeds eastward toward Martin L. King Boulevard where the existing facility is a double 3600mm X 2100mm RCB (12' X 7'). The majority of this system is in good condition, as far as structural integrity and maintenance is concerned. However, the existing system does not have enough capacity to convey the 100-year storm event runoff.

In addition to the existing Las Vegas Creek Channel, there are a number of locations where off-site flows discharge into this system. The off-site discharge locations and descriptions are listed with a photo summary documenting the condition of each of the facilities following this page (page 20). The conveyance capacity of these facilities are summarized Table 4.1 below.

Table 4.1 Summary of Existing Capacities

FACILITY NAME	SIZE / TYPE (DESCRIPTION)	CAPACITY
Las Vegas Creek Channel	24" RCP – (2) 12' X 7' RCB	2689 cfs / 76.1 cms
Washington Avenue	24" RCP	15 cfs / 0.4 cms
Rainbow / Westcliff	No Exiting Facilities	Overland ~ 840 cfs / 23.8 cms
Jones Boulevard	24" RCP	Approximately 22 cfs / 0.6 cms
Decatur Boulevard	72" RCP	494 cfs / 14.0 cms
Western High School	No Existing Facilities	71 cfs / 2.0 cms
Las Vegas Creek Lateral	6' X 6' RCB	471 cfs / 13.3 cms
Meadows Detention Basin	14' X 8' RCB	1355 cfs / 38.4 cms
Ramsey Street	60" RCP	268 cfs / 7.6 cms
Rancho Drive	No Existing Facilities	Overland ~ 705 cfs / 20.0 cms

7.0 CHANNEL DESIGN AND ANALYSIS

7.1 Introduction

The Clark County Regional Flood Control District facility *Las Vegas Creek Channel* (Facility #s LCCP 0000, 0182, and 0286), hereafter referenced as "Main Line Channel", is proposed for construction with this project. It will replace the existing Las Vegas Creek Channel along the present US-95 Freeway and will supercede the need for the Las Vegas Creek Channel – Parallel MPU Facility. The Main Line Channel will convey 100-year off-site flows that impact the US-95 Widening Project to the downstream channel constructed with the "Spaghetti Bowl" Improvements. Off-site flows will be collected at a number of locations along the project, as noted on Figure 3.3, and conveyed into the Main Line Channel. The Main Line Channel will also facilitate on-site drainage from the US-95 Widening Project. Plan and profile drawings for the channel are included in Appendix A. Channel alignment , hydraulic design, and collection facilities design will be discussed further in the following subsections.

7.2 Main Line Channel

The backbone of the Main Line Channel is typically aligned within the US-95 widening project right-of-way. Its alignment has evolved as the individual projects (3, 4, 5, and 2C/2D) have proceeded through the design process. Generally, the layout of the Main Line Channel complies with the following criteria:

1) The alignment is designed to keep manholes out of travel lanes.
2) Lateral drainage pipes must have positive drainage to the Main Line Channel with a minimum slope of 0.25%.
3) Channel alignment must stay clear of bridge abutments, piers, and wall footings.
4) Main Line Channel must be aligned in proposed or existing right-of-way.

7.2.1 Alignment Description

The Main Line Channel alignment has been modified from the channel alignment shown in the plan and profile drawings in the Preliminary Design Report (see Appendix A). This alignment features channel sizes ranging from a 900mm (36") RCP to dual 4200mm x 2100mm (14' x 7') RCBs. The alignment of the Main Line Channel is along the south side of US-95 from MARTIN L. KING Boulevard to approximately 200 meters west of the Meadows Detention Basin Confluence, where it crosses over to the north side of US-95. It remains on the north side, within the roadway shoulder area, until west of the Decatur Boulevard Interchange. The alignment then curves north of the freeway expansion, utilizing the

realigned Alaska Avenue and Reba Avenue right-of-way. The channel alignment then switches back to the north freeway shoulder in the vicinity of Jones Boulevard. Then, the Main Line Channel alignment switches over to the south side of US-95 approximately 140 meters west of Torrey Pines. It stays in the shoulder area along the south side of US-95 between Torrey Pines and the Rainbow Detention Basin, where it splits over to the north side of the right-of-way to collect the drainage from the low point caused by the super-elevation of the roadway. The Main Line Channel then remains on the north side around the "Rainbow Curve" to the limits of the project at Washington Avenue. The alignment is shown on the "SD" sheets in Appendix A.

7.3 RCB Design

Design flows produced in the hydrologic analysis included in Section 2.0 of this report were used in the design of all collection systems and the Main Line Channel analysis. The Main Line Channel was designed in accordance with criteria set forth in the CCRFCD *Hydrologic Criteria and Drainage Design Manual* and the NDOT *Draft Drainage Manual.* As directed by NDOT and the Clark County Regional Flood Control District, the main channel features for the US-95 Widening Project include:

1) Confluence structures at Rancho Lateral, Ramsey Street Lateral, the Meadows Detention Basin Outfall, Las Vegas Creek Lateral, Decatur Lateral, and Jones Lateral. Pursuant to CCRFCD criteria, these facilities will be designed in accordance with the United States Corps of Engineers criteria.
2) Manhole access provided every 120 meters, or less. Larger maintenance access structures will be provided at various points along the dual RCB channel to accommodate a small "bobcat" loader for maintenance of the channel. These larger access points are generally located immediately upstream or downstream of the large confluence structures (Rancho, Ramsey, and Meadows).
3) Dual RCB structures will be designed as pre-cast in areas crossing present travel lanes to provide minimum disturbance of traffic during construction.
4) In curved channel sections, the radius of curvature is chosen to keep super-elevation of the water surface to a maximum of 0.3 meters (1 foot).

7.4 Off-site Collection Facilities

Off-site collection facilities will be provided at design points along the US-95 Widening project. The design points and design flows are listed in Table 7.4. The Martin Luther King West, Rancho, Ramsey, Decatur, Chason, Reese, Jones South, Clarise, Western High School, Smith's and Rainbow Detention Basin Systems will be designed to collect 100-year runoff. The Las Vegas Creek Lateral and the Meadows Outfall are in-place systems that are connected to the Main Line Channel with this project. Since the 30% Overall Project Drainage Design Report (see reference #7 in Table 1.2), the alignment of the Rainbow Detention Basin outfall and the Main Line Channel in this vicinity have been revised. In the 30% report, the Main Line Channel combined with the Rainbow Detention Basin low-level outfall pipe on the north side of US-95. In the current design, the Main Line Channel crosses over to the south side of US-95 just east of the Rainbow Detention Basin, where it combines with the detention basin low-level outfall pipe. From there, the Main Line Channel continues on the south side of US-95 until it crosses back over to the north side, just east of the Torrey Pines bridge. The alignment of these off-site collection facilities is shown on the "SD" sheets in Appendix A.

7.4.1 Off-Site Hydrology

Criteria: The off-site hydrology was performed in accordance to Clark County Regional Flood Control District's (CCRFCD) *Hydrologic Criteria and Drainage Design Manual (August 1999)*. Generally, the 100-year, 6-hour storm event will be analyzed for the off-site hydrology analysis. The off-site collection points are designed to collect the 100-year storm event runoff. A list of the off-site collection points is found in Appendix E.

TABLE 7.4 OFFSITE DESIGN FLOWS
ALTERNATIVE 2B

			FLOWS IMPACTING U.S. 95		MAIN LINE FLOWS WITH IMPROVEMENTS	
LATERAL SYSTEMS	DESIGN POINTS*	LOCATION	100 YEAR FLOW (CFS)		100 YEAR FLOW (CFS)	
			CFS	CMS	CFS	CMS
MLK West	Design Point 1	"Q" 19+00 - 360m. West of M.L.K.	118	3.34	2,701	76.48
Rancho System	Design Point 2A	"Q" 26+50 - 100m. East of Rancho	705	19.96	2,633	74.56
	Design Point 2B	SEC Washington and Rancho	630	17.84	N/A	N/A
Ramsey System	Design Point 3	"Q" 29+60 - 210m. West of Rancho	268	7.59	2,138	60.54
Meadows Outfall	Design Point 4	"Q" 33+40 - 590m. West of Rancho	1,336	37.83	1,965	55.64
Las Vegas Creek Lateral	Design Point 5	"Q" 44+60 - 60m. West of Valley View	471	13.34	1,653	46.81
Western High School	Design Point 6	"Q" 52+90 - 400m. East of Decatur	71	2.01	1,189	33.67
Decatur System	Design Point 7A	"Q" 56+10 - 60m. East of Decatur	294	8.33	1,128	31.94
	Design Point 7B	Nebraska and Decatur	38	1.08	N/A	N/A
	Design Point 7C	Kansas and Decatur	261	7.39	N/A	N/A
Chason	Design Point 8	"Q" 65+40 - 780m. East of Jones	4	0.11	826	23.39
Reese	Design Point 9	"Q" 66+20 - 700m. East of Jones	8	0.23	N/A	N/A
Smith's	Design Point 10	"Q" 70+20 - 300m. East of Jones	35	0.99	813	23.02
Jones South	Design Point 11	"Q" 73+20 - Jones	369	10.45	791	22.40
Clarise System	Design Point 12	"Q" 73+40 - 20m. West of Jones	239	6.77	453	12.83
"HOV" System	Design Point 13	"Q" 82+80 - 140m. West of Torrey Pines	56	1.59	101	2.86
"North" System	Design Point 14	"Q" 84+00 - 260m. West of Torrey Pines	46	1.30	46	1.30
Rainbow Detention Basin System	Design Point 15A	NEC Rainbow and Westcliff	327	9.26	N/A	N/A
	Design Point 15B	NEC Westcliff and Lorenzi	205	5.80	N/A	N/A
	Design Point 15C	Beginning of Main Line	83	2.35	164	4.64

* Design Points are shown on Figure 3.1

7.5 Interim Drainage Facilities

Interim drainage facilities will provide for the drainage of one phase of the US-95 Widening Project before the start of the next phase. Interim drainage facilities utilize existing drainage channels and pipelines with interim connector channels to new facilities. As directed by NDOT, all interim connector channels are designed to convey a minimum of the 5-year peak off-site flow and then checked for the consequences of the 100-year peak flow. Although the majority of these interim drainage facilities will be designed during the construction phase, some of the known drainage problems caused by construction phasing will be designed and included in the individual project plans for Projects 3, 4, 5, and 2C/2D.

7.6 Hydraulics Design Summary

The basic hydraulic analysis for the Main Line Channel was performed using the Los Angeles County Flood Control District's WSPGW software. The output from WSPGW is included in Appendix D.

7.7 Confluence Design Summary

When a side drain conveys large amounts of storm water into the Main Line Channel (10% or greater of Main Line Channel peak flow), a confluence structure must be designed to reduce turbulence that can be caused at these junctions. There are a total of six confluence structures identified for design along the Main Line Channel system. These confluences are located at Rancho Lateral, Ramsey Street Lateral, Meadows Outfall, Las Vegas Creek Lateral, Decatur Lateral, and Jones Lateral.

The hydraulic analysis of these confluence structures was performed using the WSPGW software, and then checked using spreadsheets designed to calculate the momentum through these confluences. Multiple runs are required for each confluence because it is important to check the different flow combinations (peak flow in side drain modeled with resultant flow in Main Line Channel, or peak flow in Main Line Channel with resultant flow in side drain).

Currently, three of these confluence structures have been designed with Project 3 (Rancho, Ramsey and Meadows). These confluence designs and calculations are laid out in the individual project design plan submittals.

8.0 CONCLUSIONS AND RECOMMENDATIONS

This final report summarizes the criteria and method used to develop the design and analysis performed for the US-95 Widening Project. The purpose of this project is to design a storm water conveyance system that is capable of collecting and conveying the off-site 100-year storm event runoff. In addition, this project has a single point of discharge, the existing Las Vegas Creek Channel, located within the US-95 right-of-way, near Martin L. King Boulevard. The Las Vegas Creek Channel at this point of discharge has a peak conveyance capability of 2775 cfs.

The alignment of the Main Line Channel and all of the contributing laterals have evolved to the level shown on the plans found in Appendix A. The plans included in Appendix A are not intended to be "construction drawings", rather they are provided to help the reader understand the approximate size and alignment of the Las Vegas Creek Channel and adjoining off-site facilities. An individual final design will be submitted for each of the project segments.

The Las Vegas Creek Channel has been designed to accomplish the goal of conveying the 100-year storm event runoff volume through the project and discharging it into the existing RCB near Martin L. King Boulevard. The Rainbow Detention Basin has been designed to detain the peak flows, and limit the downstream peak flows to acceptable levels. The storm water laterals and off-site collection points have been designed according to the methods and criteria stated herein. The confluence design and detention basin design follows the project criteria and criteria set forth by NDOT, CCRFCD and USACOE.

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Reference HEC-1 Model

Rancho Lateral
Mainline Channel

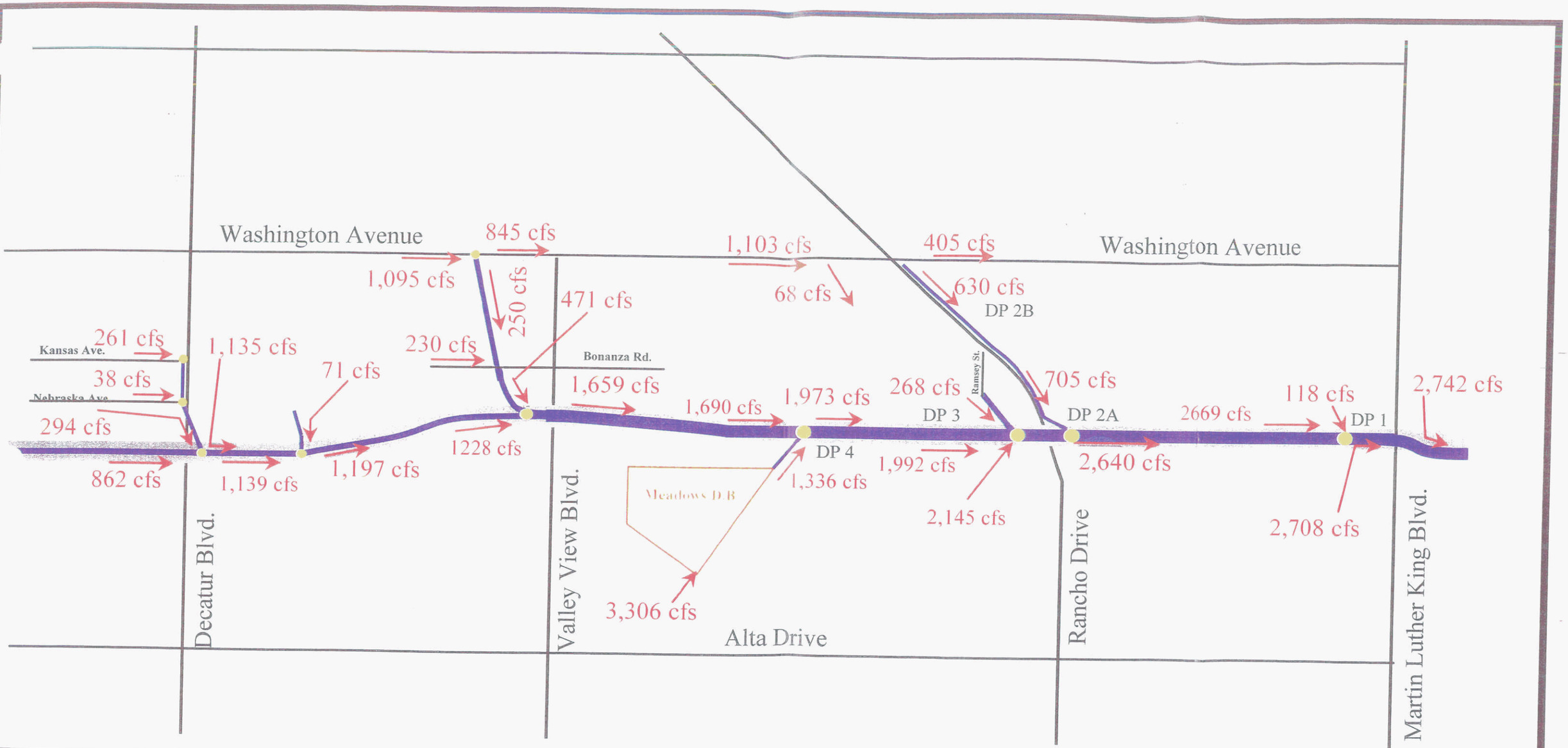

Figure 3
US 95 Widening - Design Flows

vtn nevada

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*    RUN DATE  08/21/2002  TIME  08:17:23 *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

*** FREE ***
                   *DIAGRAM
               1   ID
               2   ID    THIS MODEL WAS REVISED BY VTN NEVADA IN ASSOCIATION WITH THE NDOT US 95
               3   ID    WIDENING PROJECT AND APPLIES TO THE DESIGN OF THE US 95 LAS VEGAS CREEK
               4   ID    MAINLINE STORM DRAIN. THE HEC-1 MODEL FROM THE PRELIMINARY HYDRAULIC DESIGN
               5   ID    REPORT (30%), BY LOUIS BERGER & ASSOCIATES, APRIL 2000, WAS USED AS A BASIS
               6   ID    FOR THIS MODEL. THIS MODEL REPRESENTS A STORM CENTERED OVER THE ENTIRE
               7   ID    LAS VEGAS CREEK WATERSHED UPSTREAM OF MARTIN LUTHER KING BOULEVARD
               8   ID    INCLUDING THE MEADOWS DETENTION BASIN WATERSHED.
               9   ID    SDN 3 WAS USED FOR DESIGN POINTS WITH TRIBUTARY AREAS LESS THAN 8 SQ MILES.
              10   ID
              11   ID    REVISIONS TO THE LBA MODEL INCLUDE REVISED SUBBASIN AREAS, SUBBASIN ROUTING,
              12   ID    ADDITION OF ROUTING CARDS TO ROUTE SUBBASINS AND/OR DESIGN POINTS, UPDATED
              13   ID    MEADOWS DETENTION BASIN INFLOW/OUTFLOW DATA, AND UPDATED FLOW SPLIT
              14   ID    PARAMETERS AT WASHINGTON AND RANCHO
              15   ID
              16   ID    THE HEC-1 HYDROLOGY FOR THE MEADOWS DETENTION BASIN WAS
              17   ID    DEVELOPED BY CARTER AND BURGESS FOR THE OAKEY STORM SEWER.
              18   ID    REVISIONS TO THE MEADOWS DETENTION BASIN ARE INCORPORATED FROM THE MEADOWS
              19   ID    DETENTION BASIN EXPANSION PRELIMINARY DESIGN REPORT, BY VTN NEVADA,
              20   ID    MAY 2001 - OPTION 2B  -
              21   ID    VTN ALTERNATIVE FOR MAIN LINE, HOV COMBINES W/ NORTH RIGHT AFTER TUNNEL
              22   ID    THEN COMBINES WITH RAINBOW D.B. OUTFALL
              23   ID
              24   ID
              25   ID    INPUT FILE NAME 2BSDN3.DAT - AUGUST 2001 - REVISED PER DRAFT 30% COMMENTS
              26   ID    100 YEAR , 6 HOUR STORM (SDN #3) FUTURE CONDITION
              27   ID
              28   ID    ***THIS FILE HAS BEEN UPDATED FOR THE AUGUST 2002 OFFSITE DRAINAGE REPORT
              29   ID    UPDATE.  THE UPDATES INCLUDE MODIFICATIONS TO THE DETENTION BASIN PARAMETERS
              30   ID    AND SOME ROUTING/COMBINING REVISIONS TO REFLECT CURRENT DESIGN OF PROJECT 2C
              31   ID
              32   ID
              33   IT      5       0       0     300
              34   IN      5       0       0
              35   IO      5
              36   ID   AREA     0.0    0.5    1.0    2.0    4.0    6.0    8.0   (SQUARE MILES)
              37   JR    PREC     1.0    0.98   0.97   0.93   0.91   0.90   0.88
                   *
```

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

  38      KK   LC3A1
  39      KM   COMPUTE RUNOFF
  40      BA    .130
  41      PB    2.77
  42      PC    .000   0.020    .057    .070    .087    .108    .124    .130    .130    .130
  43      PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
  44      PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
  45      PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
  46      PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
  47      PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
  48      PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
  49      PC    .998    .999   1.00
  50      LS       0   92.0
  51      UD    .197
          *
  52      KK  LC3A1D
  53      KM   AT ANTELOPE WAY AND COBBLESTONE
  54      KM   DIVERT FLOW IN WEST SIDE OF ANTELOPE STREET CROWN (45 CFS)TO LC3B
  55      DT    3A1D
  56      DI       0      10      45     100     300    1000
  57      DQ       0      10      45      45      45      45
          *

  58      KK  LC3A1R
  59      KM   ROUTE LC3A1 IN ROAD TO LC3A2
  60      RK   01920    0.02   0.016  01.470    TRAP 002.000  50.000
          *

  61      KK   LC3A2
  62      KM   COMPUTE RUNOFF
  63      BA    .110
  64      LS       0   92.0
  65      UD    .217
          *

  66      KK    C3A2
  67      KM   COMBINE LC3A1 + LC3A2 AT RAINBOW SOUTH OF WESTCLIFF
  68      HC       2
          *

  69      KK   C3A2D
  70      KM   DIVERT FLOW IN EXCESS OF RAINBOW STREET CROWN CAPACITY(122 CFS)TO LC4
  71      DT     DES
  72      DI       0     122     300    1000
  73      DQ       0       0     178     878
          *

  74      KK  LC3A2R
  75      KM   ROUTE LC3A1 & LC3A2 IN RAINBOW TO CP1A
  76      RK   01040    0.02   0.016  01.470    TRAP 002.000  50.000
          *

  77      KK    3A1D
  78      KM   RETREIVE DIVERTED FLOWS IN ANTELOPE WAY
  79      DR    3A1D
          *

  80      KK   3A1DR
  81      KM   ROUTE 3A1D IN ANTELOPE AND WESTCLIFF TO LC3B
  82      RK   03200    0.02   0.016  01.470    TRAP 002.000  50.000
          *

  83      KK    LC3B
  84      KM   COMPUTE RUNOFF
  85      BA  .18750
  86      LS       0   92.3
  87      UD    .335
          *
```

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

  88      KK   CLC3B
  89      KM   COMBINE LC3B + 3A1D AT RAINBOW/WESTCLIFF INTERSECTION
  90      HC      2
          *

  91      KK   DLC3B
  92      KM   DIVERT FLOW IN EXCESS OF CAPACITY OF SOUTH SIDE OF WESTCLIFF CROWN (205 CFS)
  93      DT     DSS
  94      DI       0     205     400
  95      DQ       0       0     195
          *

  96      KKRAINWEST
  97      KM   COMBINE FLOW AT RAINBOW/WESTCLIFF INTERSECTION THAT CONTINUES IN WESTCLIFF
  98      HC      2
          *

  99      KK     DSS
 100      KM   RETREIVE DIVERTED FLOWS IN WESTCLIFF
 101      DR     DSS
          *

 102      KK      W5
 103      KM   COMPUTE RUNOFF (GCW=ADOPTED FROM G.C.WALLACE "US95 RAINBOW CURVE" HEC-1 MODL)
 104      BA  .07490
 105      LS       0    92.7
 106      UD    .234
          *

 107      KK     CW5
 108      KM   COMBINE FLOW NORTH OF RAINBOW/WESTCLIFF INTERSECTION
 109      HC      2
          *

 110      KK    CP1A
 111      KM   COMBINE LC3B + 3A1D + W5 AT RAINBOW/WESTCLIFF INTERSECTION
 112      HC      2
          *

 113      KK    R3AW
 114      KM   INFIELD DRAINAGE BASIN R3AW DRAINING TO PT5
 115      KM            AREA     .50 AC
 116      KM             LAG    .047
 117      KM              CN      98
 118      BA  .00078
 119      LS       0      98
 120      UD    .047
          *
```

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

  121     KK    R3AE
  122     KM   INFIELD DRAINAGE BASIN R3AE DRAINING TO PT5
  123     KM            AREA     .37 AC
  124     KM             LAG    .037
  125     KM              CN      98
  126     BA  .00058
  127     LS       0      98
  128     UD    .037
          *

  129     KK     PT5
  130     KM   COMBINE BASIN R3AE AND RA3W AT PT5
  131     KM   SUMP CONDITION ON RAMP R3A
  132     HC       2
          *

  133     KK     R6E
  134     KM   INFIELD DRAINAGE BASIN R6E DRAINING TO PT3
  135     KM            AREA    0.20 AC
  136     KM             LAG    .049 HR
  137     KM              CN      98
  138     BA  .00031
  139     LS       0      98
  140     UD    .049
          *

  141     KK     R6W
  142     KM   INFIELD DRAINAGE BASIN R6W DRAINING TO PT3
  143     KM            AREA    0.30 AC
  144     KM             LAG    .031
  145     KM              CN      98
  146     BA  .00047
  147     LS       0      98
  148     UD    .031
          *

  149     KK     PT3
  150     KM   COMBINE BASINS R6W AND R6E AT LOW POINT IN RAMP R6
  151     HC       2
          *

  152     KK   PIPE2
  153     KM   COMBINE PT5 AND PT3 IN PIPE
  154     HC       2
          *

  155     KK  PIPE2R
  156     KM   ROUTE IN PIPE 2 TO PIPE 3
  157     RK    0210     .01   0.013  00.720    CIRC     1.5  00.000
          *
```

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

  158     KK    R3BW
  159     KM   INFIELD DRAINAGE BASIN R3BW DRAINING TO PT6
  160     KM            AREA    1.25 AC
  161     KM             LAG    .054 HR
  162     KM              CN      95
  163     BA  .00195
  164     LS       0      95
  165     UD    .054
          *

  166     KK    R3BE
  167     KM   INFIELD DRAINAGE BASIN R3BE DRAINING TO PT6
  168     KM            AREA    1.53 AC
  169     KM             LAG    .043
  170     KM              CN      96
  171     BA  .00239
  172     LS       0      96
  173     UD    .043
          *

  174     KK     PT6
  175     KM   COMBINE BASINS R3BW AND RB3E AT PT6
  176     KM   SUMP CONDITION ON RAMP R3B
  177     HC       2
          *

  178     KK     R5E
  179     KM   INFIELD DRAINAGE BASI N R5E DRAINING TO PT4
  180     KM            AREA    0.73 AC
  181     KM             LAG    .045 HR
  182     KM              CN      98
  183     BA  .00114
  184     LS       0      98
  185     UD    .045
          *

  186     KK     R5W
  187     KM   INFIELD DRAINAGE BASIN R5W  DRAINING TO PT4
  188     KM            AREA    3.04 AC
  189     KM             LAG    .103
  190     KM              CN      98
  191     BA  .00475
  192     LS       0      98
  193     UD    .103
          *

  194     KK     PT4
  195     KM   COMBINE BASINS R5E AND R5W AT PT4
  196     KM   SUMP CONDITION ON RAMP R5
  197     HC       2
          *
```

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

  198     KK  PIPE1
  199     KM  COMBINE PT4 AND PT6
  200     HC       2
          *

  201     KK  PIPE1R
  202     KM  ROUTE IN PIPE 1 TO PIPE 3
  203     RK    0390     .01   0.013  00.720    CIRC     2.5  00.000
          *

  204     KK  PIPE3
  205     KM  COMBINE PIPE1 AND PIPE2
  206     HC       2
          *

  207     KK  PIPE3R
  208     KM  ROUTE IN PIPE 3 TO DETENTION BASIN
  209     RK    0250     .01   0.013  00.720    CIRC     3.0  00.000
          *

  210     KK   W6A1
  211     KM  OFFSITE BASIN W6A1 DRAINING INTO PROPOSED CHANNEL
  212     KM           AREA   50.24 AC
  213     KM            LAG    .195
  214     KM             CN      93.4
  215     BA  .0785
  216     LS       0    93.4
  217     UD    .195
          *

  218     KK   QHS1
  219     KM  OFFSITE BASIN QHS1 DRAINING INTO PROPOSED CHANNEL
  220     KM           AREA    2.17 AC
  221     KM            LAG    .152
  222     KM             CN      88
  223     BA  .00339
  224     LS       0      88
  225     UD    .152
          *

  226     KK  QHS1R
  227     KM  ROUTE QHS1 IN RIPRAP CHANNEL
  228     RK    0330    0.01   0.035  01.470    TRAP  12.000   2.000
          *

  229     KK  CHAN1
  230     KM  COMBINE BASINS W6A1 AND QHS1
  231     HC       2
          *
```

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

  232     KK  CHAN1R
  233     KM   ROUTE CHAN1 IN RIPRAP CHANNEL
  234     RK    0820    0.01   0.035  01.470    TRAP  12.000   3.000
          *

  235     KK    W6A2
  236     KM   OFFSITE BASIN W6A2 DRAINING INTO PROPOSED CHANNEL
  237     KM            AREA   25.60 AC
  238     KM             LAG    .132
  239     KM              CN      91
  240     BA  .04000
  241     LS       0      91
  242     UD    .132
          *

  243     KK   CHAN2
  244     KM   COMBINE BASIN W6A2 AND CHAN1
  245     HC       2
          *

  246     KK    DET
  247     KM   COMBINE CHANNEL AND PIPE FLOW INTO DETENTION BASIN
  248     HC       2
          *

  249     KK    DETR
  250     KM   ROUTE TO DETENTION BASIN
  251     RK    0570     .01   0.013  00.720    CIRC     5.0  00.000
          *

  252     KK    DET
  253     KM   COMBINE SD FLOWS FROM CP1 AND DET (GCW)
  254     HC       2
          *

  255     KK    DES
  256     KM   RETREIVE DIVERTED FLOWS FROM RAINBOW
  257     DR    DES
          *

  258     KK    DESR
  259     KM   ROUTE DIVERTED FLOW THROUGH LC4B
  260     RK   01575    0.02   0.016  01.470    TRAP 002.000  50.000
          *

  261     KK    LC4B
  262     KM   COMPUTE RUNOFF
  263     BA  .03640
  264     LS       0    90.6
  265     UD    .159
          *
```

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

  266     KK   CLC4B
  267     KM   COMBINE SD FLOWS FROM DES AND LC4B IN LORENZI
  268     HC       2
          *

  269     KK      C5
  270     KM   COMBINE SD FLOWS FROM DET AND LC4B AT C5
  271     HC       2
          *

  272     KK    RNDT
  273     KM   DETENTION BASIN OUTFLOW MODELED AS BASIN - SPILLWAY ELEVATION = 729
  274     KM   EAST SIDE INVERT ELEVATION = 718.0  WEST SIDE INVERT ELEVATION = 723.0
  275     KM   DETENTION BASIN WITH REVISED PBS&J GEOMETRY - ORIFICE DIAMETER = 24 INCHES
  276     KM   elevations = 718, 719, 719.5, 720.5, 721, 722, 722.5, 723.5, 724, 724.5,
  277     KM                725, 725.5, 726, 726.5, 727, 727.5, 728, 728.5, 729, 730.5,
  278     RS       1     STO       0
  279     SV    0.00    1.58    2.77    5.48    6.99   10.73   12.99   18.27   21.30   25.16
  280     SV   29.01   33.68   38.35   43.96   49.57   56.51   63.45   71.71   79.97  104.03
  281     SE 2355.64 2358.92 2360.56 2363.85  2365.5 2368.77 2370.41 2373.69 2375.33 2376.97
  282     SE 2378.61 2380.25  2381.9 2383.53 2385.17 2386.81 2388.45 2390.09 2391.73 2396.65
  283     SQ    0.00   24.75   32.45   43.98   48.73   57.06   60.79   67.65   70.83   73.88
  284     SQ   76.80   79.62   82.34   84.97   87.52   90.00   92.42   94.77   97.07 3000.00
          *

  285     KK     QS4
  286     KM   INFIELD DRAINAGE BASIN QS4
  287     KM             AREA    3.26 AC
  288     KM              LAG    .089 HR
  289     KM               CN      98
  290     BA  .00453
  291     LS       0       98
  292     UD    .089
          *

  293     KK    QS4R
  294     KM   ROUTE IN LATERAL TO PTS
  295     RK    D250     .01   0.013  00.720    CIRC     4.0  00.000
          *

  296     KK     QS5
  297     KM   INFIELD DRAINAGE BASIN QS5
  298     KM             AREA    2.37 AC
  299     KM              LAG    .079 HR
  300     KM               CN      98
  301     BA  .00370
  302     LS       0       98
  303     UD    .079
          *
```

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

  304     KK     PTS
  305     KM   COMBINE BASINS QS4 AND QS5 AT LOWPOINT IN US95 SOUTHBOUND LANE
  306     HC       2
          *

  307     KK    PTS2
  308     KM   COMBINE RAINBOW D.B. OUTFALL AND PTS
  309     HC       2
          *

  310     KK     R7W
  311     KM   INFIELD DRAINAGE BASIN R7W
  312     KM             AREA     .47 AC
  313     KM              LAG    .026 HR
  314     KM               CN      96
  315     BA  .00073
  316     LS       0       96
  317     UD    .026
          *

  318     KK     R7E
  319     KM   INFIELD DRAINAGE BASIN R7E
  320     KM             AREA    1.34 AC
  321     KM              LAG    .036 HR
  322     KM               CN      92
  323     BA  .00209
  324     LS       0       92
  325     UD    .036
          *

  326     KK     PT8
  327     KM   COMBINE BASINS R7W AND R7E AT LOWPOINT IN RAMP R7
  328     HC       2
          *

  329     KK    PTBR
  330     KM   ROUTE IN LATERAL TO PIPE 5
  331     RK    0345     .01   0.013  00.720    CIRC     2.0  00.000
          *

  332     KK     R9E
  333     KM   INFIELD DRAINAGE BASIN R9E
  334     KM             AREA    1.64 AC
  335     KM              LAG    .059 HR
  336     KM               CN      92
  337     BA  .00256
  338     LS       0       92
  339     UD    .059
          *
```

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

  340     KK     R9W
  341     KM   INFIELD DRAINAGE BASIN R9W
  342     KM             AREA    1.55 AC
  343     KM              LAG    .046 HR
  344     KM               CN      98
  345     BA  .00242
  346     LS       0       98
  347     UD    .046
          *

  348     KK     PT7
  349     KM   COMBINE BASIN R9E AND R9W AT LOWPOINT IN RAMP R9
  350     HC       2
          *

  351     KK   PIPE5
  352     KM   COMBINE PT7 AND PT8
  353     HC       2
          *

  354     KK  PIPE5R
  355     KM   ROUTE IN PIPE 5 TO PIPE 6
  356     RK    0260     .01   0.013  00.720    CIRC     3.0  00.000
          *

  357     KK    QHS2
  358     KM   INFIELD DRAINAGE BASIN QHS2
  359     KM             AREA    1.21 AC
  360     KM              LAG    .118 HR
  361     KM               CN      88
  362     BA  .00189
  363     LS       0       88
  364     UD    .118
          *

  365     KK   PIPE6
  366     KM   COMBINE PIPE5 AND BASIN QHS2
  367     HC       2
          *

  368     KK    QHN1
  369     KM   INFIELD DRAINAGE BASIN QHN1
  370     KM             AREA    2.89 AC
  371     KM              LAG    .142 HR
  372     KM               CN      90
  373     BA  .00452
  374     LS       0       90
  375     UD    .142
          *
```

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

  376     KK   QHN1R
  377     KM   ROUTE QHN1 IN DITCH
  378     RK    0200    0.01   0.025  01.470    TRAP   1.000   4.000
          *

  379     KK    QHN2
  380     KM   INFIELD DRAINAGE BASIN QHN2
  381     KM            AREA    0.46 AC
  382     KM             LAG     .05 HR MINIMUM TLAG = 5 MINUTES
  383     KM              CN      88
  384     BA  .00072
  385     LS       0      88
  386     UD     .05
          *

  387     KK    PT1A
  388     KM   COMBINE QHN1 AND QHN2 AT PT1A
  389     KM   SUMP CONDITION IN NORTHBOUND SWALE
  390     HC       2
          *

  391     KK   PIPE7
  392     KM   COMBINE PT1A AND PIPE6
  393     HC       2
          *

  394     KK  PIPE7R
  395     KM   ROUTE IN PIPE 7 TO PIPE 8
  396     RK    0390    .015   0.013  00.720    CIRC     3.5  00.000
          *

  397     KK    QHN3
  398     KM   INFIELD DRAINAGE BASIN QHN3
  399     KM            AREA    2.61 AC
  400     KM             LAG    .156 HR
  401     KM              CN      98
  402     BA  .00408
  403     LS       0      98
  404     UD    .156
          *

  405     KK    QHN4
  406     KM   INFIELD DRAINAGE BASIN QHN4
  407     KM            AREA    1.08 AC
  408     KM             LAG    .077 HR
  409     KM              CN      98
  410     BA  .00169
  411     LS       0      98
  412     UD    .077
          *
```

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

  413     KK     PT1
  414     KM   COMBINE HOV SURFACE FLOWS AT LOWPOINT IN TUNNEL
  415     HC       2
          *

  416     KK    QHS3
  417     KM   INFIELD DRAINAGE BASIN QHS3
  418     KM            AREA    2.61 AC
  419     KM             LAG    .156 HR
  420     KM              CN      98
  421     BA  .00408
  422     LS       0      98
  423     UD    .156
          *

  424     KK    QHS4
  425     KM   INFIELD DRAINAGE BASIN QHS4
  426     KM            AREA    1.10 AC
  427     KM             LAG    .084 HR
  428     KM              CN      98
  429     BA  .00172
  430     LS       0      98
  431     UD    .084
          *

  432     KK     PT2
  433     KM   COMBINE SURFACE FLOWS IN SOUTHBOUND TUNNEL
  434     KM   SUMP CONDITION IN SOUTHBOUND HOV LANE
  435     HC       2
          *

  436     KK   PIPE8
  437     KM   TOTAL PIPE FLOW AT LOWPOINT IN TUNNEL
  438     HC       3
          *

  439     KK  PIPE8R
  440     KM   ROUTE IN PIPE 8 TO PIPE 9
  441     RK    0400   .0048   0.013  00.720    CIRC     4.0  00.000
          *

  442     KK     QS1
  443     KM   INFIELD DRAINAGE BASIN QS1
  444     KM   DRAINS FROM RAMP R8 WEST THEN BACK EAST TO CULVERT AND INTO BASIN QS3
  445     KM            AREA    2.26 AC
  446     KM             LAG    .155 HR
  447     KM              CN      94
  448     BA  .00353
  449     LS       0      94
  450     UD    .155
          *
```

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

  451     KK    QS1R
  452     KM   ROUTE QS1 IN DITCH
  453     RK    0620    0.01   0.025  01.470    TRAP   1.000   4.000
          *

  454     KK     QS2
  455     KM   INFIELD DRAINAGE BASIN QS2
  456     KM   DRAINS RAMP6 NORTH INTO BASIN QS3 (US 95 SOUTHBOUND)
  457     KM            AREA    1.40 AC
  458     KM             LAG    .070 HR
  459     KM              CN      94
  460     BA  .00219
  461     LS       0      94
  462     UD    .070
          *

  463     KK    QS2R
  464     KM   ROUTE QS2 IN DITCH
  465     RK    0300    0.01   0.025  01.470    TRAP   1.000   4.000
          *

  466     KK     QS3
  467     KM   INFIELD DRAINAGE BASIN QS3
  468     KM   DRAINS SWALE ALONG US 95 SOUTH
  469     KM            AREA    2.39 AC
  470     KM             LAG    .145 HR
  471     KM              CN      88
  472     BA  .00373
  473     LS       0      88
  474     UD    .145
          *

  475     KK    PT13
  476     KM   COMBINE FLOWS FROM NORTH IN US 95 SOUTHBOUND SWALE
  477     HC       3
          *

  478     KK     R7N
  479     KM   INFIELD DRAINAGE BASIN R7N
  480     KM   DRAINS RAMP R7 TO LOWPOINT PT10
  481     KM            AREA    0.98 AC
  482     KM             LAG    .076 HR
  483     KM              CN      98
  484     BA  .00153
  485     LS       0      98
  486     UD    .076
          *

  487     KK     R7S
  488     KM   INFIELD DRAINAGE BASIN R7S
  489     KM   DRAINS RAMP R7 TO LOWPOINT PT10
  490     KM            AREA     .52 AC
  491     KM             LAG    .035 HR
  492     KM              CN      98
```

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

  493     BA  .00081
  494     LS       0      98
  495     UD    .035
          *

  496     KK    PT10
  497     KM   COMBINE BASINS R7N AND R7S AT LOWPOINT
  498     HC       2
          *

  499     KK     R2N
  500     KM   INFIELD DRAINAGE BASIN R2N
  501     KM   DRAINS RAMP R2 TO LOWPOINT PT11
  502     KM             AREA    1.13 AC
  503     KM              LAG    .060 HR
  504     KM               CN      97
  505     BA  .00177
  506     LS       0      97
  507     UD    .060
          *

  508     KK     R2S
  509     KM   INFIELD DRAINAGE BASIN R2S
  510     KM   DRAINS RAMP R2 TO LOWPOINT PT11
  511     KM             AREA    2.06 AC
  512     KM              LAG    .064 HR
  513     KM               CN      96
  514     BA  .00322
  515     LS       0      96
  516     UD    .064
          *

  517     KK    PT11
  518     KM   COMBINE BASINS R2S AND R2N AT LOWPOINT
  519     HC       2
          *

  520     KK  PIPE11
  521     KM   COMBINE PT11 AND PT10
  522     HC       2
          *

  523     KK PIPE11R
  524     KM   ROUTE IN PIPE 11 TO PIPE 12
  525     RK    0290     .01   0.013  00.720    CIRC     2.0  00.000
          *

  526     KK     QN1
  527     KM   INFIELD DRAINAGE BASIN QN1
  528     KM   DRAINS US95 NORTHBOUND TO LOWPOINT 95N
  529     KM             AREA    3.39 AC
  530     KM              LAG    .093 HR
  531     KM               CN      95
  532     BA  .00530
  533     LS       0      95
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  534     UD    .093
          *
  535     KK  PIPE12
  536     KM   COMBINE PIPE11 AND BASIN QN1
  537     HC       2
          *
  538     KK  PIPE13
  539     KM   COMBINE PIPE12 AND PT13
  540     HC       2
          *
  541     KK PIPE13R
  542     KM   ROUTE IN PIPE 13 TO PIPE 14
  543     RK    0540    .017   0.013  00.720    CIRC     2.5  00.000
          *
  544     KK    QMED
  545     KM   INFIELD DRAINAGE BASIN QMED
  546     KM   MEDIAN AREA NORTH OF HOV TUNNEL LANES
  547     KM             AREA      .26 AC
  548     KM              LAG     .094 HR
  549     KM               CN       98
  550     BA  .00102
  551     LS       0       98
  552     UD    .094
          *
  553     KK  PIPE14
  554     KM   COMBINE QMED AND PIPE13
  555     HC       2
          *
  556     KK PIPE14R
  557     KM   ROUTE IN PIPE 14 TO PIPE 15
  558     RK    0310   .0118   0.013  00.720    CIRC     2.5  00.000
          *
  559     KK     QN3
  560     KM   INFIELD DRAINAGE BASIN QN3
  561     KM   DRAINS FLYOVER ONTO BASIN QN2 VIA SD
  562     KM             AREA      .86 AC
  563     KM              LAG     .051 HR
  564     KM               CN       98
  565     BA  .00134
  566     LS       0       98
  567     UD    .051
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  568     KK     QN2
  569     KM   INFIELD DRAINAGE BASIN QN2
  570     KM   DRAINS US95 NORTHBOUND TO LOWPOINT 95N
  571     KM             AREA    1.74 AC
  572     KM              LAG    .055 HR
  573     KM               CN      94
  574     BA   .0035
  575     LS       0       94
  576     UD    .055
          *

  577     KK     QN4
  578     KM   INFIELD DRAINAGE BASIN QN4
  579     KM   DRAINS US95 NORTHBOUND TO LOWPOINT 95N
  580     KM             AREA    1.62 AC
  581     KM              LAG    .114 HR
  582     KM               CN      96
  583     BA  .00253
  584     LS       0       96
  585     UD    .114
          *

  586     KK     PTN
  587     KM   COMBINE FLOWS AT LOWPOINT 95N (US 95 NORTHBOUND LANE)
  588     HC       3
          *

  589     KK  PIPE15
  590     KM   COMBINE PIPE14 AND PTN
  591     HC       2
          *

  592     KK     HOV
  593     KM   COMBINE NORTH AND HOV (GCW)
  594     HC       2
          *

  595     KK PIPE15R
  596     KM   ROUTE IN PIPE 15 TO PIPE 16
  597     RK    0410   .0118   0.013  00.720    CIRC     3.0  00.000
          *

  598     KK   NORTH
  599     KM   COMBINE NORTH SYSTEM WITH HOV AND RAINBOW D.B. OUTFALL
  600     HC       2
          *

  601     KK     QS6
  602     KM   INFIELD DRAINAGE BASIN QS6
  603     KM             AREA    2.55 AC
  604     KM              LAG    .077 HR
  605     KM               CN      93
  606     BA  .00398
  607     LS       0       93
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  608     UD    .077
          *
  609     KK     QS6R
  610     KM    ROUTE IN LATERAL TO PIPE 16
  611     RK     0550     .01   0.013  00.720    CIRC     2.0  00.000
          *
  612     KK       R1
  613     KM    INFIELD DRAINAGE BASIN R1
  614     KM    DRAINS RAMP R1 TO LOWPOINT
  615     KM              AREA    2.29 AC
  616     KM               LAG    .069 HR
  617     KM                CN      98
  618     BA  .00358
  619     LS       0        98
  620     UD    .069
          *
  621     KK  PIPE16
  622     KM    COMBINE BASIN QS6 AND BASIN R1 WITH MAIN LINE
  623     HC       3
          *
  624     KK       N1
  625     KM    INFIELD DRAINAGE BASIN N1
  626     KM    DRAINS BASIN N1 TO EXISTING INLET
  627     KM              AREA    1.62 AC
  628     KM               LAG    .072 HR
  629     KM                CN      88
  630     BA  .00253
  631     LS       0        88
  632     UD    .072
          *
  633     KK  PIPE17
  634     KM    COMBINE (MAIN LINE) PIPE16 AND BASIN N1
  635     HC       2
          *
  636     KK       N3
  637     KM    DRAINAGE BASIN N3
  638     KM    DRAINS BASIN N3 TO PIPE 18
  639     KM              AREA    2.62 AC
  640     KM               LAG    .11 HR
  641     KM                CN      98
  642     BA    .004
  643     LS       0        98
  644     UD     .11
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  645     KK  PIPE18
  646     KM   COMBINE (MAIN LINE)PIPE17 AND BASIN N3
  647     HC       2
          *

  648     KK PIPE18R
  649     KM   ROUTE IN PIPE 16 TO PIPE 19
  650     RK    1455   .0118   0.013  00.720    CIRC     3.0  00.000
          *

  651     KK      N2
  652     KM   DRAINAGE BASIN N2
  653     KM   DRAINS BASIN N2 TO PIPE 19
  654     KM             AREA    1.53 AC
  655     KM              LAG    .13 HR
  656     KM               CN      98
  657     BA   .0024
  658     LS       0      98
  659     UD     .13
          *

  660     KK  PIPE19
  661     KM   COMBINE PIPE18 AND BASIN N2
  662     HC       2
          *

  663     KK PIPE19R
  664     KM   ROUTE RAINBOW DETENTION FLOWS + GCW TO JONES - CP11 $
  665     RK   04700  .01343   0.013  00.720    CIRC  0004.5  00.000
          *

  666     KK     95A
  667     KM   COMPUTE RUNOFF
  668     BA  .04897
  669     LS       0    95.3
  670     UD    .274
          *

  671     KK    CP8A
  672     KM   COMBINE DETENTION FLOWS + 95A AT JONES BOULEVARD UNDERPASS
  673     HC       2
          *

  674     KK     WA2
  675     KM   COMPUTE RUNOFF
  676     BA  .21528
  677     LS       0    92.2
  678     UD    .350
          *
```

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

  679     KK     CP9
  680     KM   COMBINE WA2 WITH CP8A AT JONES BOULEVARD UNDERPASS
  681     HC       2
          *

  682     KK     AL1
  683     KM   COMPUTE RUNOFF
  684     BA     .35
  685     LS       0    89.7
  686     UD    .318
          *

  687     KK    AL1R
  688     KM   ROUTE IN AL1 IN JONES SYSTEM FROM ELTON TO CP11
  689     RK    0900     .01   0.013  00.720    CIRC     5.0  00.000
          *

  690     KK    CP11
  691     KM   COMBINE CP9 AND AL1 AT JONES BOULEVARD UNDERPASS
  692     HC       2
          *

  693     KK   CP11R
  694     KM   ROUTE CP11 FROM JONES BOULEVARD TO EAST OF HIGH SCHOOL
  695     RK    1000 0.01927   0.013  01.470    TRAP 007.000  00.000
          *

  696     KK   LC12A
  697     KM   COMPUTE RUNOFF
  698     KM   COMMERCIAL CENTER
  699     BA  .01990
  700     LS       0    95.0
  701     UD    .115
          *

  702     KK    95B1
  703     KM   COMPUTE RUNOFF
  704     BA   .0103
  705     LS       0    97.6
  706     UD    .076
          *

  707     KK  CP11AA
  708     KM   COMBINE CP11, 95B1, AND LC12A 900' EAST OF JONES BOULEVARD UNDERPASS
  709     HC       3
          *

  710     KK CP11AAR
  711     KM   ROUTE CP11AA FROM JONES BOULEVARD TO INLETS AT REESE AND CHASON ST.
  712     RK    2000  0.0103   0.013  01.470    TRAP 007.000  00.000
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  713     KK   LC12D
  714     KM   COMPUTE RUNOFF
  715     BA  .00440
  716     LS       0    92.0
  717     UD    .095
          *

  718     KK   LC12C
  719     KM   COMPUTE RUNOFF
  720     BA  .00190
  721     LS       0    92.0
  722     UD    .058
          *

  723     KK    95B2
  724     KM   COMPUTE RUNOFF
  725     BA   .0116
  726     LS       0    97.6
  727     UD    .101
          *

  728     KK CP11AA2
  729     KM   COMBINE CP11AA, 95B2, LC12D, AND LC12D AT REESE ST. AND CHASON ST.
  730     HC       4
          *

  731     KKCP11AA2R
  732     KM   ROUTE CP11AA2 FROM CHASON TO DECATUR
  733     RK    2715   0.025   0.013  01.470    TRAP  07.000  00.000
          *

  734     KK    95B3
  735     KM   COMPUTE RUNOFF
  736     BA   .0320
  737     LS       0    97.6
  738     UD    .175
          *

  739     KK   CP11A
  740     KM   COMBINE 95B3 + CP11AA2 AT DECATUR BOULEVARD
  741     HC       2
          *

  742     KK    LC11
  743     KM   COMPUTE RUNOFF
  744     BA  .22231
  745     LS       0    92.0
  746     UD    .305
          *
```

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

  747     KK   LC11R
  748     KM   ROUTE LC11 IN DECATUR SYSTEM FROM KANSAS TO NEBRASKA
  749     RK    0485     .01   0.013  00.720    CIRC     6.0  00.000
          *

  750     KK   LC12B
  751     KM   COMPUTE RUNOFF
  752     BA  .02810
  753     LS       0    92.0
  754     UD    .214
          *

  755     KK   CP11C
  756     KM   COMBINE LC12B + LC11 ON DECATUR BOULEVARD AT NEBRASKA
  757     HC       2
          *

  758     KK  CP11CR
  759     KM   ROUTE IN DECATUR SYSTEM FROM NEBRASKA TO MAIN LINE
  760     RK    0475     .01   0.013  00.720    CIRC     6.0  00.000
          *

  761     KK    CP12
  762     KM   COMBINE CP11C WITH MAIN LINE AT DECATUR
  763     HC       2
          *

  764     KK   CP12R
  765     KM   ROUTE FLOWS FROM DECATUR BOULEVARD TO VALLEY VIEW BOULEVARD (CP12 TO CP13A)
  766     RK   01350 0.01282   0.013  01.840    TRAP 012.000  00.000
          *

  767     KK    LC14
  768     KM   COMPUTE RUNOFF
  769     BA  .05053
  770     LS       0    90.1
  771     UD    .173
          *

  772     KK    95C1
  773     KM   COMPUTE RUNOFF
  774     BA   .0224
  775     LS       0    92.2
  776     UD    .126
          *

  777     KK   CP13A
  778     KM   COMBINE 95C1 + CP13R + LC14 AT EASTERN EDGE OF HIGH SCHOOL
  779     HC       3
          *
```

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

  780     KK  CP13AR
  781     KM   ROUTE FLOWS TO VALLEY VIEW BOULEVARD (CP13A TO CP13B)
  782     RK   02784 0.01282   0.013  01.840    TRAP 012.000  00.000
          *

  783     KK    95C2
  784     KM   COMPUTE RUNOFF
  785     BA   .0387
  786     LS       0    92.2
  787     UD    .204
          *

  788     KK   CP13B
  789     KM   COMBINE CP13A + 95C AT VALLEY VIEW BOULEVARD
  790     HC       2
          *

  791     KK    OG11
  792     KM   COMPUTE RUNOFF
  793     BA  .10200
  794     LS       0    90.3
  795     UD    .138
          *

  796     KK    DIV1
  797     KM   DIVERT FLOWS NORTH TO VEGAS DRIVE SYSTEM
  798     KM   REMAINING FLOW (45 CFS) CROSSES US 95 IN 30-INCH SD
  799     DT   OG11D
  800     DI       0      45     150
  801     DQ       0       0     105
          *

  802     KK    WRT1
  803     KM   ROUTE SD FLOW TO RAINBOW BOULEVARD
  804     RK     750    .017    .016       0    TRAP       2      50
          *

  805     KK   VG011
  806     KM   COMPUTE RUNOFF
  807     BA   .0131
  808     LS       0    95.0
  809     UD    .125
          *

  810     KK    WCPR
  811     KM   COMBINE VG011 + WRT1 AT RAINBOW BOULEVARD AND WASHINGTON AVENUE
  812     HC       2
          *
```

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

  813     KK   WRT1A
  814     KM   ROUTE FLOWS TO TORREY PINES DRIVE
  815     RK    2550    .018    .016       0    TRAP       2      50
          *

  816     KK    WA01
  817     KM   COMPUTE RUNOFF
  818     BA   .0760
  819     LS       0    91.9
  820     UD    .197
          *

  821     KK    WA03
  822     KM   COMPUTE RUNOFF
  823     BA  .10250
  824     LS       0    92.5
  825     UD    .168
          *

  826     KK    WCP1
  827     KM   COMBINE WRT1A + WA01 + WA03 AT TORREY PINES DRIVE
  828     HC       3
          *

  829     KK    WRT2
  830     KM   ROUTE COMBINE FLOWS(WCP1) FROM TORREY PINES DRIVE TO JONES BOULEVARD (WA04)
  831     RK    2550    .018    .016       0    TRAP       2      50
          *

  832     KK    WA04
  833     KM   COMPUTE RUNOFF
  834     BA  .09970
  835     LS       0    91.9
  836     UD    .225
          *

  837     KK    WCP2
  838     KM   COMBINE ROUTED FLOWS(WRT2) WITH WA04 AT JONES BOULEVARD
  839     HC       2
          *

  840     KK    WRT3
  841     KM   ROUTE COMBINE FLOWS(WCP2) TO MICHEAL WAY (WA06)
  842     RK    2450    .014    .016       0    TRAP       2      50
          *

  843     KK    WA06
  844     KM   COMPUTE RUNOFF
  845     BA  .07370
  846     LS       0    92.3
  847     UD    .233
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

848       KK    WCP3
849       KM   COMBINE ROUTED FLOWS(WRT3) WITH WA06 AT MICHEAL WAY
850       HC       2
          *
851       KK    WRT4
852       KM   ROUTE COMBINE FLOWS(WCP3) FROM MICHEAL WAY TO DECATUR BOULEVARD(WA07)
853       RK    2450    .019    .016       0    TRAP       2      50
          *
854       KK    WA07
855       KM   COMPUTE RUNOFF
856       BA  .04780
857       LS       0    92.0
858       UD    .161
          *
859       KK    WCP4
860       KM   COMBINE ROUTED FLOWS(WRT4) WITH WA07 AT DECATUR BOULEVARD
861       HC       2
          *
862       KK    WRT5
863       KM   ROUTE COMBINE FLOWS(WCP4) 2600 FEET EAST OF DECATUR BOULEVARD(WA09)
864       RK    2600    .011    .016       0    TRAP       2      50
          *
865       KK    WA09
866       KM   COMPUTE RUNOFF
867       BA  .05430
868       LS       0    92.8
869       UD    .221
          *
870       KK    WCP5
871       KM   COMBINE ROUTED FLOWS(WRT5) WITH WA09 2600 FEET EAST OF DECATUR BOULEVARD
872       HC       2
          *
873       KK    WRT6
874       KM   ROUTE COMBINE FLOWS(WCP5) 700 FEET EAST VALLEY VIEW BOULEVARD(WA12)
875       RK    1850    .017    .016       0    TRAP       2      50
          *
876       KK     WA8
877       KM   COMPUTE RUNOFF
878       BA  .20500
879       LS       0    90.5
880       UD    .231
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

881       KK   R/WA8
882       KM   ROUTE WA5 THROUGH WA10 TO LCLT CHANNEL CROSSING WASHINGTON BOULEVARD
883       RK    4050    .006    .025       0    TRAP      12       20
          *
884       KK    WA10
885       KM   COMPUTE RUNOFF
886       BA  .19869
887       LS       0      86
888       UD    .280
          *
889       KK    CP14
890       KM   COMBINE R/WA5 + WA10 + WCP5 AT 8'X4' RCB CROSSING WASHINGTON
891       HC       3
          *
892       KK   WA10D
893       KM   250 CFS CHANNEL CAPACITY IN 8'X4' RCB DIVERT OVERFLOW TO WASHINGTON SYSTEM (S
894       DT   WA10W
895       DI       0      10     250     275     300     800    1000    3000
896       DQ       0       0       0      25      50     550     750    2750
          *
897       KK  R/CP14
898       KM   ROUTE CP14 IN LCLT CHANNEL TO CHANNEL TERMINUS AT CP15
899       RK    1400    .004    .013       0    TRAP      12        2
          *
900       KK    LC13
901       KM   COMPUTE RUNOFF
902       BA  .16960
903       LS       0    92.6
904       UD    .230
          *
905       KK    CP15
906       KM   COMBINE R/CP14 + LC13 AT CP15 LOW POINT/CHANNEL TERMINUS
907       HC       2
          *
908       KK   CP15A
909       KM   COMBINE CP15 + CP13A AT VALLEY VIEW BOULEVARD
910       HC       2
          *
911       KK  CP15AR
912       KM   ROUTE CP15A IN MAIN CHANNEL TO MEADOWS OUTFALL
913       RK    3600   .0122    .013       0    TRAP    24.0      0.0
          *
          *   BEGIN MEADOWS DETENTION BASIN TRIBUTARY AREA FROM CARTER & BURGESS
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  914     KK  1-GOLF
  915     KM   SOUTH
  916     BA    0.11
  917     LS       0      85
  918     UD    0.47
          *

  919     KK1-GOLF-RT
  920     KM  ROUTE THRU 1-OB TO NODE B
  921     RK    2640   0.015   0.013       0    CIRC       3
          *

  922     KK    1-OB
  923     KM  DURANGO TO CIMARRON HYDROGRAPH CONC. @ NODE B
  924     BA   0.066
  925     LS       0      86
  926     UD    0.27
          *

  927     KK    1-VO
  928     KM  DURANGO TO CIMARRON HYDROGRAPH CONC. @ NODE A
  929     BA   0.077
  930     LS       0      91
  931     UD    0.25
          *

  932     KK    NODE
  933     KM  ROUTE ON CIMARRON TO O'BANNON (NODE B)
  934     RK     680   0.004   0.013       0    CIRC       2
          *

  935     KK  NODE-B
  936     KM  COMBINE AT CIMARRON & O'BANNON
  937     HC       3
          *

  938     KKNODE-B-RT
  939     KM  ROUTE TO WARBONNET & O'BANNON (NODE AK)
  940     RK    1320   0.015   0.013       0    CIRC       3
          *

  941     KK  2a-ELP
  942     KM  CIMARRON TO WARBONNET HYDROGRAPH CONC. @ NODE AJ
  943     BA   0.065
  944     LS       0      88
  945     UD    0.19
          *

  946     KK    NODE
  947     KM  ROUTE TO O'BANNON & WARBONNET (NODE AK)
  948     RK     660   0.004   0.013       0    CIRC       4
          *
```

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

  949     KK NODE-AK
  950     KM  COMBINE AT WARBONNET AND O'BANNON
  951     HC       2
          *
  952     KK    NODE
  953     KM  ROUTE TO BUFFALO AND O'BANNON (NODE M)
  954     RK    1300   0.015   0.013       0    CIRC       3
          *
  955     KK    2-OB
  956     KM  CIMARRON TO BUFFALO HYDROGRAPH CONC. @ NODE M
  957     BA   0.078
  958     LS       0      86
  959     UD    0.27
          *
  960     KK  2a-OAK
  961     KM  CIMARRON TO BUFFALO CONC. @ NODE K
  962     BA    0.05
  963     LS       0      86
  964     UD     0.2
          *
  965     KK    NODE
  966     KM  KM  ROUTE TO BUFFALO AND EL PARQUE (NODE L)
  967     RK     700   0.004   0.013       0    CIRC       3
          *
  968     KK  2b-ELP
  969     KM  ROUTE TO BUFFALO AND EL PARQUE (NODE L)
  970     BA    0.05
  971     LS       0      86
  972     UD    0.16
          *
  973     KK  NODE-L
  974     KM  COMBINE AT BUFFALO AND EL PARQUE
  975     HC       2
          *
  976     KK    L-RT
  977     KM  ROUTE TO O'BANNON & BUFFALO (NODE M)
  978     RK     700   0.004   0.015       0    CIRC       5
          *
  979     KK  NODE-M
  980     KM  COMBINE AT BUFFALO & O'BANNON
  981     HC       3
          *
```

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

 982      KKNODE-M-RT
 983      KM  ROUTE TO VIA OLIVERA AND BUFFALO (NODE N)
 984      RK     700   0.004   0.013       0    CIRC       5
          *

 985      KK    2-VO
 986      KM  CIMARRON TO BUFFALO HYDROGRAPH CONC. @ NODE N
 987      BA   0.065
 988      LS       0      88
 989      UD    0.26
          *

 990      KK  NODE-N
 991      KM  COMBINE AT BUFFALO & VIA OLIVERA
 992      HC       2
          *

 993      KK    N-RT
 994      KM  ROUTE TO TENAYA ON VIA OLIVERA (NODE O)
 995      RK    2700   0.015   0.013       0    CIRC       4
          *

 996      KK    3-VO
 997      KM  BUFFALO TO TENAYA HYDROGRAPH CONC. @ NODE O
 998      BA   0.069
 999      LS       0      88
1000      UD    0.26
          *

1001      KK   3-ELP
1002      KM  BUFFALO TO TENAYA HYDROGRAPH CONC. @ NODE Q
1003      BA   0.066
1004      LS       0      86
1005      UD    0.27
          *

1006      KK    Q-RT
1007      KM  ROUTE TO O'BANNON AND TENAYA (NODE P)
1008      RK     700   0.004   0.013       0    CIRC       2
          *

1009      KK    3-OB
1010      KM  BUFFALO TO TENAYA HYDROGRAPH CONC. @ NODE P
1011      BA    0.07
1012      LS       0      86
1013      UD    0.31
          *

1014      KK  NODE-P
1015      KM  COMBINE AT O'BANNON AND TENAYA
1016      HC       2
          *
```

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

1017      KK    NODE    P-RT
1018      KM  ROUTE TO VIA OLIVERA ON TENAYA (NODE O)
1019      RK     700   0.004   0.013       0    CIRC       2
          *

1020      KK  NODE-O
1021      KM  COMBINE AT TENAYA & VIA OLIVERA
1022      HC       3
          *

1023      KK    O-RT
1024      KM  ROUTE TO ROSANNA ON VIA OLIVERA (NODE AE)
1025      RK    1360   0.015   0.013       0    CIRC       4
          * Saharaoffsite drainage  areas     per     ESI   study
          *

1026      KK   4a-VO
1027      KM  TENAYA TO ROSANNA HYDROGRAPH CONC. @ NODE AF
1028      BA   0.047
1029      LS       0      88
1030      UD    0.23
          *

1031      KK NODE-AF
1032      KM  COMBINE AT NODE AF
1033      HC       2
          *

1034      KK   AF-RT
1035      KM  ROUTE TO ROSANNA & O'BANNON (NODE AD)
1036      RK     660   0.004   0.013       0    CIRC       8
          *

1037      KK   4a-OB
1038      KM  TENAYA TO BTWN MONTESSOURI & ROSANNA CONC. @ NODE AC
1039      BA   0.077
1040      LS       0      83
1041      UD    0.21
          *

1042      KK   AC-RT
1043      KM  ROUTE TO O'BANNON & ROSANNA (NODE AD)
1044      RK     350   0.015   0.013       0    CIRC       6
          *

1045      KK    5-OB
1046      KM  LOTS ON THE CORNER OF O'BANNON & ROSSANNA CONC. @ NODE AD
1047      BA   0.008
1048      LS       0      86
1049      UD    0.11
          *
```

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

1050      KK  3a-DR
1051      KM  BUFFALO TO TENAYA HYDROGRAPH CONC. @ NODE S
1052      BA   0.044
1053      LS      0      86
1054      UD   0.22
          *

1055      KK   S-RT
1056      KM  ROUTE TO TENAYA & OAKEY (NODE R)
1057      RK    660   0.004   0.013       0    CIRC       3
          *

1058      KK  3a-OAK
1059      KM  BUFFALO TO TENAYA HYDROGRAPH CONC. @ NODE R
1060      BA   0.077
1061      LS      0      86
1062      UD   0.17
          *

1063      KK  NODE-R
1064      KM  COMBINE AT TENAYA & OAKEY
1065      HC      2
          *

1066      KK   R-RT
1067      KM  ROUTE TO MONTESSOURI & OAKEY (NODE Y)
1068      RK   1350   0.015   0.013       0    CIRC       3
          *

1069      KK  4a-OAK
1070      KM  TENAYA TO MONTESSOURI HYDROGRAPH CONC. @ NODE Y
1071      BA   0.074
1072      LS      0      86
1073      UD   0.16
          *

1074      KK  NODE-Y
1075      KM  COMBINE AT MONTESSOURI AND OAKEY
1076      HC      2
          *

1077      KK   Y-RT
1078      KM  ROUTE TO ROSANNA AND OAKEY (NODE Z)
1079      RK    700   0.015   0.013       0    CIRC       2
          *

1080      KK1aS-PUMP
1081      KM  KM  CONC. @ NODE Z
1082      BA   0.018
1083      LS      0      93
1084      UD   0.13
          *
```

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

1085      KK  NODE-Z
1086      KM  COMBINE AT ROSANNA & OAKEY
1087      HC       2
          *
1088      KK    Z-RT
1089      KM  ROUTE TO ROSANNA & EL PARQUE (NODE AB)
1090      RK     660   0.004   0.013       0    CIRC       5
          *
1091      KK   4-ELP
1092      KM  TENAYA TO MONTESSOURI HYDROGRAPH CONC. @ NODE AA
1093      BA   0.034
1094      LS       0      82
1095      UD    0.21
          *
1096      KK   AA-RT
1097      KM  ROUTE TO ROSANNA & EL PARQUE (NODE AB)
1098      RK     330   0.015   0.013       0    CIRC       2
          *
1099      KK NODE-AB
1100      KM  COMBINE AT ROSANNA AND EL PARQUE
1101      HC       2
          *
1102      KK   AB-RT
1103      KM  ROUTE TO O'BANNON AND ROSANNA (NODE AD)
1104      RK     700   0.004   0.013       0    CIRC       5
          *
1105      KK NODE-AD
1106      KM  COMBINE AT O'BANNON & ROSANNA (NODE AD)
1107      HC       4
          *
1108      KK   AD-RT
1109      KM  O'BANNON BTWN ROSANNA & RAINBOW (NODE AG)
1110      RK     300   0.015   0.013       0    CIRC       8
          *
1111      KK    1-ST
1112      KM  RESIDENTIAL AREA EAST OF PARK CONC. @ NODE AG
1113      BA   0.013
1114      LS       0      86
1115      UD    0.27
          *
```

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

1116      KK NODE-AG
1117      KM  COMBINE AT O'BANNON BTWN MONTESSOURI & ROSANNA
1118      HC       2
          *

1119      KK   AG-RT
1120      KM  ROUTE TO RAINBOW & O'BANNON (NODE AH)
1121      RK     400   0.015   0.013       0    CIRC       8
          *

1122      KK #1-COMM
1123      KM  COMMERCIAL AREA ALONG RAINBOW CONC. @ NODE AH
1124      BA   0.015
1125      LS       0      95
1126      UD    0.12
          *

1127      KK NODE-AH
1128      KM  COMBINE AT O'BANNON & RAINBOW
1129      HC       2
          *

1130      KK   AH-RT
1131      KM  ROUTE TO DETENTION BASIN (BASIN)
1132      RK    2100   0.008   0.013       0    CIRC       8
          *

1133      KK    6-OB
1134      KM  RESIDENTIAL AREA ON O'BANNON EAST OF RAINBOW CONC. @ BASIN
1135      BA   0.008
1136      LS       0      86
1137      UD    0.27
          *

1138      KK    2-ST
1139      KM  CONC. @ NODE AN
1140      BA   0.052
1141      LS       0      89
1142      UD     0.2
          *

1143      KK   AN-RT
1144      KM  ROUTE TO DETENTION BASIN (BASIN)
1145      RK     660   0.015    0.02       0    TRAP      50       3
          *

1146      KK #2-PUMP
1147      BA   0.008
1148      LS       0      97
1149      UD     0.1
          *
```

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

1150      KK#2-PUMP-RT
1151      KM  ROUTE TO OAKEY & RAINBOW (NODE AI)
1152      RK     350   0.015   0.013       0    CIRC       2
          *

1153      KK  2-COMM
1154      KM  RESIDENTIAL & COMMERICAL AREA SOUTH OF OAKEY CONC. @ NODE AI
1155      BA    0.02
1156      LS       0      87
1157      UD    0.17
          *

1158      KK  3-COMM
1159      KM  COMMERICAL AREA NORTH OF OAKEY CONC. @ NODE AI
1160      BA   0.005
1161      LS       0      95
1162      UD    0.12
          *

1163      KK NODE-AI
1164      KM  COMBINE FLOWS AT OAKEY & RAINBOW
1165      HC       3
          *

1166      KK   AI-RT
1167      KM  ROUTE TO OAKEY & REDWOOD (NODE AM)
1168      RK    1500   0.008   0.013       0    CIRC       3
          *

1169      KK   5-OAK
1170      KM  RAINBOW TO REDWOOD HYDROGRAPH CONC. @ NODE AM
1171      BA   0.062
1172      LS       0      91
1173      UD    0.21
          *

1174      KK  3-HOLM
1175      KM  BUFFALO TO TENAYA HYDROGRAPH CONC. @ NODE T
1176      BA     0.1
1177      LS       0      89
1178      UD    0.26
          *

1179      KK    T-RT
1180      KM  ROUTE TO ROSANNA & HOLMBY (NODE U)
1181      RK    2100   0.015   0.013       0    CIRC       3
          *

1182      KK  4-HOLM
1183      KM  TENAYA TO ROSANNA HYDROGRAPH CONC. @ NODE U
1184      BA     0.1
1185      LS       0      89
1186      UD    0.26
          *
```

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

1187          KK  NODE-U
1188          KM  COMBINE AT ROSANNA & HOLMBY
1189          HC       2
              *

1190          KK    U-RT
1191          KM  ROUTE TO DEL RAY & ROSANNA (NODE V)
1192          RK     660   0.004   0.013       0    CIRC     6.5
              *

1193          KK    4-DR
1194          KM  TENAYA TO ROSANNA HYDROGRAPH CONC. @ NODE V
1195          BA   0.023
1196          LS       0      86
1197          UD    0.27
              *

1198          KK  NODE-V
1199          KM  COMBINE AT ROSANNA & DEL REY
1200          HC       2
              *

1201          KK    V-RT
1202          KM  ROUTE TO DEL RAY BTWN RAINBOW AND ROSANNA (NODE W)
1203          RK     330   0.015   0.013       0    CIRC       5
              *

1204          KK1aN-PUMP
1205          KM  COMMERICAL & RESIDENTIAL AREA DRAINAGE CONC. @ NODE W
1206          BA   0.017
1207          LS       0      93
1208          UD    0.14
              *

1209          KK  NODE-W
1210          KM  COMBINE AT DEL RAY BTWN RAINBOW AND ROSANNA
1211          HC       2
              *

1212          KK    W-RT
1213          KM  ROUTE TO RAINBOW ON DEL RAY (NODE AL)
1214          RK    1500   0.015   0.013       0    CIRC       5
              *

1215          KK    5-DR
1216          KM  ROSANNA TO REDWOOD HYDROGRAPH CONC. @ NODE AL
1217          BA   0.104
1218          LS       0      95
1219          UD    0.19
              *
```

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

1220      KK NODE-AL
1221      KM  COMBINE FLOWS AT DEL RAY & REDWOOD
1222      HC       2
          *
1223      KK   AL-RT
1224      KM  ROUTE TO REDWOOD & OAKEY (NODE AM)
1225      RK    1350   0.004   0.013       0    CIRC     7.5
          *
1226      KK NODE-AM
1227      KM  COMBINE FLOWS AT REDWOOD & OAKEY
1228      HC       3
          *
1229      KK   AM-RT
1230      KM  ROUTE FLOWS TO DETENTION BASIN (BASIN)
1231      RK     700   0.015   0.013       0    CIRC       8
          *
1232      KK    7-OB
1233      KM  CONC. @ BASIN
1234      BA   0.016
1235      LS       0      88
1236      UD   0.172
          *
1237      KK   6-OAK
1238      KM  10-AC @ RED&OAK CONC. @ BASIN
1239      BA   0.017
1240      LS       0      94
1241      UD    0.19
          *
1242      KK   BASIN
1243      KM  COMBINE AT OAKEY DETENTION BASIN
1244      HC       6
          *
          * End of area tributary to the Oakey Detention Basin
          *
1245      KK   DBOKY
1246      KM  From Oakey Detention Basin
1247      RS       1    STOR       0
1248      SV       0       2       6      14      25      40      57      77     101     130
1249      SV     144     159     174     191     201     206     219     231     244     256
1250      SE      26      28      30      32      34      36      38      40      42      44
1251      SE      45      46      47      48    48.5      49      50      51      52      53
1252      SS    48.5     290     3.1     1.5
1253      SL      26     1.4    0.65     0.5
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1254      KK  ROKYDB
1255      KM  ROUTE OUTFLOW TO HINSON AND CHARLESTON
1256      KM  (HINSON IS 800 FEET WEST OF VALLEY VIEW)
1257      RK   14700   0.013   0.015       0    CIRC     2.5
          *
1258      KK   CH02A
1259      BA   0.115
1260      LS       0      92
1261      UD   0.216
          *
1262      KK  RCH02A
1263      KM  ROUTE TO CH03
1264      RK    3200  0.0218    0.02       0    TRAP      90       2
          *
1265      KK   CH02B
1266      BA   0.054
1267      LS       0      92
1268      UD   0.177
          *
1269      KK  RCH02B
1270      KM  ROUTE TO CH04
1271      RK    3300  0.0136    0.02       0    TRAP      50       2
          *
1272      KK    CH03
1273      BA    0.07
1274      LS       0      92
1275      UD   0.274
          *
1276      KK    CH04
1277      BA   0.187
1278      LS       0      92
1279      UD   0.285
          *
1280      KK   CCH04
1281      HC       4
          *
1282      KK   RCH04
1283      KM  ROUTE TO CH05
1284      RM       3    0.18      0.1
          *
```

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

1285          KK    CH05
1286          BA     0.1
1287          LS       0      92
1288          UD    0.29
              *

1289          KK   CCH05
1290          HC       2
              *

1291          KK   RCH05
1292          KM  ROUTE TO CH06
1293          RM       1    0.09     0.1
              *

1294          KK    CH06
1295          BA    0.04
1296          LS       0      94
1297          UD    0.15
              *

1298          KK   CCH06
1299          HC       2
              *

1300          KK   RCH06
1301          KM  ROUTE TO CH07
1302          RM       1    0.33     0.1
              *

1303          KK    CH07
1304          BA    0.02
1305          LS       0      91
1306          UD     0.3
              *

1307          KK   CCH07
1308          HC       2
              *

1309          KK   RCH07
1310          KM  ROUTE TO CH09
1311          RM       1    0.17     0.1
              *

1312          KK    CH08
1313          BA    0.07
1314          LS       0      96
1315          UD    0.21
              *
```

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

1316      KK   RCH08
1317      KM  ROUTE TO CH09
1318      RK     500    0.02    0.02       0    TRAP      90       2
          *

1319      KK    CH09
1320      BA    0.12
1321      LS       0      92
1322      UD    0.37
          *

1323      KK   CCH09
1324      HC       3
          *

1325      KK   RCH09
1326      KM  ROUTE TO CH11
1327      RM       1    0.35     0.1
          *

1328      KK   CH10A(FROM ARVILLE ST/DEL REY AV.NEIGHBOREHOOD STUDY)
1329      BA    0.14
1330      LS       0      89
1331      UD    0.25
          *

1332      KK    CH11
1333      BA    0.05
1334      LS       0      96
1335      UD    0.29
          *

1336      KK   CCH11
1337      HC       3
          *

1338      KK   RCH11
1339      KM  ROUTE TO CH13
1340      RM       1    0.22     0.1
          *

1341      KK    CH13
1342      BA    0.09
1343      LS       0      96
1344      UD    0.22
          *

1345      KK   CCH13
1346      HC       2
          *
```

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

1347      KK    CHHN
1348      KM  COMBINE OUTFLOW FROM Oakey Detention Basin
1349      HC       2
          *

1350      KK   RCHHN
1351      KM  ROUTE FLOW NORTH TO VALLEY VIEW AND FULTON
1352      RK    2000   0.008   0.013       0    CIRC       7
          *

1353      KK    AL04
1354      BA    0.25
1355      LS       0      92
1356      UD    0.52
          *

1357      KK   RAL04
1358      KM  ROUTE TO AL06
1359      RK    1300   0.014    0.02       0    TRAP      50       2
          *

1360      KK    AL06
1361      BA    0.07
1362      LS       0      92
1363      UD    0.38
          *

1364      KK   CAL06
1365      HC       2
          *

1366      KK   RAL06
1367      KM  ROUTE TO AL09
1368      RK    2800   0.023    0.02       0    TRAP      50       2
          *

1369      KK    AL09
1370      BA     0.1
1371      LS       0      92
1372      UD    0.28
          *

1373      KK   CAL09
1374      HC       2
          *

1375      KK   RAL09
1376      KM  ROUTE FLOW EAST ON EVERGREEN TO DECATUR
1377      RM       1    0.14     0.1
          *
```

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

1378      KK    AL10
1379      BA    0.15
1380      LS       0      93
1381      UD    0.33
          *

1382      KK    CAL10
1383      KM  COMBINE AT EVERGREEN AND DECATUR
1384      HC       2
          *

1385      KK    RAL10
1386      KM  ROUTE TO CH14A
1387      RK     2500    0.01    0.02       0    TRAP      50       2
          *

1388      KK    CH14A
1389      BA    0.12
1390      LS       0      92
1391      UD    0.29
          *

1392      KK  CCH14A
1393      HC       2
          *

1394      KK  RCH14A
1395      KM  ROUTE TO VALLEY VIEW AND FULTON
1396      RK     1300   0.015    0.02       0    TRAP      50       2
          *

1397      KK C2CH14A
1398      KM  COMBINE FLOW
1399      HC       2
          *

1400      KK    RCHHN
1401      KM  ROUTE FLOW NORTH ALONG VALLEY VIEW TO ALTA DRIVE
1402      RK     1200   0.004   0.013       0    TRAP      10       0
          *

1403      KK    CH01
1404      BA   0.121
1405      LS       0      92
1406      UD   0.274
          *

1407      KK    RCH01
1408      KM  ROUTE TO AL01A
1409      RK     5200    0.02    0.02       0    TRAP      70       2
          *
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1410      KK   AL01A
1411      BA   0.146
1412      LS      0      91
1413      UD   0.375
          *

1414      KK    AL02
1415      BA     0.2
1416      LS       0      92
1417      UD    0.36
          *

1418      KK   CAL02
1419      KM  COMBINE AT ALTA AND TORREY PINES
1420      HC       3
          *

1421      KK   RAL02
1422      KM  ROUTE FLOW EAST ON ALTA TO JONES
1423      RM       1    0.27     0.1
          *

1424      KK   AL03B
1425      BA    0.07
1426      LS       0      92
1427      UD   0.285
          *

1428      KK  RAL03B
1429      KM  ROUTE TO AL03C
1430      RK    1600   0.004    0.02       0    TRAP      70       2
          *

1431      KK   AL03C
1432      BA   0.106
1433      LS       0      92
1434      UD   0.285
          *

1435      KK  CAL03C
1436      KM  COMBINE AT ALTA AND JONES
1437      HC       3
          *

1438      KK  RAL03C
1439      KM  ROUTE FLOW EAST ALONG ALTA TO UPLAND IN 60" PIPE
1440      RK    1900   0.008   0.015       0    CIRC      5
          *
```

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

1441      KK    AL05
1442      BA     0.1
1443      LS       0      92
1444      UD     0.5
          *
1445      KK   CAL05
1446      KM  COMBINE AT ALTA AND UPLAND
1447      HC       2
          *
1448      KK   RAL05
1449      KM  ROUTE FLOW EAST ON ALTA TO FALCON
1450      RK     800   0.019   0.015       0    CIRC       5
          *
1451      KK    AL07
1452      BA    0.11
1453      LS       0      92
1454      UD    0.46
          *
1455      KK   CAL07
1456      KM  COMBINE AT ALTA AND FALCON
1457      HC       2
          *
1458      KK   RAL07
1459      KM  ROUTE FLOW EAST ON ALTA TO DECATUR (60" PIPE)
1460      RK    2800   0.016   0.015       0    CIRC       5
          *
1461      KK    AL11
1462      BA    0.05
1463      LS       0      96
1464      UD    0.23
          *
1465      KK    AL08
1466      BA     0.1
1467      LS       0      93
1468      UD    0.31
          *
1469      KK   CAL08
1470      KM  COMBINE AT ALTA AND DECATUR
1471      HC       3
          *
```

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

1472      KK   RAL08
1473      KM  ROUTE FLOW EAST ON ALTA TO BEDFORD (72" RCP)
1474      RK    2500    0.01   0.015       0    CIRC       6
          *

1475      KK    AL12
1476      BA    0.12
1477      LS       0      92
1478      UD    0.43
          *

1479      KK   CAL12
1480      KM  COMBINE AT ALTA AND BEDFORD
1481      HC       2
          *

1482      KK   RAL12
1483      KM  ROUTE FLOW EAST ON ALTA TO VALLEY VIEW (11' W CONC. CHNL)
1484      RK    1500   0.007   0.015       0    TRAP      11        1
          *

1485      KK   AL13A
1486      BA    0.07
1487      LS       0      91
1488      UD    0.30
          *

1489      KK    AL14
1490      BA    0.11
1491      LS       0      94
1492      UD    0.42
          *

1493      KK   RAL14
1494      KM  ROUTE FLOW EAST ON MEADOW LANE TO VALLEY VIEW
1495      RM       2    0.51     0.1
          *

1496      KK    AL15
1497      BA    0.22
1498      LS       0      96
1499      UD    0.45
          *

1500      KK   CAL15
1501      KM  COMBINE AT MEADOW AND VALLEY VIEW
1502      HC       2
          *
```

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

1503      KK     MVV
1504      KM  DIVERT FLOW IN EXCESS OF 115 TO MEDB
1505      DT     MVVE
1506      DI        0     115    1000
1507      DQ        0       0     885
          *

1508      KK     RMVV
1509      KM  ROUTE REMAINING FLOW SOUTH ON VALLEY VIEW TO ALTA
1510      RM        1     0.3     0.1
          *

1511      KK     AL16
1512      BA     0.18
1513      LS        0      91
1514      UD     0.53
          *

1515      KK    CAL16
1516      KM  COMBINE AT ALTA AND VALLEY VIEW
1517      HC        5
          *

1518      KK     OK06
1519      BA     0.18
1520      LS        0      93
1521      UD     0.37
          *

1522      KK    ROK06
1523      KM  ROUTE TO OK07
1524      RM        2    0.59     0.1
          *

1525      KK    OK07A
1526      BA     .205
1527      LS        0      89
1528      UD     0.24
          *

1529      KK    CSEDM
1530      HC        2
          *

1531      KK     SA01
1532      BA     0.06
1533      LS        0      90
1534      UD     0.19
          *
```

1

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1535      KK   RSA01
1536      KM  ROUTE TO SA02
1537      RM       1    0.19      0.1
          *

1538      KK    SA02
1539      BA    0.13
1540      LS       0       93
1541      UD    0.33
          *

1542      KK   CSA02
1543      HC       2
          *

1544      KK   RSA02
1545      KM  ROUTE TO SA04
1546      RM       1    0.27      0.1
          *

1547      KK    SA04
1548      BA    0.11
1549      LS       0       94
1550      UD    0.31
          *

1551      KK   CSA04
1552      HC       2
          *

1553      KK   RSA04
1554      KM  ROUTE TO SA05
1555      RM       2    0.61      0.1
          *

1556      KK    SA05
1557      BA    0.26
1558      LS       0       91
1559      UD    0.54
          *

1560      KK   CSA05 CP1 AT THE INTERSECTION OF EDMOND STREET AND SAHARA AVENUE
1561      HC       2
          *

1562      KK   OBAED INTERSECTION OF EDMOND STREET AND O'BANNON
1563      HC       2
          *
```

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

1564      KK   RSA05
1565      KM   ROUTE TO CP2 ST O'BANNON/DECATUR
1566      RK    1238    .007    .013       0    CIRC     6.5
          *

1567      KK   OK07B
1568      BA    .090
1569      LS       0      89
1570      UD    0.18
          *

1571      KK   COK07-- CONCENTRATION POINT (CP2) AT OBANNON AND DECATUR
1572      HC       2
          *

1573      KK   ROK07ROUTE FLOWS TO O'BANNON AND CAMERON
1574      RK    1200   0.014   0.013       0    CIRC     6.5
          *

1575      KK   RCAMEROUTE FLOWS TO OAKEY AND CAMERON
1576      RK    1270   0.005   0.013       0    TRAP      12       0
          *

1577      KK    OK01
1578      BA    0.03
1579      LS       0      89
1580      UD    0.16
          *

1581      KK   ROK01
1582      KM  ROUTE TO OK03
1583      RM       1    0.26     0.1
          *

1584      KK    OK02
1585      BA    0.06
1586      LS       0      91
1587      UD    0.23
          *

1588      KK   ROK02
1589      KM  ROUTE TO OK03
1590      RM       1    0.26     0.1
          *

1591      KK    OK03
1592      BA    0.24
1593      LS       0      91
1594      UD    0.42
          *
```

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

1595      KK   COKD3
1596      HC       3
          *
1597      KK   ROKD3
1598      KM  ROUTE TO OKD4
1599      RM       1    0.26     0.1
          *
1600      KK    OKD4
1601      BA    0.19
1602      LS       0      81
1603      UD    0.42
          *
1604      KK   COKD4
1605      HC       2
          *
1606      KK   ROKD4
1607      KM  ROUTE TO OKD5
1608      RM       1    0.37     0.1
          *
1609      KK    OKD5
1610      BA    0.07
1611      LS       0      90
1612      UD    0.38
          *
1613      KK   COKD5-- CONCENTRATION POINT (CP3) AT OAKEY/DECATUR
1614      HC       2
          *
          * ********************************************************************
          * **************  MODIFIED BY CARTER AND BURGESS          ************
          * ********************************************************************
          *
1615      KK   ROKD5LOCATED NEAR THE INTERSECTION OF OAKEY.DECATUR (IRS BLDG)
1616      KM  ROUTE TO OAKEY/CAMERON (SEE OAKEY PREDESIGN REPORT)
1617      RK     370   .0162    .013       0    CIRC     4.5

1618      KK   RKD5A
1619      RK     520   .0354    .013       0    CIRC       6

1620      KK   RKD5B
1621      RK     200    .005    .013       0    CIRC     6.5
          *
```

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

1622      KK    OK08
1623      BA    0.12
1624      LS       0      94
1625      UD    0.61
          *

1626      KK    COK08(COMBINE FLOWS AT BOX2)
1627      HC       3
          *

1628      KK    RK102 ROUTE FLOWS TO ARVILLE AND OAKEY
1629      RK     1124    .006    .013       0    CIRC     8.5
          *

1630      KK  RK12X8ROUTE FLOWS TO ARVILLE AND DEL REY
1631      RK     1260    .007    .013       0    TRAP     12       0
          *

1632      KK    CH10B(FROM ARVILLE/DEL REY AV.NEIGHBOREHOOD STUDY)
1633      BA    0.10
1634      LS       0      89
1635      UD    0.25
          *

1636      KK    CH12
1637      BA    0.09
1638      LS       0      93
1639      UD    0.23
          *

1640      KK    CCH12COMBINE AT ARVILLE AND DEL REY (BOX3)
1641      HC       3
          *

1642      KK    RCH12ROUTE TO CH14B ALLEY NEAR CHARLESTON
1643      RK     2300    .005    .013       0    TRAP     12       0
          *

1644      KK    CH14B
1645      BA    0.04
1646      LS       0      95
1647      UD    0.16
          *

1648      KK  CCH14B(BOX4)
1649      HC       2
          *

1650      KK     12X8  ROUTE TO FULTON/VALLEY VIEW
1651      RK     2300    .005    .013       0    TRAP     12       0
          *
```

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

1652      KK   AL13B
1653      BA    0.07
1654      LS       0      91
1655      UD    0.30
          *

1656      KK  CCH13B(BOX5)
1657      HC       2
          *

1658      KK    14X6 ROUTE TO ALTA AND VALLEY VIEW
1659      RK    1100    .005    .013       0    TRAP      14       0
          *

1660      KK   DIV12
1661      KM   DIVERT FLOWS IN EACH 12'X4' BOX
1662      DT    BOX1
1663      DI       0     200     400     600     800    1000    1200    1400    1600    1800
1664      DQ       0     100     200     300     400     500     600     700     800     900
          *

1665      KK    12X4ROUTE TO MEADOWS INFLOW CHANNEL (1-12'X4')
1666      RK     400    .005    .013       0    TRAP      12       0
          *

1667      KK    BOX1
1668      DR    BOX1
          *

1669      KK   12X4BDIVERT FLOW IN EACH BOX
1670      RK     400    .005    .013       0    TRAP      12       0
          *
          * ************************************************************
          * ***************CARTER AND BURGESS MODIFICATION**************
          * ************************************************************
          *

1671      KK  CMEDWD
1672      KM   COMBINE AT ALTA/VALLEY VIEW (CHNL1) WITH PROPOSED
1673      KM   OAKEY STORM DRAIN SYSTEM. THEN ROUTE TO MEADOWS
1674      KM   DETENTION BASIN VIA INFLOW CHANNEL
1675      HC       3
          *

1676      KK    ALG1 ROUTE FLOWS THROUGH MEDOWS INFLOW CHANNEL
1677      RK    1790     .01    .013       0    TRAP      18       1
          *

1678      KK    ALG3 ROUTE FLOWS THROUGH MEDOWS INFLOW CHANNEL
1679      RK     650    .004    .013       0    TRAP      20       1
          *
          * ****************************************************************
          * ****************CARTER AND BURGESS MODIFCATION ****************
          * ********************** NEW FLOW LOGIC ***********************
          * ****************************************************************
          *
```

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

1680      KK    MEDB
1681      BA    0.29
1682      LS       0      80
1683      UD    0.35
          *

1684      KK    MVVE
1685      KM  RECALL FLOW DIVERTED EAST FROM MEADOWS AT VALLEY VIEW
1686      DR    MVVE
          *

1687      KK   RMVVE
1688      KM  ROUTE FLOW TO MEADOW DETENTION BASIN
1689      RM       2    0.15    0.15
          *

1690      KK  MEDSPL
1691      KM  COMBINE AT MEADOW DET. BASIN
1692      HC       3
          * ************************************************************
          *       Begin DSS input cards                                  *
          * ************************************************************
          *

1693      KK   MEDET
1694      KM   RATING CURVES FROM PRELIMINARY ASSESSMENT OF PROPOSED MEADOWS DETENTION
1695      RS       1    STOR       0
1696      SV       0    1.91   10.07    25.9    45.1    64.5    84.2   104.3   124.6   145.3
1697      SV   166.2   187.3   208.9   230.7   252.9   275.5   298.3   321.6
1698      SE  2097.8    2099    2100    2101    2102    2103    2104    2105    2106    2107
1699      SE    2108    2109    2110    2111    2112    2113    2114    2115
          *
          *
          * ************************************************************
          *          OUTLET FROM BASIN REVISED 12/4/00 BY VTN          *
          *             1-10'x4' box and 1-11'x4' box @ 97.8           *
          *           SPILLWAY HEIGHT RAISED FROM 2110 TO 2111         *
          *                  48" BYPASS NOT USED                       *
          *                LOW FLOW CHANNEL USED - 10'x3'              *
          * ************************************************************
          *
1700      SQ       0     205     504     630     756    1365    3100
1701      SE  2097.8  2099.5  2101.8  2102.8  2103.8    2111    2114
          *

1702      KK    95D1
1703      KM   COMPUTE RUNOFF
1704      BA   .0297
1705      LS       0    97.6
1706      UD    .208
          *
```

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

1707      KK  MEATOT
1708      KM  COMBINE JUST DOWN STREAM MEADOW DET. BASIN
1709      HC       3
          *

1710      KK MEATOTR
1711      KM   ROUTE MAIN CHANNEL FROM MEADOWS OUTFALL TO RANCHO
1712      RK    1400    .004    .013       0    TRAP    26.0     0.0
          *

1713      KK    95D2
1714      KM   COMPUTE RUNOFF
1715      BA   .0278
1716      LS       0    97.6
1717      UD    .163
          *

1718      KK   CP15B
1719      KM   COMBINE CP15A + 95D AT RANCHO DRIVE
1720      HC       2
          *

1721      KK    RET1
1722      KM   RETRIEVE FLOW FROM WA10W
1723      DR   WA10W
          *

1724      KK   RET1R
1725      KM   ROUTE FLOWS ALONG WASHINGTON TO VALLEY VIEW
1726      RK    0700     .01    .016       0    TRAP       2      50
          *

1727      KK    WA12
1728      KM   COMPUTE RUNOFF
1729      BA  .06130
1730      LS       0    92.0
1731      UD    .194
          *

1732      KK    WCP6
1733      KM   COMBINE ROUTED FLOWS(WRT6) + WA12 + WA10W 700 FEET EAST VALLEY VIEW BOULEVARD
1734      HC       2
          *

1735      KK    WRT7
1736      KM   ROUTE COMBINE FLOWS(WCP6) TO RANCHO DRIVE(WA07)
1737      RK    2950    .015    .016       0    TRAP       2      50
          *
```

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

1738      KK    WA11
1739      KM   COMPUTE RUNOFF
1740      BA  .05510
1741      LS       0    90.6
1742      UD    .210
          *

1743      KK    WA13
1744      KM   COMPUTE RUNOFF
1745      BA  .17440
1746      LS       0    92.0
1747      UD    .293
          *

1748      KK    WCP7
1749      KM   COMBINE ROUTED FLOWS(WRT7) + WA11 + WA13 AT RANCHO DRIVE
1750      HC       3
          * FLOW SPLIT AT WASHINGTON AND RANCHO
          *

1751      KK   SPLT1
1752      KM   FLOW SPLIT AT RANCHO DRIVE AND WEST OF WASHINGTON AVENUE
1753      DT   RACPL
1754      DI       0     400    1100
1755      DQ       0       0      68
          *

1756      KK   SPLT2
1757      KM   FLOW SPLIT AT RANCHO DRIVE AND WASHINGTON AVENUE
1758      DT  RACPL2
1759      DI       0     500     812    1000    1200
1760      DQ       0     197     322     391     473
          *

1761      KK      SD
1762      KM   48-INCH SD UNDER RANCHO DRIVE - FULL FLOW CAPACITY
1763      BA   .0001
1764      BF     109
1765      LS       0      86
1766      UD   .1200
          *

1767      KK   CP17C
1768      KM   COMBINE SD + SPLT1 AT RANCHO DRIVE AND US95
1769      HC       2
          *

1770      KK   LC18A
1771      KM   COMPUTE RUNOFF
1772      BA  .00614
1773      BF       0
1774      LS       0    94.0
1775      UD    .074
          *
```

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

1776      KK   CPRAC
1777      KM   COMBINE LC18A + CP17C AT RANCHO DRIVE AND US95
1778      HC       2
          *

1779      KK   SPLT3
1780      KM   DIVERT 100% OF FLOW ALONG RANCHO DRIVE TO RECALL LATER
1781      DT  RACPL3
1782      DI       0     250     500    1000    1500
1783      DQ       0     250     500    1000    1500
          *

1784      KK    LC16
1785      KM   COMPUTE RUNOFF
1786      BA  .05856
1787      LS       0    85.1
1788      UD    .187
          *

1789      KK   LC16R
1790      KM   ROUTE FLOWS ALONG BONANZA TO RANCHO AND BONANZA
1791      RK    0960     .01    .016       0    TRAP       2      50
          *

1792      KK    LC18
1793      KM   COMPUTE RUNOFF
1794      BA  .05263
1795      LS       0    94.9
1796      UD    .156
          *

1797      KK  RACPL1
1798      KM   RETRIEVE SURFACE FLOWS FROM WASHINGTON WEST OF RANCHO
1799      DR   RACPL
          *

1800      KK   CPBON
1801      KM   COMBINE LC16 + LC18 AT BONANZA, WEST OF RANCHO
1802      HC       3
          *

1803      KK  CPBONR
1804      KM   ROUTE FLOWS IN STREET TO RAMSEY STREET
1805      RK    0300     .01    .016       0    TRAP       2      50
          *

1806      KK    LC17
1807      KM   COMPUTE RUNOFF
1808      BA  .10158
1809      LS       0    87.6
1810      UD    .281
          *
```

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

1811      KK   CPRAM
1812      KM   COMBINE LC16 + LC18 + LC17 AT RAMSEY STREET
1813      HC       2
          *
1814      KK   CP15C
1815      KM   COMBINE CP15B + CPRAM + SPLT3 AT RAMSEY STREET AND US 95
1816      HC       3
          *
1817      KK  RACPL3
1818      KM   RETRIEVE SURFACE FLOWS FROM RANCHO
1819      DR  RACPL3
          *
1820      KK   CP17D
1821      KM   COMBINE CP15CR + RACPL3 AT RANCHO DRIVE AND US95
1822      HC       2
          *
1823      KK   CP17R
1824      KM   ROUTE CP17D TO MARTIN L KING(CP18)
1825      RK   03400 0.00800   0.013  01.840    TRAP 012.000  00.000
          *
1826      KK     95E
1827      KM   COMPUTE RUNOFF
1828      BA  .04167
1829      LS       0    97.3
1830      UD    .258
          *
1831      KK    CP18
1832      KM   COMBINE 95E + CP17R AT MARTIN L KING
1833      HC       2
          *
1834      KK    LC19
1835      KM   COMPUTE RUNOFF
1836      BA  .06710
1837      LS       0    93.5
1838      UD    .162
          *
1839      KK    DIV2
1840      KM   SURFACE FLOWS IN BONANZA
1841      DT     BON
1842      DI       0      34     100    1000
1843      DQ       0      34      34      34
          *
```

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

     1844          KK    LC20
     1845          KM   COMPUTE RUNOFF
     1846          BA  .04840
     1847          LS       0    89.2
     1848          UD    .289
                   *

     1849          KK   CP19A
     1850          KM   COMBINE LC19 + LC20 AT MARTIN L KING
     1851          HC       2
                   *

     1852          KK    CPMK
     1853          KM   COMBINE CP19A + CP18
     1854          HC       2
                   *

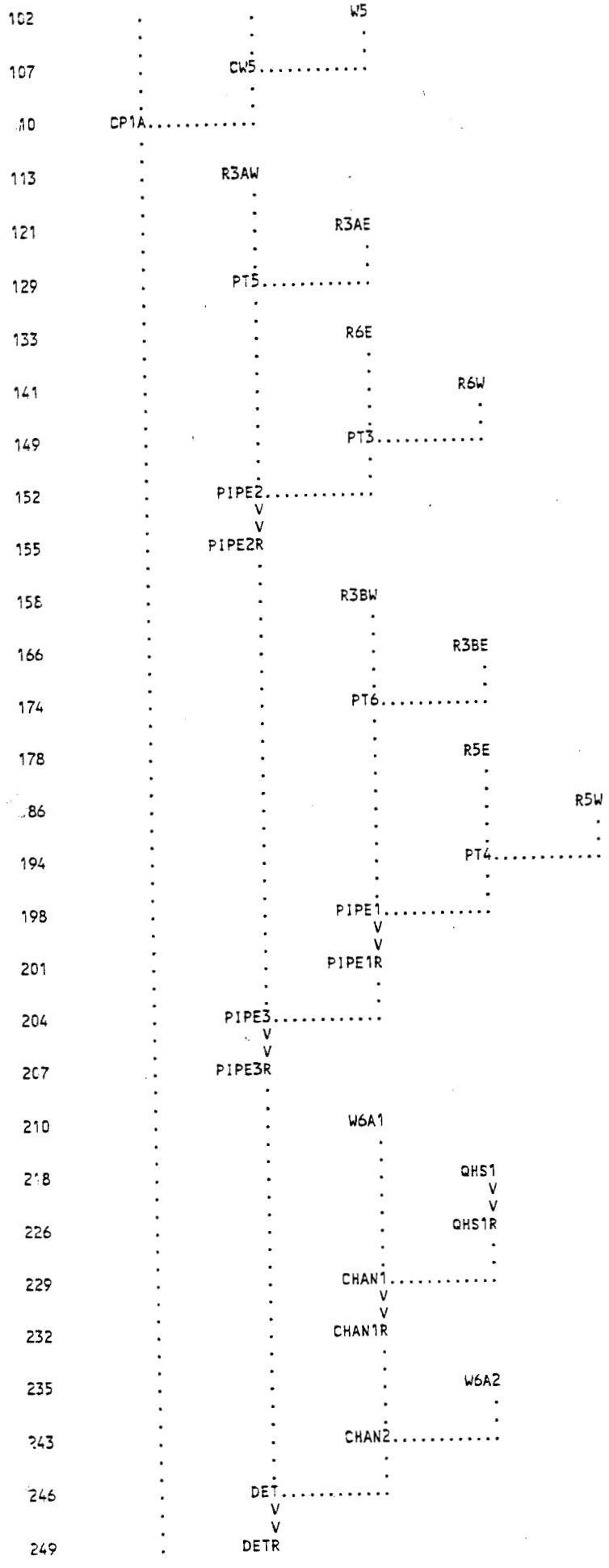
     1855          KK     RET
     1856          KM   RETRIEVE SURFACE FLOWS FROM BONANZA
     1857          DR     BON
                   *

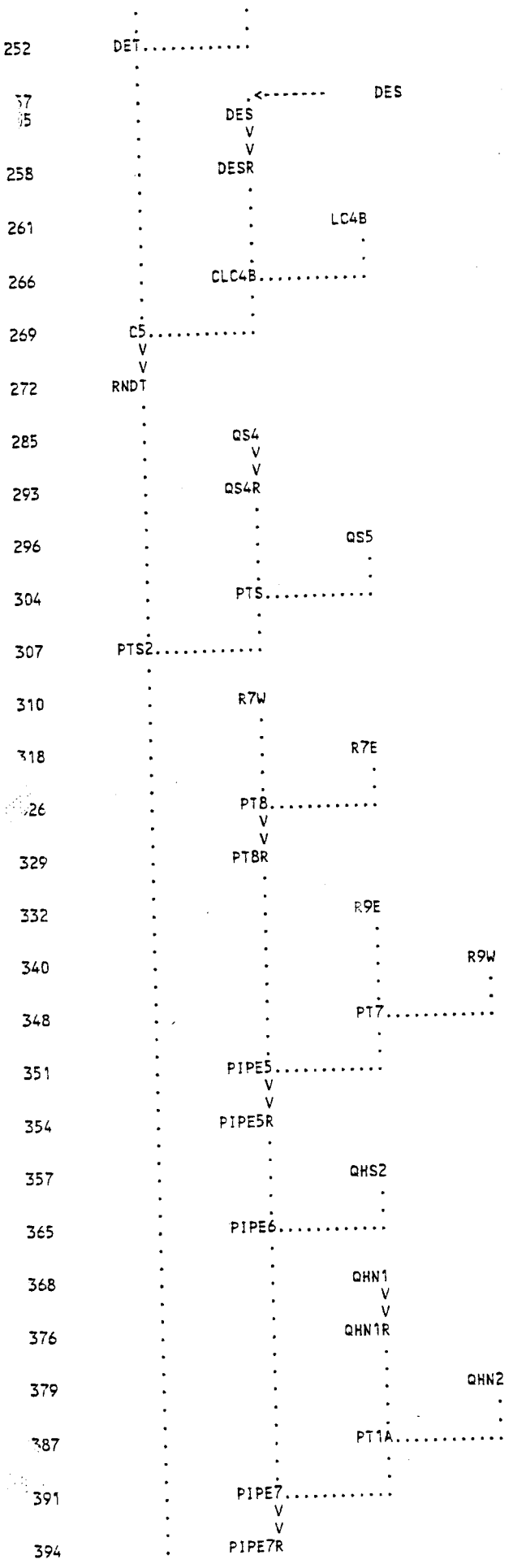
     1858          KK   CP19B
     1859          KM   COMBINE CPMLK + SURFACE FLOWS AT MARTIN L KING AND US95
     1860          HC       2
     1861          ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK

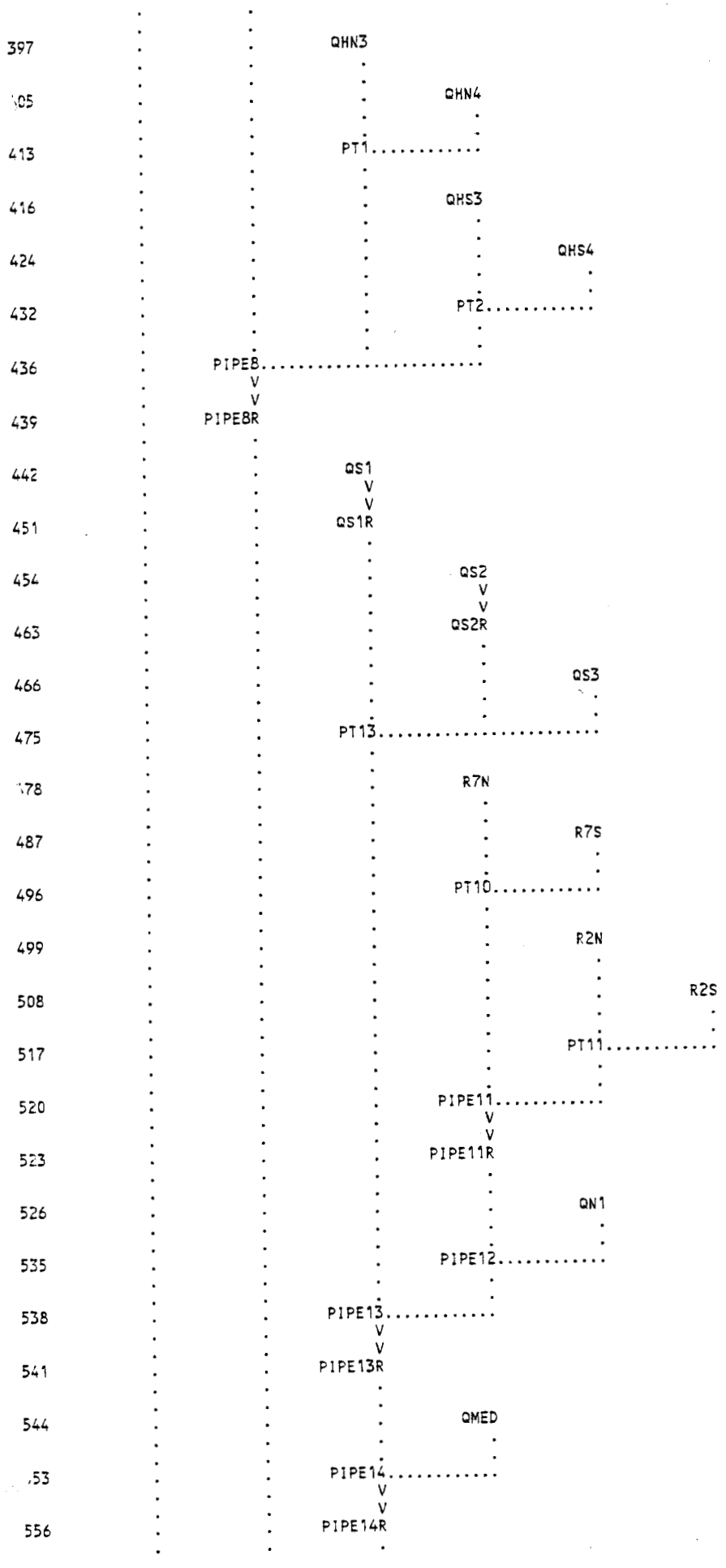
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   38      LC3A1
             .
             .
   55        .-------->    3A1D
   52      LC3A1D
             V
             V
   58      LC3A1R
             .
             .
   61        .       LC3A2
             .         .
             .         .
   66        C3A2.............
             .
             .
   71        .-------->     DES
   69      C3A2D
             V
             V
   74      LC3A2R
             .
             .
   79        .           .<--------    3A1D
   77        .         3A1D
             .           V
             .           V
   80        .       3A1DR
             .           .
             .           .
   83        .           .        LC3B
             .           .          .
             .           .          .
   88        .       CLC3B.............
             .           .
             .           .
   93        .           .-------->     DSS
   91        .       DLC3B
             .           .
             .           .
   96    RAINWEST.............
             .
             .
  101        .           .<--------     DSS
   99        .         DSS
             .           .
             .           .
```


102
W5
107
CW5
110
CP1A
113
R3AW
121
R3AE
129
PT5
133
R6E
141
R6W
149
PT3
152
PIPE2
155
PIPE2R
158
R3BW
166
R3BE
174
PT6
178
R5E
186
R5W
194
PT4
198
PIPE1
201
PIPE1R
204
PIPE3
207
PIPE3R
210
W6A1
218
QHS1
226
QHS1R
229
CHAN1
232
CHAN1R
235
W6A2
243
CHAN2
246
DET
249
DETR


252
DET
DES
DES
258
DESR
261
LC4B
266
CLC4B
269
C5
272
RNDT
285
QS4
293
QS4R
296
QS5
304
PTS
307
PTS2
310
R7W
318
R7E
326
PT8
329
PT8R
332
R9E
340
R9W
348
PT7
351
PIPE5
354
PIPE5R
357
QHS2
365
PIPE6
368
QHN1
376
QHN1R
379
QHN2
387
PT1A
391
PIPE7
394
PIPE7R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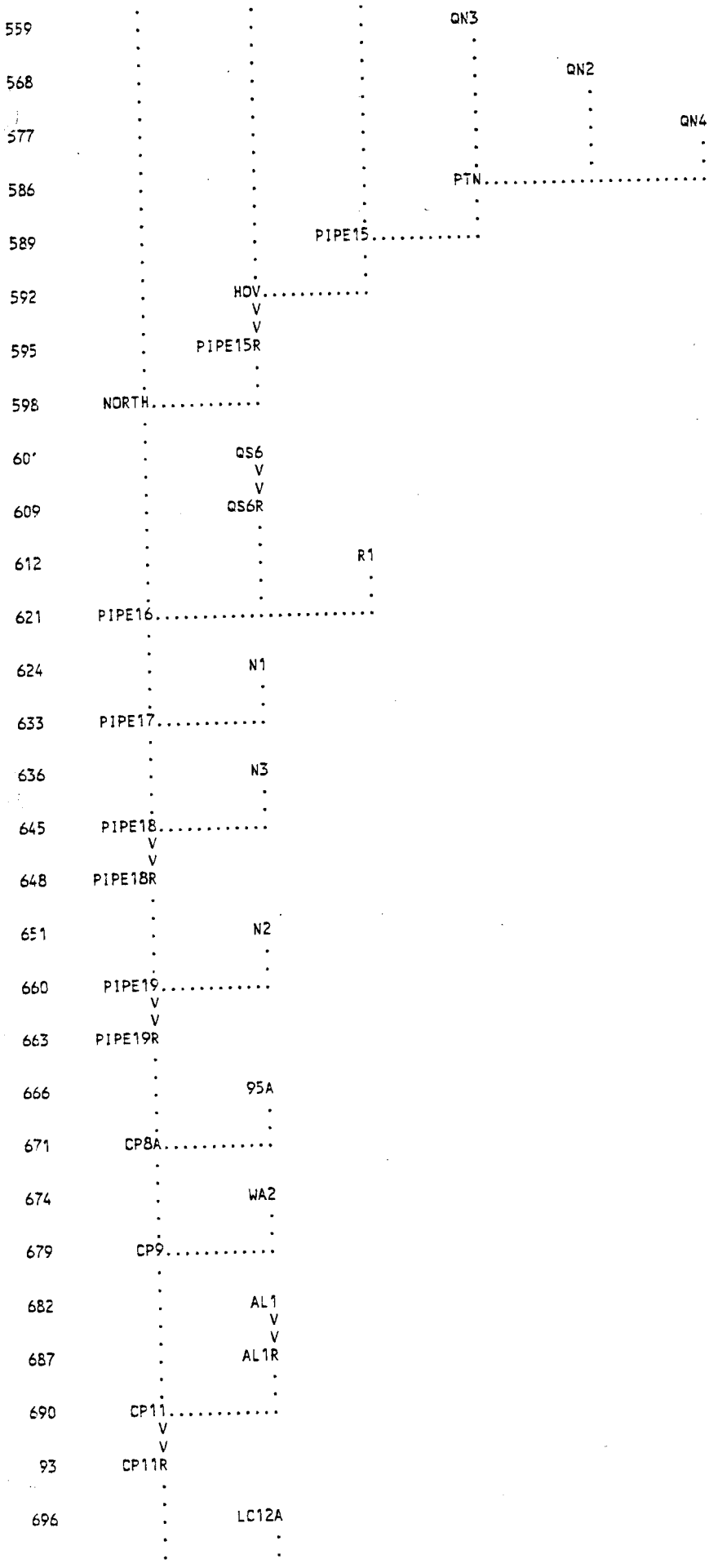
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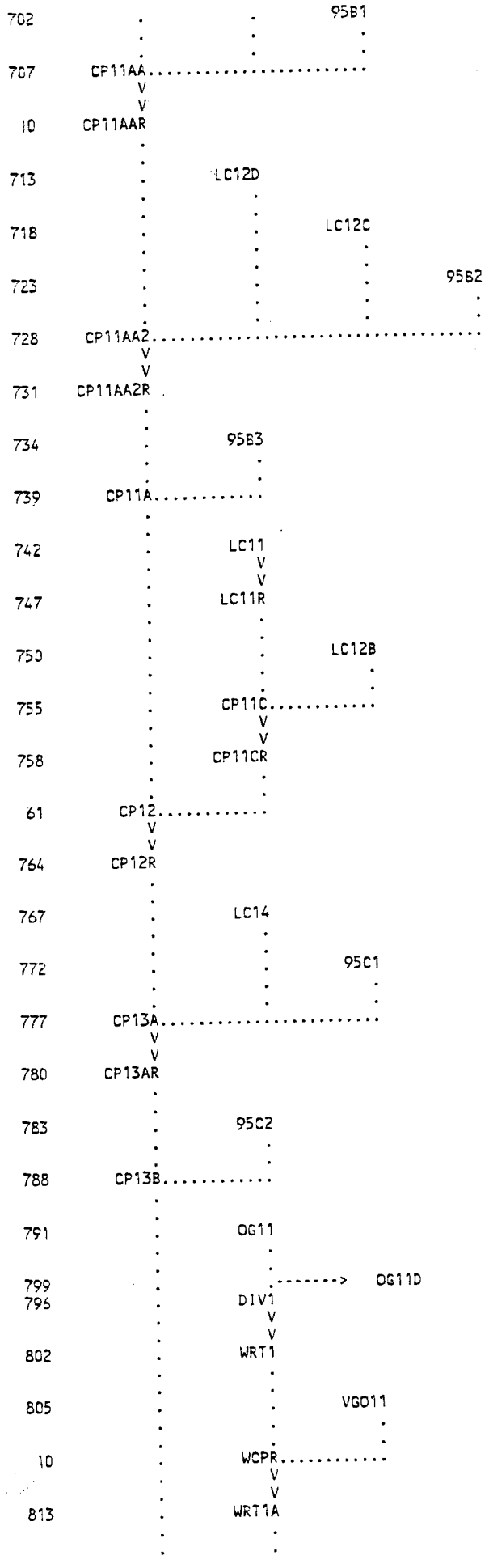
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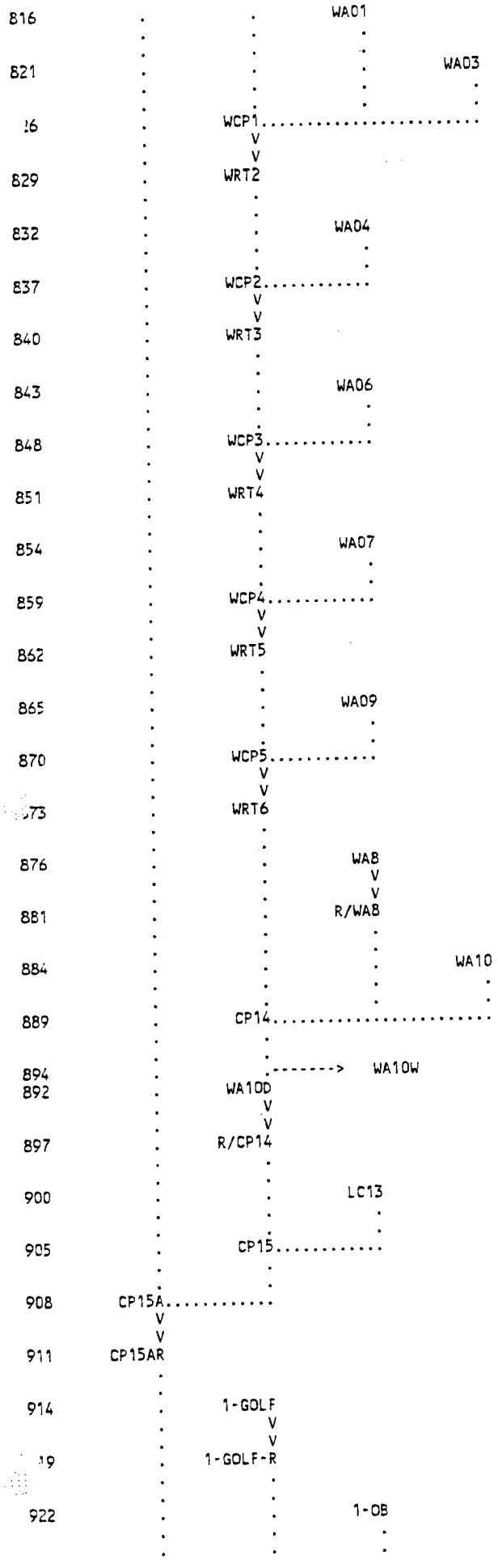
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WA07
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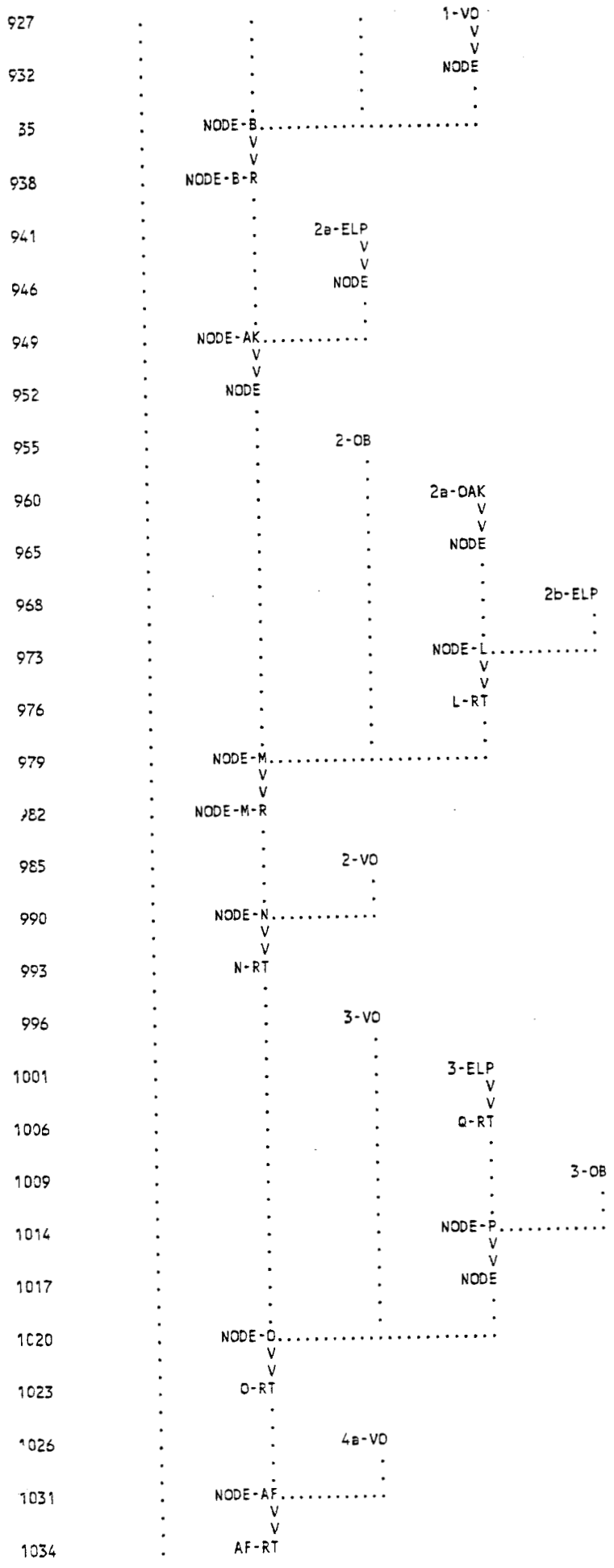
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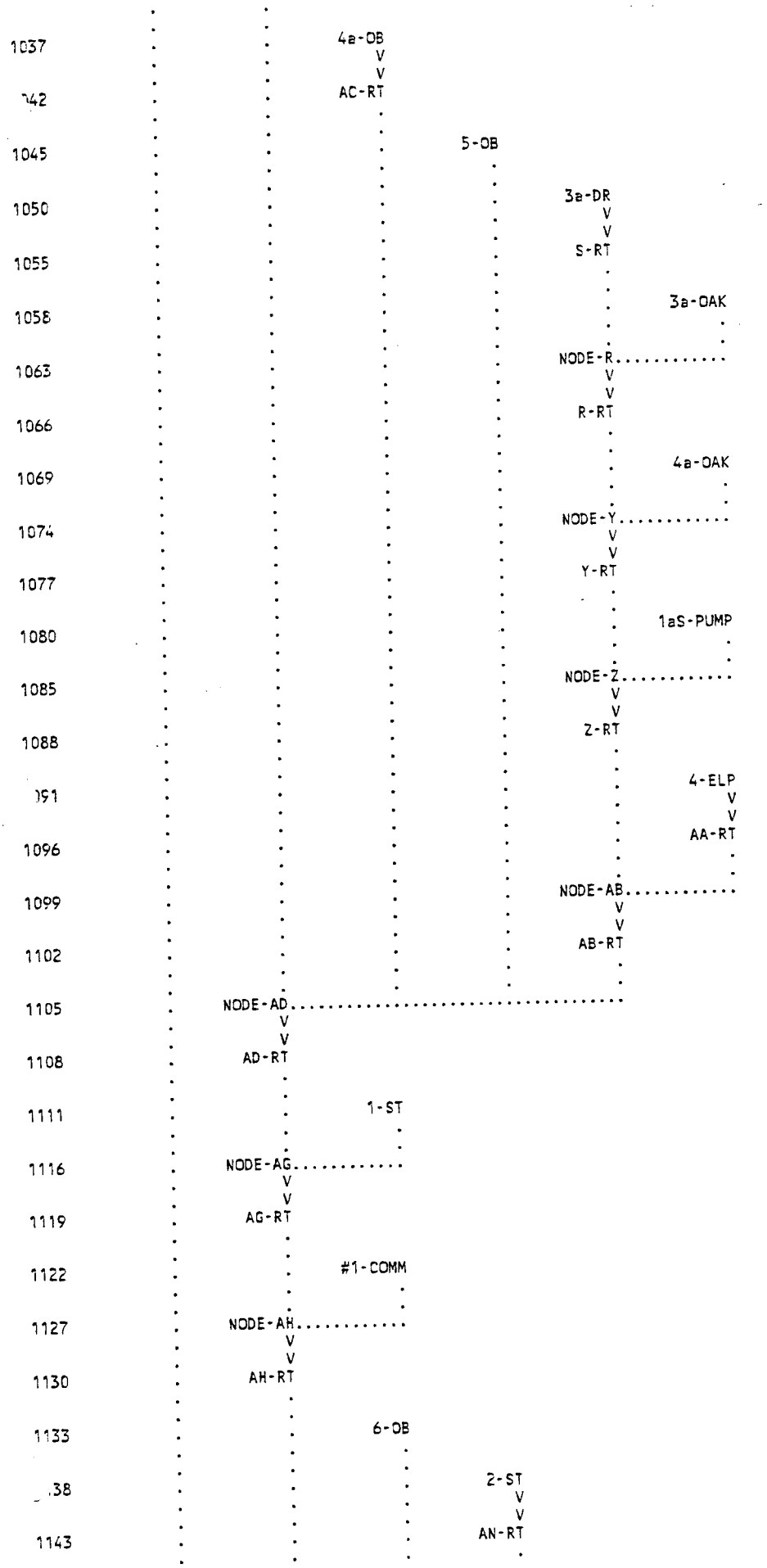
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V
V
AC-RT
5-OB
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V
V
S-RT
3a-OAK
NODE-R
V
V
R-RT
4a-OAK
NODE-Y
V
V
Y-RT
1aS-PUMP
NODE-Z
V
V
Z-RT
4-ELP
V
V
AA-RT
NODE-AB
V
V
AB-RT
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V
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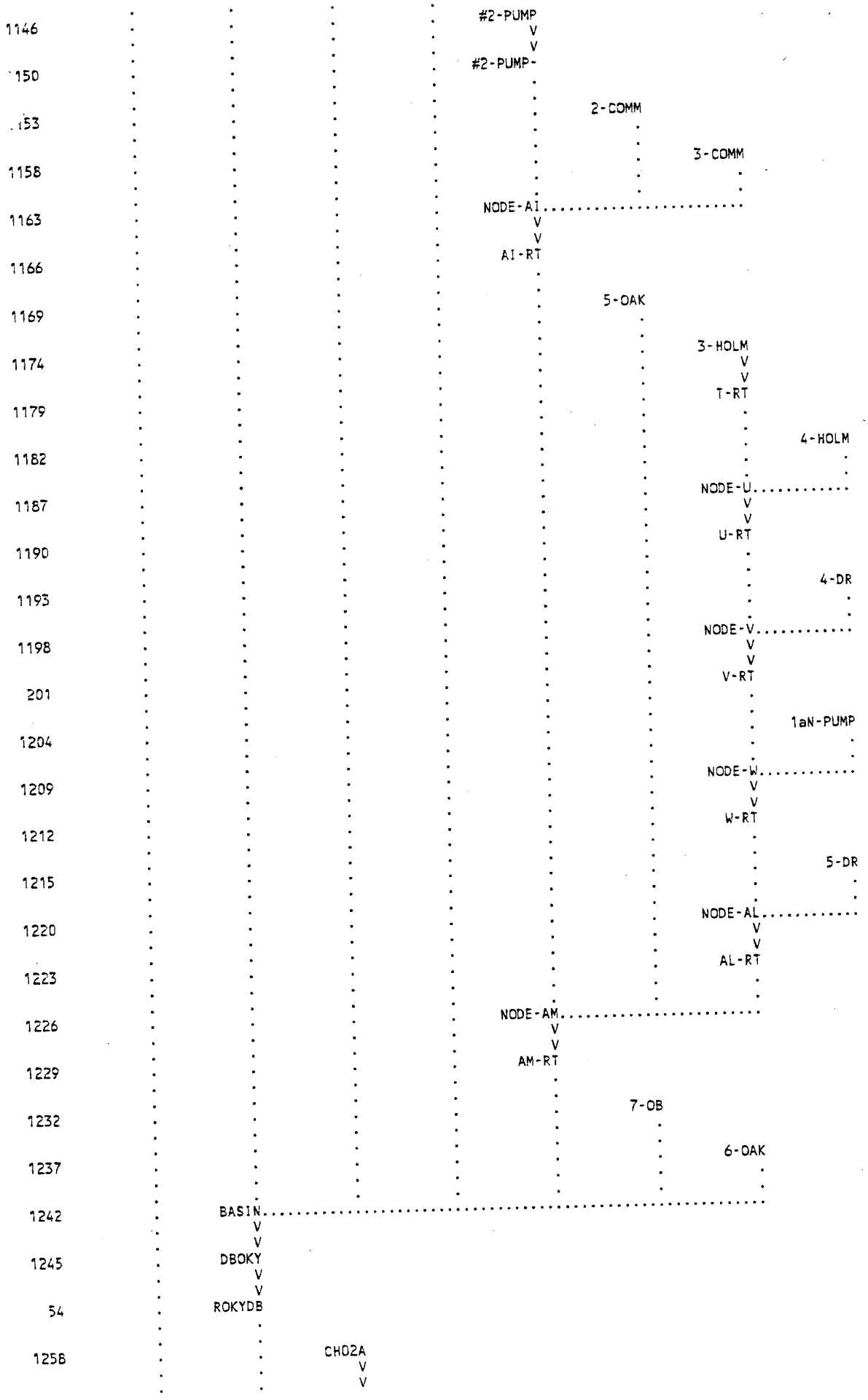
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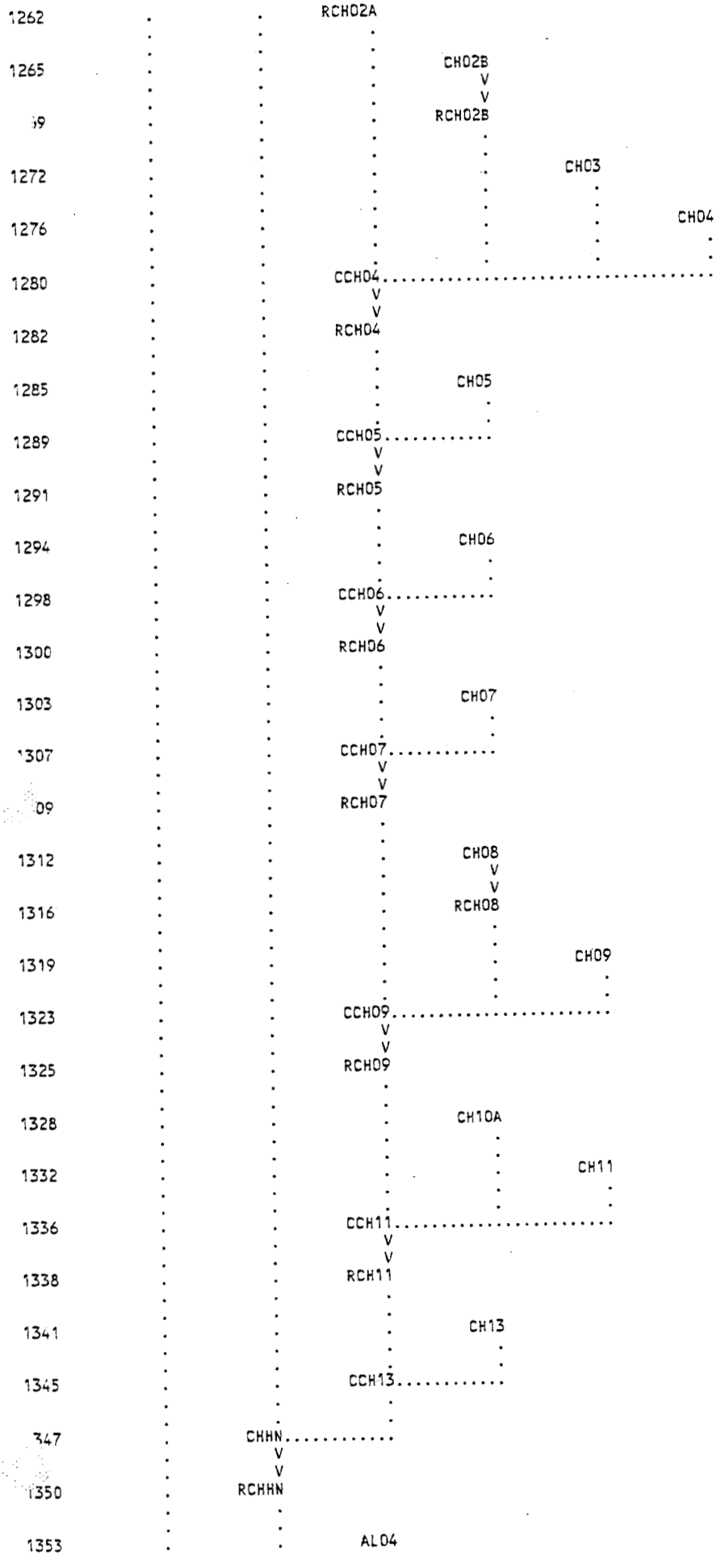
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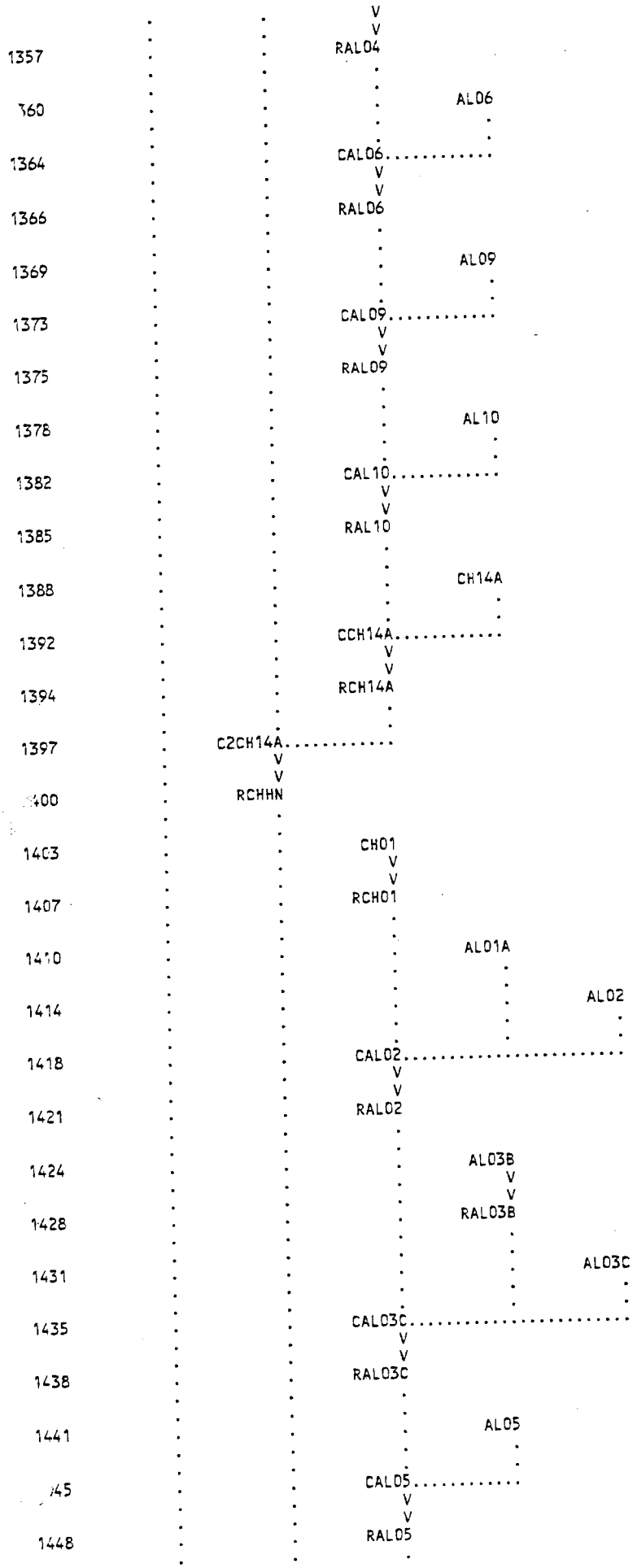
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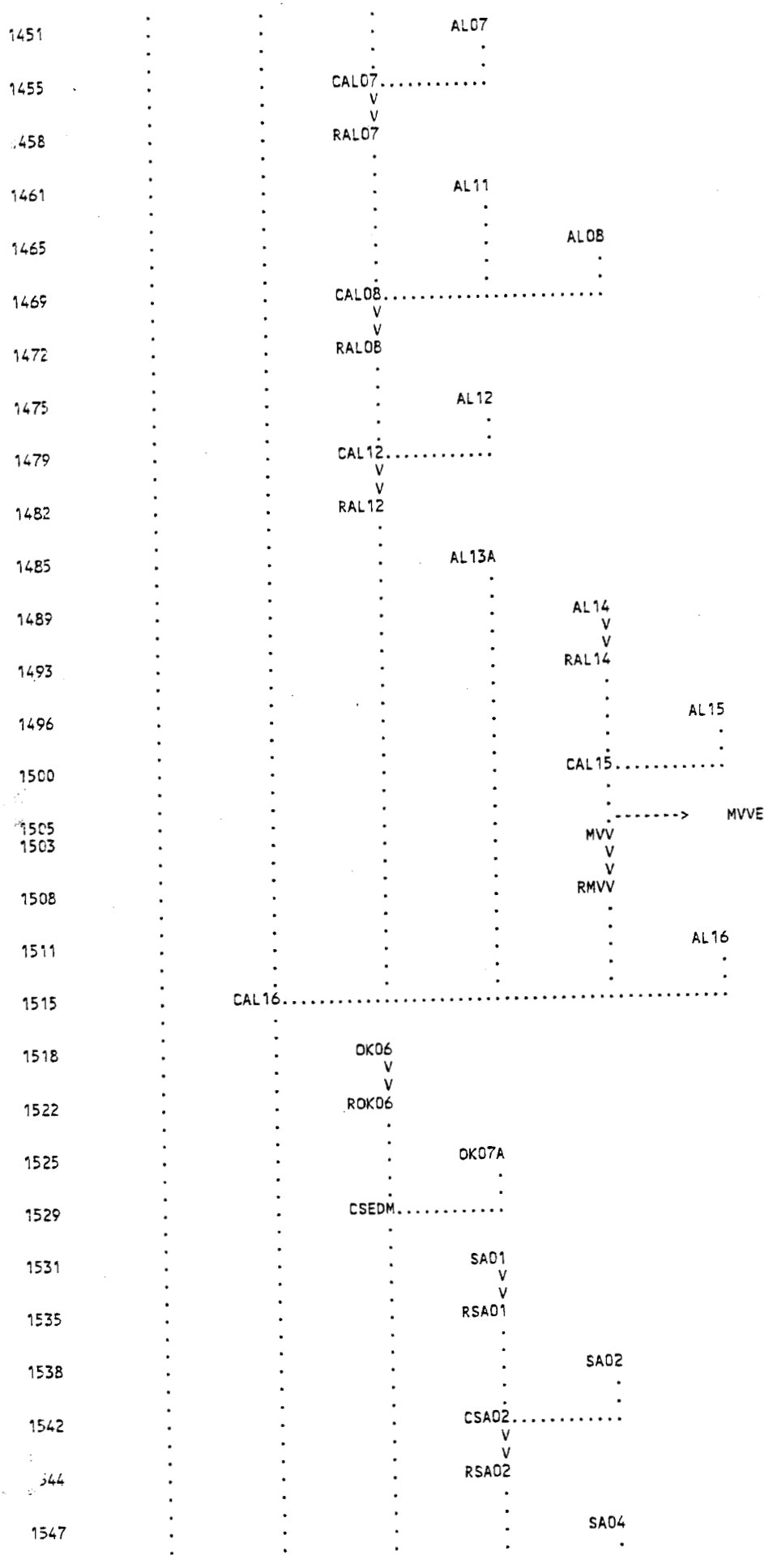
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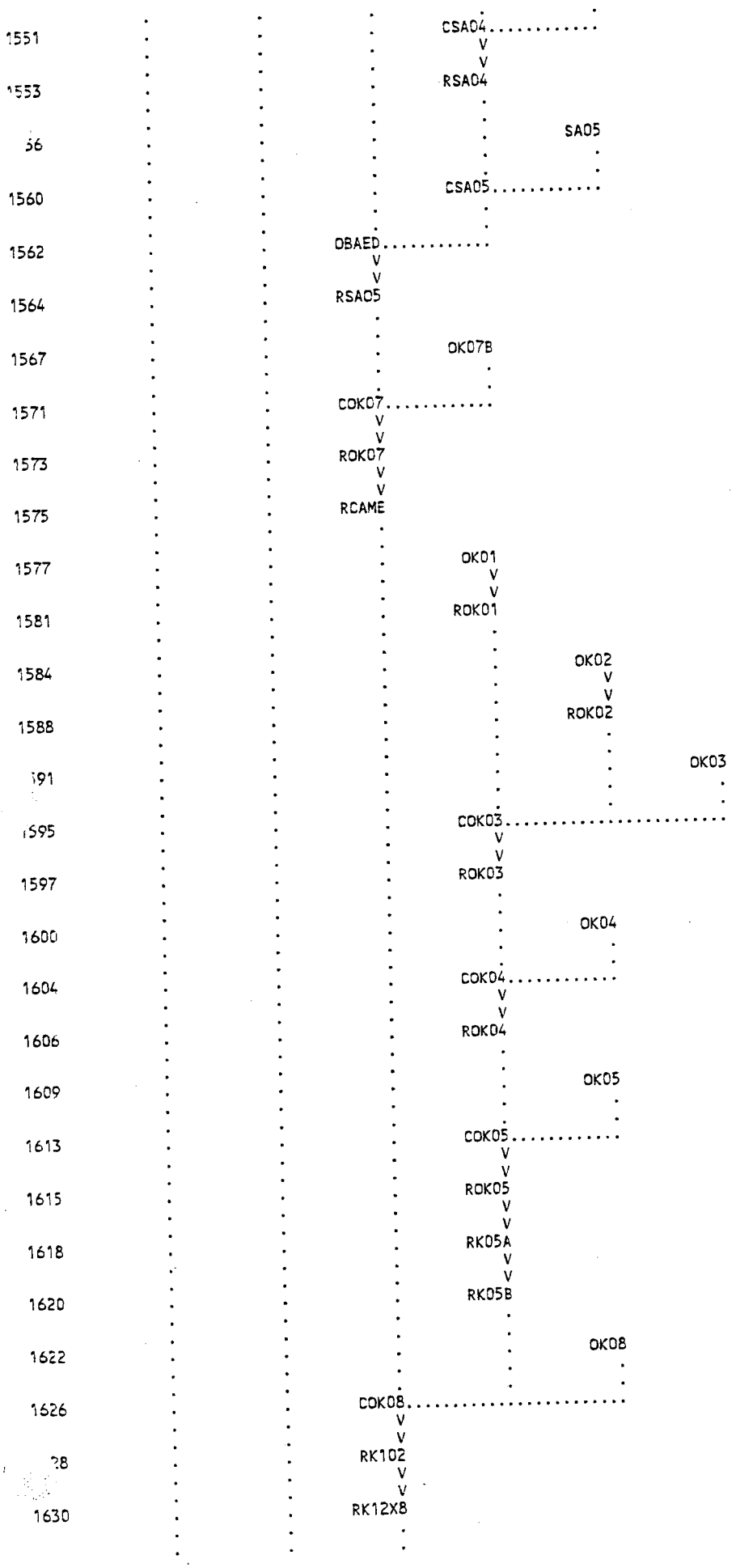
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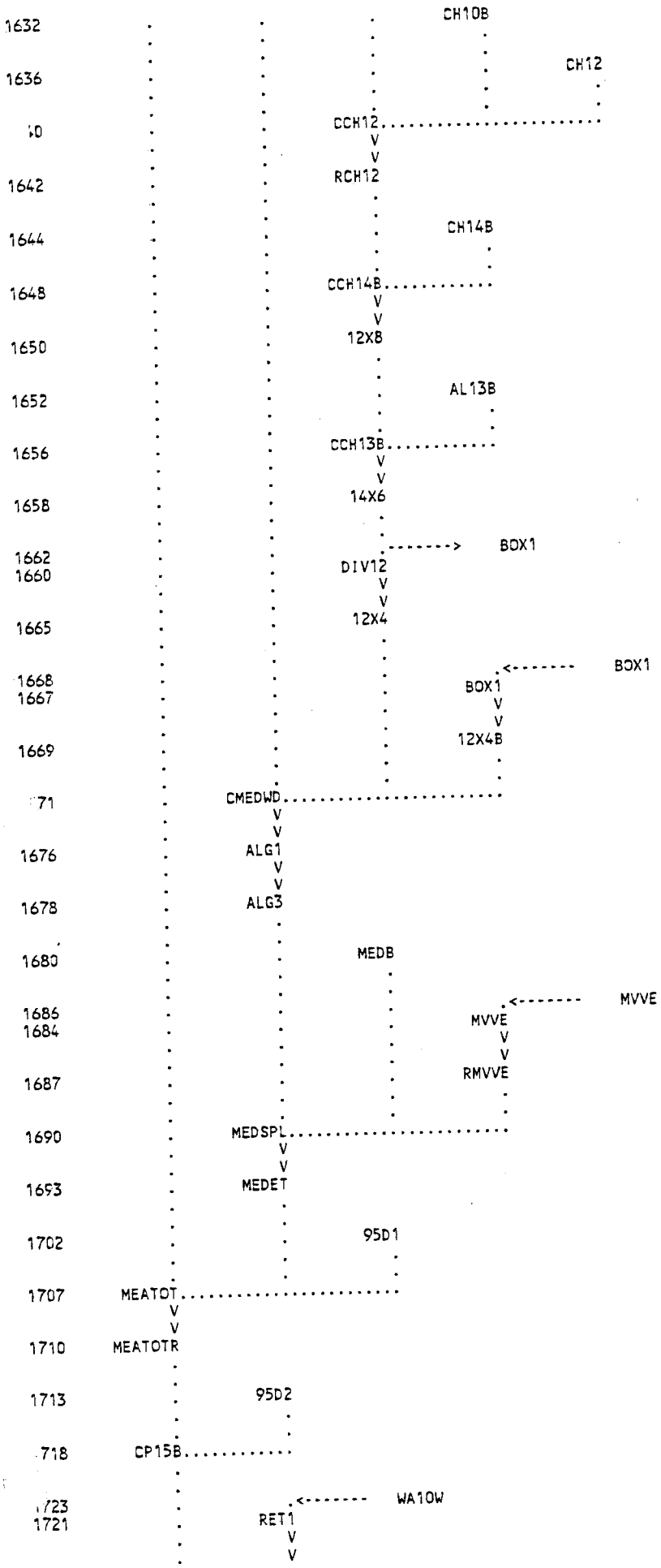
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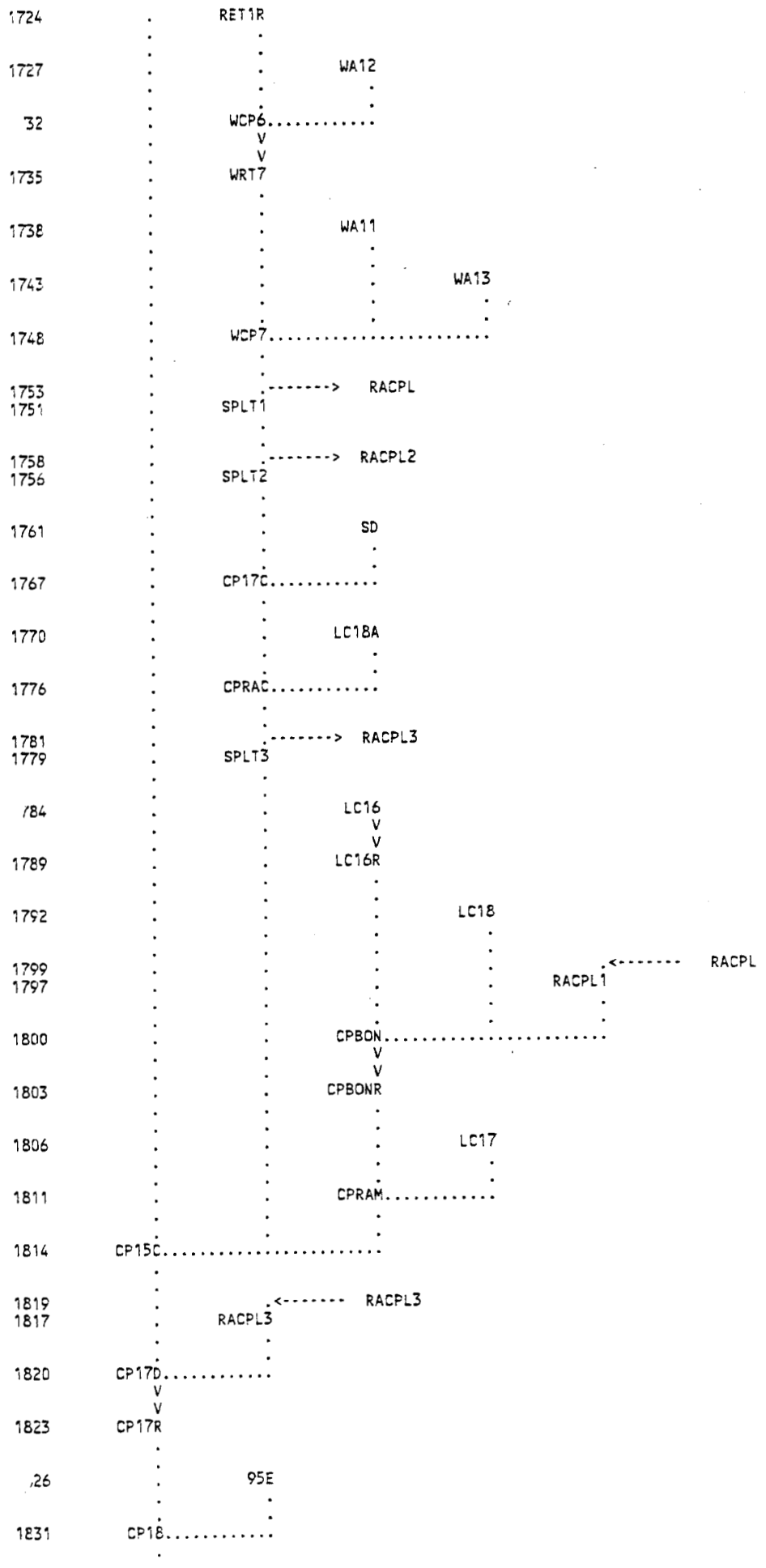
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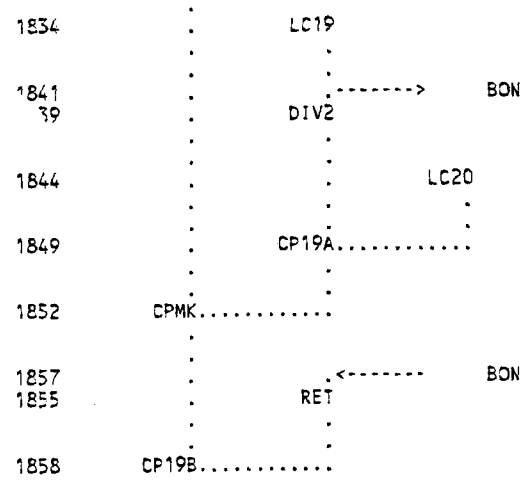

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  08/21/2002  TIME  08:17:23 *
*                                       *
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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

THIS MODEL WAS REVISED BY VTN NEVADA IN ASSOCIATION WITH THE NDOT US 95
WIDENING PROJECT AND APPLIES TO THE DESIGN OF THE US 95 LAS VEGAS CREEK
MAINLINE STORM DRAIN. THE HEC-1 MODEL FROM THE PRELIMINARY HYDRAULIC DESIGN
REPORT (30%), BY LOUIS BERGER & ASSOCIATES, APRIL 2000, WAS USED AS A BASIS
FOR THIS MODEL. THIS MODEL REPRESENTS A STORM CENTERED OVER THE ENTIRE
LAS VEGAS CREEK WATERSHED UPSTREAM OF MARTIN LUTHER KING BOULEVARD
INCLUDING THE MEADOWS DETENTION BASIN WATERSHED.
SDN 3 WAS USED FOR DESIGN POINTS WITH TRIBUTARY AREAS LESS THAN 8 SQ MILES.

REVISIONS TO THE LBA MODEL INCLUDE REVISED SUBBASIN AREAS, SUBBASIN ROUTING,
ADDITION OF ROUTING CARDS TO ROUTE SUBBASINS AND/OR DESIGN POINTS, UPDATED
MEADOWS DETENTION BASIN INFLOW/OUTFLOW DATA, AND UPDATED FLOW SPLIT
PARAMETERS AT WASHINGTON AND RANCHO

THE HEC-1 HYDROLOGY FOR THE MEADOWS DETENTION BASIN WAS
DEVELOPED BY CARTER AND BURGESS FOR THE OAKEY STORM SEWER.
REVISIONS TO THE MEADOWS DETENTION BASIN ARE INCORPORATED FROM THE MEADOWS
DETENTION BASIN EXPANSION PRELIMINARY DESIGN REPORT, BY VTN NEVADA,
MAY 2001 - OPTION 2B -
VTN ALTERNATIVE FOR MAIN LINE, HOV COMBINES W/ NORTH RIGHT AFTER TUNNEL
THEN COMBINES WITH RAINBOW D.B. OUTFALL

INPUT FILE NAME 2BSDN3.DAT - AUGUST 2001 - REVISED PER DRAFT 30% COMMENTS
100 YEAR , 6 HOUR STORM (SDN #3) FUTURE CONDITION

***THIS FILE HAS BEEN UPDATED FOR THE AUGUST 2002 OFFSITE DRAINAGE REPORT
UPDATE. THE UPDATES INCLUDE MODIFICATIONS TO THE DETENTION BASIN PARAMETERS
AND SOME ROUTING/COMBINING REVISIONS TO REFLECT CURRENT DESIGN OF PROJECT 2C

```
 35 IO          OUTPUT CONTROL VARIABLES
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                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
                         AREA     0.0    0.5    1.0    2.0    4.0    6.0    8.0   (SQUARE MILES)

    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 .98 .97 .93 .91 .90 .88

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 1.00	RATIO 2 .98	RATIO 3 .97	RATIO 4 .93	RATIO 5 .91	RATIO 6 .90	RATIO 7 .88	
HYDROGRAPH AT												
+	LC3A1	.13	1	FLOW	185.	180.	178.	168.	164.	161.	157.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
DIVERSION TO												
+	3A1D	.13	1	FLOW	45.	45.	45.	45.	45.	45.	45.	
				TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33	
HYDROGRAPH AT												
+	LC3A1D	.13	1	FLOW	140.	135.	133.	123.	119.	116.	112.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
	LC3A1R	.13	1	FLOW	136.	132.	130.	121.	116.	114.	109.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROGRAPH AT												
+	LC3A2	.11	1	FLOW	149.	145.	144.	136.	132.	131.	127.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
2 COMBINED AT												
+	C3A2	.24	1	FLOW	285.	277.	273.	257.	248.	244.	236.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
DIVERSION TO						159 FLOW DIVERTED TO LORENZI						
+	DES	.24	1	FLOW	163	155.	151.	135.	126.	122.	114.	DARF = 0.99
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT												
+	C3A2D	.24	1	FLOW	122.	122.	122.	122.	122.	122.	122.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO						FLOW REMAINING IN RAINBOW						
+	LC3A2R	.24	1	FLOW	122.	122.	122.	122.	122.	122.	122.	DARF = 1.00
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	3A1D	.00	1	FLOW	45.	45.	45.	45.	45.	45.	45.	
				TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33	
ROUTED TO												
+	3A1DR	.00	1	FLOW	45.	45.	45.	45.	45.	45.	45.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	LC3B	.19	1	FLOW	217.	212.	209.	198.	193.	190.	184.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
2 COMBINED AT												
+	CLC3B	.19	1	FLOW	262.	257.	254.	243.	238.	235.	229.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
VERSION TO												
	DSS	.19	1	FLOW	57.	52.	49.	38.	33.	30.	24.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT		AREA = 0.32					WESTCLIFF SOUTH SIDE CAPACITY					
+	DLC3B	.19	1	FLOW	205.	205.	205.	205.	205.	205.	205.	DARF = 0.987
				TIME	3.58	3.58	3.58	3.67	3.67	3.67	3.67	

RAINBOW & WESTCLIFF

+ 2 COMBINED AT	RAINWEST	.43	1	FLOW	327.	~~327.~~	327.	327.	327.	327.	327. DARF = 0.983
				TIME	3.58	3.58	3.58	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DSS	.00	1	FLOW	57.	52.	49.	38.	33.	30.	24.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
+ HYDROGRAPH AT	W5	.07	1	FLOW	102.	100.	99.	94.	91.	90.	87.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
NWC RAINBOW & WESTCLIFF											
+ 2 COMBINED AT	CW5	AREA = 0.26 .07	1	FLOW	150.	146	142.	138.	123.	115.	111.	104. DARF = 0.99
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
+ 2 COMBINED AT	CP1A	.50	1	FLOW	477.	469.	465.	450.	442.	438.	431.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
+ HYDROGRAPH AT	R3AW	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R3AE	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 2 COMBINED AT	PT5	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R6E	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R6W	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	PT3	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ COMBINED AT	PIPE2	.00	1	FLOW	5.	5.	5.	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ ROUTED TO	PIPE2R	.00	1	FLOW	5.	5.	5.	5.	5.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R3BW	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R3BE	.00	1	FLOW	5.	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 2 COMBINED AT	PT6	.00	1	FLOW	10.	10.	9.	9.	9.	9.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R5E	.00	1	FLOW	3.	3.	3.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	R5W	.00	1	FLOW	9.	9.	9.	9.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 2 COMBINED AT	PT4	.01	1	FLOW	12.	12.	12.	11.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 2 COMBINED AT	PIPE1	.01	1	FLOW	22.	21.	21.	20.	20.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
OUTED TO	PIPE1R	.01	1	FLOW	21.	21.	21.	20.	19.	19.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
+ 2 COMBINED AT	PIPE3	.01	1	FLOW	26.	26.	26.	24.	24.	24.	23.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50

ROUTED TO												
+	PIPE3R	.01	1	FLOW	26.	26.	25.	24.	24.	23.	23.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
DROGRAPH AT												
	W6A1	.08	1	FLOW	118.	115.	113.	108.	105.	103.	101.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	QHS1	.00	1	FLOW	5.	4.	4.	4.	4.	4.	4.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
+	QHS1R	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
+	CHAN1	.08	1	FLOW	122.	119.	118.	112.	109.	107.	104.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
+	CHAN1R	.08	1	FLOW	118.	115.	114.	108.	105.	104.	101.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT												
+	W6A2	.04	1	FLOW	62.	60.	60.	57.	55.	54.	53.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
+	CHAN2	.12	1	FLOW	178.	174.	172.	163.	158.	156.	152.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
+	DET	.13	1	FLOW	197. (196)	192.	190.	180.	175.	173.	168.	DARF = 0.995
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
+	DETR	.13	1	FLOW	196.	191.	189.	179.	174.	172.	167.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
	DET	.64	1	FLOW	655.	643.	637.	613.	601.	595.	583.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
DROGRAPH AT												
-	DES	.00	1	FLOW	163.	155.	151.	135.	126.	122.	114.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO												
+	DESR	.00	1	FLOW	157.	149.	145.	128.	120.	116.	107.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT												
+	LC4B	.04	1	FLOW	54.	52.	52.	49.	47.	47.	45.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT							NEC OF WESTCLIFF & LORRENZI (55 CFS IN EXISTING SYSTEM)					
+	CLC4B	.04	1	FLOW	(204.)	194.	190.	170.	161.	156.	147.	DARF = 1.00
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
2 COMBINED AT							(833) TOTAL INFLOW INTO BASIN					
+	C5	.67	1	FLOW	859.	837.	826.	783.	762.	751.	729.	DARF = 0.977
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO							OUTFLOW FROM BASIN					
+	RNDT	.67	1	FLOW	88.	(87.)	86.	85.	84.	84.	83.	DARF = 0.977
				TIME	5.33	5.33	5.33	5.25	5.25	5.25	5.25	
			** PEAK STAGES IN FEET **									
			1	STAGE	2385.17	2384.72	2384.50	2383.61	2383.17	2382.96	2382.53	
				TIME	5.33	5.33	5.33	5.25	5.25	5.25	5.25	
HYDROGRAPH AT												
+	QS4	.00	1	FLOW	9.	9.	9.	9.	8.	8.	8.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO												
+	QS4R	.00	1	FLOW	9.	9.	9.	9.	8.	8.	8.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
YDROGRAPH AT												
	QS5	.00	1	FLOW	8.	8.	8.	7.	7.	7.	7.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT												
+	PTS	.01	1	FLOW	17.	17.	17.	16.	15.	15.	15.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	

2 COMBINED AT											
+	PTS2	.68	1	FLOW	89.	88.	88.	87.	86.	86.	85.
				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83
ROGRAPH AT											
	R7W	.00	1	FLOW	2.	2.	2.	2.	2.	2.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	R7E	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT											
+	PT8	.00	1	FLOW	6.	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO											
+	PT8R	.00	1	FLOW	6.	6.	6.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	R9E	.00	1	FLOW	5.	5.	5.	5.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	R9W	.00	1	FLOW	6.	6.	6.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT											
+	PT7	.00	1	FLOW	11.	11.	10.	10.	10.	10.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT											
+	PIPE5	.01	1	FLOW	17.	16.	16.	15.	15.	15.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO											
+	PIPE5R	.01	1	FLOW	16.	16.	16.	15.	15.	15.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
	QHS2	.00	1	FLOW	3.	3.	3.	2.	2.	2.	2.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
COMBINED AT											
+	PIPE6	.01	1	FLOW	19.	19.	18.	17.	17.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	QHN1	.00	1	FLOW	7.	7.	6.	6.	6.	6.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	QHN1R	.00	1	FLOW	7.	6.	6.	6.	6.	6.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	QHN2	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT											
+	PT1A	.01	1	FLOW	7.	7.	7.	7.	6.	6.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	PIPE7	.01	1	FLOW	26.	26.	25.	24.	23.	23.	22.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO											
+	PIPE7R	.01	1	FLOW	26.	25.	25.	24.	23.	23.	22.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	QHN3	.00	1	FLOW	7.	7.	7.	7.	7.	7.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	QHN4	.00	1	FLOW	4.	4.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
' COMBINED AT											
	PT1	.01	1	FLOW	10.	10.	10.	10.	9.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	QHS3	.00	1	FLOW	7.	7.	7.	7.	7.	7.	6.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT	QHS4	.00	1	FLOW	4.	4.	3.	3.	3.	3.	3.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
COMBINED AT	PT2	.01	1	FLOW	10.	10.	10.	10.	9.	9.	9.
+				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58
3 COMBINED AT	PIPE8	.03	1	FLOW	~~46.~~	45.	45.	43.	42.	41.	40.
+				TIME	~~3.50~~	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	PIPE8R	.03	1	FLOW	46.	44.	44.	42.	41.	40.	39.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	QS1	.00	1	FLOW	6.	6.	6.	5.	5.	5.	5.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	QS1R	.00	1	FLOW	6.	6.	5.	5.	5.	5.	5.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	QS2	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	QS2R	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	QS3	.00	1	FLOW	5.	5.	5.	5.	4.	4.	4.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT	PT13	.01	1	FLOW	14.	14.	14.	13.	13.	12.	12.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	R7N	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROGRAPH AT	R7S	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	PT10	.00	1	FLOW	5.	5.	5.	5.	5.	5.	5.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	R2N	.00	1	FLOW	4.	4.	4.	4.	4.	4.	3.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	R2S	.00	1	FLOW	7.	7.	7.	6.	6.	6.	6.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	PT11	.00	1	FLOW	11.	11.	11.	10.	10.	10.	9.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	PIPE11	.01	1	FLOW	16.	16.	16.	15.	15.	14.	14.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	PIPE11R	.01	1	FLOW	16.	16.	15.	15.	14.	14.	14.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	QN1	.01	1	FLOW	10.	10.	10.	9.	9.	9.	9.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	PIPE12	.01	1	FLOW	26.	25.	25.	24.	23.	23.	23.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
COMBINED AT	PIPE13	.02	1	FLOW	39.	39.	38.	36.	35.	35.	34.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	PIPE13R	.02	1	FLOW	39.	38.	37.	36.	35.	34.	33.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50

"HOV" SYSTEM

DARF = 1.00

HYDROGRAPH AT												
+	QMED	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
COMBINED AT												
	PIPE14	.02	1	FLOW	41.	40.	39.	38.	37.	36.	35.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO												
+	PIPE14R	.02	1	FLOW	40.	39.	39.	37.	36.	36.	35.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	QN3	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	QN2	.00	1	FLOW	7.	7.	7.	7.	7.	7.	6.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	QN4	.00	1	FLOW	5.	4.	4.	4.	4.	4.	4.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT												
+	PTN	.01	1	FLOW	15.	15.	15.	14.	14.	13.	13.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
						"NORTH" SYSTEM						
2 COMBINED AT												
+	PIPE15	.03	1	FLOW	56.	54.	54.	51.	50.	49.	48.	DARF = 1.00
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
						"HOV" & "NORTH" SYSTEMS						
2 COMBINED AT												
+	HOV	.06	1	FLOW	101.	99.	97.	93.	90.	89.	87.	DARF = 1.00
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO												
+	PIPE15R	.06	1	FLOW	100.	97.	96.	92.	89.	88.	86.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT												
	NORTH	.74	1	FLOW	175.	172.	171.	163.	159.	158.	154.	DARF = 0.975
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
							RAINBOW D.B. & "HOV" + "NORTH" SYSTEM					
DROGRAPH AT												
+	QS6	.00	1	FLOW	8.	7.	7.	7.	7.	7.	6.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO												
+	QS6R	.00	1	FLOW	7.	7.	7.	7.	7.	6.	6.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	R1	.00	1	FLOW	8.	8.	8.	7.	7.	7.	7.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT												
+	PIPE16	.75	1	FLOW	190.	187.	185.	177.	173.	171.	167.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	N1	.00	1	FLOW	4.	4.	4.	4.	4.	4.	3.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT												
+	PIPE17	.75	1	FLOW	195.	191.	189.	181.	177.	175.	171.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT												
+	N3	.00	1	FLOW	8.	8.	7.	7.	7.	7.	7.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT												
+	PIPE18	.75	1	FLOW	202.	198.	196.	188.	184.	182.	178.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO												
+	PIPE18R	.75	1	FLOW	196.	192.	190.	182.	178.	176.	172.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
DROGRAPH AT												
	N2	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
+	PIPE19	.75	1	FLOW	200.	196.	194.	186.	182.	180.	175.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	

ROUTED TO	PIPE19R	.75	1	FLOW	198.	195.	193.	185.	181.	179.	175.		
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58		
HYDROGRAPH AT	95A	.05	1	FLOW	68.	67.	66.	63.	61.	60.	59.		
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67		
2 COMBINED AT	CP8A	.80	1	FLOW	259.	254.	252.	241.	236.	233.	228.		
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58		
HYDROGRAPH AT	WA2	.22	1	FLOW	242. (239.)	236.	233.	221.	215.	212.	206.	DARF = 0.99	JONES & CLARISE
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
2 COMBINED AT	CP9	1.02	1	FLOW	476.	466.	~~460.~~	439.	429.	423.	413.	DARF = 0.97	MAINLINE & CLARISE
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67		
HYDROGRAPH AT	AL1	.35	1	FLOW	376. (369.)	366.	361.	340.	330.	325.	315.	DARF = 0.986	JONES & ELTON
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
ROUTED TO	AL1R	.35	1	FLOW	375.	364.	359.	339.	329.	324.	313.		
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
2 COMBINED AT	CP11	1.37	1	FLOW	844.	824.	813. (798.)	773.	752.	742.	722.	DARF = 0.955	MAINLINE & JONES SOUTH
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
ROUTED TO	CP11R	1.37	1	FLOW	843.	823.	813.	772.	752.	742.	721.		
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
HYDROGRAPH AT	LC12A	.02	1	FLOW	(35.)	34.	34.	32.	32.	31.	30.	DARF = 1.00	SMITH'S SYSTEM
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50		
HYDROGRAPH AT	95B1	.01	1	FLOW	22.	21.	21.	20.	20.	20.	19.		
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50		
COMBINED AT	CP11AA	1.40	1	FLOW	870.	849.	839. (822.)	797.	776.	766.	744.	DARF = 0.954	MAINLINE + SMITH'S SYSTEM
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
ROUTED TO	CP11AAR	1.40	1	FLOW	869.	848.	838.	796.	775.	765.	743.		
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
HYDROGRAPH AT	LC12D	.00	1	FLOW	(8.)	7.	7.	7.	7.	7.	6.	DARF = 1.00	REESE SYSTEM
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50		
HYDROGRAPH AT	LC12C	.00	1	FLOW	(4.)	4.	4.	3.	3.	3.	3.	DARF = 1.00	CHASON SYSTEM
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50		
HYDROGRAPH AT	95B2	.01	1	FLOW	23.	22.	22.	21.	21.	20.	20.		
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50		
4 COMBINED AT	CP11AA2	1.42	1	FLOW	885.	863.	853. (835.)	810.	789.	778.	757.	DARF = 0.953	MAINLINE + REESE + CHASON
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
ROUTED TO	CP11AA2R	1.42	1	FLOW	884.	862.	852.	809.	788.	777.	756.		
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
HYDROGRAPH AT	95B3	.03	1	FLOW	56.	55.	54.	52.	51.	50.	49.		
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58		
2 COMBINED AT	CP11A	1.45	1	FLOW	923.	901.	890.	846.	824.	813.	790.		
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
DROGRAPH AT	LC11	.22	1	FLOW	264.	258.	254.	241.	234.	231.	224.		
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		
ROUTED TO	LC11R	.22	1	FLOW	264. (241.)	257.	254.	241.	234.	231.	224.	DARF = 0.991	KANSAS SYSTEM
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75		

						NEBRASKA SYSTEM						
HYDROGRAPH AT												
+	LC12B	.03	1	FLOW	(38.)	37.	37.	35.	34.	33.	32.	DARF=1.00
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
						(294) KANSAS + NEBRASKA (DECATUR SYSTEM)						
COMBINED AT												
	CP11C	.25	1	FLOW	297	290.	286.	271.	264.	260.	253.	DARF= 0.99
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO												
+	CP11CR	.25	1	FLOW	297.	290.	286.	271.	264.	260.	252.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
							(1135) MAINLINE + DECATUR SYSTEM					
2 COMBINED AT												
+	CP12	1.70	1	FLOW	1220.	1191.	1176.	1117.	1087.	1072.	1043.	DARF= 0.942
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO												
+	CP12R	1.70	1	FLOW	1220.	1190.	1175.	1116.	1086.	1072.	1042.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
						WESTERN HIGH SCHOOL						
HYDROGRAPH AT												
+	LC14	.05	1	FLOW	(71)	69.	68.	64.	62.	61.	60.	DARF=1.00
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	95C1	.02	1	FLOW	36.	35.	35.	33.	32.	32.	31.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
							(1197) MAINLINE + WESTERN H.S.					
3 COMBINED AT												
+	CP13A	1.77	1	FLOW	1294.	1262.	1246.	1182.	1151.	1135.	1103.	DARF= 0.939
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	
ROUTED TO												
+	CP13AR	1.77	1	FLOW	1292.	1261.	1245.	1182.	1150.	1135.	1103.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT												
+	95C2	.04	1	FLOW	54.	53.	52.	49.	48.	47.	46.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
	CP13B	1.81	1	FLOW	1338.	1305.	1289.	1223.	1191.	1175.	1142.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT												
+	OG11	.10	1	FLOW	154.	150.	148.	140.	136.	134.	129.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
DIVERSION TO												
+	OG11D	.10	1	FLOW	109.	105.	103.	95.	91.	89.	84.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	DIV1	.10	1	FLOW	45.	45.	45.	45.	45.	45.	45.	
				TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33	
ROUTED TO												
+	WRT1	.10	1	FLOW	45.	45.	45.	45.	45.	45.	45.	
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.42	
HYDROGRAPH AT												
+	VGO11	.01	1	FLOW	23.	22.	22.	21.	21.	20.	20.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
+	WCPR	.12	1	FLOW	68.	67.	67.	66.	66.	65.	65.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
+	WRT1A	.12	1	FLOW	67.	67.	67.	66.	65.	65.	64.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	WA01	.08	1	FLOW	108.	105.	103.	98.	95.	94.	91.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	WA03	.10	1	FLOW	159.	155.	153.	145.	141.	139.	135.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
COMBINED AT												
	WCP1	.29	1	FLOW	334.	327.	323.	309.	302.	298.	291.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
+	WRT2	.29	1	FLOW	324.	317.	314.	300.	294.	290.	283.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	

HYDROGRAPH AT												
+	WA04	.10	1	FLOW	134.	130.	129.	122.	119.	117.	114.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
COMBINED AT												
	WCP2	.39	1	FLOW	458.	448.	443.	422.	412.	407.	397.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO												
+	WRT3	.39	1	FLOW	447.	437.	432.	411.	401.	396.	386.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT												
+	WA06	.07	1	FLOW	99.	97.	96.	91.	88.	87.	85.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
2 COMBINED AT												
+	WCP3	.47	1	FLOW	546.	534.	527.	502.	489.	483.	471.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO												
+	WRT4	.47	1	FLOW	536.	524.	518.	494.	482.	476.	464.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT												
+	WA07	.05	1	FLOW	74.	72.	71.	67.	65.	65.	63.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT												
+	WCP4	.51	1	FLOW	586.	572.	566.	539.	526.	519.	506.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO												
+	WRT5	.51	1	FLOW	582.	569.	562.	535.	521.	514.	500.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT												
+	WA09	.05	1	FLOW	75.	73.	73.	69.	67.	66.	64.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
2 COMBINED AT												
	WCP5	.57	1	FLOW	649.	634.	626.	596.	580.	572.	557.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
TED TO												
+	WRT6	.57	1	FLOW	633.	617.	610.	579.	564.	557.	543.	
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	
HYDROGRAPH AT												
+	WA8	.20	1	FLOW	260.	253.	250.	236.	229.	226.	219.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO												
+	R/WA8	.20	1	FLOW	252.	245.	241.	229.	222.	217.	212.	
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	
HYDROGRAPH AT												
+	WA10	.20	1	FLOW	191.	185.	182.	171.	165.	162.	157.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
3 COMBINED AT												
+	CP14	.97	1	FLOW	1076.	1046.	1030.	977.	945.	931.	907.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
DIVERSION TO												
+	WA10W	.97	1	FLOW	826.	796.	780.	727.	695.	681.	657.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT												
+	WA10D	.97	1	FLOW	250.	250.	250.	250.	250.	250.	250.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
ROUTED TO												
+	R/CP14	.97	1	FLOW	250.	250.	250.	250.	250.	250.	250.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	LC13	.17	1	FLOW	232.	226.	223.	212.	206.	203.	198.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
COMBINED AT												
	CP15	1.14	1	FLOW	482.	476.	473. [471]	462.	456.	453.	448.	DARF = 0.964
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
2 COMBINED AT												
+	CP15A	2.95	1	FLOW	1815.	1776.	1756.	1678. [1659]	1639.	1620.	1581.	DARF = 0.921
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	

[471] LV CREEK LATERAL

[1659] MAINLINE + LV CREEK LATERAL

ROUTED TO	CP15AR	2.95	1	FLOW	1800.	1761.	1743.	1667.	1629.	1610.	1572.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
"DROGRAPH AT	1-GOLF	.11	1	FLOW	79.	76.	75.	70.	68.	66.	64.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	1-GOLF-R	.11	1	FLOW	78.	75.	74.	69.	67.	65.	63.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	1-OB	.07	1	FLOW	65.	63.	62.	58.	56.	55.	53.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	1-VO	.08	1	FLOW	97.	94.	93.	88.	86.	84.	82.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	NODE	.08	1	FLOW	96.	93.	92.	87.	85.	83.	81.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT	NODE-B	.25	1	FLOW	219.	213.	210.	197.	190.	187.	181.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO	NODE-B-R	.25	1	FLOW	218.	212.	208.	196.	189.	186.	180.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT	2a-ELP	.06	1	FLOW	80.	78.	77.	72.	70.	69.	66.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	NODE	.06	1	FLOW	78.	76.	75.	70.	68.	67.	65.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67
2 COMBINED AT	NODE-AK	.32	1	FLOW	285.	277.	272.	256.	248.	244.	235.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
JTED TO	NODE	.32	1	FLOW	285.	276.	272.	256.	248.	243.	235.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT	2-OB	.08	1	FLOW	77.	74.	73.	68.	66.	65.	63.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	2a-OAK	.05	1	FLOW	55.	53.	52.	49.	47.	46.	45.
+				TIME	3.58	3.58	3.58	3.58	3.67	3.67	3.67
ROUTED TO	NODE	.05	1	FLOW	55.	53.	52.	49.	47.	46.	45.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	2b-ELP	.05	1	FLOW	61.	59.	58.	55.	53.	52.	50.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	NODE-L	.10	1	FLOW	114.	111.	109.	102.	98.	97.	93.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	L-RT	.10	1	FLOW	111.	107.	106.	99.	95.	94.	90.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT	NODE-M	.50	1	FLOW	466.	452.	445.	417.	403.	396.	382.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	NODE-M-R	.50	1	FLOW	461.	447.	440.	412.	398.	392.	378.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
"DROGRAPH AT	2-VO	.06	1	FLOW	71.	69.	68.	64.	62.	61.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	NODE-N	.56	1	FLOW	532.	516.	508.	477.	461.	453.	437.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67

ROUTED TO											
+	N-RT	.56	1	FLOW	526.	510.	503.	472.	456.	449.	434.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
'DROGRAPH AT											
	3-VO	.07	1	FLOW	76.	74.	72.	68.	66.	65.	63.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	3-ELP	.07	1	FLOW	65.	63.	62.	58.	56.	55.	53.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	Q-RT	.07	1	FLOW	64.	62.	61.	57.	55.	54.	53.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	3-OB	.07	1	FLOW	65.	63.	62.	58.	56.	55.	53.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	NODE-P	.14	1	FLOW	129.	125.	123.	115.	112.	110.	106.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											
+	NODE	.14	1	FLOW	129.	125.	123.	115.	111.	109.	105.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT											
+	NODE-O	.77	1	FLOW	727.	706.	695.	653.	631.	621.	599.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											
+	O-RT	.77	1	FLOW	726.	705.	694.	651.	630.	619.	598.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	4a-VO	.05	1	FLOW	54.	53.	52.	49.	47.	46.	45.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT											
	NODE-AF	.81	1	FLOW	776.	753.	741.	696.	673.	662.	639.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
UTED TO											
+	AF-RT	.81	1	FLOW	774.	751.	740.	694.	671.	660.	638.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	4a-OB	.08	1	FLOW	73.	70.	69.	64.	62.	61.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AC-RT	.08	1	FLOW	73.	70.	69.	64.	62.	61.	58.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	5-OB	.01	1	FLOW	10.	10.	10.	9.	9.	9.	9.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	3a-DR	.04	1	FLOW	47.	46.	45.	42.	41.	40.	39.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	S-RT	.04	1	FLOW	47.	45.	45.	42.	40.	40.	38.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	3a-OAK	.08	1	FLOW	92.	89.	88.	82.	79.	78.	75.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	NODE-R	.12	1	FLOW	135.	131.	129.	121.	117.	115.	110.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	R-RT	.12	1	FLOW	132.	128.	126.	118.	114.	112.	108.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
'DROGRAPH AT											
	4a-OAK	.07	1	FLOW	91.	88.	86.	81.	78.	77.	74.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	NODE-Y	.19	1	FLOW	222.	215.	212.	198.	191.	188.	181.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58

ROUTED TO											
+	Y-RT	.19	1	FLOW	219.	212.	208.	195.	188.	185.	178.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DROGRAPH AT											
	1aS-PUMP	.02	1	FLOW	30.	29.	29.	27.	27.	26.	26.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	NODE-Z	.21	1	FLOW	248.	241.	237.	222.	215.	211.	203.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	Z-RT	.21	1	FLOW	244.	236.	233.	218.	210.	207.	199.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	4-ELP	.03	1	FLOW	31.	30.	29.	27.	26.	25.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AA-RT	.03	1	FLOW	31.	30.	29.	27.	26.	25.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT											
+	NODE-AB	.25	1	FLOW	273.	264.	260.	243.	235.	231.	222.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	AB-RT	.25	1	FLOW	268.	260.	256.	240.	232.	228.	220.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
4 COMBINED AT											
+	NODE-AD	1.14	1	FLOW	1099.	1065.	1048.	981.	947.	931.	897.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AD-RT	1.14	1	FLOW	1096.	1062.	1045.	978.	945.	928.	895.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
	1-ST	.01	1	FLOW	13.	12.	12.	11.	11.	11.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
COMBINED AT											
+	NODE-AG	1.16	1	FLOW	1109.	1075.	1057.	989.	956.	939.	905.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AG-RT	1.16	1	FLOW	1105.	1071.	1053.	986.	953.	935.	902.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	#1-COMM	.01	1	FLOW	26.	26.	25.	24.	24.	23.	23.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	NODE-AH	1.17	1	FLOW	1124.	1090.	1072.	1004.	970.	953.	918.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AH-RT	1.17	1	FLOW	1109.	1076.	1059.	994.	961.	945.	912.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	6-OB	.01	1	FLOW	8.	8.	8.	7.	7.	7.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	2-ST	.05	1	FLOW	65.	63.	62.	59.	57.	56.	54.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	AN-RT	.05	1	FLOW	64.	62.	62.	58.	56.	55.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	#2-PUMP	.01	1	FLOW	16.	15.	15.	14.	14.	14.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
TED TO											
	#2-PUMP-	.01	1	FLOW	15.	15.	15.	14.	14.	14.	13.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	2-COMM	.02	1	FLOW	25.	24.	24.	22.	22.	21.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT											
+	3-COMM	.00	1	FLOW	9.	9.	8.	8.	8.	8.	8.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
COMBINED AT											
	NODE-AI	.03	1	FLOW	48.	47.	46.	44.	42.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	AI-RT	.03	1	FLOW	47.	46.	45.	43.	42.	41.	40.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	5-OAK	.06	1	FLOW	82.	80.	78.	74.	72.	71.	69.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	3-HOLM	.10	1	FLOW	114.	111.	110.	103.	100.	98.	95.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	T-RT	.10	1	FLOW	111.	108.	107.	100.	97.	96.	93.
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75
HYDROGRAPH AT											
+	4-HOLM	.10	1	FLOW	114.	111.	110.	103.	100.	98.	95.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT											
+	NODE-U	.20	1	FLOW	226.	220.	216.	204.	197.	194.	188.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	U-RT	.20	1	FLOW	223.	217.	213.	201.	195.	192.	185.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	4-DR	.02	1	FLOW	23.	22.	22.	20.	19.	19.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT											
	NODE-V	.22	1	FLOW	246.	239.	235.	221.	214.	211.	204.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
JTED TO											
+	V-RT	.22	1	FLOW	245.	238.	234.	220.	213.	210.	203.
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75
HYDROGRAPH AT											
+	1aN-PUMP	.02	1	FLOW	28.	27.	27.	26.	25.	25.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	NODE-W	.24	1	FLOW	267.	260.	256.	241.	233.	230.	222.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	W-RT	.24	1	FLOW	263.	256.	252.	237.	229.	226.	218.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	5-DR	.10	1	FLOW	166.	162.	160.	152.	149.	147.	143.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	NODE-AL	.34	1	FLOW	418.	407.	402.	380.	369.	364.	353.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AL-RT	.34	1	FLOW	414.	403.	398.	376.	365.	360.	349.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT											
+	NODE-AM	.44	1	FLOW	537.	523.	516.	488.	474.	467.	453.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	AM-RT	.44	1	FLOW	536.	522.	515.	487.	473.	466.	452.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DROGRAPH AT											
	7-OB	.02	1	FLOW	21.	20.	20.	19.	18.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	6-OAK	.02	1	FLOW	26.	26.	25.	24.	23.	23.	23.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58

6 COMBINED AT											
+	BASIN	1.70	1	FLOW	1754.	1703.	1676.	1574.	1524.	1498.	1447.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
	DBOKY	1.70	1	FLOW	31.	31.	31.	30.	30.	30.	30.
				TIME	6.25	6.25	6.17	6.17	6.17	6.17	6.17
			** PEAK STAGES IN FEET **								
			1	STAGE	44.51	44.20	44.05	43.47	43.18	43.04	42.76
				TIME	6.25	6.25	6.25	6.25	6.25	6.25	6.17
ROUTED TO											
+	ROKYDB	1.70	1	FLOW	31.	31.	31.	30.	30.	30.	30.
				TIME	6.50	6.50	6.50	6.42	6.42	6.42	6.42
HYDROGRAPH AT											
+	CH02A	.12	1	FLOW	156.	152.	150.	142.	138.	137.	133.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RCH02A	.12	1	FLOW	155.	149.	148.	141.	136.	134.	130.
				TIME	3.67	3.67	3.67	3.67	3.75	3.67	3.75
HYDROGRAPH AT											
+	CH02B	.05	1	FLOW	81.	79.	78.	73.	71.	70.	68.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	RCH02B	.05	1	FLOW	80.	76.	76.	71.	69.	68.	67.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	CH03	.07	1	FLOW	87.	85.	84.	80.	78.	76.	74.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	CH04	.19	1	FLOW	228.	222.	219.	208.	202.	199.	193.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
4 COMBINED AT											
	CCH04	.43	1	FLOW	550.	533.	527.	499.	484.	478.	464.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RCH04	.43	1	FLOW	507.	493.	488.	462.	450.	443.	431.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	CH05	.10	1	FLOW	121.	118.	116.	110.	107.	105.	102.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	CCH05	.53	1	FLOW	605.	588.	581.	550.	534.	527.	511.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RCH05	.53	1	FLOW	578.	562.	555.	526.	511.	504.	489.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00
HYDROGRAPH AT											
+	CH06	.04	1	FLOW	67.	65.	65.	61.	60.	59.	58.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	CCH06	.57	1	FLOW	599.	583.	576.	545.	530.	522.	507.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RCH06	.57	1	FLOW	475.	462.	456.	432.	420.	414.	402.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT											
+	CH07	.02	1	FLOW	23.	22.	22.	21.	20.	20.	19.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	CCH07	.59	1	FLOW	484.	471.	466.	441.	428.	422.	410.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO											
	RCH07	.59	1	FLOW	454.	442.	437.	414.	402.	396.	385.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT											
+	CH08	.07	1	FLOW	109.	106.	105.	100.	98.	97.	94.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58

ROUTED TO	RCH08	.07	1	FLOW	107.	105.	104.	99.	97.	95.	93.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROGRAPH AT	CH09	.12	1	FLOW	129.	126.	124.	118.	115.	113.	110.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83
3 COMBINED AT	CCH09	.78	1	FLOW	521.	507.	501.	475.	461.	454.	441.
+				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	RCH09	.78	1	FLOW	470.	458.	452.	429.	417.	411.	399.
+				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT	CH10A	.14	1	FLOW	163.	159.	156.	147.	143.	140.	136.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	CH11	.05	1	FLOW	69.	67.	66.	63.	62.	61.	59.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT	CCH11	.97	1	FLOW	514.	501.	495.	469.	457.	450.	437.
+				TIME	4.67	4.67	4.67	4.67	4.67	4.67	4.67
ROUTED TO	RCH11	.97	1	FLOW	503.	490.	484.	459.	446.	440.	427.
+				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83
HYDROGRAPH AT	CH13	.09	1	FLOW	137.	134.	132.	126.	123.	122.	119.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	CCH13	1.06	1	FLOW	529.	516.	509.	483.	470.	463.	450.
+				TIME	4.75	4.75	4.75	4.83	4.83	4.83	4.83
2 COMBINED AT	CHHN	2.76	1	FLOW	559.	545.	539.	512.	499.	492.	479.
				TIME	4.75	4.83	4.83	4.83	4.83	4.83	4.83
TED TO	RCHHN	2.76	1	FLOW	559.	545.	539.	512.	499.	492.	479.
+				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83
HYDROGRAPH AT	AL04	.25	1	FLOW	225.	219.	216.	205.	199.	196.	191.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RAL04	.25	1	FLOW	224.	218.	216.	204.	199.	196.	190.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT	AL06	.07	1	FLOW	75.	73.	72.	68.	66.	65.	63.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT	CAL06	.32	1	FLOW	292.	284.	281.	266.	258.	255.	247.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RAL06	.32	1	FLOW	289.	281.	278.	263.	256.	252.	245.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT	AL09	.10	1	FLOW	123.	120.	119.	112.	109.	108.	105.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	CAL09	.42	1	FLOW	376.	367.	362.	343.	333.	328.	319.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RAL09	.42	1	FLOW	356.	347.	342.	324.	315.	310.	301.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DROGRAPH AT	AL10	.15	1	FLOW	179.	175.	173.	164.	159.	157.	153.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	CAL10	.57	1	FLOW	492.	479.	473.	448.	435.	429.	416.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

ROUTED TO											
+	RAL10	.57	1	FLOW	486.	474.	467.	443.	430.	424.	412.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00
ROGRAPH AT											
	CH14A	.12	1	FLOW	145.	141.	139.	132.	128.	126.	123.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	CCH14A	.69	1	FLOW	596.	581.	573.	542.	527.	519.	504.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RCH14A	.69	1	FLOW	595.	580.	572.	541.	526.	518.	503.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT											
+	C2CH14A	3.45	1	FLOW	1072.	1045.	1031.	976.	949.	935.	908.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RCHHN	3.45	1	FLOW	1070.	1043.	1029.	974.	947.	933.	906.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	CH01	.12	1	FLOW	151.	147.	145.	138.	134.	132.	128.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RCH01	.12	1	FLOW	148.	145.	143.	135.	132.	130.	126.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	AL01A	.15	1	FLOW	151.	147.	145.	138.	134.	132.	128.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	AL02	.20	1	FLOW	219.	214.	211.	200.	194.	192.	186.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT											
+	CAL02	.47	1	FLOW	516.	503.	497.	471.	458.	451.	438.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
TED TO											
+	RAL02	.47	1	FLOW	416.	406.	400.	379.	368.	363.	352.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT											
+	AL03B	.07	1	FLOW	85.	83.	82.	78.	76.	75.	72.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RAL03B	.07	1	FLOW	85.	83.	82.	77.	76.	74.	72.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	AL03C	.11	1	FLOW	129.	126.	124.	118.	115.	113.	110.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT											
+	CAL03C	.64	1	FLOW	566.	552.	545.	516.	501.	494.	479.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RAL03C	.64	1	FLOW	562.	548.	541.	511.	497.	490.	475.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	AL05	.10	1	FLOW	92.	90.	89.	84.	82.	81.	78.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT											
+	CAL05	.74	1	FLOW	655.	638.	630.	596.	579.	570.	553.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RAL05	.74	1	FLOW	653.	636.	628.	594.	577.	569.	552.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROGRAPH AT											
	AL07	.11	1	FLOW	106.	103.	102.	97.	94.	93.	90.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT											
+	CAL07	.85	1	FLOW	759.	740.	730.	691.	671.	661.	642.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

ROUTED TO	RAL07	.85	1	FLOW	752.	733.	723.	685.	666.	657.	637.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DROGRAPH AT	AL11	.05	1	FLOW	75.	74.	73.	70.	68.	67.	65.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	AL08	.10	1	FLOW	122.	119.	118.	112.	109.	107.	104.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT	CAL08	1.00	1	FLOW	891.	869.	857.	811.	789.	778.	755.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RAL08	1.00	1	FLOW	887.	865.	853.	808.	785.	774.	751.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	AL12	.12	1	FLOW	120.	117.	116.	110.	107.	105.	102.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT	CAL12	1.12	1	FLOW	1006.	981.	967.	916.	890.	877.	852.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RAL12	1.12	1	FLOW	1002.	977.	964.	912.	886.	874.	848.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	AL13A	.07	1	FLOW	81.	79.	78.	73.	71.	70.	68.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT	AL14	.11	1	FLOW	120.	117.	116.	110.	107.	106.	103.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO	RAL14	.11	1	FLOW	89.	87.	86.	81.	79.	78.	76.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33
DROGRAPH AT	AL15	.22	1	FLOW	243.	238.	235.	225.	219.	217.	211.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT	CAL15	.33	1	FLOW	299.	292.	289.	275.	269.	265.	258.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO	MVVE	.33	1	FLOW	184.	177.	174.	160.	154.	150.	143.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	MVV	.33	1	FLOW	115.	115.	115.	115.	115.	115.	115.
+				TIME	3.50	3.50	3.50	3.50	3.58	3.58	3.58
ROUTED TO	RMVV	.33	1	FLOW	115.	115.	115.	115.	115.	114.	114.
+				TIME	5.00	4.92	4.92	4.83	4.83	4.83	4.75
HYDROGRAPH AT	AL16	.18	1	FLOW	154.	150.	148.	140.	136.	134.	130.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
5 COMBINED AT	CAL16	5.15	1	FLOW	2393.	2334.	2304.	2186.	2127.	2098.	2038.
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	OK06	.18	1	FLOW	201.	196.	194.	184.	179.	176.	172.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO	ROK06	.18	1	FLOW	137.	134.	132.	126.	122.	121.	117.
+				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33
DROGRAPH AT	OK07A	.20	1	FLOW	243.	236.	233.	219.	212.	209.	202.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	CSEDM	.38	1	FLOW	282.	274.	270.	254.	247.	243.	235.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT											
+	SA01	.06	1	FLOW	80.	78.	77.	73.	71.	70.	67.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
	RSA01	.06	1	FLOW	65.	64.	63.	59.	57.	56.	55.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	SA02	.13	1	FLOW	155.	151.	150.	142.	138.	136.	133.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	CSA02	.19	1	FLOW	221.	215.	212.	201.	196.	193.	187.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											
+	RSA02	.19	1	FLOW	176.	171.	169.	160.	156.	154.	149.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT											
+	SA04	.11	1	FLOW	139.	135.	134.	127.	124.	122.	119.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	CSA04	.30	1	FLOW	288.	281.	277.	263.	256.	252.	245.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RSA04	.30	1	FLOW	208.	203.	200.	190.	185.	182.	177.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT											
+	SA05	.26	1	FLOW	221.	215.	212.	201.	195.	192.	186.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	CSA05	.56	1	FLOW	379.	370.	365.	345.	336.	331.	321.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT											
+	OBAED	.94	1	FLOW	590.	575.	568.	538.	522.	515.	500.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
UTED TO											
+	RSA05	.94	1	FLOW	590.	575.	567.	537.	522.	514.	499.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT											
+	OK07B	.09	1	FLOW	119.	116.	114.	107.	104.	102.	99.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	COK07	1.03	1	FLOW	623.	606.	598.	566.	550.	542.	526.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO											
+	ROK07	1.03	1	FLOW	623.	606.	598.	566.	550.	542.	526.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO											
+	RCAME	1.03	1	FLOW	623.	606.	598.	566.	550.	542.	526.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08
HYDROGRAPH AT											
+	OK01	.03	1	FLOW	42.	40.	40.	38.	36.	36.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	ROK01	.03	1	FLOW	30.	29.	28.	27.	26.	25.	25.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	OK02	.06	1	FLOW	78.	76.	75.	71.	69.	68.	66.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	ROK02	.06	1	FLOW	60.	58.	57.	54.	52.	52.	50.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DROGRAPH AT											
	OK03	.24	1	FLOW	236.	230.	226.	214.	208.	205.	199.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT											
+	COK03	.33	1	FLOW	324.	316.	311.	294.	286.	281.	273.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83

ROUTED TO	ROK03	.33	1	FLOW	271.	264.	260.	246.	239.	235.	228.
+				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROGRAPH AT	OK04	.19	1	FLOW	118.	114.	112.	103.	99.	97.	93.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	COK04	.52	1	FLOW	377.	366.	361.	339.	328.	323.	312.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO	ROK04	.52	1	FLOW	303.	295.	290.	273.	264.	260.	251.
+				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT	OK05	.07	1	FLOW	69.	68.	67.	63.	61.	60.	58.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT	COK05	.59	1	FLOW	333.	324.	319.	299.	290.	285.	276.
+				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	ROK05	.59	1	FLOW	333.	323.	319.	299.	290.	285.	275.
+				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	RK05A	.59	1	FLOW	333.	323.	318.	299.	289.	285.	275.
+				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	RK05B	.59	1	FLOW	333.	323.	318.	299.	289.	284.	275.
+				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT	OK08	.12	1	FLOW	105.	103.	101.	96.	94.	93.	90.
+				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
3 COMBINED AT	COK08	1.74	1	FLOW	1037.	1009.	995.	941.	913.	900.	872.
+				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
TED TO	RK102	1.74	1	FLOW	1036.	1009.	995.	940.	913.	899.	872.
+				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO	RK12X8	1.74	1	FLOW	1036.	1009.	995.	940.	913.	899.	872.
+				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT	CH10B	.10	1	FLOW	117.	113.	112.	105.	102.	100.	97.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	CH12	.09	1	FLOW	125.	122.	120.	114.	111.	110.	107.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT	CCH12	1.93	1	FLOW	1121.	1091.	1076.	1017.	987.	972.	942.
+				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO	RCH12	1.93	1	FLOW	1121.	1091.	1076.	1016.	986.	972.	942.
+				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT	CH14B	.04	1	FLOW	68.	66.	65.	62.	61.	60.	59.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CCH14B	1.97	1	FLOW	1137.	1106.	1091.	1030.	1000.	985.	954.
+				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08
ROUTED TO	12X8	1.97	1	FLOW	1137.	1106.	1091.	1030.	1000.	985.	954.
+				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08
ROGRAPH AT	AL13B	.07	1	FLOW	81.	79.	78.	73.	71.	70.	68.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	CCH13B	2.04	1	FLOW	1198.	1165.	1149.	1084.	1052.	1035.	1003.
+				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92

ROUTED TO											
+	14X6	2.04	1	FLOW	1197.	1165.	1149.	1084.	1051.	1035.	1003.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
VERSION TO											
	BOX1	2.04	1	FLOW	599.	582.	574.	542.	526.	518.	502.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	DIV12	2.04	1	FLOW	599.	582.	574.	542.	526.	518.	502.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	12X4	2.04	1	FLOW	599.	582.	574.	542.	526.	518.	501.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	BOX1	.00	1	FLOW	599.	582.	574.	542.	526.	518.	502.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	12X4B	.00	1	FLOW	599.	582.	574.	542.	526.	518.	501.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT											
+	CMEDWD	7.20	1	FLOW	3590.	3499.	3453.	3270.	3178.	3133.	3041.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	ALG1	7.20	1	FLOW	3584.	3493.	3446.	3263.	3172.	3126.	3034.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	ALG3	7.20	1	FLOW	3579.	3489.	3442.	3259.	3167.	3122.	3030.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	MEDB	.29	1	FLOW	188.	182.	178.	164.	158.	154.	148.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
	MVVE	.00	1	FLOW	184.	177.	174.	160.	154.	150.	143.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
JTED TO											
+	RMVVE	.00	1	FLOW	176.	170.	166.	153.	147.	144.	137.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
3 COMBINED AT											
+	MEDSPL	7.49	1	FLOW	3902.	3799.	3747.	3539.	3435.	3384.	3280.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	MEDET	7.49	1	FLOW	1935.	1840.	1789.	1564.	1428.	1361.	1328.
				TIME	5.17	5.17	5.17	5.25	5.33	5.42	5.42
			** PEAK STAGES IN FEET **								
			1	STAGE	2111.99	2111.82	2111.73	2111.34	2111.11	2110.95	2110.56
				TIME	5.17	5.17	5.17	5.25	5.33	5.42	5.42
HYDROGRAPH AT											
+	95D1	.03	1	FLOW	48.	47.	47.	45.	44.	43.	42.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT											
+	MEATOT	10.47	1	FLOW	2609.	2494.	2461.	2358.	2303.	2275.	2219.
				TIME	5.00	5.08	3.75	3.83	3.83	3.83	3.83
ROUTED TO											
+	MEATOTR	10.47	1	FLOW	2606.	2493.	2456.	2357.	2301.	2274.	2218.
				TIME	5.08	5.08	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	95D2	.03	1	FLOW	50.	49.	48.	46.	45.	44.	43.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	CP15B	10.50	1	FLOW	2612.	2511.	2482.	2380.	2324.	2296.	2240.
				TIME	5.00	3.75	3.75	3.83	3.83	3.83	3.83
DROGRAPH AT											
	RET1	.00	1	FLOW	826.	796.	780.	727.	695.	681.	657.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											
+	RET1R	.00	1	FLOW	807.	780.	766.	715.	687.	673.	649.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83

1336 MEADOWS OUTFALL
DARF = 0.885

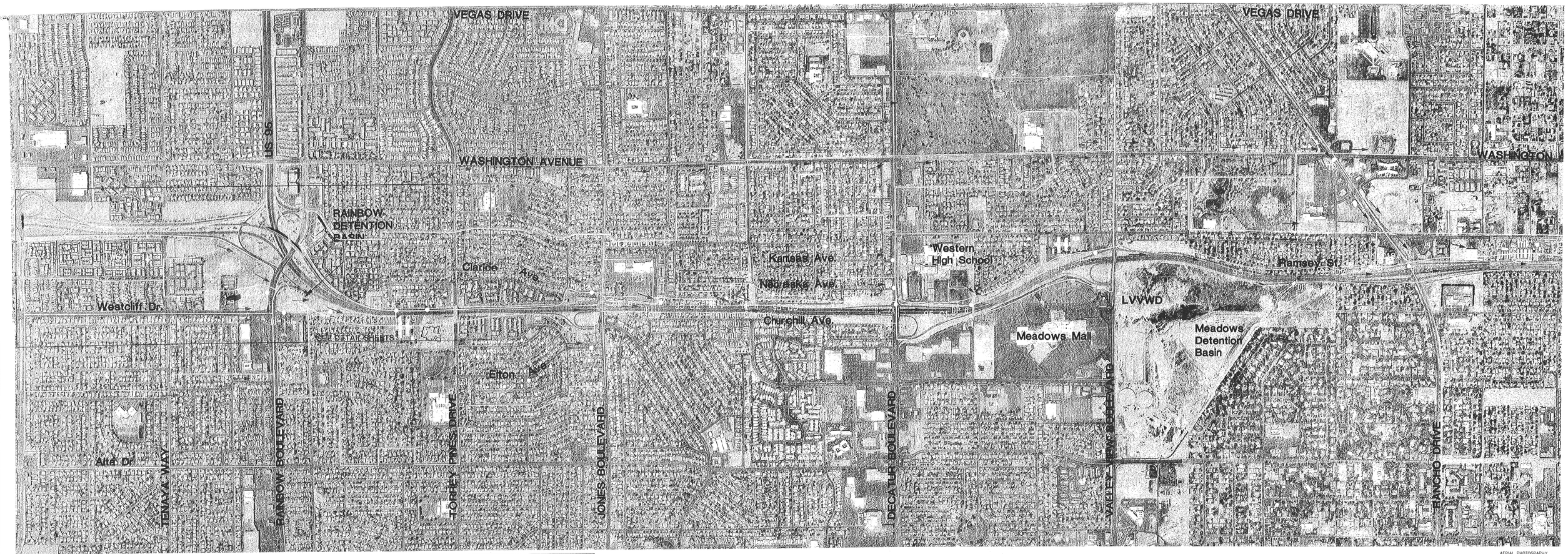
HYDROGRAPH AT												
+	WA12	.06	1	FLOW	88.	85.	84.	80.	78.	77.	74.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
COMBINED AT												
	WCP6	.06	1	FLOW	877.	846.	829.	772.	739.	724.	696.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO												
+	WRT7	.06	1	FLOW	869.	840.	824.	769.	738.	723.	696.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
HYDROGRAPH AT												
+	WA11	.06	1	FLOW	72.	70.	69.	65.	63.	62.	60.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT												
+	WA13	.17	1	FLOW	210.	204.	202.	191.	186.	183.	178.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
3 COMBINED AT		AREA=1.26										
+	WCP7	.29	1	FLOW	1108.	1074.	1055 (1037)	987.	950.	933.	900.	DARF = 0.96
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
								WASHINGTON WEST OF RANCHO				
DIVERSION TO		AREA=1.26										
+	RACPL	.29	1	FLOW	69.	65.	64 (62)	57.	53.	52.	49.	DARF = 0.96
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
								SPLIT TOWARDS RAMSEY				
HYDROGRAPH AT												
+	SPLT1	.29	1	FLOW	1040.	1008.	991.	930.	897.	881.	852.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
DIVERSION TO												
+	RACPL2	.29	1	FLOW	407.	394.	388.	365.	353.	347.	337.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
HYDROGRAPH AT		AREA=1.26										
+	SPLT2	.29	1	FLOW	632.	614.	604 (594)	565.	544.	534.	515.	DARF = 0.96
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
								RANCHO SOUTH OF WASHINGTON				
HYDROGRAPH AT												
+	SD	.00	1	FLOW	109.	109.	109.	109.	109.	109.	109.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
COMBINED AT												
+	CP17C	.29	1	FLOW	741.	723.	713.	674.	653.	643.	624.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
HYDROGRAPH AT												
+	LC18A	.01	1	FLOW	12.	12.	12.	11.	11.	11.	10.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT		AREA=1.27										
+	CPRAC	.30	1	FLOW	744.	726.	715 (705)	677.	655.	645.	626.	DARF = 0.959
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
								RANCHO SYSTEM				
DIVERSION TO												
+	RACPL3	.30	1	FLOW	744.	726.	715.	677.	655.	645.	626.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
HYDROGRAPH AT												
+	SPLT3	.30	1	FLOW	0.	0.	0.	0.	0.	0.	0.	
				TIME	.08	.08	.08	.08	.08	.08	.08	
HYDROGRAPH AT												
+	LC16	.06	1	FLOW	64.	62.	61.	57.	55.	54.	52.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO												
+	LC16R	.06	1	FLOW	63.	61.	60.	56.	54.	53.	51.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT												
+	LC18	.05	1	FLOW	89.	87.	86.	82.	80.	79.	77.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT												
+	RACPL1	.00	1	FLOW	69.	65.	64.	57.	53.	52.	49.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
COMBINED AT												
	CPBON	.11	1	FLOW	184.	178.	174.	160.	153.	149.	142.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO												
+	CPBONR	.11	1	FLOW	182.	175.	172.	158.	151.	147.	140.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	

HYDROGRAPH AT	LC17	.10	1	FLOW	105.	101.	100.	94.	91.	89.	86.
+				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75
COMBINED AT	CPRAM	AREA=1.18 .21	1	FLOW	287.	277.	272. (268)	251.	241.	236.	227. DARF=0.963
+				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75
3 COMBINED AT	CP15C	11.01	1	FLOW	2853.	2786.	2752.	2619.	2552.	2519.	2453.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT	RACPL3	.00	1	FLOW	744.	726.	715.	677.	655.	645.	626.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT	CP17D	11.01	1	FLOW	3581.	3493.	3448.	3282.	3196.	3154.	3071.
+				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83
ROUTED TO	CP17R	11.01	1	FLOW	3558.	3480.	3439.	3280.	3195.	3152.	3069.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT	95E	.04	1	FLOW	62.	61.	60.	58.	57.	56.	55.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	CP18	11.05	1	FLOW	3613.	3528.	3487.	3326.	3240.	3197.	3112.
+				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT	LC19	.07	1	FLOW	108.	106.	105.	99.	97.	96.	93.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO	BON	.07	1	FLOW	34.	34.	34.	34.	34.	34.	34.
+				TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT	DIV2	.07	1	FLOW	74.	72.	71.	65.	63.	62.	59.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DROGRAPH AT	LC20	.05	1	FLOW	53.	51.	51.	48.	46.	45.	44.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	CP19A	.12	1	FLOW	119. (118) NORTH CHANNEL (AHERN)	115.	113.	106.	102.	100.	96. DARF=0.995
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CPMK	11.17	1	FLOW	3704.	3612.	3565.	3387.	3298.	3253.	3166.
+				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83
HYDROGRAPH AT	RET	.00	1	FLOW	34.	34.	34.	34.	34.	34.	34.
+				TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33
2 COMBINED AT	CP19B	11.17	1	FLOW	3738.	3646.	3599.	3421.	3332.	3287.	3200.
+				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83

1

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

US 95 WIDENING PROJECT
OFF-SITE SUB-BASINS



Washington Sub-basins
Las Vegas Creek Sub-basins
Design Point

AERIAL PHOTOGRAPHY
FLIGHT DATE: SPRING 2002

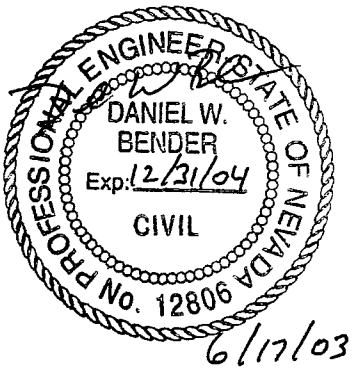
DATE: August 21, 2002
WORK ORDER: 5017
DRAWN BY: TH
DRAWING NAME: o:\projects\projects\5017-01\dwg\5017dwg05-basins.mxd

vtn nevada
2727 South Rainbow Boulevard
Las Vegas, Nevada 89146-5148
Tel. (702) 873-7550
Fax (702) 362-2597
Web Site http://www.vtnnv.com

APPENDIX D

Hydraulics

vtn nevada
CONSULTING ENGINEERS • PLANNERS • SURVEYORS
PROVIDING QUALITY PROFESSIONAL SERVICES SINCE 1960



June 17, 2003

Paul Frost, P.E.
1263 South Stewart Street - Room 401
Carson City Nevada 89712

Re: **US95 Widening Project**
Project No.: **#72807**
Subject: **Addendum #1 to *Final Overall Project Drainage Design Report***

Dear Paul:

Please find attached calculations that support the design of the Rancho Lateral Project. The Rancho Lateral facilities are discussed in the text of the report and the design drawings are provided in Appendix A. The attached calculations include hydraulic modeling for the RCB; drop inlet interception calculations; and HGL calculations for the storm drain laterals. The following is a brief description of the design criteria and calculation methods utilized:

Hydraulic Modeling for RCB (Appendix H-1, WSPG Output) – The Rancho Lateral was designed in accordance with the criteria and methods discussed in Section 2.4, *Storm Drain Systems*, of the report. The output from the WSPG model is included in the attached Appendix H-1.

Drop Inlet Interception (Appendix H-2, Drop Inlet Calculations) - The interception rates of inlets along Washington Avenue and Rancho Drive have been determined using the HEC-22 calculation method, as well as a modified HEC-22 method. The typical HEC-22 method has been used in locations where the expected water surface is within the gutter section of the roadway. This method has been modified for deeper flows because HEC-22 is an empirical method intended for flow within the gutter section and without modifications, the results are unreasonable. The method was modified by using a spread width representative of the flow upstream of the inlet, typically the top width of the flow to the crown in the street. The standard HEC-22 method uses a spread width calculated based on the modified Manning's equation (equation 4-2, page 4-9).

Spreadsheets have been developed to design the drop inlets in accordance to the procedures outlined in HEC-22. HEC-22 equations are embedded in the spreadsheets, but a step-by-step summary of how these spreadsheets perform the calculations is included with each spreadsheet. Copies of the drop inlet design spreadsheets are found in Appendix H-2 (attached). For the modified HEC-22 method, the inlet calculations show a spread width highlighted in gray.

A clogging factor of 50% is used in these calculations. The clogging factor is applied geometrically to the two trench drains (facilities 1.1 and 1.3) because of their large size and applied to the efficiency for all other inlets.

Storm Drain Laterals (Appendix H-3, Pipeline Calculations) - The hydraulic calculations for the storm drain laterals were performed using the energy method, as set forth in Standard Form 6 of the CCRFCD Flood Control Manual. The input variables for this method include the design flow, pipe size, pipe material, downstream and upstream inverts, the length of pipe, and the downstream starting depth. The downstream starting depth is obtained from WSPG model of the Rancho Lateral RCB, at the point where the lateral connects into the RCB. The spreadsheet is used to compute the HGL for the storm drain system. Storms drain calculations are found in Appendix H-3 (attached).

Also attached is a revised page number "v" from the *Final Overall Project Drainage Design Report* Table of Contents. Please replace the existing page "v" with the attached, and insert Appendix H in the appropriate section of the report.

If you have any questions or wish to discuss this further, please contact me at (702) 247-4020.

Sincerely,

Daniel W. Bender, P.E.
Project Manager

cc: 1-Mike McFall, PBSJ
1-Chad Anson, PTG
1-Paul Wolf, PBQD
2-Greg McDermott, CLV
2-Steve Parish, CCRFCD
1-John Terry, NDOT
1-Amir Soltani, NDOT
1-Phil Slagel, NDOT
4-VTN, File

WSPG Models

Rancho Lateral Model
Rancho1TS.dat

```
T1 U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK  100 YEAR  FLOWS                1
T2 "QD"20+03.50 TO "WA"9+10.00
T3 PREPARED BY VTN - TAM  UPDATED: 11/21/03     FILE: RANCHO1TS.WSW
SO    2003.50  630.052  5       .013                    630.711          12.2
R     2060.26  630.394  5       .013
TS    2062.76  630.409  4       .013
R     2107.88  630.680  4       .013
JX    2107.88  630.680  4 10    .013     1.813          630.750          20.5
R     2120.26  630.754  4       .013                                     2.7
R     2260.26  631.765  4       .013                                     5.1
R     2333.26  632.291  4       .013                                    29.7
JX    2333.26  632.291  4 14    .013     0.021          633.500          90.0
R     2478.26  633.335  4       .013
JX    2478.26  633.335  4 14    .013     0.022          634.820          90.0
R     2633.26  634.458  4       .013                                     3.8
JX    2633.26  634.458  4 14    .013     0.023          635.650          90.0
R     2640.26  634.508  4       .013
R     2684.26  634.826  4       .013
JX    2684.26  634.826  4 13    .013     0.096          635.100          90.0
R     2715.26  635.050  4       .013
R     2723.26  635.144  4       .013
JX    2723.26  635.144  4 12    .013     0.182          635.650          90.0
R     2757.01  635.542  4       .013
JX    2757.01  635.542  4 12    .013     0.901          636.150          90.0
R     2772.66  635.730  4       .013
JX    2772.66  635.730  4 10    .013     3.241          635.950          90.0
R     2789.63  635.931  4       .013
JX    2790.69  635.943  4 12    .013     1.793          636.100          57.0
R     2793.15  635.969  4       .013
TS    2795.55  635.997  6       .013
R     2846.93  636.159  6       .013                                    52.3
JX    2846.93  636.159  6 11    .013     3.087          636.163          55.0
R     2848.16  636.163  6       .013
R     2863.16  636.238  6       .013
JX    2863.16  636.238  6 12    .013     0.602          636.800          48.0
R     2885.50  636.350  6       .013                                    17.2
JX    2885.50  636.350  6  3    .013     2.934          636.350          60.0
R     2887.66  636.361  6       .013
TS    2887.67  636.411 13       .013
R     2900.32  637.000 13       .013                                             1
JX    2902.50  637.050 13       .013
R     2906.56  637.150 13       .013                                    90.0
JX    2912.56  637.200 12  5    .013     1.484          637.200           0.1
R     2925.65  637.600 12       .013
SH    2926.65  637.600 12       .013
CD    3  3                0.914    1.524
CD    4  3                1.829    3.658
CD    5  3                2.438    3.658
CD    6  3                1.829    2.438
CD    7  3                1.524    1.829
CD    8  3                1.219    1.829
CD    9  4                1.829
CD   10  4                1.524
CD   11  4                1.219
CD   12  4                1.067
CD   13  4                1.372
CD   14  4                0.457
Q             3.764   .0
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Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21
U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS
"QD"20+03.50 TO "WA"9+10.00
PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2003.500	630.052	1.175	631.227	19.963	4.65	1.10	632.33	.00	1.45	3.66	2.438	3.658	.00	0 .0
56.760	.0060					.0054	..31	1.17	1.37	1.15	.013	.00	.00	BOX
2060.260	630.394	1.219	631.613	19.963	4.48	1.02	632.63	.00	1.45	3.66	2.438	3.658	.00	0 .0
TRANS STR	.0060					.0051	..01	1.22	1.29		.013	.00	.00	BOX
2062.760	630.409	1.221	631.630	19.963	4.47	1.02	632.65	.00	1.45	3.66	1.829	3.658	.00	0 .0
18.744	.0060					.0049	..09	1.22	1.29	1.15	.013	.00	.00	BOX
2081.504	630.522	1.254	631.776	19.963	4.35	.96	632.74	.00	1.45	3.66	1.829	3.658	.00	0 .0
17.022	.0060					.0045	..08	1.25	1.24	1.15	.013	.00	.00	BOX
2098.526	630.624	1.316	631.939	19.963	4.15	.88	632.82	.00	1.45	3.66	1.829	3.658	.00	0 .0
7.367	.0060					.0039	..03	1.32	1.15	1.15	.013	.00	.00	BOX
2105.893	630.668	1.380	632.048	19.963	3.96	.80	632.85	.00	1.45	3.66	1.829	3.658	.00	0 .0
1.987	.0060					.0034	..01	1.38	1.08	1.15	.013	.00	.00	BOX
2107.880	630.680	1.448	632.128	19.963	3.77	.72	632.85	.00	1.45	3.66	1.829	3.658	.00	0 .0
JUNCT STR	.0000					.0028	..00	1.47	1.00		.013	.00	.00	BOX
2107.880	630.680	1.861	632.541	18.150	2.71	.38	632.92	.00	1.36	3.66	1.829	3.658	.00	0 .0
12.380	.0060					.0024	..03	.00	.64	1.08	.013	.00	.00	BOX
2120.260	630.754	1.830	632.584	18.150	2.71	.38	632.96	.00	1.36	3.66	1.829	3.658	.00	0 .0
.427	.0072					.0024	..00	.00	.64	1.01	.013	.00	.00	BOX

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21
U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS
"QD"20+03.50 TO "WA"9+10.00
PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2120.687	630.757	1.829	632.586	18.150	2.71	.38	632.96	1.83	1.36	3.66	1.829	3.658	.00	0 .0
4.940	.0072					.0014	..01	1.83	.64	1.01	.013	.00	.00	BOX
2125.628	630.793	1.778	632.571	18.150	2.79	.40	632.97	.00	1.36	3.66	1.829	3.658	.00	0 .0
HYDRAULIC JUMP														
---------- WARNING - Flow depth near top of box conduit ----------														
2125.628	630.793	1.011	631.804	18.150	4.91	1.23	633.03	.01	1.36	3.66	1.829	3.658	.00	0 .0
134.632	.0072					.0072	..97	1.02	1.56	1.01	.013	.00	.00	BOX
2260.260	631.765	1.013	632.778	18.150	4.90	1.22	634.00	.06	1.36	3.66	1.829	3.658	.00	0 .0
73.000	.0072					.0072	..52	1.08	1.55	1.01	.013	.00	.00	BOX
2333.260	632.291	1.011	633.302	18.129	4.90	1.23	634.53	.00	1.36	3.66	1.829	3.658	.00	0 .0
7.587	.0072					.0072	..05	1.01	1.56	1.01	.013	.00	.00	BOX
2340.847	632.346	1.011	633.356	18.129	4.90	1.23	634.58	.00	1.36	3.66	1.829	3.658	.00	0 .0
137.413	.0072					.0072	..99	1.01	1.56	1.01	.013	.00	.00	BOX
2478.260	633.335	1.008	634.343	18.107	4.91	1.23	635.57	.00	1.36	3.66	1.829	3.658	.00	0 .0
14.963	.0072					.0072	..11	1.01	1.56	1.01	.013	.00	.00	BOX
2493.223	633.443	1.008	634.451	18.107	4.91	1.23	635.68	.00	1.36	3.66	1.829	3.658	.00	0 .0
140.037	.0072					.0071	1.00	1.01	1.56	1.01	.013	.00	.00	BOX

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21
U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS
"QD"20+03.50 TO "WA"9+10.00
PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch

2633.260	634.458	1.015	635.473	18.084	4.87	1.21	636.68	.00	1.36	3.66	1.829	3.658	.00	0 .0
7.000	.0071					.0071	..05	1.01	1.54	1.01	.013	.00	.00	BOX
2640.260	634.508	1.015	635.523	18.084	4.87	1.21	636.73	.00	1.36	3.66	1.829	3.658	.00	0 .0
44.000	.0072					.0070	..31	1.01	1.54	1.01	.013	.00	.00	BOX
2684.260	634.826	1.021	635.847	18.084	4.84	1.19	637.04	.00	1.36	3.66	1.829	3.658	.00	0 .0
JUNCT STR	.0000					.0071	..00	1.02	1.53		.013	.00	.00	BOX
2684.260	634.826	1.003	635.829	17.988	4.90	1.23	637.05	.00	1.35	3.66	1.829	3.658	.00	0 .0
31.000	.0072					.0073	..22	1.00	1.56	1.00	.013	.00	.00	BOX
2715.260	635.050	1.002	636.052	17.988	4.91	1.23	637.28	.00	1.35	3.66	1.829	3.658	.00	0 .0
8.000	.0117					.0070	..06	1.00	1.56	.85	.013	.00	.00	BOX
2723.260	635.144	1.031	636.175	17.988	4.77	1.16	637.33	.00	1.35	3.66	1.829	3.658	.00	0 .0
JUNCT STR	.0000					.0070	..00	1.03	1.50		.013	.00	.00	BOX
2723.260	635.144	.995	636.139	17.806	4.89	1.22	637.36	.00	1.34	3.66	1.829	3.658	.00	0 .0
3.855	.0118					.0071	..03	.99	1.57	.84	.013	.00	.00	BOX
2727.115	635.189	1.007	636.197	17.806	4.83	1.19	637.39	.00	1.34	3.66	1.829	3.658	.00	0 .0
11.289	.0118					.0066	..07	1.01	1.54	.84	.013	.00	.00	BOX
2738.404	635.323	1.057	636.379	17.806	4.61	1.08	637.46	.00	1.34	3.66	1.829	3.658	.00	0 .0
7.718	.0118					.0057	..04	1.06	1.43	.84	.013	.00	.00	BOX

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21

U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS

"QD"20+03.50 TO "WA"9+10.00

PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2746.122	635.414	1.108	636.522	17.806	4.39	.98	637.51	.00	1.34	3.66	1.829	3.658	.00	0 .0
5.205	.0118					.0050	..03	1.11	1.33	.84	.013	.00	.00	BOX
2751.328	635.475	1.162	636.637	17.806	4.19	.89	637.53	.00	1.34	3.66	1.829	3.658	.00	0 .0
3.311	.0118					.0044	..01	1.16	1.24	.84	.013	.00	.00	BOX
2754.638	635.514	1.219	636.733	17.806	3.99	.81	637.55	.00	1.34	3.66	1.829	3.658	.00	0 .0
1.807	.0118					.0038	..01	1.22	1.15	.84	.013	.00	.00	BOX
2756.446	635.535	1.279	636.814	17.806	3.81	.74	637.55	.00	1.34	3.66	1.829	3.658	.00	0 .0
.564	.0118					.0034	..00	1.28	1.08	.84	.013	.00	.00	BOX
2757.010	635.542	1.342	636.884	17.806	3.63	.67	637.55	.00	1.34	3.66	1.829	3.658	.00	0 .0
JUNCT STR	.0000					.0023	..00	1.34	1.00		.013	.00	.00	BOX
2757.010	635.542	1.672	637.214	16.905	2.76	.39	637.60	.00	1.30	3.66	1.829	3.658	.00	0 .0
3.755	.0120					.0017	..01	1.67	.68	.81	.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
2760.765	635.587	1.594	637.182	16.905	2.90	.43	637.61	.00	1.30	3.66	1.829	3.658	.00	0 .0
2.050	.0120					.0018	..00	1.59	.73	.81	.013	.00	.00	BOX
2762.815	635.612	1.543	637.155	16.905	2.99	.46	637.61	.00	1.30	3.66	1.829	3.658	.00	0 .0
HYDRAULIC JUMP														

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21

U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS

"QD"20+03.50 TO "WA"9+10.00

PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2762.815	635.612	1.070	636.682	16.905	4.32	.95	637.63	.00	1.30	3.66	1.829	3.658	.00	0 .0
4.509	.0120					.0050	..02	1.07	1.33	.81	.013	.00	.00	BOX
2767.324	635.666	1.122	636.788	16.905	4.12	.86	637.65	.00	1.30	3.66	1.829	3.658	.00	0 .0
3.102	.0120					.0044	..01	1.12	1.24	.81	.013	.00	.00	BOX
2770.426	635.703	1.177	636.880	16.905	3.93	.79	637.67	.00	1.30	3.66	1.829	3.658	.00	0 .0
1.699	.0120					.0038	..01	1.18	1.16	.81	.013	.00	.00	BOX
2772.125	635.724	1.235	636.958	16.905	3.74	.71	637.67	.00	1.30	3.66	1.829	3.658	.00	0 .0

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
	.535 .0120					.0033	.00	1.23	1.08	.81	.013	.00	.00	BOX
2772.660	635.730	1.296	637.026	16.905	3.57	.65	637.67	.00	1.30	3.66	1.829	3.658	.00	0 .0
JUNCT STR	.0000					.0022	.00	1.30	1.00		.013	.00	.00	BOX
2772.660	635.730	1.873	637.603	13.664	2.04	.21	637.82	.00	1.12	3.66	1.829	3.658	.00	0 .0
	4.235 .0118					.0014	.01	1.87	.48	.70	.013	.00	.00	BOX
2776.895	635.780	1.829	637.609	13.664	2.04	.21	637.82	.00	1.12	3.66	1.829	3.658	.00	0 .0
	5.800 .0118					.0008	.00	1.83	.48	.70	.013	.00	.00	BOX
2782.695	635.849	1.743	637.592	13.664	2.14	.23	637.83	.00	1.12	3.66	1.829	3.658	.00	0 .0
	5.302 .0118					.0010	.01	1.74	.52	.70	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21

U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS

"QD"20+03.50 TO "WA"9+10.00

PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2787.998	635.912	1.662	637.573	13.664	2.25	.26	637.83	.00	1.12	3.66	1.829	3.658	.00	0 .0
	1.632 .0118					.0010	.00	1.66	.56	.70	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

2789.630	635.931	1.636	637.567	13.664	2.28	.27	637.83	.00	1.12	3.66	1.829	3.658	.00	0 .0
JUNCT STR	.0113					.0009	.00	1.64	.57		.013	.00	.00	BOX
2790.690	635.943	1.742	637.685	11.871	1.86	.18	637.86	.00	1.02	3.66	1.829	3.658	.00	0 .0
	2.460 .0106					.0007	.00	1.74	.45	.66	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

2793.150	635.969	1.712	637.681	11.871	1.90	.18	637.86	.00	1.02	3.66	1.829	3.658	.00	0 .0
TRANS STR	.0117					.0018	.00	1.71	.46		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

2795.550	635.997	1.518	637.515	11.871	3.21	.52	638.04	.02	1.34	2.44	1.829	2.438	.00	0 .0
	51.380 .0032					.0030	.15	1.54	.83	1.48	.013	.00	.00	BOX
2846.930	636.159	1.492	637.651	11.871	3.26	.54	638.19	.00	1.34	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0000					.0023	.00	1.49	.85		.013	.00	.00	BOX

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21

U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS

"QD"20+03.50 TO "WA"9+10.00

PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2846.930	636.159	1.912	638.071	8.784	1.97	.20	638.27	.00	1.10	2.44	1.829	2.438	.00	0 .0
	1.230 .0033					.0016	.00	1.91	.47	1.16	.013	.00	.00	BOX
2848.160	636.163	1.910	638.073	8.784	1.97	.20	638.27	.00	1.10	2.44	1.829	2.438	.00	0 .0
	15.000 .0050					.0016	.02	1.91	.47	.99	.013	.00	.00	BOX
2863.160	636.238	1.858	638.096	8.784	1.97	.20	638.29	.00	1.10	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0000					.0014	.00	.00	.47		.013	.00	.00	BOX
2863.160	636.238	1.904	638.142	8.182	1.83	.17	638.31	.00	1.05	2.44	1.829	2.438	.00	0 .0
	22.340 .0050					.0014	.03	.00	.43	.94	.013	.00	.00	BOX
2885.500	636.350	1.838	638.188	8.182	1.83	.17	638.36	.00	1.05	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0000					.0006	.00	1.84	.43		.013	.00	.00	BOX
2885.500	636.350	1.969	638.319	5.248	1.18	.07	638.39	.00	.78	2.44	1.829	2.438	.00	0 .0
	2.160 .0051					.0006	.00	1.97	.28	.68	.013	.00	.00	BOX
2887.660	636.361	1.959	638.320	5.248	1.18	.07	638.39	.00	.78	2.44	1.829	2.438	.00	0 .0
TRANS STR	4.9939							1.96	.28		.013	.00	.00	BOX
2887.670	636.411	.831	637.242	5.248	5.61	1.60	638.85	.00	1.20	1.34	1.370	.000	.00	0 .0
	2.866 .0466					.0183	.05	.83	2.14	.63	.013	.00	.00	PIPE
2890.535	636.544	.855	637.400	5.248	5.42	1.50	638.90	.00	1.20	1.33	1.370	.000	.00	0 .0
	3.335 .0466					.0165	.06	.86	2.03	.63	.013	.00	.00	PIPE

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21
U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS
"QD"20+03.50 TO "WA"9+10.00
PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2893.870	636.700	.891	637.591	5.248	5.17	1.36	638.95	.00	1.20	1.31	1.370	.000	.00	0 .0
2.690	.0466					.0147	..04	.89	1.87	.63	.013	.00	.00	PIPE
2896.560	636.825	.929	637.754	5.248	4.93	1.24	638.99	.00	1.20	1.28	1.370	.000	.00	0 .0
2.105	.0466					.0131	..03	.93	1.72	.63	.013	.00	.00	PIPE
2898.665	636.923	.971	637.894	5.248	4.70	1.12	639.02	.00	1.20	1.24	1.370	.000	.00	0 .0
1.655	.0466					.0117	..02	.97	1.58	.63	.013	.00	.00	PIPE
2900.320	637.000	1.016	638.016	5.248	4.48	1.02	639.04	.00	1.20	1.20	1.370	.000	.00	0 .0
JUNCT STR	.0229					.0107	..02	1.37	1.45		.013	.00	.00	PIPE
2902.500	637.050	1.043	638.093	5.248	4.36	.97	639.06	1.37	1.20	1.17	1.370	.000	.00	0 .0
1.709	.0246					.0101	..02	1.37	1.37	.77	.013	.00	.00	PIPE
2904.209	637.092	1.075	638.167	5.248	4.23	.91	639.08	1.37	1.20	1.13	1.370	.000	.00	0 .0
1.742	.0246					.0093	..02	1.37	1.29	.77	.013	.00	.00	PIPE
2905.951	637.135	1.131	638.266	5.248	4.03	.83	639.09	1.37	1.20	1.04	1.370	.000	.00	0 .0
.609	.0246					.0085	..01	1.37	1.15	.77	.013	.00	.00	PIPE
2906.560	637.150	1.198	638.348	5.248	3.84	.75	639.10	.00	1.20	.91	1.370	.000	.00	0 .0
JUNCT STR	.0083					.0131	..08	1.20	1.00		.013	.00	.00	PIPE
2912.560	637.200	1.575	638.775	3.764	4.27	.93	639.70	.00	1.01	.00	1.060	.000	.00	0 .0
13.090	.0306					.0181	..24	1.58	.00	.70	.013	.00	.00	PIPE

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date:11-21-2003 Time: 1: 4:21
U.S 95 WIDENING - RANCHO LATERAL RANCHO PEAK 100 YEAR FLOWS
"QD"20+03.50 TO "WA"9+10.00
PREPARED BY VTN - TAM UPDATED: 11/21/03 FILE: RANCHO1TS.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2925.650	637.600	1.412	639.012	3.764	4.27	.93	639.94	.00	1.01	.00	1.060	.000	.00	0 .0
1.000	.0306					.0188	..25	1.41	.00	.70	.013	.00	.00	PIPE
2926.650	637.600	1.412	639.012	3.764	4.27	.93	639.94	.00	1.01	.00	1.060	.000	.00	0 .0

Mainline Channel Model
US954A.dat

T1 U.S 95 WIDENING - MAINLINE CHANNEL
T2 OVERALL PROJECT
T3 PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

SO	752.20	621.418	3						
R	886.74	622.51	3		.013				
R	913.04	622.737	3		.013			30.1	
R	970.49	623.208	3		.013				
R	989.74	623.366	3		.013			22.1	
R	1000.00	623.450	3		.013				
WE	1000.00	623.450	1		.013				
R	1119.87	624.169	1		.013				
R	1207.00	624.692	1		.013			6.66	
JX	1209.00	624.704	1	10	.013	2.067	625.000	30.0	
R	1294.91	625.219	1		.013			6.56	
R	1479.13	626.325	1		.013				
R	1597.97	627.038	1		.013			13.62	
R	1829.95	628.430	1		.013				
R	1909.11	628.905	1		.013			9.07	
R	1935.00	629.059	1		.013				
TS	1978.00	629.317	19		.013				
JX	2003.50	629.673	16	22	.013	14.838	629.673	..001	
BX	2003.50	629.673	1		.013				
R	2070.00	630.600	1		.013				
R	2072.08	630.960	1		.013				
R	2102.30	630.762	1		.013			17.31	
R	2124.38	630.872	1		.013			12.65	
R	2200.00	631.250	1		.013				
TS	2212.00	631.310	21		.013				
JX	2234.00	631.420	16	7	.013	4.322	631.420	..001	
BX	2234.00	631.420	1		.013				
R	2274.61	631.623	1		.013				
R	2307.94	631.790	1		.013			7.64	
R	2422.09	632.360	1		.013				
R	2445.73	632.479	1		.013			5.42	
R	2479.67	633.071	1		.013				
R	2550.00	633.000	1		.013			16.22	
R	2557.50	633.071	1		.013				
TS	2560.00	633.095	2		.013				
R	2620.00	633.665	2		.013				
TS	2653.00	633.979	20		.013				
JX	2678.50	634.221	17	5	.013	8.552	634.221	..001	
BX	2678.50	634.221	3		.013				
R	2882.05	636.155	3		.013				
R	2982.54	637.109	3		.013			57.58	
R	3007.50	637.347	3		.013				
R	3050.00	637.750	3		.013			24.35	
R	3077.76	638.122	3		.013			15.90	
R	3200.00	639.757	3		.013				
R	3213.73	640.043	3		.013				
R	3230.40	640.389	3		.013			1.91	
R	3339.60	642.661	3		.013				
R	3449.70	644.953	3		.013				
R	3500.00	646.000	3		.013			3.84	
R	3699.21	647.379	3		.013			15.22	
R	3753.00	647.750	3		.013				
R	3863.32	648.302	3		.013				
BE	3863.32	648.302	17		.013				
JX	3879.36	648.823	24	7	.013	13.082	648.823	..001	
WX	3879.36	648.823	4		.013				
R	4048.71	654.327	4		.013				
R	4080.00	655.350	4		.013			7.17	
R	4110.77	655.504	4		.013			7.05	
R	4210.00	656.000	4		.013				
R	4411.96	659.308	4		.013				
R	4416.29	659.379	4		.013			1.08	
R	4449.85	659.599	4		.013			7.61	
R	4527.60	660.109	4		.013				
R	4565.19	660.355	4		.013			17.23	
R	4653.49	660.934	4		.013				
R	4675.65	661.080	4		.013			12.69	
R	4954.08	662.906	4		.013				
R	4961.40	662.954	4		.013			1.69	
R	5000.00	663.208	4		.013				
R	5103.13	664.706	4		.013				
TS	5114.13	664.956	30		.013				
JX	5124.20	665.185	30	8	.013	9.967	665.185	0.001	
WX	5124.20	665.185	6		.013				
R	5159.21	665.980	6		.013				
R	5192.28	666.731	6		.013			15.16	
R	5434.80	672.236	6		.013				
R	5455.27	672.700	6		.013			11.73	
R	5530.00	674.400	6		.013			3.30	
R	5534.54	674.554	6		.013			0.19	
R	5656.24	678.680	6		.013			5.38	
R	5734.00	681.312	6		.013				
R	5870.00	682.000	6		.013				
R	5939.67	685.725	6		.013				
R	5945.28	686.235	6		.013			0.13	
JX	5945.73	686.260	6	15	.013	1.303	687.000	90.0	
R	5950.00	686.500	6		.013			0.11	
R	5959.34	686.696	6		.013			0.24	
R	6007.78	687.707	6		.013				
JX	6008.23	687.717	6		.013	0.227	688.750	66.0	
R	6105.00	689.749	6		.013				
R	6220.03	690.899	6		.013				
R	6240.00	691.099	6		.013			2.29	
R	6254.94	691.248	6		.013			1.71	
R	6293.07	691.630	6		.013			4.0	
R	6392.56	692.625	6		.013				
JX	6395.00	692.649	6	11	.013	0.679	693.567	45.0	
R	6403.58	692.735	6		.013				
R	6578.78	694.487	6		.013			4.0	
R	6631.00	695.009	6		.013				
TS	6648.00	695.179	28		.013				
JX	6658.00	695.250	6	7	.013	9.572	695.560	..001	
R	6720.51	695.704	6		.013				

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R    6746.09  695.890  6       .013                                  14.65
R    6771.67  696.076  6       .013                                  14.65
R    6775.00  696.100  6       .013
R    6816.00  696.902  6       .013
JX   6818.50  696.931  6       .013    6.059          695.560          ..001
R    6821.00  697.000  6       .013
WX   6821.00  697.000 10       .013
R    6863.10  698.250 10       .013                                   10.0
JX   6865.34  698.300 10       .013
R    6952.93  699.250 10       .013                                    7.0
R    6955.17  699.300 10       .013                                          1
R    7065.68  700.500 10       .013                                          1
R    7065.92  700.550 10       .013
R    7123.80  700.950 10       .013                                          1
R    7126.04  701.000 10       .013                                          1
R    7235.64  701.750 10       .013
JX   7237.59  701.800 10 11    .013    2.124          703.100          ..001
R    7260.00  702.006 10       .013                                   34.0
R    7269.15  702.100 10       .013                                          1
R    7271.10  702.150 10       .013
R    7306.07  702.450 10       .013                                          1
R    7308.02  702.500 10       .013
R    7366.09  703.000 10       .013                                   35.0
R    7368.04  703.050 10       .013                                          1
R    7406.07  703.250 10       .013                                          1
R    7408.02  703.300 10       .013
R    7442.07  703.650 10       .013                                          1
R    7444.02  703.700 10       .013                                          1
R    7486.07  704.500 10       .013
R    7488.02  704.550 10       .013                                          1
R    7576.58  706.250 10       .013                                          1
R    7578.53  706.300 10       .013
R    7606.85  706.745 10       .013                                          1
R    7608.80  706.750 10       .013
R    7651.43  709.050 10       .013                                          1
R    7772.48  711.050 10       .013                                          1
R    7893.13  711.750 10       .013
R    8013.40  712.450 10       .013                                          1
R    8134.08  713.150 10       .013                                          1
JX   8234.45  713.750 12 11    .013    2.378          713.750          68.0                    1
R    8354.20  716.800 12       .013                                          1
R    8439.36  717.600 12       .013                                          1
SH   8439.36  717.600 12
CD   1  3   1    0.686    2.134     9.220
CD   2  3   1    0.686    2.134     8.611
CD   3  3   1    0.686    1.829     8.001
CD   4  3                1.829     3.658
CD   5  3                2.438     4.267
CD   6  3                1.829     2.438
CD   7  3                1.829     1.829
CD   8  3                1.524     1.829
CD   9  4                1.829
CD  10  4                1.524
CD  11  4                1.219
CD  12  4                1.067
CD  13  4                0.914
CD  14  4                0.762
CD  15  4                0.457
CD  16  3                2.134     9.220
CD  17  3                1.829     8.001
CD  18  3                1.219     3.048
CD  19  3                1.829    13.564
CD  20  3                2.438    12.954
CD  21  3                2.134    11.608
CD  22  3                2.438     3.658
CD  23  3   1    0.686    2.134     8.611
CD  24  3                1.829     6.045
CD  25  3                1.829     4.953
CD  26  3                1.829     4.267
CD  27  3                2.134     2.438
CD  28  3                2.134     4.724
CD  29  3                2.134     3.048
CD  30  3                1.829     4.657
Q            2.464  .0
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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
752.200	621.418	1.679	623.097	77.634	6.32	2.04	625.13	.00	1.83	8.00	1.829	8.001	.00	1 .7
134.540	.0082					.0078	1.06	1.68	1.63	1.67	.013	.00	.00	BOX
		WARNING - Flow depth near top of box conduit												
886.740	622.521	1.714	624.235	77.634	6.19	1.95	626.19	1.83	1.83	8.00	1.829	8.001	.00	1 .7
26.300	.0082					.0075	..20	1.83	1.58	1.67	.013	.00	.00	BOX
		WARNING - Flow depth near top of box conduit												
913.040	622.737	1.728	624.465	77.634	6.14	1.92	626.39	.00	1.83	8.00	1.829	8.001	.00	1 .7
57.450	.0082					.0072	..41	1.73	1.56	1.67	.013	.00	.00	BOX
		WARNING - Flow depth near top of box conduit												
970.490	623.208	1.781	624.989	77.634	5.96	1.81	626.80	1.83	1.83	8.00	1.829	8.001	.00	1 .7
19.250	.0082					.0067	..13	1.83	1.49	1.67	.013	.00	.00	BOX
		WARNING - Flow depth near top of box conduit												
989.740	623.366	1.809	625.175	77.634	5.87	1.75	626.93	.00	1.83	8.00	1.829	8.001	.00	1 .7
10.260	.0082					.0088	..09	1.81	1.46	1.67	.013	.00	.00	BOX
		WARNING - Flow depth near top of box conduit												

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	623.450	1.829	625.279	77.634	5.80	1.72	627.00	.00	1.83	8.00	1.829	8.001	.00	1 .7
WALL ENTRANCE														
1000.000	623.450	2.764	626.214	77.634	4.26	.93	627.14	.00	2.04	9.22	2.134	9.220	.00	1 .7
119.870	.0060					.0048	..58	2.76	.97	1.62	.013	.00	.00	BOX
1119.870	624.169	2.624	626.793	77.634	4.26	.93	627.72	.00	2.04	9.22	2.134	9.220	.00	1 .7
87.130	.0060					.0048	..42	.00	.97	1.61	.013	.00	.00	BOX
1207.000	624.692	2.573	627.265	77.634	4.26	.93	628.19	.00	2.04	9.22	2.134	9.220	.00	1 .7
JUNCT STR	.0060					.0046	..01	.00	.97		.013	.00	.00	BOX
1209.000	624.704	2.657	627.361	75.567	4.15	.88	628.24	.00	2.00	9.22	2.134	9.220	.00	1 .7
85.910	.0060					.0046	..39	.00	.94	1.58	.013	.00	.00	BOX
1294.910	625.219	2.583	627.802	75.567	4.15	.88	628.68	.00	2.00	9.22	2.134	9.220	.00	1 .7
184.220	.0060					.0046	..84	2.58	.94	1.58	.013	.00	.00	BOX
1479.130	626.325	2.321	628.646	75.567	4.15	.88	629.52	.00	2.00	9.22	2.134	9.220	.00	1 .7
66.988	.0060					.0046	..31	.00	.94	1.58	.013	.00	.00	BOX
1546.118	626.727	2.264	628.991	75.567	4.15	.88	629.87	.00	2.00	9.22	2.134	9.220	.00	1 .7
HYDRAULIC JUMP														

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1546.118	626.727	1.584	628.311	75.567	5.59	1.59	629.90	.05	2.00	9.22	2.134	9.220	.00	1 .7
51.852	.0060					.0060	..31	1.64	1.47	1.58	.013	.00	.00	BOX
1597.970	627.038	1.584	628.622	75.567	5.59	1.59	630.22	.00	2.00	9.22	2.134	9.220	.00	1 .7
45.964	.0060					.0060	..28	1.58	1.47	1.58	.013	.00	.00	BOX
1643.934	627.314	1.584	628.897	75.567	5.59	1.59	630.49	.00	2.00	9.22	2.134	9.220	.00	1 .7
186.016	.0060					.0057	1.06	1.58	1.47	1.58	.013	.00	.00	BOX

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1829.950	628.430	1.641	630.071	75.567	5.40	1.48	631.55	.05	2.00	9.22	2.134	9.220	.00	1 .7
41.074	.0060					.0053	..22	1.69	1.40	1.58	.013	.00	.00	BOX
1871.024	628.676	1.681	630.357	75.567	5.27	1.41	631.77	.05	2.00	9.22	2.134	9.220	.00	1 .7
38.086	.0060					.0048	..18	1.73	1.35	1.58	.013	.00	.00	BOX
1909.110	628.905	1.763	630.668	75.567	5.02	1.29	631.95	.00	2.00	9.22	2.134	9.220	.00	1 .7
12.860	.0059					.0043	..06	1.76	1.26	1.59	.013	.00	.00	BOX
1921.970	628.982	1.817	630.798	75.567	4.87	1.21	632.01	.00	2.00	9.22	2.134	9.220	.00	1 .7
10.269	.0059					.0039	..04	1.82	1.20	1.59	.013	.00	.00	BOX
1932.239	629.043	1.906	630.948	75.567	4.65	1.10	632.05	.00	2.00	9.22	2.134	9.220	.00	1 .7
2.761	.0059					.0034	..01	1.91	1.12	1.59	.013	.00	.00	BOX
1935.000	629.059	2.000	631.059	75.567	4.43	1.00	632.06	.00	2.00	9.22	2.134	9.220	.00	1 .7
TRANS STR	.0060					.0021	..09	2.00	1.04		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL

OVERALL PROJECT

PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1978.000	629.317	2.434	631.751	75.567	3.05	.47	632.22	.00	1.47	13.56	1.829	13.564	.00	0 .0
JUNCT STR	.0140							2.43	.72		.013	.00	.00	BOX
2003.500	629.673	.996	630.669	60.729	6.61	2.23	632.90	.00	1.64	9.22	2.134	9.220	.00	0 .0
BRIDGE EXIT														
2003.500	629.673	1.100	630.773	60.729	6.47	2.13	632.91	.00	1.73	9.22	2.134	9.220	.00	1 .7
13.809	.0139					.0106	..15	1.10	2.05	1.01	.013	.00	.00	BOX
2017.309	629.865	1.116	630.982	60.729	6.37	2.07	633.05	.00	1.73	9.22	2.134	9.220	.00	1 .7
31.774	.0139					.0097	..31	1.12	2.00	1.01	.013	.00	.00	BOX
2049.083	630.308	1.171	631.479	60.729	6.08	1.88	633.36	.00	1.73	9.22	2.134	9.220	.00	1 .7
20.917	.0139					.0085	..18	1.17	1.86	1.01	.013	.00	.00	BOX
2070.000	630.600	1.228	631.828	60.729	5.79	1.71	633.54	.00	1.73	9.22	2.134	9.220	.00	1 .7
.105	.1731					.0078	..00	1.23	1.74	.44	.013	.00	.00	BOX
2070.104	630.618	1.238	631.856	60.729	5.75	1.69	633.54	.00	1.73	9.22	2.134	9.220	.00	1 .7
.560	.1731					.0072	..00	1.24	1.72	.44	.013	.00	.00	BOX
2070.664	630.715	1.298	632.013	60.729	5.48	1.53	633.54	.00	1.73	9.22	2.134	9.220	.00	1 .7
.455	.1731					.0063	..00	1.30	1.60	.44	.013	.00	.00	BOX

Program Package License Serial Number: 1222

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U.S 95 WIDENING - MAINLINE CHANNEL

OVERALL PROJECT

PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2071.119	630.794	1.361	632.155	60.729	5.23	1.39	633.55	.00	1.73	9.22	2.134	9.220	.00	1 .7
.359	.1731					.0055	..00	1.36	1.49	.44	.013	.00	.00	BOX
2071.478	630.856	1.428	632.284	60.729	4.98	1.27	633.55	.00	1.73	9.22	2.134	9.220	.00	1 .7
.270	.1731					.0048	..00	1.43	1.38	.44	.013	.00	.00	BOX
2071.748	630.903	1.497	632.400	60.729	4.75	1.15	633.55	.00	1.73	9.22	2.134	9.220	.00	1 .7
.187	.1731					.0042	..00	1.50	1.29	.44	.013	.00	.00	BOX
2071.935	630.935	1.571	632.506	60.729	4.53	1.05	633.55	.00	1.73	9.22	2.134	9.220	.00	1 .7
.109	.1731					.0037	..00	1.57	1.20	.44	.013	.00	.00	BOX
2072.044	630.954	1.647	632.601	60.729	4.32	.95	633.55	.00	1.73	9.22	2.134	9.220	.00	1 .7
.036	.1731					.0033	..00	1.65	1.12	.44	.013	.00	.00	BOX
2072.080	630.960	1.729	632.689	60.729	4.12	.86	633.55	.15	1.73	9.22	2.134	9.220	.00	1 .7
.651	-.0066					.0029	..00	1.88	1.04	.00	.013	.00	.00	BOX
2072.731	630.956	1.815	632.771	60.729	3.92	.78	633.55	.13	1.73	9.22	2.134	9.220	.00	1 .7

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1.979	-.0066					.0023	..00	1.95	.97	.00	.013	.00	.00	BOX
2074.710	630.943	1.906	632.849	60.729	3.73	.71	633.56	.12	1.73	9.22	2.134	9.220	.00	1 .7
3.342	-.0066					.0020	..01	2.03	.90	.00	.013	.00	.00	BOX
2078.053	630.921	2.001	632.922	60.729	3.56	.64	633.57	.11	1.73	9.22	2.134	9.220	.00	1 .7
4.736	-.0066					.0018	..01	2.11	.83	.00	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2082.789	630.890	2.101	632.991	60.729	3.39	.58	633.58	2.13	1.73	9.22	2.134	9.220	.00	1 .7
1.803	-.0066					.0017	..00	2.13	.78	.00	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

2084.592	630.878	2.134	633.012	60.729	3.33	.57	633.58	2.13	1.73	9.22	2.134	9.220	.00	1 .7
17.708	-.0066					.0030	..05	2.13	.76	.00	.013	.00	.00	BOX
2102.300	630.762	2.340	633.102	60.729	3.33	.57	633.67	.00	1.73	9.22	2.134	9.220	.00	1 .7
22.080	.0050					.0030	..07	.00	.76	1.45	.013	.00	.00	BOX
2124.380	630.872	2.338	633.210	60.729	3.33	.57	633.78	.00	1.73	9.22	2.134	9.220	.00	1 .7
75.620	.0050					.0030	..22	2.34	.76	1.45	.013	.00	.00	BOX
2200.000	631.250	2.184	633.434	60.729	3.33	.57	634.00	.00	1.73	9.22	2.134	9.220	.00	1 .7
TRANS STR	.0050					.0012	..01	2.18	.76		.013	.00	.00	BOX
2212.000	631.310	2.435	633.745	60.729	2.45	.31	634.05	.00	1.41	11.61	2.134	11.608	.00	0 .0
JUNCT STR	.0050					.0012	..03	2.44	.54		.013	.00	.00	BOX
2234.000	631.420	2.272	633.692	56.407	2.87	.42	634.11	.00	1.56	9.22	2.134	9.220	.00	0 .0

BRIDGE EXIT

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2234.000	631.420	2.272	633.692	56.407	3.10	.49	634.18	.00	1.65	9.22	2.134	9.220	.00	1 .7
40.610	.0050					.0026	..10	2.27	.70	1.37	.013	.00	.00	BOX
2274.610	631.623	2.173	633.796	56.407	3.10	.49	634.28	.00	1.65	9.22	2.134	9.220	.00	1 .7
26.133	.0050					.0026	..07	.00	.70	1.37	.013	.00	.00	BOX
2300.743	631.754	2.134	633.888	56.407	3.10	.49	634.38	2.13	1.65	9.22	2.134	9.220	.00	1 .7
7.197	.0050					.0015	..01	2.13	.70	1.37	.013	.00	.00	BOX
2307.940	631.790	2.086	633.876	56.407	3.17	.51	634.39	.00	1.65	9.22	2.134	9.220	.00	1 .7
7.159	.0050					.0016	..01	2.09	.73	1.37	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

2315.099	631.826	2.038	633.864	56.407	3.24	.54	634.40	.00	1.65	9.22	2.134	9.220	.00	1 .7

HYDRAULIC JUMP

---------- WARNING - Flow depth near top of box conduit ----------

2315.099	631.826	1.306	633.132	56.407	5.06	1.30	634.44	.00	1.65	9.22	2.134	9.220	.00	1 .7
8.057	.0050					.0058	..05	1.31	1.47	1.37	.013	.00	.00	BOX
2323.156	631.866	1.301	633.167	56.407	5.08	1.32	634.48	.00	1.65	9.22	2.134	9.220	.00	1 .7
58.014	.0050					.0062	..36	1.30	1.48	1.37	.013	.00	.00	BOX

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch

2381.170	632.156	1.240	633.396	56.407	5.33	1.45	634.84	.00	1.65	9.22	2.134	9.220	.00	1 .7
40.920	.0050					.0071	..29	1.24	1.59	1.37	.013	.00	.00	BOX
2422.090	632.360	1.182	633.542	56.407	5.59	1.59	635.14	.11	1.65	9.22	2.134	9.220	.00	1 .7
23.640	.0050					.0080	..19	1.29	1.71	1.37	.013	.00	.00	BOX
2445.730	632.479	1.144	633.623	56.407	5.78	1.70	635.32	.00	1.65	9.22	2.134	9.220	.00	1 .7
6.677	.0174					.0080	..05	1.14	1.79	.89	.013	.00	.00	BOX
2452.406	632.595	1.178	633.774	56.407	5.61	1.60	635.38	.00	1.65	9.22	2.134	9.220	.00	1 .7
8.621	.0174					.0072	..06	1.18	1.72	.89	.013	.00	.00	BOX
2461.027	632.746	1.236	633.982	56.407	5.35	1.46	635.44	.00	1.65	9.22	2.134	9.220	.00	1 .7
6.477	.0174					.0063	..04	1.24	1.60	.89	.013	.00	.00	BOX
2467.504	632.859	1.296	634.155	56.407	5.10	1.33	635.48	.00	1.65	9.22	2.134	9.220	.00	1 .7
4.792	.0174					.0055	..03	1.30	1.49	.89	.013	.00	.00	BOX
2472.297	632.942	1.359	634.302	56.407	4.86	1.21	635.51	.00	1.65	9.22	2.134	9.220	.00	1 .7
3.420	.0174					.0048	..02	1.36	1.38	.89	.013	.00	.00	BOX
2475.717	633.002	1.426	634.428	56.407	4.64	1.10	635.52	.00	1.65	9.22	2.134	9.220	.00	1 .7
2.268	.0174					.0042	..01	1.43	1.29	.89	.013	.00	.00	BOX
2477.985	633.042	1.495	634.537	56.407	4.42	1.00	635.53	.00	1.65	9.22	2.134	9.220	.00	1 .7
1.278	.0174					.0037	..00	1.50	1.20	.89	.013	.00	.00	BOX

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2479.263	633.064	1.568	634.632	56.407	4.22	.91	635.54	.00	1.65	9.22	2.134	9.220	.00	1 .7
.407	.0174					.0032	..00	1.57	1.12	.89	.013	.00	.00	BOX
2479.670	633.071	1.646	634.717	56.407	4.02	.82	635.54	.06	1.65	9.22	2.134	9.220	.00	1 .7
1.525	-.0010					.0028	..00	1.70	1.04	.00	.013	.00	.00	BOX
2481.195	633.069	1.728	634.797	56.407	3.83	.75	635.54	.05	1.65	9.22	2.134	9.220	.00	1 .7
4.907	-.0010					.0025	..01	1.78	.97	.00	.013	.00	.00	BOX
2486.102	633.065	1.814	634.879	56.407	3.64	.68	635.56	.05	1.65	9.22	2.134	9.220	.00	1 .7
8.779	-.0010					.0020	..02	1.86	.90	.00	.013	.00	.00	BOX
2494.881	633.056	1.905	634.961	56.407	3.47	.61	635.57	.04	1.65	9.22	2.134	9.220	.00	1 .7
13.165	-.0010					.0018	..02	1.95	.83	.00	.013	.00	.00	BOX
2508.045	633.042	2.000	635.043	56.407	3.30	.56	635.60	.04	1.65	9.22	2.134	9.220	.00	1 .7
18.083	-.0010					.0016	..03	2.04	.78	.00	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

2526.128	633.024	2.100	635.124	56.407	3.15	.50	635.63	2.13	1.65	9.22	2.134	9.220	.00	1 .7
7.078	-.0010					.0015	..01	2.13	.72	.00	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2533.206	633.017	2.134	635.151	56.407	3.10	.49	635.64	2.13	1.65	9.22	2.134	9.220	.00	1 .7
16.794	-.0010					.0026	..04	2.13	.70	.00	.013	.00	.00	BOX
2550.000	633.000	2.214	635.214	56.407	3.10	.49	635.70	.00	1.65	9.22	2.134	9.220	.00	1 .7
1.348	.0095					.0026	..00	2.21	.70	1.10	.013	.00	.00	BOX
2551.348	633.013	2.204	635.217	56.407	3.10	.49	635.71	.00	1.65	9.22	2.134	9.220	.00	1 .7
HYDRAULIC JUMP														
2551.348	633.013	1.158	634.170	56.407	5.71	1.66	635.83	.00	1.65	9.22	2.134	9.220	.00	1 .7
6.152	.0095					.0080	..05	1.16	1.76	1.10	.013	.00	.00	BOX

2557.500	633.071	1.163	634.234	56.407	5.68	1.65	635.88	.00	1.65	9.22	2.134	9.220	.00	1 .7
TRANS STR	.0096					.0075	..02	1.16	1.75		.013	.00	.00	BOX
2560.000	633.095	1.304	634.399	56.407	5.46	1.52	635.92	.00	1.73	8.61	2.134	8.611	.00	1 .7
23.060	.0095					.0065	..15	1.30	1.59	1.17	.013	.00	.00	BOX
2583.060	633.314	1.361	634.675	56.407	5.23	1.39	636.07	.00	1.73	8.61	2.134	8.611	.00	1 .7
16.153	.0095					.0058	..09	1.36	1.49	1.17	.013	.00	.00	BOX
2599.213	633.468	1.428	634.895	56.407	4.99	1.27	636.16	.00	1.73	8.61	2.134	8.611	.00	1 .7
10.235	.0095					.0051	..05	1.43	1.39	1.17	.013	.00	.00	BOX
2609.448	633.565	1.497	635.062	56.407	4.75	1.15	636.21	.00	1.73	8.61	2.134	8.611	.00	1 .7
6.240	.0095					.0044	..03	1.50	1.29	1.17	.013	.00	.00	BOX

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL

OVERALL PROJECT

PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2615.687	633.624	1.570	635.194	56.407	4.53	1.05	636.24	.00	1.73	8.61	2.134	8.611	.00	1 .7
3.303	.0095					.0039	..01	1.57	1.20	1.17	.013	.00	.00	BOX
2618.990	633.655	1.647	635.302	56.407	4.32	.95	636.25	.00	1.73	8.61	2.134	8.611	.00	1 .7
1.010	.0095					.0034	..00	1.65	1.12	1.17	.013	.00	.00	BOX
2620.000	633.665	1.728	635.393	56.407	4.12	.86	636.26	.00	1.73	8.61	2.134	8.611	.00	1 .7
TRANS STR	.0095					.0018	..06	1.73	1.04		.013	.00	.00	BOX
2653.000	633.979	2.206	636.185	56.407	1.97	.20	636.38	.00	1.25	12.95	2.438	12.954	.00	0 .0
JUNCT STR	.0095							2.21	.42		.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
2678.500	634.221	.985	635.206	47.855	6.07	1.88	637.08	.00	1.54	8.00	1.829	8.001	.00	0 .0
BRIDGE EXIT														
2678.500	634.221	1.115	635.336	47.855	5.87	1.76	637.09	.00	1.63	8.00	1.829	8.001	.00	1 .7
24.332	.0095					.0095	..23	1.11	1.86	1.11	.013	.00	.00	BOX
2702.832	634.452	1.115	635.567	47.855	5.87	1.76	637.32	.00	1.63	8.00	1.829	8.001	.00	1 .7
179.218	.0095					.0099	1.77	1.11	1.86	1.11	.013	.00	.00	BOX
2882.050	636.155	1.086	637.241	47.855	6.02	1.85	639.09	.27	1.63	8.00	1.829	8.001	.00	1 .7
17.835	.0095					.0103	..18	1.36	1.93	1.11	.013	.00	.00	BOX

Program Package License Serial Number: 1222

WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL

OVERALL PROJECT

PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2899.885	636.324	1.080	637.404	47.855	6.06	1.87	639.27	.27	1.63	8.00	1.829	8.001	.00	1 .7
82.655	.0095					.0111	..92	1.35	1.95	1.11	.013	.00	.00	BOX
2982.540	637.109	1.030	638.139	47.855	6.35	2.06	640.20	.00	1.63	8.00	1.829	8.001	.00	1 .7
24.960	.0095					.0123	..31	1.03	2.09	1.11	.013	.00	.00	BOX
3007.500	637.347	1.008	638.355	47.855	6.49	2.15	640.50	.31	1.63	8.00	1.829	8.001	.00	1 .7
2.155	.0095					.0127	..03	1.32	2.16	1.12	.013	.00	.00	BOX
3009.655	637.367	1.005	638.373	47.855	6.51	2.16	640.53	.32	1.63	8.00	1.829	8.001	.00	1 .7
40.345	.0095					.0137	..55	1.32	2.17	1.12	.013	.00	.00	BOX
3050.000	637.750	.959	638.709	47.855	6.82	2.37	641.08	.35	1.63	8.00	1.829	8.001	.00	1 .7
27.760	.0134					.0148	..41	1.31	2.33	.99	.013	.00	.00	BOX
3077.760	638.122	.948	639.070	47.855	6.90	2.42	641.50	.00	1.63	8.00	1.829	8.001	.00	1 .7
19.010	.0134					.0153	..29	.95	2.36	.99	.013	.00	.00	BOX
3096.771	638.376	.940	639.316	47.855	6.96	2.47	641.79	.00	1.63	8.00	1.829	8.001	.00	1 .7
62.825	.0134					.0166	1.04	.94	2.40	.99	.013	.00	.00	BOX

3259.596	639.217	.896	640.113	47.855	7.30	2.72	642.83	.00	1.63	8.00	1.829	8.001	.00	1 .7
40.404	.0134					.0191	..77	.90	2.58	.99	.013	.00	.00	BOX
3200.000	639.757	.854	640.611	47.855	7.66	2.99	643.60	.00	1.63	8.00	1.829	8.001	.00	1 .7
13.730	.0208					.0204	..28	.85	2.77	.85	.013	.00	.00	BOX

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3213.730	640.043	.855	640.898	47.855	7.65	2.98	643.88	.09	1.63	8.00	1.829	8.001	.00	1 .7
16.670	.0208					.0203	..34	.94	2.76	.85	.013	.00	.00	BOX
3230.400	640.389	.856	641.245	47.855	7.65	2.98	644.22	.00	1.63	8.00	1.829	8.001	.00	1 .7
109.200	.0208					.0194	2.12	.86	2.76	.85	.013	.00	.00	BOX
3339.600	642.661	.882	643.543	47.855	7.42	2.81	646.35	.00	1.63	8.00	1.829	8.001	.00	1 .7
42.157	.0208					.0179	..76	.88	2.64	.85	.013	.00	.00	BOX
3381.758	643.539	.905	644.444	47.855	7.23	2.66	647.11	.00	1.63	8.00	1.829	8.001	.00	1 .7
42.222	.0208					.0161	..68	.91	2.54	.85	.013	.00	.00	BOX
3423.979	644.418	.949	645.367	47.855	6.89	2.42	647.79	.00	1.63	8.00	1.829	8.001	.00	1 .7
25.721	.0208					.0141	..36	.95	2.36	.85	.013	.00	.00	BOX
3449.700	644.953	.996	645.949	47.855	6.57	2.20	648.15	.04	1.63	8.00	1.829	8.001	.00	1 .7
7.406	.0208					.0128	..09	1.04	2.20	.85	.013	.00	.00	BOX
3457.105	645.107	1.013	646.121	47.855	6.46	2.12	648.24	.04	1.63	8.00	1.829	8.001	.00	1 .7
15.689	.0208					.0117	..18	1.05	2.14	.85	.013	.00	.00	BOX
3472.794	645.434	1.063	646.497	47.855	6.15	1.93	648.43	.04	1.63	8.00	1.829	8.001	.00	1 .7
11.630	.0208					.0102	..12	1.10	1.99	.85	.013	.00	.00	BOX
3484.424	645.676	1.115	646.791	47.855	5.87	1.76	648.55	.03	1.63	8.00	1.829	8.001	.00	1 .7
8.824	.0208					.0089	..08	1.15	1.86	.85	.013	.00	.00	BOX

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3493.249	645.859	1.169	647.029	47.855	5.60	1.60	648.62	.03	1.63	8.00	1.829	8.001	.00	1 .7
6.751	.0208					.0078	..05	1.20	1.73	.85	.013	.00	.00	BOX
3500.000	646.000	1.226	647.226	47.855	5.33	1.45	648.68	.03	1.63	8.00	1.829	8.001	.00	1 .7
14.814	.0069					.0073	..11	1.25	1.61	1.25	.013	.00	.00	BOX
3514.814	646.102	1.222	647.325	47.855	5.35	1.46	648.78	.03	1.63	8.00	1.829	8.001	.00	1 .7
95.547	.0069					.0079	..75	1.25	1.62	1.25	.013	.00	.00	BOX
3610.361	646.764	1.165	647.929	47.855	5.61	1.61	649.54	.03	1.63	8.00	1.829	8.001	.00	1 .7
51.628	.0069					.0090	..46	1.20	1.74	1.25	.013	.00	.00	BOX
3661.989	647.121	1.111	648.232	47.855	5.89	1.77	650.00	.03	1.63	8.00	1.829	8.001	.00	1 .7
37.221	.0069					.0103	..38	1.15	1.87	1.25	.013	.00	.00	BOX
3699.210	647.379	1.059	648.438	47.855	6.18	1.94	650.38	.00	1.63	8.00	1.829	8.001	.00	1 .7
28.314	.0069					.0117	..33	1.06	2.00	1.25	.013	.00	.00	BOX
3727.524	647.574	1.013	648.587	47.855	6.46	2.13	650.71	.00	1.63	8.00	1.829	8.001	.00	1 .7
25.476	.0069					.0134	..34	1.01	2.14	1.25	.013	.00	.00	BOX
3753.000	647.750	.965	648.716	47.855	6.78	2.34	651.06	.00	1.63	8.00	1.829	8.001	.00	1 .7
6.933	.0050					.0147	..10	.97	2.30	1.40	.013	.00	.00	BOX
3759.932	647.785	.948	648.733	47.855	6.90	2.43	651.16	.00	1.63	8.00	1.829	8.001	.00	1 .7
17.754	.0050					.0162	..29	.95	2.37	1.40	.013	.00	.00	BOX

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
3777.687	647.874	.904	648.778	47.855	7.24	2.67	651.45	.00	1.63	8.00	1.829	8.001	.00	1 .7
16.564	.0050					.0186	..31	.90	2.54	1.40	.013	.00	.00	BOX
3794.250	647.956	.862	648.818	47.855	7.59	2.94	651.75	.00	1.63	8.00	1.829	8.001	.00	1 .7
15.519	.0050					.0213	..33	.86	2.73	1.40	.013	.00	.00	BOX
3809.770	648.034	.822	648.856	47.855	7.96	3.23	652.09	.00	1.63	8.00	1.829	8.001	.00	1 .7
14.586	.0050					.0245	..36	.82	2.93	1.40	.013	.00	.00	BOX
3824.355	648.107	.784	648.891	47.855	8.35	3.55	652.44	.00	1.63	8.00	1.829	8.001	.00	1 .7
13.741	.0050					.0282	..39	.78	3.15	1.40	.013	.00	.00	BOX
3838.096	648.176	.747	648.923	47.855	8.76	3.91	652.83	.00	1.63	8.00	1.829	8.001	.00	1 .7
12.968	.0050					.0325	..42	.75	3.38	1.40	.013	.00	.00	BOX
3851.064	648.241	.712	648.953	47.855	9.18	4.30	653.25	.00	1.63	8.00	1.829	8.001	.00	1 .7
12.256	.0050					.0374	..46	.71	3.63	1.40	.013	.00	.00	BOX
3863.320	648.302	.679	648.981	47.855	9.63	4.73	653.71	.00	1.63	8.00	1.829	8.001	.00	1 .7
BRIDGE ENTRANCE														
3863.320	648.302	.617	648.919	47.855	9.70	4.79	653.71	.00	1.54	8.00	1.829	8.001	.00	0 .0
JUNCT STR	.0325					.0396	..64	.62	3.94		.013	.00	.00	BOX
3879.360	648.823	.584	649.407	34.773	9.85	4.95	654.36	.00	1.50	6.05	1.829	6.045	.00	0 .0
WALL EXIT														

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
3879.360	648.823	.983	649.806	34.773	9.67	4.76	654.57	.00	1.83	3.66	1.829	3.658	.00	0 .0
27.887	.0325					.0281	..78	.98	3.11	.94	.013	.00	.00	BOX
3907.247	649.729	.997	650.727	34.773	9.53	4.63	655.36	.00	1.83	3.66	1.829	3.658	.00	0 .0
55.319	.0325					.0258	1.43	1.00	3.05	.94	.013	.00	.00	BOX
3962.566	651.527	1.046	652.573	34.773	9.09	4.21	656.78	.00	1.83	3.66	1.829	3.658	.00	0 .0
33.157	.0325					.0225	..75	1.05	2.84	.94	.013	.00	.00	BOX
3995.723	652.605	1.097	653.702	34.773	8.66	3.83	657.53	.00	1.83	3.66	1.829	3.658	.00	0 .0
22.916	.0325					.0197	..45	1.10	2.64	.94	.013	.00	.00	BOX
4018.639	653.350	1.151	654.500	34.773	8.26	3.48	657.98	.00	1.83	3.66	1.829	3.658	.00	0 .0
16.982	.0325					.0172	..29	1.15	2.46	.94	.013	.00	.00	BOX
4035.621	653.902	1.207	655.108	34.773	7.88	3.16	658.27	.00	1.83	3.66	1.829	3.658	.00	0 .0
13.089	.0325					.0150	..20	1.21	2.29	.94	.013	.00	.00	BOX
4048.710	654.327	1.266	655.593	34.773	7.51	2.87	658.47	.08	1.83	3.66	1.829	3.658	.00	0 .0
2.609	.0327					.0138	..04	1.35	2.13	.94	.013	.00	.00	BOX
4051.319	654.412	1.280	655.692	34.773	7.43	2.81	658.50	.08	1.83	3.66	1.829	3.658	.00	0 .0
9.699	.0327					.0128	..12	1.36	2.10	.94	.013	.00	.00	BOX
4061.018	654.729	1.342	656.072	34.773	7.08	2.56	658.63	.07	1.83	3.66	1.829	3.658	.00	0 .0
7.764	.0327					.0112	..09	1.42	1.95	.94	.013	.00	.00	BOX

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
4068.781	654.983	1.408	656.391	34.773	6.75	2.32	658.72	.07	1.83	3.66	1.829	3.658	.00	0 .0
6.233	.0327					.0098	..06	1.48	1.82	.94	.013	.00	.00	BOX
4075.015	655.187	1.476	656.663	34.773	6.44	2.11	658.78	.06	1.83	3.66	1.829	3.658	.00	0 .0
4.985	.0327					.0086	..04	1.54	1.69	.94	.013	.00	.00	BOX
4080.000	655.350	1.548	656.898	34.773	6.14	1.92	658.82	.03	1.83	3.66	1.829	3.658	.00	0 .0
30.770	.0050					.0086	..26	1.58	1.58	1.83	.013	.00	.00	BOX
4110.770	655.504	1.482	656.986	34.773	6.42	2.10	659.08	.00	1.83	3.66	1.829	3.658	.00	0 .0
22.239	.0050					.0095	..21	1.48	1.68	1.83	.013	.00	.00	BOX
4133.009	655.615	1.431	657.046	34.773	6.64	2.25	659.30	.00	1.83	3.66	1.829	3.658	.00	0 .0
27.780	.0050					.0107	..30	1.43	1.77	1.83	.013	.00	.00	BOX
4160.789	655.754	1.364	657.118	34.773	6.97	2.47	659.59	.00	1.83	3.66	1.829	3.658	.00	0 .0
25.525	.0050					.0122	..31	1.36	1.90	1.83	.013	.00	.00	BOX
4186.313	655.882	1.301	657.182	34.773	7.31	2.72	659.90	.00	1.83	3.66	1.829	3.658	.00	0 .0
23.687	.0050					.0139	..33	1.30	2.05	1.83	.013	.00	.00	BOX
4210.000	656.000	1.240	657.240	34.773	7.66	2.99	660.23	.00	1.83	3.66	1.829	3.658	.00	0 .0
72.496	.0164					.0142	1.03	1.24	2.20	1.20	.013	.00	.00	BOX
4282.496	657.187	1.284	658.472	34.773	7.40	2.79	661.26	.00	1.83	3.66	1.829	3.658	.00	0 .0
51.144	.0164					.0126	..65	1.28	2.09	1.20	.013	.00	.00	BOX

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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
4333.640	658.025	1.347	659.372	34.773	7.06	2.54	661.91	.00	1.83	3.66	1.829	3.658	.00	0 .0
31.133	.0164					.0111	..34	1.35	1.94	1.20	.013	.00	.00	BOX
4364.773	658.535	1.413	659.948	34.773	6.73	2.31	662.26	.00	1.83	3.66	1.829	3.658	.00	0 .0
21.137	.0164					.0097	..21	1.41	1.81	1.20	.013	.00	.00	BOX
4385.910	658.881	1.482	660.363	34.773	6.42	2.10	662.46	.00	1.83	3.66	1.829	3.658	.00	0 .0
15.079	.0164					.0085	..13	1.48	1.68	1.20	.013	.00	.00	BOX
4400.989	659.128	1.554	660.682	34.773	6.12	1.91	662.59	.00	1.83	3.66	1.829	3.658	.00	0 .0
10.971	.0164					.0075	..08	1.55	1.57	1.20	.013	.00	.00	BOX
4411.960	659.308	1.630	660.938	34.773	5.83	1.73	662.67	.06	1.83	3.66	1.829	3.658	.00	0 .0
4.330	.0164					.0068	..03	1.69	1.46	1.20	.013	.00	.00	BOX
4416.290	659.379	1.669	661.048	34.773	5.70	1.65	662.70	.05	1.83	3.66	1.829	3.658	.00	0 .0
33.560	.0066					.0066	..22	1.72	1.41	1.67	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
4449.850	659.599	1.668	661.267	34.773	5.70	1.66	662.92	.00	1.83	3.66	1.829	3.658	.00	0 .0
77.750	.0066					.0066	..51	1.67	1.41	1.67	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														

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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
4527.600	660.109	1.665	661.773	34.773	5.71	1.66	663.44	.10	1.83	3.66	1.829	3.658	.00	0 .0
37.590	.0065					.0066	..25	1.76	1.41	1.67	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
4565.190	660.355	1.661	662.016	34.773	5.72	1.67	663.69	.00	1.83	3.66	1.829	3.658	.00	0 .0
88.300	.0066					.0068	..60	1.66	1.42	1.67	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
4653.490	660.934	1.643	662.577	34.773	5.78	1.71	664.28	.12	1.83	3.66	1.829	3.658	.00	0 .0
22.160	.0066					.0069	..15	1.77	1.44	1.67	.013	.00	.00	BOX
4675.650	661.080	1.637	662.717	34.773	5.81	1.72	664.44	.00	1.83	3.66	1.829	3.658	.00	0 .0

64.725	.0066					.0071	..46	1.64	1.45	1.67	.013	.00	.00	BOX	
4740.375	661.504	1.606	663.110	34.773	5.92	1.79	664.90	.00	1.83	3.66	1.829	3.658	.00	0	.0
83.601	.0066					.0078	..65	1.61	1.49	1.67	.013	.00	.00	BOX	
4823.976	662.053	1.531	663.584	34.773	6.21	1.96	665.55	.00	1.83	3.66	1.829	3.658	.00	0	.0
53.858	.0066					.0089	..48	1.53	1.60	1.67	.013	.00	.00	BOX	
4877.834	662.406	1.460	663.866	34.773	6.51	2.16	666.03	.00	1.83	3.66	1.829	3.658	.00	0	.0
41.564	.0066					.0101	..42	1.46	1.72	1.67	.013	.00	.00	BOX	

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U.S 95 WIDENING - MAINLINE CHANNEL

OVERALL PROJECT

PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
4919.398	662.679	1.392	664.070	34.773	6.83	2.38	666.45	.00	1.83	3.66	1.829	3.658	.00	0	.0
34.682	.0066					.0115	..40	1.39	1.85	1.67	.013	.00	.00	BOX	
4954.080	662.906	1.327	664.233	34.773	7.16	2.61	666.85	.08	1.83	3.66	1.829	3.658	.00	0	.0
7.320	.0066					.0125	..09	1.40	1.99	1.67	.013	.00	.00	BOX	
4961.400	662.954	1.313	664.266	34.773	7.24	2.67	666.94	.00	1.83	3.66	1.829	3.658	.00	0	.0
10.307	.0066					.0130	..13	1.31	2.02	1.67	.013	.00	.00	BOX	
4971.707	663.022	1.291	664.313	34.773	7.36	2.76	667.07	.00	1.83	3.66	1.829	3.658	.00	0	.0
28.293	.0066					.0142	..40	1.29	2.07	1.67	.013	.00	.00	BOX	
5000.000	663.208	1.231	664.439	34.773	7.72	3.04	667.48	.00	1.83	3.66	1.829	3.658	.00	0	.0
103.130	.0145					.0157	1.62	1.23	2.22	1.25	.013	.00	.00	BOX	
5103.130	664.706	1.202	665.908	34.773	7.91	3.19	669.10	.00	1.83	3.66	1.829	3.658	.00	0	.0
TRANS STR	.0227					.0185	..20	1.20	2.30		.013	.00	.00	BOX	
5114.130	664.956	.900	665.856	34.773	8.30	3.51	669.36	.00	1.78	4.66	1.829	4.657	.00	0	.0
JUNCT STR	.0227					.0270	..27	.90	2.79		.013	.00	.00	BOX	
5124.200	665.185	.614	665.799	24.806	8.68	3.84	669.64	.00	1.43	4.66	1.829	4.657	.00	0	.0
WALL EXIT															
5124.200	665.185	1.220	666.405	24.806	8.34	3.55	669.95	.00	1.83	2.44	1.829	2.438	.00	0	.0
35.010	.0227					.0227	..80	1.22	2.41	1.22	.013	.00	.00	BOX	

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U.S 95 WIDENING - MAINLINE CHANNEL

OVERALL PROJECT

PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
5159.210	665.980	1.220	667.200	24.806	8.34	3.55	670.75	.14	1.83	2.44	1.829	2.438	.00	0	.0
33.070	.0227					.0227	..75	1.36	2.41	1.22	.013	.00	.00	BOX	
5192.280	666.731	1.220	667.951	24.806	8.34	3.55	671.50	.00	1.83	2.44	1.829	2.438	.00	0	.0
55.684	.0227					.0227	1.27	1.22	2.41	1.22	.013	.00	.00	BOX	
5247.963	667.995	1.220	669.215	24.806	8.34	3.55	672.76	.00	1.83	2.44	1.829	2.438	.00	0	.0
186.836	.0227					.0243	4.54	1.22	2.41	1.22	.013	.00	.00	BOX	
5434.800	672.236	1.163	673.399	24.806	8.75	3.90	677.30	.19	1.83	2.44	1.829	2.438	.00	0	.0
20.470	.0227					.0262	..54	1.35	2.59	1.22	.013	.00	.00	BOX	
5455.270	672.700	1.150	673.850	24.806	8.85	3.99	677.84	.01	1.83	2.44	1.829	2.438	.00	0	.0
22.667	.0227					.0272	..62	1.17	2.63	1.22	.013	.00	.00	BOX	
5477.938	673.216	1.133	674.349	24.806	8.98	4.11	678.46	.02	1.83	2.44	1.829	2.438	.00	0	.0
52.063	.0227					.0296	1.54	1.15	2.69	1.22	.013	.00	.00	BOX	
5530.000	674.400	1.080	675.480	24.806	9.42	4.52	680.00	.02	1.83	2.44	1.829	2.438	.00	0	.0
4.540	.0339					.0315	..14	1.10	2.89	1.05	.013	.00	.00	BOX	
5534.540	674.554	1.081	675.635	24.806	9.41	4.51	680.15	.02	1.83	2.44	1.829	2.438	.00	0	.0
80.605	.0339					.0296	2.39	1.10	2.89	1.05	.013	.00	.00	BOX	

5615.145	677.287	1.132	678.418	24.806	8.99	4.12	682.54	.02	1.83	2.44	1.829	2.438	.00	0 .0
41.095	.0339					.0261	1.07	1.15	2.70	1.05	.013	.00	.00	BOX

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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5656.240	678.680	1.187	679.867	24.806	8.57	3.75	683.61	.00	1.83	2.44	1.829	2.438	.00	0 .0
4.751	.0338					.0242	..12	1.19	2.51	1.05	.013	.00	.00	BOX
5660.991	678.841	1.196	680.036	24.806	8.51	3.69	683.73	.00	1.83	2.44	1.829	2.438	.00	0 .0
24.573	.0338					.0226	..55	1.20	2.49	1.05	.013	.00	.00	BOX
5685.564	679.673	1.254	680.926	24.806	8.11	3.36	684.28	.00	1.83	2.44	1.829	2.438	.00	0 .0
17.462	.0338					.0199	..35	1.25	2.31	1.05	.013	.00	.00	BOX
5703.026	680.264	1.315	681.579	24.806	7.74	3.05	684.63	.00	1.83	2.44	1.829	2.438	.00	0 .0
13.063	.0338					.0175	..23	1.32	2.15	1.05	.013	.00	.00	BOX
5716.089	680.706	1.379	682.085	24.806	7.38	2.77	684.86	.00	1.83	2.44	1.829	2.438	.00	0 .0
10.055	.0338					.0155	..16	1.38	2.01	1.05	.013	.00	.00	BOX
5726.144	681.046	1.447	682.493	24.806	7.03	2.52	685.01	.00	1.83	2.44	1.829	2.438	.00	0 .0
7.856	.0338					.0137	..11	1.45	1.87	1.05	.013	.00	.00	BOX
5734.000	681.312	1.517	682.829	24.806	6.71	2.29	685.12	.00	1.83	2.44	1.829	2.438	.00	0 .0
8.721	.0051					.0132	..12	1.52	1.74	1.83	.013	.00	.00	BOX
5742.720	681.356	1.484	682.840	24.806	6.86	2.40	685.24	.00	1.83	2.44	1.829	2.438	.00	0 .0
18.119	.0051					.0145	..26	1.48	1.80	1.83	.013	.00	.00	BOX
5760.839	681.448	1.415	682.862	24.806	7.19	2.64	685.50	.00	1.83	2.44	1.829	2.438	.00	0 .0
17.443	.0051					.0164	..29	1.41	1.93	1.83	.013	.00	.00	BOX

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5778.282	681.536	1.349	682.885	24.806	7.54	2.90	685.79	.00	1.83	2.44	1.829	2.438	.00	0 .0
16.791	.0051					.0186	..31	1.35	2.07	1.83	.013	.00	.00	BOX
5795.073	681.621	1.286	682.907	24.806	7.91	3.19	686.10	.00	1.83	2.44	1.829	2.438	.00	0 .0
16.162	.0051					.0211	..34	1.29	2.23	1.83	.013	.00	.00	BOX
5811.235	681.703	1.226	682.929	24.806	8.30	3.51	686.44	.00	1.83	2.44	1.829	2.438	.00	0 .0
15.554	.0051					.0240	..37	1.23	2.39	1.83	.013	.00	.00	BOX
5826.790	681.781	1.169	682.951	24.806	8.70	3.86	686.81	.00	1.83	2.44	1.829	2.438	.00	0 .0
14.966	.0051					.0272	..41	1.17	2.57	1.83	.013	.00	.00	BOX
5841.756	681.857	1.115	682.972	24.806	9.13	4.25	687.22	.00	1.83	2.44	1.829	2.438	.00	0 .0
14.397	.0051					.0309	..45	1.11	2.76	1.83	.013	.00	.00	BOX
5856.153	681.930	1.063	682.993	24.806	9.57	4.67	687.66	.00	1.83	2.44	1.829	2.438	.00	0 .0
13.847	.0051					.0352	..49	1.06	2.96	1.83	.013	.00	.00	BOX
5870.000	682.000	1.013	683.013	24.806	10.04	5.14	688.15	.00	1.83	2.44	1.829	2.438	.00	0 .0
21.822	.0535					.0353	..77	1.01	3.18	.89	.013	.00	.00	BOX
5891.822	683.167	1.060	684.227	24.806	9.60	4.70	688.92	.00	1.83	2.44	1.829	2.438	.00	0 .0
16.837	.0535					.0312	..52	1.06	2.98	.89	.013	.00	.00	BOX
5908.659	684.067	1.112	685.179	24.806	9.15	4.27	689.45	.00	1.83	2.44	1.829	2.438	.00	0 .0
12.818	.0535					.0274	..35	1.11	2.77	.89	.013	.00	.00	BOX

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WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM *UPDATED:* 01/13/03 *FILE:* US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
5921.478	684.752	1.166	685.918	24.806	8.73	3.88	689.80	.00	1.83	2.44	1.829	2.438	.00	0 .0
10.088	.0535					.0241	..24	1.17	2.58	.89	.013	.00	.00	BOX
5931.565	685.292	1.223	686.515	24.806	8.32	3.53	690.04	.00	1.83	2.44	1.829	2.438	.00	0 .0
8.104	.0535					.0212	..17	1.22	2.40	.89	.013	.00	.00	BOX
5939.670	685.725	1.283	687.008	24.806	7.93	3.21	690.22	.01	1.83	2.44	1.829	2.438	.00	0 .0
2.881	.0909					.0188	..05	1.29	2.24	.74	.013	.00	.00	BOX
5942.551	685.987	1.338	687.325	24.806	7.60	2.95	690.27	.01	1.83	2.44	1.829	2.438	.00	0 .0
2.729	.0909					.0167	..05	1.34	2.10	.74	.013	.00	.00	BOX
5945.280	686.235	1.404	687.639	24.806	7.25	2.68	690.32	.00	1.83	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0556					.0179	..01	1.41	1.95		.013	.00	.00	BOX
5945.730	686.260	1.226	687.486	23.503	7.86	3.15	690.64	.01	1.83	2.44	1.829	2.438	.00	0 .0
4.270	.0562					.0193	..08	1.23	2.27	.84	.013	.00	.00	BOX
5950.000	686.500	1.266	687.766	23.503	7.61	2.96	690.72	.01	1.83	2.44	1.829	2.438	.00	0 .0
9.340	.0210					.0184	..17	1.27	2.16	1.21	.013	.00	.00	BOX
5959.340	686.696	1.273	687.969	23.503	7.58	2.92	690.89	.00	1.83	2.44	1.829	2.438	.00	0 .0
48.440	.0209					.0173	..84	1.27	2.14	1.21	.013	.00	.00	BOX
6007.780	687.707	1.324	689.031	23.503	7.28	2.70	691.73	.00	1.83	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0222					.0168	..01	1.32	2.02		.013	.00	.00	BOX

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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
6008.230	687.717	1.291	689.008	23.276	7.39	2.79	691.79	.00	1.83	2.44	1.829	2.438	.00	0 .0
18.534	.0210					.0168	..31	1.29	2.08	1.20	.013	.00	.00	BOX
6026.764	688.106	1.316	689.422	23.276	7.26	2.68	692.11	.00	1.83	2.44	1.829	2.438	.00	0 .0
32.229	.0210					.0154	..50	1.32	2.02	1.20	.013	.00	.00	BOX
6058.993	688.783	1.380	690.163	23.276	6.92	2.44	692.60	.00	1.83	2.44	1.829	2.438	.00	0 .0
0.897	.0210					.0136	..28	1.38	1.88	1.20	.013	.00	.00	BOX
6079.890	689.222	1.447	690.669	23.276	6.60	2.22	692.89	.00	1.83	2.44	1.829	2.438	.00	0 .0
14.585	.0210					.0120	..18	1.45	1.75	1.20	.013	.00	.00	BOX
6094.476	689.528	1.518	691.046	23.276	6.29	2.02	693.06	.00	1.83	2.44	1.829	2.438	.00	0 .0
10.524	.0210					.0106	..11	1.52	1.63	1.20	.013	.00	.00	BOX
6105.000	689.749	1.592	691.341	23.276	6.00	1.83	693.17	.00	1.83	2.44	1.829	2.438	.00	0 .0
115.030	.0100					.0099	1.14	1.59	1.52	1.59	.013	.00	.00	BOX
6220.030	690.899	1.602	692.501	23.276	5.96	1.81	694.31	.02	1.83	2.44	1.829	2.438	.00	0 .0
19.970	.0100					.0098	..20	1.62	1.50	1.59	.013	.00	.00	BOX
6240.000	691.099	1.606	692.705	23.276	5.95	1.80	694.51	.02	1.83	2.44	1.829	2.438	.00	0 .0
14.940	.0100					.0097	..15	1.62	1.50	1.59	.013	.00	.00	BOX
6254.940	691.248	1.609	692.857	23.276	5.93	1.79	694.65	.02	1.83	2.44	1.829	2.438	.00	0 .0
38.130	.0100					.0096	..37	1.62	1.49	1.59	.013	.00	.00	BOX

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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
6293.070	691.630	1.622	693.252	23.276	5.89	1.77	695.02	.00	1.83	2.44	1.829	2.438	.00	0 .0
52.670	.0100					.0092	..49	1.62	1.48	1.59	.013	.00	.00	BOX

6345.740	692.157	1.659	693.815	23.276	5.76	1.69	695.50	.00	1.83	2.44	1.829	2.438	.00	0 .0
46.820	.0100					.0085	..40	1.66	1.43	1.59	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

6392.560	692.625	1.740	694.365	23.276	5.49	1.54	695.90	.00	1.83	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0098					.0089	..02	1.74	1.33		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

6395.000	692.649	1.559	694.208	22.597	5.94	1.80	696.01	.00	1.83	2.44	1.829	2.438	.00	0 .0
8.580	.0100					.0099	..08	1.56	1.52	1.55	.013	.00	.00	BOX
6403.580	692.735	1.560	694.295	22.597	5.94	1.80	696.09	.00	1.83	2.44	1.829	2.438	.00	0 .0
82.125	.0100					.0098	..80	1.56	1.52	1.55	.013	.00	.00	BOX
6485.706	693.556	1.575	695.131	22.597	5.89	1.77	696.90	.00	1.83	2.44	1.829	2.438	.00	0 .0
93.074	.0100					.0091	..85	1.58	1.50	1.55	.013	.00	.00	BOX
6578.780	694.487	1.651	696.138	22.597	5.61	1.61	697.74	.00	1.83	2.44	1.829	2.438	.00	0 .0
6.340	.0100					.0085	..05	1.65	1.39	1.55	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

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U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
6585.120	694.550	1.662	696.212	22.597	5.58	1.59	697.80	.00	1.83	2.44	1.829	2.438	.00	0 .0
30.441	.0100					.0079	..24	1.66	1.38	1.55	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

6615.561	694.855	1.743	696.598	22.597	5.32	1.44	698.04	.00	1.83	2.44	1.829	2.438	.00	0 .0
15.439	.0100					.0089	..14	1.74	1.29	1.55	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

6631.000	695.009	1.829	696.838	22.597	5.07	1.31	698.15	.00	1.83	2.44	1.829	2.438	.00	0 .0
TRANS STR	.0100					.0058	..10	1.83	1.20		.013	.00	.00	BOX
6648.000	695.179	2.916	698.095	22.597	2.24	.26	698.35	.00	1.33	4.72	2.134	4.724	.00	0 .0
JUNCT STR	.0071					.0013	..01	2.92	.49		.013	.00	.00	BOX
6658.000	695.250	2.661	697.911	13.025	2.92	.43	698.35	.00	1.43	2.44	1.829	2.438	.00	0 .0
62.510	.0073					.0034	..21	2.66	.69	1.15	.013	.00	.00	BOX
6720.510	695.704	2.421	698.125	13.025	2.92	.43	698.56	.00	1.43	2.44	1.829	2.438	.00	0 .0
25.580	.0073					.0034	..09	.00	.69	1.15	.013	.00	.00	BOX

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U.S 95 WIDENING - MAINLINE CHANNEL
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Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
6746.090	695.890	2.358	698.248	13.025	2.92	.43	698.68	.00	1.43	2.44	1.829	2.438	.00	0 .0
25.580	.0073					.0034	..09	.00	.69	1.15	.013	.00	.00	BOX
6771.670	696.076	2.295	698.371	13.025	2.92	.43	698.81	.00	1.43	2.44	1.829	2.438	.00	0 .0
3.330	.0072					.0034	..01	2.29	.69	1.16	.013	.00	.00	BOX
6775.000	696.100	2.282	698.382	13.025	2.92	.43	698.82	.00	1.43	2.44	1.829	2.438	.00	0 .0
28.075	.0196					.0034	..10	2.28	.69	.80	.013	.00	.00	BOX
6803.075	696.649	1.829	698.478	13.025	2.92	.43	698.91	.00	1.43	2.44	1.829	2.438	.00	0 .0
.528	.0196					.0028	..00	1.83	.69	.80	.013	.00	.00	BOX
6803.603	696.659	1.829	698.488	13.025	2.92	.43	698.92	.00	1.43	2.44	1.829	2.438	.00	0 .0
HYDRAULIC JUMP														
6803.603	696.659	1.098	697.758	13.025	4.86	1.21	698.96	.00	1.43	2.44	1.829	2.438	.00	0 .0
2.169	.0196					.0081	..02	1.10	1.48	.80	.013	.00	.00	BOX
6805.772	696.702	1.124	697.826	13.025	4.75	1.15	698.98	.00	1.43	2.44	1.829	2.438	.00	0 .0
4.076	.0196					.0073	..03	1.12	1.43	.80	.013	.00	.00	BOX
6809.848	696.782	1.179	697.961	13.025	4.53	1.05	699.01	.00	1.43	2.44	1.829	2.438	.00	0 .0

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2.872	.0196					.0065	..02	1.18	1.33	.80	.013	.00	.00	BOX
6812.720	696.838	1.236	698.074	13.025	4.32	.95	699.03	.00	1.43	2.44	1.829	2.438	.00	0 .0
1.886	.0196					.0057	..01	1.24	1.24	.80	.013	.00	.00	BOX

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
6814.606	696.875	1.297	698.172	13.025	4.12	.87	699.04	.00	1.43	2.44	1.829	2.438	.00	0 .0
1.056	.0196					.0050	..01	1.30	1.16	.80	.013	.00	.00	BOX
6815.662	696.895	1.360	698.255	13.025	3.93	.79	699.04	.00	1.43	2.44	1.829	2.438	.00	0 .0
.338	.0196					.0044	..00	1.36	1.08	.80	.013	.00	.00	BOX
6816.000	696.902	1.427	698.329	13.025	3.74	.71	699.04	.00	1.43	2.44	1.829	2.438	.00	0 .0
JUNCT STR	.0116					.0026	..01	1.43	1.00		.013	.00	.00	BOX
6818.500	696.931	2.377	699.308	6.966	1.56	.12	699.43	.00	.94	2.44	1.829	2.438	.00	0 .0
2.500	.0276					.0010	..00	2.38	.37	.46	.013	.00	.00	BOX
6821.000	697.000	2.311	699.311	6.966	1.56	.12	699.44	.00	.94	2.44	1.829	2.438	.00	0 .0
WALL EXIT														
6821.000	697.000	2.311	699.311	6.966	3.84	.75	700.06	.00	1.34	.00	1.520	.000	.00	0 .0
30.761	.0297					.0090	..28	2.31	.00	.81	.013	.00	.00	PIPE
6851.761	697.913	1.695	699.608	6.966	3.84	.75	700.36	.00	1.34	.00	1.520	.000	.00	0 .0
HYDRAULIC JUMP														
6851.761	697.913	1.024	698.937	6.966	5.36	1.46	700.40	.00	1.34	1.43	1.520	.000	.00	0 .0
1.891	.0297					.0143	..03	1.02	1.79	.81	.013	.00	.00	PIPE
6853.652	697.969	1.024	698.994	6.966	5.35	1.46	700.45	.00	1.34	1.43	1.520	.000	.00	0 .0
5.418	.0297					.0135	..07	1.02	1.79	.81	.013	.00	.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
6859.070	698.130	1.069	699.199	6.966	5.10	1.33	700.53	.00	1.34	1.39	1.520	.000	.00	0 .0
4.030	.0297					.0120	..05	1.07	1.64	.81	.013	.00	.00	PIPE
6863.100	698.250	1.119	699.369	6.966	4.87	1.21	700.58	.00	1.34	1.34	1.520	.000	.00	0 .0
JUNCT STR	.0223					.0111	..02	1.12	1.50		.013	.00	.00	PIPE
6865.340	698.300	1.140	699.440	6.966	4.77	1.16	700.60	.00	1.34	1.32	1.520	.000	.00	0 .0
87.590	.0108					.0111	..97	1.14	1.45	1.14	.013	.00	.00	PIPE
6952.930	699.250	1.120	700.370	6.966	4.86	1.20	701.57	.00	1.34	1.34	1.520	.000	.00	0 .0
2.240	.0223					.0111	..02	1.12	1.50	.88	.013	.00	.00	PIPE
6955.170	699.300	1.141	700.441	6.966	4.77	1.16	701.60	.00	1.34	1.32	1.520	.000	.00	0 .0
18.247	.0109					.0109	..20	1.14	1.44	1.14	.013	.00	.00	PIPE
6973.417	699.498	1.141	700.639	6.966	4.77	1.16	701.80	.00	1.34	1.32	1.520	.000	.00	0 .0
92.263	.0109					.0103	..95	1.14	1.44	1.14	.013	.00	.00	PIPE
7065.680	700.500	1.195	701.695	6.966	4.55	1.06	702.75	.00	1.34	1.25	1.520	.000	.00	0 .0
.022	.2085					.0097	..00	1.20	1.31	.47	.013	.00	.00	PIPE
7065.703	700.505	1.201	701.706	6.966	4.53	1.04	702.75	.00	1.34	1.24	1.520	.000	.00	0 .0
.160	.2085					.0092	..00	1.20	1.30	.47	.013	.00	.00	PIPE
7065.863	700.538	1.264	701.802	6.966	4.32	.95	702.75	.00	1.34	1.14	1.520	.000	.00	0 .0
.057	.2085					.0085	..00	1.26	1.16	.47	.013	.00	.00	PIPE

OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
7065.920	700.550	1.340	701.890	6.966	4.11	.86	702.75	.00	1.34	.98	1.520	.000	.00	0 .0
17.598	.0069					.0080	..14	1.34	1.00	1.52	.013	.00	.00	PIPE
7083.518	700.672	1.437	702.109	6.966	3.92	.78	702.89	.00	1.34	.69	1.520	.000	.00	0 .0
35.153	.0069					.0078	..28	1.44	.78	1.52	.013	.00	.00	PIPE
7118.671	700.915	1.437	702.352	6.966	3.92	.78	703.14	.00	1.34	.69	1.520	.000	.00	0 .0
HYDRAULIC JUMP														
7118.671	700.915	1.223	702.137	6.966	4.45	1.01	703.15	.00	1.34	1.21	1.520	.000	.00	0 .0
5.128	.0069					.0094	..05	1.22	1.25	1.52	.013	.00	.00	PIPE
7123.800	700.950	1.223	702.173	6.966	4.45	1.01	703.18	.00	1.34	1.21	1.520	.000	.00	0 .0
1.416	.0223					.0091	..01	1.22	1.25	.88	.013	.00	.00	PIPE
7125.215	700.982	1.264	702.246	6.966	4.32	.95	703.20	.00	1.34	1.14	1.520	.000	.00	0 .0
.825	.0223					.0085	..01	1.26	1.16	.88	.013	.00	.00	PIPE
7126.040	701.000	1.340	702.340	6.966	4.11	.86	703.20	.00	1.34	.98	1.520	.000	.00	0 .0
16.537	.0068					.0080	..13	1.34	1.00	1.52	.013	.00	.00	PIPE
7142.577	701.113	1.437	702.550	6.966	3.92	.78	703.33	.00	1.34	.69	1.520	.000	.00	0 .0
39.084	.0068					.0081	..32	1.44	.78	1.52	.013	.00	.00	PIPE
7181.661	701.381	1.520	702.901	6.966	3.84	.75	703.65	.00	1.34	.00	1.520	.000	.00	0 .0
53.979	.0068					.0087	..47	1.52	.00	1.52	.013	.00	.00	PIPE

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
7235.640	701.750	1.658	703.408	6.966	3.84	.75	704.16	.00	1.34	.00	1.520	.000	.00	0 .0
JUNCT STR	.0256					.0067	..01	1.66	.00		.013	.00	.00	PIPE
7237.590	701.800	2.177	703.977	4.842	2.67	.36	704.34	.00	1.14	.00	1.520	.000	.00	0 .0
22.410	.0092					.0044	..10	2.18	.00	.93	.013	.00	.00	PIPE
7260.000	702.006	2.109	704.115	4.842	2.67	.36	704.48	.00	1.14	.00	1.520	.000	.00	0 .0
9.150	.0103					.0044	..04	2.11	.00	.89	.013	.00	.00	PIPE
7269.150	702.100	2.055	704.155	4.842	2.67	.36	704.52	.00	1.14	.00	1.520	.000	.00	0 .0
1.950	.0257					.0044	..01	2.06	.00	.68	.013	.00	.00	PIPE
7271.100	702.150	2.032	704.182	4.842	2.67	.36	704.54	.00	1.14	.00	1.520	.000	.00	0 .0
34.970	.0086					.0044	..15	2.03	.00	.95	.013	.00	.00	PIPE
7306.070	702.450	1.885	704.335	4.842	2.67	.36	704.70	.00	1.14	.00	1.520	.000	.00	0 .0
1.950	.0256					.0044	..01	1.88	.00	.68	.013	.00	.00	PIPE
7308.020	702.500	1.862	704.362	4.842	2.67	.36	704.72	.00	1.14	.00	1.520	.000	.00	0 .0
58.070	.0086					.0044	..25	1.86	.00	.95	.013	.00	.00	PIPE
7366.090	703.000	1.657	704.657	4.842	2.67	.36	705.02	.00	1.14	.00	1.520	.000	.00	0 .0
1.950	.0256					.0044	..01	1.66	.00	.68	.013	.00	.00	PIPE
7368.040	703.050	1.634	704.684	4.842	2.67	.36	705.05	.00	1.14	.00	1.520	.000	.00	0 .0
38.030	.0053					.0044	..17	1.63	.00	1.14	.013	.00	.00	PIPE

Program Package License Serial Number: 1222
WATER SURFACE PROFILE LISTING Date: 2-27-2004 Time:11:34: 7

U.S 95 WIDENING - MAINLINE CHANNEL
OVERALL PROJECT
PREPARED BY VTN - TAM UPDATED: 01/13/03 FILE: US954A.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.- M / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
7406.070	703.250	1.600	704.850	4.842	2.67	.36	705.21	.00	1.14	.00	1.520	.000	.00	0 .0

.619	.0256						.0044	..00	1.60	.00	.68	.013	.00	.00	PIPE		
7406.688	703.266	1.577	704.843	4.842	2.67	.36	705.21	.00	1.14	.00	1.520	.000	.00	0	.0		
HYDRAULIC JUMP																	
7406.688	703.266	.788	704.054	4.842	5.10	1.32	705.38	.00	1.14	1.52	1.520	.000	.00	0	.0		
1.332	.0256						.0153	..02	.79	2.06	.68	.013	.00	.00	PIPE		
7408.020	703.300	.794	704.094	4.842	5.05	1.30	705.39	.00	1.14	1.52	1.520	.000	.00	0	.0		
3.342	.0103						.0152	..05	.79	2.03	.89	.013	.00	.00	PIPE		
7411.362	703.334	.789	704.123	4.842	5.09	1.32	705.44	.00	1.14	1.52	1.520	.000	.00	0	.0		
16.716	.0103						.0164	..27	.79	2.05	.89	.013	.00	.00	PIPE		
7428.078	703.506	.760	704.266	4.842	5.34	1.45	705.72	.00	1.14	1.52	1.520	.000	.00	0	.0		
13.992	.0103						.0187	..26	.76	2.20	.89	.013	.00	.00	PIPE		
7442.070	703.650	.732	704.382	4.842	5.60	1.60	705.98	.00	1.14	1.52	1.520	.000	.00	0	.0		
1.950	.0256						.0198	..04	.73	2.37	.68	.013	.00	.00	PIPE		
7444.020	703.700	.734	704.435	4.842	5.58	1.58	706.02	.00	1.14	1.52	1.520	.000	.00	0	.0		
42.050	.0190						.0201	..85	.73	2.35	.74	.013	.00	.00	PIPE		
7486.070	704.500	.724	705.224	4.842	5.67	1.64	706.87	.00	1.14	1.52	1.520	.000	.00	0	.0		
1.950	.0256						.0205	..04	.72	2.42	.68	.013	.00	.00	PIPE		

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
7488.020	704.550	.726	705.276	4.842	5.66	1.63	706.91	.00	1.14	1.52	1.520	.000	.00	0 .0
19.633	.0192					.0207	..41	.73	2.40	.74	.013	.00	.00	PIPE
7507.653	704.927	.720	705.647	4.842	5.71	1.66	707.31	.00	1.14	1.52	1.520	.000	.00	0 .0
43.725	.0192					.0224	..98	.72	2.44	.74	.013	.00	.00	PIPE
7551.377	705.766	.694	706.460	4.842	5.99	1.83	708.29	.00	1.14	1.51	1.520	.000	.00	0 .0
25.203	.0192					.0255	..64	.69	2.62	.74	.013	.00	.00	PIPE
7576.580	706.250	.670	706.920	4.842	6.28	2.01	708.93	.00	1.14	1.51	1.520	.000	.00	0 .0
1.950	.0256					.0272	..05	.67	2.81	.68	.013	.00	.00	PIPE
7578.530	706.300	.669	706.969	4.842	6.29	2.02	708.99	.00	1.14	1.51	1.520	.000	.00	0 .0
4.780	.0157					.0278	..13	.67	2.81	.78	.013	.00	.00	PIPE
7583.310	706.375	.661	707.036	4.842	6.39	2.08	709.12	.00	1.14	1.51	1.520	.000	.00	0 .0
12.564	.0157					.0304	..38	.66	2.88	.78	.013	.00	.00	PIPE
7595.874	706.573	.637	707.210	4.842	6.70	2.29	709.50	.00	1.14	1.50	1.520	.000	.00	0 .0
10.976	.0157					.0346	..38	.64	3.08	.78	.013	.00	.00	PIPE
7606.850	706.745	.615	707.360	4.842	7.03	2.52	709.88	.00	1.14	1.49	1.520	.000	.00	0 .0
1.950	.0026					.0376	..07	.62	3.30	1.52	.013	.00	.00	PIPE
7608.799	706.750	.608	707.358	4.842	7.14	2.60	709.96	.00	1.14	1.49	1.520	.000	.00	0 .0
11.167	.0540					.0363	..41	.61	3.38	.55	.013	.00	.00	PIPE

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
7619.967	707.353	.628	707.981	4.842	6.84	2.39	710.37	.00	1.14	1.50	1.520	.000	.00	0 .0
8.879	.0540					.0321	..29	.63	3.18	.55	.013	.00	.00	PIPE
7628.846	707.832	.651	708.483	4.842	6.52	2.17	710.65	.00	1.14	1.50	1.520	.000	.00	0 .0
6.727	.0540					.0282	..19	.65	2.96	.55	.013	.00	.00	PIPE
7635.572	708.194	.675	708.870	4.842	6.22	1.97	710.84	.00	1.14	1.51	1.520	.000	.00	0 .0
5.289	.0540					.0248	..13	.68	2.77	.55	.013	.00	.00	PIPE

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
7640.861	708.480	.700	709.180	4.842	5.93	1.79	710.97	.00	1.14	1.52	1.520	.000	.00	0 .0
4.258	.0540					.0218	..09	.70	2.58	.55	.013	.00	.00	PIPE
7645.119	708.710	.726	709.436	4.842	5.65	1.63	711.06	.00	1.14	1.52	1.520	.000	.00	0 .0
3.454	.0540					.0192	..07	.73	2.40	.55	.013	.00	.00	PIPE
7648.573	708.896	.754	709.650	4.842	5.39	1.48	711.13	.00	1.14	1.52	1.520	.000	.00	0 .0
2.857	.0540					.0169	..05	.75	2.24	.55	.013	.00	.00	PIPE
7651.430	709.050	.783	709.833	4.842	5.14	1.35	711.18	.00	1.14	1.52	1.520	.000	.00	0 .0
27.917	.0165					.0155	..43	.78	2.08	.77	.013	.00	.00	PIPE
7679.347	709.511	.791	710.302	4.842	5.07	1.31	711.61	.00	1.14	1.52	1.520	.000	.00	0 .0
40.334	.0165					.0143	..58	.79	2.04	.77	.013	.00	.00	PIPE
7719.681	710.178	.822	711.000	4.842	4.83	1.19	712.19	.00	1.14	1.51	1.520	.000	.00	0 .0
19.686	.0165					.0127	..25	.82	1.90	.77	.013	.00	.00	PIPE

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
7739.367	710.503	.854	711.357	4.842	4.61	1.08	712.44	.00	1.14	1.51	1.520	.000	.00	0 .0
12.027	.0165					.0112	..13	.85	1.76	.77	.013	.00	.00	PIPE
7751.394	710.702	.888	711.590	4.842	4.39	.98	712.57	.00	1.14	1.50	1.520	.000	.00	0 .0
8.040	.0165					.0099	..08	.89	1.64	.77	.013	.00	.00	PIPE
7759.434	710.834	.924	711.758	4.842	4.19	.89	712.65	.00	1.14	1.48	1.520	.000	.00	0 .0
5.441	.0165					.0087	..05	.92	1.52	.77	.013	.00	.00	PIPE
7764.875	710.924	.963	711.887	4.842	3.99	.81	712.70	.00	1.14	1.46	1.520	.000	.00	0 .0
3.870	.0165					.0078	..03	.96	1.40	.77	.013	.00	.00	PIPE
7768.745	710.988	1.003	711.991	4.842	3.81	.74	712.73	.00	1.14	1.44	1.520	.000	.00	0 .0
2.409	.0165					.0069	..02	1.00	1.29	.77	.013	.00	.00	PIPE
7771.154	711.028	1.047	712.075	4.842	3.63	.67	712.75	.00	1.14	1.41	1.520	.000	.00	0 .0
1.326	.0165					.0062	..01	1.05	1.19	.77	.013	.00	.00	PIPE
7772.480	711.050	1.094	712.144	4.842	3.46	.61	712.76	.00	1.14	1.36	1.520	.000	.00	0 .0
92.859	.0058					.0058	..54	1.09	1.09	1.09	.013	.00	.00	PIPE
7865.339	711.589	1.094	712.683	4.842	3.46	.61	713.29	.00	1.14	1.36	1.520	.000	.00	0 .0
27.791	.0058					.0058	..16	1.09	1.09	1.09	.013	.00	.00	PIPE
7893.130	711.750	1.093	712.843	4.842	3.47	.61	713.46	.00	1.14	1.37	1.520	.000	.00	0 .0
88.359	.0058					.0058	..51	1.09	1.09	1.09	.013	.00	.00	PIPE

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
7981.489	712.264	1.093	713.357	4.842	3.47	.61	713.97	.00	1.14	1.37	1.520	.000	.00	0 .0
31.911	.0058					.0058	..19	1.09	1.09	1.09	.013	.00	.00	PIPE
8013.400	712.450	1.095	713.545	4.842	3.46	.61	714.16	.00	1.14	1.36	1.520	.000	.00	0 .0
104.749	.0058					.0058	..61	1.09	1.09	1.09	.013	.00	.00	PIPE
8118.149	713.058	1.095	714.152	4.842	3.46	.61	714.76	.00	1.14	1.36	1.520	.000	.00	0 .0
15.931	.0058					.0055	..09	1.09	1.09	1.09	.013	.00	.00	PIPE
8134.080	713.150	1.143	714.293	4.842	3.31	.56	714.85	.00	1.14	1.31	1.520	.000	.00	0 .0
JUNCT STR	.0060					.0065	..65	1.14	1.00		.013	.00	.00	PIPE
8234.450	713.750	1.827	715.577	2.464	2.79	.40	715.97	.00	.88	.00	1.060	.000	.00	0 .0
28.688	.0255					.0077	..22	1.83	.00	.56	.013	.00	.00	PIPE
8263.138	714.481	1.322	715.802	2.464	2.79	.40	716.20	.00	.88	.00	1.060	.000	.00	0 .0

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
HYDRAULIC JUMP														
8263.138	714.481	.565	715.045	2.464	5.16	1.35	716.40	.00	.88	1.06	1.060	.000	.00	0 .0
6.825	.0255					.0247	..17	.56	2.45	.56	.013	.00	.00	PIPE
8269.963	714.655	.569	715.224	2.464	5.10	1.33	716.55	.00	.88	1.06	1.060	.000	.00	0 .0
38.818	.0255					.0229	..89	.57	2.41	.56	.013	00	.00	PIPE
8308.781	715.643	.591	716.234	2.464	4.86	1.21	717.44	.00	.88	1.05	1.060	.000	.00	0 .0
16.402	.0255					.0202	..33	.59	2.24	.56	.013	.00	.00	PIPE

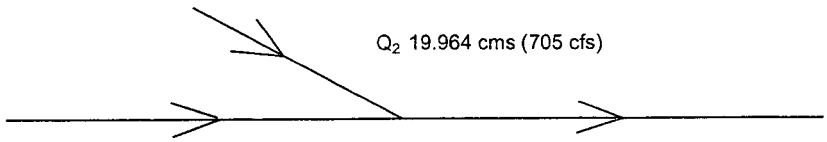
Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
8325.184	716.061	.615	716.676	2.464	4.64	1.10	717.77	.00	.88	1.05	1.060	.000	.00	0 .0
9.877	.0255					.0179	..18	.62	2.08	.56	.013	.00	.00	PIPE
8335.061	716.313	.640	716.953	2.464	4.42	1.00	717.95	.00	.88	1.04	1.060	.000	.00	0 .0
6.719	.0255					.0158	..11	.64	1.93	.56	.013	.00	.00	PIPE
8341.779	716.484	.666	717.150	2.464	4.22	.91	718.06	.00	.88	1.02	1.060	.000	.00	0 .0
4.763	.0255					.0141	..07	.67	1.78	.56	.013	.00	.00	PIPE
8346.542	716.605	.694	717.299	2.464	4.02	.82	718.12	.00	.88	1.01	1.060	.000	.00	0 .0
3.458	.0255					.0125	..04	.69	1.65	.56	.013	.00	.00	PIPE
8350.000	716.693	.724	717.417	2.464	3.83	.75	718.17	.00	.88	.99	1.060	.000	.00	0 .0
2.515	.0255					.0111	..03	.72	1.52	.56	.013	.00	.00	PIPE
8352.515	716.757	.756	717.513	2.464	3.66	.68	718.19	.00	.88	.96	1.060	.000	.00	0 .0
1.686	.0255					.0099	..02	.76	1.39	.56	.013	.00	.00	PIPE
8354.200	716.800	.792	717.592	2.464	3.48	.62	718.21	.00	.88	.92	1.060	.000	.00	0 .0
13.891	.0094					.0094	..13	.79	1.27	.79	.013	.00	.00	PIPE
8368.091	716.930	.792	717.722	2.464	3.48	.62	718.34	.00	.88	.92	1.060	.000	.00	0 .0
43.855	.0094					.0093	..41	.79	1.27	.79	.013	.00	.00	PIPE
8411.946	717.342	.800	718.143	2.464	3.45	.61	718.75	.00	.88	.91	1.060	.000	.00	0 .0
23.780	.0094					.0087	..21	.80	1.24	.79	.013	.00	.00	PIPE

Station	Invert Elev	Depth (M)	Water Elev	Q (M3/S)	Vel (M/S)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.- M	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
8435.727	717.566	.839	718.405	2.464	3.29	.55	718.96	.00	.88	.86	1.060	.000	.00	0 .0
3.634	.0094					.0079	..03	.84	1.13	.79	.013	.00	.00	PIPE
8439.360	717.600	.885	718.485	2.464	3.13	.50	718.98	.00	.88	.79	1.060	.000	.00	0 .0

Confluence Calculations

W.O.#:
Calculated by:
Checked by:
Date:

CONFLUENCE MOMENTUM ANALYSIS
(RANCHO LATERAL PEAKING)



GIVEN DATA

DISCHARGES		CHANNEL WIDTHS		FLOW DEPTHS		FROUDE NO.		ANGLE & LENGTH	
Q_1 (cfs)	1,964	b_1 (ft)	30.25	y_1 (ft)	3.189	F_1	2.01	θ (deg)	0.001
Q_2 (cfs)	705	b_2 (ft)	12.00	y_2 (ft)	3.796	F_2	1.40	$\cos\theta$	1.0000
Q_3 (cfs)	2,669	b_3 (ft)	44.50	y_3 (ft)	**3.129**	F_3	1.91	L (ft)	83.66

MOMENTUM EQUATION*

$$\frac{Q_1^2}{gA_1} + \frac{Q_2^2}{gA_2}COS\theta + \frac{b_1 y_1^2}{2} + \frac{(b_3 - b_1)}{2} y_1^2 = \frac{Q_3^2}{gA_3} + \frac{b_3 y_3^2}{2}$$

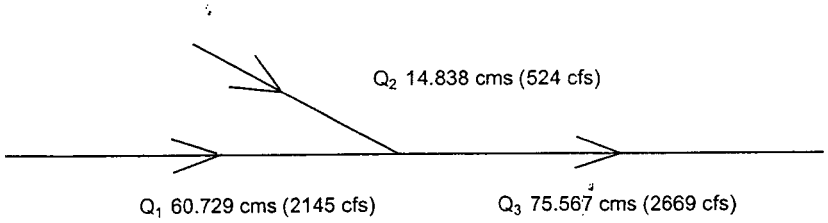
$$y_{c3} = \sqrt[3]{\frac{Q_3^2}{b_3^2 g}} = 4.82 \qquad 0.85y_{c3} = 4.09$$

MOMENTUM UPSTREAM*	(ft^3)	MOMENTUM DOWNSTREAM*	(ft^3)
$\frac{Q_1^2}{gA_1} = \frac{Q_1^2}{32.2(b_1 y_1)} =$	1,241.8	$y_3 =$ **3.129** ft	
$\frac{Q_2^2}{gA_2}COS\theta = \frac{Q_2^2}{32.2(b_2 y_2)}COS\theta =$	338.9	$\frac{Q_3^2}{gA_3} = \frac{Q_3^2}{32.2(b_3 y_3)} =$	1,589.1
$\frac{b_1 y_1^2}{2} =$	153.8	$\frac{b_3 y_3^2}{2} =$	217.8
$\frac{(b_3 - b_1)}{2} y_1^2 =$	72.4		
$\sum M_{1-2}$	1,806.9	$\sum M_{1-2}$	1,806.9

* THE TERM r (SPECIFIC WEIGHT OF WATER) HAS BEEN OMITTED FROM ALL TERMS OF THIS EQUATION AND THE FOLLOWING COMPUTATIONS.

W.O.#:
Calculated by:
Checked by:
Date:

CONFLUENCE MOMENTUM ANALYSIS
(MAINLINE CHANNEL PEAKING AT RANCHO)



GIVEN DATA

DISCHARGES		CHANNEL WIDTHS		FLOW DEPTHS		FROUDE NO.		ANGLE & LENGTH	
Q_1 (cfs)	2,145	b_1 (ft)	30.25	y_1 (ft)	3.780	F_1	1.70	θ (deg)	0.001
Q_2 (cfs)	524	b_2 (ft)	12.00	y_2 (ft)	3.091	F_2	1.42	$\cos\theta$	1.0000
Q_3 (cfs)	2,669	b_3 (ft)	44.50	y_3 (ft)	**3.155**	F_3	1.89	L (ft)	83.66

MOMENTUM EQUATION*

$$\frac{Q_1^2}{gA_1} + \frac{Q_2^2}{gA_2}COS\theta + \frac{b_1 y_1^2}{2} + \frac{(b_3 - b_1)}{2} y_1^2 = \frac{Q_3^2}{gA_3} + \frac{b_3 y_3^2}{2}$$

$$y_{c3} = \sqrt[3]{\frac{Q_3^2}{b_3^2 g}} = 4.82 \qquad 0.85y_{c3} = 4.09$$

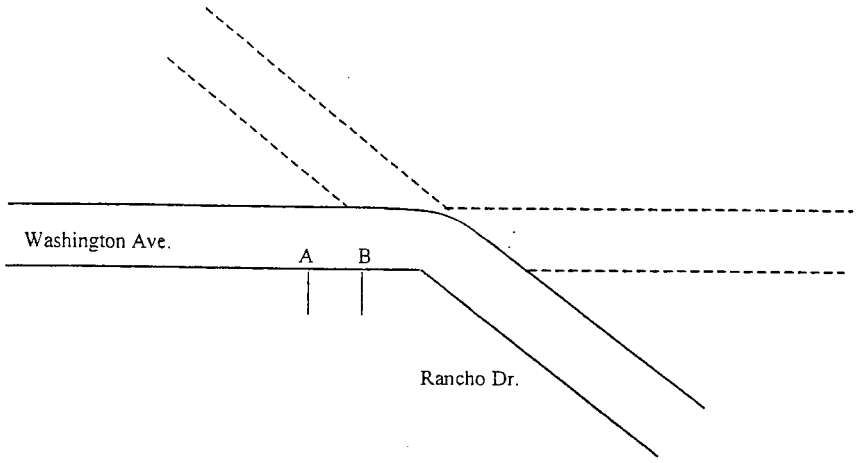
MOMENTUM UPSTREAM*	(ft^3)	MOMENTUM DOWNSTREAM*	(ft^3)
$\frac{Q_1^2}{gA_1} = \frac{Q_1^2}{32.2(b_1 y_1)} =$	1,249.6	$y_3 =$ **3.155** ft	
$\frac{Q_2^2}{gA_2}COS\theta = \frac{Q_2^2}{32.2(b_2 y_2)}COS\theta =$	229.9	$\frac{Q_3^2}{gA_3} = \frac{Q_3^2}{32.2(b_3 y_3)} =$	1,576.0
$\frac{b_1 y_1^2}{2} =$	216.1	$\frac{b_3 y_3^2}{2} =$	221.4
$\frac{(b_3 - b_1)}{2} y_1^2 =$	101.8		
$\sum M_{1-2}$	1,797.4	$\sum M_{1-2}$	1,797.4

* THE TERM r (SPECIFIC WEIGHT OF WATER) HAS BEEN OMITTED FROM ALL TERMS OF THIS EQUATION AND THE FOLLOWING COMPUTATIONS.

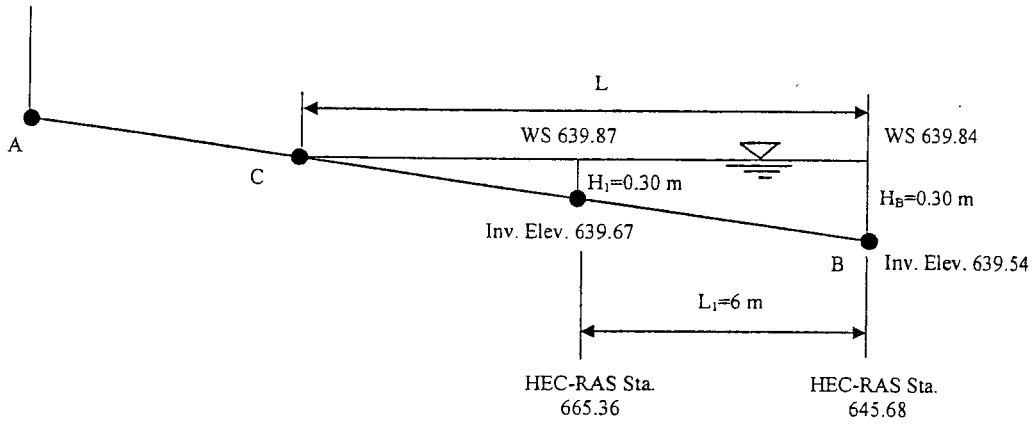
Flow Split Calculations
Washington Ave & Rancho Dr

Flow Split @ Opening AB West of the Intersection of
Washington Ave. and Rancho Dr.

Flow Split @ Opening AB West of the Intersection of Washington Ave. and Rancho Dr.



(a) Street Overview



(b) Opening AB

Figure 1 Illustration of Opening AB

1. Assume no flow split @ Opening AB, use HEC-RAS to compute the water surface along Washington Street.

Q = 1,100 cfs = 31.15 cms

The water surface elevations at the two cross sections 665.36 and 645.68 are 639.87 and 639.84, respectively (see attached HEC-RAS output).

2. The opening can be considered as a broad-crested weir. Note that the water surface along the weir is not constant. Assume the water surface varies linearly within this distance, the functioning length of side weir (L) can be computed as follow

$$\frac{L_1}{L} = \frac{H_B - H_1}{H_B}$$

$$L = \frac{H_B}{H_B - H_1} L_1 = \frac{0.30}{0.30 - 0.20}(6) = 18\,m$$

For unit length, the flow over the side weir is

$$q = \frac{dQ}{dx} = CH^{3/2}$$

where $H = \frac{H_B}{L} x$, and C is the discharge coefficient. Therefore the total flow over the side weir is

$$Q = \int_0^L CH^{3/2} dx = C \int_0^L \left(\frac{H_B}{L} x\right)^{3/2} dx$$

$$= C\left(\frac{H_B}{L}\right)^{3/2} \int_0^L x^{3/2} dx$$

$$= C\left(\frac{H_B}{L}\right)^{3/2} \frac{2}{5}(L)^{5/2}$$

$$= \frac{2}{5} CL(H_B)^{3/2}$$

For broad-crested weir, assume the crest slope 0.4%, C = 1.63 (Table 5.3. Brater, E. F., *et al., Handbook of Hydraulics*, 7th edition, 1996). Therefore,

$$Q = \frac{2}{5}(1.63)(18)(0.30)^{3/2}$$

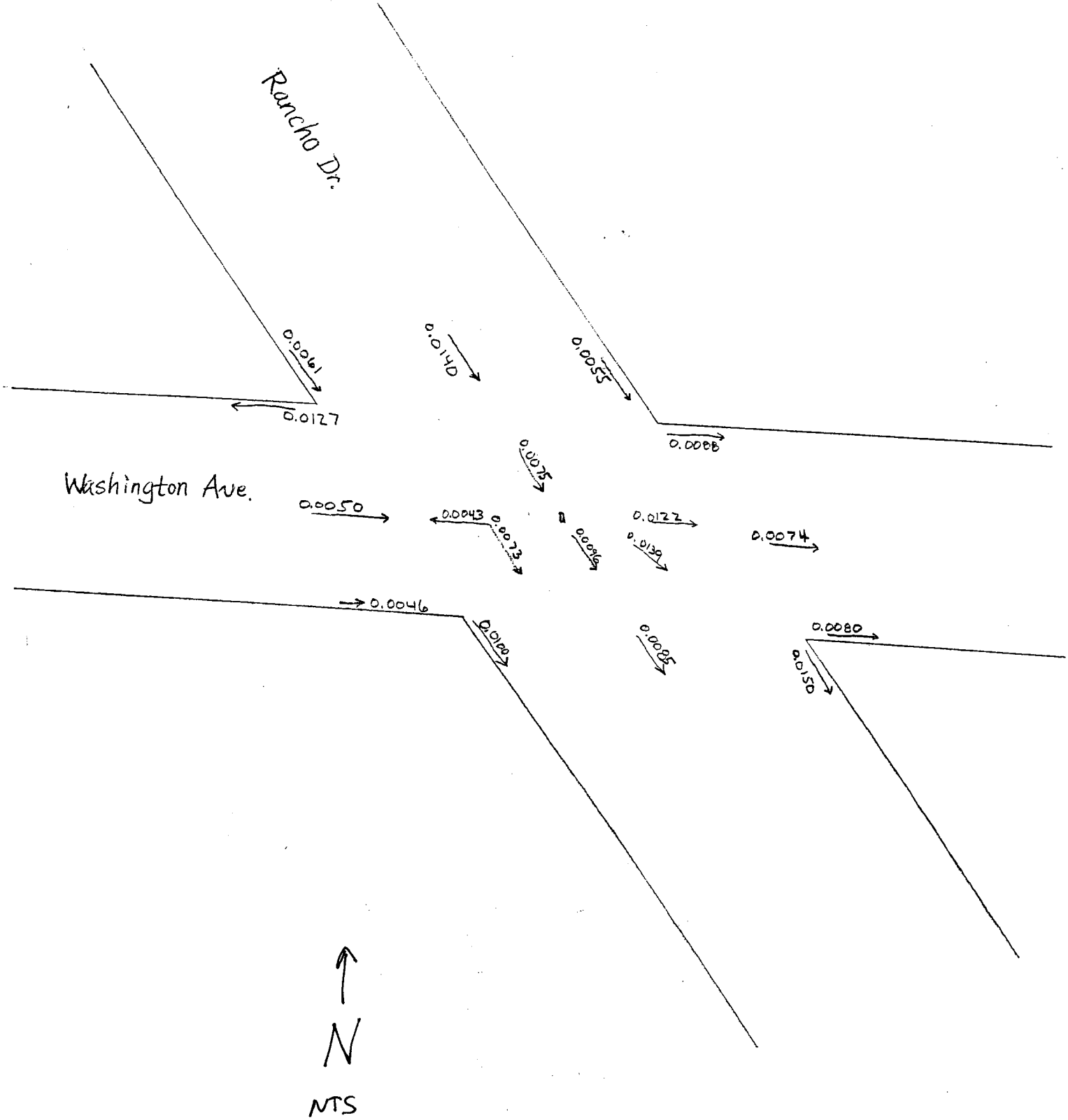
$$= 1.928\ (m^3/s)$$

$$= 68.1\ (ft^3/s)$$

Prepared By: H.T. Date: 6/13/01

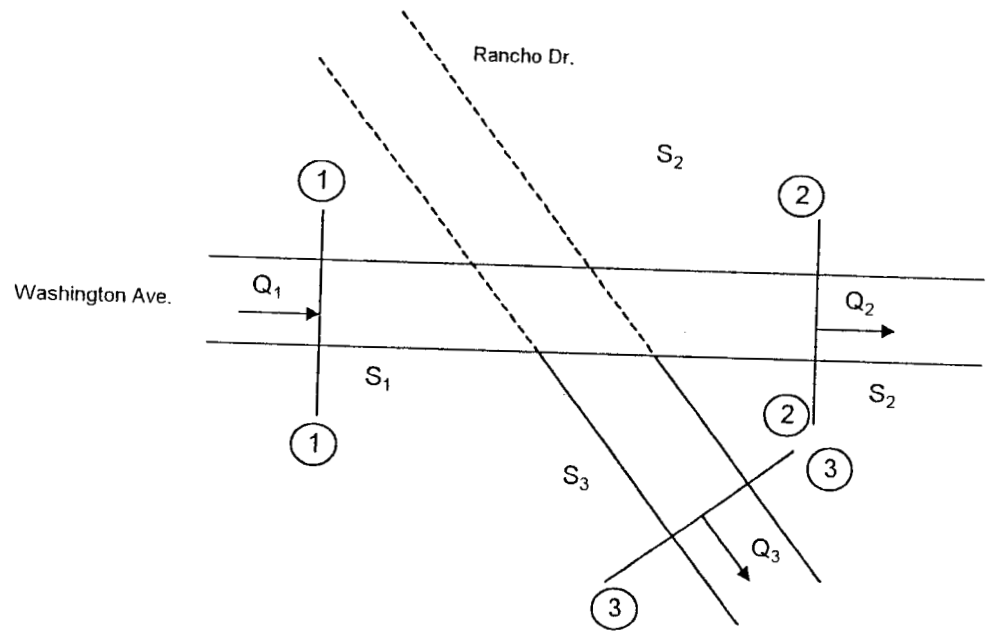
Checked By: J.P.L. Date: 6/13/01

Flow Split @ Washington Ave. and Rancho Dr.


Rancho Dr.
Washington Ave.
0.0061
0.0127
0.0140
0.0055
0.0088
0.0075
0.0050
0.0043
0.0073
0.0096
0.0122
0.0139
0.0074
0.0046
0.0100
0.0085
0.0080
0.0150
N
NTS

Flow Split @ Intersection of Washington Ave. and Rancho Dr.

Calculated by: H. Tan
Date: 06/08/01
Checked b J.L.
Date: 06/09/01



From the HEC-RAS output (attached in this section), it can be seen that flows around the intersection are subcritical. For subcritical flow, the downstream flow conditions should be known or given. Assume flows in the two streets after the intersection are normal flow. Based on this assumption and the principles of continuity and energy conservation, we have the following equations

$$
\begin{cases}
Q_1 = Q_2 + Q_3 \\
E_1 = E_2 \\
E_1 = E_3 \\
Q_2 = \dfrac{1}{n} A_2 R_2^{2/3} S_2^{1/2} \\
Q_3 = \dfrac{1}{n} A_3 R_3^{2/3} S_3^{1/2}
\end{cases}
$$

or

$$
\begin{cases}
Q_1 = Q_2 + Q_3 & (1) \\
D_1 + \dfrac{Q_1^2}{2gA_1^2} = D_2 + \dfrac{Q_2^2}{2gA_2^2} + \overline{S_f}_{1-2} \Delta L_{1-2} - \Delta Z_{1-2} & (2) \\
D_1 + \dfrac{Q_1^2}{2gA_1^2} = D_3 + \dfrac{Q_3^2}{2gA_3^2} + \overline{S_f}_{1-3} \Delta L_{1-3} - \Delta Z_{1-3} & (3) \\
Q_2 = \dfrac{1}{n} A_2 R_2^{2/3} S_2^{1/2} & (4) \\
Q_3 = \dfrac{1}{n} A_3 R_3^{2/3} S_3^{1/2} & (5)
\end{cases}
$$

There are five (5) unknows in the above system of equations: D_1, D_2, D_3, Q_2, and Q_3. A spreadsheet is designed below to solve this system of equations. The steps of solution are: **(i)** assume a value of Q_2, Q_3 can be obtained from the continuity equation (Eq.(1)) since Q_1 is known; **(ii)** solve Eq. (4) and Eq. (5) to get D_2 and D_3, respectively; **(iii)** solve Eq. (4) to get D_1; **(iv)** check if Eq. (5) is satisfied. If yes, the above values of D_1, D_2, D_3, Q_2, and Q_3 are the solution to the equations. If not, go back to step (i). Continue the calculations till Eq.(5) is satisfied.

(1) Q_1 = **500** cfs = 14.16 m^3/s

n = 0.016

B_1 =	20 m	S_1 =	0.49%	L_{1-2} =	74.5 m	DZ_{1-2} =	0.26
B_2 =	20 m	S_2 =	0.74%	L_{1-3} =	67.5 m	DZ_{1-3} =	0.30
B_3 =	25 m	S_3 =	0.85%				

Q_1 (m^3/s)	Q_2 (m^3/s)	Q_3 (m^3/s)	D_1 (m)	D_2 (m)	D_3 (m)	A_1 (m^2)	A_2 (m^2)	A_3 (m^2)	P_1 (m)	P_2 (m)	P_3 (m)	R_1 (m)	R_2 (m)	R_3 (m)
14.16	2	12.158423	0.252	0.092	0.229	5.05	1.84	5.71	20.50	20.18	25.46	0.2463	0.0911	0.2244
14.16	4	10.158423	0.280	0.140	0.205	5.59	2.79	5.13	20.56	20.28	25.41	0.2721	0.1376	0.2017
14.16	5	9.1584233	0.296	0.160	0.193	5.92	3.19	4.81	20.59	20.32	25.39	0.2875	0.1572	0.1897
14.16	**5.58873**	**8.56970**	**0.30682**	**0.17077**	**0.18502**	**6.14**	**3.42**	**4.63**	**20.61**	**20.34**	**25.37**	**0.2977**	**0.1679**	**0.1823**
14.16	5.6	8.5584233	0.307	0.171	0.185	6.14	3.42	4.62	20.61	20.34	25.37	0.2979	0.1681	0.1822

Calculated-Given $(Q_2)_n$-Q_2 (m^3/s)	$(Q_3)_n$-Q_3 (m^3/s)	S_{f1}	S_{f2}	S_{f3}	S_{f1-2}	S_{f1-3}	E_1 (m)	E_2-E_1 (m)	E_3-E_1 (m)	F_{r1}	F_{r2}	F_{r3}
0.00000	0.00000	0.01304	0.00740	0.00850	0.01022	0.01077	0.65356	0.00000	0.23287	1.78	1.15	1.42
0.00000	0.00000	0.00930	0.00740	0.00850	0.00835	0.00890	0.60657	0.00000	0.09974	1.53	1.23	1.40
0.00000	0.00000	0.00772	0.00740	0.00850	0.00756	0.00811	0.58782	0.00000	0.03667	1.40	1.25	1.38
0.00000	**0.00000**	**0.00686**	**0.00740**	**0.00850**	**0.00713**	**0.00768**	**0.57843**	**0.00000**	**0.00000**	**1.33**	**1.26**	**1.38**
0.00000	0.00000	0.00684	0.00740	0.00850	0.00712	0.00767	0.57826	0.00000	-0.00070	1.33	1.27	1.38

(2) Q_1 = **812** cfs = 22.99 m^3/s

n = 0.016

B_1 =	20 m	S_1 =	0.49%	L_{1-2} =	74.5 m	DZ_{1-2} =	0.26
B_2 =	20 m	S_2 =	0.74%	L_{1-3} =	67.5 m	DZ_{1-3} =	0.30
B_3 =	25 m	S_3 =	0.85%				

Q_1 (m^3/s)	Q_2 (m^3/s)	Q_3 (m^3/s)	D_1 (m)	D_2 (m)	D_3 (m)	A_1 (m^2)	A_2 (m^2)	A_3 (m^2)	P_1 (m)	P_2 (m)	P_3 (m)	R_1 (m)	R_2 (m)	R_3 (m)
22.99	2	20.993279	0.270	0.092	0.318	5.40	1.84	7.95	20.54	20.18	25.64	0.2628	0.0911	0.3102
22.99	4	18.993279	0.286	0.140	0.299	5.71	2.79	7.48	20.57	20.28	25.60	0.2778	0.1376	0.2923
22.99	6	16.993279	0.304	0.178	0.280	6.08	3.57	7.00	20.61	20.36	25.56	0.2948	0.1751	0.2737
22.99	8	14.993279	0.296	0.212	0.259	5.92	4.24	6.49	20.59	20.42	25.52	0.2875	0.2077	0.2541
22.99	9	13.993279	0.340	0.228	0.249	6.80	4.56	6.22	20.68	20.46	25.50	0.3287	0.2227	0.2439
22.99	**9.11882**	**13.87446**	**0.34159**	**0.22961**	**0.24752**	**6.83**	**4.59**	**6.19**	**20.68**	**20.46**	**25.50**	**0.3303**	**0.2245**	**0.2427**
22.99	10	12.993279	0.356	0.243	0.238	7.12	4.86	5.95	20.71	20.49	25.48	0.3436	0.2370	0.2335

Calculated-Given

$(Q_2)_n$-Q_2 (m^3/s)	$(Q_3)_n$-Q_3 (m^3/s)	S_{f1}	S_{f2}	S_{f3}	S_{f1-2}	S_{f1-3}	E_1 (m)	E_2-E_1 (m)	E_3-E_1 (m)	F_{r1}	F_{r2}	F_{r3}
0.00000	0.00000	0.02758	0.00740	0.00850	0.01749	0.01804	1.19547	0.00000	0.39608	2.62	1.15	1.50
0.00000	0.00000	0.02286	0.00740	0.00850	0.01513	0.01568	1.11171	0.00000	0.27485	2.40	1.23	1.48
0.00000	0.00000	0.01869	0.00740	0.00850	0.01304	0.01359	1.03459	0.00000	0.16392	2.19	1.27	1.47
0.00000	0.00000	0.02035	0.00740	0.00850	0.01387	0.01442	1.06560	0.10162	0.14019	2.28	1.31	1.45
0.00000	0.00000	0.01292	0.00740	0.00850	0.01016	0.01071	0.92378	0.00000	0.00613	1.85	1.32	1.44
0.00000	**0.00000**	**0.01270**	**0.00740**	**0.00850**	**0.01005**	**0.01060**	**0.91952**	**0.00000**	**0.00000**	**1.84**	**1.32**	**1.44**
0.00000	0.00000	0.01110	0.00740	0.00850	0.00925	0.00980	0.88841	0.00000	-0.04539	1.73	1.33	1.43

(3) Q_1 = **1,000** cfs = 28.32 m^3/s

n = 0.016

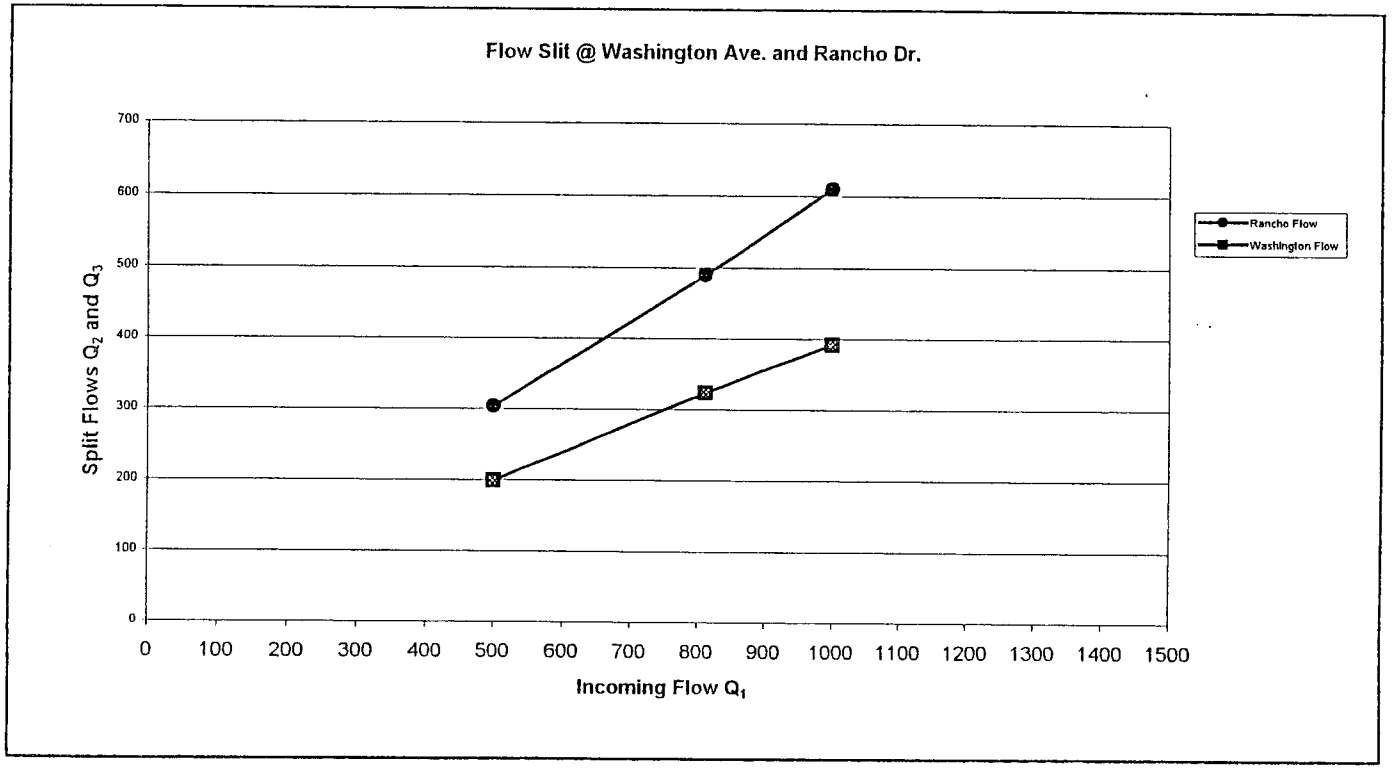
B_1 =	20 m	S_1 =	0.49%	L_{1-2} =	74.5 m
B_2 =	20 m	S_2 =	0.74%	L_{1-3} =	67.5 m
B_3 =	25 m	S_3 =	0.85%		

Q_1 (m^3/s)	Q_2 (m^3/s)	Q_3 (m^3/s)	D_1 (m)	D_2 (m)	D_3 (m)	A_1 (m^2)	A_2 (m^2)	A_3 (m^2)	P_1 (m)	P_2 (m)	P_3 (m)	R_1 (m)	R_2 (m)	R_3 (m)
28.32	2	26.316847	0.276	0.092	0.365	5.51	1.84	9.12	20.55	20.18	25.73	0.2683	0.0911	0.3544
28.32	4	24.316847	0.288	0.140	0.348	5.75	2.79	8.69	20.58	20.28	25.70	0.2796	0.1376	0.3383
28.32	6	22.316847	0.300	0.178	0.330	6.01	3.57	8.25	20.60	20.36	25.66	0.2916	0.1751	0.3216
28.32	8	20.316847	0.315	0.212	0.312	6.30	4.24	7.80	20.63	20.42	25.62	0.3054	0.2077	0.3042
28.32	10	18.316847	0.333	0.243	0.293	6.66	4.86	7.32	20.67	20.49	25.59	0.3222	0.2370	0.2861
28.32	**11.06802**	**17.24882**	**0.34439**	**0.25820**	**0.28237**	**6.89**	**5.16**	**7.06**	**20.69**	**20.52**	**25.56**	**0.3329**	**0.2517**	**0.2761**
28.32	12	16.316847	0.356	0.271	0.273	7.12	5.42	6.83	20.71	20.54	25.55	0.3437	0.2640	0.2672

Calculated-Given $(Q_2)_n$-Q_2 (m^3/s)	$(Q_3)_n$-Q_3 (m^3/s)	S_{f1}	S_{f2}	S_{f3}	S_{f1-2}	S_{f1-3}	E_1 (m)	E_2-E_1 (m)	E_3-E_1 (m)	F_{r1}	F_{r2}	F_{r3}
0.00000	0.00000	0.03901	0.00740	0.00850	0.02321	0.02376	1.62124	0.00000	0.47204	3.12	1.15	1.53
0.00000	0.00000	0.03393	0.00740	0.00850	0.02067	0.02122	1.52389	0.00000	0.35511	2.93	1.23	1.52
0.00000	0.00000	0.02941	0.00740	0.00850	0.01840	0.01895	1.43384	0.00000	0.24880	2.75	1.27	1.50
0.00000	0.00000	0.02513	0.00740	0.00850	0.01627	0.01682	1.34541	0.00000	0.14811	2.93	1.23	1.52
0.00000	0.00000	0.02096	0.00740	0.00850	0.01418	0.01473	1.25575	0.00000	0.05091	2.75	1.27	1.50
0.00000	**0.00000**	**0.01875**	**0.00740**	**0.00850**	**0.01308**	**0.01363**	**1.20670**	**0.00000**	**0.00000**	**2.24**	**1.35**	**1.47**
0.00000	0.00000	0.01682	0.00740	0.00850	0.01211	0.01266	1.16307	0.00000	-0.04401	2.13	1.36	1.46

(4) Concluded

Q_1		Q_2		Q_3	
(cfs)	(m^3/s)	(cfs)	(m^3/s)	(cfs)	(m^3/s)
500	14.16	197	5.589	303	8.570
812	22.99	322	9.119	490	13.874
1000	28.32	391	11.068	609	17.249



HEC-RAS Model

HEC-RAS Plan: Plan 01 River: Washington Reach: Street

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Street	1000	29.45	639.51	640.05	640.06	640.21	0.004301	1.79	16.47	56.50	1.06
Street	1000	20.00	639.51	639.99	639.99	640.11	0.004300	1.53	13.05	56.50	1.02
Street	1000	15.00	639.51	639.94	639.94	640.04	0.004305	1.46	10.30	48.21	1.01
Street	1000	13.00	639.51	639.90	639.91	640.01	0.004296	1.47	8.85	40.75	1.01
Street	1000	12.00	639.51	639.89	639.89	640.00	0.004528	1.47	8.19	39.40	1.03
Street	1000	31.15	639.51	640.06	640.07	640.23	0.004301	1.83	17.04	56.50	1.06
Street	916.34	29.45	639.37	639.96	639.93	640.09	0.003031	1.63	18.07	54.81	0.91
Street	916.34	20.00	639.37	639.82	639.85	639.98	0.005576	1.81	11.03	45.07	1.17
Street	916.34	15.00	639.37	639.76	639.79	639.91	0.006108	1.72	8.73	41.39	1.19
Street	916.34	13.00	639.37	639.74	639.77	639.88	0.006417	1.68	7.76	39.67	1.21
Street	916.34	12.00	639.37	639.73	639.75	639.86	0.005914	1.59	7.55	39.27	1.16
Street	916.34	31.15	639.37	639.92	639.94	640.11	0.004839	1.96	15.91	52.01	1.13
Street	832.68	29.45	639.27	639.87		640.01	0.002979	1.69	17.45	49.53	0.91
Street	832.68	20.00	639.27	639.71	639.75	639.90	0.005817	1.91	10.46	40.68	1.20
Street	832.68	15.00	639.27	639.65	639.69	639.83	0.006754	1.85	8.11	37.10	1.26
Street	832.68	13.00	639.27	639.63	639.67	639.80	0.007371	1.83	7.12	35.48	1.30
Street	832.68	12.00	639.27	639.62	639.65	639.78	0.007211	1.77	6.79	34.92	1.28
Street	832.68	31.15	639.27	639.82	639.86	640.04	0.004846	2.04	15.27	46.94	1.14
Street	749.02	29.45	639.15	639.83		639.94	0.001963	1.47	19.97	50.65	0.75
Street	749.02	20.00	639.15	639.62	639.65	639.81	0.005596	1.91	10.45	39.40	1.19
Street	749.02	15.00	639.15	639.55	639.60	639.74	0.006902	1.89	7.94	35.70	1.28
Street	749.02	13.00	639.15	639.52	639.57	639.71	0.008070	1.91	6.81	33.91	1.36
Street	749.02	12.00	639.15	639.51	639.56	639.69	0.007997	1.86	6.46	33.34	1.35
Street	749.02	31.15	639.15	639.86	639.76	639.97	0.001845	1.47	21.26	51.98	0.73
Street	665.36	29.45	639.03	639.85		639.90	0.000665	1.02	28.92	56.50	0.45
Street	665.36	20.00	639.03	639.69	639.56	639.74	0.000985	0.98	20.34	56.50	0.52
Street	665.36	15.00	639.03	639.60	639.50	639.65	0.001536	1.01	14.91	56.05	0.62
Street	665.36	13.00	639.03	639.56	639.47	639.61	0.001706	1.02	12.78	51.07	0.65
Street	665.36	12.00	639.03	639.54	639.46	639.59	0.001786	1.02	11.77	48.54	0.66
Street	665.36	31.15	639.03	639.87		639.92	0.000636	1.03	30.32	56.50	0.45
Street	645.68	29.45	638.99	639.82		639.89	0.000771	1.21	24.34	40.50	0.50

HEC-RAS Plan: Plan 01 River: Washington Reach: Street (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Street	645.68	20.00	638.99	639.68		639.74	0.000848	1.07	18.70	40.50	0.50
Street	645.68	15.00	638.99	639.59		639.64	0.000947	0.99	15.20	40.50	0.51
Street	645.68	13.00	638.99	639.56		639.60	0.000995	0.95	13.74	40.50	0.52
Street	645.68	12.00	638.99	639.54		639.58	0.001028	0.93	12.96	40.50	0.52
Street	645.68	31.15	638.99	639.84		639.92	0.000763	1.23	25.26	40.50	0.50
Street	634.19	29.45	638.99	639.77		639.88	0.001238	1.49	19.72	34.00	0.63
Street	634.19	20.00	638.99	639.64		639.73	0.001285	1.30	15.42	34.00	0.61
Street	634.19	15.00	638.99	639.56		639.64	0.001376	1.18	12.68	34.00	0.62
Street	634.19	13.00	638.99	639.53		639.60	0.001410	1.13	11.55	34.00	0.62
Street	634.19	12.00	638.99	639.51		639.57	0.001434	1.10	10.95	34.00	0.62
Street	634.19	31.15	638.99	639.79		639.91	0.001235	1.53	20.42	34.00	0.63
Street	581.70	29.45	638.95	639.70		639.86	0.001838	1.74	16.96	31.50	0.76
Street	581.70	20.00	638.95	639.59		639.70	0.001857	1.50	13.37	31.50	0.73
Street	581.70	15.00	638.95	639.51		639.61	0.002106	1.39	10.81	31.50	0.76
Street	581.70	13.00	638.95	639.48		639.57	0.002142	1.32	9.82	31.09	0.75
Street	581.70	12.00	638.95	639.46		639.54	0.002136	1.29	9.31	30.65	0.75
Street	581.70	31.15	638.95	639.72		639.88	0.001845	1.78	17.53	31.50	0.76
Street	557.09	29.45	638.93	639.61	639.61	639.83	0.003440	2.09	14.07	31.92	1.01
Street	557.09	20.00	638.93	639.50	639.50	639.68	0.003713	1.89	10.58	29.74	1.01
Street	557.09	15.00	638.93	639.46		639.59	0.003029	1.60	9.36	28.93	0.90
Street	557.09	13.00	638.93	639.44		639.55	0.002701	1.47	8.85	28.58	0.84
Street	557.09	12.00	638.93	639.43		639.53	0.002567	1.41	8.54	28.37	0.82
Street	557.09	31.15	638.93	639.63	639.63	639.86	0.003436	2.14	14.57	32.00	1.01
Street	493.04	29.45	638.97	639.45	639.53	639.74	0.009035	2.35	12.51	49.67	1.50
Street	493.04	20.00	638.97	639.51	639.46	639.60	0.002443	1.30	15.41	56.08	0.79
Street	493.04	15.00	638.97	639.44		639.52	0.002792	1.28	11.67	47.67	0.83
Street	493.04	13.00	638.97	639.41		639.49	0.002709	1.23	10.55	44.82	0.81
Street	493.04	12.00	638.97	639.40		639.47	0.002689	1.21	9.93	43.17	0.80
Street	493.04	31.15	638.97	639.46	639.55	639.76	0.009607	2.44	12.76	50.26	1.55
Street	445.47	29.45	638.92	639.46	639.50	639.68	0.005503	2.06	14.31	47.82	1.20
Street	445.47	20.00	638.92	639.43	639.42	639.55	0.003664	1.59	12.58	45.66	0.97

HEC-RAS Plan: Plan 01 River: Washington Reach: Street (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Street	445.47	15.00	638.92	639.38		639.48	0.003411	1.42	10.55	42.98	0.92
Street	445.47	13.00	638.92	639.37		639.45	0.003048	1.31	9.94	42.14	0.86
Street	445.47	12.00	638.92	639.36		639.44	0.002902	1.25	9.56	41.61	0.84
Street	445.47	31.15	638.92	639.48	639.51	639.70	0.005351	2.07	15.03	48.70	1.19
Street	392.98	29.45	638.88	639.52	639.43	639.62	0.001814	1.45	20.27	49.50	0.72
Street	392.98	20.00	638.88	639.39		639.49	0.002769	1.42	14.13	49.50	0.85
Street	392.98	15.00	638.88	639.32	639.31	639.42	0.004043	1.41	10.60	49.50	0.98
Street	392.98	13.00	638.88	639.30	639.30	639.39	0.004471	1.38	9.41	49.18	1.01
Street	392.98	12.00	638.88	639.29	639.29	639.38	0.004525	1.35	8.90	48.59	1.01
Street	392.98	31.15	638.88	639.54	639.45	639.65	0.001682	1.45	21.46	49.50	0.70
Street	356.89	29.45	638.76	639.39	639.39	639.59	0.003597	1.99	14.81	37.50	1.01
Street	356.89	20.00	638.76	639.30	639.30	639.45	0.003864	1.74	11.47	37.50	1.01
Street	356.89	15.00	638.76	639.24	639.24	639.37	0.004262	1.60	9.36	37.50	1.02
Street	356.89	13.00	638.76	639.21	639.22	639.34	0.005227	1.61	8.08	37.50	1.11
Street	356.89	12.00	638.76	639.19	639.21	639.32	0.005552	1.59	7.56	37.50	1.13
Street	356.89	31.15	638.76	639.40	639.40	639.61	0.003575	2.03	15.36	37.50	1.01
Street	320.8	29.45	638.66	639.12	639.23	639.51	0.011844	2.72	10.77	41.50	1.71
Street	320.8	20.00	638.66	639.07	639.15	639.36	0.012938	2.39	8.30	41.50	1.72
Street	320.8	15.00	638.66	639.03	639.10	639.27	0.013466	2.15	6.90	41.50	1.70
Street	320.8	13.00	638.66	639.02	639.08	639.23	0.013458	2.03	6.33	41.50	1.67
Street	320.8	12.00	638.66	639.01	639.07	639.22	0.014305	2.00	5.92	41.50	1.71
Street	320.8	31.15	638.66	639.13	639.25	639.53	0.011770	2.78	11.16	41.50	1.72
Street	284.71	29.45	638.61	639.27	639.13	639.36	0.001226	1.31	22.46	47.00	0.61
Street	284.71	20.00	638.61	639.00	639.06	639.21	0.008592	2.02	9.88	47.00	1.41
Street	284.71	15.00	638.61	638.98	639.01	639.13	0.007767	1.75	8.57	47.00	1.31
Street	284.71	13.00	638.61	638.97	638.99	639.10	0.007034	1.61	8.10	47.00	1.23
Street	284.71	12.00	638.61	638.96	638.98	639.08	0.006952	1.55	7.74	47.00	1.22
Street	284.71	31.15	638.61	639.30	639.15	639.39	0.001140	1.31	23.75	47.00	0.59
Street	196.13	29.45	638.36	639.03	639.03	639.29	0.003391	2.27	12.97	25.00	1.01
Street	196.13	20.00	638.36	638.86	638.91	639.12	0.005407	2.25	8.89	25.00	1.20
Street	196.13	15.00	638.36	638.82	638.84	639.01	0.004801	1.94	7.74	25.00	1.11

HEC-RAS Plan: Plan 01 River: Washington Reach: Street (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Street	196.13	13.00	638.36	638.80	638.81	638.96	0.004308	1.77	7.34	25.00	1.04
Street	196.13	12.00	638.36	638.79	638.79	638.94	0.004235	1.71	7.03	25.00	1.03
Street	196.13	31.15	638.36	639.05	639.05	639.32	0.003340	2.31	13.48	25.00	1.00

Prepared By: H.T. **Date:** 6/13/01

Checked By: J.P.L. **Date:** 6/13/01

Rancho Lateral Facility
Drop Inlet Calculations

US 95 WIDENING
PROJECT 3A
DETERMINATION OF FLOW INTERCEPTION CAPACITY IN SUMP LOCATION

All calculations are based on FHWA HEC-22 method

Calculations By: TAM
Date: 5-10-03

Checked By: JPL
Date: 5-12-03

INLET TO BE REPLACED AT BONANZA AND RANCHO

							1	2	3	4	5	6	7		
Subbasins Contributing Flow	Drop Inlet I.D.	LOCATION	Inlet size (ft)	Inlet Type	Clogging Factor Grate	Clogging Factor Slotted Drain	Q_{100} (cfs)	d (ft)	Perimeter (ft)	Q_{grate} (cfs)	Ag (ft^2)	Q_{grate} (cfs)	Weir vs. Orifice Control	$Q_{Captured}$ (cfs)	$Q_{Captured}$ (cms)
Rancho	2.9	NW CORNER OF BONANZA	10 X 2	Special DI	50%	50%	80.28	0.50	13.8	7.34	12.7	24.18	WEIR	7.34	0.208

1 Total flow that gets to sump inlet

2 d is flow depth over grate: 0.5' curb

3 Perimeter of the grate disregarding the side against the curb or barrier rail

4 Capacity of grate inlet operating as a weir: $Q_i = C_w P(1\text{-CLOGGING FACTOR})d^{1.5}$ where $C_w = 3.0$, P = Perimeter, d = flow depth Hec-22 Eq. 4-26 Pg. 4-46

5 Ag = Clear opening area of grate = Area of grate - Area of bars

6 Capacity of grate inlet operating as an orifice: $Q_i = C_o Ag(1\text{-CLOGGING FACTOR})(2gd)^{0.5}$ where $C_o = 0.67$, Ag = Clear opening of grate, $g = 32.2\ ft/s^2$, d = flow depth, Hec-22 Eq. 4-27

7 This column shows if the flow is by weir control or orifice control

US 95 WIDENING
PROJECT 3A
DETERMINATION OF FLOW INTERCEPTION CAPACITY

Calculations By: TAM 5-10-03
Date:

Checked By: JPL
Date: 5-12-03

All calculations are based on modified FHWA HEC-22 method

INPUT DATA:
n = 0.016

Rancho-Washington Pave DI

				1	2	3	3.5	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
Subbasins Contributing Flow	**Inlet I.D.**	**Inlet Type**	**Location**	**Q (cfs)**	**L_{grate} (ft)**	**W_{grate} (ft)**	**Vo (ft/s)**	**$L_{Slotted\ drain/Curb\ opening}$ (ft)**	**CLOGGING FACTOR GRATE**	**CLOGGING FACTOR SLOTTED DRAIN**	**S (ft/ft)**	**S_x (ft/ft)**	**L_T (ft)**	**L_{eff} (ft)**	**$E_{Slotted\ drain/Curb\ opening}$**	**T (ft)**	**Q (cfs)**	**Q_S (cfs)**	**E_o**	**V (ft/s)**	**R_f**	**R_s**	**E_{grate}**	**Q_{grate} (cfs)**	**$Q_{slotted\ drain}$**	**Flow Intercepted (cfs)**	**Bypass (cfs)**	**Bypass goes to inlet:**	**Flow Intercepted (cms)**	**Bypass (cms)**
	Rancho Plan																													
TRENCH DRAIN	1.1	Trench Drain	"WA" 9+14.606 LT.	551.50	8.0	3.6	6.84	0	0%	0%	0.004	0.015	239.77	0.00	0.00	66.60	139.48	120.25	0.14	4.55	1.00	0.43	0.51	71.47	0.00	71.47	480.03	1.2	2.024	13.593
WASHINGTON AVE.	1.2	Special DI	"WA" 9+39.500 LT.	480.03	20.0	2.0	4.66	0	50%	50%	0.003	0.023	166.30	0.00	0.00	42.00	76.22	66.91	0.12	6.87	0.80	0.82	0.42	32.15	0.00	32.15	447.88	1.7	0.910	12.683
RANCHO DRIVE	1.7	Special DI	"LM" 3+05.250 RT.	159.89	20.0	2.0	4.66	0	50%	50%	0.001	0.018	88.92	0.00	0.00	62.77	95.06	87.18	0.08	2.90	1.00	0.95	0.48	45.18	0.00	45.18	114.71	1.11	1.279	3.248
RANCHO DRIVE	1.11	Special DI	"RM" 28+81.500 RT.	114.71	20.0	2.0	4.66	0	50%	50%	0.009	0.018	144.88	0.00	0.00	52.49	158.17	142.58	0.10	5.07	0.96	0.86	0.44	69.29	0.00	69.29	45.42	1.12	1.962	1.286
RANCHO DRIVE	1.12	Special DI	"RM" 28+66.000 RT.	45.42	20.0	2.0	4.66	0	50%	50%	0.006	0.017	88.74	0.00	0.00	42.19	68.06	59.78	0.12	3.38	1.00	0.93	0.47	31.83	0.00	31.83	13.59	1.14	0.901	0.385
RANCHO DRIVE	1.14	Special DI	"RM" 28+32.500 RT.	13.59	20.0	2.0	4.66	0	50%	50%	0.008	0.018	56.79	0.00	0.00	21.24	13.59	10.44	0.23	3.35	1.00	0.93	0.47	6.43	0.00	6.43	7.16	1.17	0.182	0.203
RANCHO DRIVE	1.17	Special DI	"RD" 27+90.900 RT.	7.16	20.0	2.0	4.66	0	50%	50%	0.008	0.011	56.84	0.00	0.00	23.68	7.16	5.66	0.21	2.43	1.00	0.93	0.47	3.39	0.00	3.39	3.77	1.23	0.096	0.107
RANCHO DRIVE	1.23	Exisitng DI	"RM" 27+40.000 RT.	3.77	2.5	2.0	4.66	0	50%	50%	0.004	0.014	31.14	0.00	0.00	17.31	3.77	2.74	0.27	1.77	1.00	0.22	0.22	0.81	0.00	0.81	2.96	2.7	0.023	0.084
RANCHO DRIVE	2.7	Type 3	"RM" 25+85.000 RT.	2.96	2.5	2.0	4.66	0	50%	50%	0.003	0.018	21.34	0.00	0.00	15.06	2.96	2.04	0.31	1.47	1.00	0.33	0.27	0.79	0.00	0.79	2.17	2.8	0.022	0.061
RANCHO DRIVE	2.8	Type 3	"RM" 24+40.000 RT.	2.17	2.5	2.0	4.66	0	50%	50%	0.003	0.029	14.01	0.00	0.00	9.91	2.17	1.21	0.44	1.54	1.00	0.42	0.34	0.73	0.00	0.73	1.43	-	0.021	0.041
TRENCH DRAIN	1.3	Trench Drain	"WA" 9+08.971 RT.	551.50	15.0	3.6	6.84	0	0%	0%	0.003	0.020	190.27	0.00	0.00	59.71	157.68	133.56	0.15	4.55	1.00	0.81	0.84	132.94	0.00	132.94	418.56	1.4	3.764	11.852
WASHINGTON AVE.	1.4	Special DI	"WA" 9+29.500 RT.	418.56	20.0	2.0	4.66	0	50%	50%	0.002	0.020	154.74	0.00	0.00	59.71	128.38	117.21	0.09	6.87	0.80	0.80	0.41	52.42	0.00	52.42	366.14	1.6	1.484	10.368
WASHINGTON AVE.	1.6	Special DI	"WA" 9+65.750 RT.	366.14	20.0	2.0	4.66	0	50%	50%	0.001	0.014	152.95	0.00	0.00	59.71	53.88	49.19	0.09	6.24	0.86	0.77	0.39	21.25	0.00	21.25	344.89	1.25	0.602	9.766
WASHINGTON AVE. / RANCHO	1.25	Exisitng DI	"LM" 3+40.547 LT.	159.89	2.5	2.0	4.66	0	50%	50%	0.022	0.037	139.06	0.00	0.00	37.32	159.89	159.76	0.13	8.56	0.65	0.04	0.08	13.49	0.00	13.49	146.39	1.8	0.382	4.145
RANCHO DRIVE	1.8	Special DI	"RSM" 28+92.882 LT.	146.39	20.0	2.0	4.66	0	50%	50%	0.007	0.024	125.70	0.00	0.00	40.41	112.43	98.18	0.13	5.74	0.90	0.87	0.44	49.83	0.00	49.83	96.57	1.15	1.411	2.734
RANCHO DRIVE	1.15	Special DI	"RSM" 28+46.318 LT.	96.57	20.0	2.0	4.66	0	50%	50%	0.009	0.024	110.69	0.00	0.00	41.01	129.47	113.29	0.12	5.11	0.96	0.89	0.45	58.65	0.00	58.65	37.92	1.16	1.661	1.074
RANCHO DRIVE	1.16	Special DI	"RSM" 28+03.317 LT.	37.92	20.0	2.0	4.66	0	50%	50%	0.008	0.017	89.77	0.00	0.00	36.35	52.07	44.77	0.14	3.63	1.00	0.92	0.46	24.17	0.00	24.17	13.75	N/A	0.684	0.389
RANCHO DRIVE	N/A	Exisitng DI	"RM" 27+40.000 LT.	13.75	2.5	2.0	4.66	0	50%	50%	0.003	0.012	52.75	0.00	0.00	34.46	13.75	11.77	0.14	3.03	1.00	0.08	0.11	1.46	0.00	1.46	12.28	-	0.041	0.348

1 The potential capute flow rate

2 This is the width of the grate as defined by 2001 NDOT Standard Plans or Special Details

3 This is the length of the grate as defined by 2001 NDOT Standard Plans or Special Details

3.5 This is the splash over velocity based on W_g from HEC-22 Chart 5, page A-6

4 This is the length of slotted drain opening or curb length opening for the corresponding inlet

5 This is the clogging factor for the inlet grate as specified in the U.S. 95 Drainage Design Standards and Guidelines, for trench drains 1.1 and 1.3 the cogging factor has been applied geometrically to the grate.

6 This is the clogging factor for the slotted drain as specified in the U.S. 95 Drainage Design Standards and Guidelines

7 This is the longitudinal slope at the inlet

8 This is the cross slope at the inlet (for trench drains 1.1and 1.3, this is an average cross slope)

9 L_T = Slotted drain length required to intercept 100% of the gutter flow

$L_T = KQ^{0.42}S^{0.3}(1/nS_x)^{0.6}$ Q = Flow from column 2, K = 0.6 Hec-22 Eq. 4-25 Pg.4-39

10 Slotted drain length or Curb opening length upstream of the grate

11 $E_{Slotted\ drain/Curb\ opening}$ = Slotted drain/Curb Opening interception efficiency

$E_{Slotted\ drain/Curb\ opening} = 1-(1-L/L_T)^{1.8}$ L= slotted drain length/curb opening length, Hec-22 Eq. 4-23 Pg.4-39

12 T = Width of flow (Spread)

For water depth less than curb height: $T = (Q/((0.56/n)S_x^{1.67}S^{0.5}))^{1/2.67}$ Q = Q from column 2 - Q from column 21, Hec-22 Eq. 4-2 Pg. 4-9

For water depth greater than curb height: T is entered manually from a Flowmaster calc. (highlighted in grey)

13 Q = Total Gutter flow after the slotted drain

$Q = (0.56/n)S_x^{1.67}T^{2.67}S^{0.5}$ Hec-22 Eq. 4-2 Pg. 4-9

14 Q_S = Side flow after the slotted drain

$Q_S = (0.56/n)S_x^{1.67}T_x^{2.67}S^{0.5}$, Tx = T - Wg (Spread - Width of Grate), Hec-22 Eq. 4-2 Pg. 4-9

15 E_o = Ratio of frontal flow to total gutter flow

$E_o = Q_s-Q_x/Q_s$, Hec-22 Eq. 4-16 Pg. 4-34

16 V = Velocity of flow in gutter

For water depth less than curb height: $V = Q_x/(T^2S_x/2)$

For water depth greater than curb height: V is entered manually from a Flowmaster calc.

17 R_f = Frontal flow interception efficiency

$R_f = 1-K_c(V-V_o)$, K_c = .09, V_o = Gutter velocity where splash-over first occurs, Hec-22 Eq. 4-18 Pg. 4-35

18 Rs = Side flow interception efficiency

$Rs = 1/(1+0.15V^{1.8}/S_xL^{2.3})$, L = Length of Grate from column 3, Hec-22 Eq. 4-19 Pg. 4-35

19 E_{Grate} = Grate efficiency

$E_{Grate} = R_fE_o+R_s(1-E_o)$, Hec-22 Eq. 4-20 Pg. 4-35

20 Q_{Grate} = Flow that is intercepted by the grate

$Q_{Grate} = Q_xE_{grate}$

21 $Q_{Slotted\ drain/Curb\ opening}$ = Flow that is intercepted by the slotted drain/curb opening

$Q_{Slotted\ drain/Curb\ opening}$ = (Q from column 1)*($E_{Slotted\ drain/Curb\ opening}$)

22 Flow intercepted = Q_{grate} + $Q_{slotted\ drain/curb\ opening}$

23 Bypass = Q from column 1 - Flow intercepted

Rancho Lateral Facility
Storm Drain Lateral Calculations

Project Summary Report

Project Description	
Worksheet	Cross Section at -"WA" 9+0
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.003500	ft/ft
Discharge	1,103.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	2,098.51	ft
Elevation Range	2,096.54 to 2,102.63	
Flow Area	189.4	ft²
Wetted Perimeter	173.46	ft
Top Width	171.95	ft
Actual Depth	1.97	ft
Critical Elevation	2,098.49	ft
Critical Slope	0.003671	ft/ft
Velocity	5.82	ft/s
Velocity Head	0.53	ft
Specific Energy	2,099.04	ft
Froude Number	0.98	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.7904294e-1 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+58	2+30	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+58	2,102.63
0+58	2,097.63
0+75	2,097.29
0+81	2,097.04
0+81	2,096.54
1+15	2,097.42
1+43	2,096.79
1+51	2,096.79
1+62	2,097.28
1+81	2,097.77

Project Summary Report

Natural Channel Points	
Station (ft)	Elevation (ft)
1+98	2,097.93
2+16	2,098.10
2+30	2,098.43

Project Summary Report

Project Description	
Worksheet	Cross Section at upstream edge of 1.1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.003500	ft/ft
Discharge	1,103.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	2,098.29	ft
Elevation Range	2,096.54 to 2,098.43	
Flow Area	242.3	ft²
Wetted Perimeter	321.24	ft
Top Width	321.19	ft
Actual Depth	1.76	ft
Critical Elevation	2,098.25	ft
Critical Slope	0.004150	ft/ft
Velocity	4.55	ft/s
Velocity Head	0.32	ft
Specific Energy	2,098.62	ft
Froude Number	0.92	
Flow Type	Subcritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
1+14	2+30	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
-1+14	2,098.43
-0+97	2,098.29
-0+81	2,098.16
-0+64	2,098.06
-0+49	2,097.97
-0+32	2,097.93
-0+16	2,097.83
0+00	2,097.74
0+18	2,097.61
0+35	2,097.44
0+51	2,097.31
0+66	2,096.95
0+77	2,096.54
0+81	2,096.54

Project Summary Report

Natural Channel Points	
Station (ft)	Elevation (ft)
1+15	2,097.42
1+43	2,096.79
1+51	2,096.79
1+62	2,097.28
1+81	2,097.77
1+98	2,097.93
2+16	2,098.10
2+30	2,098.43

Prepared By: TAM **Date:** 5-10-03

Checked By: JPL **Date:** 5-12-03

Project Summary Report

Project Description	
Worksheet	Upstream of 1.11
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.009300	ft/ft
Discharge	114.71	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.87	ft
Elevation Range	0.00 to 6.31	
Flow Area	22.6	ft²
Wetted Perimeter	53.10	ft
Top Width	52.49	ft
Actual Depth	0.87	ft
Critical Elevation	0.97	ft
Critical Slope	0.004706	ft/ft
Velocity	5.07	ft/s
Velocity Head	0.40	ft
Specific Energy	1.27	ft
Froude Number	1.36	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+56	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	5.83
0+00	0.83
0+07	0.50
0+07	0.00
0+52	0.81
0+52	1.31
0+56	1.31
0+56	6.31

Project Summary Report

Project Description	
Worksheet	Upstream of 1.12
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.006200	ft/ft
Discharge	45.42	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.68	ft
Elevation Range	0.00 to 6.31	
Flow Area	13.4	ft²
Wetted Perimeter	42.70	ft
Top Width	42.19	ft
Actual Depth	0.68	ft
Critical Elevation	0.69	ft
Critical Slope	0.005514	ft/ft
Velocity	3.38	ft/s
Velocity Head	0.18	ft
Specific Energy	0.86	ft
Froude Number	1.06	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+56	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	5.83
0+00	0.83
0+07	0.50
0+07	0.00
0+52	0.81
0+52	1.31
0+56	1.31
0+56	6.31

Project Summary Report

Project Description	
Worksheet	Upstream of 1.14
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.008300	ft/ft
Discharge	13.58	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.41	ft
Elevation Range	0.00 to 6.31	
Flow Area	4.7	ft²
Wetted Perimeter	23.53	ft
Top Width	23.12	ft
Actual Depth	0.41	ft
Critical Elevation	0.43	ft
Critical Slope	0.006389	ft/ft
Velocity	2.89	ft/s
Velocity Head	0.13	ft
Specific Energy	0.54	ft
Froude Number	1.13	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+56	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	5.83
0+00	0.83
0+07	0.50
0+07	0.00
0+52	0.81
0+52	1.31
0+56	1.31
0+56	6.31

Project Summary Report

Project Description	
Worksheet	Upstream of 1.15
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.008700	ft/ft
Discharge	96.57	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.91	ft
Elevation Range	0.00 to 6.32	
Flow Area	18.9	ft²
Wetted Perimeter	41.70	ft
Top Width	41.01	ft
Actual Depth	0.91	ft
Critical Elevation	1.01	ft
Critical Slope	0.004666	ft/ft
Velocity	5.11	ft/s
Velocity Head	0.41	ft
Specific Energy	1.32	ft
Froude Number	1.33	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+44	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	6.32
0+00	1.32
0+03	1.32
0+03	0.82
0+38	0.00
0+38	0.50
0+44	0.83
0+44	5.83

Project Summary Report

Project Description	
Worksheet	Upstream of 1.16
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.008200	ft/ft
Discharge	37.92	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.60	ft
Elevation Range	0.00 to 6.09	
Flow Area	10.4	ft²
Wetted Perimeter	36.87	ft
Top Width	36.35	ft
Actual Depth	0.60	ft
Critical Elevation	0.63	ft
Critical Slope	0.005568	ft/ft
Velocity	3.63	ft/s
Velocity Head	0.20	ft
Specific Energy	0.80	ft
Froude Number	1.19	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+44	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	6.09
0+00	1.09
0+03	1.09
0+03	0.59
0+38	0.00
0+38	0.50
0+44	0.83
0+44	5.83

Project Summary Report

Project Description	
Worksheet	Upstream of 1.25 on Ranch
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.021900	ft/ft
Discharge	159.89	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	1.07	ft
Elevation Range	0.00 to 5.91	
Flow Area	18.7	ft²
Wetted Perimeter	36.02	ft
Top Width	37.32	ft
Actual Depth	1.07	ft
Critical Elevation	1.42	ft
Critical Slope	0.004301	ft/ft
Velocity	8.56	ft/s
Velocity Head	1.14	ft
Specific Energy	2.21	ft
Froude Number	2.13	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+49	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	1.51
0+41	0.00
0+41	0.50
0+49	0.91
0+49	5.91

Project Summary Report

Project Description	
Worksheet	Upstream of 1.4 and 1.2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.002890	ft/ft
Discharge	898.59	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	2,098.64	ft
Elevation Range	2,096.49 to 2,102.45	
Flow Area	130.9	ft²
Wetted Perimeter	80.32	ft
Top Width	76.73	ft
Actual Depth	2.15	ft
Critical Elevation	2,098.56	ft
Critical Slope	0.003365	ft/ft
Velocity	6.87	ft/s
Velocity Head	0.73	ft
Specific Energy	2,099.37	ft
Froude Number	0.93	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+77	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,101.87
0+00	2,096.87
0+08	2,096.59
0+08	2,096.49
0+42	2,097.27
0+71	2,096.69
0+71	2,097.19
0+77	2,097.45
0+77	2,102.45

Project Summary Report

Project Description	
Worksheet	Upstream of 1.6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.002250	ft/ft
Discharge	846.17	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	2,098.70	ft
Elevation Range	2,096.49 to 2,102.45	
Flow Area	135.6	ft²
Wetted Perimeter	80.44	ft
Top Width	76.73	ft
Actual Depth	2.21	ft
Critical Elevation	2,098.49	ft
Critical Slope	0.003403	ft/ft
Velocity	6.24	ft/s
Velocity Head	0.61	ft
Specific Energy	2,099.31	ft
Froude Number	0.83	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+77	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	2,101.87
0+00	2,096.87
0+08	2,096.59
0+08	2,096.49
0+42	2,097.27
0+71	2,096.69
0+71	2,097.19
0+77	2,097.45
0+77	2,102.45

Project Summary Report

Project Description	
Worksheet	Upstream of 1.7
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data		
Slope	0.001200	ft/ft
Discharge	159.89	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	1.40	ft
Elevation Range	0.00 to 6.51	
Flow Area	55.1	ft²
Wetted Perimeter	54.25	ft
Top Width	52.77	ft
Actual Depth	1.40	ft
Critical Elevation	1.11	ft
Critical Slope	0.004542	ft/ft
Velocity	2.90	ft/s
Velocity Head	0.13	ft
Specific Energy	1.53	ft
Froude Number	0.55	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+63	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	5.83
0+00	0.83
0+07	0.50
0+07	0.00
0+53	1.01
0+63	1.51
0+63	6.51

Project Summary Report

Project Description	
Worksheet	Upstream of 1.8
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data		
Slope	0.007300	ft/ft
Discharge	146.39	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	1.28	ft
Elevation Range	0.20 to 6.51	
Flow Area	25.5	ft²
Wetted Perimeter	41.44	ft
Top Width	40.41	ft
Actual Depth	1.08	ft
Critical Elevation	1.39	ft
Critical Slope	0.004292	ft/ft
Velocity	5.74	ft/s
Velocity Head	0.51	ft
Specific Energy	1.79	ft
Froude Number	1.27	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+62	1+06	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+62	6.51
0+62	1.51
0+66	1.51
0+66	1.01
1+00	0.20
1+00	0.70
1+06	1.03
1+06	6.03

U.S. 95 WIDENING
PROJECT 3A
LATERAL PIPE HGL CALCULATIONS USING MODIFIED CCRFCD STANDARD FORM 6

Calculations By: TAM
Date: 5-10-03

Checked By: JPL
Date: 5-13-03

EACH ROW REPRESENTS A SEGMENT OF PIPE AND AN UPSTREAM INLET

CONDUIT DATA														FLOW DATA												ENERGY LOSS DATA			ENERGY AND HYDRAULIC DATA (english)			CHECK - CONSIDER LATERAL AS AN RCP CULVERT		CONTROLLING U/S HGL		METHOD CONTROLLING U/S HGL
LOCATION			PIPE SIZE		INVERTS				D/S HGL ELEV. (ft)	D/S HGL ELEV. (m)	PIPE LENGTH		Manning n value	Q (cfs)	Eq 1 [1]	β [2]	y[3] (ft)	y_F[4] (%)	A[5] (ft^2)	F[6]	V[7] (fps)	Manual Velocity Check (fps)	$H_v = V^2/2g$ (ft)	S_f[8] (ft/ft)	PIPE	INLET		PIPE / TRANSITION			INLET CONTROL				
SHEET I.D.	FROM ("RL" STA.)	TO (DI#)	(in)	(mm)	D/S ENGLISH ELEV.	D/S METRIC ELEV.	U/S ENGLISH ELEV.	U/S METRIC ELEV.			(ft)	(m)														H_f (ft)	K_i	$H_{f[10]}$ (ft)	D/S EGL ELEV.	U/S EGL ELEV.	U/S HGL ELEV.	H_w/D (fig. 1005)	U/S HGL ELEV.[9]	U/S HGL ELEV. (ft)	U/S HGL ELEV. (m)	
downstream to upstream																																			
SD-7	**11+97.000**	**1.14**	42	**1050**	2085.47	**635.650**	2085.79	**635.750**	2087.19	**636.175**	2.91	**0.888**	0.013	**6.43**	0.060	0.630	0.34	0	9.62	0.00492	0.67	**13.69**	0.01	0.0003	0.00	**0.4**	0.00	2087.20	2087.20	2087.19	**0.50**	2087.54	2087.54	**636.283**	INLET
SD-7	**12+36.00**	**1.17**	54	**1350**	2083.66	**635.100**	2083.78	**635.135**	2086.08	**635.838**	2.52	**0.767**	0.013	**3.39**	0.025	0.510	0.29	0	15.90	0.00492	0.21	**7.94**	0.00	0.0000	0.00	**0.4**	0.00	2086.08	2086.08	2086.08	**0.50**	2086.03	2086.08	**635.838**	OUTLET
SD-8	**11+63.250**	**1.12**	42	**1050**	2087.11	**636.150**	2087.43	**636.250**	2089.51	**636.884**	2.88	**0.879**	0.013	**31.83**	0.295	0.945	0.72	0	9.62	0.00492	3.31	**22.14**	0.17	0.0025	0.01	**0.4**	0.07	2089.68	2089.76	2089.59	**0.70**	2089.88	2089.88	**636.997**	INLET
SD-8	**10+57.000**	**1.6**	42	**1050**	2089.24	**636.800**	2091.21	**637.400**	2093.48	**638.092**	14.92	**4.548**	0.013	**21.25**	0.183	0.832	0.57	0	9.62	0.00492	2.21	**20.70**	0.08	0.0015	0.02	**0.4**	0.03	2093.55	2093.61	2093.53	**0.55**	2093.13	2093.53	**638.108**	OUTLET
SD-8	**11+47.500**	**1.11**	60	**1500**	2086.45	**635.950**	2086.61	**636.000**	2089.98	**637.026**	2.99	**0.910**	0.013	**114.47**	0.589	1.144	1.47	0	19.63	0.00492	5.83	**23.83**	0.53	0.0033	0.01	**0.4**	0.21	2090.51	2090.73	2090.20	**0.90**	2091.11	2091.11	**637.372**	INLET
SD-8	**D.I. 1.11**	**1.7**	42	**1050**	2086.78	**636.050**	2089.23	**636.798**	2091.11	**637.372**	35.94	**10.954**	0.013	**45.18**	0.540	1.117	0.98	0	9.62	0.00492	4.70	**20.44**	0.34	0.0036	0.13	**0.4**	0.14	2091.46	2091.72	2091.38	**0.90**	2092.38	2092.38	**637.758**	INLET
SD-8	**11+47.500**	**1.8**	42	**1050**	2085.79	**635.750**	2086.25	**635.890**	2089.98	**637.026**	76.19	**23.224**	0.013	**63.32**	2.547	1.945	2.39	0	9.62	0.00492	6.58	**9.02**	0.67	0.0032	0.24	**0.4**	0.27	2090.65	2091.17	2090.49	**1.20**	2090.45	2090.49	**637.182**	OUTLET
SD-9	**15+87.000**	**2.8**	18	**450**	2078.41	**633.500**	2078.65	**633.574**	2078.60	**633.558**	5.70	**1.736**	0.013	**0.73**	0.106	0.724	0.19	90	0.13	0.00492	5.69	**5.68**	0.50	0.0425	0.24	**0.4**	0.00	2079.10	2079.35	2078.84	**0.50**	2079.40	2079.40	**633.803**	INLET
SD-10	**12+87.000**	**1.23**	18	**450**	2085.47	**635.650**	2085.62	**635.697**	2085.66	**635.708**	3.10	**0.946**	0.013	**0.81**	0.109	0.729	0.19	0	1.77	0.00492	0.46	**5.86**	0.00	0.0003	0.00	**0.4**	0.00	2085.66	2085.66	2085.66	**0.50**	2086.37	2086.37	**635.926**	INLET
SD-10	**14+42.000**	**2.7**	18	**450**	2081.69	**634.500**	2082.31	**634.689**	2081.89	**634.561**	14.56	**4.437**	0.013	**0.79**	0.114	0.740	0.20	90	0.14	0.00492	5.81	**5.82**	0.52	0.0421	0.61	**0.4**	0.00	2082.42	2083.03	2082.51	**0.50**	2083.06	2083.06	**634.918**	INLET

[1] Eq 1 = $Q*n*D^{(2/3)}/(c*(S^{0.5})*((D^2)/4)^{(5/3)})$ = left side of Manning's Equation for circular channels when the right side is equal to: $(\beta-\cos(\beta)*\sin(\beta))^{(5/3)}/\beta^{(2/3)}$

β is calculated by equating Eq. 1 and (β-

Fig. 1

[2] β = Angle between pipe invert and point where top of flow touches pipe wall. See Fig. 1. $\cos(\beta)*\sin(\beta))^{(5/3)}/\beta^{(2/3)}$

[3] y = (1-cosβ)(D/2) = flow depth

[4] y_F = Percent of depth of flow in pipe at which full flow is assumed above, y_F= 0 if pipe is submerged

[5] A = $(D^2)/4)*(\beta-\cos(\beta)*\sin(\beta))$ for percent of flow depth <= y_F, $\pi*D^2/4$ for percent of flow depth > y_F

[6] F = $2*g*n^2/2.21$

[7] V = Q/A

[8] S_f = $F*H_v/R^{1.33}$, where R = Hydraulic Radius = A/P

[9] Note: This U/S HGL ELEV check only applies for inlet control lateral pipes

[10] H_i= $K_i*(Q/p(D^2/4))^2/(2*g)$ <= Calculated using full flow

Normal Depth Calculations

Worksheet for 80' ROW BONANZA HALF STREET @ 0.71%

Project Description		
Flow Element:	Irregular Section	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Channel Slope:	0.71000	%
Discharge:	49.00	ft^3/s
Options		
Current Roughness Weighted Methc	ImprovedLotters	
Open Channel Weighted Roughnes:	ImprovedLotters	
Closed Channel Weighted Roughne	Hortons	
Results		
Roughness Coefficient:	0.016	
Water Surface Elevation:	0.81	ft
Elevation Range:	0.00 to 1.00 ft	
Flow Area:	12.89	ft^2
Wetted Perimeter:	39.90	ft
Top Width:	39.14	ft
Normal Depth:	0.81	ft
Critical Depth:	0.85	ft
Critical Slope:	0.00506	ft/ft
Velocity:	3.80	ft/s
Velocity Head:	0.22	ft
Specific Energy:	1.04	ft
Froude Number:	1.17	
Flow Type:	Supercritical	

Segment Roughness

Start Station	End Station	Roughness Coefficient
(0+40, 1.00)	(0+73, 0.13)	0.016
(0+73, 0.13)	(0+80, 1.00)	0.013

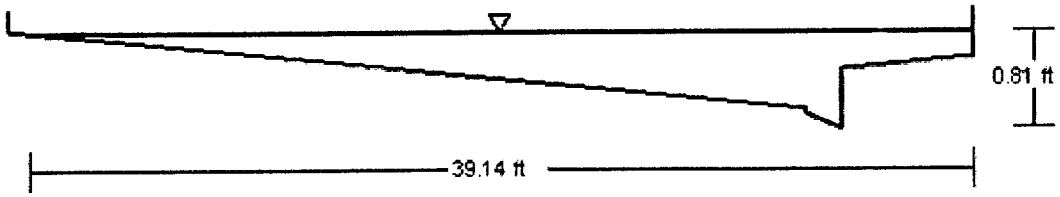
Section Geometry

Station	Elevation
0+40	1.00
0+40	0.83
0+73	0.17
0+73	0.13
0+75	0.00
0+75	0.50
0+80	0.60

80' ROW BONANZA HALF-STREET @ 0.71%

Cross Section for 80' ROW BONANZA HALF STREET @ 0.71%

Project Description		
Flow Element:	Irregular Section	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Section Data		
Roughness Coefficient:	0.016	
Channel Slope:	0.71000	%
Normal Depth:	0.81	ft
Elevation Range:	0.00 to 1.00 ft	
Discharge:	49.00	ft^3/s



V: 5
H: 1

Worksheet for 80' ROW MLK BLVD SECTON B @ 0.4%

Project Description		
Flow Element:	Irregular Section	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Input Data		
Channel Slope:	0.40000	%
Discharge:	75.00	ft³/s
Options		
Current Roughness Weighted Meth	ImprovedLotters	
Open Channel Weighted Roughnes	ImprovedLotters	
Closed Channel Weighted Roughne	Hortons	
Results		
Roughness Coefficient:	0.015	
Water Surface Elevation:	0.81	ft
Elevation Range:	0.00 to 1.50 ft	
Flow Area:	25.86	ft²
Wetted Perimeter:	79.84	ft
Top Width:	78.30	ft
Normal Depth:	0.81	ft
Critical Depth:	0.78	ft
Critical Slope:	0.00514	ft/ft
Velocity:	2.90	ft/s
Velocity Head:	0.13	ft
Specific Energy:	0.94	ft
Froude Number:	0.89	
Flow Type:	Subcritical	

Hydraulic Depth

$\frac{A}{TW} = \frac{25.86}{78.30} = 0.33'$

Segment Roughness

Start Station	End Station	Roughness Coefficient
(0+00, 1.50)	(0+07, 0.17)	0.013
(0+07, 0.17)	(0+73, 0.17)	0.016
(0+73, 0.17)	(0+80, 1.50)	0.013

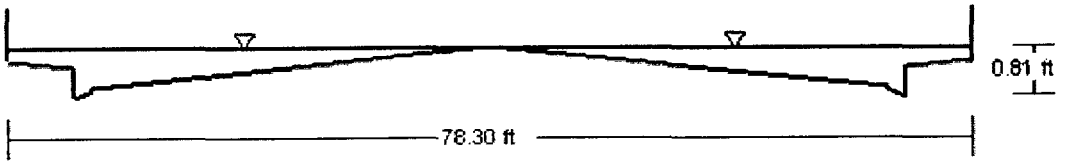
Section Geometry

Station	Elevation
0+00	1.50
0+00	0.60
0+06	0.50
0+06	0.00
0+07	0.13
0+07	0.17

80' ROW MLK [redacted] SECTION B @ 0.4%

Cross Section for 80' ROW MLK BLVD SECTON B @ 0.4%

Project Description		
Flow Element:	Irregular Section	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	
Section Data		
Roughness Coefficient:	0.015	
Channel Slope:	0.40000	%
Normal Depth:	0.81	ft
Elevation Range:	0.00 to 1.50 ft	
Discharge:	75.00	ft^3/s



V: 5
H: 1

APPENDIX E

As-Built Plans

As-Builts

Contract No. 3167

Project No.
SPSR-0599(004)

Asbuilt 1of2

CONTRACT 3167

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	1

INDEX OF SHEETS

1	TITLE SHEET
1A	LOCATION SKETCH
2 - 2G	TYPICAL SECTIONS
3 - 3F	SUMMARIES
3G - 3K	CONTROL POINTS, ESTIMATE OF QUANTITIES
4 - 14	CONSTRUCTION PLANS
SD-1 - SD-15	DRAINAGE PLANS
R-1 - R-3	REMOVAL PLANS
ST-1 - ST-3	PERMANENT STRIPING
TS-1 - TS-4	SIGNING REMOVAL PLAN
TS-5 - TS-8	PERMANENT SIGNING PLAN
L-1 - L-5	LIGHTING PLANS
T-1 - T-11	SIGNAL MODIFICATIONS
U-1 - U-8	UTILITY PLANS
S-1 TO S-19	STRUCTURE LISTS
TC-1 TO TC-81	TRAFFIC CONTROL
B-1 TO B-2	STRUCTURAL DETAILS

SEE BOOK OF STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION (METRIC VERSION), JANUARY 2001

STATE OF NEVADA

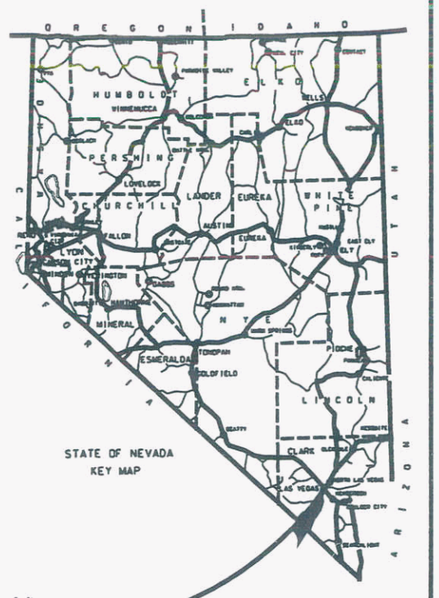
DEPARTMENT OF TRANSPORTATION

METRIC NDOT

CONSTRUCTION PLANS

CLARK COUNTY

FROM SR 589 (W. SAHARA AVE.) N.W. TO US 95



STATE OF NEVADA
KEY MAP

PROJECT SPSR 0599 (004)

ALIGNMENT BAR

BEGIN PROJECT "Lm" 3+87.779 - P.O.T.

STATION EQUATION "Lm" 3+04.801 - P.O.B.= "Rm" 28+97.668, 6.706m LT. P.O.E.= "RSm" 28+97.871, 6.706m RT. P.O.E.

STATION EQUATION "Rm" 23+35.922, 18.288m LT. P.O.C.= "RSm" 23+35.935 P.O.B.

"Rm" 21+68.725 P.O.C. STRUCTURE I-944 (U.S. 95)

END PROJECT "Rm" 19+37.500 P.O.C.

END SR599

BEGIN SR599

BEGIN PROJECT SPSR 0599 (004) "Lm" 3+87.779 - P.O.T.

70mm COLD MILLING WITH 20mm OPEN GRADE OVERLAY. SURFACE TREATMENT FULL WIDTH

REMOVAL & REPLACEMENT OF EXISTING NORTHBOUND PAVEMENT, CURB, GUTTER & SIDEWALK

125mm PLANTMIX SURFACE, 400mm TYPE 1 CLASS B AGGREGATE BASE, 20mm OPEN GRADED SURFACE TREATMENT FULL WIDTH

MODIFY SIGNAL AT BONANZA
MODIFY SIGNAL AT ERNEST MAY

CONSTRUCT DRAINAGE IMPROVEMENTS ALONG RANCHO

END PROJECT SPSR 0599 (004) "Rm" 19+37.500 - P.O.C.

0 1 2 4 6
KILOMETERS

APPROVED March 8, 2004:

THOMAS E. STEPHENS, P.E. DIRECTOR, DEPT. OF TRANSPORTATION

GOVERNOR KENNY C. GUINN
CHAIRMAN, TRANSPORTATION BOARD

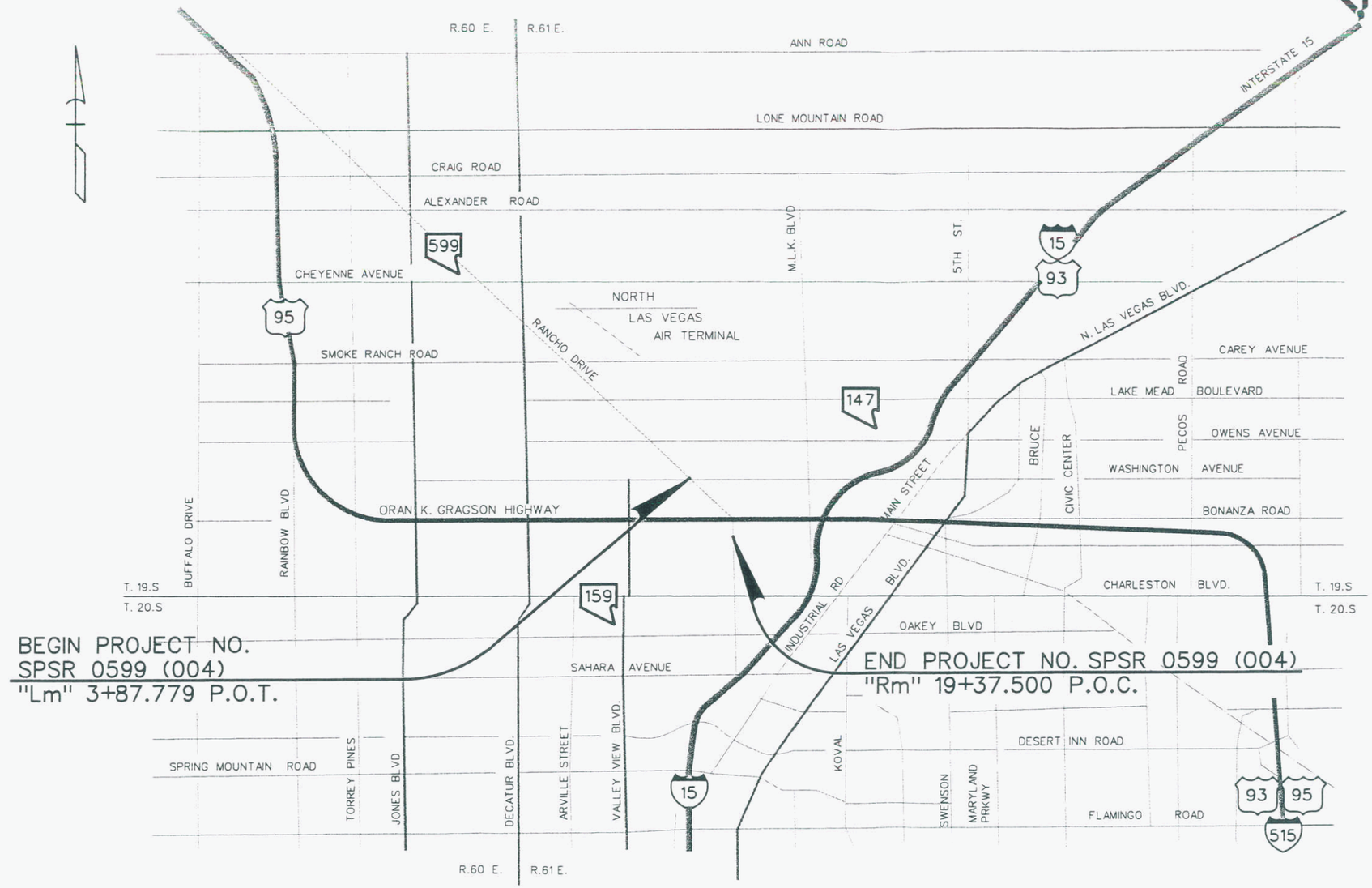
PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

SCALE 100:1

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	1A

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

METRIC NDOT



PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

LOCATION SKETCH

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2567

DESIGN BY	WBM
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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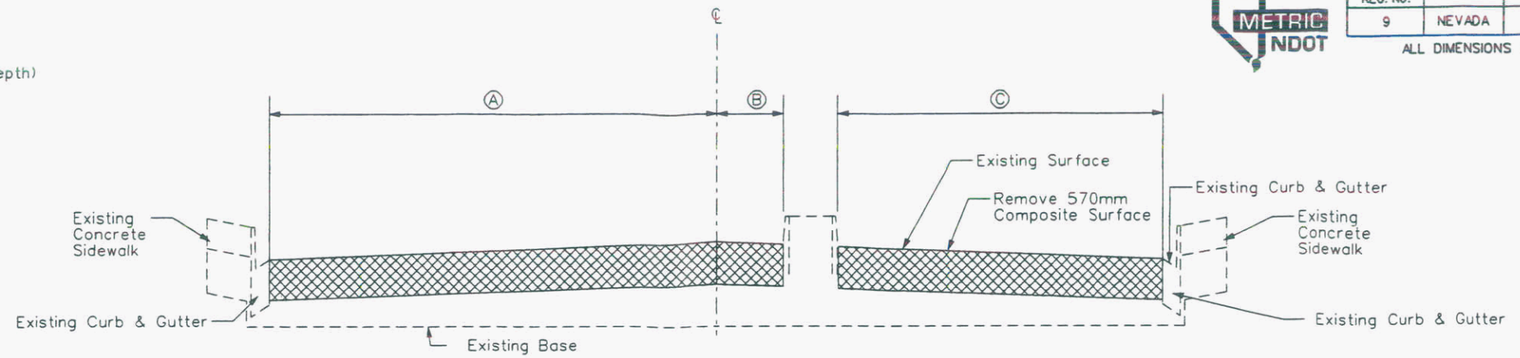
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

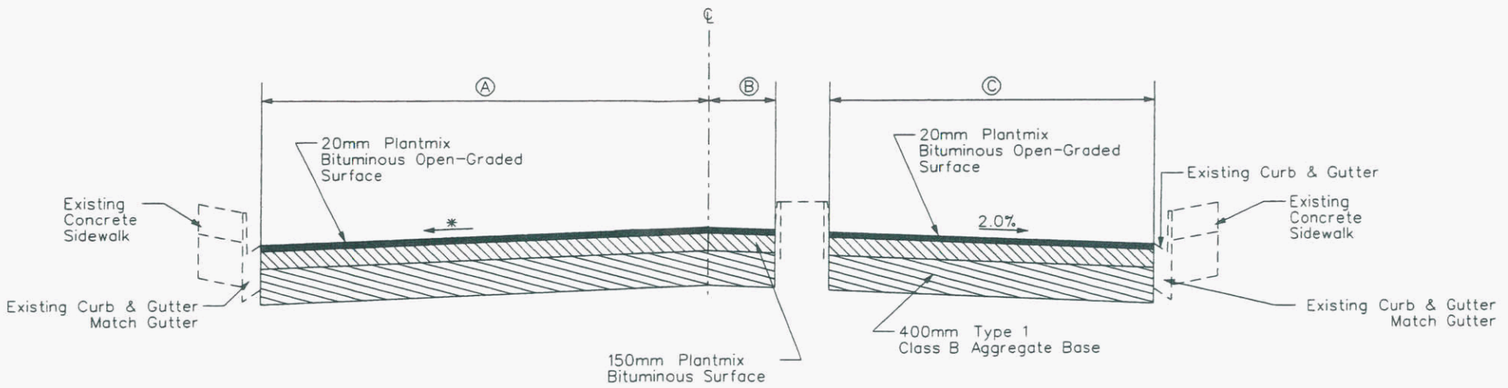
LEGEND

Remove Composite Surface (570 mm Depth)

Cold Milling Area



AS CONSTRUCTED



* Match Existing, Minimum Slope = 1.5%

SECTION OF IMPROVEMENT

Construction Code 1000

FROM STATION	TO STATION	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	AVERAGE WIDTH
"WA" 10+14.792	"WA" 10+44.000	9.800m (Min.) - 16.480m (Max.)	1.338m (Min.) - 1.429m (Max.)	8.119m (Min.) - 17.285m (Max.)	17.803m
"Lm" 3+87.779	"Lm" 3+25.351	12.428m (Min.) - 29.003m (Max.)	0.753m (Min.) - 0.754m (Max.)	9.598m (Min.) - 17.699m (Max.)	33.558m

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	WBM
DRAWN BY	JJK
CHECKED BY	PL
REVIEWED BY	DWB

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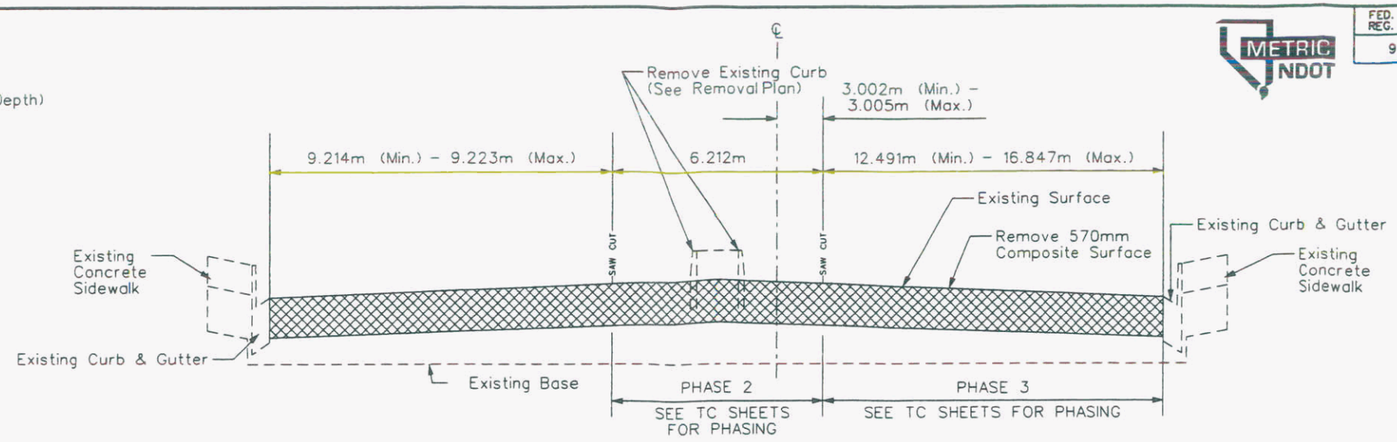
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2A

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

LEGEND

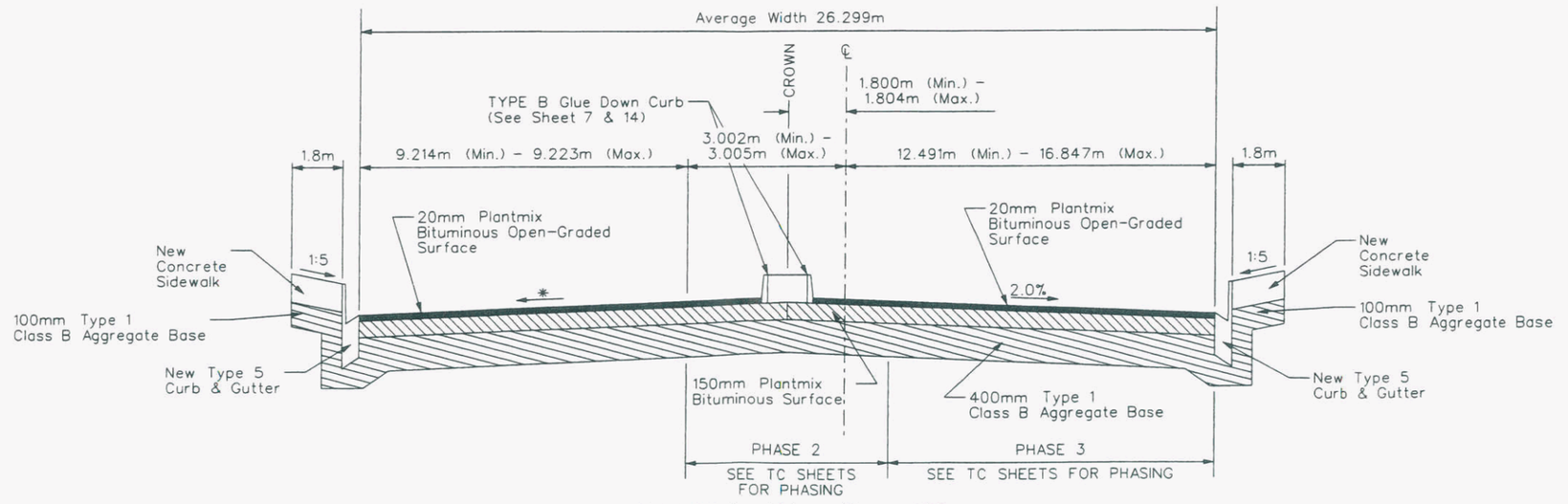
Remove Composite Surface (570 mm Depth)

Cold Milling Area



AS CONSTRUCTED

From Station "Lm" 3+04.801 to "Lm" 3+25.351



* Match Existing, Minimum Slope = 1.5%

SECTION OF IMPROVEMENT

Construction Code 1000

From Station "Lm" 3+04.801 to "Lm" 3+25.351

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

VTN nevada
• CONSULTING ENGINEERS
• PLANNERS
• LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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DESIGN BY	WBM
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CHECKED BY	JPL
REVIEWED BY	DWB

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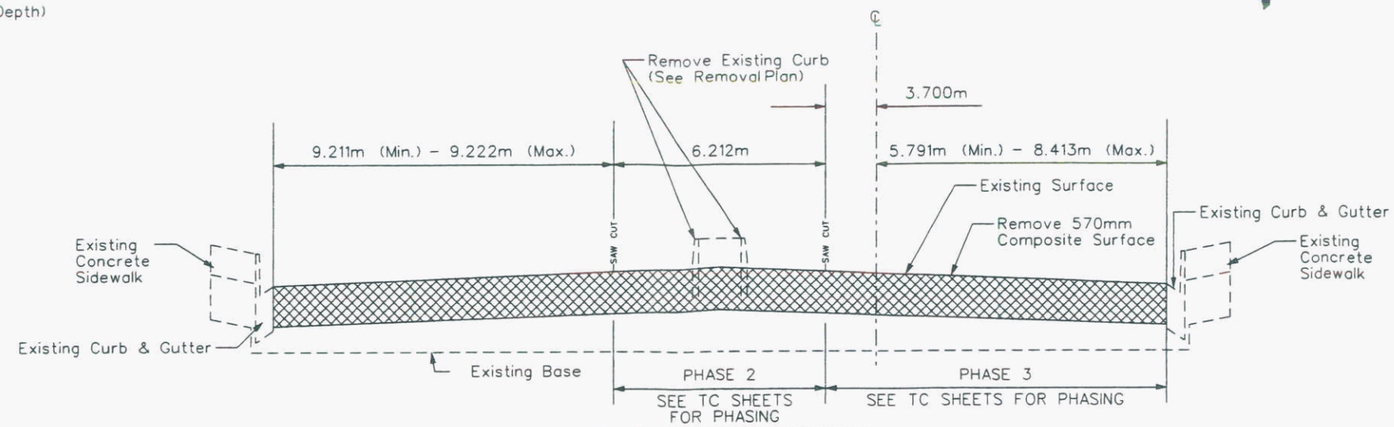
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2B

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

LEGEND

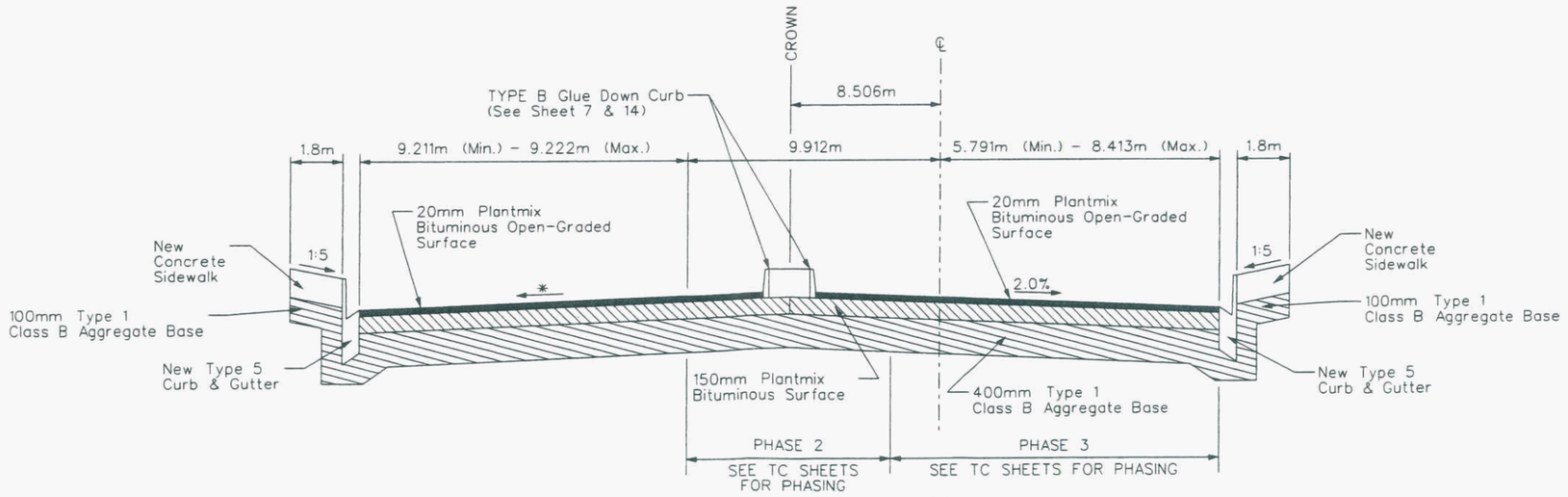
Remove Composite Surface (570 mm Depth)

Cold Milling Area



AS CONSTRUCTED

From Station "Lm" 3+04.801=
"Rm" 28+97.668 to "Rm" 28+79.797



* Match Existing, Minimum Slope = 1.5%

SECTION OF IMPROVEMENT

Construction Code 1000

From Station "Lm" 3+04.801=
"Rm" 28+97.668 to "Rm" 28+79.797

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2587

DESIGN BY	WBM
DRAWN BY	JJK
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2C

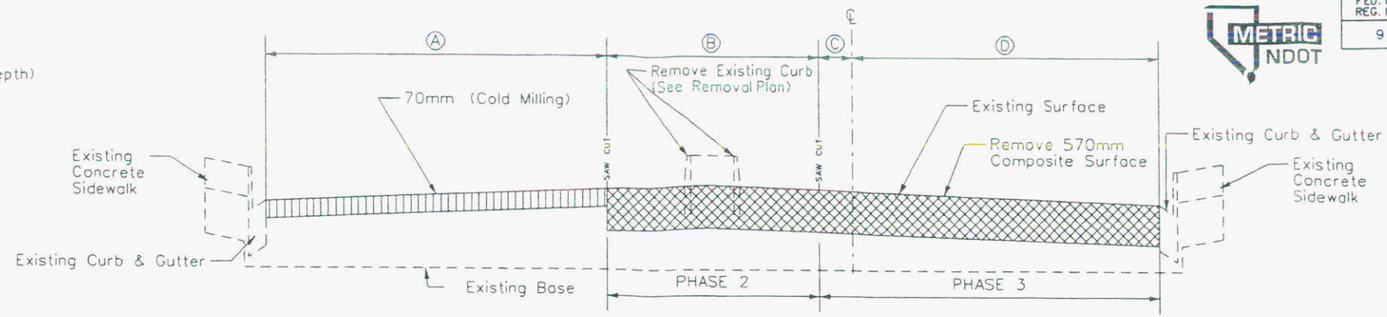
REVISED 1-15-04

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

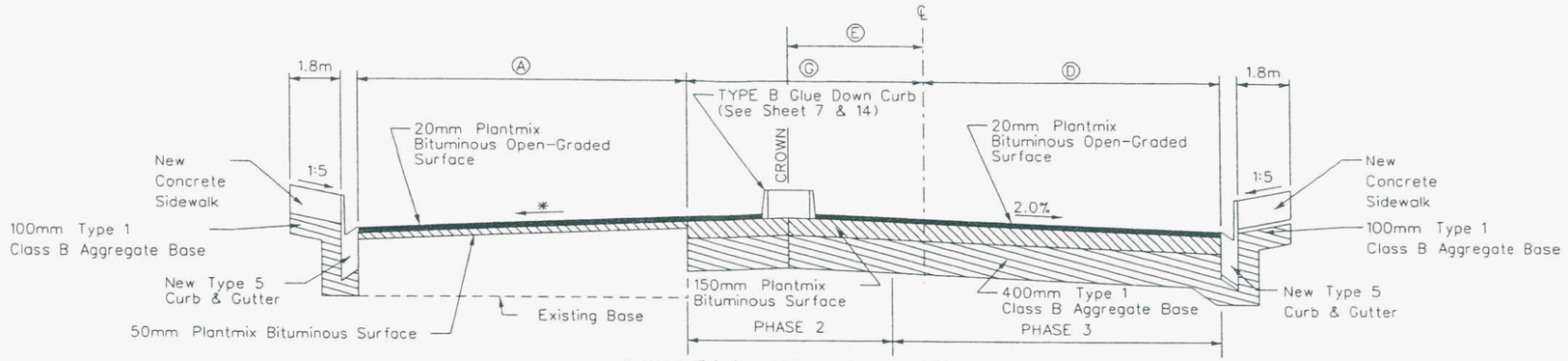
LEGEND

Remove Composite Surface (570 mm Depth)

Cold Milling Area



AS CONSTRUCTED



* Match Existing, Minimum Slope = 1.5%

SECTION OF IMPROVEMENT

Construction Code 1000

FROM STATION	TO STATION	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "D"	DIMENSION "E"	AVERAGE WIDTH	DIMENSION "G"	CURB LEFT	NEW WALK LEFT	CURB RIGHT	NEW WALK RIGHT	GLUEDOWN CURB
"Rm" 28+41.818	"Rm" 28+79.797	9.211m	6.212m (Min.) - 6.213m (Max.)	3.700m	5.600m (Min.) - 5.791m (Max.)	8.506m (Min.) - 8.507m (Max.)	24.820m	9.913m	YES	YES	YES	YES	YES
"Rm" 28+09.318	"Rm" 28+41.818	9.305m	6.213m (Min.) - 6.215m (Max.)	3.700m	5.600m	8.507m (Min.) - 8.509m (Max.)	24.820m	9.915m	NO	NO	YES	YES	YES
"Rm" 28+01.318	"Rm" 28+09.318	9.305m	6.215m	3.700m	5.600m	8.509m	24.820m	9.915m	YES	YES	YES	YES	YES
"Rm" 27+62.216	"Rm" 28+01.318	9.305m	6.215m (Min.) - 6.217m (Max.)	3.700m	5.600m	8.509m (Min.) - 5.215m (Max.)	24.822m	9.917m	NO	NO	YES	YES	YES
"Rm" 26+61.805	"Rm" 27+62.216	9.305m	6.217m (Min.) - 8.355m (Max.)	3.700m	5.600m (Min.) - 17.327m (Max.)	5.106m (Min.) - 8.506m (Max.)	29.096m	12.055m	NO	YES	YES	YES	YES
"Rm" 26+51.537	"Rm" 26+61.805	9.305m	12.055m (Min.) - 4.588m (Max.)	3.700m	6.700m (Min.) - 18.400m (Max.)	5.843m (Min.) - 9.933m (Max.)	30.143m	8.288m	NO	NO	YES	YES	YES
"Rm" 26+16.051	"Rm" 26+51.537	9.512m	12.055m (Min.) - 4.588m (Max.)	3.700m	6.700m (Min.) - 18.400m (Max.)	5.843m (Min.) - 9.933m (Max.)	30.350m	8.288m	NO	YES	YES	YES	YES
"Rm" 23+68.500	"Rm" 26+16.051	14.138m	12.055m (Min.) - 4.588m (Max.)	3.700m	6.700m (Min.) - 18.400m (Max.)	5.843m (Min.) - 9.933m (Max.)	33.291m	8.288m	NO	NO	YES	YES	YES

PROFESSIONAL ENGINEER - STATE OF NEVADA
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1/15/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
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PHONE: (702) 873-7350
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DESIGN BY	WBM
DRAWN BY	JJK
CHECKED BY	JPL
REVIEWED BY	DWB

$$DATE$$ 01:18:08 PM I:\CAD\PUBWRK\5817\Sheets\Roadway\Section 3\2C_clouded.dgn

LEGEND

Remove Composite Surface (570 mm Depth)

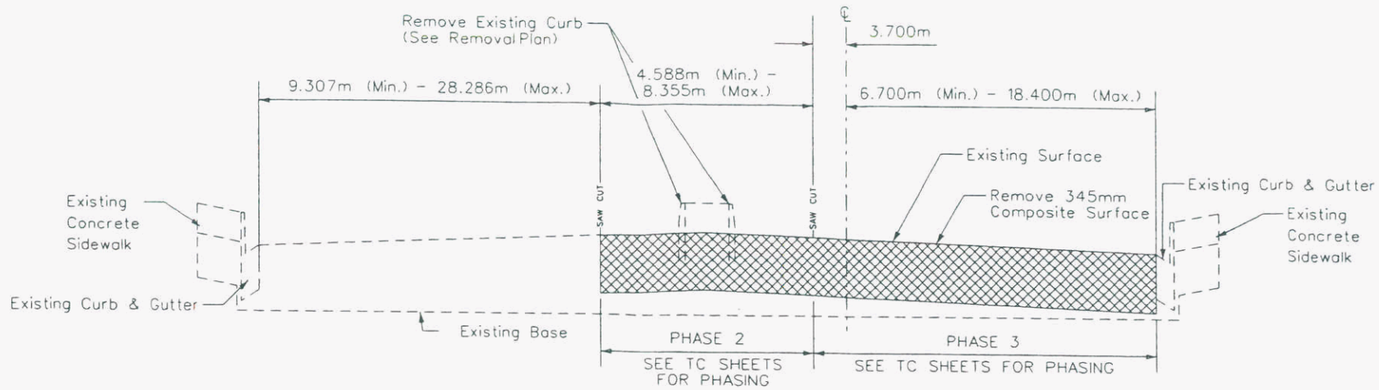
Cold Milling Area

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2D

METRIC NDOT

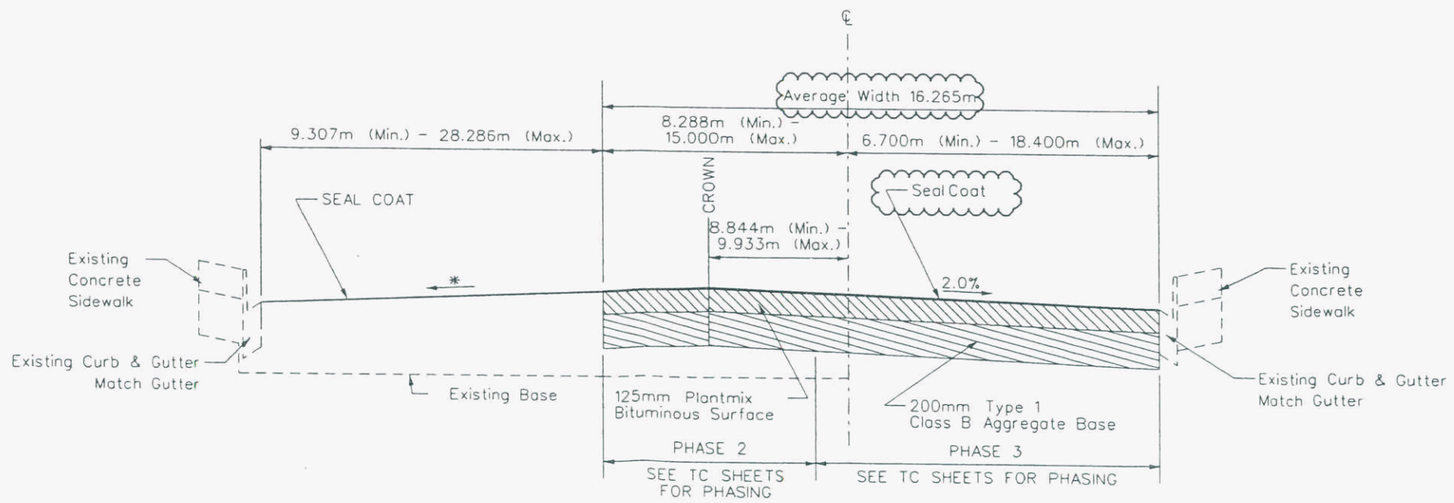
REVISED 1-15-04

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



AS CONSTRUCTED

From Station "RM" 21+00.000 to "RM" 23+68.500



* Match Existing, Minimum Slope = 1.5%

SECTION OF IMPROVEMENT

Construction Code 1000

From Station "RM" 21+00.000 to "RM" 23+68.500

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
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1/15/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

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DESIGN BY	WBM
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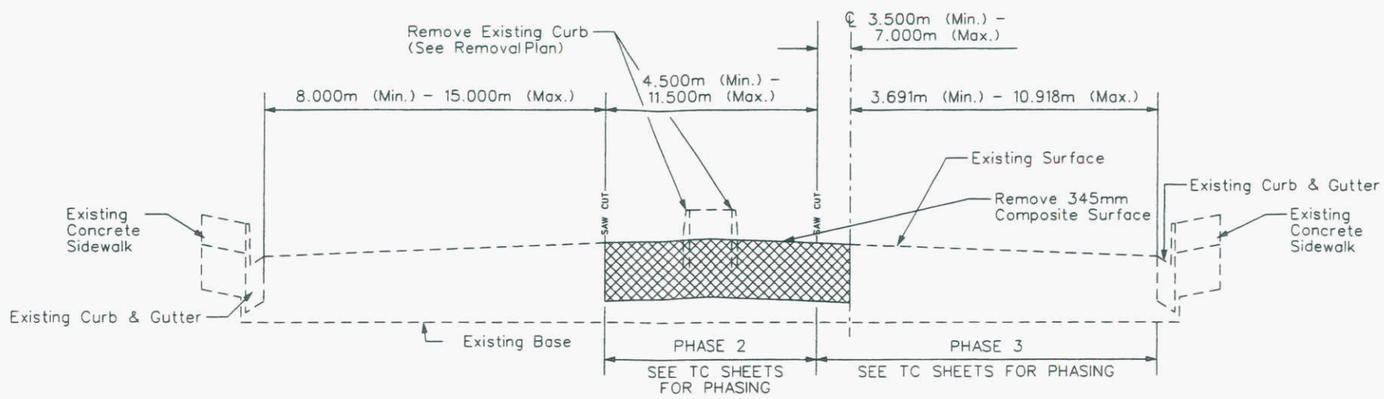
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2E

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

LEGEND

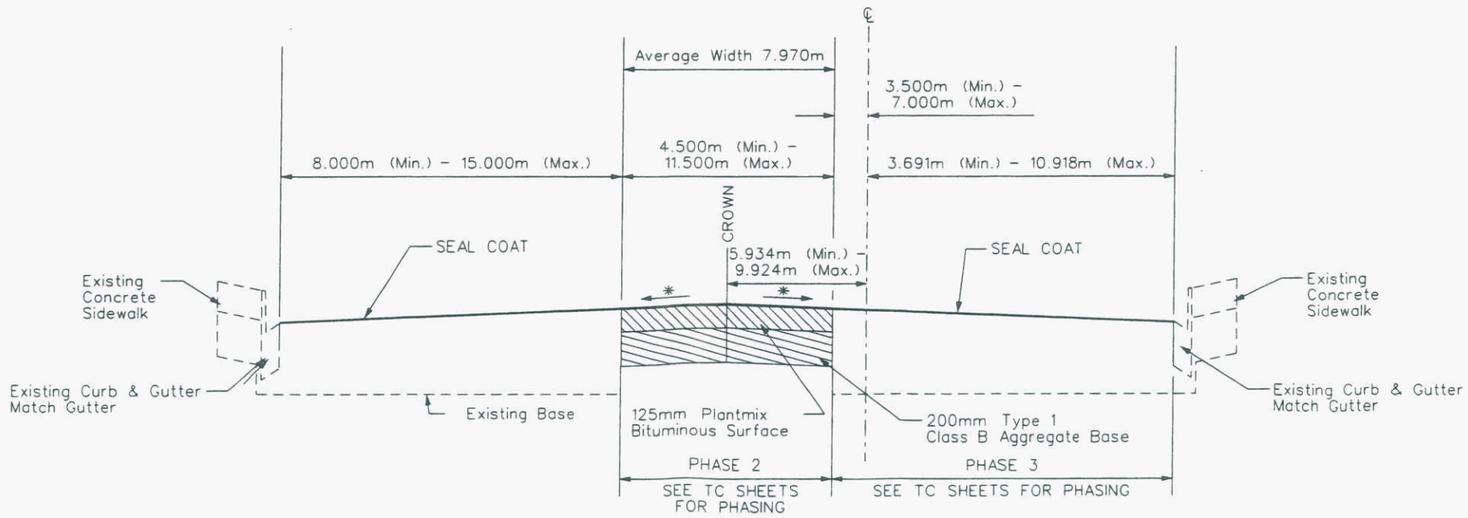
Remove Composite Surface (570 mm Depth)

Cold Milling Area



AS CONSTRUCTED

From Station "RM" 19+37.500 to "RM" 21+00.00



* Match Existing, Minimum Slope = 1.5%

SECTION OF IMPROVEMENT

Construction Code 1000

From Station "RM" 19+37.500 to "RM" 21+00.00

PROFESSIONAL ENGINEER-STATE OF NEVADA
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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

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DESIGN BY	WBM
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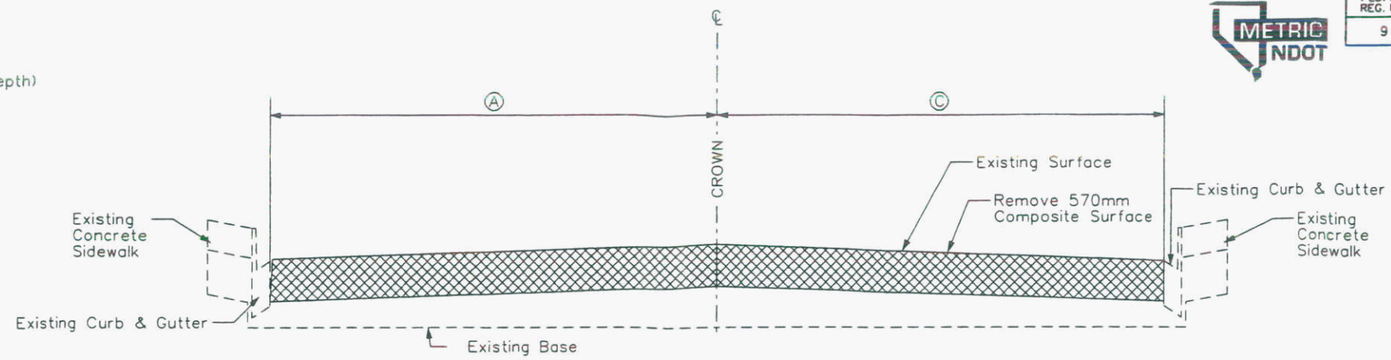
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2F

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

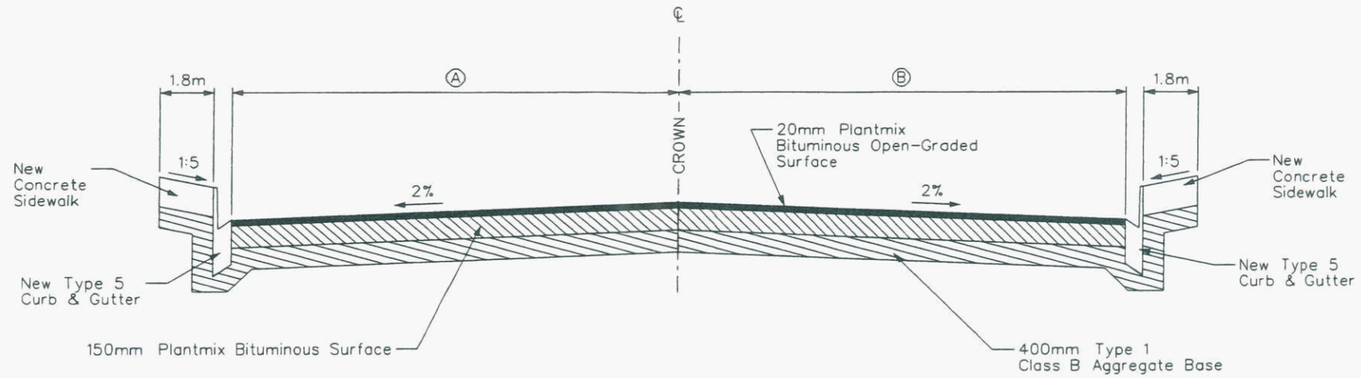
LEGEND

Remove Composite Surface (570 mm Depth)

Cold Milling Area



AS CONSTRUCTED



SECTION OF IMPROVEMENT

Construction Code 1000

FROM STATION	TO STATION	DIMENSION "A"	DIMENSION "B"	AVERAGE WIDTH	CURB LEFT	NEW WALK LEFT	CURB RIGHT	NEW WALK RIGHT	GLUEDOWN CURB
"WA" 8+95.505	"WA" 9+02.980	9.300m	9.300m	18.601	NO	NO	YES	YES	NO
"WA" 9+02.980	"WA" 9+33.500	9.300m	9.300m	18.600	YES	YES	YES	YES	NO
"WA" 9+33.500	"WA" 9+45.000	9.300m (MIN) - 9.478 (MAX)	9.300m	18.578	YES	NO	NO	NO	NO
"WA" 9+45.000	"WA" 9+61.000	9.300m (MIN) - 10.162 (MAX)	9.300m	18.330	NO	NO	NO	NO	NO
"WA" 9+61.000	"WA" 9+70.500	5.216m	9.300m	7.280	NO	NO	YES	YES	NO

PROFESSIONAL ENGINEER-STATE OF NEVADA
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STATE OF NEVADA
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US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

TYPICAL SECTIONS

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PLANNERS
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2727 S. RAINBOW BLVD.
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DESIGN BY	WBM
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CHECKED BY	JPL
REVIEWED BY	DWB

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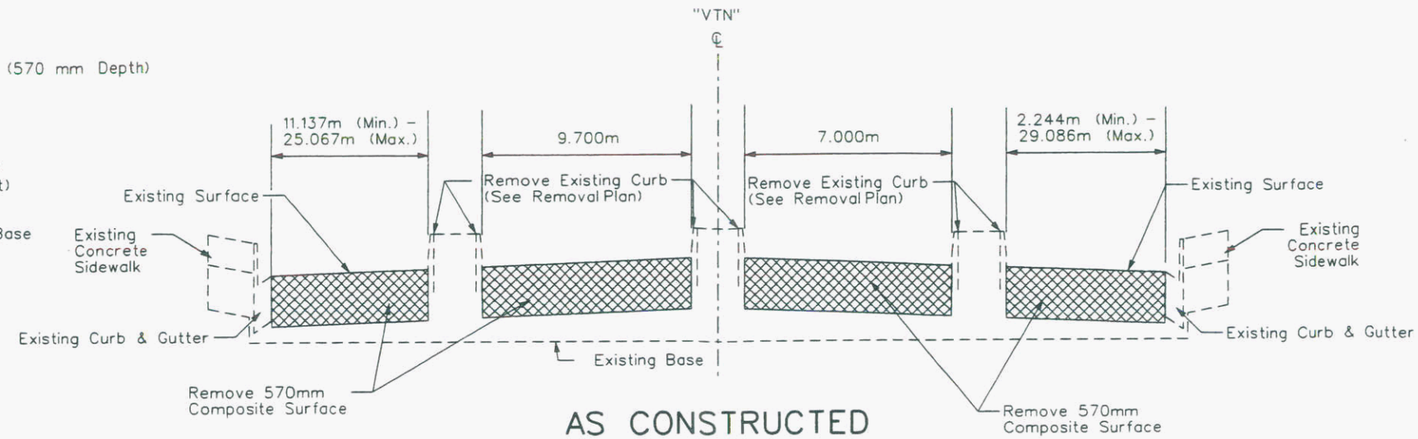
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	2G

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

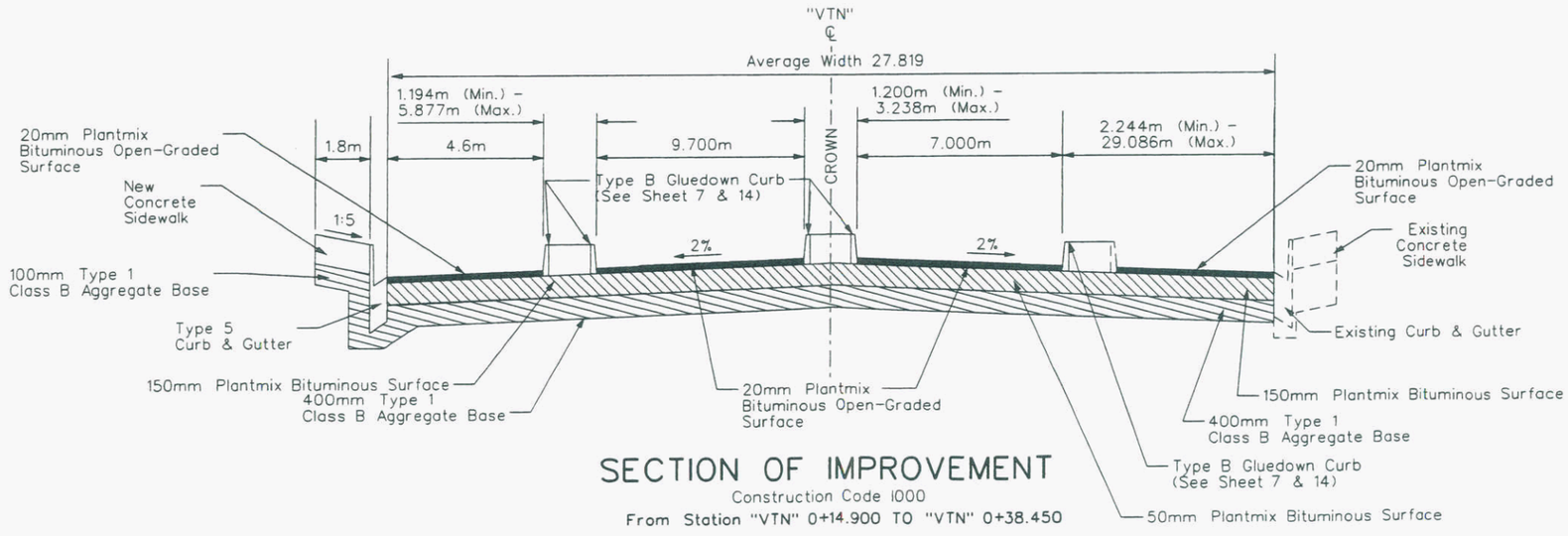
LEGEND

- Remove Composite Surface (570 mm Depth)
- Cold Milling Area
- Plantmix Bituminous Surface PG 76-22NV Type 2C (Wet)
- Type 1 Class B Aggregate Base



AS CONSTRUCTED

From Station "VTN" 0+14.900 TO "VTN" 0+38.450



SECTION OF IMPROVEMENT

Construction Code 1000

From Station "VTN" 0+14.900 TO "VTN" 0+38.450

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

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DESIGN BY	WBM
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5/13/2003 3:54:27 AM i:\cad\pubwrk\5817\sheets\roadway\section 3r\2g.dgn

SUMMARY OF PLANTMIX SURFACING QUANTITIES

NOTE:
QUANTITIES SHOWN IN THE SUMMARIES FOR THE BASE AND SURFACE MATERIALS ARE THEORETICAL AND USED FOR ESTIMATING PURPOSES ONLY. ACTUAL SPREADS SHALL BE VARIED AS REQUIRED TO OBTAIN THE DEPTH OF THE VARIOUS COURSES. ANGLE OF REPOSE INCLUDED IN TOTAL WEIGHT WHERE APPLICABLE.

ITEM	AVG. WIDTH (M)	MTON/STA	STA	TOTAL	UNIT
150 mm Plantmix Bituminous Surface (PG 76-22NV) (TYPE 2C) (Wet) UNIT WT. = 2.41 MTON/CUM					
" WA " 10+14.792 TO " WA " 10+44.000	17.803	643.578	0.292	187.98	MTON
" Lm " 3+25.351 TO " Lm " 3+87.779	33.558	1213.122	0.624	757.33	MTON
" Lm " 3+04.801 TO " Lm " 3+25.351	26.299	950.709	0.206	195.37	MTON
" Rm " 28+79.797 TO " Rm " 28+97.668	26.231	948.251	0.179	169.46	MTON
" Rm " 28+41.818 TO " Rm " 28+79.797	15.609	564.265	0.380	214.30	MTON
" Rm " 28+09.318 TO " Rm " 28+41.818	15.515	560.867	0.325	182.28	MTON
" Rm " 28+01.318 TO " Rm " 28+09.318	15.515	560.867	0.080	44.87	MTON
" Rm " 27+62.216 TO " Rm " 28+01.318	15.517	560.940	0.391	219.34	MTON
" Rm " 26+61.805 TO " Rm " 27+62.216	19.791	715.445	1.004	718.39	MTON
" Rm " 26+51.537 TO " Rm " 26+61.805	20.838	753.294	0.103	77.35	MTON
" Rm " 26+16.051 TO " Rm " 26+51.537	20.838	753.294	0.355	267.31	MTON
" Rm " 23+68.500 TO " Rm " 26+16.051	19.153	692.381	2.476	1714.00	MTON
" WA " 8+95.505 TO " WA " 9+02.980	18.600	672.390	0.075	50.26	MTON
" WA " 9+02.980 TO " WA " 9+33.500	18.600	672.390	0.305	205.21	MTON
" WA " 9+33.500 TO " WA " 9+45.000	18.689	675.607	0.115	77.69	MTON
" WA " 9+45.000 TO " WA " 9+61.000	19.031	687.971	0.160	110.08	MTON
" WA " 9+61.000 TO " WA " 9+70.500	14.516	524.753	0.095	49.85	MTON
" VTN " +14.900 TO " VTN " +48.450	27.819	1005.657	0.336	337.40	MTON
TOTAL				5578.47	MTON
USE TOTAL				5900.00	MTON
125 mm Plantmix Bituminous Surface (PG 76-22NV) (TYPE 2C) (Wet) UNIT WT. = 2.41 MTON/CUM					
" Rm " 21+00.000 TO " Rm " 23+68.500	16.265	489.983	2.685	1315.60	MTON
" Rm " 19+37.500 TO " Rm " 21+00.000	7.970	240.096	1.625	390.16	MTON
TOTAL				1705.76	MTON
USE TOTAL				2700.00	MTON
20 mm Plantmix Bituminous Open Graded Surface (12.5-MM) UNIT WT. = 2.278 MTON/CUM					
" WA " 10+14.792 TO " WA " 10+44.000	17.803	81.110	0.292	23.69	MTON
		0.000	0.000	0.00	MTON
" Lm " 3+25.351 TO " Lm " 3+87.779	33.558	152.890	0.624	95.45	MTON
" Lm " 3+04.801 TO " Lm " 3+25.351	26.299	119.818	0.206	24.62	MTON
" Rm " 28+79.797 TO " Rm " 28+97.668	26.231	119.508	0.179	21.36	MTON
" Rm " 28+41.818 TO " Rm " 28+79.797	24.820	113.080	0.380	42.95	MTON
" Rm " 28+09.318 TO " Rm " 28+41.818	24.820	113.080	0.325	36.75	MTON
" Rm " 28+01.318 TO " Rm " 28+09.318	24.820	113.080	0.080	9.05	MTON
" Rm " 27+62.216 TO " Rm " 28+01.318	24.822	113.089	0.391	44.22	MTON
" Rm " 26+61.805 TO " Rm " 27+62.216	29.096	132.561	1.004	133.11	MTON
" Rm " 26+51.537 TO " Rm " 26+61.805	30.143	137.332	0.103	14.10	MTON
" Rm " 26+16.051 TO " Rm " 26+51.537	30.350	138.275	0.355	49.07	MTON
" Rm " 23+68.500 TO " Rm " 26+16.051	33.291	151.674	2.476	375.47	MTON
" WA " 8+95.505 TO " WA " 9+02.980	18.600	84.742	0.075	6.33	MTON
" WA " 9+02.980 TO " WA " 9+33.500	18.600	84.742	0.305	25.86	MTON
" WA " 9+33.500 TO " WA " 9+45.000	18.689	85.147	0.115	9.79	MTON
" WA " 9+45.000 TO " WA " 9+61.000	19.031	86.705	0.160	13.87	MTON
" WA " 9+61.000 TO " WA " 9+70.500	14.516	66.135	0.095	6.28	MTON
" VTN " +14.900 TO " VTN " +48.450	27.819	126.743	0.336	42.52	MTON
TOTAL				974.49	MTON
USE TOTAL				750.00	MTON

STATE OF NEVADA
No. 12806
PROFESSIONAL ENGINEER
DANIEL W. BENDER
Exp: 12/31/04
CIVIL
1/15/04

D. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3

METRIC NDOT

SUMMARY OF PLANTMIX SURFACING QUANTITIES

NOTE:
QUANTITIES SHOWN IN THE SUMMARIES FOR THE BASE AND SURFACE MATERIALS ARE THEORETICAL AND USED FOR ESTIMATING PURPOSES ONLY. ACTUAL SPREADS SHALL BE VARIED AS REQUIRED TO OBTAIN THE DEPTH OF THE VARIOUS COURSES. ANGLE OF REPOSE INCLUDED IN TOTAL WEIGHT WHERE APPLICABLE.

	ITEM	AVG. WIDTH (M)	MTON/STA	STA	TOTAL	UNIT
	50 mm Plantmix Bituminous Surface (PG 76-22NV) (TYPE 2C) (Wet) UNIT WT. = 2.41 MTON/CUM					
actual overlay thickness = 55mm	" Rm " 28+41.818 TO " Rm " 28+79.797	9.211	122.092	0.380	46.37	MTON
actual overlay thickness = 56mm	" Rm " 28+09.318 TO " Rm " 28+41.818	9.305	125.580	0.325	40.81	MTON
actual overlay thickness = 56mm	" Rm " 28+01.318 TO " Rm " 28+09.318	9.305	125.580	0.080	10.05	MTON
actual overlay thickness = 56mm	" Rm " 27+62.216 TO " Rm " 28+01.318	9.305	125.580	0.391	49.10	MTON
actual overlay thickness = 56mm	" Rm " 26+61.805 TO " Rm " 27+62.216	9.305	125.580	1.004	126.10	MTON
actual overlay thickness = 56mm	" Rm " 26+51.537 TO " Rm " 26+61.805	9.305	125.580	0.103	12.89	MTON
actual overlay thickness = 54mm	" Rm " 26+16.051 TO " Rm " 26+51.537	9.512	123.789	0.355	43.93	MTON
actual overlay thickness = 50mm	" Rm " 23+68.500 TO " Rm " 26+16.051	14.138	170.363	2.476	421.74	MTON
	TOTAL				750.99	MTON
	USE TOTAL					MTON

ITEM	AREA (SQM)
Plantmixing Miscellaneous Areas	
" Rm " 23+94.579 TO " Rm " 23+62.282	27.5
" Rm " 24+19.905 TO " Rm " 23+99.330	107.6
TOTAL	135.10
USE TOTAL	140.00

	ITEM	AVG. WIDTH (M)	MTON/STA	STA	TOTAL	UNIT
	Seal Coat Areas Emulsified Asphalt type SS-1H (Diluted) 0.55 liter/SQM S.G. = 2.70					
	" Rm " 22+50.000 TO " Rm " 23+68.500	27.000	4.010	1.185	4.75	MTON
	" Rm " 19+37.500 TO " Rm " 22+50.000	28.500	4.232	3.125	13.23	MTON
	TOTAL				17.98	MTON
	USE TOTAL				20.00	MTON

STATE OF NEVADA
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CIVIL
1/15/04

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3A

SUMMARY OF AGGREGATE BASE QUANTITIES

NOTE:
QUANTITIES SHOWN IN THE SUMMARIES FOR THE BASE AND SURFACE MATERIALS ARE THEORETICAL AND USED FOR ESTIMATING PURPOSES ONLY. ACTUAL SPREADS SHALL BE VARIED AS REQUIRED TO OBTAIN THE DEPTH OF THE VARIOUS COURSES. ANGLE OF REPOSE INCLUDED IN TOTAL WEIGHT WHERE APPLICABLE.

ITEM			AVG. WIDTH (M)	MTON/STA	STA	TOTAL	UNIT
400 mm Type 1, Class B Aggregate Base (Includes 8% Moisture)							
" WA " 10+14.792	TO	" WA " 10+44.000	17.803	1609.391	0.292	470.07	MTON
" Lm " 3+25.351	TO	" Lm " 3+87.779	33.558	3033.643	0.624	1893.84	MTON
" Lm " 3+04.801	TO	" Lm " 3+25.351	26.299	2377.430	0.206	488.56	MTON
" Rm " 28+79.797	TO	" Rm " 28+97.668	26.231	2371.282	0.179	423.77	MTON
" Rm " 28+41.818	TO	" Rm " 28+79.797	15.609	1411.054	0.380	535.90	MTON
" Rm " 28+09.318	TO	" Rm " 28+41.818	15.515	1402.556	0.325	455.83	MTON
" Rm " 28+01.318	TO	" Rm " 28+09.318	15.515	1402.556	0.080	112.20	MTON
" Rm " 27+62.216	TO	" Rm " 28+01.318	15.517	1402.737	0.391	548.50	MTON
" Rm " 26+61.805	TO	" Rm " 27+62.216	19.791	1789.106	1.004	1796.46	MTON
" Rm " 26+51.537	TO	" Rm " 26+61.805	20.838	1883.755	0.103	193.42	MTON
" Rm " 26+16.051	TO	" Rm " 26+51.537	20.838	1883.755	0.355	668.47	MTON
" Rm " 23+68.500	TO	" Rm " 26+16.051	19.153	1731.431	2.476	4286.18	MTON
" WA " 8+95.505	TO	" WA " 9+02.980	18.600	1681.440	0.075	125.69	MTON
" WA " 9+02.980	TO	" WA " 9+33.500	18.600	1681.440	0.305	513.18	MTON
" WA " 9+33.500	TO	" WA " 9+45.000	18.689	1689.486	0.115	194.29	MTON
" WA " 9+45.000	TO	" WA " 9+61.000	19.031	1720.402	0.160	275.26	MTON
" WA " 9+61.000	TO	" WA " 9+70.500	14.516	1312.246	0.095	124.66	MTON
" VTN " +14.900	TO	" VTN " +48.450	27.819	2514.838	0.336	843.73	MTON
200 mm Type 1, Class B Aggregate Base (Includes 8% Moisture)							
" Rm " 21+00.000	TO	" Rm " 23+68.500	16.265	735.178	2.685	1973.95	MTON
" Rm " 19+37.500	TO	" Rm " 21+00.000	7.970	360.244	1.625	585.40	MTON
100 mm Type 1, Class B Aggregate Base (Includes 8% Moisture)							
CONSTRUCT TYPE 5 CURB & GUTTER	"WA" 9+22.596, 9.750M LT.	TO "WA" 9+45.000, 9.750M LT.				4.56	MTON
	"WA" 9+19.156, 9.750M RT.	TO "WA" 9+33.500, 9.750M RT.				2.91	MTON
	"WA" 9+61.000, 9.750M RT.	TO "WA" 9+70.500, 9.750M RT.				1.93	MTON
	"LM" 3+09.543, 17.265M RT.	TO "RM" 27+67.243, 6.050M RT				27.46	MTON
	"RM" 27+46.721, 6.050M RT.	TO "RM" 27+20.343, 12.231M RT.				6.00	MTON
	"RM" 27+05.314, 17.415M RT.	TO "RM" 26+30.000, 8.854M RT.				15.97	MTON
	"RM" 28+97.298, 19.585M LT.	TO "RM" 28+85.602, 19.586M LT.				2.44	MTON
	"RM" 28+54.203, 19.611M LT.	TO "RM" 28+41.818, 19.611M LT.				2.64	MTON
	"RM" 28+09.318, 19.650M LT.	TO "RM" 28+01.318, 19.650M LT.				1.63	MTON
1.83M SIDEWALK	"WA" 9+17.796, 14.400M LT.	TO "WA" 9+45.000, 9.900M LT.				11.59	MTON
	"WA" 9+14.156, 14.198M RT.	TO "WA" 9+33.500, 9.900M RT.				8.66	MTON
	"WA" 9+61.000, 9.900M RT.	TO "WA" 9+70.500, 9.900M RT.				3.86	MTON
	"LM" 3+09.543, 17.404M RT.	TO "RM" 27+62.243, 11.200M RT				58.17	MTON
	"RM" 28+97.298, 19.735M LT.	TO "RM" 28+79.603, 25.765M LT.				8.18	MTON
	"RM" 28+61.702, 27.365M LT.	TO "RM" 28+41.818, 19.761M LT.				9.52	MTON
	"RM" 28+09.318, 19.800M LT.	TO "RM" 28+01.318, 19.801M LT.				3.25	MTON
	"RM" 27+62.216, 19.679M LT.	TO "RM"27+25.614, 23.396M LT.				13.83	MTON
	"RM" 27+53.021, 12.200M RT.	TO "RM" 27+20.493, 12.230M RT.				15.87	MTON
	"RM" 27+05.164, 17.421M RT.	TO "RM" 26+30.000, 8.900M RT.				31.93	MTON
	"RM"26+96.857, 24.045M LT.	TO "RM"26+61.805, 19.877M LT.				14.03	MTON
	"RM"26+51.357, 20.328M LT.	TO "RM" 26+30.000, 21.222M LT.				8.54	MTON
CURB RAMP	"LM" 3+80.045, 17.382M LT.					3.60	MTON
	"LM" 3+44.268, 13.648M LT.					3.60	MTON
	"LM" 3+56.229, 12.863M RT.					3.60	MTON
	"LM" 3+49.763, 14.157M RT.					3.60	MTON
	"LM" 3+23.623, 13.140M RT.					1.08	MTON
	"LM" 3+16.556, 15.867M RT.					1.08	MTON
	"LM" 3+12.400, 20.765M RT.					3.60	MTON
COMMERCIAL D/W	"RM" 27+67.243, 6.200M RT.	TO "RM" 27+46.721, 6.200M RT.				12.88	MTON
	"RM" 28+85.602, 19.736M LT.	TO "RM" 28+54.305, 19.761M LT.				21.36	MTON
CONCRETE D/W	"WA" 9+30.000, 9.900M LT.					4.54	MTON
	"RM" 28+57.000, 6.200M RT.					4.54	MTON
	"RM" 28+20.000, 6.200M RT.					5.38	MTON
	"RM" 27+76.000, 6.200M RT.					4.54	MTON
COMMERCIAL D/W W/ SPECIAL TRENCH DRAIN						2.00	MTON
CONSTRUCT TYPE 5 CURB & GUTTER	"RM" 26+30.367, 8.854M RT.	TO "RM" 26+13.621, 7.650M RT.				6.44	MTON
	"RM" 25+89.171, 10.750M RT.	TO "RM" 23+66.883, 67.442M RT.				53.60	MTON
1.83M SIDEWALK	"RM" 26+30.000, 21.222M LT.	TO "RM" 26+16.051, 21.806M LT.				5.70	MTON
	"RM" 26+30.000, 8.900M RT.	TO "RM" 26+06.121, 15.250M RT.				11.19	MTON
	"RM" 25+96.671, 18.400M RT.	TO "RM" 23+67.003, 67.532M RT.				104.95	MTON
CURB RAMP	"RM" 23+85.600, 9.750M RT.					1.08	MTON
	"RM" 24+43.602, 31.230M LT.					3.60	MTON
	"RM" 24+19.600, 27.000M LT.					3.60	MTON
COMMERCIAL D/W	"RM" 26+13.621, 7.800M RT.	TO "RM" 25+89.171, 10.900M RT.				18.65	MTON
TOTAL						17046.55	MTON
USE TOTAL						19300.00	MTON

STATE OF NEVADA No. 12806 PROFESSIONAL ENGINEER DANIEL W. BENDER CIVIL Exp: 12/31/04
1/15/04

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	38

SUMMARY OF COLD MILLING AND REMOVAL QUANTITIES

NOTE:

QUANTITIES SHOWN IN THE SUMMARY FOR THE COLD MILLING ARE THEORETICAL AND USED FOR ESTIMATING PURPOSES ONLY. ACTUAL DEPTHS MAY BE VARIED AS REQUIRED.

ITEM	AVG. WIDTH (M)	SQM/STA	STA	TOTAL	UNIT
70 mm Removal of Bituminous Surface (Cold Milling)					
" Rm " 28+41.818 TO " Rm " 28+79.797	9.621	962.100	0.380	365.40	SQM
" Rm " 28+09.318 TO " Rm " 28+41.818	5.566	556.600	0.325	180.90	SQM
" Rm " 28+01.318 TO " Rm " 28+09.318	5.586	558.600	0.080	44.69	SQM
" Rm " 27+62.216 TO " Rm " 28+01.318	5.581	558.100	0.391	218.23	SQM
" Rm " 26+61.805 TO " Rm " 27+62.216	5.575	557.500	1.004	559.79	SQM
" Rm " 26+51.537 TO " Rm " 26+61.805	20.660	2066.000	0.103	212.14	SQM
" Rm " 26+16.051 TO " Rm " 26+51.537	20.660	2066.000	0.355	733.14	SQM
" Rm " 23+68.500 TO " Rm " 26+16.051	20.660	2066.000	2.476	5114.40	SQM
			TOTAL	7428.68	SQM
			USE TOTAL	7500.00	SQM
Removal of Composite Surface					
" WA " 10+14.792 TO " WA " 10+44.000	17.803	1780.300	0.292	519.99	SQM
" Lm " 3+25.351 TO " Lm " 3+87.779	33.558	3355.800	0.624	2094.96	SQM
" Lm " 3+04.801 TO " Lm " 3+25.351	26.299	2629.900	0.206	540.44	SQM
" Rm " 28+79.797 TO " Rm " 28+97.668	26.231	2623.100	0.179	468.77	SQM
" Rm " 28+41.818 TO " Rm " 28+79.797	15.609	1560.900	0.380	592.81	SQM
" Rm " 28+09.318 TO " Rm " 28+41.818	15.515	1551.500	0.325	504.24	SQM
" Rm " 28+01.318 TO " Rm " 28+09.318	15.515	1551.500	0.080	124.12	SQM
" Rm " 27+62.216 TO " Rm " 28+01.318	15.517	1551.700	0.391	606.75	SQM
" Rm " 26+61.805 TO " Rm " 27+62.216	23.519	2351.900	1.004	2361.57	SQM
" Rm " 26+51.537 TO " Rm " 26+61.805	20.838	2083.800	0.103	213.96	SQM
" Rm " 26+16.051 TO " Rm " 26+51.537	20.838	2083.800	0.355	739.46	SQM
" Rm " 23+68.500 TO " Rm " 26+16.051	20.838	2083.800	2.476	5158.47	SQM
" Rm " 21+00.000 TO " Rm " 23+68.500	28.520	2852.000	2.685	7657.62	SQM
" Rm " 19+37.500 TO " Rm " 21+00.000	7.970	797.000	1.625	1295.13	SQM
" WA " 8+95.505 TO " WA " 9+02.980	18.600	1860.000	0.075	139.04	SQM
" WA " 9+02.980 TO " WA " 9+33.500	18.600	1860.000	0.305	567.67	SQM
" WA " 9+33.500 TO " WA " 9+45.000	18.689	1868.900	0.115	214.92	SQM
" WA " 9+45.000 TO " WA " 9+61.000	19.031	1903.100	0.160	304.50	SQM
" WA " 9+61.000 TO " WA " 9+70.500	14.516	1451.600	0.095	137.90	SQM
" VTN " +14.900 TO " VTN " +48.450	27.819	2781.900	0.336	933.33	SQM
			TOTAL	25175.64	SQM
			USE TOTAL	25200.00	SQM

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3C

STATE OF NEVADA PROFESSIONAL ENGINEER No. 12806 DANIEL W. BENDER Exp. 12/31/04 CIVIL

ENGINEER OF RECORD

5/12/03

SUMMARY OF PERMANENT PAVEMENT MARKINGS

634-2150 PERMANENT PAVEMENT MARKING FILM (TYPE 2) 600 mm SOLID WHITE (LINM)
842

634-2165 PERMANENT PAVEMENT MARKING FILM (TYPE 2) 100 mm SOLID YELLOW (LINM)
53

634-2173 PERMANENT PAVEMENT MARKING FILM (TYPE 2) 100 mm SOLID WHITE (LINM)
251

632-2604 WATERBOURNE PAVEMENT STRIPING 600 mm SOLID YELLOW (LINM)
42

632-2600 WATERBOURNE PAVEMENT STRIPING 600 mm SOLID WHITE (LINM)
260

632-2620 WATERBOURNE PAVEMENT STRIPING (TYPE 2) (SOLID YELLOW (LINM)
680

632-2616 WATERBOURNE PAVEMENT STRIPING (TYPE 2) (SOLID WHITE) (LINM)
600

633-2624 WATERBOURNE PAVEMENT STRIPING (TYPE 2) TURN ARROW (SQM)
20.16

633-2624 WATERBOURNE PAVEMENT STRIPING (TYPE 2) LEGEND (SQM)
17.2

633-2624 WATERBOURNE PAVEMENT STRIPING (TYPE 2) STRAIGHT ARROW (SQM)
3.33

634-2016 PERMANENT PAVEMENT MARKING FILM TURN ARROW (SQM)
39.24

634-2016 PERMANENT PAVEMENT MARKING FILM STRAIGHT ARROW (SQM)
5.84

634-2016 PERMANENT PAVEMENT MARKING FILM LEGEND (SQM)
40.85

SUMMARY OF PAVEMENT MARKERS

	NON-REFLECTIVE	REFLECTIVE
TYPE A	124 EA	
TYPE B	2,377 EA	
TYPE C		142 EA
TYPE D		119 EA
TYPE E		770 EA
TOTAL USE TOTAL	2,501 EA 2,501 EA	1031 EA 1031 EA

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3D

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

THEORETICAL APPLICATION OF SURFACING MATERIALS

ASPHALT CEMENT, GRADE PG 76-22NV (OPEN-GRADE)	5.50 PERCENT
ASPHALT CEMENT, GRADE PG 76-22NV (DENSE-GRADE)	4.50 PERCENT
EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED), (TACK COAT FOR OPEN-GRADE)	0.25 LITERS/SQ. METER
EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED), (SEAL COAT)	0.55 LITERS/SQ. METER
EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED), (TACK COAT ON PBS LIFTS)	0.20 LITERS/SQ. METER
LIQUID ASPHALT, TYPE MC-70, (PRIME COAT BASE)	1.28 LITERS/SQ. METER
EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED), (TACK COAT ON COLD MILLING)	0.40 LITERS/SQ. METER
MINERAL FILLER	1.50 PERCENT
SPECIFIC GRAVITY	2.70
SAND BLOTTER, FOR SEAL COAT	8.2 KG/SQ. METER
TYPE 1 CLASS B AGGREGATE BASE UNIT WEIGHT FACTOR (INCLUDES 8% MOISTURE)	2260 KG/CUBIC METER

GENERAL NOTES

1. DEPTH OF BASE AND SURFACE IS MINIMUM COMPACTED THICKNESS.

2. TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE REQUIREMENTS OF THE M.U.T.C.D., 2000 EDITION.

3. CONSTRUCTION SIGNS SHALL BE REMOVED, LAID DOWN, OR COVERED WHEN THE SPECIFIED OPERATIONS ARE NOT BEING PERFORMED.

4. THE CONTRACTOR SHALL REMOVE, MOVE, RESET, OR COVER ANY EXISTING SIGNS TO ACCOMMODATE TRAFFIC DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. (NO DIRECT PAYMENT)

5. FOR TRAFFIC CONTROL REFER TO PLAN SHEET TC-1 THRU TC-81 AND SHEETS T-35.1.8 TO T-35.1.13 IN THE STATE OF NEVADA DEPARTMENT OF TRANSPORTATION STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION, 2001 METRIC EDITION.

6. TEMPORARY STRIPING SHALL INCLUDE STOP BARS, CROSSWALKS, STORAGE LINES, AND LANE LINES AS SHOWN ON PERMANENT STRIPING DETAILS.

7. REFER TO STATE OF NEVADA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, 2001 METRIC EDITION, FOR SPECIFICATIONS EXEPT AS MODIFIED BY THESE PLANS AND SPECIAL PROVISIONS.

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3E

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

SUMMARY OF CONSTRUCTION SIGNS AND BARRICADES

QUANTITIES SHOWN ARE APPROXIMATE AND ARE SUBJECT TO INCREASE OR DECREASE.
ADDITIONAL SIGNS NOT LISTED, MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

SIGN NO.	MESSAGE	PANEL SIZE	SQM EACH	NO. OF SIGNS	TOTAL SQM
M1-4	US 95 SHIELD	600 x 600	0.36	12	4.3
M3-1	NORTH	600 x 300	0.18	6	1.1
M3-3	SOUTH	600 x 300	0.18	6	1.1
M4-8	DETOUR	600 x 300	0.18	10	1.8
M4-8a	END DETOUR	600 x 450	0.27	3	0.8
M4-9(L)	DETOUR W/LEFT ARROW	750 x 600	0.45	4	1.8
M4-9(R)	DETOUR W/RIGHT ARROW	750 x 600	0.45	4	1.8
M5-2	ADVANCE TURN ARROW - 45°	600 x 300	0.18	1	0.2
M6-1	180° ARROW	600 x 300	0.18	6	1.1
M6-3	90° ARROW	600 x 300	0.18	6	1.1
NBA-1	BUSINESS, ACCESS, RIGHT ARROW	1050 x 1050	1.10	1	1.1
NBA-2	BUSINESS, ACCESS, LEFT ARROW	1050 x 1050	1.10	1	1.1
NBA-3	BUSINESS ACCESS ONLY	1500 x 600	0.90	3	2.7
NC-1	CLOSED	3000 x 900	2.70	1	2.7
NDR-1	DETOUR W/UP ARROW	750 x 600	0.45	7	3.2
NFE-1	FREEWAY ENTRANCE	1200 x 600	0.72	1	0.7
NLU-207	LEFT ARROW, ONLY, THRU ARROW, ONLY	900 x 750	0.68	3	2.0
NLU-303	THRU ARROW, ONLY, THRU ARROW, ONLY, RIGHT ARROW, ONLY	1350 x 750	1.01	1	1.0
NLU-311	LEFT ARROW, ONLY, THRU ARROW, ONLY, THRU ARROW, ONLY	1350 x 750	1.01	2	2.0
NLU-313	LEFT ARROW, ONLY, THRU ARROW, ONLY, RIGHT ARROW, ONLY	1350 x 750	1.01	2	2.0
NPS-1	PREPARE TO STOP	1200 x 1200	1.44	5	7.2
NRC-1	RAMP CLOSED	1200 x 900	1.08	1	1.1
NTL-1	LEFT TURN LANE, 180° ARROW	750 x 1200	0.90	3	2.7
NTM-1	THRU TRAFFIC MERGE LEFT	1200 x 1200	1.44	2	2.9
NTM-1	THRU TRAFFIC MERGE RIGHT	1200 x 1200	1.44	1	1.4
NTT-1	THRU TRAFFIC, 90° ARROW	1350 x 1500	2.03	2	4.1
NWC-1	WALKWAY CLOSED USE OTHER SIDE (RIGHT ARROW)	600 x 600	0.36	1	0.4
NWC-2	WALKWAY CLOSED USE OTHER SIDE (LEFT ARROW)	600 x 600	0.36	1	0.4
NWC-3	WALKWAY CLOSED USE OTHER SIDE (DOUBLE ARROW)	600 x 600	0.36	1	0.4
NWC-4	WALKWAY CLOSED	600 x 300	0.18	4	0.7
NWC-5	WALKWAY CLOSED AHEAD	600 x 450	0.27	1	0.3
NWZ-1	BEGIN WORK ZONE	1200 x 600	0.72	1	0.7
NWZ-2	END WORK ZONE	1200 x 600	0.72	1	0.7
NWZ-3	DOUBLE PENALTY IN WORK ZONES	1200 x 1200	1.44	1	1.4
R1-2	YIELD	900 x 900	0.35	2	0.7
R3-1	NO RIGHT TURN	600 x 600	0.36	2	0.7
R3-2L	NO LEFT TURNS	600 x 600	0.36	5	1.8
R3-5R	RIGHT TURN ARROW, ONLY	750 x 900	0.68	1	0.7
R3-7R	RIGHT LANE MUST TURN RIGHT	750 x 750	0.56	2	1.1
R4-7A	KEEP RIGHT (RIGHT ARROW)	900 x 1200	1.08	4	4.3
R6-1R	ONE WAY (RIGHT ARROW)	900 x 300	0.27	2	0.5
R11-2	ROAD CLOSED	1200 x 750	0.90	5	4.5
R11-4	ROAD CLOSED TO THRU TRAFFIC	1500 x 750	1.13	3	3.4
TC-1	RANCHO DRIVE, 45° ARROW	3048 x 1524	4.65	1	4.7
TC-2	RANCHO DRIVE	750 x 600	0.45	17	7.7
TC-3	RANCHO DR CLOSED USE VALLEY VIEW	3050 x 1830	5.60	1	5.6
TC-4	BONANZA ROAD	900 x 600	0.54	16	8.6
TC-5	WASHINGTON AVE.	900 x 600	0.54	2	1.1
TC-6	WENDY'S	910 x 460	0.42	1	0.4
TC-7	WINCHELL'S, SUBWAY	1070 x 600	0.64	1	0.6
TC-8	BURGER KING	1220 x 460	0.56	1	0.6
TC-9	CHECKER AUTO	1200 x 460	0.55	1	0.6
TC-10	CLOSED	1980 x 750	1.49	1	1.5
TC-11	CLOSED	4880 x 750	3.66	1	3.7
TC-12	CLOSED	4350 x 750	3.26	1	3.3
W1-4R	DOUBLE REVERSE CURVE (RIGHT)	1200 x 1200	1.44	1	1.4
W1-6R	LARGE ARROW	910 x 460	0.42	3	1.3
W4-1aL	THRU TRAFFIC MERGE LEFT	1200 x 1200	1.44	1	1.4
W4-1aR	THRU TRAFFIC MERGE RIGHT	1200 x 1200	1.44	1	1.4
W4-2L	PAVEMENT WIDTH TRANSITION (LEFT)	1200 x 1200	1.44	2	2.9
W4-2R	PAVEMENT WIDTH TRANSITION (RIGHT)	1200 x 1200	1.44	2	2.9
W6-3	TWO WAY TRAFFIC	1200 x 1200	1.44	2	2.9
W12-1	DOUBLE ARROW SIGN	600 x 600	0.36	1	0.4
W13-1	ADVISORY SPEED PLATE (25 MPH)	600 x 600	0.36	8	2.9
W16-5P	ARROW PLAQUES	600 x 300	0.18	12	2.2
W20-1	ROAD WORK AHEAD	1200 x 1200	1.44	22	31.7
W20-2	DETOUR AHEAD	1200 x 1200	1.44	5	7.2
W20-3	ROAD CLOSED AHEAD	1200 x 1200	1.44	4	5.8
W20-5L	LEFT LANE CLOSED AHEAD	1200 x 1200	1.44	2	2.9
W20-5R	RIGHT LANE CLOSED AHEAD	1200 x 1200	1.44	2	2.9
W20-7A	FLAGGER SYMBOL	1200 x 1200	1.44	5	7.2
				TOTAL	**191.1**
				USE TOTAL	**191**

ARROW BOARD (TYPE C)	4 EACH
RENT TRUCK MOUNTED IMPACT ATTENUATOR)	2 EACH
RENT CONSTRUCTION BARRICADES (TYPE III B)	15 EACH
RENT TEMPORARY IMPACT ATTENUATOR (60 kph)	2 EACH
RENT PORTABLE PRECAST CONCRETE BARRIER RAIL	410 LINM
RENT TRAFFIC DRUMS	200 EACH
RENT CHANGEABLE MESSAGE SIGN	6 EACH

PROFESSIONAL ENGINEER-STATE OF NEVADA
JESSE M. GALVAN
No. 9645
EXP. 6-30-03
CIVIL
5-12-03

Washington
WASHINGTON INFRASTRUCTURE SERVICES, INC.

METRIC
NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPRS-0599(004)	CLARK	3-F

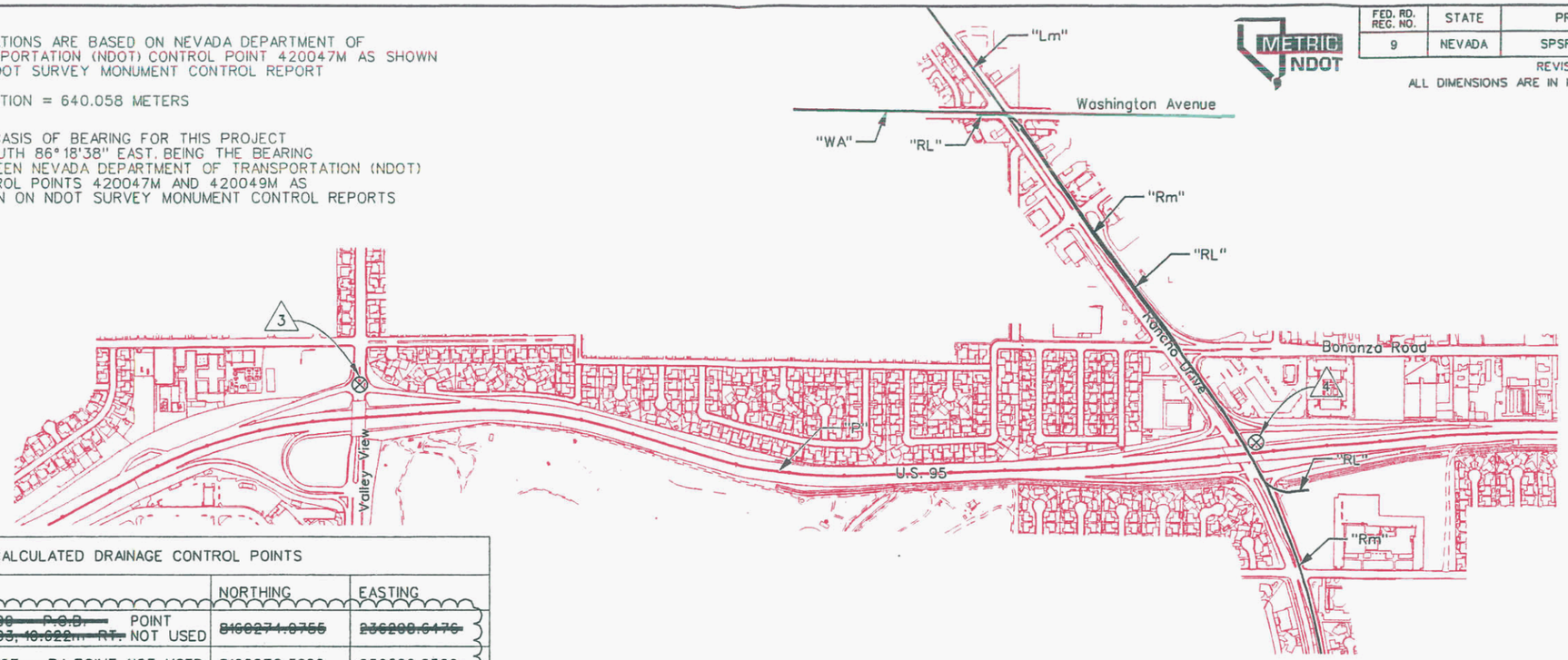
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3G

REVISED 06/06/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

VERTICAL DATUM: ELEVATIONS ARE BASED ON NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) CONTROL POINT 420047M AS SHOWN ON NDOT SURVEY MONUMENT CONTROL REPORT

ELEVATION = 640.058 METERS

BEARING SOURCE: THE BASIS OF BEARING FOR THIS PROJECT IS SOUTH 86°18'38" EAST, BEING THE BEARING BETWEEN NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) CONTROL POINTS 420047M AND 420049M AS SHOWN ON NDOT SURVEY MONUMENT CONTROL REPORTS



SCALE 1:5,000

CALCULATED DRAINAGE CONTROL POINTS

POINT No.	DESCRIPTION	NORTHING	EASTING
1	~~"RL" 9+00.000 — P.O.B.~~ POINT ~~"WA" 8+11.603, 18.022m RT.~~ NOT USED	~~8160274.8755~~	~~236288.6476~~
2	~~"RL" 10+00.997 — P.I.~~ POINT NOT USED	~~8160272.3666~~	~~236388.6386~~
3	~~"RL" 10+08.543 — P.I.~~ POINT NOT USED	~~8160273.0688~~	~~236317.4134~~
4	~~"RL" 10+44.534 — P.I.~~ POINT NOT USED	~~8160272.9941~~	~~236323.4429~~
5	"RL" 10+32.500 - P.I. - BEGIN RCB	8160278.5702	236340.2124
6	"RL" 10+54.926 - P.C.	8160278.1908	236362.6346
7	"RL" 10+60.938 - P.R.C.	8160278.5404	236368.6309
8	"RL" 10+66.950 - P.T.	8160278.8899	236374.6271
9	"RL" 10+77.078 - P.C.	8160278.7186	236384.7535
10	"RL" 11+22.740 - P.T.	8160258.6107	236423.9937
11	"RL" 11+43.002 - P.C.	8160242.3667	236436.1039
12	"RL" 11+50.152 - P.T.	8160236.5584	236440.2746
13	"RL" 13+00.745 - P.C.	8160112.6844	236525.9104
14	"RL" 13+64.096 - P.T.	8160061.3503	236563.0245
15	"RL" 16+10.001 - P.C.	8159865.1593	236711.2758
16	"RL" 16+29.420 - P.R.C.	8159848.3315	236720.8583
17	"RL" 16+84.839 - P.T.	8159831.5036	236730.4407
18	"RL" 16+91.132 - P.C.	8159797.7608	236755.9384
19	"RL" 19+04.504 - P.R.C.	8159617.1584	236869.0485
20	"RL" 19+75.534 - P.T.	8159584.6526	236927.5834
21	"RL" 20+05.432 - P.O.E.= "Rm" 20+58.937, 67.785m RT.	8159587.1909	236957.3728

MONUMENTED CONTROL POINTS

NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
3	8159784.206	235197.1936	658.331	NDOT-420049-M
4	8159676.901	236861.2721	640.058	NDOT-420047-M

CALCULATED CONTROL POINTS

POINT No.	DESCRIPTION	NORTHING	EASTING
1	"Lm" 4+00.000 - P.O.T.	8160324.1104	236363.0788
2	"Lm" 3+04.801 - P.O.T. = "Rm" 28+97.668, 6.706m LT. P.O.E.	8160247.7767	236419.9647
3	"Rm" 28+74.567 - P.I.	8160233.2642	236439.1480
4	"Rm" 26+65.882 - P.I.	8160061.6054	236557.8181
5	"Rm" 23+35.936 - P.T.	8159798.3637	236756.7362
6	"Rm" 19+00.000 - P.O.C.	8159411.4361	236952.4682
7	"WA" 9+00.000 - P.O.T.	8160283.2411	236294.8124
8	"WA" 10+00.000 - P.O.T.= "Rm" 3+46.920 - P.O.T.	8160281.5491	236394.7981
9	"WA" 11+00.000 - P.O.T.	8160279.8625	236494.7839
10	"VTN" 0+00.000 - P.O.B.= "Rm" 24+03.071 - P.O.C.	8159851.9264	236716.2617
11	"VTN" 1+19.856 - P.O.E.	8159852.2455	236836.1170

LEGEND

- 9 — CALCULATED CONTROL POINTS
- ⊗ — MONUMENTED CONTROL POINTS
- 9 — CALCULATED DRAINAGE CONTROL POINTS

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

SURVEY CONTROL PLAN

vtn nevada
• CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD. LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550 FAX (702) 362-2597

DESIGN BY	JPL
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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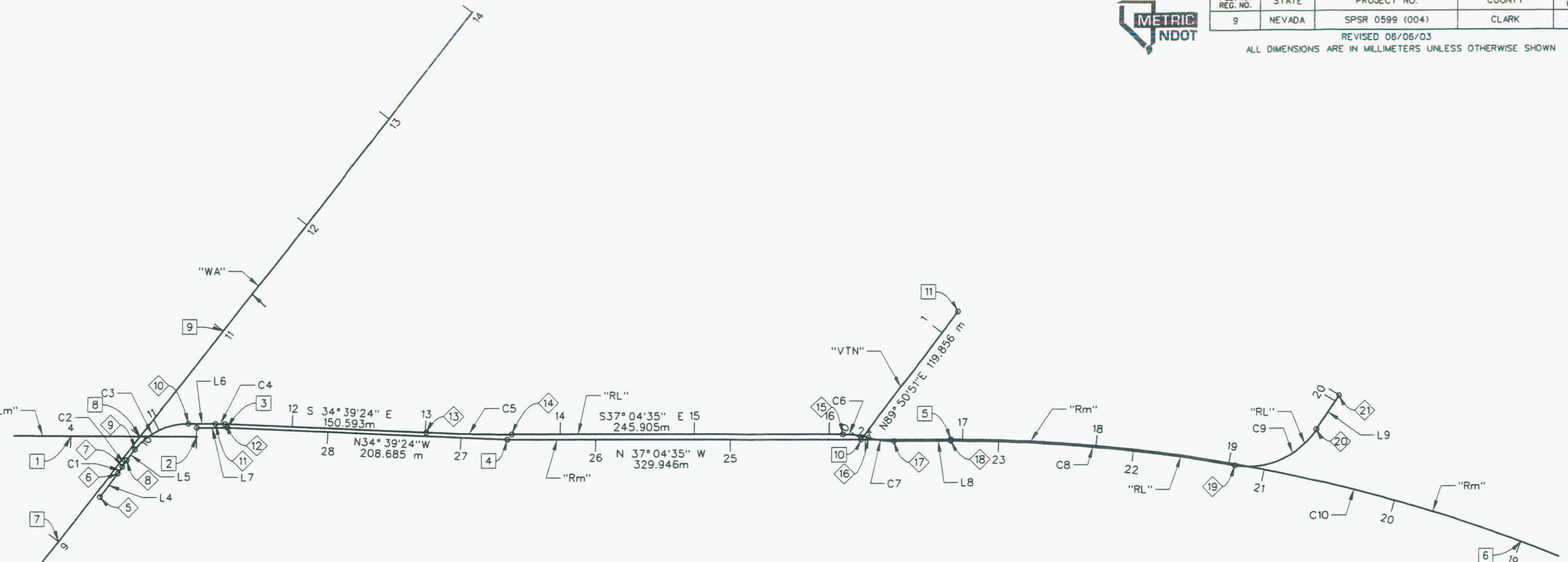
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3H

REVISED 06/06/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



LINE DATA			
	LINE No.	BEARING	DISTANCE
NOT USED	~~L1~~	~~N 84° 39'38" E~~	~~7.548m~~
NOT USED	~~L2~~	~~S 89°17'12" E~~	~~6.000m~~
NOT USED	~~L3~~	~~N 74° 54'33" E~~	~~17.957m~~
	L4	S 89° 01'50" E	22.425m
	L5	S 89° 01'50" E	10.128m
	L6	S 36° 42'19" E	20.261m
	L7	N 36° 42'19" W	23.101m
	L8	S 37° 04'35" E	42.293m
	L9	N 85° 07'47" E	29.897m

CURVE DATA				
CURVE No.	RADIUS	LENGTH	TANGENT	DELTA
C1	40.000m	6.012m	3.012m	8° 36'42"
C2	40.000m	6.012m	3.012m	8° 36'42"
C3	50.000m	46.663m	24.563m	52° 19'31"
C4	200.000m	7.151m	3.576m	2° 02'55"
C5	1500.000m	63.350m	31.680m	2° 25'11"
C6	75.000m	19.419m	9.764m	14° 50'06"
C7	75.000m	19.419m	9.764m	14° 50'06"
C8	1218.202m	213.372m	106.959m	10° 02'08"
C9	60.000m	71.031m	40.341m	67° 49'46"
C10	1219.202m	796.850m	413.241m	37° 26'51"

PROFESSIONAL ENGINEER-STATE OF NEVADA
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Exp. 12/31/2004
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No. 12806
6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

RANCHO ROAD
ROADWAY CONTROL POINTS

vtn nevada
CONSULTING ENGINEERS
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2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE: (702) 873-7550
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DESIGN BY	MC
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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ESTIMATE OF QUANTITIES

Quantities Shown are Approximate Only and are Subject to Increase or Decrease

TO BE CONTRACTED

ITEM NO.	TOTAL	UNIT	ITEM
200 0001	50	HOUR	SURVEY CREW
201 0008	2	EACH	REMOVE TREES
202 0004			Remove + Set Structures + Obstructions
202 0300	4	EACH	REMOVAL OF LIGHTING AND/OR SIGNAL POLE
202 0320	1	EACH	REMOVAL OF PULL BOX
202 0328	4	EACH	REMOVAL OF DROP INLET
202 0468	3,220	EACH	REMOVAL OF PAVEMENT MARKER
202 2012	~~55~~ 85	SQM	REMOVE CONCRETE SLAB
202 2136	7,700	SQM	REMOVE BITUMINOUS SURFACE (COLD MILLING)
202 2162	25,500	SQM	REMOVE COMPOSITE SURFACE
202 2184	240	SQM	REMOVE VALLEY GUTTER
202 2188	~~1,100~~ 1,250	SQM	REMOVE SIDEWALK
202 2200	660	LINM	REMOVE CURB AND GUTTER
202 2244	20	LINM	REMOVE STORM DRAIN PIPE
202 2284	4,250	SQM	REMOVE MEDIAN ISLAND
202 2308	4,680	LINM	REMOVE PAVEMENT MARKING FILM-TRAFFIC LINE
203 2150	4,500	SQM	GEOGRID
203 2152	2,000	SQM	GEOTEXTILE
206 2000	21,500	CUM	STRUCTURE EXCAVATION
207 2000	5,900	CUM	BACKFILL
207 2004	6,350	CUM	GRANULAR BACKFILL
302 2000	22,500	MTON	TYPE 1 CLASS B AGGREGATE BASE
402 2160	~~250~~ 300	SQM	PLANTMIXING MISCELLANEOUS AREAS
402 6008	9,700	MTON	PLANTMIX SURFACING (TYPE 2C) (WET)
403 6006	~~800~~ 950	MTON	PLANTMIX OPEN-GRADED SURFACING (12.5-MM) (WET)
405 2016	25	MTON	EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED)
406 2000	35	MTON	LIQUID ASPHALT, TYPE MC-70
502 2004	150	CUM	CLASS A CONCRETE (MINOR)
502 2008	~~50~~ 90	CUM	CLASS A CONCRETE (ISLAND PAVING)
502 2200	14	LINM	1800-MM X 900-MM PRECAST CONCRETE BOX CULVERT
502 2244	110	LINM	2400-MM X 1800-MM PRECAST CONCRETE BOX CULVERT
502 2309	60	LINM	3600-MM X 2400-MM PRECAST CONCRETE BOX CULVERT
502 2314	720	LINM	3600-MM X 1800-MM PRECAST CONCRETE BOX CULVERT
505 2000	~~8,000~~ 11,000	KG	REINFORCING STEEL
505 2005	~~200~~ 220	KG	REINFORCING STEEL (EPOXY COATED) (DOWELED)
506 2000	~~4,600~~ 5,100	KG	STRUCTURAL STEEL
603 2024	40	LINM	450-MM REINFORCED CONCRETE PIPE, CLASS III
603 2048	8	LINM	600-MM REINFORCED CONCRETE PIPE, CLASS III
603 2108	~~70~~ 80	LINM	1050-MM REINFORCED CONCRETE PIPE, CLASS III
603 2132	~~10~~ 20	LINM	1350-MM REINFORCED CONCRETE PIPE, CLASS III
603 2144	10	LINM	1500-MM REINFORCED CONCRETE PIPE, CLASS III
603 2268	20	linm	1095-mm X 1630 mm Oval Reinforced concrete pipe Class HE III
~~603 2316~~	~~17~~	~~LINM~~	~~1730-MM X 1095-MM OVAL REINFORCED CONCRETE PIPE, CLASS VE III~~
609 0130	16	EACH	ADJUSTING MANHOLE COVERS (METHOD B)
609 0134	22	EACH	ADJUSTING VALVE COVERS (METHOD B)
609 0148	4	each	Adjust water valve Boxes
609 0176	3	EACH	SPECIAL SEWER MANHOLE
609 0192	1	EACH	Type 4 Manhole (Modified)
609 2000	~~150~~ 1,400	KG	CASTINGS
609 2002	9,000	KG	STRUCTURAL STEEL GRATES
609 2004	190	LINM	ABANDON PIPE
609 2028	45	LINM	200-MM POLYVINYL CHLORIDE PIPE
609 2504	~~8~~ 9	EACH	1200-MM PRECAST REINFORCED CONCRETE MANHOLE, TYPE 1
613 2092	1,350	LINM	CLASS A CONCRETE GLUE DOWN CURB (TYPE B)

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR-0599(004)	CLARK	31

ESTIMATE OF QUANTITIES (CONTINUED)

ITEM NO.	TOTAL	UNIT	ITEM
613 2228	600	LINM	CLASS A CONCRETE CURB AND GUTTER (TYPE 5)
613 2356	~~1,400~~ 1,440	SQM	CLASS A CONCRETE SIDEWALK (100-MM)
613 2388	100	SQM	CLASS A CONCRETE DRIVEWAY (150-MM)
613 2394	~~200~~ 250	SQM	CLASS A CONCRETE DRIVEWAY (225-MM) (REINFORCED)
613 2452	150	SQM	CLASS A CONCRETE RAMP (100-MM)
623 0072	8	EACH	NO. 3-1/2 PULL BOX
623 0076	11	EACH	NO. 5 PULL BOX
623 0080	14	EACH	NO. 7 PULL BOX
623 0084	4	EACH	NO. 9 PULL BOX
623 0140	11	EACH	SODIUM VAPOR LUMINAIRE, 400 WATT
623 0304	1	EACH	STEEL POLE, TYPE 1B
623 0316	4	EACH	STEEL POLE, TYPE 7
623 0408	1	EACH	STEEL POLE, TYPE 35
623 0416	1	EACH	STEEL POLE, TYPE 35A
623 0480	2	EACH	PEDESTRIAN SIGNAL HEAD 1W
623 0484	1	EACH	PEDESTRIAN SIGNAL HEAD 2W
623 0492	1	EACH	PEDESTRIAN SIGNAL HEAD 2W, POST TOP
623 0504	6	EACH	PEDESTRIAN PUSH BUTTON WITH SIGN
623 0508	2	EACH	LOOP DETECTOR
623 0524	1	EACH	EMERGENCY VEHICLE OPTICAL DETECTOR SYSTEM
623 0564	4	EACH	VIDEO IMAGE DETECTION SYSTEM
623 0566	14	EACH	VIDEO IMAGE DETECTION CAMERA
623 0602	1	EACH	TRAFFIC ACTUATED CONTROLLER, 2070N
623 0756	LS	---	REMOVAL OF EXISTING TRAFFIC SIGNAL SYSTEM
623 0800	16	EACH	REMOVE AND RESET LIGHT POLE
623 0888	1	EACH	UNDERGROUND ELECTRICAL SERVICE
623 1564	1	EACH	SIGNAL HEAD 1W3C, BRACKET
623 1572	1	EACH	SIGNAL HEAD 2W3C, BRACKET
623 1584	12	EACH	SIGNAL HEAD 1W3C, MAST ARM
623 2020	830	LINM	50-MM CONDUIT
623 2028	780	LINM	80-MM CONDUIT
623 2032	1,220	LINM	100-MM CONDUIT
623 2132	1,680	LINM	NO. 4 CONDUCTOR
623 2140	2,860	LINM	NO. 8 CONDUCTOR
623 2144	3,350	LINM	NO. 10 CONDUCTOR
623 2177	~~1,650~~ 1,720	LINM	3 CONDUCTOR NO. 14 CABLE
623 2188	360	LINM	15 CONDUCTOR NO. 14 CABLE
623 2196	1,770	LINM	25 CONDUCTOR NO. 14 CABLE
623 2212	140	LINM	3 CONDUCTOR NO. 20 CABLE
623 2256	830	LINM	25 PAIR CONDUCTOR NO. 22 CABLE
623 2270	~~1,650~~ 17,20	LINM	COAXIAL CABLE
623 2284	4	EACH	ILLUMINATED STREET NAME SIGN, DOUBLE FACE (2.4M)
623 2312	3	SQM	TRAFFIC SIGNAL SIGNS
624 0004	1,200	HOUR	FLAGGER
624 0010	FA	---	UNIFORMED TRAFFIC CONTROL OFFICER
624 0016	~~50~~ 120	DAY	TRAFFIC CONTROL SUPERVISOR
625 0036	15	EACH	RENT CONSTRUCTION BARRICADES (TYPE IIIB)
625 0044	6	EACH	RENT CHANGEABLE MESSAGE SIGN
625 0060	4	EACH	RENT ARROW BOARD (TYPE C)
625 0072	200	EACH	RENT TRAFFIC DRUMS

FED. RD. REG. NO.	STATE
9	NEVADA
PROJECT NO.	COUNTY
SPSR-0599(004)	CLARK
	SHEET NO. 3J

ESTIMATE OF QUANTITIES (CONTINUED)

ITEM NO.	TOTAL	UNIT	ITEM
625 0092	2	EACH	RENT TRUCK-MOUNTED IMPACT ATTENUATOR
625 2000	203	SQM	RENT CONSTRUCTION SIGNS
625 2012	410	LINM	RENT PORTABLE PRECAST CONCRETE BARRIER RAIL
625 2045	2	EACH	RENT TEMPORARY IMPACT ATTENUATOR (60 KPH)
627 2010	4.20	SQM	PERMANENT SIGNS (GROUND MOUNTED) (METAL SUPPORTS)
627 2026	2.20	SQM	PERMANENT SIGNS, REMOVE
627 2028	6.60	SQM	PERMANENT SIGNS, REMOVE AND RESET
628 0004	LS	---	MOBILIZATION
629 0100	120	DAY	TIME RELATED OVERHEAD
632 2600	270	LINM	WATERBORNE PAVEMENT STRIPING (TYPE II) (600-MM SOLID WHITE)
632 2604	50	LINM	WATERBORNE PAVEMENT STRIPING (TYPE II) (600-MM SOLID YELLOW)
632 2616	610	LINM	WATERBORNE PAVEMENT STRIPING (TYPE II) (SOLID WHITE)
632 2620	685	LINM	WATERBORNE PAVEMENT STRIPING (TYPE II) (SOLID YELLOW)
632 2624	45	SQM	WATERBORNE PAVEMENT STRIPING (TYPE II) (VARIES)
633 0000	2,600	EACH	NON-REFLECTIVE PAVEMENT MARKERS
633 0004	1,100	EACH	REFLECTIVE PAVEMENT MARKERS
633 0016	700	EACH	TEMPORARY LANE LINE MARKERS (YELLOW)
633 0020	700	EACH	TEMPORARY LANE LINE MARKERS (WHITE)
634 2016	90	SQM	PERMANENT PAVEMENT MARKING FILM (TYPE 1) (VARIES)
~~634 2056~~	~~850~~	~~LINM~~	~~PERMANENT PAVEMENT MARKING FILM (TYPE 1) (600-MM SOLID WHITE)~~
634 2150	850	linM	Linear METER Permanent Paving MARKing Film (Type II)
634 2165	60	LINM	PERMANENT PAVEMENT MARKING FILM (TYPE 2) (SOLID YELLOW)
634 2173	260	LINM	PERMANENT PAVEMENT MARKING FILM (TYPE 2) (SOLID WHITE)
635 2004	20	SQM	TYPE 1 TEMPORARY STRIPING TAPE (VARIES)
635 2005	1,950	LINM	TYPE 1 TEMPORARY STRIPING TAPE (DOUBLE SOLID YELLOW)
635 2008	2,290	LINM	TYPE 1 TEMPORARY STRIPING TAPE (SOLID)
635 2010	990	LINM	TYPE 1 TEMPORARY STRIPING TAPE (BROKEN)
635 2060	100	LINM	TYPE 1 TEMPORARY STRIPING TAPE (300-MM WIDTH DOTTED)
637 0000	FA	---	TEMPORARY POLLUTION CONTROL
637 0090			Dust Control
639 2097	24	LINM	750-MM STEEL PIPE
639 2088	20	linm	450 mm Steel pipe
650 2084	21	LINM	200-MM WATER PIPE
650 2098	22	LINM	400-MM WATER PIPE

FED. REG. NO.	RD. NO.	STATE
9		NEVADA

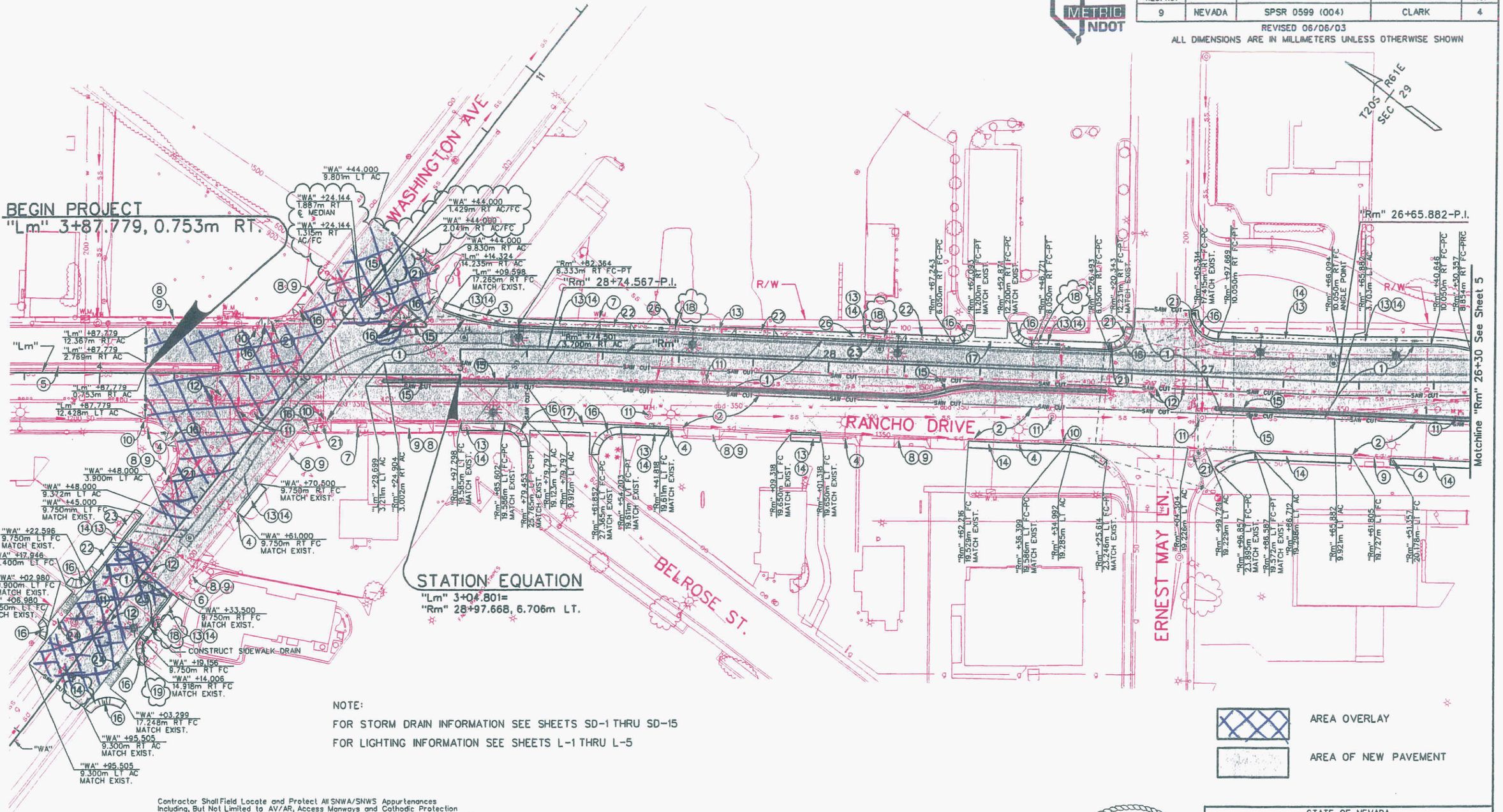
PROJECT NO.	COUNTY	SHEET NO.
SPSR-0599(004)	CLARK	3K

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	4

REVISED 06/06/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

METRIC NDOT



NOTE:

FOR STORM DRAIN INFORMATION SEE SHEETS SD-1 THRU SD-15

FOR LIGHTING INFORMATION SEE SHEETS L-1 THRU L-5

AREA OVERLAY

AREA OF NEW PAVEMENT

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA DATE

LVVWD DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

CONSTRUCTION PLAN

VTN nevada
© CONSULTING ENGINEERS © PLANNERS © LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	JPL, LW
DRAWN BY	WRM, CH
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	4A

REVISED 06/06/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	CONSTRUCT PAVEMENT SECTION No. 1 (SEE TYPICAL SECTIONS)	
②	CONSTRUCT 70mm MILL & OVERLAY (SEE TYPICAL SECTIONS)	
③	PROTECT IN PLACE (TRAFFIC SIGNAL CABINET)	"Rm" 28+91.000, 9.000m RT.
④	PROTECT IN PLACE (STREET LIGHT)	"Lm" 3+87.126, 14.890m LT. "Rm" 28+41.138, 20.157m LT. "Rm" 27+94.660, 20.206m LT. "Rm" 27+48.684, 20.139m LT. "Rm" 26+51.161, 20.771m LT.
⑤	PROTECT IN PLACE (MEDIAN)	"Lm" 3+68.558, 1.000m RT. TO "Lm" 3+87.769, 1.000m RT. "WA" 10+21.145, 2.000m RT. TO "WA" 10+43.891, 2.000m RT.
⑥	PROTECT IN PLACE (FIRE HYDRANT)	"WA" 9+34.396, 11.037m RT.
⑦	PROTECT IN PLACE (WATER METER)	"Rm" 28+61.240, 8.507m RT. "LM" 3+31.454, 13.982 LT.
⑧	PROTECT IN PLACE (CURB & GUTTER)	"Lm" 3+87.779, 12.428m LT. TO "WA" 9+45.000, 9.750m LT. "Lm" 3+87.779, 12.367m RT. TO "WA" 10+44.000, 9.801m LT. "WA" 9+33.500, 9.750m RT. TO "WA" 9+61.000, 9.750m RT. "WA" 9+70.500, 9.750m RT. TO "Rm" 27+97.298, 19.585m LT. "WA" 10+44.000, 9.830m RT. TO "Lm" 3+09.598, 17.265m RT. "Rm" 28+41.818, 19.611m LT. TO "Rm" 28+09.318, 19.650m LT. "Rm" 28+01.318, 19.650m LT. TO "Rm" 26+30.000, 21.750m LT.
⑨	PROTECT IN PLACE (SIDEWALK)	"Lm" 3+87.779, 12.428m LT. TO "WA" 9+45.000, 9.750m LT. "Lm" 3+87.779, 12.367m RT. TO "WA" 10+44.000, 9.801m LT. "WA" 9+33.500, 9.750m RT. TO "WA" 9+61.000, 9.750m RT. "WA" 9+70.500, 9.750m RT. TO "Rm" 27+97.298, 19.585m LT. "WA" 10+44.000, 9.830m RT. TO "Lm" 3+09.598, 17.265m RT. "Rm" 28+41.818, 19.611m LT. TO "Rm" 28+09.318, 19.318m LT. "Rm" 28+01.318, 19.650m LT. TO "Rm" 27+62.216, 19.529m LT. "Rm" 26+61.805, 19.727m LT. "Rm" 26+51.357, 20.178m LT.
⑩	PROTECT IN PLACE (DROP INLET)	"Lm" 3+58.663, 12.745m RT. "Lm" 3+40.547, 12.998m LT. "Lm" 3+87.779, 12.237m LT. "Rm" 27+37.242, 19.644m LT.
⑪	ADJUST TO GRADE (CLV SEWER MANHOLE)	"WA" 9+11.663, 6.328m LT. "Lm" 3+62.803, 10.156m LT. "Lm" 3+58.726, 10.411m LT. "Rm" 28+47.032, 16.246m LT. "Rm" 27+40.507, 12.326m LT.
⑪	ADJUST TO GRADE (CLV SEWER MANHOLE)	"Rm" 27+00.910, 10.848m LT. "Rm" 26+33.970, 9.767m LT. "Rm" 28+32.370, 6.593m LT.
⑫	ADJUST TO GRADE PER UDACS, 2nd EDITION, PLATE 8 (LVVWD WATER VALVE)	"WA" 9+16.499, 0.913m RT. "WA" 9+34.519, 1.663m RT. "Lm" 3+68.793, 6.494m LT. "Lm" 3+69.787, 7.765m LT. "Rm" 27+06.289, 2.203m LT. "Rm" 27+13.985, 2.851m LT. "Rm" 27+14.611, 3.391m LT.
⑬	CONSTRUCT TYPE 5 CURB & GUTTER (SEE SHEETS 8 & 9)	"WA" 9+22.596, 9.750m LT. TO "WA" 9+45.000, 9.750m LT. "WA" 9+19.156, 9.750m RT. TO "WA" 9+33.500, 9.750m RT. "WA" 9+61.000, 9.750m RT. TO "WA" 9+70.500, 9.750m RT. "Lm" 3+09.598, 17.265m RT. TO "Rm" 27+67.243, 6.050m RT. "Rm" 27+46.721, 6.050m RT. TO "Rm" 27+20.343, 12.231m RT. "Rm" 27+05.314, 17.415m RT. TO "Rm" 26+30.000, 8.854m RT. "Rm" 28+97.298, 19.585m LT. TO "Rm" 28+85.602, 19.586m LT. "Rm" 28+54.203, 19.611m LT. TO "Rm" 28+41.818, 19.611m LT. "Rm" 28+09.318, 19.650m LT. TO "Rm" 28+01.318, 19.650m LT.
⑭	CONSTRUCT 1.83m SIDEWALK	"WA" 9+17.946, 14.400m LT. TO "WA" 9+45.000, 9.750m LT. "WA" 9+14.006, 14.918m RT. TO "WA" 9+33.500, 9.750m RT. "WA" 9+61.000, 9.750m RT. TO "WA" 9+70.500, 9.750m RT. "Lm" 3+09.598, 17.265m RT. TO "Rm" 27+62.093, 11.200m RT. "Rm" 28+97.298, 19.585m LT. TO "Rm" 28+79.453, 25.765m LT. "Rm" 28+61.852, 27.365m LT. TO "Rm" 28+41.818, 19.611m LT. "Rm" 28+09.318, 19.650m LT. TO "Rm" 28+01.318, 19.650m LT. "Rm" 27+62.216, 19.529m LT. TO "Rm" 27+25.614, 23.246m LT. "Rm" 27+52.871, 12.200m RT. TO "Rm" 27+20.343, 12.231m RT. "Rm" 27+05.314, 17.514m RT. TO "Rm" 26+30.000, 8.854m RT. "Rm" 26+96.857, 23.895m LT. TO "Rm" 26+61.805, 19.727m LT. "Rm" 26+51.357, 20.178m LT. TO "Rm" 26+30.000, 21.250m LT.
⑮	CONSTRUCT TYPE B GLUE DOWN MEDIAN CURB (SEE SHEETS 7 & 14)	"WA" 8+95.505, 9.300m RT. TO "WA" 9+03.299, 17.248m RT. "Lm" 3+25.900, 1.800m LT. TO "Rm" 27+25.991, 4.900m LT. "Rm" 26+98.330, 8.500m LT. TO "Rm" 26+30.000, 7.000m LT. "WA" 10+24.114, 1.315m RT. TO "WA" 10+44.000, 1.429m RT. "Lm" 3+23.893, 13.467m RT. TO "Lm" 3+14.337, 12.500m RT.
⑯	CONSTRUCT CURB RAMP (SEE SHEETS 11-13)	"Lm" 3+80.045, 17.382m LT.(TYPE D, ALT. 2) "Lm" 3+44.268, 13.648m LT.(TYPE D, ALT. 2) "Lm" 3+56.229, 12.863m RT.(TYPE D, ALT. 2) "Lm" 3+47.078, 16.713m RT.(TYPE D, ALT. 2) "Lm" 3+22.360, 14.962m RT.(ISLAND) "Lm" 3+17.006, 15.525m RT.(ISLAND) "Lm" 3+12.400, 20.765m RT.(TYPE D, ALT. 2) "Rm" 27+63.601, 7.558m RT.(TYPE B) "Rm" 27+51.070, 7.851m RT.(TYPE B) "Rm" 27+22.133, 7.862m RT.(TYPE B) "Rm" 27+02.977, 12.191m RT.(TYPE B) "Rm" 28+81.244, 21.398m LT.(TYPE B) "Rm" 28+59.649, 21.888m LT.(TYPE B) "WA" 9+19.308, 11.112m LT.(TYPE B) "WA" 9+15.508, 11.265m RT.(TYPE B) "WA" 9+05.808, 10.922m LT.(TYPE B) "WA" 9+00.914, 11.929m RT.(TYPE B)
⑰	CONSTRUCT COMMERCIAL DRIVEWAY	"Rm" 27+67.243, 6.200m RT. TO "Rm" 27+46.721, 6.200m RT. "Rm" 28+85.602, 19.736m LT. TO "Rm" 28+54.305, 19.761m LT.
⑱	ADJUST TO GRADE PER UDACS, 2nd EDITION, PLATE 1 (LVVWD WATER METER)	"WA" 9+25.385, 10.487m RT "RM" 28+41.620, 6.600m RT "RM" 27+84.519, 6.609m RT "RM" 27+46.128, 6.705m RT
⑲	ADJUST TO GRADE (SNWA TEST STA.)	"WA" 9+18.601, 11.029m RT
㉑	PROTECT IN PLACE (TRAFFIC SIGNAL)	"WA" 9+55.492, 10.290m LT. "Lm" 3+54.466, 13.822m RT. "Lm" 3+11.020, 28.630m RT. "Lm" 3+40.608, 13.981m LT. "Rm" 27+26.010, 8.067m RT. "Rm" 27+22.442, 9.689m RT. "Rm" 27+03.658, 15.233m RT. "Rm" 27+02.676, 21.066m LT.
㉒	CONSTRUCT CONCRETE DRIVEWAY	"WA" 9+30.000, 9.900m LT. (W=8.000m) "Rm" 28+57.000, 6.200m RT. (W=8.000m) "Rm" 28+20.000, 6.200m RT. (W=10.000m) "Rm" 27+76.000, 6.200m RT. (W=8.000m)
㉓	REMOVE & RESET BUS STOP PAD, EQUIPMENT & APPURTENANCES	"WA" 9+40.000, 10.500m LT. "Rm" 27+87.500, 7.000m RT.
㉔	CONSTRUCT COMMERCIAL DRIVEWAY WITH SPECIAL TRENCH DRAIN (SEE SHEET SD-13 & SD-14)	
㉕⑳		NOTE NOT USED
㉖	ADJUST TO GRADE (CLV SEWER CLEANOUT)	"Rm" 28+41.650, 6.500m RT. "Rm" 27+97.000, 7.000m RT.

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

CONSTRUCTION PLAN

VTN nevada
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2727 S. RAINBOW BLVD.
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DESIGN BY	JPL, LW
DRAWN BY	WBM, CH
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	5

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

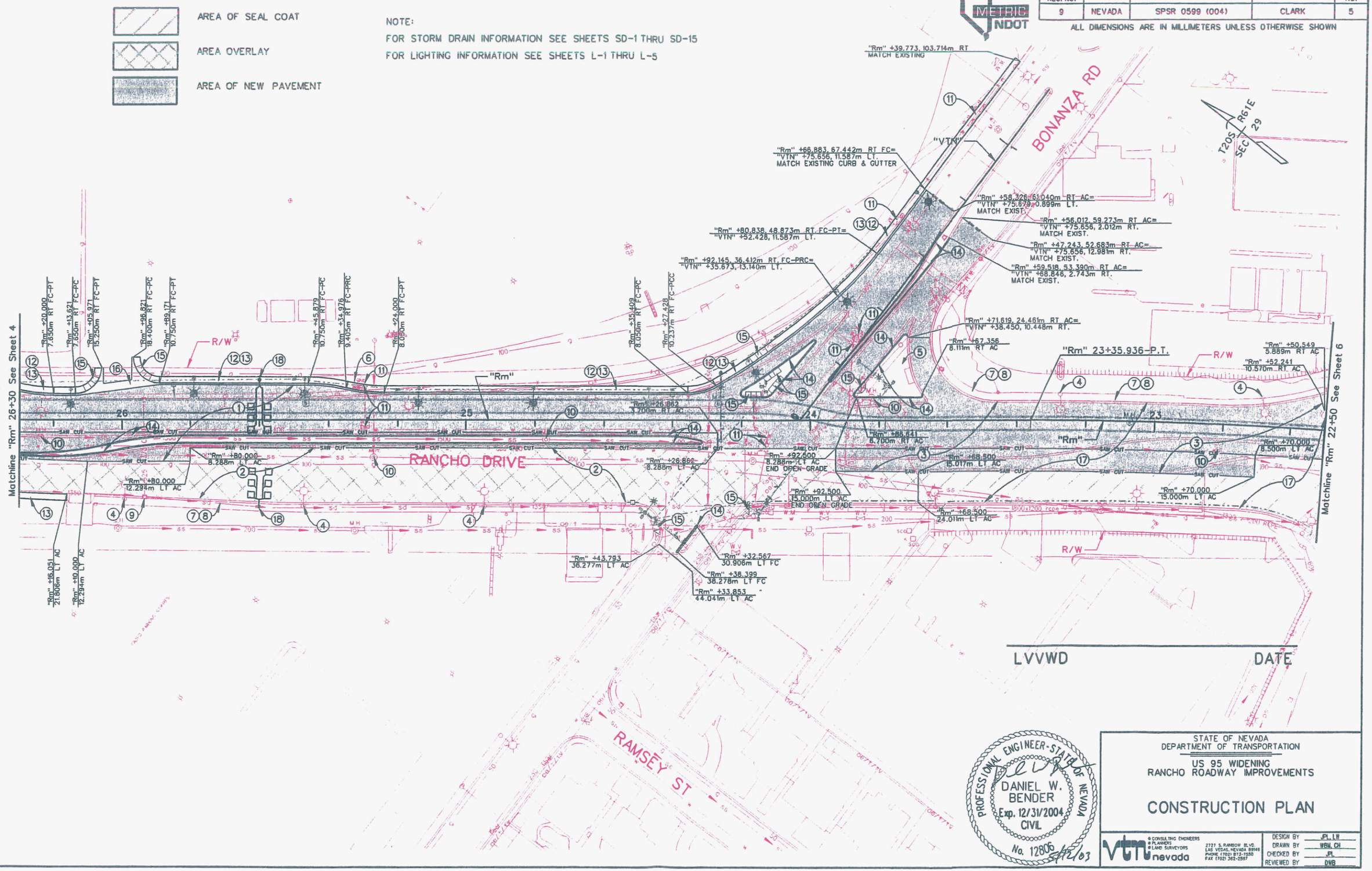
METRIC NDOT

AREA OF SEAL COAT

AREA OVERLAY

AREA OF NEW PAVEMENT

NOTE:
FOR STORM DRAIN INFORMATION SEE SHEETS SD-1 THRU SD-15
FOR LIGHTING INFORMATION SEE SHEETS L-1 THRU L-5



LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	5A

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	CONSTRUCT PAVEMENT SECTION No. 1 (SEE TYPICAL SECTIONS)	
②	CONSTRUCT 70mm MILL & OVERLAY (SEE TYPICAL SECTIONS)	
③	CONSTRUCT PAVEMENT SECTION No. 2 (SEE TYPICAL SECTIONS)	
④	PROTECT IN PLACE (STREET LIGHT)	"Rm" 23+27.464, 8.042m RT. "Rm" 22+68.897, 8.771m LT. "Rm" 25+99.216, 22.998m LT. "Rm" 25+47.278, 24.988m LT. "Rm" 24+94.589, 25.019m LT.
⑤	PROTECT IN PLACE (MEDIAN)	"Rm" 23+67.356, 8.111m RT. TO "Rm" 23+71.619, 24.461m RT.
⑥	PROTECT IN PLACE (FIRE HYDRANT)	"Rm" 25+32.621, 10.373m RT.
⑦	PROTECT IN PLACE (CURB & GUTTER)	"Rm" 26+30.000, 21.250m LT. TO "Rm" 24+43.793, 36.277m LT. "Rm" 23+47.243, 52.685m RT. TO "Rm" 22+52.241, 10.570m RT.
⑧	PROTECT IN PLACE (SIDEWALK)	"Rm" 26+16.051, 21.806m LT. TO "Rm" 24+44.296, 28.800m LT. "Rm" 23+60.199, 11.697m RT. TO "Rm" 22+52.241, 10.570m RT.
⑨	PROTECT IN PLACE (DROP INLET)	"Rm" 25+93.301, 22.745m LT.
⑩	ADJUST TO GRADE (CLV SEWER MANHOLE)	"Rm" 26+23.791, 4.992m LT. "Rm" 24+76.879, 5.564m RT. "Rm" 23+82.288, 6.980M RT. "Rm" 22+81.174, 7.436m LT. "Rm" 25+27.038, 10.833m LT.
⑪	ADJUST TO GRADE (LVVWD WATER VALVE)	"Rm" 25+29.979, 10.380m RT. "Rm" 25+29.644, 10.828m RT. "Rm" 25+29.476, 1.887m LT. "Rm" 23+87.832, 22.567m RT. "Rm" 23+86.153, 25.536m RT. "Rm" 23+75.192, 58.530m RT. "Rm" 24+12.829, 7.787m LT. "Rm" 24+12.569, 5.077m LT.
⑫	CONSTRUCT TYPE 5 CURB & GUTTER (SEE SHEETS 8 & 9)	"Rm" 26+30.357, 8.854m RT. TO "Rm" 26+13.621, 7.650m RT. "Rm" 25+89.171, 10.750m RT. TO "Rm" 23+66.883, 67.442m RT.
⑬	CONSTRUCT 1.83m SIDEWALK	"Rm" 26+30.000, 21.250m LT. TO "Rm" 26+16.051, 21.806m LT. "Rm" 26+30.000, 8.854m RT. TO "Rm" 26+05.971, 15.250m RT. "Rm" 25+96.821, 18.400m RT. TO "Rm" 23+39.773, 103.714m RT.
⑭	CONSTRUCT TYPE B GLUE DOWN MEDIAN CURB (SEE SHEETS 7 & 14)	"Rm" 26+30.000, 7.000m LT. TO "Rm" 24+31.622, 5.904m LT. "Rm" 24+19.905, 8.916m RT. TO "Rm" 23+99.330, 23.590m RT. "Rm" 23+94.579, 12.292m RT. TO "Rm" 23+62.282, 55.238m RT. "Rm" 23+87.332, 8.177m RT. TO "Rm" 23+71.619, 24.461m RT. "Rm" 24+32.567, 30.906m LT. TO "Rm" 24+38.399, 38.278m LT.
⑮	CONSTRUCT CURB RAMP (SEE SHEETS 11 & 13)	"Rm" 26+08.230, 9.873m RT.(TYPE B) "Rm" 25+94.581, 12.991m RT.(TYPE B) "Rm" 24+16.618, 7.000m RT.(ISLAND) "Rm" 24+14.582, 18.488m RT.(TYPE B, MIDBLOCK) "Rm" 24+11.532, 14.039m RT(ISLAND). "Rm" 24+09.364, 10.188m RT.(ISLAND) "Rm" 23+85.660, 9.712m RT.(ISLAND) "Rm" 24+43.660, 31.211m LT.(TYPE D, ALT. 2) "Rm" 24+19.540, 26.965m LT.(TYPE D, ALT. 2)
⑯	CONSTRUCT COMMERCIAL DRIVEWAY	"Rm" 26+13.621, 7.800m RT. TO "Rm" 25+89.171, 10.900m RT.
⑰	APPLY SEAL COAT (WITH SAND BLOTTER)	
⑱	INSTALL SPEED LOOP DETECTORS	"Rm" 25+60.000, RT. "Rm" 25+60.000, LT.

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

CONSTRUCTION PLAN

VTN nevada
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PLANNERS
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CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	6

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① CONSTRUCT PAVEMENT SECTION No. 2
(SEE TYPICAL SECTIONS)

② PROTECT IN PLACE
(CURB & GUTTER)
"Rm" 22+50.000, 3.600m RT. TO "Rm" 22+18.682, 3.548m RT.
"Rm" 22+08.319, 3.677m RT. TO "Rm" 21+28.513, 3.819m RT.
"Rm" 21+11.040, 3.606m RT. TO "Rm" 21+00.000, 3.681m RT.

③ PROTECT IN PLACE
(SIDEWALK)
"Rm" 22+50.000, 3.600m RT. TO "Rm" 22+18.682, 3.548m RT.
"Rm" 22+08.319, 3.677m RT. TO "Rm" 21+28.513, 3.819m RT.
"Rm" 21+11.040, 3.606m RT. TO "Rm" 21+00.000, 3.681m RT.

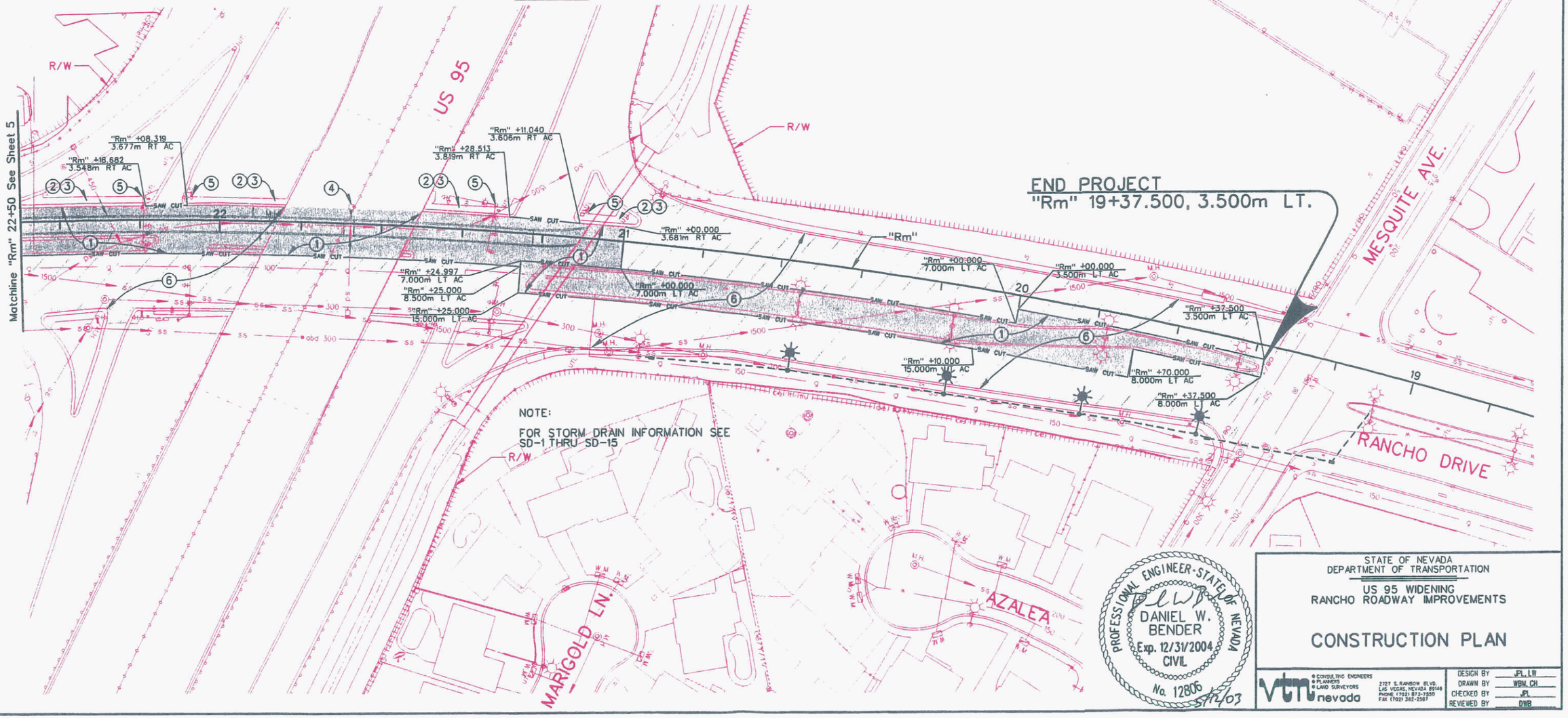
④ PROTECT IN PLACE
(DROP INLET)
"Rm" 21+67.715, 4.772m RT.

⑤ PROTECT IN PLACE
(TRAFFIC SIGNAL)
"Rm" 22+19.012, 5.857m RT.
"Rm" 22+07.264, 5.725m RT.
"Rm" 21+32.185, 6.718m RT.
"Rm" 21+09.367, 6.383m RT.

⑥ APPLY SEAL COAT
(WITH SAND BLOTTER)

AREA OF NEW PAVEMENT

AREA OF SEAL COAT



PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/14/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

CONSTRUCTION PLAN

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CHECKED BY	JPL
REVIEWED BY	DWB

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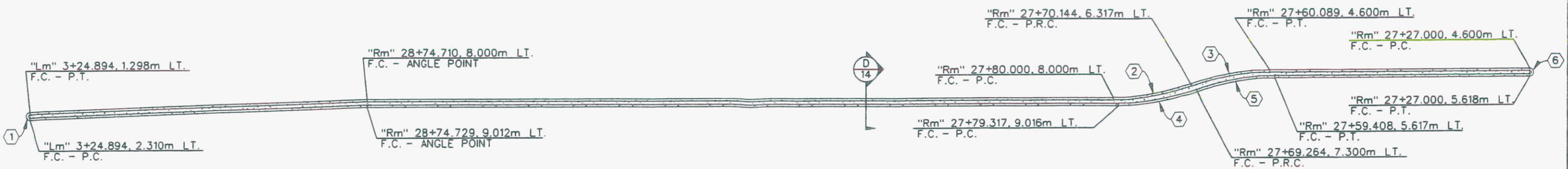
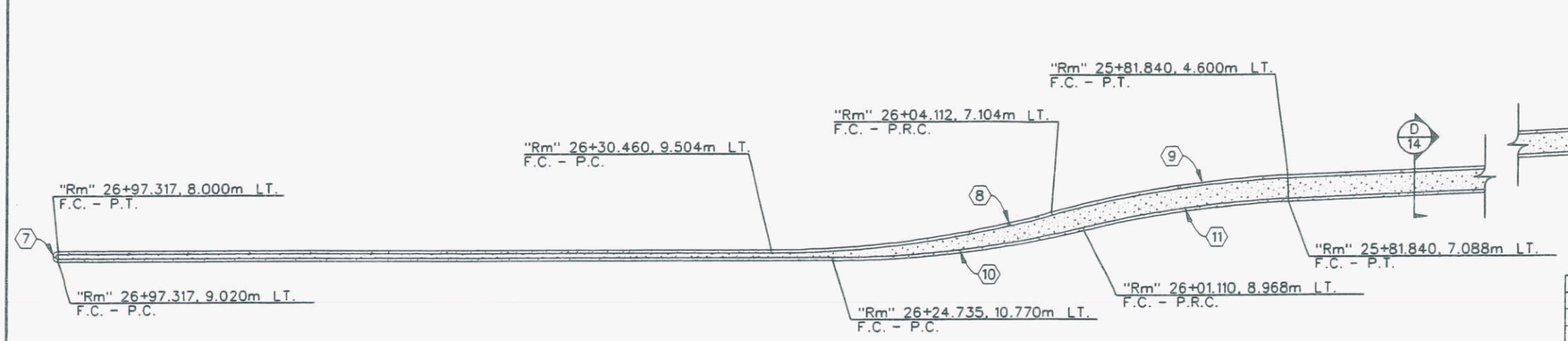
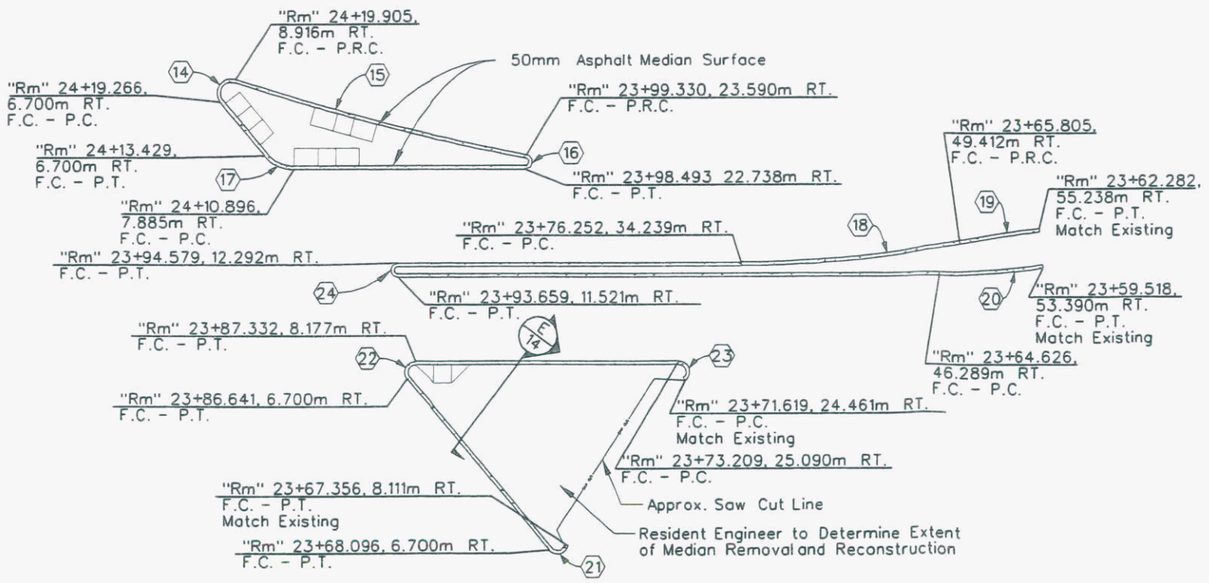
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	7

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN







Median Face of Curb Curve Table

Curve #	Radius	Length	Tangent	Delta
1	0.506m	1.588m	–	180° 00'00"
2	29.700m	10.046m	5.072m	19° 22'51"
3	30.300m	10.249m	5.174m	19° 22'51"
4	30.300m	10.248m	5.173m	19° 22'42"
5	29.700m	10.046m	5.072m	19° 22'51"
6	0.509m	1.599m	–	180° 00'00"
7	0.510m	1.601m	–	180° 00'00"
8	99.700m	26.535m	13.346m	15° 14'57"
9	100.300m	22.459m	11.276m	12° 49'45"
10	100.300m	23.749m	11.930m	13° 33'59"
11	99.700m	19.392m	9.727m	11° 08'40"
12	50.300m	11.477m	5.764m	13° 04'25"
13	0.600m	1.747m	5.236m	166° 55'35"
14	1.200m	1.548m	4.161m	147° 49'24"
15	218.200m	25.286m	12.658m	6° 38'23"
16	0.600m	1.765m	6.054m	168° 40'49"
17	3.300m	2.887m	1.544m	50° 08'10"
18	99.400m	18.449m	9.251m	10° 38'03"
19	100.600m	6.810m	3.406m	3° 52'42"
20	60.600m	8.754m	4.385m	8° 16'37"
21	0.900m	1.957m	1.715m	124° 37'28"
22	0.900m	2.039m	1.924m	129° 51'50"
23	0.900m	2.252m	2.724m	143° 25'38"
24	0.600m	1.882m	–	180° 00'00"

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/07

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

MEDIAN ISLAND GEOMETRICS

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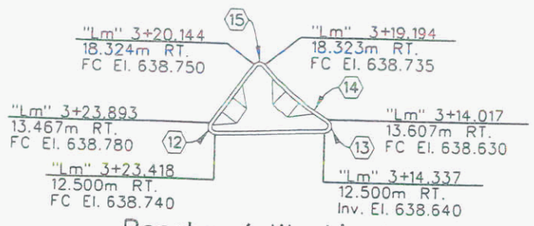
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	8

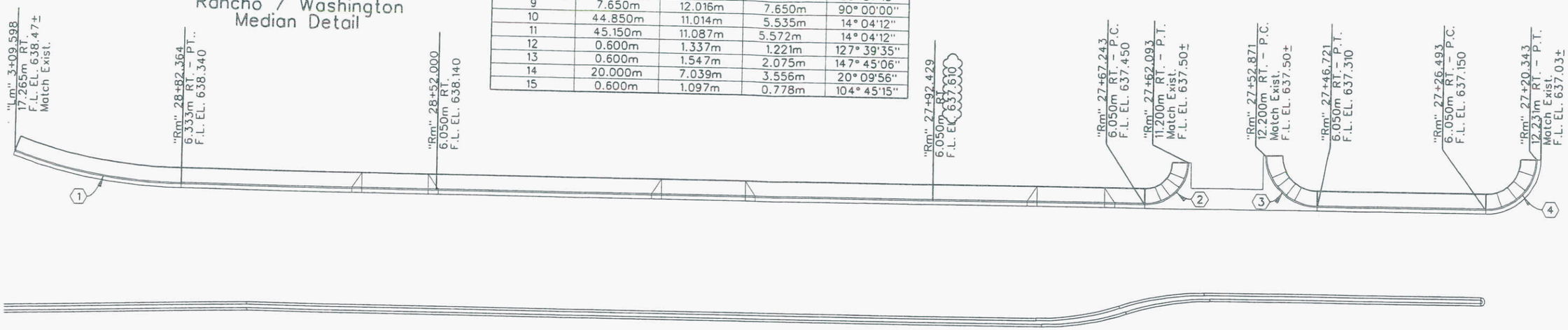
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

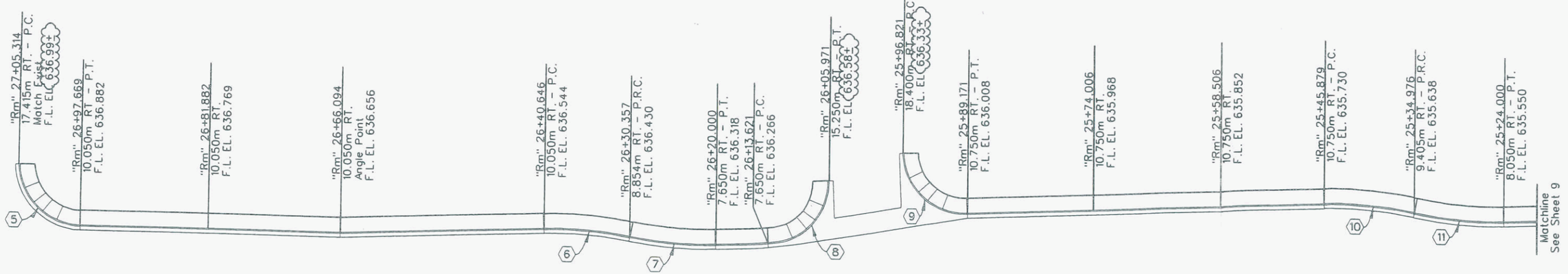


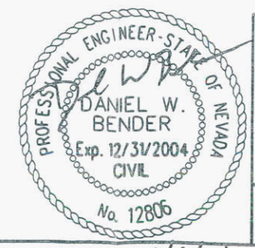
Rancho / Washington Median Detail

Face of Curb Curve Table

Curve #	Radius	Length	Tangent	Delta
1	60.150m	20.639m	10.422m	19° 39'35"
2	5.150m	8.089m	5.150m	90° 00'00"
3	6.150m	9.660m	6.150m	90° 00'00"
4	6.152m	9.695m	6.184m	90° 17'44"
5	7.650m	11.731m	7.370m	87° 51'59"
6	44.850m	10.380m	5.214m	13° 15'41"
7	45.150m	10.450m	5.249m	13° 15'41"
8	7.650m	11.966m	7.600m	89° 37'18"
9	7.650m	12.016m	7.650m	90° 00'00"
10	44.850m	11.014m	5.535m	14° 04'12"
11	45.150m	11.087m	5.572m	14° 04'12"
12	0.600m	1.337m	1.221m	127° 39'35"
13	0.600m	1.547m	2.075m	147° 45'06"
14	20.000m	7.039m	3.556m	20° 09'56"
15	0.600m	1.097m	0.778m	104° 45'15"







1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

ROADWAY DETAILS

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	9

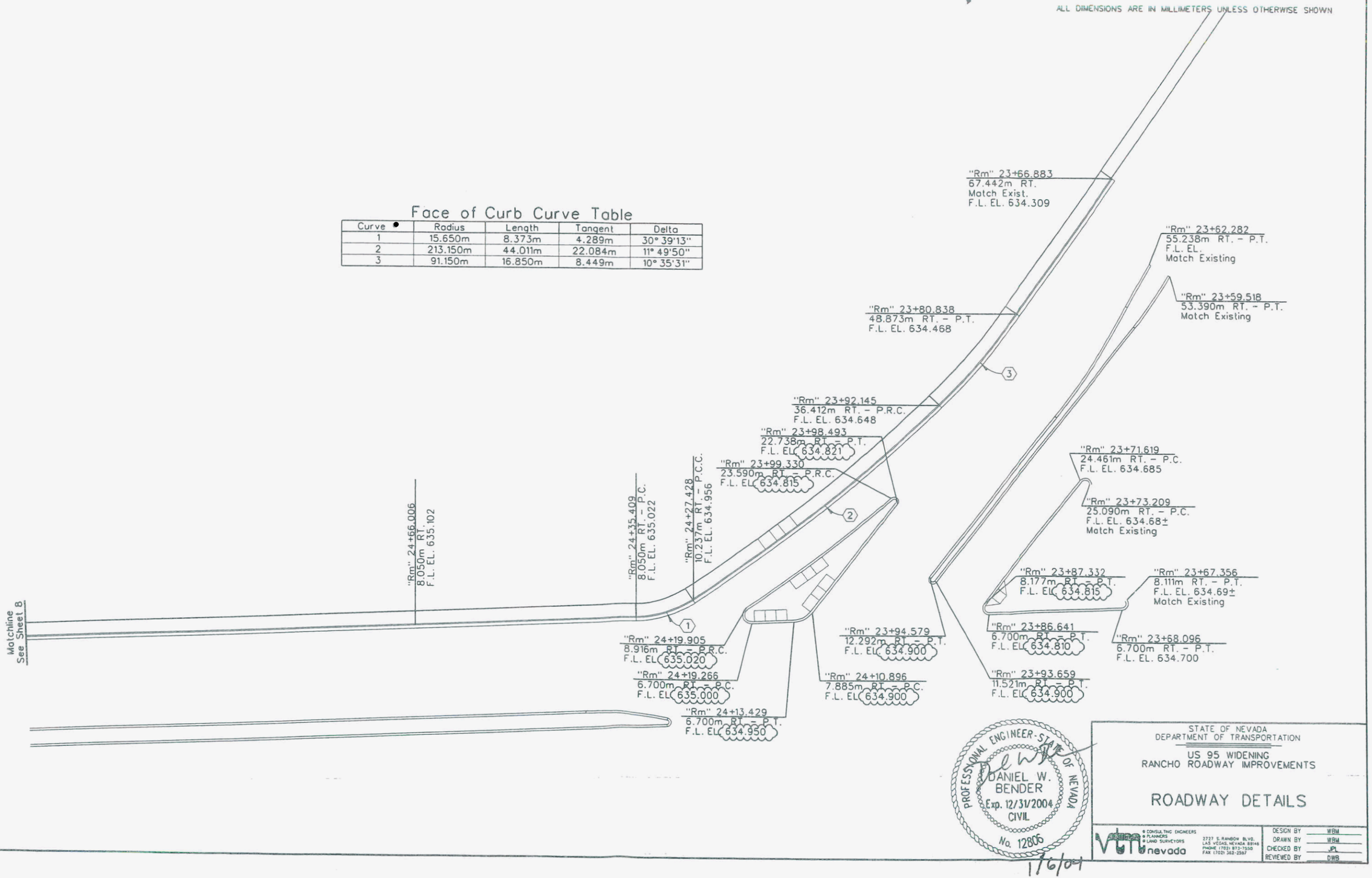
REVISED 01/06/04

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

Face of Curb Curve Table

Curve	Radius	Length	Tangent	Delta
1	15.650m	8.373m	4.289m	30° 39'13"
2	213.150m	44.011m	22.084m	11° 49'50"
3	91.150m	16.850m	8.449m	10° 35'31"



PROFESSIONAL ENGINEER-STATE OF NEVADA
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1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

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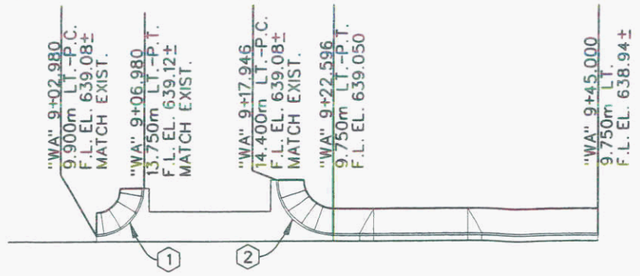
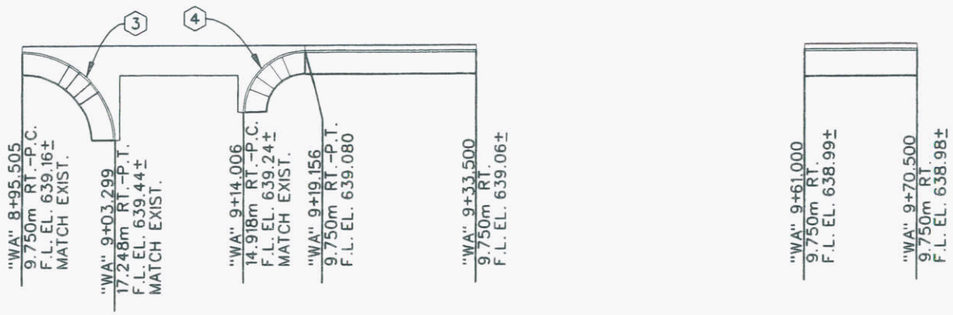
9	NEVADA	SPSR 0599 (004)	CLARK	10

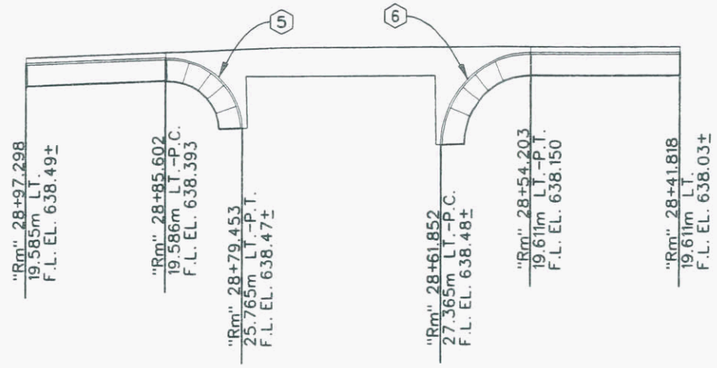
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

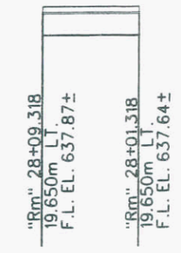


Face of Curb Curve Table

Curve	Radius	Length	Tangent	Delta
1	4.000m	6.283m	4.000m	90° 00'00"
2	4.650m	7.304m	4.650m	89° 59'57"
3	7.798m	11.951m	7.505m	87° 48'21"
4	5.150m	8.107m	5.168m	90° 11'50"
5	6.150m	9.688m	6.179m	90° 15'50"
6	7.650m	12.121m	7.755m	90° 46'57"







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5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

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ROADWAY DETAILS

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9	NEVADA	SPSR 0599 (004)	CLARK	11

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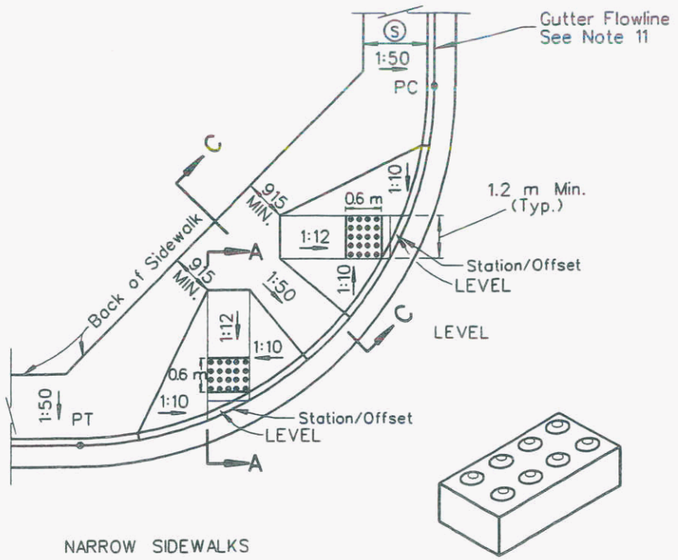
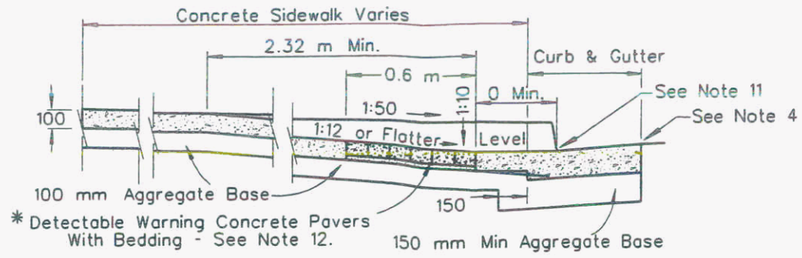


NARROW SIDEWALKS

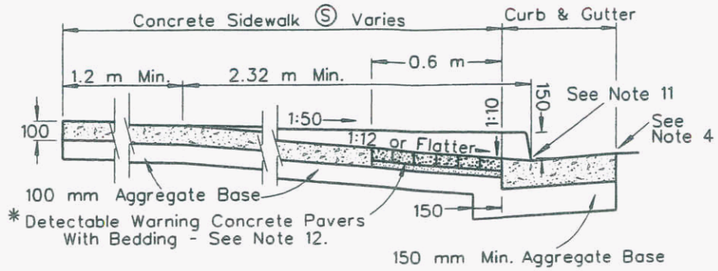
CURB RAMP TYPE A

DETECTABLE WARNING PAVER

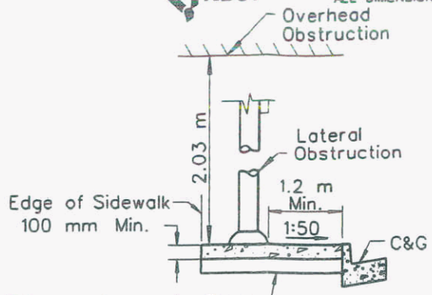
(Nominal 200 x 100)

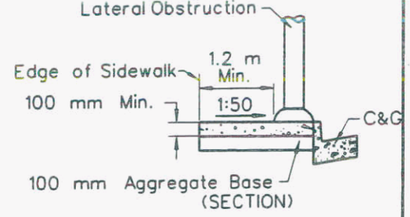


SECTION A-A



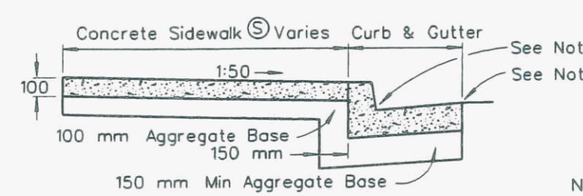
SECTION B-B



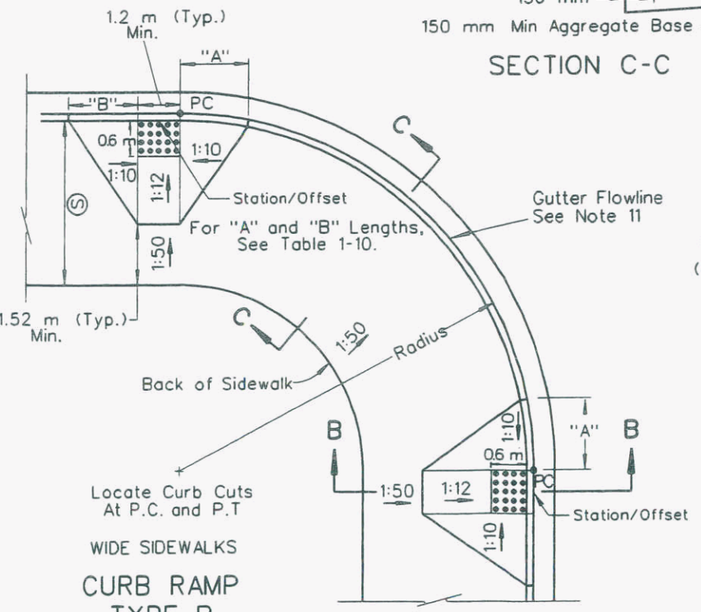


TYPICAL SIDEWALK vs OBSTRUCTION CLEARANCE DETAIL

(See Note 13 - Protruding Objects)



SECTION C-C



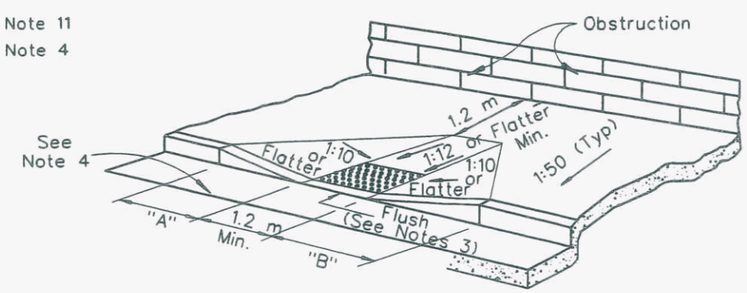
WIDE SIDEWALKS

CURB RAMP TYPE B

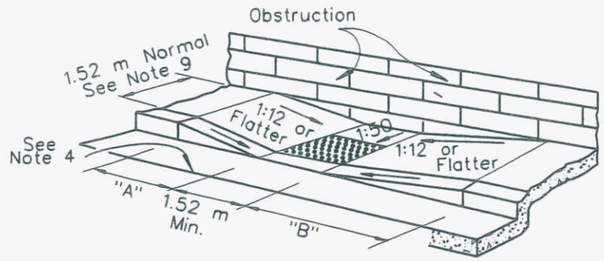
TABLE 1-10

Transition Lengths for 1:10 Side Slopes
(For 1:12 See Table 1-12 Sheet R-5.2.2)

Grade (%) "B" to "A"	"A" (m) Min.	"B" (m) Min.
- 6 to -5.01	1.22	3.81
-5 to -4.01	1.22	3.05
-4 to -3.01	1.22	2.59
-3 to -2.01	1.22	2.29
-2 to -1.01	1.37	1.98
-1 to 1	1.68	1.68
1.01 to 2	1.98	1.37
2.01 to 3	2.29	1.22
3.01 to 4	2.59	1.22
4.01 to 5	3.05	1.22
5.01 to 6	3.81	1.22



MID BLOCK CURB RAMP



MID BLOCK CURB RAMP ALTERNATE

LEGEND

Ⓢ SIDEWALK, 1.52 m NORMAL, SEE NOTE 9

DETECTABLE WARNING PAVERS, SEE NOTE 12.

* ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

GENERAL NOTES:

1. SEE STRUCTURE LIST AND PLAN SHEETS FOR Ⓢ, "A" AND "B".
2. GRATINGS OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP. AND FEATHERED AT 1:12 IN LINE WITH THE CROSSWALK.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE SIDEWALK.
6. CURB RAMP WINGS DO NOT HAVE TO BE WITHIN CROSS-WALK HOWEVER. THE RAMP ITSELF HAS TO BE INSIDE CROSS-WALK.
7. ALL RAMPS SHALL BE 1:12 OR FLATTER.
8. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
9. IF THERE ARE R/W RESTRICTIONS. SIDEWALK WIDTHS CAN BE REDUCED TO 1.2 m WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. IN THIS INSTANCE A 1.52 m X 1.52 m PASSING ZONE IS REQUIRED EVERY 61 m PER ADA APPENDIX C. SECTION 4.3.4.
10. CONCRETE SHALL BE CLASS A OR AA.
11. RAISE GUTTER FLOWLINE 50 mm MAX.. WHEN REQUIRED TO PREVENT PONDING AT THE RAMP AND MAINTAIN POSITIVE DRAINAGE.
12. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.4) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.
13. PROTRUDING OBJECTS MOUNTED ON WALLS OR POSTS THAT HAVE LEADING EDGES 685 mm ABOVE THE SIDEWALK AND BELOW THE STANDARD HEAD ROOM CLEARANCE OF 2032 mm WILL BE LIMITED TO A 100 mm PROTRUSION.

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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
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CURB RAMP DETAILS

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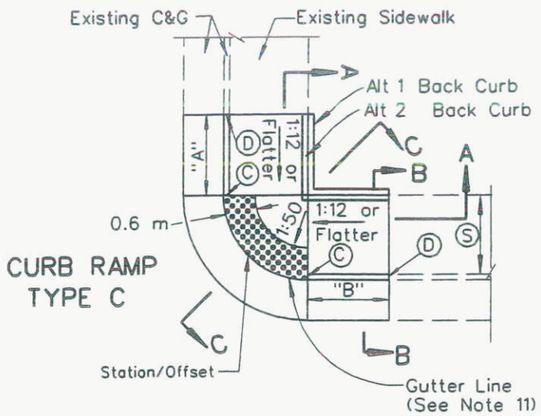
9	NEVADA	SPSR 0599 (004)	CLARK	12

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



CURB RAMP TYPE C

SEE TABLE 1-12
FOR "A and "B" LENGTHS

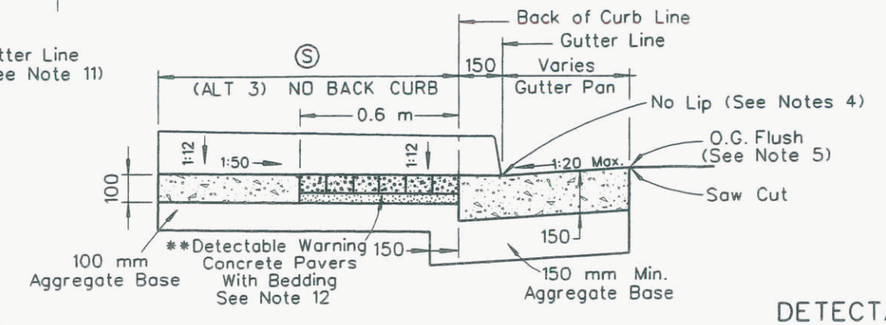
Alt 1: Back Curb Outside Ramp - No R/W Restrictions

Alt 2: Back Curb Inside Ramp - If R/W Restrictions

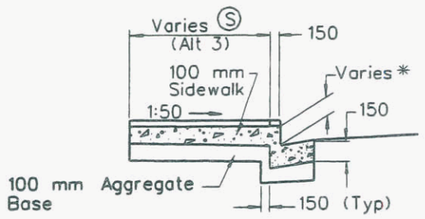
Alt 3: No Back Curb

Grade (%) "B" to "A"	"A" (m) Min.	"B" (m) Min.
-6 to -5.01	1.37	6.55
-5 to -4.01	1.37	4.57
-4 to -3.01	1.37	3.66
-3 to -2.01	1.52	2.90
-2 to -1.01	1.68	2.44
-1 to 1	2.13	2.13
1.01 to 2	2.44	1.68
2.01 to 3	2.90	1.52
3.01 to 4	3.66	1.37
4.01 to 5	4.57	1.37
5.01 to 6	6.55	1.37

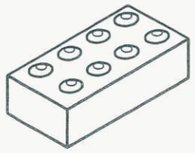
TABLE 1-12
Transition Lengths for 1:12 Side Slopes



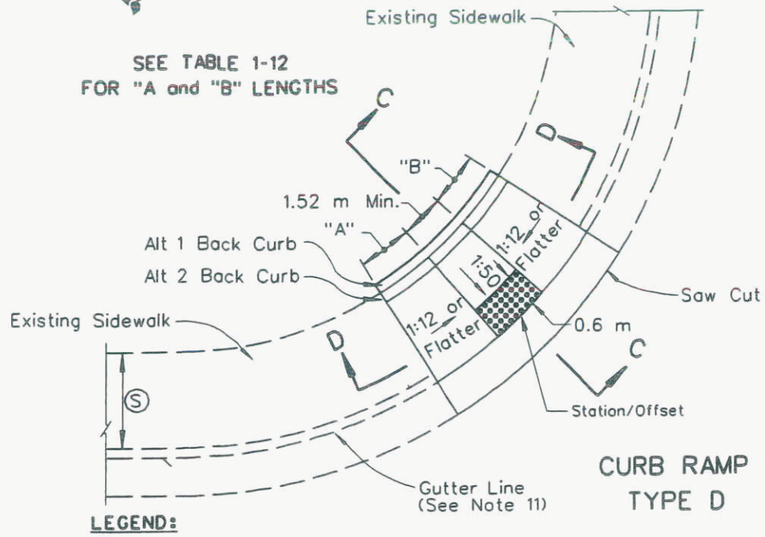
SECTION C-C WITHOUT BACK CURB



SECTION B-B



DETECTABLE WARNING PAVER
(Nominal 200 x 100)



CURB RAMP TYPE D

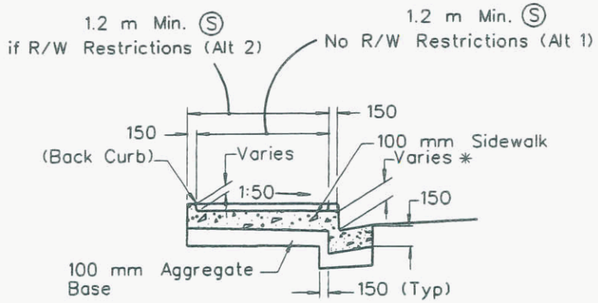
LEGEND:

Ⓢ SIDEWALK, 1.52 m NORMAL, SEE NOTE 9

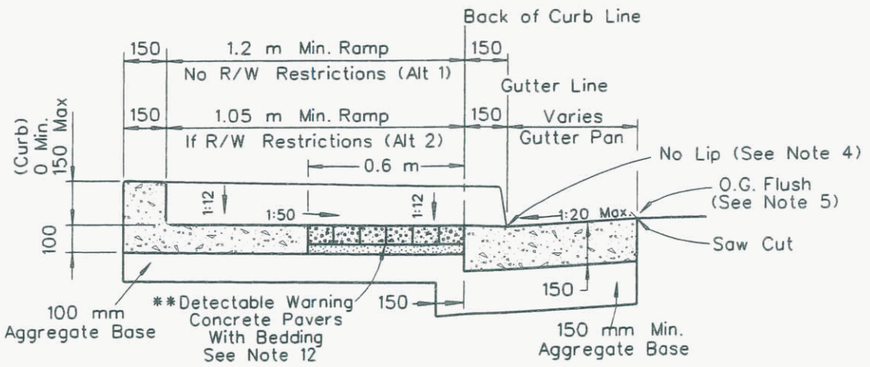
* FROM 0 mm AT Ⓒ TO 150 mm AT Ⓓ

DETECTABLE WARNING PAVER, SEE NOTE 12.

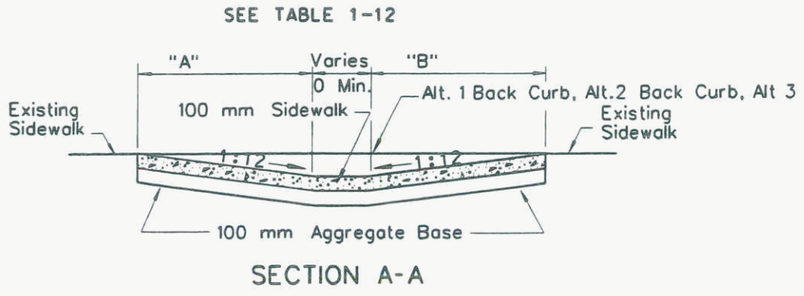
** ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.



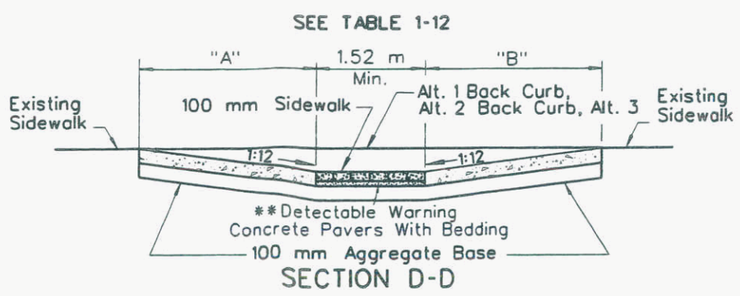
SECTION B-B WITH BACK CURB



SECTION C-C WITH BACK CURB



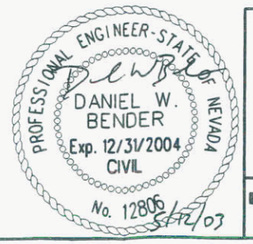
SECTION A-A



SECTION D-D

GENERAL NOTES:

1. IF RIGHT OF WAY IS AVAILABLE, USE TYPE A CURB RAMP.
2. SEE STRUCTURE LIST AND PLAN SHEETS FOR Ⓢ, "A" AND "B".
3. GRATINGS OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN THE AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
4. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN. GRINDING SHALL BE 150 mm MINIMUM PERPENDICULAR TO FLOWLINE FOR RETROFIT.
5. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP. GRINDING WIDTH 225 mm MINIMUM OR 1:12 PLANTMIX BITUMINOUS SURFACE MINIMUM FOR RETROFIT.
6. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE SIDEWALK.
7. ALL RAMPS SHALL BE 1:12 OR FLATTER.
8. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
9. IF THERE ARE R/W RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 1.2 m WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. IN THIS INSTANCES A 1.52 m X 1.52 m PASSING ZONE IS REQUIRED EVERY 61 m PER ADA APPENDIX C, SECTION 4.3.4.
10. CONCRETE SHALL BE CLASS A OR AA.
11. ADJUST FLOWLINE WHEN REQUIRED TO PREVENT PONDING AT THE RAMP AND MAINTAIN POSITIVE DRAINAGE.
12. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.4) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.
13. NO DIRECT PAYMENT FOR NEAT LINE SAW CUT. AN ADDITIONAL 0.3 m OF PAVEMENT MAY BE REMOVED. IF ELECTING TO REMOVE AN ADDITIONAL 0.3 m: MATCH EXISTING STRUCTURAL SECTION WITH PATCH: NO ADJUSTMENT TO THE PLAN QUANTITIES FOR REMOVAL AND PATCHING



STATE OF NEVADA
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CURB RAMP DETAILS

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9	NEVADA	SPSR 0599 (004)	CLARK	13

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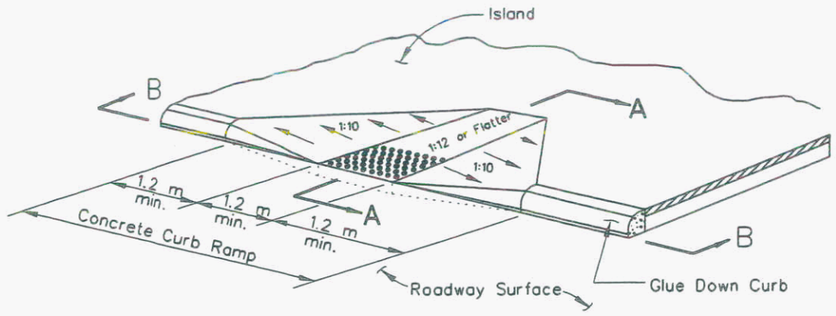
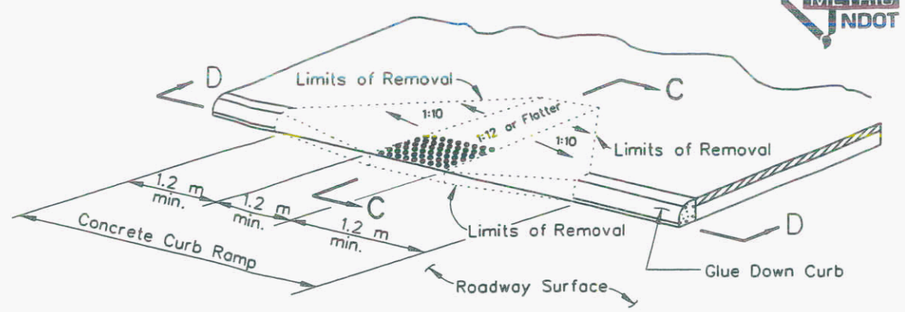
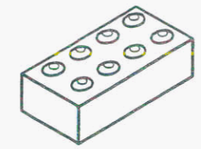


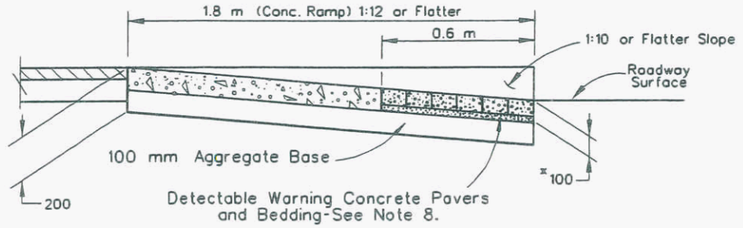
NEW ISLAND



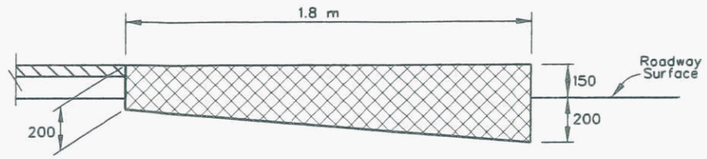
EXISTING ISLAND



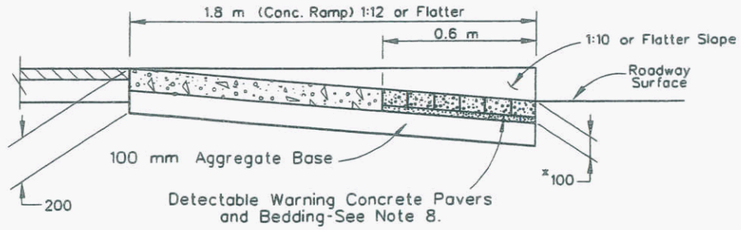
DETECTABLE WARNING PAVER
(Nominal 200 x 100)



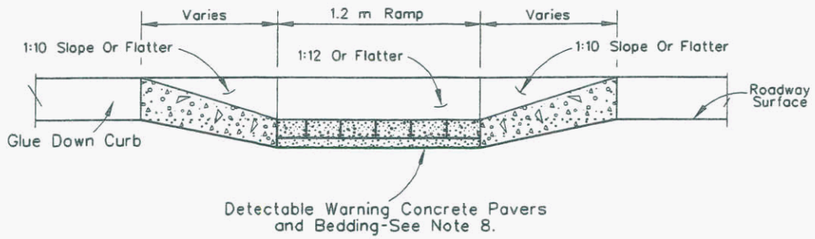
SECTION A-A



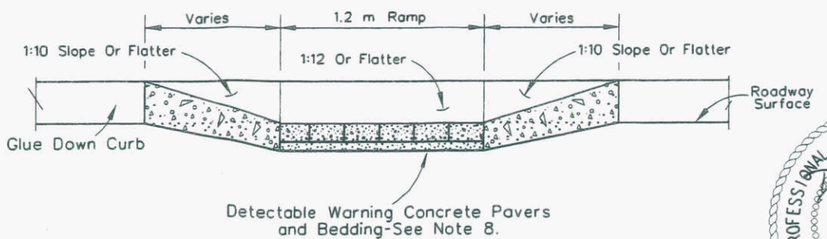
SECTION C-C
REMOVAL IN EXISTING ISLAND



SECTION C-C MODIFIED



SECTION B-B



SECTION D-D

LEGEND

DETECTABLE WARNING PAVERS, SEE NOTE 8.

* ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR SAND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 1:12 OR FLATTER. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
2. GRATING, MANHOLES, VALVE COVERS OR SIMILAR APPURTENANCES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
6. CONCRETE SHALL BE CLASS A OR AA.
7. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
8. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.4) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/07

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

CURB RAMP DETAILS

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	JPL
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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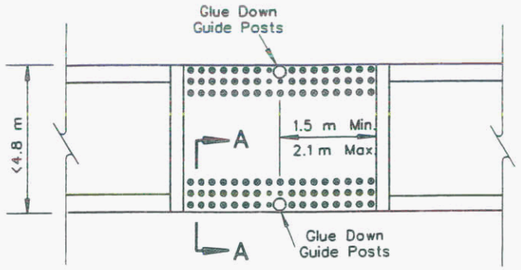
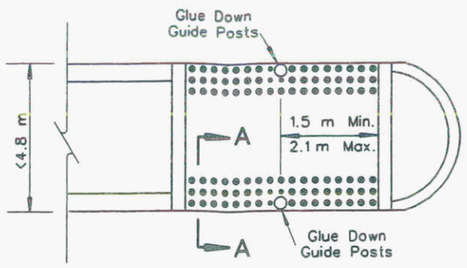
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	14

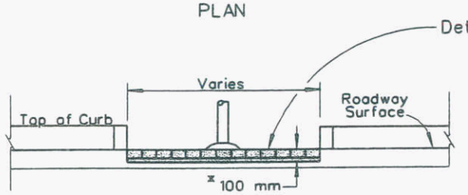
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



PLAN

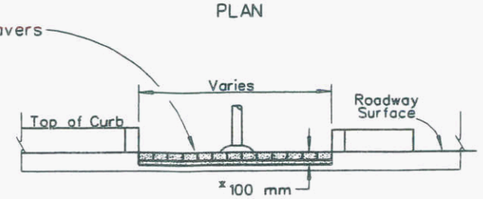


PLAN



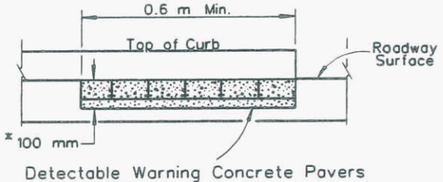
ELEVATION

Type A-At Mid Block

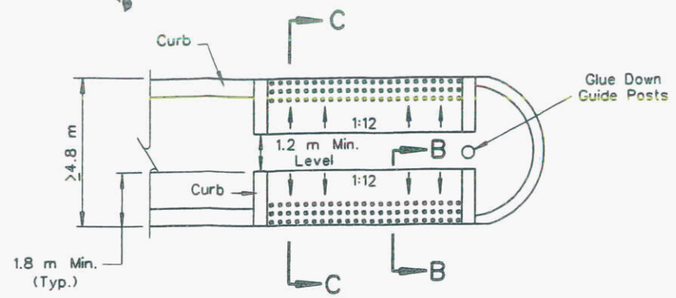


ELEVATION

Type B-At Nose



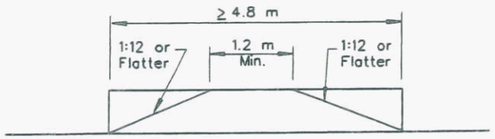
SECTION A-A



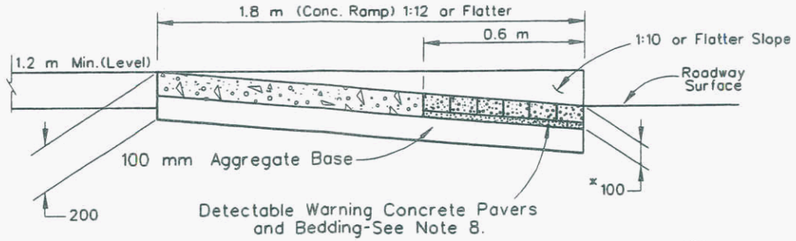
(ELEVATION)

TYPE C

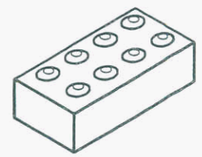
OPTION TO USE TYPE B



SECTION C-C

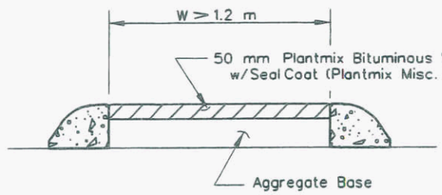


SECTION B-B

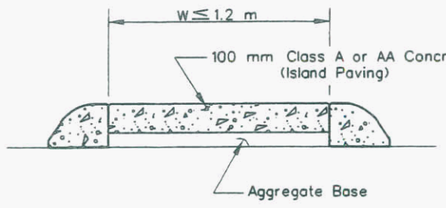


DETECTABLE WARNING PAVER

(Nominal 200 mm x 100 mm)



SECTION E



SECTION D

TYPICAL ISLAND PAVING DETAILS

GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 1:12 OR FLATTER.
2. GRATING, MANHOLES, VALVE COVERS, OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
6. CONCRETE SHALL BE CLASS A OR AA.
7. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
8. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.4) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.

LEGEND:

DETECTABLE WARNING PAVER

* ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

MEDIAN ISLAND DETAILS

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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DESIGN BY	JPL
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CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	15

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

NEW SHEET

"Lm" 3+09.598
17.265m RT.
F.L. EL. 638.47±
Match (EXIST.)

"Rm" 28+82.364
6.333m RT.
F.L. EL. 638.340

"Rm" 28+52.000
6.050m RT.
F.L. EL. 638.140

"Rm" 27+92.429
6.050m RT.
F.L. EL. 637.610

SAW CUT

FC El. 638.750
FC El. 638.735
Lip 638.510
FC El. 638.780
FC El. 638.630
FC El. 638.740
FC El. 638.640
"Lm" 3+23.418
12.500m Rt.
Lip 638.380
Lip 638.180
Lip 637.650

"Lm" 3+56.743
12.348m Rt.
"Lm" 3+35.879
12.442m Rt.
Lip 639.09±
"Lm" 3+67.269
12.307m Rt.
Lip 639.03±
Lip 639.01±
AC 638.930
"Lm" 3+46.293
12.394m Rt.
AC 638.850

FL 639.33±
AC 639.230
FL 639.40±
"Lm" 3+77.504
1.138m Rt.
"Lm" 3+67.228
1.710m Rt.
"Lm" 3+56.689
0.824m Rt.
AC 639.115
"Lm" 3+46.235
0.054m Lt.
AC 639.000
"Lm" 3+35.817
0.929m Lt.
AC 638.947
AC 638.950
"Lm" 3+25.400
1.804m Lt.
"Lm" 3+23.415
1.298m Lt.
AC 638.935
"Lm" 3+24.894
1.298m Lt.
"Lm" 3+09.802
1.295m Lt.
AC 638.827
"Rm" 28+82.876
8.000m Lt.
AC 638.658
"Rm" 28+52.000
8.000m Lt.
AC 638.452
"Rm" 27+92.429
8.000m Lt.
AC 637.854

Pavement Hinge Line
@ East Face of Median

SAW CUT
Vary Mill from
13mm to 70mm @ LIP

Vary Mill Depth to Match
Proposed Cross Slope Transition

"Rm" 28+82.877
19.136m Lt.
Lip 638.411
Lip 638.129

"Lm" 3+77.512
12.435m Lt.
AC 639.21±
"Lm" 3+67.237
12.442m Lt.
AC 639.090
"Lm" 3+56.698
12.448m Lt.
AC 639.025
"Lm" 3+46.243
12.455m Lt.
AC 638.900
"Lm" 3+35.789
12.450m Lt.
Lip 638.75±
"Lm" 3+24.892
12.423m Lt.
Lip 638.68±
"Lm" 3+09.800
12.430m Lt.
Lip 638.57±
Lip 638.77±
Lip 637.65±

AC 639.160
AC 639.059
"WA" 9+76.279
0.152m Lt.
Lip 638.95±
AC 639.092
"WA" 9+68.779
0.152m Lt.
Lip 638.97±
AC 639.125
"WA" 9+61.279
0.152m Lt.
Lip 639.01±
Lip 639.03±

"Rm" 28+97.298
19.585m LT.
F.L. EL. 638.49±

"Rm" 28+85.602
19.586m LT.-P.C.
F.L. EL. 638.393

"Rm" 28+79.453
25.765m LT.-P.T.
F.L. EL. 638.47±

"Rm" 28+61.852
27.365m LT.-P.C.
F.L. EL. 638.48±

"Rm" 28+54.203
19.611m LT.-P.T.
F.L. EL. 638.150

"Rm" 28+41.818
19.611m LT.
F.L. EL. 638.03±

NOTE:
ALL ASPHALT ELEVATIONS
ARE TO TOP OF DENSE GRADE.

FADED PARKING STRIPES

I:\cad\pubwrk\5817\sheets\roadway\section 3r\pavement detail1.dgn
1/8/2004 7:16:52 AM

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12805
1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

ROADWAY DETAILS

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2587

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DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	16

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

"Rm" 27+67.243
6.050m RT. - P.C.
F.L. EL. 637.450

"Rm" 27+62.093
11.200m RT. - P.T.
Match Exist.
F.L. EL. 637.50±

"Rm" 27+52.871
12.200m RT. - P.C.
Match Exist.
F.L. EL. 637.50±

"Rm" 27+46.721
6.050m RT. - P.T.
F.L. EL. 637.310

"Rm" 27+26.493
6.050m RT. - P.C.
F.L. EL. 637.150

"Rm" 27+20.343
12.231m RT. - P.T.
Match Exist.
F.L. EL. 637.03±

SAW CUT
Match Existing

"Rm" 27+05.314
17.415m RT. - P.C.
Match Exist.
F.L. EL. 636.99±

"Rm" 26+97.669
10.050m RT. - P.T.
F.L. EL. 636.882

"Rm" 26+81.882
10.050m RT.
F.L. EL. 636.769

"Rm" 26+66.094
10.050m RT.
Angle Point
F.L. EL. 636.656

"Rm" 26+40.646
10.050m RT. - P.C.
F.L. EL. 636.544

"Rm" 26+30.357
8.854m RT. - P.R.C.
F.L. EL. 636.430

"Rm" 26+20.000
7.650m RT. - P.T.
F.L. EL. 636.318

"Rm" 26+13.621
7.650m RT. - P.C.
F.L. EL. 636.266

"Rm" 26+05.971
15.250m RT. - P.T.
F.L. EL. 636.58±

"Rm" 25+96.821
18.400m RT. - P.C.
F.L. EL. 636.33±

"Rm" 25+89.171
10.750m RT. - P.T.
F.L. EL. 636.008

Lip 637.490 — Lip 637.350 — Lip 637.190 — Lip 636.922 — Lip 636.809 — Lip 636.696 — Lip 636.584 — Lip 636.470 — Lip 636.358 — Lip 636.305 — Lip 636.048

AC 637.683 — AC 637.513 — AC 637.369 — Crown Line — AC 637.186 — AC 637.073 — AC 636.960 — AC 636.817 — AC 636.694 — AC 636.624 — AC 636.580 — AC 636.469 — AC 636.351

SAW CUT — AC 637.610 — Vary Mill from 15.25mm to 70mm @ LIP

SAW CUT — AC 637.420 — Vary Mill from 15.25mm to 70mm @ LIP

SAW CUT — AC 637.295 — Vary Mill from 15.25mm to 70mm @ Sawcut Line

SAW CUT — AC 637.149 — Vary Mill from 15.25mm to 70mm @ Sawcut Line

"Rm" 27+27.001
19.111m Lt.

"Rm" 26+97.317
19.095m Lt.
FL 636.98±

SAW CUT — AC 637.039 — Vary Mill from 15.25mm to 70mm @ LIP

SAW CUT — AC 636.928 — Vary Mill from 15.25mm to 70mm @ LIP

SAW CUT — AC 636.775 — Vary Mill from 15.25mm to 70mm @ LIP

SAW CUT — AC 636.659

SAW CUT — AC 636.583

SAW CUT — AC 636.570 — AC 636.546

Lip 637.46± — Lip 637.26± — AC 637.17± — Lip 636.88± — Lip 636.77± — Lip 636.57± — Lip 636.49± — Lip 636.43± — Lip 636.39± — Lip 636.19±

Transition to Full Mill Depth — Begin 70mm Full Depth Mill

NOTE:
ALL ASPHALT ELEVATIONS
ARE TO TOP OF DENSE GRADE.

NEW SHEET

PARKING

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

ROADWAY DETAILS

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DESIGN BY	WBM
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	17

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

"Rm" 25+74.006
10.750m RT.
F.L. EL. 635.968

"Rm" 25+58.506
10.750m RT
F.L. EL. 635.852

"Rm" 25+45.879
10.750m RT. – P.C.
F.L. EL. 635.730

"Rm" 25+34.976
9.405m RT. – P.R.C.
F.L. EL. 635.638

"Rm" 25+24.000
8.050m RT. – P.T.
F.L. EL. 635.560

"Rm" 24+66.006
8.050m RT.
F.L. EL. 635.102

"Rm" 24+35.409
8.050m RT. – P.C.
F.L. EL. 635.022

"Rm" 24+27.428
10.237m RT. – P.C.C.
F.L. EL. 634.956

Lip 635.998
Lip 635.892
Lip 635.770
Lip 635.678
Lip 635.590
Lip 635.362
Lip 635.142
Lip 635.082
Lip 635.062
Lip 635.029
Lip 634.996
F.L. EL. 635.020
F.L. EL. 635.000
F.L. EL. 634.950
FL EL 634.900
FL EL 634.900
FL EL 634.815
FL EL 634.810

AC 636.296
AC 636.190
AC 636.100
AC 636.000
AC 635.895
AC 635.698
AC 635.508
"Rm" 24+43.000
4.500m Lt.
AC 635.375
"Rm" 24+19.286
7.089m Lt.
AC 635.345
"Rm" 24+13.429
7.351m Lt.
AC 635.275
AC 635.242
AC 635.12±
SAW CUT
AC 636.337
AC 636.224
AC 636.135
AC 636.069
AC 636.000
AC 635.797
AC 635.576
AC 635.410
"Rm" 24+43.000
7.088m Lt.
"Rm" 24+31.162
6.557m Lt.

Lip 636.08±
Lip 635.99±
Lip 635.91±
Lip 635.83±
Lip 635.75±
FL 635.56±
FL 635.36±
FL 635.17±
"Rm" 24+43.000
24.133m Lt.
FL 635.07±
"Rm" 24+31.162
24.094m Lt.
Lip 634.92±

NOTE:
ALL ASPHALT ELEVATIONS
ARE TO TOP OF DENSE GRADE.

NEW SHEET

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

ROADWAY DETAILS

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2567

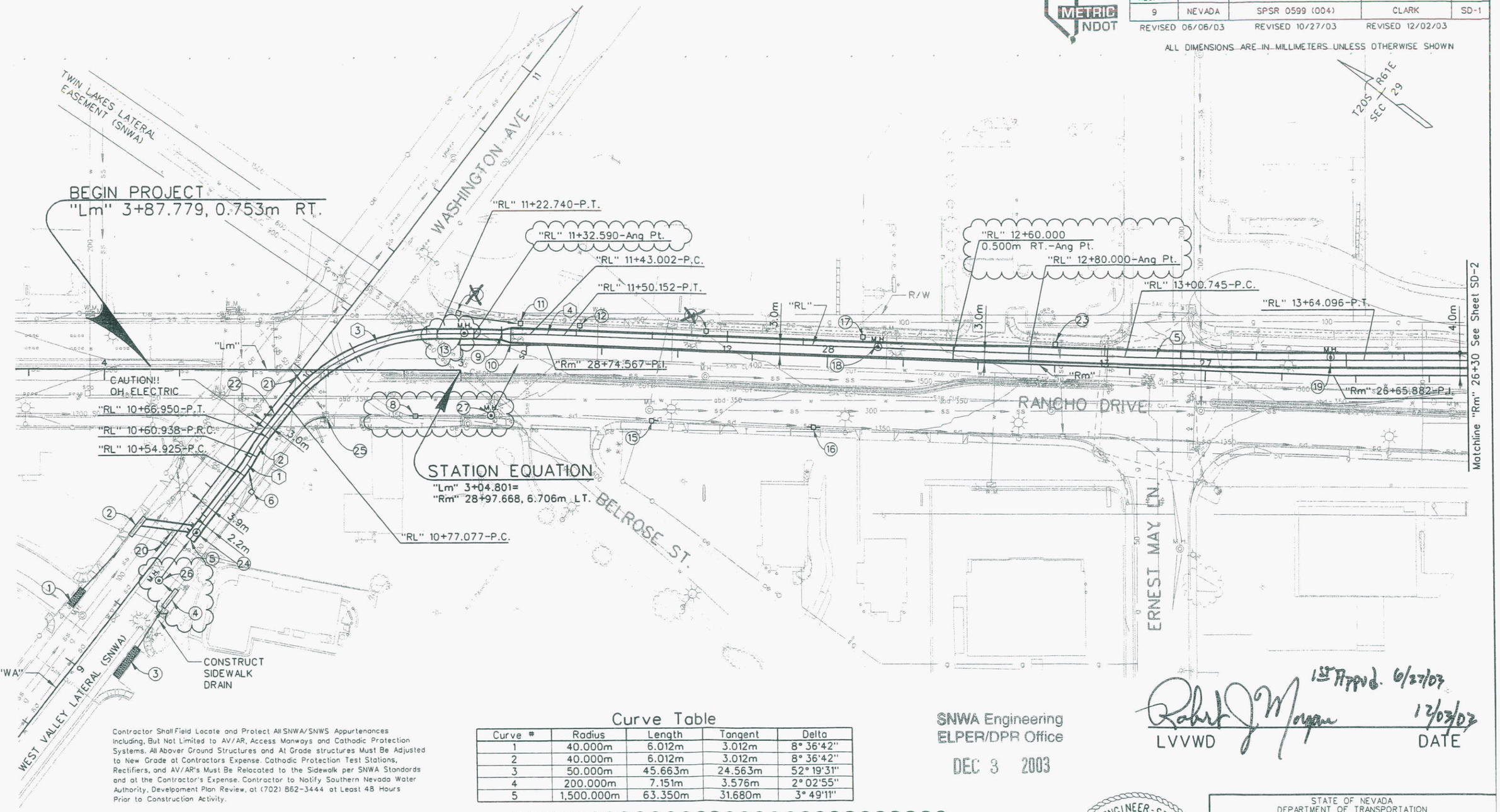
DESIGN BY	WBM
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

1/7/2004 3:00:14 PM I:\CAD\PUBWRK\5817\Sheets\Roadway\Section 3\Pavement Detail 3.dgn

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-1

REVISED 06/06/03 REVISED 10/27/03 REVISED 12/02/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

J Mason 12-4-03

SNWA DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

Curve Table

Curve #	Radius	Length	Tangent	Delta
1	40.000m	6.012m	3.012m	8° 36'42"
2	40.000m	6.012m	3.012m	8° 36'42"
3	50.000m	45.663m	24.563m	52° 19'31"
4	200.000m	7.151m	3.576m	2° 02'55"
5	1,500.000m	63.350m	31.680m	3° 49'11"

NOTE
CONTRACTOR TO MAINTAIN 2.87m HORIZONTAL SEPARATION BETWEEN THE RCB AND 400mm WATERLINE. IF RCB IS LESS THAN 2.87m HORIZONTALLY FROM THE 400mm WATERLINE, DRAPE THE RCB WITH 8 MIL POLYETHYLENE SHEETING w/ POLYURETHANE ELASTOMERIC SEALANT PER U.D.A.C.S. AT NO TIME WILL HORIZONTAL SEPARATION OF LESS THAN 1.8m BE ACCEPTED BETWEEN THE RCB AND THE WATERLINE.

SNWA Engineering
ELPER/DPR Office
DEC 3 2003

1st Appvd. 6/27/03

Robert J Morgan 12/03/03

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

12/2/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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DESIGN BY	JPL, WT
DRAWN BY	WRM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-1A

REVISED 06/06/03 REVISED 10/27/03
REVISED 12/02/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① "WA" 9+14.606 10.550m LT.
CONSTRUCT SPECIAL TRENCH DRAIN 1, H=1.500m
INSTALL 1050mm x 19.021m RCP
(SEE SHEET SD-9 & SD-13)

② "WA" 9+39.500 9.725m LT.
CONSTRUCT 6.000m SPECIAL D.I., H=2.550m
INSTALL 1800mm x 900mm x 13.187m RCB
(SEE SHEET SD-9, SD-11 & SD-12)

③ "WA" 9+08.971 10.550m RT.
CONSTRUCT SPECIAL TRENCH DRAIN 2 H=1.515m
INSTALL 1050mm x 13.087m RCP
CONNECT TO SPECIAL D.I.
(SEE SHEET SD-7 & SD-14)

④ "WA" 9+29.500 9.725m RT.
CONSTRUCT 6.000m SPECIAL D.I., H=2.200m
INSTALL 1095mm x 1630mm x 4.065m OVAL RCP
(SEE SHEET SD-7 & SD-12)

⑤ "RL" 10+32.500
INSTALL 2400mm x 1800mm x 107.500m RCB
(SEE SHEET SD-4)

⑥ "WA" 9+65.750 9.735m RT.
CONSTRUCT 6.000m SPECIAL D.I., H=1.600m
INSTALL 1050 mm x 4.548m RCP
CONNECT TO RCB
(SEE SHEET SD-8 & SD-12)

~~⑦ "Lm" 3+05.250 15.735m RT.~~
~~CONSTRUCT 6.000m SPECIAL D.I., H=1.700 m~~
~~INSTALL 1050mm x 16.954m RCP~~
~~(SEE SHEET SD-8, SD-12, & SD-15)~~

⑧ "Lm" 3+17.047 12.855m LT.
CONSTRUCT 6.000m SPECIAL D.I., H=MATCH EX. RCP DEPTH
INSTALL 1350mm x 1050mm PRECAST RCP TRANSITION UPSTREAM & DOWNSTREAM
CONNECT UPSTREAM AND DOWNSTREAM END TO EXISTING 1350mm RCP
(SEE SHEET SD-11 & SD-12)

⑨ "RL"11+40.085 0.268m RT.
INSTALL 2.400m PRECAST TRANSITION (2400mm x 1800mm TO 3600mm x 1800mm)
(SEE SHEET SD-4)

⑩ "RL" 11+42.522 0.355m RT. TO "RL" 13+96.651
INSTALL 3600mm x 1800mm x 254.251m RCB
(SEE SHEET SD-4 & SD-5)

⑪ "Rm" 28+81.500 6.269m RT.
CONSTRUCT ~~6.000~~ 12.000 m SPECIAL D.I., H=2.350m
INSTALL 1500mm x 1.294m RCP
CONNECT TO RCB
(SEE SHEET SD-8 & SD-12)

⑫ "Rm" 28+66.000 6.119m RT.
CONSTRUCT ~~6.000~~ 12.000 m SPECIAL D.I., H=2.000m
INSTALL 1050mm x 1.290m RCP
CONNECT TO RCB
(SEE SHEET SD-8 & SD-12)

⑬ "RL" 11+30.000 0.600m LT.
CONSTRUCT TYPE 1 MODIFIED SDMH, H=0.794m
CONNECT TO RCB
(SEE SHEET SD-4 & SD-15)

~~⑭ "Rm" 28+32.500 6.023m RT.~~
~~CONSTRUCT 6.000m SPECIAL D.I., H=2.200m~~
~~INSTALL 1050mm x 1.333m RCP~~
~~CONNECT TO RCB~~
~~(SEE SHEET SD-7 & SD-12)~~

⑮ "Rm" 28+46.318 19.632m LT.
CONSTRUCT 6.000m SPECIAL D.I., H=MATCH EX RCP DEPTH
INSTALL 1350mm x 1050mm PRECAST RCP TRANSITION DOWNSTREAM
CONNECT DOWNSTREAM END TO EXISTING 1350mm RCP
(SEE SHEET SD-11 & SD-12)

⑯ "Rm" 28+~~03.317~~ 02.247 19.689m LT.
CONSTRUCT 6.000m SPECIAL D.I., H=MATCH EX RCP DEPTH
INSTALL 1350mm x 1050mm PRECAST RCP TRANSITION UPSTREAM & DOWNSTREAM
CONNECT UPSTREAM AND DOWNSTREAM END TO EXISTING 1350mm RCP
(SEE SHEET SD-11 & SD-12)

⑰ "Rm" 27+90.900 6.025m RT.
CONSTRUCT 6.000m SPECIAL D.I., H=2.500m
INSTALL 1350mm x 1.263m RCP
CONNECT TO RCB
(SEE SHEET SD-7 & SD-12)

⑱ "RL" 12+40.000 1.200 m LT.
CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.064m
CONNECT TO RCB
(SEE SHEET SD-4 & SD-15)

⑲ "RL" 13+60.000 1.200m LT.
CONSTRUCT TYPE 1 MODIFIED SDMH, H=0.986m
CONNECT TO RCB
(SEE SHEET SD-4 & SD-15)

⑳ "WA" 9+39.927 1.358m LT. TO "WA" 9+44.804 1.362m LT.
CONNECT EXISTING RCP TO RCB
INSTALL 450mm x 4.877m RCP
(SEE SHEET SD-11)

㉑ "RL" 10+84.08± 1.219m LT. TO "RL" 10+84.584 6.066m LT.
CONNECT EXISTING RCP TO RCB
INSTALL 450mm X 4.877m RCP
(SEE SHEET SD-11)

㉒ "RL" 10+73.23± 1.219m LT.
CONNECT EXISTING 1200mm RCP TO RCB
(SEE SHEET SD-4)

㉓ "Rm" 27+40.000 6.050m RT.
CONSTRUCT TYPE 3 D.I., H=1.600m
INSTALL 450mm x 0.946m RCP
(SEE SHEET SD-10)

㉔ "RL" 10+35.00 0.600m RT.
CONSTRUCT TYPE 1 MODIFIED SDMH, H=0.974m
CONNECT TO RCB
(SEE SHEET SD-4 & SD-15)

㉕ "Lm" 3+40.547 12.398m LT.
INSTALL BICYCLE SAFE GRATE ON EXISTING DI.

㉖ "WA" 9+31.575 4.000m RT.
CONSTRUCT TYPE 4 MODIFIED M.H., H=2.159m
INSTALL 1095mm x 1630mm x 12.658m OVAL RCP
CONNECT TO RCB END SECTION
(SEE SHEET SD-7)

㉗ "Lm" 28+89.700 18.819m LT.
CONSTRUCT TYPE 2 MODIFIED M.H., H=2.625m
INSTALL 1350mm x 1050mm PRECAST RCP TRANSITION UPSTREAM
CONNECT UPSTREAM END TO EXISTING 1350mm RCP
INSTALL 1050mm x 21.193m RCP
CONNECT TO RCB
(SEE SHEET SD-9)

1st Rev'd 6/27/03
Robert J. Morgan 12/3/03
LVVWD DATE

PROFESSIONAL ENGINEER · STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
12/2/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS · PLANNERS · LAND SURVEYORS
2727 S. RAINBOW BLVD. LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550 FAX (702) 362-2597

DESIGN BY	JPL, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-2

REVISED 06/06/03
REVISED 01/06/04

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① "RL" 13+96.651 TO "RL" 17+76.951 — 3600mm x 1800mm x 380.300m RCB (SEE SHEET SD-5 & SD-6)

② "RL" 17+35.000 1.828m LT. TO "RL" 17+34.008 4.054m LT. — INSTALL 450mm x 2.438m RCP STUB; INSTALL PLYWOOD CAP (NO DIRECT PAYMENT); L.I.E. 632.500 - U.I.E. 632.595 (SEE SHEET SD-6)

③ "RL" 17+63.422 1.828m RT. TO "RL" 17+62.056 3.849m RT. — INSTALL 450mm x 2.438m RCP STUB; INSTALL PLYWOOD CAP (NO DIRECT PAYMENT); L.I.E. 632.500 - U.I.E. 632.617 (SEE SHEET SD-6)

④ "RL" 14+80.000 1.200m LT. — CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.096m; CONNECT TO RCB (SEE SHEET SD-5 & SD-15)

⑤ "RL" 16+00.000 1.200m LT. — CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.153m; CONNECT TO RCB (SEE SHEET SD-5 & SD-15)

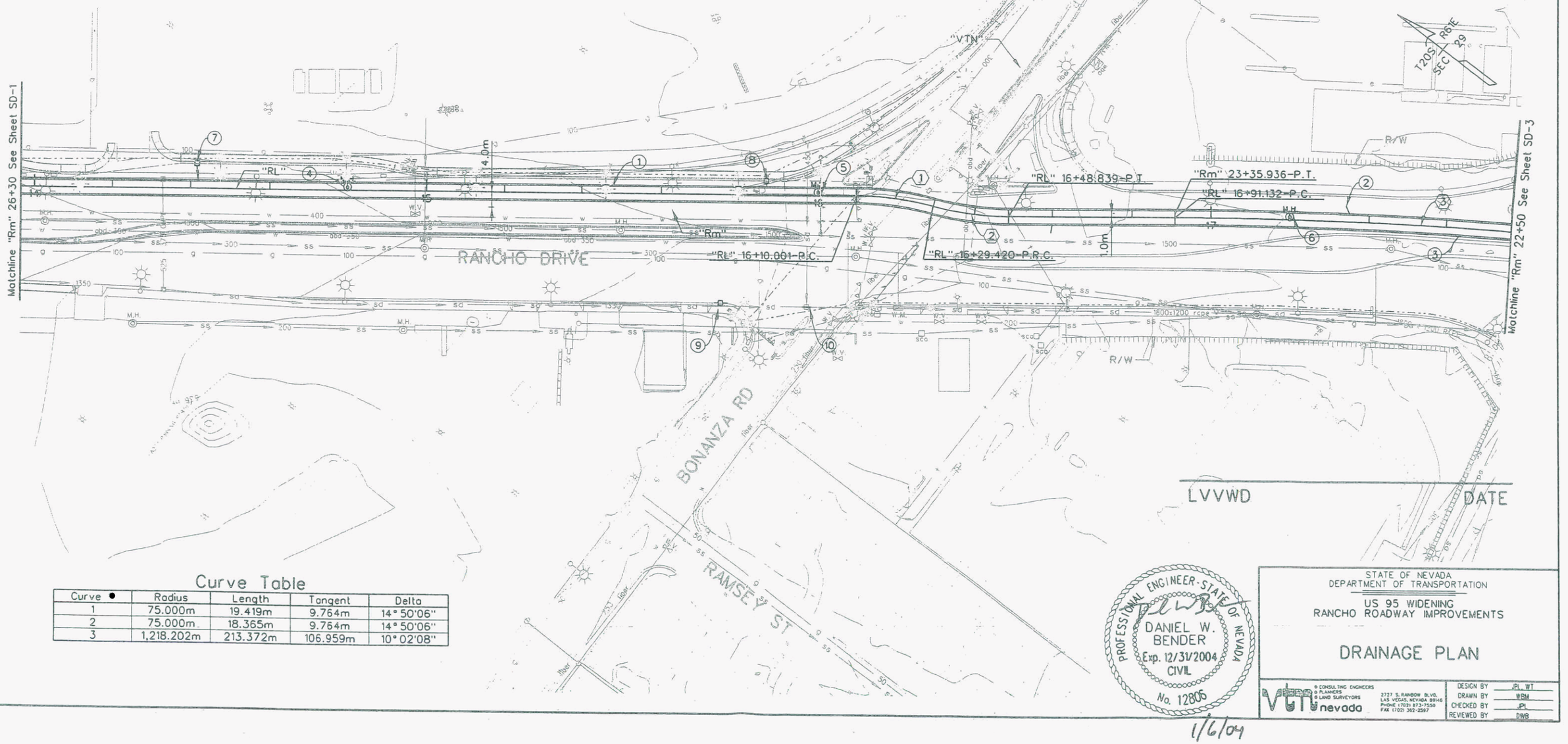
⑥ "RL" 17+20.000 1.200m LT. — CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.251m; CONNECT TO RCB (SEE SHEET SD-6 & SD-15)

⑦ "Rm" 25+85.000 10.750m RT. — CONSTRUCT TYPE 3 D.I. (H=1.351m); INSTALL 450mm x 4.437m RCP (SEE SHEET SD-10)

⑧ "Rm" 24+40.000 8.025m RT. — CONSTRUCT TYPE 3 D.I., H=1.500m; INSTALL 450mm x 1.736m RCP (SEE SHEET SD-9)

⑨ "Rm" 24+51.616 24.706m LT. — CONSTRUCT 3.000m SPECIAL D.I., INSTALL 1350mm x 1050mm PRECAST RCP TRANSITION UPSTREAM & DOWNSTREAM H=MATCH EX RCP DEPTH CONNECT DOWNSTREAM AND UPSTREAM TO EXISTING 1350mm RCP (SEE SHEET SD-11 & SD-12)

⑩ "Rm" 24+29.589 24.308m LT. — INSTALL 1350mm x 3.000m RCP (Class III); INSTALL CONCRETE COLLAR AT BOTH ENDS



Curve Table

Curve	Radius	Length	Tangent	Delta
1	75.000m	19.419m	9.764m	14° 50'06"
2	75.000m	18.365m	9.764m	14° 50'06"
3	1,218.202m	213.372m	106.959m	10° 02'08"

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

VTN nevada
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DESIGN BY	JPL, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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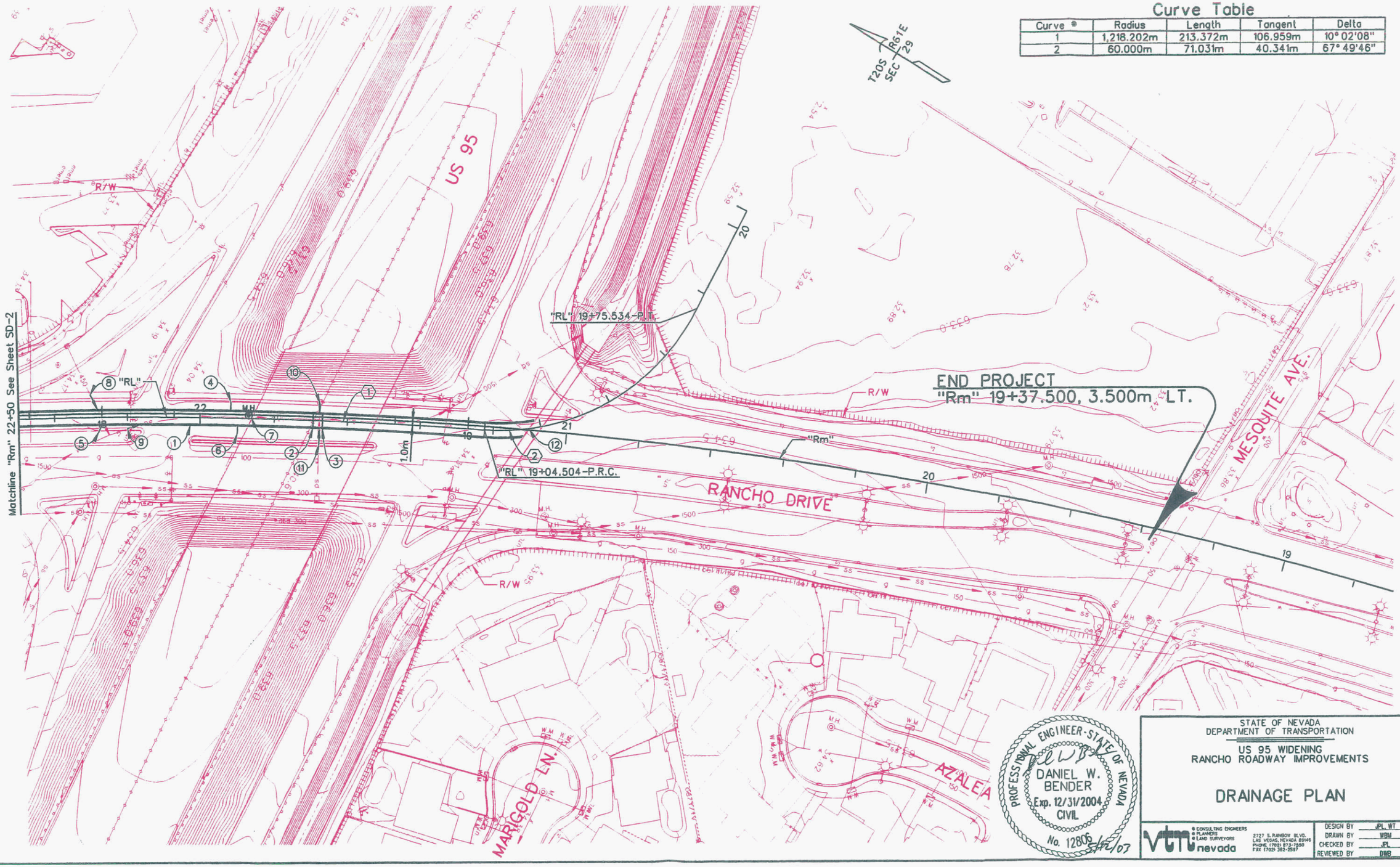
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-3

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

Curve Table

Curve #	Radius	Length	Tangent	Delta
1	1,218.202m	213.372m	106.959m	10° 02'08"
2	60.000m	71.031m	40.341m	67° 49'46"



PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12805
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

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DESIGN BY	JPL, WT
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-3A

REVISED 06/06/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"RL" 17+76.951 TO "RL" 18+57.500	INSTALL 3600mm x 1800mm x 80.549m RCB (SEE SHEET SD-6)
②	"RL" 18+57.600	INSTALL 2.400M PRECAST TRANSITION (SEE SHEET SD-6)
③	"RL" 18+60.000	INSTALL 3600mm x 2400mm x 56.755m RCB (SEE SHEET SD-6)
④	"RL" 18+35.001 1.828m LT. TO "RL" 18+35.015 4.266m LT.	INSTALL 450mm x 2.438m RCP STUB INSTALL PLYWOOD CAP (NO DIRECT PAYMENT) L.I.E. 631.300 - U.I.E. 631.350 (SEE SHEET SD-6)
⑤	"RL" 18+00.000 1.828m RT. TO 17+99.009 4.056m RT.	INSTALL 600mm x 2.438m RCP STUB INSTALL PLYWOOD CAP (NO DIRECT PAYMENT) L.I.E. 631.000 - U.I.E. 631.032 (SEE SHEET SD-6)
⑥	"RL" 18+37.000 1.828m RT. TO "RL" 18+36.957 4.266m RT.	INSTALL 600mm x 2.438m RCP STUB INSTALL PLYWOOD CAP (NO DIRECT PAYMENT) L.I.E. 630.750 - U.I.E. 630.768 (SEE SHEET SD-6)
⑦	"RL" 18+40.000 1.200m LT.	CONSTRUCT TYPE 1 SDMH, H = 1.697m CONNECT TO RCB (SEE SHEET SD-6)
⑧	"RL" 17+98.89± 1.828m LT. TO "RL" 17+96.832 6.917m LT.	CONNECT EXISTING RCP TO RCB INSTALL 450mm X 4.877m RCP (SEE SHEET SD-6 & SD-11)
⑨	"RL" 18+11.189 1.828m RT. TO "RL" 18+06.475 3.122m RT.	CONNECT EXISTING RCP TO RCB INSTALL 1500mm X 4.877m RCP (SEE SHEET SD-6 & SD-11)
⑩	"RL" 18+59.247 1.828m LT. TO "RL" 18+59.22± 4.572m LT.	CONNECT EXISTING RCP TO RCB INSTALL 450mm X 2.740m RCP (SEE SHEET SD-6 & SD-11)
⑪	"RL" 18+59.320 1.828m RT. TO "RL" 18+59.279 4.572m RT.	CONNECT EXISTING RCP TO RCB INSTALL 450mm X 4.877m RCP (SEE SHEET SD-6 & SD-11)
⑫	"RL" 19+16.801	CONNECT RCB TO EXISTING 2400mm x 2100mm RCB (SEE SHEET SD-6 & B-2)

PROFESSIONAL ENGINEER-STATE OF NEVADA
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6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

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DESIGN BY	JPL, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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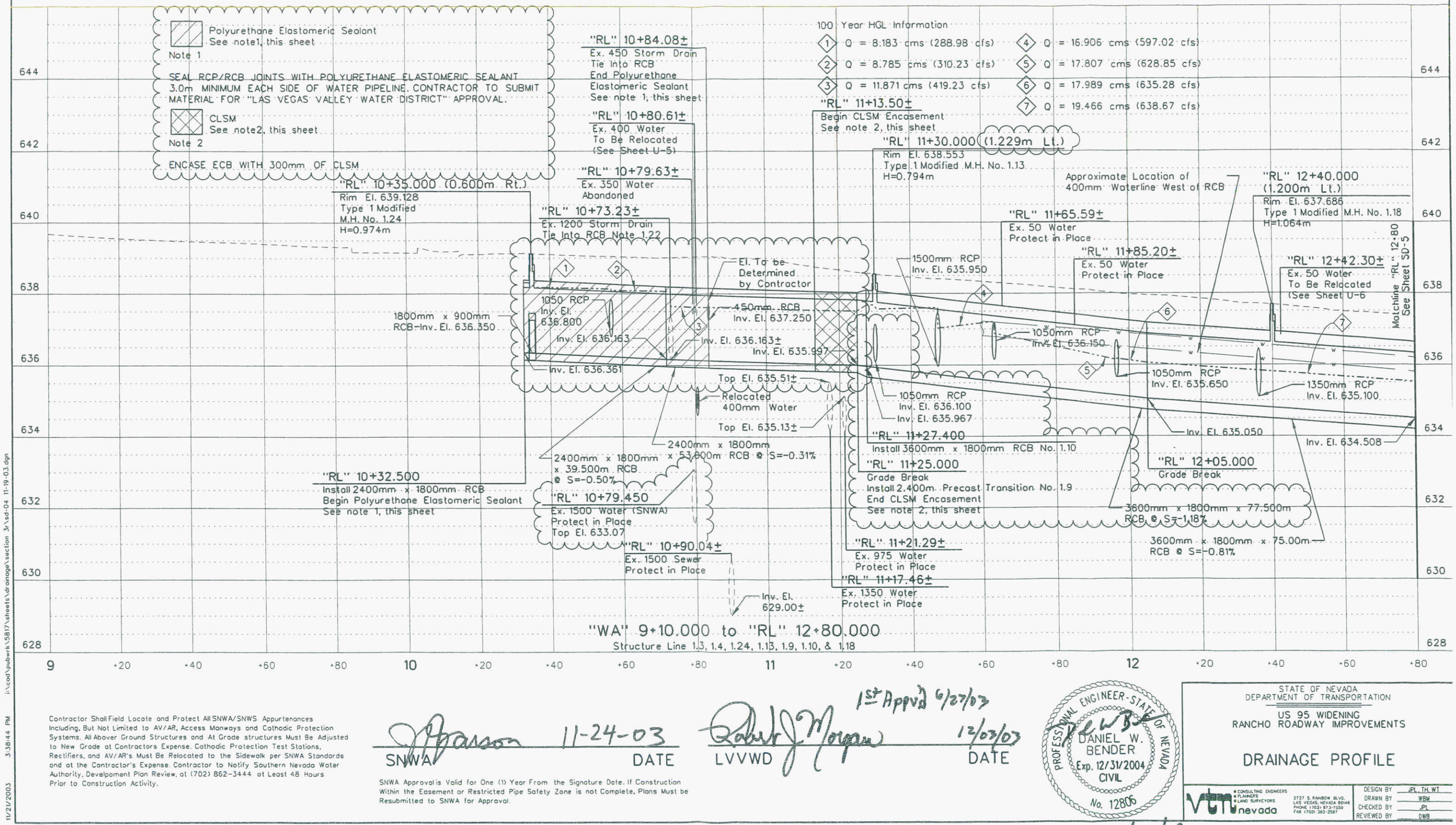
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-4

REVISED 06/06/03
REVISED 11/19/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



"WA" 9+10.000 to "RL" 12+80.000
Structure Line 1.3, 1.4, 1.24, 1.13, 1.9, 1.10, & 1.18

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA 11-24-03 DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

1st Approval 6/27/03

LVVWD 12/03/03 DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
11/24/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

VTN nevada
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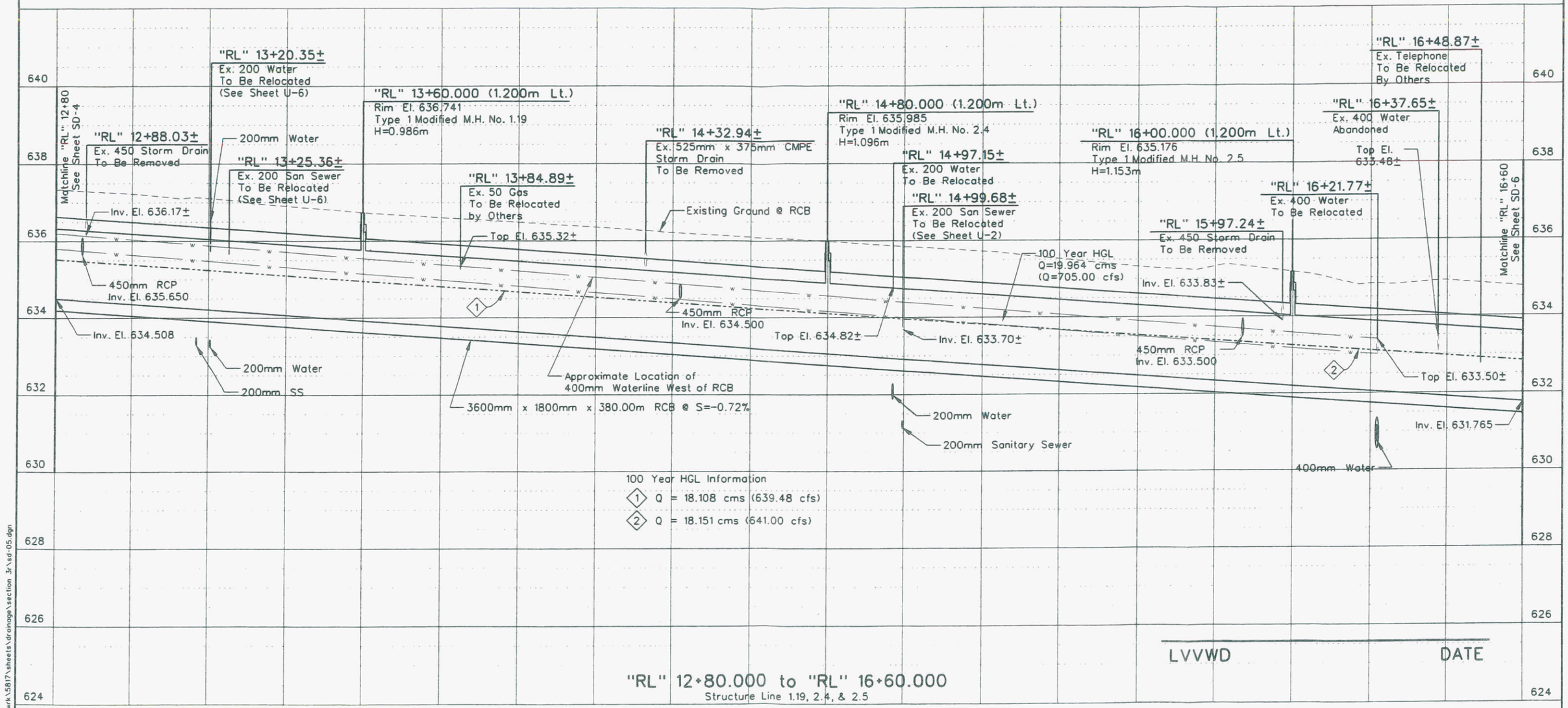
DESIGN BY	JPL, TH, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

11/21/2003 3:38:44 PM i:\cad\pubwrk\5817\sheets\drainage\section 3r\sd-04 11-19-03.dgn

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-5

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



100 Year HGL Information

◇1 Q = 18.108 cms (639.48 cfs)

◇2 Q = 18.151 cms (641.00 cfs)

"RL" 12+80.000 to "RL" 16+60.000

Structure Line 1.19, 2.4, & 2.5

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/14/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

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DESIGN BY	JPL, TH, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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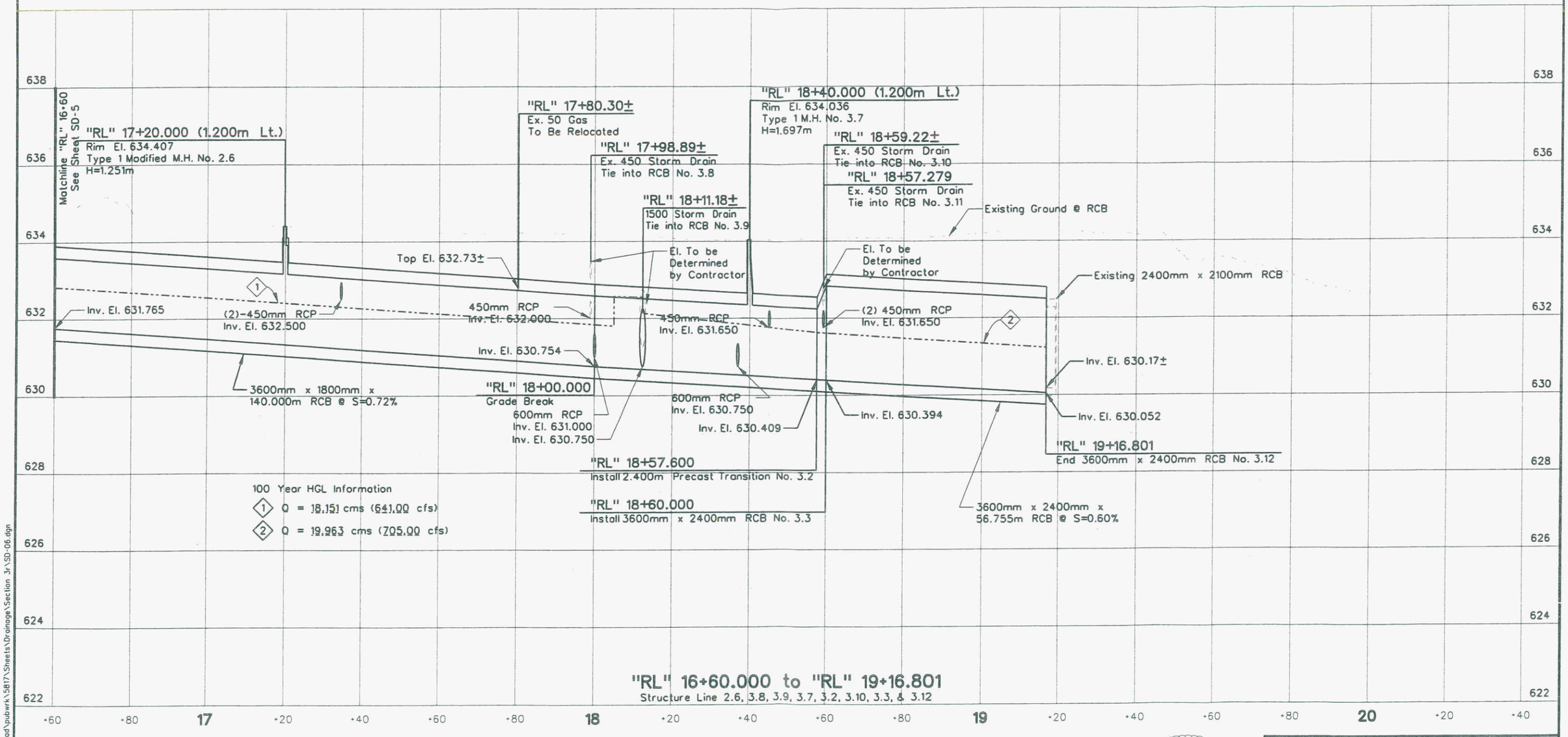
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-6

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

VTN nevada
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FAX (702) 362-2597

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9	NEVADA	SPSR 0599 (004)	CLARK	SD-7

REVISED 06/06/03
REVISED 12/02/03
REVISED 01/06/04

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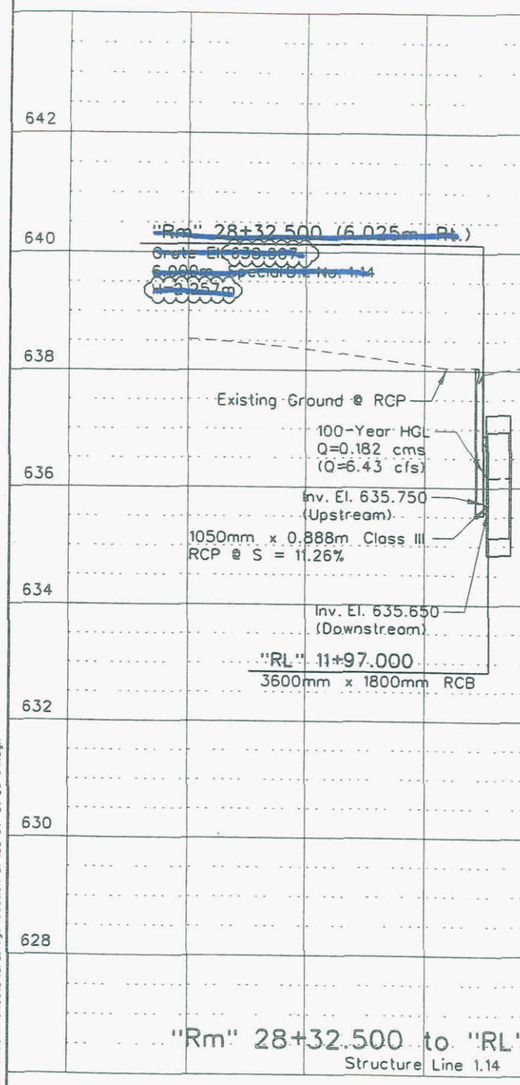

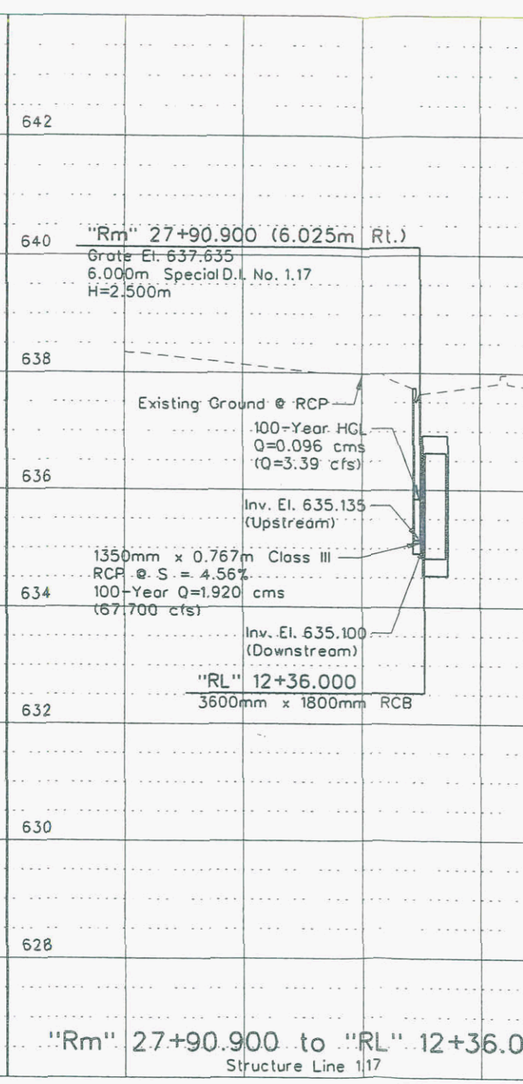

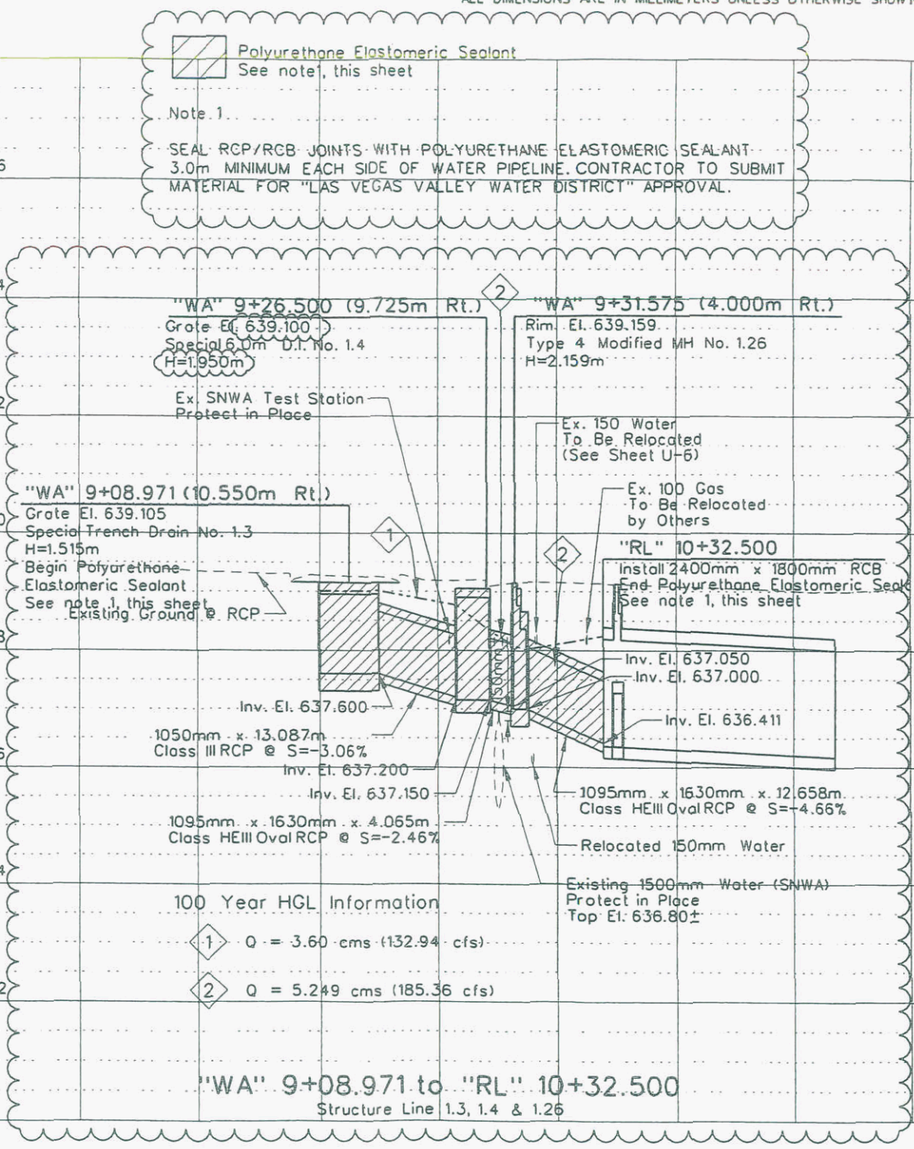

"Rm" 28+32.500 to "RL" 11+97.000
Structure Line 1.14

"Rm" 27+90.900 to "RL" 12+36.000
Structure Line 1.17

"WA" 9+08.971 to "RL" 10+32.500
Structure Line 1.3, 1.4 & 1.26

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA DATE

LVVWD DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2567

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9	NEVADA	SPSR 0599 (004)	CLARK	SD-8

REVISED 12/02/03
REVISED 01/06/04

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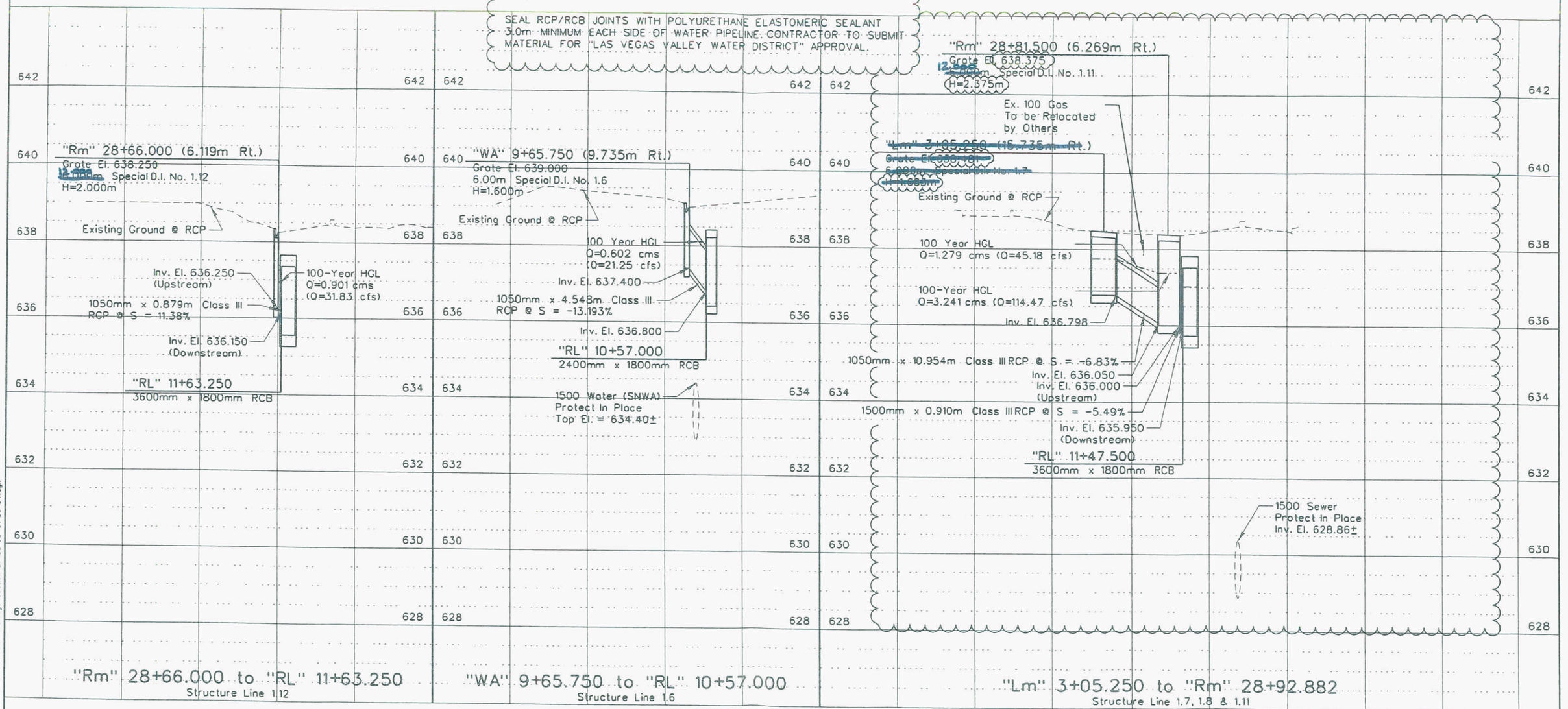
Polyurethane Elastomeric Sealant
See note1, this sheet

Note 1

SEAL RCP/RCB JOINTS WITH POLYURETHANE ELASTOMERIC SEALANT 3.0m MINIMUM EACH SIDE OF WATER PIPELINE. CONTRACTOR TO SUBMIT MATERIAL FOR "LAS VEGAS VALLEY WATER DISTRICT" APPROVAL.



"Rm" 28+66.000 to "RL" 11+63.250
Structure Line 1.12

"WA" 9+65.750 to "RL" 10+57.000
Structure Line 1.6

"Lm" 3+05.250 to "Rm" 28+92.882
Structure Line 1.7, 1.8 & 1.11

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

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LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
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9	NEVADA	SPSR 0599 (004)	CLARK	SD-9

METRIC NDOT

REVISED 12/02/03
REVISED 01/06/04
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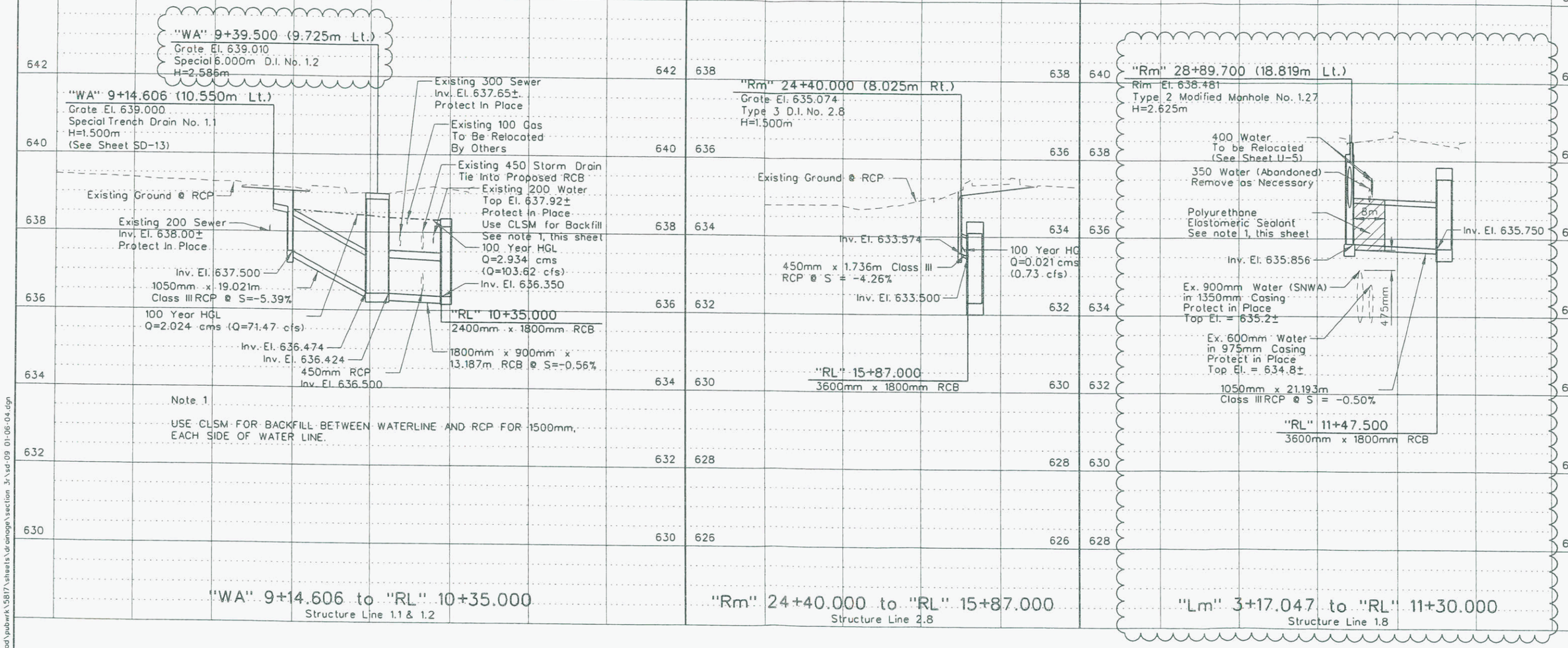
Polyurethane Elastomeric Sealant
See note1, this sheet

Note 1

SEAL RCP/RCB JOINTS WITH POLYURETHANE ELASTOMERIC SEALANT 3.0m MINIMUM EACH SIDE OF WATER PIPELINE. CONTRACTOR TO SUBMIT MATERIAL FOR "LAS VEGAS VALLEY WATER DISTRICT" APPROVAL.



LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
1/6/04

STATE OF NEVADA
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9	NEVADA	SPSR 0599 (004)	CLARK	SD-10

REVISED 01/06/04

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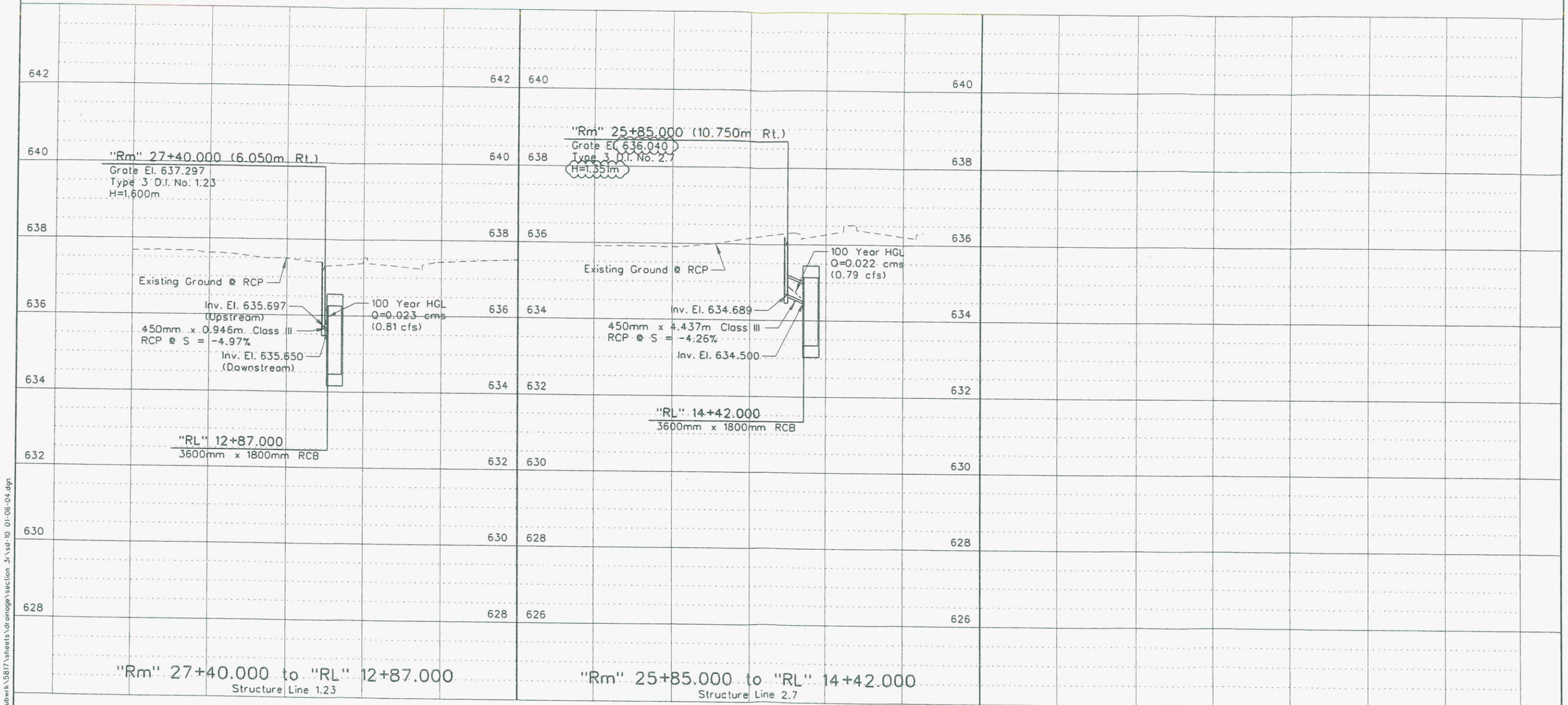

"Rm" 27+40.000 to "RL" 12+87.000
Structure Line 1.23

"Rm" 25+85.000 to "RL" 14+42.000
Structure Line 2.7

PROFESSIONAL ENGINEER-STATE OF NEVADA
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9	NEVADA	SPSR 0599 (004)	CLARK	SD-11

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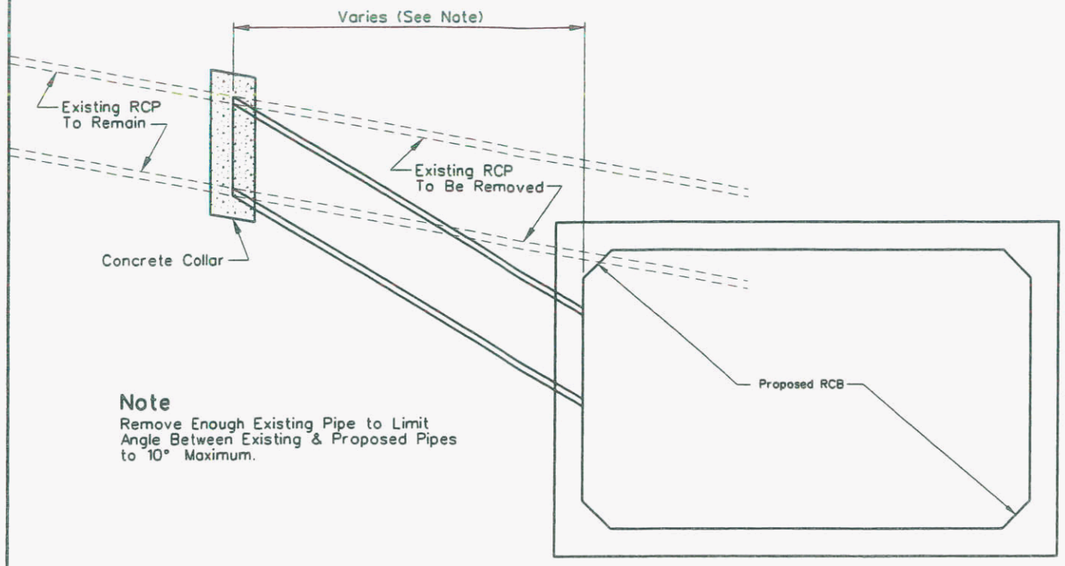
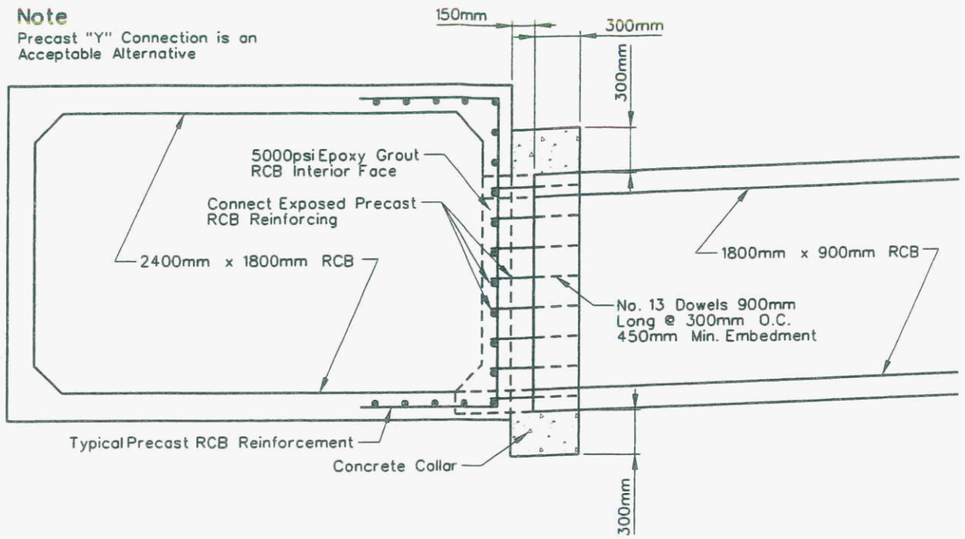
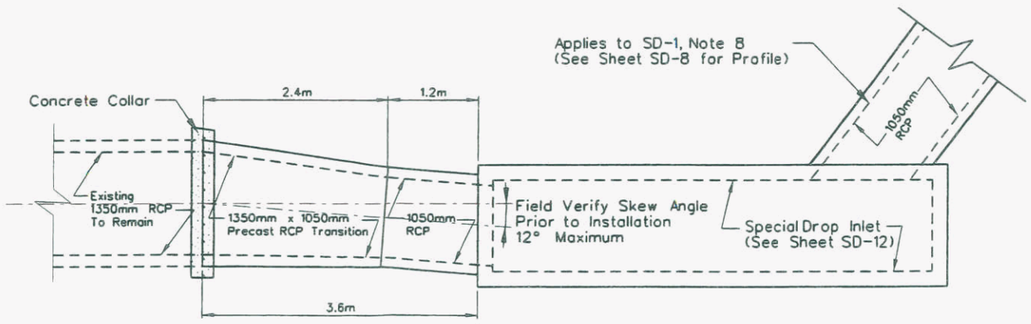


Existing RCP Connection to Proposed RCB

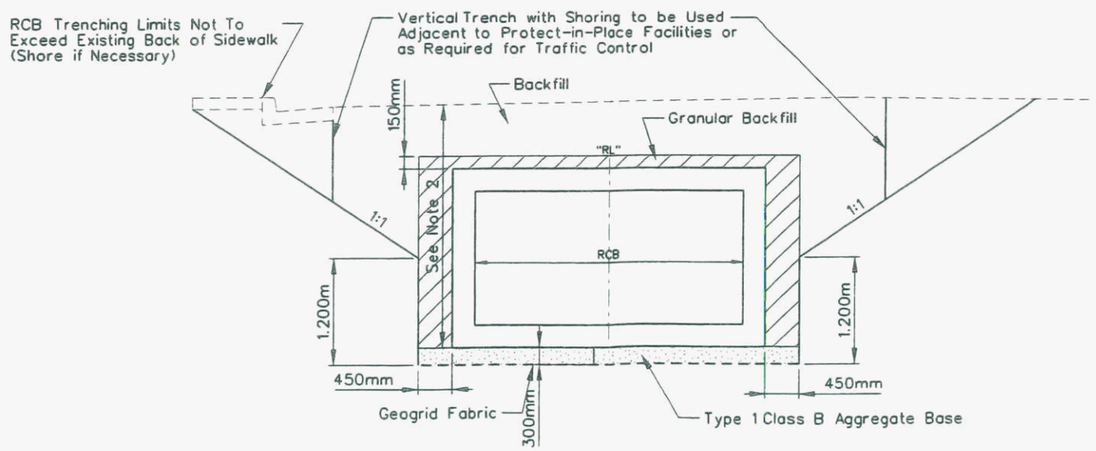


RCB to RCB Connection Detail



APPLIES TO EITHER UP OR DOWNSTREAM

Existing RCP Transition to Proposed Drop Inlet



Typical Trenching Detail

Note

1. Not to be Used for Structure Excavation and Backfill Quantities.
2. Structure Excavation & Granular Backfill Quantities are per NDOT Std. Dwg. R-1.1.4.
3. Backfill per section 207 of the Standard Specifications and Special Provisions to be Used Outside the Limits of Granular Backfill.
4. See NDOT Standard Plans for Geogrid Fabric.

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STATE OF NEVADA
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US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE DETAILS

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9	NEVADA	SPSR 0599 (004)	CLARK	SD-12

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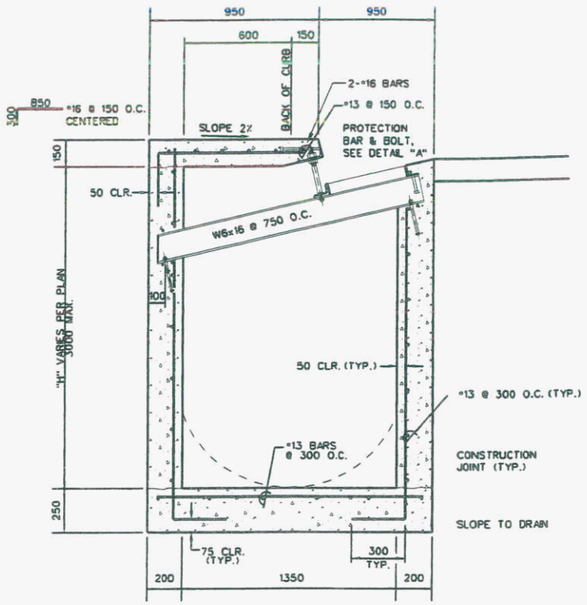
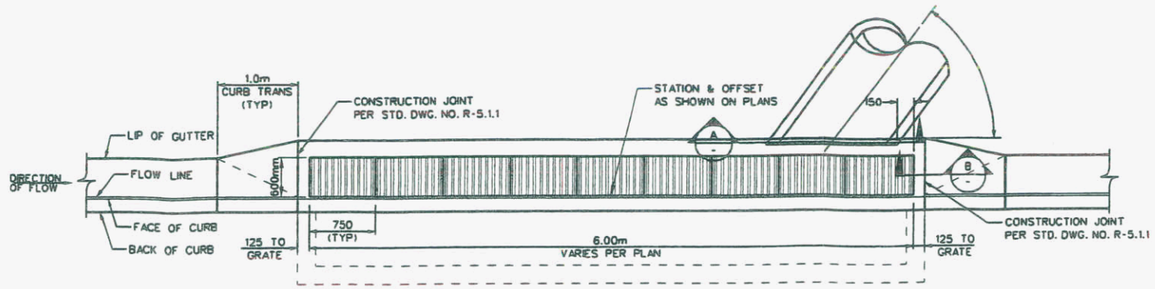
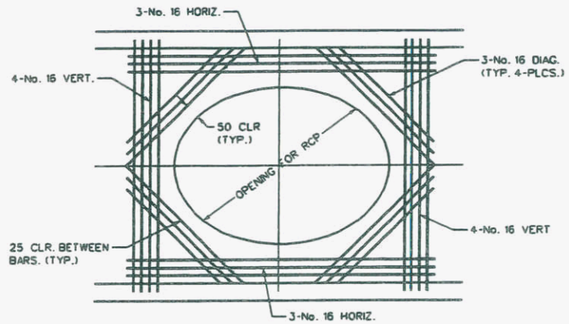


SPECIAL DROP INLET SECTION
NOT TO SCALE



DROP INLET LAYOUT PLAN
NOT TO SCALE



SECTION "A"
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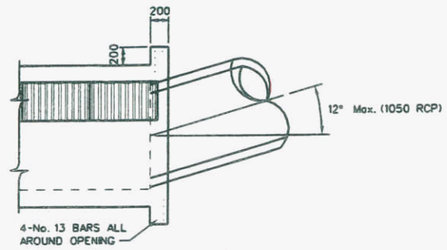
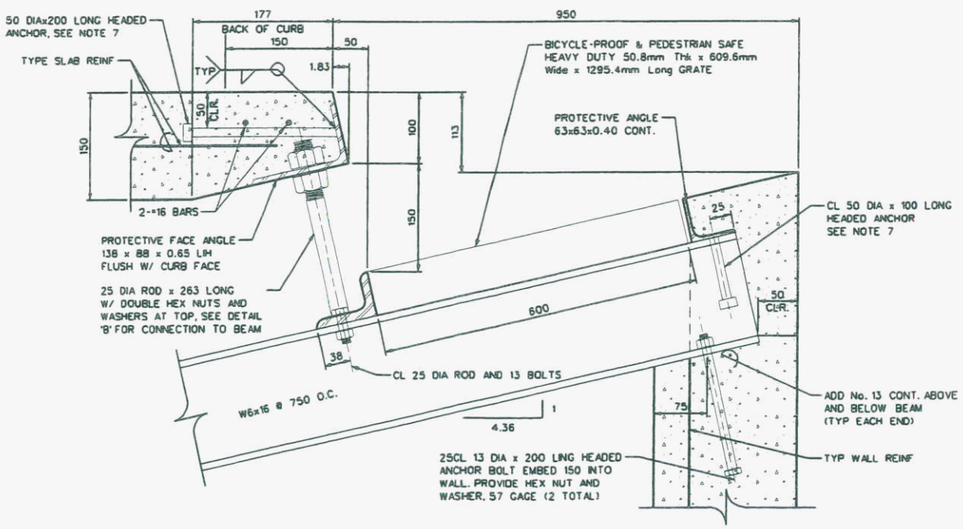


ALTERNATE CONNECTION DETAIL
NOT TO SCALE



PROTECTIVE FACE & ROD - DETAIL "A"
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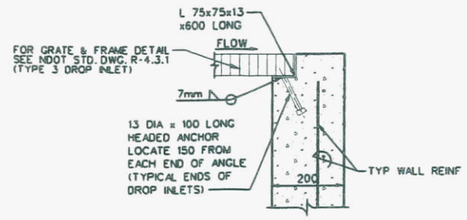

SECTION "B"
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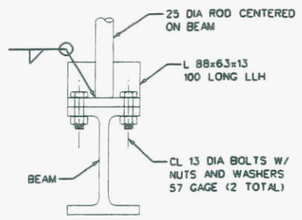

DETAIL "B"
NOT TO SCALE

NOTES:

1. ALL EXPOSED METALS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
2. PROVIDE 50 (MIN.) CLEARANCE ALL AROUND THE STEEL BEAM, DRY PACK AFTER INSTALLATION.
3. WHEN REQUIRED BY LENGTH OF OPENING, PLATE ANGLE MAY BE DELIVERED IN SECTIONS AND BUTT WELDED IN PLACE.
4. ALL GALVANIZING DAMAGED BY WELDING SHALL RECEIVE TWO COATS OF GALVALLOY OR EQUAL.
5. CONCRETE SHALL BE MODIFIED CLASS DA, SEE SPECIAL PROVISIONS SECTION 501.
6. SEE GENERAL NOTES FOR STRUCTURES.
7. ANGLE ANCHORS SHALL BE EMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED. (MAXIMUM SPACING OF 600).

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5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

SPECIAL DROP INLET

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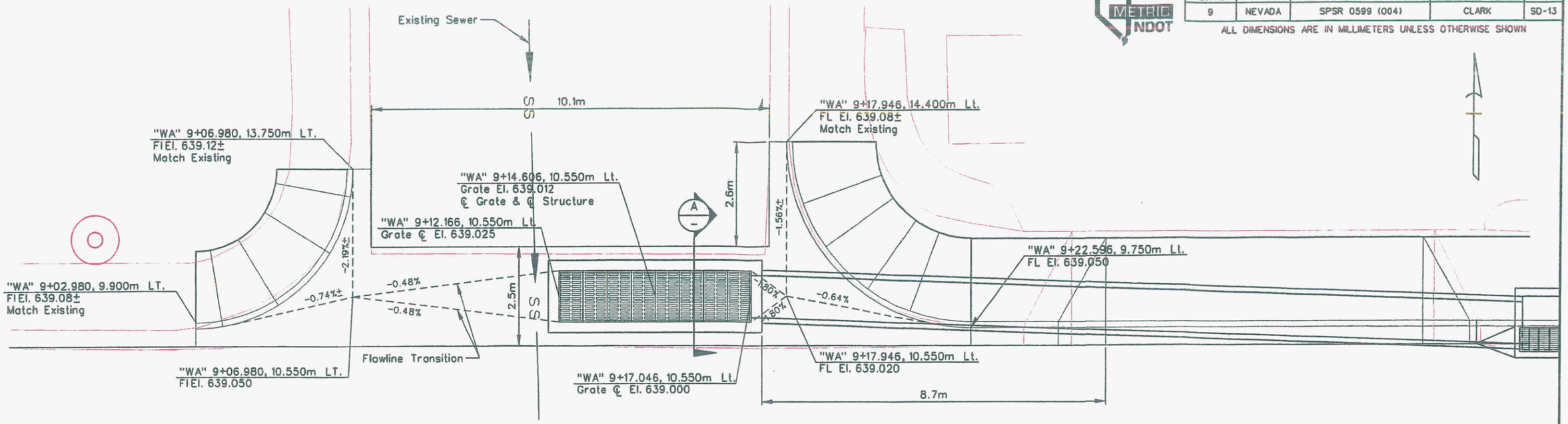
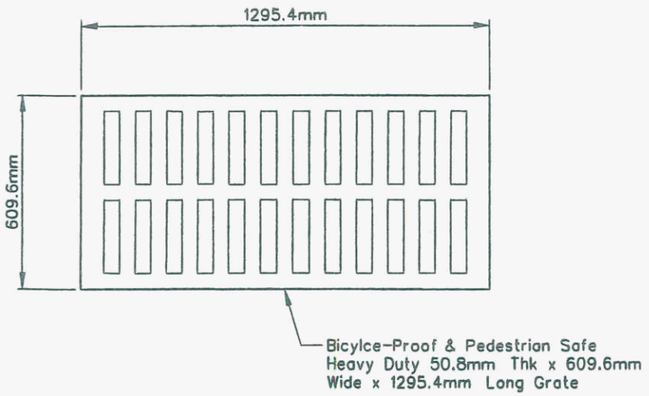
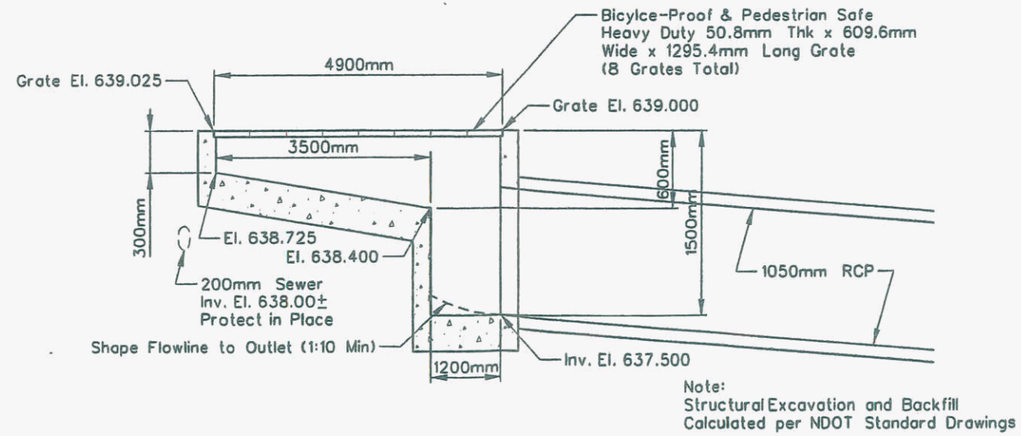


Plan

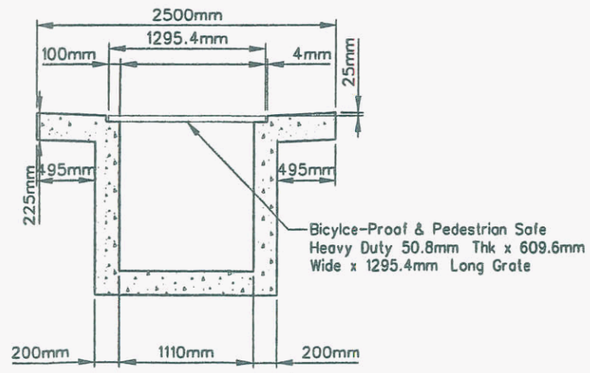


Grate Detail



Elevation

See Sheet B-001 for Structural Reinforcing.



Section A

Special Trench Drain 1

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12805
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE DETAILS

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9	NEVADA	SPSR 0599 (004)	CLARK	SD-14

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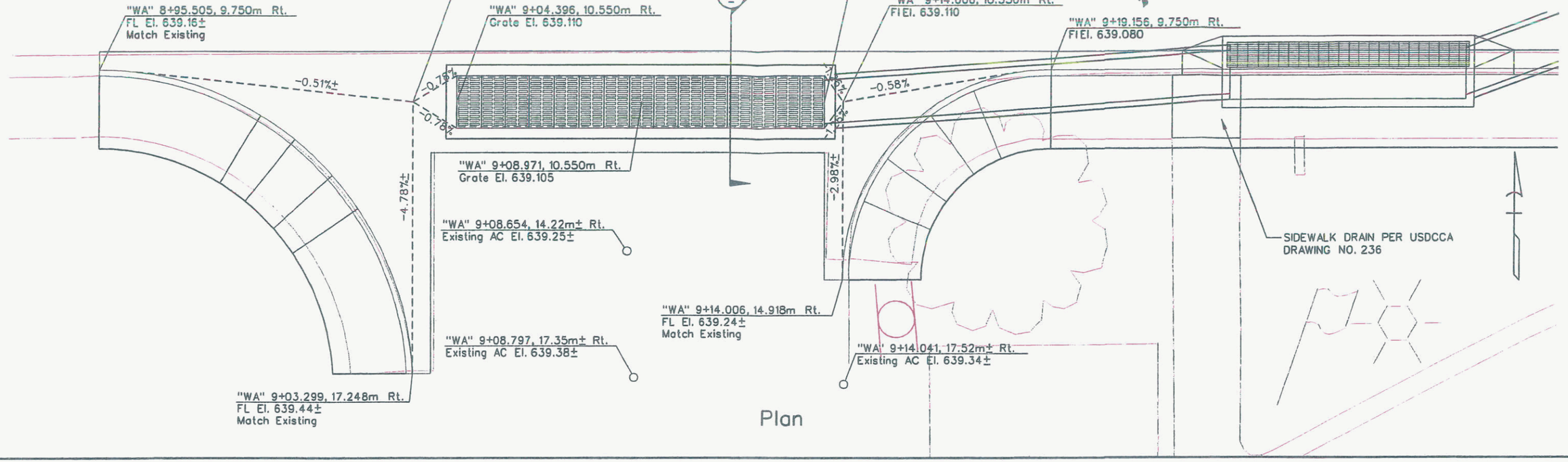
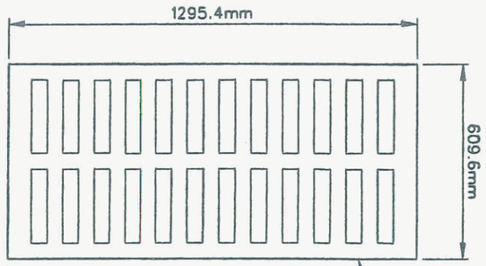
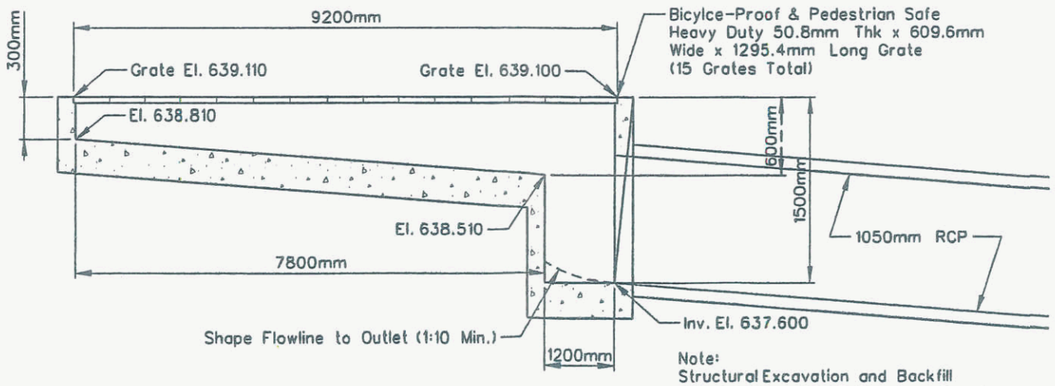


Plan



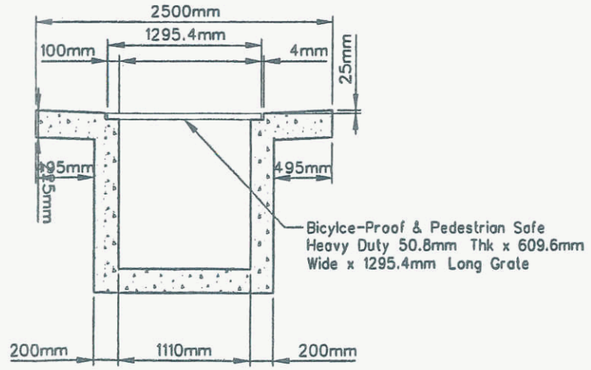
Grate Detail

Bicylce-Proof & Pedestrian Safe
Heavy Duty 50.8mm Thk x 609.6mm
Wide x 1295.4mm Long Grate



Note:
Structural Excavation and Backfill
Calculated per NDOT Standard Drawings

Elevation
See Sheet B-001 for
Structural Reinforcing.



Section A

Special Trench Drain 2

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12805
5/27/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE DETAILS

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& PLANNERS
& LAND SURVEYORS
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FAX (702) 362-2597

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CHECKED BY	JPL
REVIEWED BY	DWB

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9	NEVADA	SPSR 0599 (004)	CLARK	SD-15

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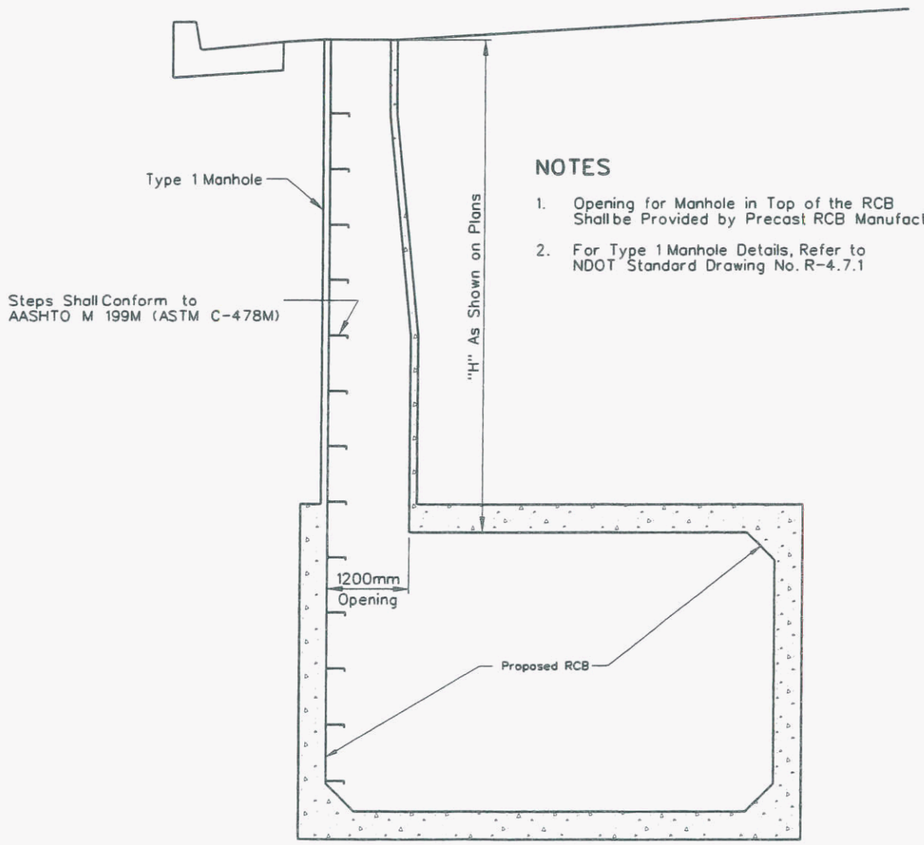


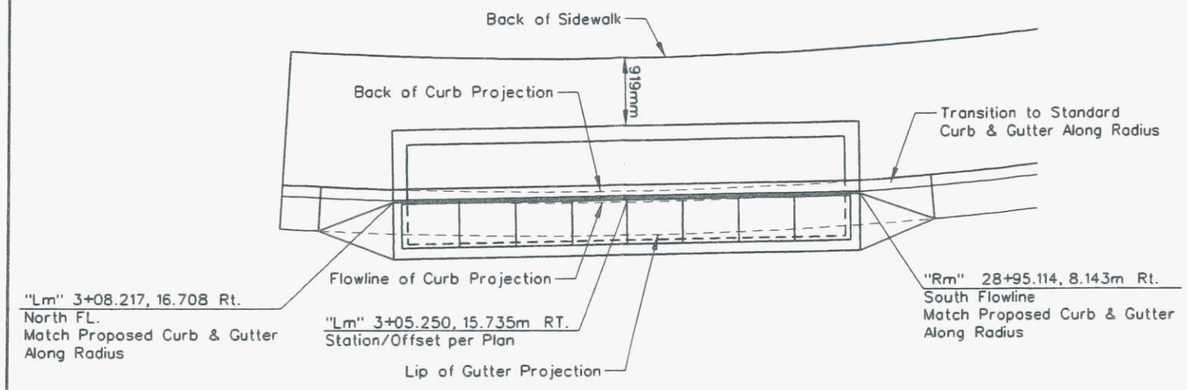
Manhole Connection Detail

NOTES

1. Opening for Manhole in Top of the RCB Shall be Provided by Precast RCB Manufacturer.
2. For Type 1 Manhole Details, Refer to NDOT Standard Drawing No. R-4.7.1

NOTE

1. Inlet Grates Not Shown for Clarity.



Drop Inlet 1.7 Layout Detail
Inlet at "Lm" 3+05.250, 15.735m Rt.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE DETAILS

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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DESIGN BY	JPL
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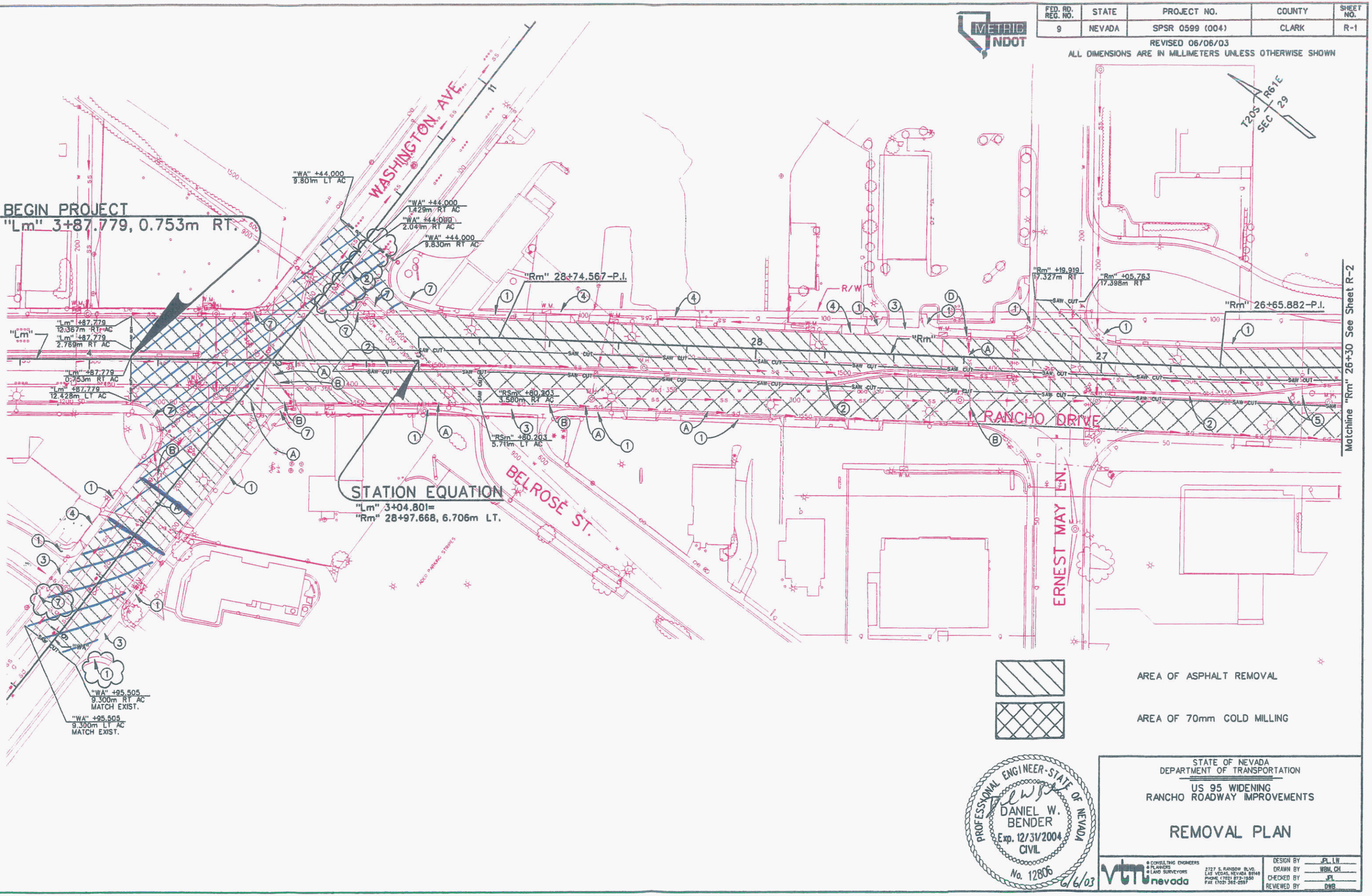
METRIC
NDOT
FED. RD. REG. NO. 9
STATE NEVADA
PROJECT NO. SPSR 0599 (004)
COUNTY CLARK
SHEET NO. R-1
REVISED 06/06/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN
T20S R61E SEC 29
BEGIN PROJECT
"Lm" 3+87.779, 0.753m RT.
"WA" +44.000
9.801m LT AC
"WA" +44.000
1.429m RT AC
"WA" +44.000
2.041m RT AC
"WA" +44.000
9.830m RT AC
WASHINGTON AVE.
"Rm" 28+74.567-P.I.
"Rm" +19.919
17.327m RT
"Rm" +05.763
17.398m RT
"Rm" 26+65.882-P.I.
"Lm" +87.779
12.387m RT AC
"Lm" +87.779
2.769m RT AC
"Lm" +87.779
0.753m RT AC
"Lm" +87.779
12.428m LT AC
"RSm" +80.203
3.580m RT AC
"RSm" +80.203
5.711m LT AC
STATION EQUATION
"Lm" 3+04.801=
"Rm" 28+97.668, 6.706m LT.
BELROSE ST.
RANCHO DRIVE
ERNEST MAY LN.
SAW CUT
"WA" +95.505
9.300m RT AC
MATCH EXIST.
"WA" +95.505
9.300m LT AC
MATCH EXIST.
Matchline "Rm" 26+30 See Sheet R-2
AREA OF ASPHALT REMOVAL
AREA OF 70mm COLD MILLING
PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/6/03
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS
REMOVAL PLAN
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REVIEWED BY DWB
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	R-1A

REVISED 06/06/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① REMOVE CURB, GUTTER AND SIDEWALK

"WA" 9+18.096, 14.400m LT. TO
"WA" 9+25.120, 9.303m LT. (7.024 m)

"WA" 9+34.272, 9.282m LT. TO
"WA" 9+25.120, 9.303m LT. (9.152 m)

"WA" 9+14.156, 14.917m RT. TO
"WA" 9+48.120, 9.316m RT. (33.964 m)

"WA" 9+56.841, 9.304m RT. TO
"WA" 9+74.969,9.290m RT. (18.128 m)

"WA" 9+61.000, 9.900m RT. TO
"WA" 9+70.500, 9.900m RT. (9.500 m)

"Rm" 28+97.298, 19.735m LT. TO
"Rm" 28+85.602, 19.736m LT. (9.500 m)

"Rm" 28+54.305, 19.761m LT. TO
"Rm" 28+41.818, 19.761m LT. (9.000 m)

"Rm" 28+09.318, 19.800m LT. TO
"Rm" 28+01.318, 19.801m LT. (8.000 m)

"Lm" 3+09.543, 17.404m RT. TO
"Rm" 27+62.243, 11.200m RT. (144.899 m)

"Rm" 27+52.721, 12.200m RT. TO
"Rm" 27+20.493, 12.230m RT. (40.327 m)

"Rm" 27+05.763, 17.421m RT. TO
"Rm" 26+30.000, 8.900m RT. (83.090 m)
(CURB & GUTTER ONLY)

"WA" 8+95.505, 9.300m RT. TO
"WA" 9+03.299, 17.248m RT. (16.380 m)

② REMOVE MEDIAN ISLANDS

"Lm" 3+26.813, 1.496m LT. TO
"Rm" 27+25.148, 4.887m LT. (392.081 sq m)

"Rm" 26+98.377, 8.107m LT. TO
"Rm" 26+30.000, 4.640m LT. (220.079 sq m)

"WA" 10+21.055, 1.695m RT. TO
"WA" 10+44.000, 1.429m RT. (13.700 sq m)

③ REMOVE COMMERCIAL DRIVEWAY

"WA" 8+95.505, 9.300m RT. TO
"WA" 9+19.156, 9.300m RT. (34.223 sq m)

"WA" 9+02.980 9.300m LT. TO
"WA" 9+22.596, 9.300m LT. (33.584 sq m)

"Rm" 27+67.243, 6.200m RT. TO
"Rm" 27+46.721, 6.200m RT. (48.526 sq m)

"Rm" 28+85.602, 19.761m LT. TO
"Rm" 28+54.305, 19.761m LT. (108.908 sq m)

④ REMOVE DRIVEWAY

"WA" 9+30.000, 9.900m LT. (W=8.000m±)
"Rm" 28+57.000, 6.200m RT. (W=8.000m±)
"Rm" 28+20.000, 6.200m RT. (W=10.000m±)
"Rm" 27+76.000, 6.200m RT. (W=8.000m±)

⑤ REMOVE OLEANDER SHRUBS (2 TOTAL)

"Rm" 26+30.000 LT. TO
"Rm" 26+80.000 LT.

⑦ REMOVE SIDEWALK RAMP (7 TOTAL)

"Lm" 3+81.308, 17.036 LT.
"Lm" 3+52.360, 13.946 RT.
"Lm" 3+44.537, 14.758 LT.
"Lm" 3+22.468, 13.730 RT.
"Lm" 3+17.739, 15.633 RT.
"Lm" 3+07.549, 17.432 RT.
"WA" 9+05.808, 10.922 LT.

Ⓐ REMOVE RCP

"Rm" 27+38.894, 5.539m RT. TO
"Rm" 27+38.398, 2.428m LT. (7.983m)
(NO DIRECT PAYMENT)

"Rm" 28+09.000, 18.656m LT. TO
"Rm" 28+00.000, 18.692m LT. (10.800m)
(NO DIRECT PAYMENT)

"Rm" 28+50.467, 18.487m LT. TO
"Rm" 28+42.168, 18.521m LT. (8.299m)
(NO DIRECT PAYMENT)

"Rm" 28+97.367, 18.807m LT. TO
"Rm" 28+87.000, 18.823m LT. (10.367m)
(NO DIRECT PAYMENT)

"WA" 9+98.391, 2.436m LT. TO
"WA" 9+96.231, 5.829m RT. (8.540m)
(NO DIRECT PAYMENT)

"WA" 9+86.001, 1.578m RT. TO
"WA" 9+88.948, 5.395m RT. (4.822m)
(NO DIRECT PAYMENT)

"WA" 9+49.252, 1.365m LT. TO
"WA" 9+44.600, 1.362m LT. (4.652m)
(NO DIRECT PAYMENT)

Ⓑ PLUG AND ABANDON RCP

"WA" 9+49.252, 1.365m LT. TO
"WA" 9+59.936, 10.664m LT. (14.164m)

"WA" 9+88.948, 5.395m RT. TO
"WA" 9+94.078, 12.620m RT. (8.861m)

"WA" 9+96.231, 5.829m RT.

"Rm" 27+38.398, 2.428m LT. TO
"Rm" 27+37.303, 19.090m LT. (16.697m)

"Rm" 28+87.000, 18.823m LT. TO
"Rm" 28+50.467, 18.487m LT. (36.500m)

Ⓓ REMOVE DROP INLET

"Rm" 27+38.894, 5.539m RT.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

REMOVAL PLAN

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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CHECKED BY	JPL
REVIEWED BY	DWB

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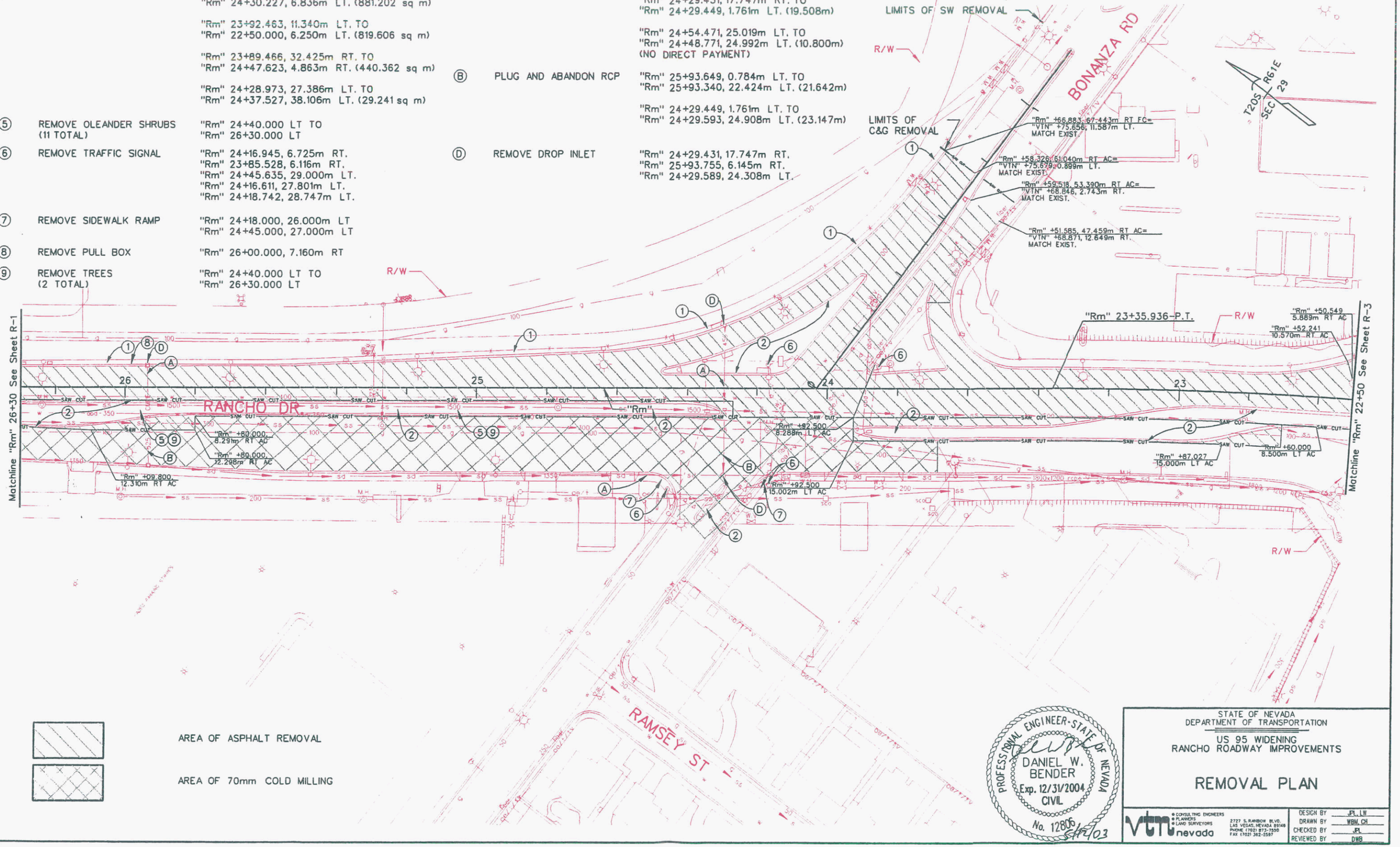
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	R-2

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	REMOVE CURB, GUTTER AND SIDEWALK	"Rm" 26+30.000, 8.900m RT. TO "Rm" 23+67.003, 67.532m RT. (282.508 m)
②	REMOVE MEDIAN ISLANDS	"Rm" 26+30.000, 4.650m LT. TO "Rm" 24+30.227, 6.836m LT. (881.202 sq m) "Rm" 23+92.463, 11.340m LT. TO "Rm" 22+50.000, 6.250m LT. (819.606 sq m) "Rm" 23+89.466, 32.425m RT. TO "Rm" 24+47.623, 4.863m RT. (440.362 sq m) "Rm" 24+28.973, 27.386m LT. TO "Rm" 24+37.527, 38.106m LT. (29.241 sq m)
⑤	REMOVE OLEANDER SHRUBS (11 TOTAL)	"Rm" 24+40.000 LT TO "Rm" 26+30.000 LT
⑥	REMOVE TRAFFIC SIGNAL	"Rm" 24+16.945, 6.725m RT. "Rm" 23+85.528, 6.116m RT. "Rm" 24+45.635, 29.000m LT. "Rm" 24+16.611, 27.801m LT. "Rm" 24+18.742, 28.747m LT.
⑦	REMOVE SIDEWALK RAMP	"Rm" 24+18.000, 26.000m LT "Rm" 24+45.000, 27.000m LT
⑧	REMOVE PULL BOX	"Rm" 26+00.000, 7.160m RT
⑨	REMOVE TREES (2 TOTAL)	"Rm" 24+40.000 LT TO "Rm" 26+30.000 LT
Ⓐ	REMOVE RCP	"Rm" 25+93.755, 6.145m RT. TO "Rm" 25+93.649, 0.784m LT. (6.920m) (NO DIRECT PAYMENT) "Rm" 24+29.431, 17.747m RT. TO "Rm" 24+29.449, 1.761m LT. (19.508m) "Rm" 24+54.471, 25.019m LT. TO "Rm" 24+48.771, 24.992m LT. (10.800m) (NO DIRECT PAYMENT)
Ⓑ	PLUG AND ABANDON RCP	"Rm" 25+93.649, 0.784m LT. TO "Rm" 25+93.340, 22.424m LT. (21.642m) "Rm" 24+29.449, 1.761m LT. TO "Rm" 24+29.593, 24.908m LT. (23.147m)
Ⓓ	REMOVE DROP INLET	"Rm" 24+29.431, 17.747m RT. "Rm" 25+93.755, 6.145m RT. "Rm" 24+29.589, 24.308m LT.



AREA OF ASPHALT REMOVAL

AREA OF 70mm COLD MILLING

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/14/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

REMOVAL PLAN

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	R-3

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

② REMOVE MEDIAN ISLANDS

"Rm" 22+50.000, 4.755m LT. TO
"Rm" 22+15.392, 4.666m LT (153.395 sq m)

"Rm" 22+03.126, 7.137m LT. TO
"Rm" 21+51.708, 7.303m LT. (122.495 sq m)

"Rm" 21+23.227, 12.924m LT. TO
"Rm" 19+38.625, 5.742m LT. (1122.916 sq m)

Ⓐ REMOVE RCP

"Rm" 22+29.348, 3.590m RT. TO
"Rm" 22+24.902, 5.771m LT. (10.362m)
(NO DIRECT PAYMENT)

"Rm" 21+67.710, 4.172m RT. TO
"Rm" 21+67.622, 6.291m LT. (10.463m)
(NO DIRECT PAYMENT)

"Rm" 22+24.902, 5.771m LT TO
"Rm" 21+33.020, 3.810m RT. (92.380m)
(NO DIRECT PAYMENT)

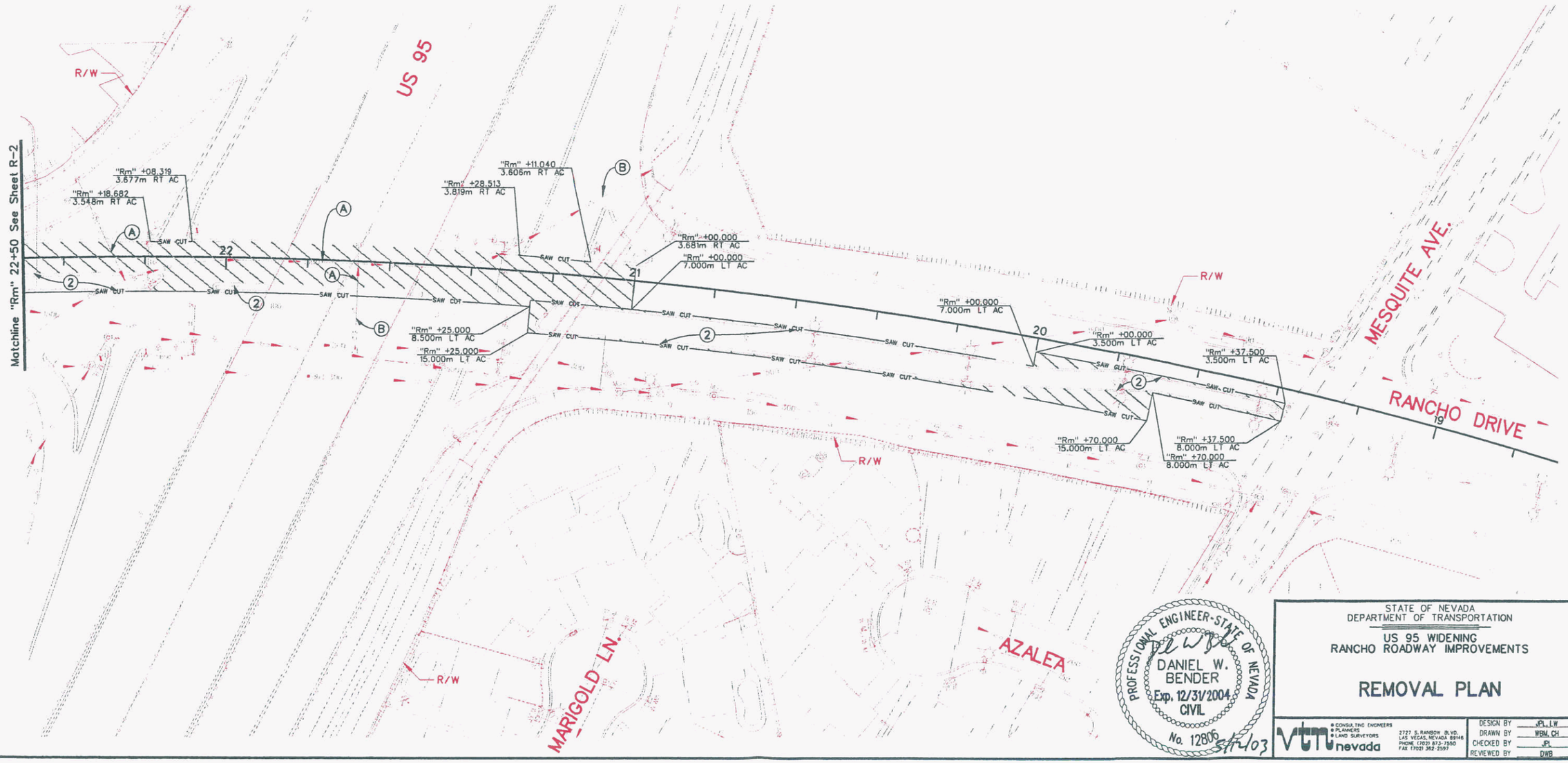
Ⓑ PLUG AND ABANDON RCP

"Rm" 21+67.622, 6.291m LT. TO
"Rm" 21+67.486, 22.173m LT. (15.883m)

"Rm" 21+33.020, 3.810m RT. TO
"Rm" 20+98.304, 27.393m RT. (42.333m)

T20S R61E SEC. 29

AREA OF ASPHALT REMOVAL



PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/7/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

REMOVAL PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	U-1

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

LAS VEGAS VALLEY WATER DISTRICT STANDARD NOTES

LVVWD PROJECT # 27769

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION.
   WHEN REQUESTING INSPECTION, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE

2. ALL WORK SHALL CONFORM TO LVVWD'S STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION

3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.

4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.

5. ALL SEVICE LATERALS 50mm (2") IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.

6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.

7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.

8. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT OF A WATER LINE AND SANITARY OR STORM SEWER LINE CROSS:

   A MINIMUM 450mm (18") VERTICAL SEPARATION (OUTSIDED TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS.

   A. POTABLE WATER SUPPLY QUALITY MATERIAL.
   B. ENCASEMENT, WITH 100mm (4") (MINIMUM)
   C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE.

   EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 3050mm (10') DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.

9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL 150mm (6") DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.

10. ALL WATER FACILITIES SHALL BE DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.

11. THE CONTRACTOR MUST OBTAIN ALL METERS 50mm (2") AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.

12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.

13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURERES LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

LVVWD WATERLINE RELOCATION NOTES

VTN nevada
• CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD. LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550 FAX (702) 362-2597

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	U-2

METRIC NDOT

REVISED 10/24/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

BEGIN PROJECT
"Lm" 3+87.779, 0.753m RT.

TWIN LAKES LATERAL EASEMENT (SNWA)

"Lm" 3+62.356, 7.050m LT
BEGIN WATERLINE RELOCATION
CONNECT TO EXIST 400mm WATER LINE
SEE SHEET U-5 FOR PROFILE
N 8160289.369
E 236380.175

ENCASE EXIST 300mm SS WITH 100mm (4") THICK CLSM 3m (10') EACH SIDE OF 400mm WATER

WASHINGTON AVE

"RSm" 28+90.961, 0.513m LT
BEGIN WATERLINE RELOCATION
CONNECT TO EXIST 400mm WATER LINE
SEE SHEET U-5 FOR PROFILE
N 8160237.9220
E 236418.3066

"RSm" 28+83.558, 0.493m LT
END WATERLINE RELOCATION
CONNECT TO EXIST 400mm WATER LINE
SEE SHEET U-5 FOR PROFILE
N 8160231.9988
E 236422.7474

"Rm" 28+44.954, 5.233m RT
BEGIN SANITARY SEWER RELOCATION
INSTALL NEW 1200mm TYPE 1 SSMH
INSTALL NEW 200mm SS
SEE PROFILE ON SHEET U-6

"Rm" 27+57.466, 5.841m RT
INSTALL NEW 1200mm TYPE 1 SSMH
SEE PROFILE ON SHEET U-6

ERNEST MAY LN.

"Rm" 27+01.540, 5.954m RT
INSTALL NEW 1200mm TYPE 1 SSMH
CONNECT TO EXISTING 200mm SS
HIGH DROP CONNECTION PER DCSWCS SD-8
SEE PROFILE ON SHEET U-6

T20S R61E SEC 29

"Rm" 28+74.567=P.I.

"RL"

"Rm"

"Rm" 26+65.882=P.I.

RANCHO DRIVE

NOTE 1

Matchline "Rm" 26+30 See Sheet U-2

STATION EQUATION
"Lm" 3+04.801=
"Rm" 28+97.668, 6.706m LT.

"Lm" 3+39.372, 7.129m LT
END WATERLINE RELOCATION
CONNECT TO EXIST 400mm WATER LINE
SEE SHEET U-5 FOR PROFILE
N 8160271.462
E 236393.424

BELROSE ST.

CAUTION: OH ELECTRIC

B METER

CAUTION: OH ELECTRIC

A TEST STA SNWA

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA 12-4-03 DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

NOTE
CONTRACTOR TO MAINTAIN 2.87m HORIZONTAL SEPARATION BETWEEN THE RCB AND 400mm WATERLINE. IF RCB IS LESS THAN 2.87m HORIZONTALLY FROM THE 400mm WATERLINE, DRAPE THE RCB WITH 8 MIL POLYETHYLENE SHEETING w/ POLYURETHANE ELASTOMERIC SEALANT PER U.D.A.C.S. AT NO TIME WILL HORIZONTAL SEPARATION OF LESS THAN 1.8m BE ACCEPTED BETWEEN THE RCB AND THE WATERLINE.

SNWA Engineering
ELPER/DPR Office
DEC 3 - 2003

(A) TO REMAIN IN SERVICE PROTECT IN PLACE

(B) GAS LINE RELOCATED BY OTHERS

(C) RELOCATE EXISTING WATER LINE SEE SHEET U-5 FOR PROFILE
"Lm" 3+62.356, 7.050m LT TO "Lm" 3+39.372, 7.129m LT
"RSM" 28+90.961, 0.513m LT TO "RSM" 28+83.558, 0.493m LT

(D) RELOCATE EXISTING SANITARY SEWER LINE SEE SHEET U-6 FOR PROFILE
"Rm" 27+01.602, 7.394m RT TO "Rm" 26+23.791, 4.992m LT

(F) RELOCATE EXISTING WATERLINE SEE DETAIL, SHEET U-7
"Rm" 27+06.664, 9.332m RT TO "Rm" 27+06.299, 1.004m LT

(H) ADJUST EXISTING WATER SERVICE LATERAL

(I) ADJUST EXISTING SEWER UTILITY BOX

NOTE 1
SPRINT TO ADJUST LOCATION DURING CONSTRUCTION
CALL DEAN WHITMAN FOR COORDINATION (244-7801)

1st Appvd. 6/27/03
12/3/03
LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN

vtn nevada
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

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REVIEWED BY	DWB

12/3/03

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	U-3

REVISED 10/24/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

"Rm" 25+64.258, 6.923m RT
INSTALL NEW 1200mm TYPE 1 SSMH
SEE PROFILE ON SHEET U-6

"Rm" 24+76.879, 6.933m RT
INSTALL NEW 1200mm TYPE 1 SSMH
SEE PROFILE ON SHEET U-6a

"Rm" 24+76.879, 0.694m LT
INSTALL NEW 1200mm TYPE 1 SSMH
SEE PROFILE ON SHEET U-6a

"Rm" 24+76.879, 5.564m LT
END SANITARY SEWER RELOCATION
CONNECT TO EXISTING 1200mm TYPE 1 SSMH
HIGH DROP CONNECTION
SEE DETAIL ON SHEET U-8
SEE PROFILE ON SHEET U-6a

"Rm" 24+10.970, 3.294m LT
BEGIN WATER LINE RELOCATION
CONNECT TO EXIST 400mm WATER LINE
SEE SHEET U-5 FOR PROFILE
N 8169856.243
E 2367708.872

"Rm" 23+98.938, 10.133m RT
END WATER LINE RELOCATION
CONNECT TO EXIST 400mm WATER LINE
SEE SHEET U-5 FOR PROFILE
N 8169854.990
E 2367723.819

Matchline "Rm" 26+30 See Sheet U-1

Matchline "Rm" 22+50 See Sheet U-3

"RL"

"Rm"

CAUTION
OH ELECTRIC

"Rm" 23+35.936-P.T.

R/W.

R/W.

(A) TO REMAIN IN SERVICE
PROTECT IN PLACE

(C) RELOCATE EXISTING WATERLINE
SEE SHEET U-5 FOR PROFILE
"Rm" 24+10.970, 3.294m LT TO
"Rm" 23+98.938, 10.133m RT

(F) RELOCATE EXISTING WATERLINE
PER DETAIL, SHEET U-7
"Rm" 25+29.477, 1.576m LT TO
"Rm" 25+29.536, 8.711m RT

(G) RELOCATED TELEPHONE LINE
BY SPRINT

1st Rpvd 6/27/03

Robert J. Morgan
LVVWD

12/3/03
DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

12/3/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN

VTN nevada
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	U-4

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

T20S R61E SEC 29

(A) TO REMAIN IN SERVICE PROTECT IN PLACE

(B) RELOCATE EXISTING GAS LINE BY OTHERS

Matchline "Rm" 22+50 See Sheet U-2

US-95

"RL"

"Rm"

R/W

R/W.

END PROJECT
"Rm" 19+37.500, 3.500m LT.

MESQUITE AVE.

RANCHO DRIVE

MARIGOLD LN.

AZALEA

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN

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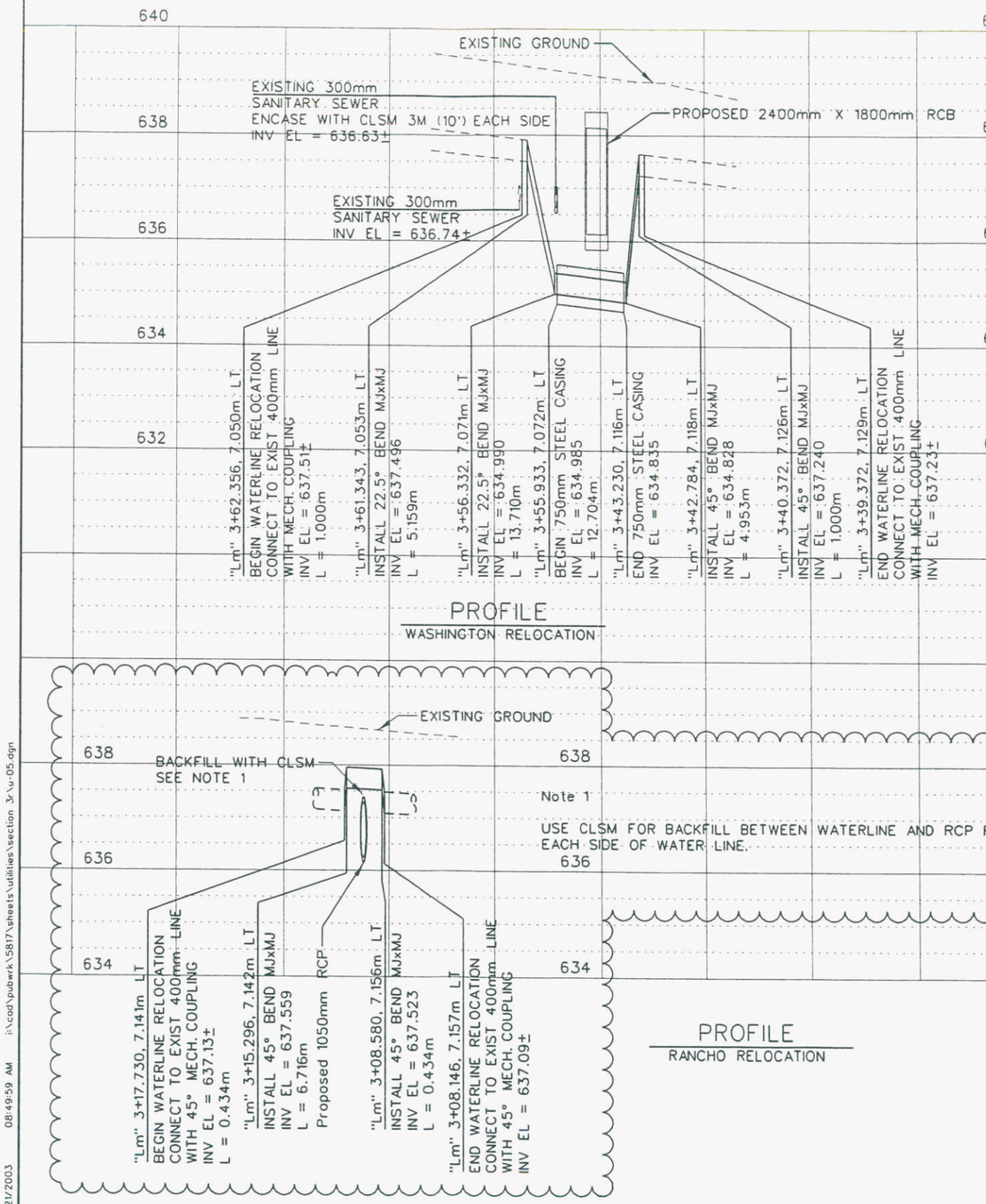
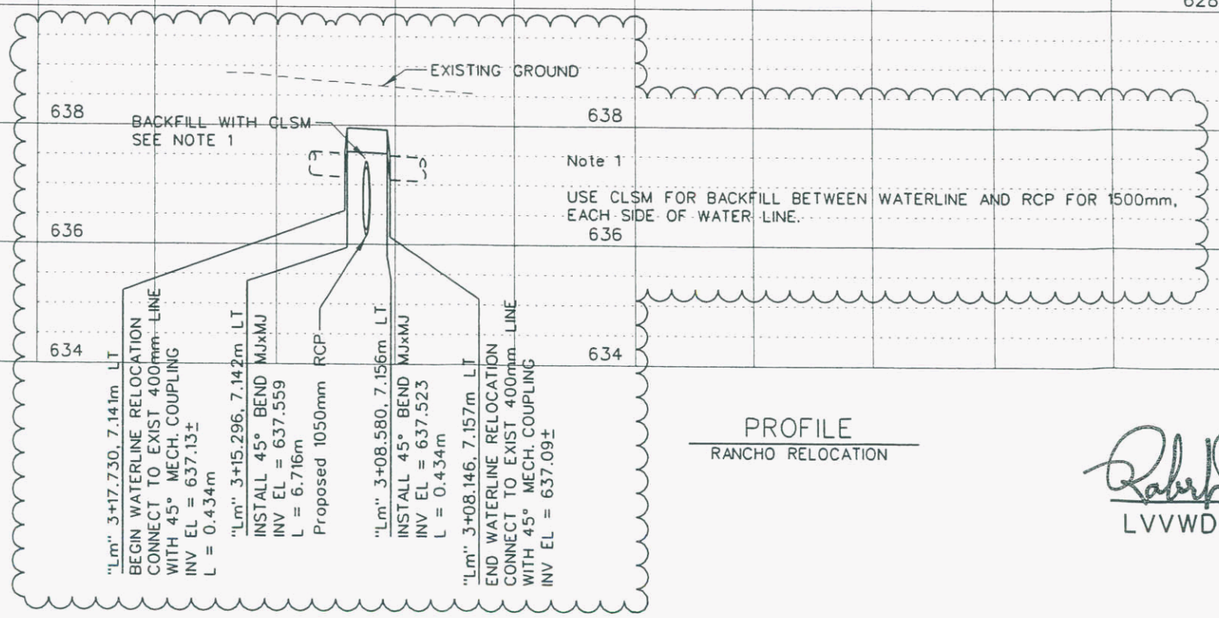
METRIC NDOT	FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
	9	NEVADA	SPSR 0599 (004)	CLARK	U-5

REVISED 06/06/03
REVISED 11/21/03
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



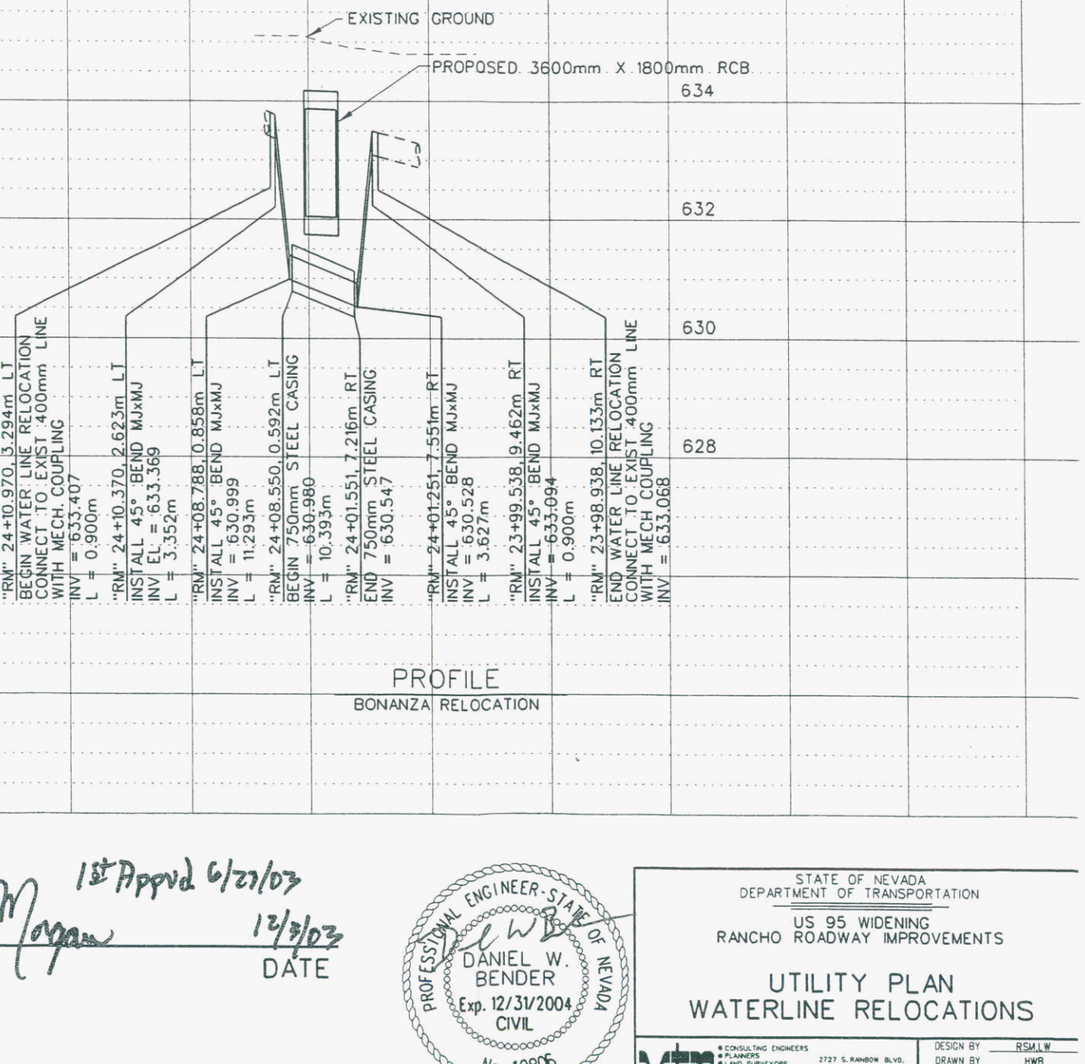
PROFILE
WASHINGTON RELOCATION



Note 1

USE CLSM FOR BACKFILL BETWEEN WATERLINE AND RCP FOR 1500mm, EACH SIDE OF WATER LINE.

PROFILE
RANCHO RELOCATION



PROFILE
BONANZA RELOCATION

1st Appvd 6/21/03
LVVWD
12/3/03
DATE

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
11/21/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN
WATERLINE RELOCATIONS

VTN nevada
CONSULTING ENGINEERS
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LAND SURVEYORS
2727 S. RAINBOW BLVD.
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	U-6

METRIC NDOT

REVISED 10/24/03

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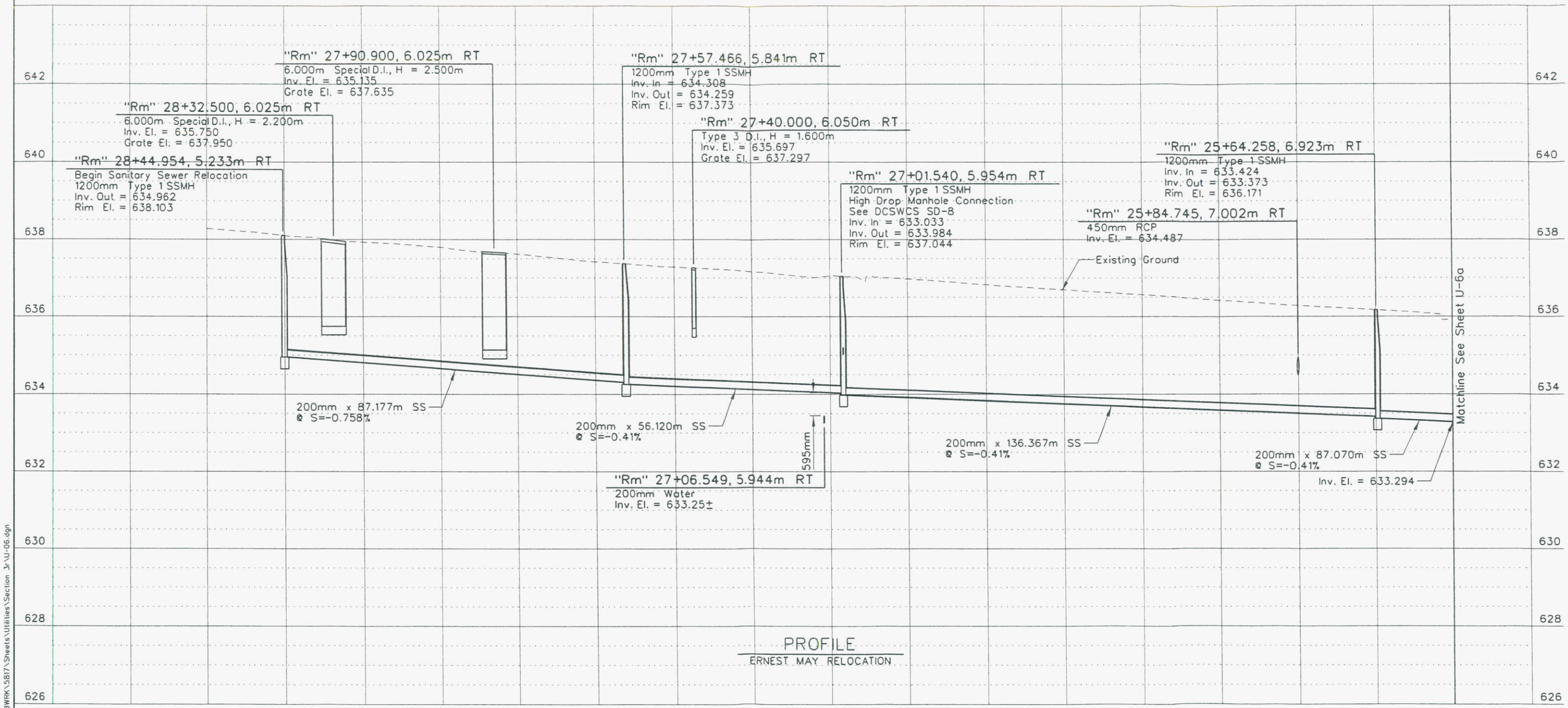

PROFILE

ERNEST MAY RELOCATION

1st Appvd. 6/20/03

Robert J. Morgan 12/3/03

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
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12/3/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN
SANITARY SEWER RELOCATIONS

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9	NEVADA	SPSR 0599 (004)	CLARK	U-6a

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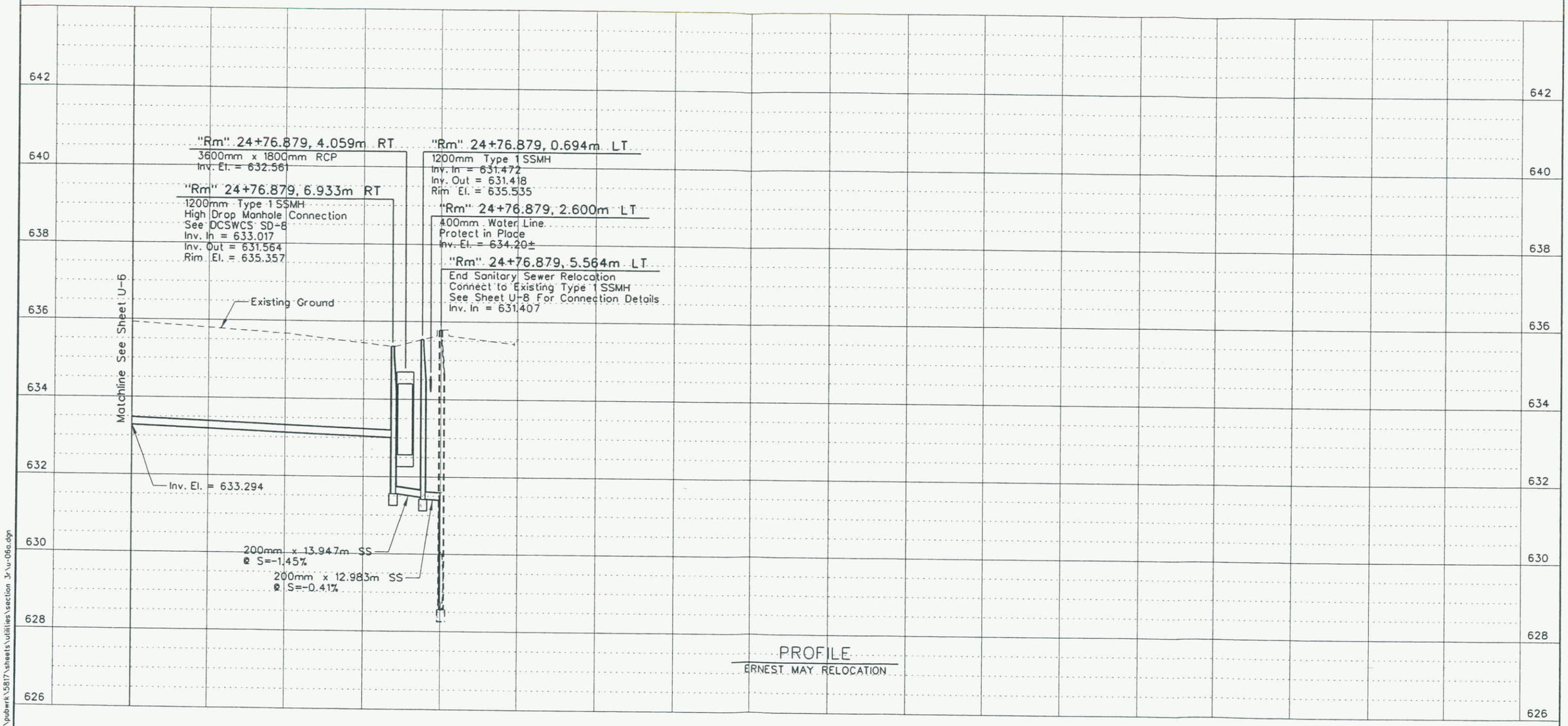

PROFILE
ERNEST MAY RELOCATION

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/27/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN
SANITARY SEWER RELOCATIONS

VTN nevada
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	U-7

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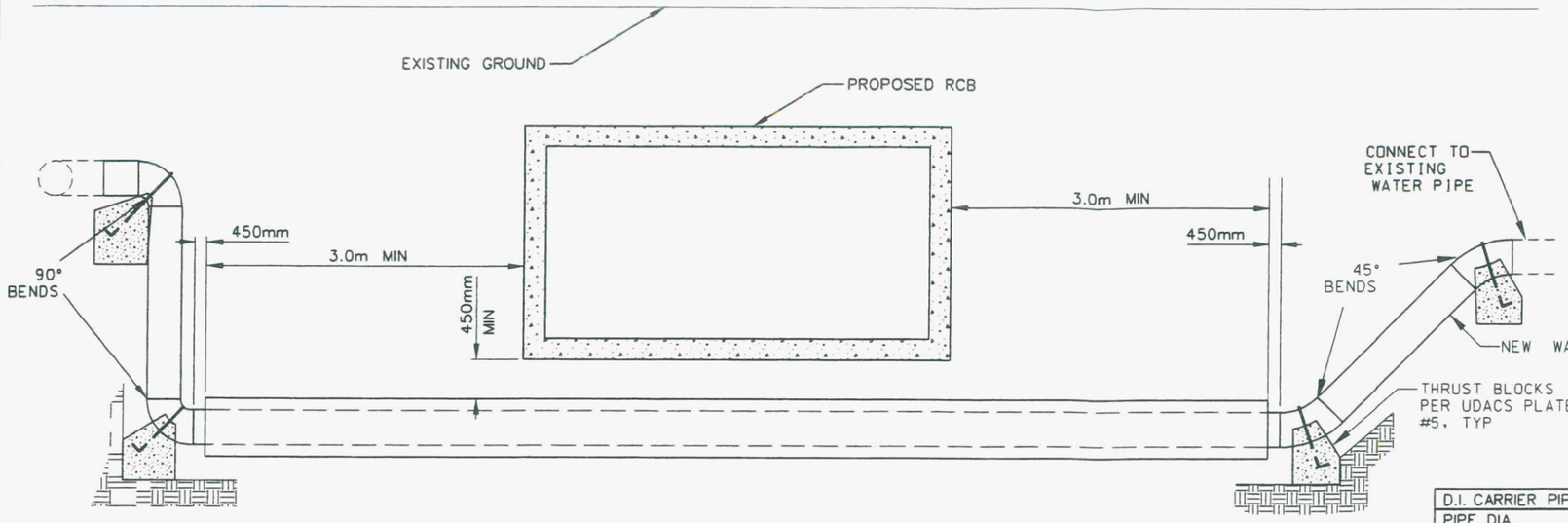
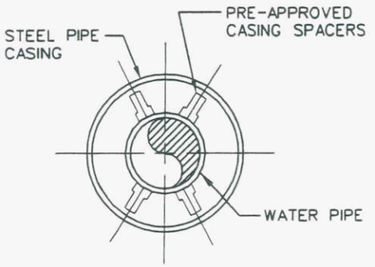


TYPICAL CASING SECTION

NOTES:

1. STEEL PIPE CASING SYMMETRICAL ABOUT WATER MAIN CENTERLINE.
2. PRE-APPROVED CASING SPACERS AND PRE-APPROVED END SEALS INSTALLED PER MANUFACTURER'S SPECIFICATIONS. (REDWOOD SKIDS NOT ALLOWED, UDACS SECTION 3.26 NOT APPLICABLE
3. USE A "CENTERED" CONFIGURATION AND PROVIDE THE MANUFACTURER WITH THE FOLLOWING:
   - PIPE O.D.
   - CASING I.D.
   - CASING LENGTH

D.I. CARRIER PIPE	
PIPE DIA.	CASING I.D.
400mm (16")	750mm (30")
150mm (6")	400mm (16")



WHERE THE WATER LINE IS LESS THAN 450mm OVER THE STORM/SEWER LINE, WHERE THE WATER LINE IS UNDER THE STORM/SEWER LINE, AND WHERE THE HORIZONTAL SEPERATION, AS REQUIRED BY THE WATER SUPPLY REGULATION, CANNOT BE MAINTAINED BECAUSE OF PHYSICAL OBSTRUCTIONS. THE WATER LINE SHALL BE PROTECTED BY CONSTRUCTION OF THE STORM/SEWER OR WATER LINE IN THE FOLLOWING PRIORITY:

1. THE STORM/SEWER MAIN MUST BE CONSTRUCTED OF WATER SUPPLY QUALITY MATERIALS MEETING AWWA STANDARDS.
2. THE WATERMAIN SHALL BE D.I.P. WITH RESTRAINED JOINTS. INSTALLED IN A STEEL CASING WHICH EXTENDS A MINIMUM OF 3.0m ON EACH SIDE OF THE CROSSING.
3. THE STORM SEWER MAIN SHALL BE TOTALLY ENCASED IN A MINIMUM OF 100mm OF CEMENT SLURRY (2.4MPa) FOR A DISTANCE OF 3.0m ON EACH SIDE OF THE CROSSING ONLY WITH AGENCY APPROVAL. ENCASEMENT WILL NOT BE PERMITTED FOR ASBESTOS CEMENT PIPE.

EACH OF THE PROVISIONS SHALL ALSO BE EXTENDED FOR OTHER THAN 90 DEGREE CROSSINGS TO THE POINT AT WHICH THE 3.0m SEPARATION BETWEEN THE WATER AND SEWER LINES IS ACHIEVED (10/SINE OF CROSSING ANGLE).

DETAIL ALSO APPLICABLE FOR RCP AND HERCP CROSSINGS

1. STEEL CASING SHALL BE FABRICATED FROM A MINIMUM OF 6mm (1/4 ") THICK STEEL PLATES, CONFORMING TO THE REQUIREMENTS OF ASTM A283, GRADE B, C OR D. ALL JOINTS SHALL BE WELDED. INTERIOR JOINTS SHALL BE GROUND TO A SMOOTH FINISH. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AWWA 200, "AWWA STANDARD FOR FABRICATED ELECTRICALLY WELDED STEEL WATER PIPE". COATINGS FOR STEEL CASING ARE NOT REQUIRED.
2. PIPE CASING SHALL BE LAID TRUE TO LINE AND GRADE WITH NO BENDS OR CHANGES IN GRADE FOR THE FULL LENGTH OF THE CASING.
3. THE PIPE SHALL BE SUPPORTED AT EACH END JOINT WITH SPACERS. AFTER INSTALLATION OF THE PIPE THE CASING SHALL BE SEALED AT BOTH ENDS WITH CASING END SEALS. DUCTILE IRON PIPE JOINTS INSIDE CASING ARE TO BE RESTRAINED.

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN WATERLINE RELOCATION

VTN nevada
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9	NEVADA	SPSR 0599 (004)	CLARK	U-8

METRIC NDOT

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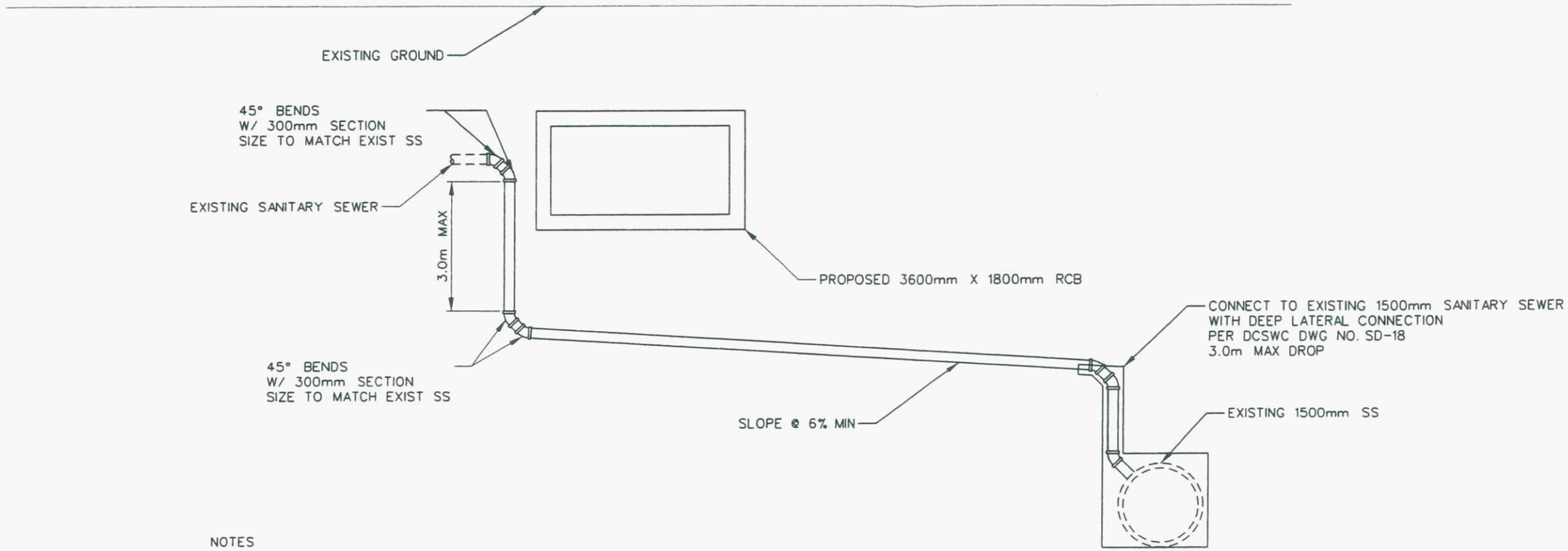

NOTES

ALL PIPES SHALL BE EXTRA STRENGTH VITRIFIED CLAY PIPE AND BE FURNISHED WITH MECHANICAL COMPRESSION JOINTS OR COMPRESSION COUPLINGS. MATERIALS FOR COMPRESSION JOINTS OR COMPRESSION COUPLINGS SHALL CONFORM TO ASTM C425.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
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No. 12806
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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

UTILITY PLAN
SEWER LATERAL RELOCATION

VTN nevada
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9	NEVADA	SPSR 0599 (004)	CLARK	S 1

REVISED 06/06/03

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - CONSTRUCTION PLANS

REMOVE AND RESET STRUCTURES AND OBSTRUCTIONS	PLANTMIXING MISCELLANEOUS AREAS	EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED)	CLASS A CONCRETE (ISLAND PAVING)	ADJUST WATER VALVE BOXES	ADJUSTING MANHOLECOVERS (METHOD B)	ADJUST VALVE COVERS (METHOD B)	CLASS A CONCRETE GLUE DOWN CURB (TYPE B)	CLASS A CONCRETE CURB AND GUTTER (TYPE 5)	CLASS A CONCRETE SIDEWALK (100-mm)	CLASS A CONCRETE DRIVEWAY (150-mm)	CLASS A CONCRETE DRIVEWAY (225-mm) (REINFORCED	CLASS A CONCRETE RAMP (100-mm)	LOOP DETECTOR	ITEM NUMBER	DESCRIPTION	STATION TO STATION	DWG.	NOTE
202 0004	402 2160	405 2016	502 2008	609 0148	609 0130	609 0134	613 2092	613 2228	613 2356	613 2388	613 2394	613 2452	623 0508					
LS	SQM	MTON	CM	EA	EA	EA	LM	LM	SM	SM	SM	SM	EA	UNIT				
															NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
SEE SHEETS 3 THRU 3F															CONSTRUCT PAVEMENT SECTION NO.1 (SEE TYPICAL SECTIONS)		4A	1
SEE SHEETS 3 THRU 3F															CONSTRUCT 70MM MILL & OVERLAY (SEE TYPICAL SECTIONS)		4A	2
					1										ADJUST TO GRADE (CLV SEWER MANHOLE)	"WA" 9+11.663, 6.328M LT.	4A	11
					1											"LM" 3+62.803, 10.156M LT.		
					1											"LM" 3+58.726, 10.411M LT.		
					1											"RM" 28+47.032, 16.246M LT.		
					1											"RM" 27+40.507, 12.326M LT.		
					1											"RM" 27+00.910, 10.848M LT.		
					1											"RM" 26+33.970, 9.767M LT.		
					1											"RM" 28+32.370, 6.593M LT.		
						1									ADJUST TO GRADE PER UDACS, 2ND EDITION, PLATE 8 (LVVWD WATER VALVE)	"WA" 9+16.499, 09.13M RT.	4A	12
						1										"WA" 9+34.519, 1.663M RT.		
						1										"LM" 3+68.793, 6.494M LT.		
						1										"LM" 3+69.787, 7.765M LT.		
						1										"RM" 27+06.289, 2.203M LT.		
						1										"RM" 27+13.985, 2.851M LT.		
						1										"RM" 27+14.611, 3.391M LT.		
							22.4								CONSTRUCT TYPE 5 CURB & GUTTER (SEE SHEETS 8 & 9)	"WA" 9+22.596, 9.750M LT. TO	4A	13
							14.3									"WA" 9+45.000, 9.750M LT.		
							9.5									"WA" 9+19.156, 9.750M RT. TO		
							135.0									"WA" 9+33.500, 9.750M RT.		
							29.5									"WA" 9+61.000, 9.750M RT. TO		
							78.5									"WA" 9+70.500, 9.750M RT.		
							11.7									"LM" 3+09.598, 17.265M RT. TO		
							12.4									"RM" 27+67.243, 6.050M RT		
							8.0									"RM" 27+46.721, 6.050M RT. TO		
																"RM" 27+20.343, 12.231M RT.		
																"RM" 27+05.314, 17.415M RT. TO		
																"RM" 26+30.000, 8.854M RT.		
																"RM" 28+97.298, 19.585M LT. TO		
																"RM" 28+85.602, 19.586M LT.		
																"RM" 28+54.203, 19.611M LT. TO		
																"RM" 28+41.818, 19.611M LT.		
																"RM" 28+09.318, 19.650M LT. TO		
																"RM" 28+01.318, 19.650M LT.		
0	0	0	0	0	8	7	0	321	0	0	0	0	0		PAGE SUBTOTAL			

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
NO. 12806
6/6/03

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9	NEVADA	SPSR 0599 (004)	CLARK	S 2

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - CONSTRUCTION PLANS

ITEM NUMBER	REMOVE AND RESET STRUCTURES AND OBSTRUCTIONS	PLANTMIXING MISCELLANEOUS AREAS	EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED)	CLASS A CONCRETE (ISLAND PAVING)	ADJUST WATER VALVE BOXES	ADJUSTING MANHOLECOVERS (METHOD B)	ADJUST VALVE COVERS (METHOD B)	CLASS A CONCRETE GLUE DOWN CURB (TYPE B)	CLASS A CONCRETE CURB AND GUTTER (TYPE 5)	CLASS A CONCRETE SIDEWALK (100-mm)	CLASS A CONCRETE DRIVEWAY (150-mm)	CLASS A CONCRETE DRIVEWAY (225-mm) (REINFORCED	CLASS A CONCRETE RAMP (100-mm)	LOOP DETECTOR	DESCRIPTION	STATION TO STATION	DWG.	NOTE
	202 0004	402 2160	405 2016	502 2008	609 0148	609 0130	609 0134	613 2092	613 2228	613 2356	613 2388	613 2394	613 2452	623 0508				
UNIT	LS	SQM	MTON	CM	EA	EA	EA	LM	LM	SM	SM	SM	SM	EA				
										36.6					CONSTRUCT 1.83M SIDEWALK	"WA" 9+17.946, 14.400M LT. TO	4A	14
										39.3						"WA" 9+14.006, 14.918 M LT.		
																"WA" 9+19.156, 9.750M RT. TO		
										17.4						"WA" 9+33.500, 9.750M RT.		
																"WA" 9+61.000, 9.750M RT. TO		
										199.5						"WA" 9+70.500, 9.750M RT.		
																"LM" 3+09.598, 17.265M RT. TO		
										37.5						"RM" 27+62.093, 11.200M RT		
																"RM" 28+97.298, 19.585M LT. TO		
										42.1						"RM" 28+79.453, 25.765M LT.		
																"RM" 28+61.852, 27.365M LT. TO		
										14.6						"RM" 28+41.818, 19.611M LT.		
																"RM" 28+09.318, 19.650M LT. TO		
										66.8						"RM" 28+01.318, 19.650M LT.		
																"RM" 27+62.216, 19.529M LT. TO		
										59.5						"RM" 27+25.614, 23.246M LT.		
																"RM" 27+52.871, 12.200M RT. TO		
										153.7						"RM" 27+20.343, 12.231M RT.		
																"RM" 27+05.314, 17.514M RT. TO		
										65.0						"RM" 26+30.000, 8.854M RT.		
																"RM" 26+96.857, 23.895M LT. TO		
										40.0						"RM"26+61.805, 19.727M LT.		
																"RM"26+51.357, 20.178M LT. TO		
										20.1						"RM" 26+30.000, 21.250M LT.		
																"WA" 8+95.505, 9.300M RT. TO		
																"WA" 9+03.299, 17.248M RT.		
				12.4				382.8							CONSTRUCT TYPE B GLUE DOWN MEDIAN CURB	"LM" 3+25.900, 1.800M LT. TO	4A	15
															(SEE SHEET 7 & 14)	"RM" 27+25.991, 4.900M LT.		
				4.4				136.0								"RM" 26+98.330, 8.500M LT. TO		
																"RM" 26+30.000, 7.000M LT.		
				1.8				41.3								"WA" 10+24.114, 1.315M RT. TO		
																"WA" 10+44.000, 1.429M RT		
		27.5						24.3								"LM" 3+23.893, 13.467M RT. TO		
																"LM" 3+14.337, 12.500M RT.		
													16.0		CONSTRUCT CURB RAMP	"LM" 3+80.045, 17.382M LT. (TYPE D, ALT. 2)	4A	16
													16.0		(SEE SHEETS 11-13)	"LM" 3+44.268, 13.648M LT. (TYPE D, ALT. 2)		
													16.0			"LM" 3+56.229, 12.863M RT. (TYPE D, ALT. 2)		
													16.0			"LM" 3+47.078, 16.713M RT. (TYPE D, ALT. 2)		
													4.8			"LM" 3+22.360, 14.962M RT. (ISLAND)		
													4.8			"LM" 3+17.006, 15.525M RT. (ISLAND)		
													16.0			"LM" 3+12.400, 20.765M RT. (TYPE D, ALT. 2)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"RM" 27+63.601, 7.558M RT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"RM" 27+51.070, 7.851M RT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"RM" 27+22.133, 7.862M RT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"RM" 27+02.977, 12.191M RT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"RM" 28+81.244, 21.398M LT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"RM" 28+59.649, 21.888M LT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"WA" 9+19.308, 11.112M LT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"WA" 9+15.508, 11.265M RT. (TYPE B)		
													11.00			"WA" 9+05.808, 10.922M LT. (TYPE B)		
										QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"						"WA" 9+00.914, 11.929M RT. (TYPE B)		
	0	28	0	19	0	0	0	584	0	792	0	0	100	0		PAGE SUBTOTAL		

PROFESSIONAL ENGINEER, STATE OF NEVADA
DANIEL W. BENDER
Exp: 12-31-04
CIVIL
No. 12006
6/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 3

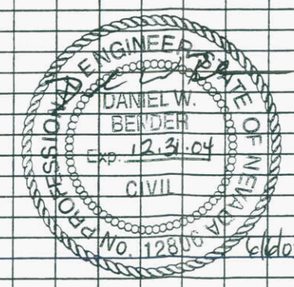
REVISED 06/06/03

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - CONSTRUCTION PLANS

REMOVE AND RESET STRUCTURES AND OBSTRUCTIONS	PLANTMIXING MISCELLANEOUS AREAS	EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED)	CLASS A CONCRETE (ISLAND PAVING)	ADJUST WATER VALVE BOXES	ADJUSTING MANHOLECOVERS (METHOD B)	ADJUST VALVE COVERS (METHOD B)	CLASS A CONCRETE GLUE DOWN CURB (TYPE B)	CLASS A CONCRETE CURB AND GUTTER (TYPE 5)	CLASS A CONCRETE SIDEWALK (100-mm)	CLASS A CONCRETE DRIVEWAY (150-mm)	CLASS A CONCRETE DRIVEWAY (225-mm) (REINFORCED	CLASS A CONCRETE RAMP (100-mm)	LOOP DETECTOR	ITEM NUMBER	DESCRIPTION	STATION TO STATION	DWG.	NOTE
202 0004	402 2160	405 2016	502 2008	609 0148	609 0130	609 0134	613 2092	613 2228	613 2356	613 2388	613 2394	613 2452	623 0508					
LS	SQM	MTON	CM	EA	EA	EA	LM	LM	SM	SM	SM	SM	EA	UNIT				
											44.1				CONSTRUCT COMMERCIAL DRIVEWAY	"RM" 27+67.243, 6.200M RT. TO	4A	17
																"RM" 27+46.721, 6.200M RT.		
											72.0					"RM" 28+85.602, 19.736M LT. TO		
																"RM" 28+54.305, 19.761M LT.		
				1											ADJUST TO GRADE PER UDACS, 2ND EDITION, PLATE 1	"WA" 9+25.385, 10.487M RT	4A	18
				1											(LVVWD WATER METER)	"RM" 28+41.620, 6.600M RT		
				1												"RM" 27+84.519, 6.609M RT		
				1												"RM" 27+46.128, 6.705M RT		
					1										ADJUST TO GRADE	"WA" 9+18.601, 11.029M RT	4A	19
															(SNWA TEST STA.)			
															NOTE NOT USED		4A	20
															PROTECT IN PLACE	"WA" 9+55.492, 10.290M LT.	4A	21
															(TRAFFIC SIGNAL)	"LM" 3+54.466, 13.822M RT.		
																"LM" 3+11.020, 28.630M RT.		
																"LM" 3+40.608, 13.981M LT.		
																"RM" 27+26.010, 8.067M RT.		
																"RM" 27+22.442, 9.689M RT.		
																"RM" 27+03.658, 15.233M RT.		
																"RM" 27+02.676, 21.066M LT.		
										19.0					CONSTRUCT CONCRETE DRIVEWAY	"WA" 9+30.000, 9.900M LT. (W=8.000M)	4A	22
										19.0						"RM" 28+57.000, 6.200M RT. (W=8.000)		
										23.8						"RM" 28+20.000, 6.200M RT. (W=10.000M)		
										19.0						"RM" 27+76.000, 6.200M RT. (W=8.000M)		
1.0															REMOVE & RESET BUS STOP PAD,	"WA" 9+40.000, 10.500M LT.	4A	23
															EQUIPMENT & APPURTENANCES	"RM" 27+87.500, 7.000M RT.		
(see sheet S-7 for trench drain qtys)											37.5				CONSTRUCT COMMERCIAL DRIVEWAY W/ SPECIAL		4A	24
															TRENCH DRAIN			
											31.526				(SEE SHEET SD-13 & SD-14)			
															NOTE NOT USED		4A	25
					1										ADJUST TO GRADE	"RM" 28+41.650, 6.500M RT.	4A	26
					1										(CLV SEWER CLEANOUT)	"RM" 27+97.000, 7.000M RT.		
SEE SHEETS 3 THRU 3F															CONSTRUCT PAVEMENT SECTION NO. 1		5A	1
															(SEE TYPICAL SECTIONS)			
SEE SHEETS 3 THRU 3F															CONSTRUCT 70MM MILL & OVERLAY		5A	2
															(SEE TYPICAL SECTIONS)			
SEE SHEETS 3 THRU 3F															CONSTRUCT PAVEMENT SECTION NO. 2		5A	3
															(SEE TYPICAL SECTIONS)			
1	0	0	0	4	3	0	0	0	0	81	185	0	0		PAGE SUBTOTAL			



FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 4

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - CONSTRUCTION PLANS

REMOVE AND RESET STRUCTURES AND OBSTRUCTIONS	PLANTMIXING MISCELLANEOUS AREAS	EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED)	CLASS A CONCRETE (ISLAND PAVING)	ADJUST WATER VALVE BOXES	ADJUSTING MANHOLECOVERS (METHOD B)	ADJUST VALVE COVERS (METHOD B)	CLASS A CONCRETE GLUE DOWN CURB (TYPE B)	CLASS A CONCRETE CURB AND GUTTER (TYPE 5)	CLASS A CONCRETE SIDEWALK (100-mm)	CLASS A CONCRETE DRIVEWAY (150-mm)	CLASS A CONCRETE DRIVEWAY (225-mm) (REINFORCED	CLASS A CONCRETE RAMP (100-mm)	LOOP DETECTOR	ITEM NUMBER	DESCRIPTION	STATION TO STATION	DWG.	NOTE
202 0004	402 2160	405 2016	502 2008	609 0148	609 0130	609 0134	613 2092	613 2228	613 2356	613 2388	613 2394	613 2452	623 0508					
LS	SQM	MTON	CM	EA	EA	EA	LM	LM	SM	SM	SM	SM	EA	UNIT				
					1										ADJUST TO GRADE	"RM" 26+23.791, 4.992M LT.	5A	10
					1										(CLV SEWER MANHOLE)	"RM" 24+76.879, 5.564M RT.		
					1											"RM" 23+82.288, 6.980M LT.		
					1											"RM" 22+81.174, 7.436M LT.		
					1											"RM" 25+27.038, 10.833M LT.		
						1									ADJUST TO GRADE	"RM" 25+29.979, 10.380M RT.	5A	11
						1									(LVVWD WATER VALVE)	"RM" 25+29.644, 10.828M RT.		
						1										"RM" 25+29.476, 1.887M LT.		
						1										"RM" 23+87.832, 22.567M RT.		
						1										"RM" 23+86.153, 25.536M RT.		
						1										"RM" 23+75.192, 58.530M RT.		
						1										"RM" 24+12.829, 7.787M LT.		
						1										"RM" 24+12.569, 5.077M LT.		
								16.5							CONSTRUCT TYPE 5	"RM" 26+30.357, 8.854M RT. TO	5A	12
															CURB & GUTTER	"RM" 26+13.621, 7.650M RT.		
								247.0							(SEE SHEETS 8&9)	"RM" 25+89.171, 10.750M RT. TO		
																"RM" 23+66.883, 67.442M RT.		
									25.2						CONSTRUCT 1.83M SIDEWALK	"RM" 26+30.000, 21.222M LT. TO	5A	13
																"RM" 26+16.051, 21.806M LT.		
									49.5							"RM" 26+30.000, 8.854M RT. TO		
																"RM" 26+05.971, 15.250M RT.		
									549.0							"RM" 25+96.821, 18.400M RT. TO		
																"RM" 23+39.773, 103.714M RT.		
			53.0				397.8								CONSTRUCT TYPE B GLUE DOWN	"RM" 26+30.000, 7.000M LT. TO	5A	14
															MEDIAN CURB	"RM" 24+31.694, 5.904M RT.		
	80.5						56.3								(SEE SHEET 7 & SHEET 14)	"RM" 24+19.905, 8.916M RT. TO		
																"RM" 23+99.330, 23.590M RT.		
	175.0						44.7									"RM" 23+94.579, 12.292M RT. TO		
																"RM" 23+62.282, 55.238M RT.		
			8.7				108.8									"RM" 23+87.332, 8.177M RT. TO		
																"RM" 23+71.619, 24.461M RT.		
							18.8									"RM" 24+32.567, 30.906M LT. TO		
																"RM" 24+38.399, 38.278M LT		
QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"															CONSTRUCT CURB RAMP	"RM" 26+08.230, 9.873M RT. (TYPE B)	5A	15
QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"																"RM" 25+94.581, 12.991M RT. (TYPE B)		
QTY IS INCLUDED UNDER "PLANTMIXING MISCELLANEOUS AREAS"																"RM" 24+16.618, 7.000M RT. (ISLAND)		
QTY IS INCLUDED UNDER "CLASS A CONCRETE SIDEWALK (100-mm)"																"RM" 24+14.582, 18.488M RT. (TYPE B, MIDBLOCK)		
QTY IS INCLUDED UNDER "PLANTMIXING MISCELLANEOUS AREAS"																"RM" 24+11.532, 14.039M RT. (ISLAND)		
QTY IS INCLUDED UNDER "PLANTMIXING MISCELLANEOUS AREAS"																"RM" 24+09.364, 10.188M RT. (ISLAND)		
												4.8				"RM" 23+85.660, 9.712M RT. (ISLAND)		
												16.0				"RM" 24+43.660, 31.211M LT. (TYPE D, ALT. 2)		
												16.0				"RM" 24+19.540, 26.965M LT. (TYPE D, ALT. 2)		
											55.0				CONSTRUCT COMMERCIAL DRIVEWAY	"RM" 26+13.621, 7.800M RT. TO	5A	16
																"RM" 25+89.171, 10.900M RT.		
		4.8													APPLY SEAL COAT		5A	17
0	256	5	62	0	5	8	626	264	624	0	55	37	0		PAGE SUBTOTAL			

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
No. 12806
6/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 5

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - CONSTRUCTION PLANS

ITEM NUMBER	REMOVE AND RESET STRUCTURES AND OBSTRUCTIONS	PLANTMIXING MISCELLANEOUS AREAS	EMULSIFIED ASPHALT, TYPE SS-1H (DILUTED)	CLASS A CONCRETE (ISLAND PAVING)	ADJUST WATER VALVE BOXES	ADJUSTING MANHOLECOVERS (METHOD B)	ADJUST VALVE COVERS (METHOD B)	CLASS A CONCRETE GLUE DOWN CURB (TYPE B)	CLASS A CONCRETE CURB AND GUTTER (TYPE 5)	CLASS A CONCRETE SIDEWALK (100-mm)	CLASS A CONCRETE DRIVEWAY (150-mm)	CLASS A CONCRETE DRIVEWAY (225-mm) (REINFORCED	CLASS A CONCRETE RAMP (100-mm)	LOOP DETECTOR	DESCRIPTION	STATION TO STATION	DWG.	NOTE
202 0004	402 2160	405 2016	502 2008	609 0148	609 0130	609 0134	613 2092	613 2228	613 2356	613 2388	613 2394	613 2452	623 0508					
UNIT	LS	SQM	MTON	CM	EA	EA	EA	LM	LM	SM	SM	SM	SM	EA				
														1	INSTALL SPEED LOOP DETECTORS	"RM" 25+60.000M RT.	5A	18
														1		"RM" 25+60.000M LT.		
SEE SHEETS 3 THRU 3F															CONSTRUCT PAVEMENT SECTION NO. 2		6	1
															(SEE TYPICAL SECTIONS)			
			13.2												APPLY SEAL COAT		6	6
0	0	13	0	0	0	0	0	0	0	0	0	0	2		PAGE SUBTOTAL			
20	283	18	80	4	16	15	1,211	585	1,416	81	240	137	2		PROJECT TOTAL			

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
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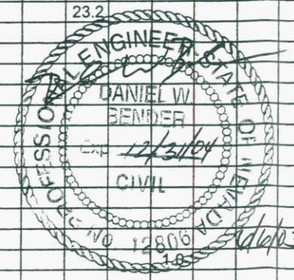
FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 6

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - DRAINAGE

GEOGRID	STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	TYPE 1, CLASS B AGGREGATE BASE	CLASS A CONCRETE (MINOR)	1800-MM X 900-MM PRECAST CONCRETE BOX CULVERT	2400-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 2400-MM PRECAST CONCRETE BOX CULVERT	3800-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	REINFORCING STEEL	REINFORCING STEEL (EPOXY COATED) (DOWELED)	STRUCTURAL STEEL	450-MM REINFORCED CONCRETE PIPE, CLASS III	600-MM REINFORCED CONCRETE PIPE, CLASS III	1050-MM REINFORCED CONCRETE PIPE, CLASS III	1350-MM REINFORCED CONCRETE PIPE, CLASS III	1500-MM REINFORCED CONCRETE PIPE, CLASS III	1095-MM X 1630-MM OVAL RCP (CLASS HEIII)	TYPE 4 MANHOLE (MODIFIED)	CASTINGS	STRUCTURAL STEEL GRATES	1200-MM PRECAST REINFORCED CONCRETE MANHOLE, TYPE 1	ITEM NUMBER / UNIT	DESCRIPTION	STATION TO STATION	DWG.	NOTE
203 2150	206 2000	207 2000	207 2004	302 2000	502 2004	502 2200	502 2244	502 2309	502 2314	505 2000	505 2005	506 2000	603 2024	603 2048	603 2108	603 2132	603 2144	603 2268	609 0192	609 2000	609 2002	609 2504					
SQM	CM	CM	CM	MTON	CM	LM	LM	LM	LM	KG	KG	KG	LM	LM	LM	LM	LM	LM	EA	KG	KG	EA					
																								NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
	18.0		9.0		6.0					186											116		CONSTRUCT SPECIAL TRENCH DRAIN, H = 1.500M	"WA" 9+14.606	SD-1A	1
	145.8	73.3	47.5												19.0								INSTALL 1050MM X 19.021M RCP	10.550M LT.		
																							(SEE SHEET SD-9, SD-13)			
	56.1		20.5		11.2					926		395									620		CONSTRUCT 6.00MM SPECIAL DI, H=2.550M	"WA" 9+39.500	SD-1A	2
40.3	164.9	87.3	41.5	27.3		13.2																	INSTALL 1800MM X 900MM X 13.187M RCB	9.725M LT.		
																							(SEE SHEET SD-9, SD-11, & SD-12)			
	34.0		17.0		12.0					353											222		CONSTRUCT SPECIAL TRENCH DRAIN 2 H=1.515M	"WA" 9+08.971	SD-1A	3
	88.0	38.0	32.8												13.1								INSTALL 1050MM X 13.087M RCP	10.550M RT.		
																							CONNECT TO SPECIAL D.I.			
																							(SEE SHEET SD-7 & SD-14)			
	49.0		18.0		10.1					801		395									620		CONSTRUCT 6.000M SPECIAL D.I., H=2.200M	"WA" 9+26.500	SD-1A	4
	22.0	0.0	17.5															4.1					INSTALL 1095MM X 1630MM X 4.065M OVAL RCP	9.725M RT.		
																							(SEE SHEET SD-7 & SD-12)			
397.8	1645.7	394.9	588.6	269.7			107.5																INSTALL 2400MM X 1800MM X 107.500M RCB	"RL" 10+32.500	SD-1A	5
																							(SEE SHEET SD-4)			
	37.0		13.6		8.4					649		395									620		CONSTRUCT 6.000M SPECIAL D.I., H = 1.600M	"WA" 9+65.750	SD-1A	6
	15.6		11.3												4.5								INSTALL 1050MM X 4.548M RCP	9.735M RT.		
					0.3						11.2												CONNECT TO RCB			
																							(SEE SHEET SD-8 & SD-12)			
	39.0		14.3		8.7					672		395									620		CONSTRUCT 6.000M SPECIAL D.I., H = 1.700M	"LM" 3+05.250	SD-1A	7
	41.5		27.5												11.0								INSTALL 1050MM X 10.954M RCP	15.735M RT.		
																							(SEE SHEET SD-8 & SD-12, & SD-15)			
	57.1		20.9		11.3					882		395									620		CONSTRUCT 6.000M SPECIAL DI, H = 2.600M	"RM" 28+92.882	SD-1A	8
	15.4	3.9	7.2													2.5							INSTALL 1350MM X 1050MM PRECAST RCP TRANSITION	19.560M LT.		
					0.3						11.2												CONNECT UPSTREAM TO EXISTING 1350MM RCP			
	159.0	70.5	58.0												23.2								INSTALL 1050MM X 23.224M RCP			
																							CONNECT TO RCB			
																							(SEE SHEET SD-8, SD-11 & SD-12)			
12.2	41.0	1.7	15.1	8.3					2.4														INSTALL 2.400M PRECAST TRANSITION	"RL" 11+40.000	SD-1A	9
																							(2400MM X 1800MM TO 3600MM X 1800MM)			
																							(SEE SHEET SD-4)			
1296.9	5429.0	1267.4	1598.3	879.3					254.3														INSTALL 3600MM X 1800MM X 254.251M RCB	"RL" 11+42.400 TO	SD-1A	10
																							(SEE SHEET SD-4 & SD-5)	"RL" 13+96.651		
	52.1		19.1		10.6					836		395									620		CONSTRUCT 6.000M SPECIAL DI, H = 2.350M	"RM" 28+81.500	SD-1A	11
	7.1		4.3																				INSTALL 1500MM X 0.910M RCP	6.269M RT.		
					0.5						14.9												CONNECT TO RCB			
																							(SEE SHEET SD-8 & SD-12)			
1,747	8,117	1,937	2,582	1,185	79	13	108	0	257	5,305	37	2,370	0	0	71	3	1	4	0	0	4,058	0	PAGE TOTAL			



FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 7

REVISED 06/06/03

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U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - DRAINAGE

GEOGRID	STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	TYPE 1, CLASS B AGGREGATE BASE	CLASS A CONCRETE (MINOR)	1800-MM X 900-MM PRECAST CONCRETE BOX CULVERT	2400-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 2400-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	REINFORCING STEEL	REINFORCING STEEL (EPOXY COATED) (DOWELED)	STRUCTURAL STEEL	450-MM REINFORCED CONCRETE PIPE, CLASS III	600-MM REINFORCED CONCRETE PIPE, CLASS III	1050-MM REINFORCED CONCRETE PIPE, CLASS III	1350-MM REINFORCED CONCRETE PIPE, CLASS III	1500-MM REINFORCED CONCRETE PIPE, CLASS III	1095-MM X 1630-MM OVAL RCP (CLASS HEIII)	TYPE 4 MANHOLE (MODIFIED)	CASTINGS	STRUCTURAL STEEL GRATES	1200-MM PRECAST REINFORCED CONCRETE MANHOLE, TYPE 1			
203 2150	206 2000	207 2000	207 2004	302 2000	502 2004	502 2200	502 2244	502 2309	502 2314	505 2000	505 2005	506 2000	603 2024	603 2048	603 2108	603 2132	603 2144	603 2268	609 0192	609 2000	609 2002	609 2504	ITEM NUMBER			
SQM	CM	CM	CM	MTON	CM	LM	LM	LM	LM	KG	KG	KG	LM	LM	LM	LM	LM	LM	EA	KG	KG	EA	UNIT			
																							DESCRIPTION	STATION TO STATION	DWG.	NOTE
	45.0		16.5		9.6					742		395									620		CONSTRUCT 6.000M SPECIAL DI, H = 2.000M	"RM" 28+66.000	SD-1A	12
	4.4		2.5												1.0								INSTALL 1050MM X 0.879M RCP	6.119M RT.		
					0.3						11.2												CONNECT TO RCB			
																							(SEE SHEET SD-8 & SD-12)			
																				136.0		1	CONSTRUCT TYPE 1 MODIFIED SDMH, H = 0.794M	"RL" 11+30.000	SD-1A	13
																							CONNECT TO RCB	0.600M LT.		
																							(SEE SHEET SD-4 & SD-15)			
	49.0		18.0		10.1					789		395									620		CONSTRUCT 6.000M SPECIAL DI, H = 2.200M	"RM" 28+32.500	SD-1A	14
	4.8	1.0	2.5												1.0								INSTALL 1050MM X 0.888M RCP	6.025M RT.		
					0.3						11.2												CONNECT TO RCB			
																							(SEE SHEET SD-7 & SD-12)			
	45.0		16.5		9.6					742		395									620		CONSTRUCT 6.000M SPECIAL DI, H = MATCH EX RCP DEPTH	"RM" 28+46.318	SD-1A	15
	9.2		9.0													2.5							INSTALL 1350MM X 1050MM PRECAST RCP TRANSITION	19.632M LT.		
																							DOWNSTREAM			
																							CONNECT DOWNSTREAM END TO EXISTING 1350MM RCP			
																							(SEE SHEET SD-11 & SD-12)			
	45.0		16.5		9.6					742		395									620		CONSTRUCT 6.000M SPECIAL DI, H =MATCH EX RCP DEPTH	"RM" 28+03.317	SD-1A	16
	18.5		18.0													5.0							INSTALL 1350MM X 1050MM PRECAST RCP TRANSITION	19.689M LT.		
																							UPSTREAM & DOWNSTREAM			
																							CONNECT UPSTREAM AND DOWNSTREAM END TO			
																							EXISTING 1350MM RCP			
																							(SEE SHEET SD-11 & SD-12)			
	55.1		20.2		11.0					859		395									620		CONSTRUCT 6.000M SPECIAL DI, H = 2.500M	"RD" 27+90.900	SD-1A	17
	6.7	1.0	3.6													1.0							INSTALL 1350MM X 0.767M RCP	6.025M RT.		
					0.4						13.6												CONNECT TO RCB			
																							(SEE SHEET SD-7 & SD-12)			
																				136.0		1	CONSTRUCT TYPE 1 MODIFIED SDMH, H = 1.064M	"RL" 12+40.000	SD-1A	18
																							CONNECT TO RCB	1.200M LT.		
																							(SEE SHEET SD-4 & SD-15)			
	55.1		20.2		11.0					859		395									620		CONSTRUCT 6.000M SPECIAL DI, H = 2.500M	"RD" 27+90.900	SD-1A	17
	6.7	1.0	3.6													1.0							INSTALL 1350MM X 0.767M RCP	6.025M RT.		
					0.4						13.6												CONNECT TO RCB			
																							(SEE SHEET SD-7 & SD-12)			
																				136.0		1	CONSTRUCT TYPE 1 MODIFIED SDMH, H = 1.064M	"RL" 12+40.000	SD-1A	18
																							CONNECT TO RCB	1.200M LT.		
																							(SEE SHEET SD-4 & SD-15)			
																				136.0		1	CONSTRUCT TYPE 1 MODIFIED SDMH, H = 0.986M	"RL" 13+60.000	SD-1A	19
																							CONNECT TO RCB	1.200M LT.		
																							(SEE SHEET SD-4 & SD-15)			
					0.1						6.2												CONNECT EXISTING RCP TO RCB	"WA" 9+39.927	SD-1A	20
	13.0	6.1	5.6										4.9										INSTALL 450MM X 4.877M RCP	1.358M LT. TO		
																							(SEE SHEET SD-11)	"WA" 9+44.804		
																								1.362M LT.		
0	358	9	153	0	62	0	0	0	0	4,733	56	2,370	5	0	2	10	0	0	0	544	3,720	4	PAGE TOTAL			

PROFESSIONAL ENGINEER
DANIEL W. BENDER
Exp: 12/31/04
CIVIL
STATE OF NEVADA
No. 12606
6/6/03

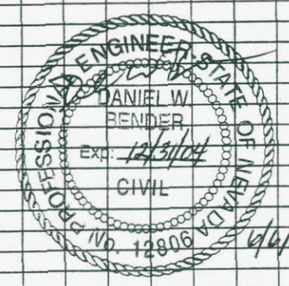
FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 8

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - DRAINAGE

ITEM NUMBER	GEOGRID	STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	TYPE 1, CLASS B AGGREGATE BASE	CLASS A CONCRETE (MINOR)	1800-MM X 900-MM PRECAST CONCRETE BOX CULVERT	2400-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	2400-MM X 2400-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	REINFORCING STEEL	REINFORCING STEEL (EPOXY COATED) (DOWELED)	STRUCTURAL STEEL	450-MM REINFORCED CONCRETE PIPE, CLASS III	600-MM REINFORCED CONCRETE PIPE, CLASS III	1050-MM REINFORCED CONCRETE PIPE, CLASS III	1350-MM REINFORCED CONCRETE PIPE, CLASS III	1600-MM REINFORCED CONCRETE PIPE, CLASS III	1095-MM X 1630-MM OVAL RCP (CLASS HEIII)	TYPE 4 MANHOLE (MODIFIED)	CASTINGS	STRUCTURAL STEEL GRATES	1200-MM PRECAST REINFORCED CONCRETE MANHOLE, TYPE 1	DESCRIPTION	STATION TO STATION	DWG.	NOTE
	203 2150	206 2000	207 2000	207 2004	302 2000	502 2004	502 2200	502 2244	502 2309	502 2314	505 2009	505 2005	506 2000	603 2024	603 2048	603 2108	603 2132	603 2144	603 2268	609 0192	609 2000	609 2002	609 2504				
	SQM	CM	CM	CM	MTON	CM	LM	LM	LM	LM	KG	KG	KG	LM	LM	LM	LM	LM	LM	EA	KG	KG	EA				
						0.1						6.2													CONNECT EXISTING RCP TO RCB	"RL" 10+84.083	SD-1A	21
		13.0	6.1	5.6										4.9											INSTALL 450MM X 4.877M RCP	1.219M LT. TO		
																									(SEE SHEET SD-11)	"RL" 10+84.584		
																										6.066M LT.		
						0.3						12.4													CONNECT EXISTING 1200MM RCP TO RCB	"RL" 10+73.23+/-	SD-1A	22
																									(SEE SHEET SD-4)	1.219M LT.		
		6.6		4.8		1.0					31											171			CONSTRUCT TYPE 3 DI, H=1.600M	"RM" 27+40.000	SD-1A	23
		2.0	0.6	1.1		0.1						6.2		1.0											INSTALL 450MM X 0.946M RCP	6.050M RT.		
																									(SEE SHEET SD-10)			
																					136.0		1		CONSTRUCT TYPE 1 MODIFIED SDMH, H=0.974M	"RL" 10+35.000	SD-1A	24
																									CONNECT TO RCB	0.600M RT.		
																									(SEE SHEET SD-4 & SD-15)			
																						171			INSTALL BICYCLE SAFE GRATE	"LM" 3+40.547	SD-1A	25
																									ON EXISTING DI	12.398M LT.		
																				1.0	136.0				CONSTRUCT TYPE 4 MODIFIED M.H., H=2.159M	"WA" 9+31.575	SD-1A	26
																			12.7						INSTALL 1095MM X 1630MM X 12.658M OVAL RCP	4.000M RT.		
		84.6	0.0	54.1																					CONNECT TO RCB END SECTION			
						0.5						14.9													(SEE SHEET SD-7)			
	1939.5	8118.9	1895.3	2390.2	1315.0					380.3															3600MM X 1800MM X 380.300M RCB	"RL" 13+96.651 TO	SD-2	1
																									(SEE SHEET SD-5 & SD-6)	"RL" 17+76.951		
		5.3	2.0	2.7		0.1						6.2		2.4											INSTALL 450MM X 2.438M RCP STUB	"RL" 17+35.000	SD-2	2
																									INSTALL PLYWOOD CAP (NO DIRECT PAYMENT)	1.828M LT. TO		
																									L.I.E. 632.500 - U.I.E. 632.595	"RL" 17+34.008		
																									(SEE SHEET SD-6)	4.054M LT.		
		6.4	3.0	2.7		0.1						6.2		2.4											INSTALL 450MM X 2.438M RCP STUB	"RL" 17+63.422	SD-2	3
																									INSTALL PLYWOOD CAP (NO DIRECT PAYMENT)	1.828M RT. TO		
																									L.I.E. 632.500 - U.I.E. 632.617	"RL" 17+62.056		
																									(SEE SHEET SD-6)	3.849M RT.		
																					136.0		1		CONSTRUCT TYPE 1 MODIFIED SDMH, H = 1.096M	"RL" 14+80.000	SD-2	4
																									CONNECT TO RCB	1.200M LT.		
																									(SEE SHEET SD-5 & SD-15)			
																					136.0		1		CONSTRUCT TYPE 1 MODIFIED SDMH, H = 1.153M	"RL" 16+00.000	SD-2	5
																									CONNECT TO RCB	1.200M LT.		
																									(SEE SHEET SD-5 & SD-15)			
																					136.0		1		CONSTRUCT TYPE 1 MODIFIED SDMH, H = 1.251M	"RL" 17+20.000	SD-2	6
																									CONNECT TO RCB	1.200M LT.		
																									(SEE SHEET SD-6 & SD-15)			
		5.9		4.3		0.9					28											171			CONSTRUCT TYPE 3 DI, H=1.400M	"RM" 25+85.000	SD-2	7
		9.0	2.8	5.0		0.1						6.2		4.4											INSTALL 450MM X 4.437M RCP	10.750M RT.		
																									(SEE SHEET SD-10)			
	1,940	8,252	1,910	2,471	1,315	3	0	0	0	380	59	58	0	15	0	0	0	0	13	1	680	513	4		PAGE TOTAL			



FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 9

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - DRAINAGE

GEOGRID	STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	TYPE 1, CLASS B AGGREGATE BASE	CLASS A CONCRETE (MINOR)	1800-MM X 900-MM PRECAST CONCRETE BOX CULVERT	2400-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 2400-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	REINFORCING STEEL	REINFORCING STEEL (EPOXY COATED) (DOWELED)	STRUCTURAL STEEL	450-MM REINFORCED CONCRETE PIPE, CLASS III	600-MM REINFORCED CONCRETE PIPE, CLASS III	1050-MM REINFORCED CONCRETE PIPE, CLASS III	1350-MM REINFORCED CONCRETE PIPE, CLASS III	1500-MM REINFORCED CONCRETE PIPE, CLASS III	1095-MM X 1630-MM OVAL RCP (CLASS HEIII)	TYPE 4 MANHOLE (MODIFIED)	CASTINGS	STRUCTURAL STEEL GRATES	1200-MM PRECAST REINFORCED CONCRETE MANHOLE, TYPE 1	ITEM NUMBER		
203 2150	206 2000	207 2000	207 2004	302 2000	502 2004	502 2200	502 2244	502 2309	502 2314	505 2000	505 2005	506 2000	603 2024	603 2048	603 2108	603 2132	603 2144	603 2268	609 0192	609 2000	609 2002	609 2504			
SQM	CM	CM	CM	MTON	CM	LM	LM	LM	LM	KG	KG	KG	LM	LM	LM	LM	LM	LM	EA	KG	KG	EA	UNIT		
																							DESCRIPTION	STATION TO STATION	DWG.	NOTE
	6.3		4.5		0.9					29											171		CONSTRUCT TYPE 3 DI, H=1.500M	"RM" 24+40.000	SD-2	8
	2.9	0.5	1.9		0.1						6.2		1.7										INSTALL 450MM X 1.736M RCP	8.025M RT.		
																							(SEE SHEET SD-9)			
	26.1		10.4		8.1					505		198									310		CONSTRUCT 3.000M SPECIAL DI	"RM" 24+51.616	SD-2	9
	28.7		18.0													5.0							INSTALL 1350MM X 1050MM PRECAST RCP TRANSITION	24.706M LT.		
																							UPSTREAM & DOWNSTREAM			
																							H=MATCH EX RCP DEPTH CONNECT DOWNSTREAM			
																							AND TO EXISTING 1350MM RCP			
																							(SEE SHEET SD-11 & SD-12)			
410.6	2358.2	1040.9	505.9	278.4					80.5														INSTALL 3600MM X 1800MM X 80.549M RCB	"RL" 17+76.951 TO	SD-3A	1
																							(SEE SHEET SD-6)	"RL" 18+57.500		
								2.5															INSTALL 2.400M PRECAST TRANSITION	"RL" 18+57.600	SD-3A	2
12.8	80.0	28.3	20.2	8.6																			(SEE SHEET SD-6)			
289.7	1856.7	681.8	459.2	196.4				56.8															INSTALL 3600MM X 2400MM X 56.755M RCB	"RL" 18+60.0000	SD-3A	3
																							(SEE SHEET SD-6)			
	7.6	4.2	2.7		0.1						6.2		2.4										INSTALL 450MM X 2.438M RCP STUB	"RL" 18+35.001	SD-3A	4
																							INSTALL PLYWOOD CAP (NO DIRECT PAYMENT)	1.828M LT. TO		
																							L.I.E. 631.300-U.I.E. 631.350	"RL" 18+35.015		
																							(SEE SHEET SD-6)	4.266M LT.		
	16.6	12.1	3.4		0.2						7.4			2.4									INSTALL 600MM X 2.438M RCP STUB	"RL" 18+00.000	SD-3A	5
																							INSTALL PLYWOOD CAP (NO DIRECT PAYMENT)	1.828M RT. TO		
																							L.I.E. 631.000-U.I.E. 631.032	17+99.009, 4.056M RT.		
																							(SEE SHEET SD-6)			
	17.7	13.3	3.4		0.2						7.4			2.4									INSTALL 600MM X 2.438M RCP STUB	"RL" 18+37.000	SD-3A	6
																							INSTALL PLYWOOD CAP (NO DIRECT PAYMENT)	1.828M RT. TO		
																							L.I.E. 630.750-U.I.E. 630.768	"RL" 18+36.957		
																							(SEE SHEET SD-6)	4.266M RT.		
																				136.0		1	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.697M	"RL" 18+40.000	SD-3A	7
																							CONNECT TO RCB	1.200M LT.		
																							(SEE SHEET SD-6)			
	14.2	7.3	5.6		0.1						6.2		4.9										CONNECT EXISTING RCP TO RCB	"RL" 17+98.89+/-, 1.828M LT. TO	SD-3A	8
																							INSTALL 450MM X 4.877M RCP	"RL" 17+96.832, 6.917M LT.		
																							(SEE SHEET SD-6 & SD-11)			
					0.5						14.9												CONNECT EXISTING RCP TO RCB	"RL" 18+11.188, 1.828M RT. TO	SD-3A	9
	53.7	20.0	20.9														4.9						INSTALL 1500MM X 4.877M RCP	"RL" 18+06.9475, 3.122M RT.		
																							(SEE SHEET SD-6 & SD-11)			
					0.1						6.2												CONNECT EXISTING RCP TO RCB	"RL" 18+59.247, 1.828M LT. TO	SD-3A	10
	8.5	4.7	3.1										2.7										INSTALL 450MM X 2.740 RCP	"RL" 18+59.22+/-, 4.572M LT.		
																							(SEE SHEET SD-6 & SD-11)			
713	4,477	1,813	1,059	483	10	0	0	59	81	534	55	198	12	5	0	5	5	0	0	136	481	1	PAGE TOTAL			

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
No. 10810
6/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 10

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - DRAINAGE

ITEM NUMBER	GEOGRID	STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	TYPE 1, CLASS B AGGREGATE BASE	CLASS A CONCRETE (MINOR)	1800-MM X 900-MM PRECAST CONCRETE BOX CULVERT	2400-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 2400-MM PRECAST CONCRETE BOX CULVERT	3600-MM X 1800-MM PRECAST CONCRETE BOX CULVERT	REINFORCING STEEL	REINFORCING STEEL (EPOXY COATED) (DOWELED)	STRUCTURAL STEEL	450-MM REINFORCED CONCRETE PIPE, CLASS III	600-MM REINFORCED CONCRETE PIPE, CLASS III	1050-MM REINFORCED CONCRETE PIPE, CLASS III	1350-MM REINFORCED CONCRETE PIPE, CLASS III	1500-MM REINFORCED CONCRETE PIPE, CLASS III	1095-MM X 1630-MM OVAL RCP (CLASS HEIII)	TYPE 4 MANHOLE (MODIFIED)	CASTINGS	STRUCTURAL STEEL GRATES	1200-MM PRECAST REINFORCED CONCRETE MANHOLE, TYPE 1	DESCRIPTION	STATION TO STATION	DWG.	NOTE
	203 2150	206 2000	207 2000	207 2004	302 2000	502 2004	502 2200	502 2244	502 2309	502 2314	505 2000	505 2005	506 2000	603 2024	603 2048	603 2108	603 2132	603 2144	603 2268	609 0192	609 2000	609 2002	609 2504				
UNIT	SQM	CM	CM	CM	MTON	CM	LM	LM	LM	LM	KG	KG	KG	LM	LM	LM	LM	LM	LM	EA	KG	KG	EA				
						0.1						6.2												CONNECT EXISTING RCP TO RCB	"RL" 18+59.233, 1.828M RT. TO	SD-3A	11
		10.9	4.0	5.6										4.9										INSTALL 450MM X 4.877M RCP	"RL" 18+59.274, 4.572M RT.		
																								(SEE SHEET SD-6 & SD-11)			
																								CONNECT RCB TO EXISTING (NO DIRECT PAYMENT)	"RL" 19+16.801	SD-3A	12
																								2400MM X 2100MM RCB			
																								SEE SHEET SD-6 & B-2)			
PAGE TOTAL	0	11	4	6	0	0	0	0	0	0	0	6	0	5	0	0	0	0	0	0	0	0	0				
PROJECT TOTAL	4,400	21,215	5,673	6,270	2,983	155	13	108	59	718	10,631	212	4,938	37	5	73	17	6	17	1	1,360	8,772	9				

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
No. 12006
6/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 11

REVISED 06/06/03

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - REMOVAL ITEMS

DESCRIPTION	REMOVE TREES	REMOVAL OF LIGHTING AND/OR SIGNAL POLE	REMOVAL OF PULL BOX	REMOVAL OF DROP INLET	REMOVE CONCRETE SLAB	REMOVE BITUMINOUS SURFACE (COLD MILLING)	REMOVE OF COMPOSITE SURFACE	REMOVE VALLEY GUTTER	REMOVE SIDEWALK	REMOVE CURB AND GUTTER	REMOVE STORM DRAIN PIPE	REMOVE MEDIAN ISLAND	ABANDON PIPE	STATION TO STATION	DWG.	NOTE
ITEM NUMBER	201 0008	202 0300	202 0320	202 0328	202 2012	202 2136	202 2162	202 2184	202 2188	202 2200	202 2244	202 2284	609 2004			
UNIT	EA	EA	EA	EA	SM	SM	SM	SM	SM	LM	LM	SM	LM			
NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER																
REMOVE CURB, GUTTER AND SIDEWALK									559.8	372.6				"WA" 9+18.096, 14.400M LT. TO	R-1A	1
														"WA" 9+25.120, 9.303M LT. (7.024M)		
														"WA" 9+34.272, 9.282M LT. TO		
														"WA" 9+25.120, 9.303M LT. (9.152M)		
														"WA" 9+14.156, 14.197M RT TO		
														"WA" 9+48.120, 9.316M RT. (33.964M)		
														"WA" 9+56.841, 9.304M RT. TO		
														"WA" 9+74.969, 9.290M RT. (18.128M)		
														"WA" 9+61.000, 9.900M RT. TO		
														"WA" 9+70.500, 9.900M RT. (9.500M)		
														"RM" 28+97.298, 19.735M LT. TO		
														"RM" 28+85.602, 19.736M LT. (9.500M)		
														"RM" 28+54.305, 19.761M LT. TO		
														"RM" 28+41.818, 19.761M LT. (9.000M)		
														"RM" 28+09.318, 19.800M LT. TO		
														"RM" 28+01.318, 19.801M LT. (8.000M)		
														"LM" 3+09.543, 17.404M RT. TO		
														"RM" 27+62.243, 11.200M RT. (144.899M)		
														"RM" 27+52.721, 12.200M RT. TO		
														"RM" 27+20.493, 12.230M RT. (40.327M)		
														"RM" 27+05.763, 17.421M RT. TO		
														"RM" 26+30.000, 8.900M RT (83.090M)		
														(CURB & GUTTER ONLY		
														"WA" 8+95.505, 9.300M RT. TO		
														"WA" 9+03.299, 17.248M RT. (16.380M)		
REMOVE MEDIAN ISLANDS												625.9		"LM" 3+26.813, 1.496M LT. TO	R-1A	2
														"RM" 27+25.148, 4.887M LT. (392.081 SQM)		
														"RM" 26+98.377, 8.107M LT. TO		
														"RM" 26+30.000, 4.640 LT. (220.079 SQM)		
														"WA" 10+21.055, 1.695M RT. TO		
														"WA" 10+44.000, 1.429M RT. (13.700 SQM)		
REMOVE COMMERCIAL DRIVEWAY								225.2						"WA" 8+95.505, 9.300M RT. TO	R-1A	3
														"WA" 9+19.156, 9.300M RT. (34.223 SQM)		
														"WA" 9+02.980, 9.300M LT. TO		
														"WA" 9+22.596, 9.300M LT. (33.584 SQM)		
														"RM" 27+67.243, 6.200M RT. TO		
														"RM" 27+46.721, 6.200M RT. (48.526 SQM)		
														"RM" 28+85.602, 19.761M LT. TO		
														"RM" 28+54.305, 19.761M LT. (108.908 SQM)		
REMOVE DRIVEWAY					80.9									"WA" 9+30.000, 9.900M LT. (W=8.000M+/-)	R-1A	4
														"RM" 28+57.000, 6.200M RT. (W=8.000M+/-)		
														"RM" 28+20.000, 6.200M RT. (W=10.000M+/-)		
														"RM" 27+76.000, 6.200M RT. (W=8.000M+/-)		
NO DIRECT PAYMENT																
REMOVE OLEANDER SHRUBS (2 TOTAL)														"RM" 26+30.000 LT. TO	R-1A	5
														"RM" 26+80.000 LT.		
PAGE SUBTOTAL	0	0	0	0	81	0	0	225	560	373	0	626	0			

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
EXP 12/31/04
CIVIL
NO. 12276
6/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 12

REVISED 06/06/03

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - REMOVAL ITEMS

DESCRIPTION	STATION TO STATION	DWG.	NOTE	REMOVE TREES	REMOVAL OF LIGHTING AND/OR SIGNAL PCLE	REMOVAL OF PULL BOX	REMOVAL OF DROP INLET	REMOVE CONCRETE SLAB	REMOVE BITUMINOUS SURFACE (COLD-MILLING)	REMOVE OF COMPOSITE SURFACE	REMOVE VALLEY GUTTER	REMOVE SIDEWALK	REMOVE CURB AND GUTTER	REMOVE STORM DRAIN PIPE	REMOVE MEDIAN ISLAND	ABANDON PIPE
ITEM NUMBER				201 0008	202 0300	202 0320	202 0328	202 2012	202 2136	202 2162	202 2184	202 2188	202 2200	202 2244	202 2284	609 2004
UNIT				EA	EA	EA	EA	SM	SM	SM	SM	SM	LM	LM	SM	LM
REMOVE SIDEWALK	"LM" 3+81.308, 17.036M LT.	R-1A	7									14.5				
RAMP (7 TOTAL)	"LM" 3+52.360, 13.946M RT.											14.5				
	"LM" 3+44.537, 14.758M LT.											14.5				
	"LM" 3+22.468, 13.730M RT.											14.5				
	"LM" 17.739, 15.633M RT.											14.5				
	"LM" 3+07.549, 17.432M RT.											14.5				
	"WA" 9+05.808, 10.922M LT.											14.5				
REMOVE RCP	"RM" 27+38.894, 5.539 RT. TO	R-1A	A	(NO DIRECT PAYMENT)												
	"RM" 27+38.398, 2.428 LT. (7.983M)															
	(NO DIRECT PAYMENT)															
	"RM" 28+09.000, 18.656 LT. TO															
	"RM" 28+00.000, 18.692 LT. (10.800M)															
	(NO DIRECT PAYMENT)															
	"RM" 28+50.467, 18.487 LT. TO															
	"RM" 28+42.168, 18.521 LT. (8.299M)															
	(NO DIRECT PAYMENT)															
	"RM" 28+97.367, 18.807 LT. TO															
	"RM" 28+87.000, 18.823 LT. (10.367M)															
	(NO DIRECT PAYMENT)															
	"WA" 9+98.391, 2.436 LT. TO															
	"WA" 9+96.231, 5.829 RT. (8.540M)															
	(NO DIRECT PAYMENT)															
	"WA" 9+86.001, 1.578 RT. TO															
	"WA" 9+88.948, 5.395 RT. (4.822M)															
	(NO DIRECT PAYMENT)															
	"WA" 9+49.252, 1.365 LT. TO															
	"WA" 9+44.600, 1.362 LT. (4.652M)															
	(NO DIRECT PAYMENT)															
PLUG AND ABANDON RCP	"WA" 9+49.252, 1.365 LT. TO	R-1A	B													76.2
	"WA" 9+59.936, 10.664 LT. (14.164M)															
	"WA" 9+88.948, 5.395 RT. TO															
	"WA" 9+94.078, 12.620 RT. (8.861M)															
	"WA" 9+96.231, 5.829M RT.															
	"RM" 27+38.398, 2.428 LT. TO															
	"RM" 27.37.303, 19.090 LT. (16.697M)															
	"RM" 28+87.000, 18.823 LT. TO															
	"RM" 28+50.467, 18.487 LT. (36.500M)															
REMOVE DROP INLET	"RM" 27+38.894, 5.539 RT.	R-1A	D				1									
REMOVE CURB, GUTTER AND SIDEWALK	"RM" 26+30.000, 8.900M RT. TO	R-2	1										517.0	282.5		
	"RM" 23+67.003, 67.532M RT. (282.508M)															
REMOVE MEDIAN ISLANDS	"RM" 26+30.000, 4.650 LT. TO	R-2	2												2170.4	
	"RM" 24+30.227, 6.836 LT. (881.202 SQM)															
	"RM" 23+92.463, 11.340M LT. TO															
	"RM" 22+50.000, 6.250M LT. (819.606 SQM)															
	"RM" 23+89.466, 32.425M RT. TO															
	"RM" 24+47.623, 4.863M RT. (440.362 SQM)															
	"RM" 24+28.973, 27.386M LT. TO															
	"RM" 24+37.527, 38.106M LT. (29.241 SQM)															
PAGE SUBTOTAL				0	0	0	1	0	0	0	0	619	283	0	2170	76

1 12/31/04 6/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 13

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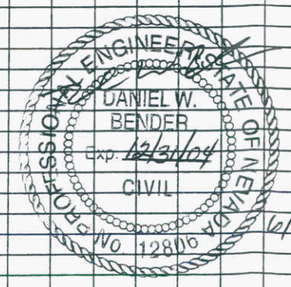
U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - REMOVAL ITEMS

DESCRIPTION	STATION TO STATION	DWG.	NOTE	REMOVE TREES	REMOVAL OF LIGHTING AND/OR SIGNAL POLE	REMOVAL OF PULL BOX	REMOVAL OF DROP INLET	REMOVE CONCRETE SLAB	REMOVE BITUMINOUS SURFACE (COLD-MILLING)	REMOVE OF COMPOSITE SURFACE	REMOVE VALLEY GUTTER	REMOVE SIDEWALK	REMOVE CURB AND GUTTER	REMOVE STORM DRAIN PIPE	REMOVE MEDIAN ISLAND	ABANDON PIPE
ITEM NUMBER				201 0008	202 0300	202 0320	202 0328	202 2012	202 2136	202 2162	202 2184	202 2188	202 2200	202 2244	202 2284	609 2004
UNIT				EA	EA	EA	EA	SM	SM	SM	SM	SM	LM	LM	SM	LM
REMOVE OLEANDER SHRUBS	"RM" 24+40.000 LT. TO	R-2	5	11												
(11 TOTAL)	"RM" 26+30.000 LT.															
REMOVE TRAFFIC SIGNAL	"RM" 24+16.945, 6.725M RT.	R-2	6	(SEE TRAFFIC SIGNAL STRUCTURE LIST)												
	"RM" 23+85.528, 6.116M RT.															
	"RM" 24+45.635, 29.000M LT.															
	"RM" 24+16.611, 27.801M LT.															
	"RM" 24+18.742, 28.747M LT.															
REMOVE SIDEWALK RAMP (6 TOTAL)	"LM" 3+81.308, 17.036 LT	R-2	7									29.0				
	"LM" 3+52.360, 13.946 RT															
	"LM" 3+44.537, 14.758 LT															
	"LM" 3+22.468, 13.730 RT															
	"LM" 3+17.739, 15.633 RT															
	"LM" 3+07.549, 17.432 RT															
REMOVE PULL BOX	"RM" 26+00.000, 7.160M RT.	R-2	8			1										
REMOVE TREES (2 TOTAL)	"RM" 24+40.000 LT. TO "RM" 26+30.000 LT.	R-2	9	2												
REMOVE RCP	"RM" 25+93.755, 6.145M RT. TO	R-2	A											19.5		
	"RM" 25+93.649, 0.784M LT. (6.920M)															
	(NO DIRECT PAYMENT)															
	"RM" 24+29.431, 17.747M RT. TO															
	"RM" 24+29.449, 1.761M LT. (19.508M)															
	"RM" 24+54.471, 25.019M LT. TO															
	"RM" 24+48.771, 24.992M LT. (10.800M)															
	(NO DIRECT PAYMENT)															
PLUG AND ABANDON RCP	"RM" 25+93.649, 0.784M LT. TO	R-2	B													44.8
	"RM" 25+93.340, 22.424M LT. (21.642M)															
	"RM" 24+29.449, 1.761M LT. TO															
	"RM" 24+29.593, 24.908M LT. (23.147M)															
REMOVE DROP INLET	"RM" 24+29.431, 17.747 RT.	R-2	D				3									
	"RM" 25+93.775, 6.145 RT.															
	"RM" 24+29.589, 24.308M LT.															
REMOVE MEDIAN ISLANDS	"RM" 22+50.000, 4.755M LT. TO	R-3	2												1398.8	
	"RM" 22+15.392, 4.666M LT. (153.395 SQM)															
	"RM" 22+03.126, 7.137M LT. TO															
	"RM" 21+51.708, 7.303M LT. (122.495 SQM)															
	"RM" 21+23.227, 12.924M LT. TO															
	"RM" 19+38.625, 5.742M LT. (1122.916 SQM)															
REMOVE STREET LIGHT	"RM" 20+54.612, 10.258M LT.	R-3	10		4											
	"RM" 20+15.803, 10.175M LT.															
	"RM" 19+77.467, 6.481M LT.															
	"RM" 19+43.764, 5.975M LT.															
PAGE SUBTOTAL				13	4	1	3	0	0	0	0	29	0	20	1399	45



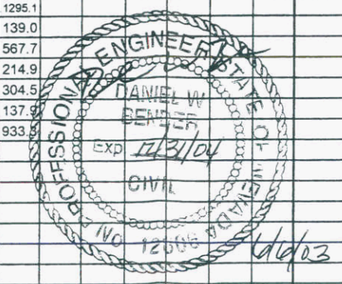
FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 14

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - REMOVAL ITEMS

DESCRIPTION	STATION TO STATION	DWG.	NOTE	REMOVE TREES	REMOVAL OF LIGHTING AND/OR SIGNAL POLE	REMOVAL OF PULL BOX	REMOVAL OF DROP INLET	REMOVE CONCRETE SLAB	REMOVE BITUMINOUS SURFACE (COLD-MILLING)	REMOVE OF COMPOSITE SURFACE	REMOVE VALLEY GUTTER	REMOVE SIDEWALK	REMOVE CURB AND GUTTER	REMOVE STORM DRAIN PIPE	REMOVE MEDIAN ISLAND	ABANDON PIPE
ITEM NUMBER				201 0008	202 0300	202 0320	202 0328	202 2012	202 2136	202 2162	202 2184	202 2188	202 2200	202 2244	202 2284	609 2004
UNIT				EA	EA	EA	EA	SM	SM	SM	SM	SM	LM	LM	SM	LM
REMOVE RCP	"RM" 22+29.348, 3.590M RT. TO	R-3	A	(NO DIRECT PAYMENT)												
	"RM" 22+24.902, 5.771M LT. (10.362M)								365.4							
	(NO DIRECT PAYMENT)								180.9							
	"RM" 21+67.710, 4.172M RT. TO								44.7							
	"RM" 21+67.622, 6.291M LT. (10.463M)								218.2							
	(NO DIRECT PAYMENT)								559.8							
	"RM" 22+24.902, 5.771M LT. TO								212.1							
	"RM" 21+33.020, 3.810M RT. (92.380M)								733.1							
	(NO DIRECT PAYMENT)								5114.4							
PLUG AND ABANDON RCP	"RM" 21+67.622, 6.291M LT. TO	R-3	B													58.2
	"RM" 21+67.486, 22.173M LT. (15.883M)															
	"RM" 21+33.020, 3.810M RT. TO															
	"RM" 20+98.304, 27.393M RT. (42.333M)															
COLD MILLING (SEE TYPICAL SECTIONS)	"RM" 28+41.818 TO "RM" 28+79.797									592.8						
	"RM" 28+09.318 TO "RM" 28+41.818									504.2						
	"RM" 28+01.318 TO "RM" 28+09.318									124.1						
	"RM" 27+62.216 TO "RM" 28+01.318									606.5						
	"RM" 26+61.805 TO "RM" 27+62.216									2361.6						
	"RM" 26+51.537 TO "RM" 26+61.805									214.0						
	"RM" 26+16.051 TO "RM" 26+51.537									739.5						
	"RM" 23+68.500 TO "RM" 26+16.051									5158.5						
REMOVE COMPOSITE SURFACE (SEE TYPICAL SECTIONS)	"RM" 28+41.818 TO "RM" 28+79.797										520.0					
	"RM" 28+09.318 TO "RM" 28+41.818										2095.0					
	"RM" 28+01.318 TO "RM" 28+09.318										540.4					
	"RM" 27+62.216 TO "RM" 28+01.318										468.8					
	"RM" 26+61.805 TO "RM" 27+62.216										7657.6					
	"RM" 26+51.537 TO "RM" 26+61.805										1295.1					
	"RM" 26+16.051 TO "RM" 26+51.537										139.0					
	"RM" 23+68.500 TO "RM" 26+16.051										567.7					
	"WA" 10+14.792 TO "WA" 10+44.000										214.9					
	"LM" 3+87.779 TO "LM" 3+25.351										304.5					
	"LM" 3+04.801 TO "LM" 3+25.351										137.9					
	"RM" 28+97.668 TO "RM" 28+79.797										933.8					
	"RM" 21+00.000 TO "RM" 23+68.500															
	"RM" 19+37.500 TO "RM" 21+00.000															
	"WA" 8+95.505 TO "WA" 9+02.980															
	"WA" 9+02.980 TO "WA" 9+33.500															
	"WA" 9+33.500 TO "WA" 9+45.000															
	"WA" 9+45.000 TO "WA" 9+61.000															
	"WA" 9+61.000 TO "WA" 9+70.500															
	"VTN" 0+14.900 TO "VTN" 0+38.450															
PAGE SUBTOTAL				0	0	0	0	0	7429	25175	0	0	0	0	0	58
PROJECT TOTAL				13	4	1	4	81	7,429	25,175	225	1,207	655	20	4,195	179



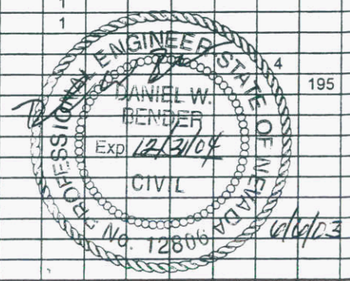
FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 15

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - LIGHTING PLAN

DESCRIPTION	STATION TO STATION	DWG.	NOTE	NO. 3-1/2 PULL BOX	NO. 7 PULL BOX	NO. 9 PULL BOX	SODIUM VAPOR LUMINAIRE, 400 WATT	STEEL POLE, TYPE 7	REMOVE AND RESET LIGHT POLE	50-MM CONDUIT	100-MM CONDUIT	NO. 4 CONDUCTOR	NO. 8 CONDUCTOR	25 PAIR CONDUCTOR NO. 22 CABLE
ITEM NUMBER				623 0072	623 0080	623 0084	623 0140	623 0316	623 0800	623 2020	623 2032	623 2132	623 2140	623 2256
UNIT				EA	EA	EA	EA	EA	EA	LM	LINM	LM	LINM	LINM
NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER														
STREETLIGHT PULL BOX	"LM" 3+08.500, 17.750M RT.	L-1		1										
	"RM" 27+27.500, 7.250M RT.			1										
	"RM" 26+96.700, 11.000M RT.			1										
	"RM" 27+27.300, 5.100M LT.			1										
I.C. PULL BOX	"RM" 28+88.000, 7.500M RT.	L-1				1								
	"RM" 28+45.000, 7.000M RT.				1									
	"RM" 27+40.000, 7.000M RT.				1									
	"RM" 26+93.500, 10.750M RT.				1									
	"RM" 26+92.000, 22.250M LT.					1								
	"RM" 26+45.000, 11.000M RT.				1									
LIGHTING POLE SCHEDULE	REFER TO SHEET L-4 FOR SCHEDULE	L-1					1	1	6					
LIGHTING CONDUIT AND WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-1								272		550	275	
INTERCONNECT CONDUIT & WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-1									420			423
STREETLIGHT PULL BOX	"RM" 23+43.000, 101.250M RT.	L-2		1										
I.C. PULL BOX	"RM" 25+50.000, 12.000M RT.	L-2			1									
	"RM" 25+20.000, 9.000M RT.				1									
	"RM" 24+40.000, 9.000M RT.					1								
	"RM" 24+10.000, 24.750M RT.					1								
	"RM" 24+13.000, 8.500M RT.				1									
	"RM" 24+45.000, 29.000M LT.				1									
	"RM" 23+98.000, 25.250M LT.				1									
	"RM" 23+61.500, 25.750M LT.				1									
LIGHTING POLE SCHEDULE	REFER TO SHEET L-4 FOR SCHEDULE	L-2					3	3	6					
LIGHTING CONDUIT AND WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-2								354		714	357	
INTERCONNECT CONDUIT & WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-2									400			403
STREETLIGHT PULL BOX	"RM" 20+90.000, 28.000M LT.	L-3		1										
	"RM" 19+47.000, 25.500M LT.			1										
	"RM" 19+15.000, 24.000M LT.			1										
LIGHTING POLE SCHEDULE	REFER TO SHEET L-4 FOR SCHEDULE	L-3					4							
LIGHTING CONDUIT AND WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-3								195		396	198	
PROJECT TOTAL				8	10	4	4	4	16	821	820	1,660	830	826



FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 16

REVISED 06/06/03

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - TRAFFIC SIGNAL

NO. 5 PULL BOX	NO. 7 PULL BOX	SODIUM VAPOR LUMINAIRE, 400 WATT	STEEL POLE, TYPE 1B	STEEL POLE, TYPE 35	STEEL POLE, TYPE 35A	PEDESTRIAN SIGNAL HEAD (1W)	PEDESTRIAN SIGNAL HEAD (2W)	PEDESTRIAN SIGNAL HEAD (2W), POST TOP	PEDESTRIAN PUSH BUTTON W/ SIGN	EMERGENCY VEHICLE DETECTOR SYSTEM	VIDEO IMAGE DETECTION SYSTEM	VIDEO IMAGE DETECTION CAMERA	TRAFFIC ACTUATED CONTROLLER, 2070N	REMOVAL OF EXISTING TRAFFIC SIGNAL SYSTEM	UNDERGROUND ELECTRICAL SERVICE	SIGNAL HEAD 1W3C, BRACKET	SIGNAL HEAD 2W3C, BRACKET	SIGNAL HEAD 1W3C, MAST ARM	80-MM CONDUIT	100-MM CONDUIT	NO. 8 CONDUCTOR	NO. 10 CONDUCTOR	3 CONDUCTOR NO. 14 CABLE	15 CONDUCTOR NO. 14 CABLE	25 CONDUCTOR NO. 14 CABLE	3 CONDUCTOR NO. 20 CABLE	COAXIAL CABLE	ILLUMINATED STREET NAME SIGN, DOUBLE FACE (2.4M)	TRAFFIC SIGNAL SIGNS
623 0076	623 0080	623 0140	623 0304	623 0408	623 0416	623 0480	623 0484	623 0492	623 0504	623 0524	623 0564	623 0566	623 0602	623 0756	623 0888	623 1564	623 1572	623 1684	623 2028	623 2032	623 2140	623 2144	623 2177	623 2188	623 2196	623 2212	623 2270	623 2284	623 2312
EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LS	EA	EA	EA	EA	LINM	LINM	LINM	LINM	LINM	LINM	LINM	LINM	LINM	EA	SQM
																					315.0	630.0	331.0		315.0		331.0		
											1	4												179.0				179.0		
																					284.0	326.0		121.0	163.0				
											1	3												62.0				62.0		
																					143.0	88.0		99.0	44.0				
											1	3												133.0				133.0		
																					148.0	280.0		78.0	70.0				
(NO QTYS ASSOCIATED WITH THIS SHEET)																													
4	1																		76.0	332.0	236.0	472.0	236.0		236.0		236.0		
4	1																		324.0	12.0	295.0	374.0	187.0		295.0		187.0		
														1															
													1																
										1																116.0			
						2	1	1	6							1	1	12							341.0				
											1	4											301.0				301.0		
		7	1	1	3																262.0	602.0						4	3
3	2																												
														1															
																			379.0	52.0									
11	4	7	1	1	3	2	1	1	6	1	4	14	1	1	1	1	1	12	779	396	1,683	2,772	1,429	298	1,464	116	1,429	4	3
																					337	554	286	60	293	23	286		
11	4	7	1	1	3	2	1	1	6	1	4	14	1	1	1	1	1	12	779	396	2,020	3,326	1,715	358	1,757	139	1,715	4	3

ITEM NUMBER
UNIT

DESCRIPTION	SHEET TITLE	DWG.	NOTE
NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
TEMPORARY SIGNAL WIRING NOTES	RANCHO & WASHINGTON TEMPORARY OVERHEAD SIGNAL WIRING PLAN	T-1	
VIDEO IMAGE DETECTION NOTES TEMPORARY SIGNAL WIRING NOTES	RANCHO & ERNEST MAY TEMPORARY OVERHEAD WIRING PLAN	T-2	
VIDEO IMAGE DETECTION NOTES TEMPORARY SIGNAL WIRING NOTES	RANCHO & U.S.95 (NORTH SIDE) TEMPORARY OVERHEAD WIRING PLAN	T-4	
VIDEO IMAGE DETECTION NOTES TEMPORARY SIGNAL WIRING NOTES	RANCHO & U.S.95 (SOUTH SIDE) TEMPORARY OVERHEAD WIRING PLAN	T-5	
	TEMPORARY OVERHEAD WIRING SPAN DETAIL	T-6	
GENERAL NOTES	RANCHO & WASHINGTON TRAFFIC SIGNAL MODIFICATION PLAN	T-7	
GENERAL NOTES	RANCHO & ERNEST MAY TRAFFIC SIGNAL MODIFICATION PLAN	T-8	
SERVICE NOTES	RANCHO & BONANZA TRAFFIC SIGNAL	T-9	
CONTROLLER NOTES			
EMERGENCY VEHICLE OPTICAL DETECTOR NOTES			
SIGNAL HEAD NOTES			
VIDEO IMAGE DETECTION NOTES			
POLE NOTES			
PULL BOX NOTES			
REMOVAL NOTES			
GENERAL NOTES			

PROJECT TOTAL
ADJUSTED LENGTH (+20%)
PROJECT TOTAL

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
No. 12808

10/6/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 17

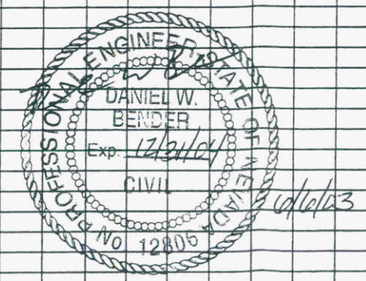
REVISED 06/06/03

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - UTILITIES

DESCRIPTION	STATION TO STATION	DWG.	NOTE	STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	ADJUST VALVE COVERS (METHOD B)	SPECIAL SEWER MANHOLE	200-MM SANITARY SEWER PIPE	200-MM WATER PIPE	450-MM STEEL PIPE	750-MM STEEL PIPE	400-MM WATER PIPE
ITEM NUMBER				206 2000	207 2000	207 2004	609 0134	609 0176	609 2028	650 2084	639 2088	639 2097	650 2098
UNIT				CM	CM	CM	EA	EA	LM	LM	LM	LM	LM
NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER													
RELOCATE EXISTING WATERLINE SEE SHT. U-5 FOR PROFILE	"RSM" 28+90.961, 0.513M LT.	U-2	C	9.4	1.3	6.9							7.7
	"LM" 3+62.356, 7.050M LT. TO			23.3		22.5						12.7	25.8
	"LM" 3+39.372, 7.129M LT.												
RELOCATE EXISTING SANITARY SEWER LINE	"RM" 27+02.600, 33.744M RT. TO	U-2	D	149.5	124.4	23.6		3.0	39.9				
SEE SHEET U-6 FOR PROFILE	"RM" 27+11.148, 4.628M LT.												
RELOCATE EXISTING WATERLINE PER DETAIL, SHEET U-7	"RM" 27+06.664, 9.332M RT. TO	U-2	F	50.2	18.3	27.5				10.3	9.4		
	"RM" 27+06.299, 1.004M LT.												
ADJUST EXISTING WATER SERVICE LATERAL		U-1	H				4						
ADJUST EXISTING SEWER UTILITY BOX		U-1	I				1						
LOCATE AND RE-ESTABLISH SEWER SERVICE	APN#139-29-702-001	U-2	J										
WITH DEEP LATERAL CONNECTION (DCSWCS SD-18)	APN#139-29-702-002												
TO EXISTING 1500MM SANITARY SEWER	APN#139-29-702-005												
SEE DETAIL, SHEET U-8	APN#139-29-702-006												
RELOCATE EXISTING WATERLINE	"RM" 24+10.970, 3.294M LT. TO	U-3	C									10.4	20.1
SEE SHEET U-5 FOR PROFILE	"RM" 23+98.938, 10.133M RT.												
RELOCATE EXISTING WATERLINE PER DETAIL, SHEET U-7	"RM" 25+29.477, 1.576M LT. TO	U-3	F							10.3	9.4		
	"RM" 25+29.536, 8.711M RT.												
RELOCATED TELEPHONE LINE BY SPRINT		U-3	G										
LOCATE AND RE-ESTABLISH SEWER SERVICE	APN# 139-29-704-035	U-3	J										
WITH DEEP LATERAL CONNECTION (DCSWCS SD-18)													
TO EXISTING 1500MM SANITARY SEWER													
SEE DETAIL, SHEET U-8													
PROJECT TOTAL				232	144	81	5	3	40	21	19	23	54



FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 18

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - LIGHTING PLAN

DESCRIPTION	STATION TO STATION	DWG.	NOTE	NO. 3-1/2 PULL BOX	NO. 7 PULL BOX	NO. 9 PULL BOX	SODIUM VAPOR LUMINAIRE, 400 WATT	STEEL POLE, TYPE 7	REMOVE AND RESET LIGHT POLE	50-MM CONDUIT	100-MM CONDUIT	NO. 4 CONDUCTOR	NO. 8 CONDUCTOR	25 PAIR CONDUCTOR NO. 22 CABLE
ITEM NUMBER				623 0072	623 0080	623 0084	623 0140	623 0316	623 0800	623 2020	623 2032	623 2132	623 2140	623 2256
UNIT				EA	EA	EA	EA	EA	EA	LM	LINM	LM	LINM	LINM
NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER														
STREETLIGHT PULL BOX	"LM" 3+08.500, 17.750M RT.	L-1		1										
	"RM" 27+27.500, 7.250M RT.			1										
	"RM" 26+96.700, 11.000M RT.			1										
	"RM" 27+27.300, 5.100M LT.			1										
I.C. PULL BOX	"RM" 28+88.000, 7.500M RT.	L-1				1								
	"RM" 28+45.000, 7.000M RT.				1									
	"RM" 27+40.000, 7.000M RT.				1									
	"RM" 26+93.500, 10.750M RT.					1								
	"RM" 26+92.000, 22.250M LT.				1									
	"RM" 26+45.000, 11.000M RT.				1									
LIGHTING POLE SCHEDULE	REFER TO SHEET L-4 FOR SCHEDULE	L-1					1	1	6					
LIGHTING CONDUIT AND WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-1								272		550	275	
INTERCONNECT CONDUIT & WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-1									420			423
STREETLIGHT PULL BOX	"RM" 23+43.000, 101.250M RT.	L-2		1										
I.C. PULL BOX	"RM" 25+50.000, 12.000M RT.	L-2			1									
	"RM" 25+20.000, 9.000M RT.				1									
	"RM" 24+40.000, 9.000M RT.					1								
	"RM" 24+10.000, 24.750M RT.					1								
	"RM" 24+13.000, 8.500M RT.				1									
	"RM" 24+45.000, 29.000M LT.				1									
	"RM" 23+98.000, 25.250M LT.				1									
	"RM" 23+61.500, 25.750M LT.				1									
LIGHTING POLE SCHEDULE	REFER TO SHEET L-4 FOR SCHEDULE	L-2					3	3	6					
LIGHTING CONDUIT AND WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-2								354		714	357	
INTERCONNECT CONDUIT & WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-2									400			403
STREETLIGHT PULL BOX	"RM" 20+90.000, 28.000M LT.	L-3		1										
	"RM" 19+47.000, 25.500M LT.			1										
	"RM" 19+15.000, 24.000M LT.			1										
LIGHTING POLE SCHEDULE	REFER TO SHEET L-4 FOR SCHEDULE	L-3							4					
LIGHTING CONDUIT AND WIRE SCHEDULE	REFER TO SHEET L-5 FOR SCHEDULE	L-3								195		396	198	
PROJECT TOTAL				8	10	4	4	4	16	821	820	1,660	830	826

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	S 19

METRIC NDOT

U.S. 95 WIDENING - RANCHO ROADWAY IMPROVEMENTS

STRUCTURE LIST - UTILITIES

STRUCTURE EXCAVATION	BACKFILL	GRANULAR BACKFILL	ADJUST VALVE COVERS (METHOD B)	SPECIAL SEWER MANHOLE	200-MM SANITARY SEWER PIPE	200-MM WATER PIPE	450-MM STEEL PIPE	750-MM STEEL PIPE	400-MM WATER PIPE	DESCRIPTION	STATION TO STATION	DWG.	NOTE
206 2000	207 2000	207 2004	609 0134	609 0176	609 2028	650 2084	639 2088	639 2097	650 2098	ITEM NUMBER			
CM	CM	CM	EA	EA	LM	LM	LM	LM	LM	UNIT			
										NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
9.4	1.3	6.9							7.7	RELOCATE EXISTING WATERLINE SEE SHT. U-5 FOR PROFILE	"RSM" 28+90.961, 0.513M LT.	U-2	C
23.3		22.5						12.7	25.8		"LM" 3+62.356, 7.050M LT. TO		
											"LM" 3+39.372, 7.129M LT.		
149.5	124.4	23.6		3.0	39.9					RELOCATE EXISTING SANITARY SEWER LINE	"RM" 27+02.600, 33.744M RT. TO	U-2	D
										SEE SHEET U-6 FOR PROFILE	"RM" 27+11.148, 4.628M LT.		
50.2	18.3	27.5				10.3	9.4			RELOCATE EXISTING WATERLINE PER DETAIL, SHEET U-7	"RM" 27+06.664, 9.332M RT. TO	U-2	F
											"RM" 27+06.299, 1.004M LT.		
			4							ADJUST EXISTING WATER SERVICE LATERAL		U-1	H
			1							ADJUST EXISTING SEWER UTILITY BOX		U-1	I
										LOCATE AND RE-ESTABLISH SEWER SERVICE	APN#139-29-702-001	U-2	J
										WITH DEEP LATERAL CONNECTION (DCSWCS SD-18)	APN#139-29-702-002		
										TO EXISTING 1500MM SANITARY SEWER	APN#139-29-702-005		
										SEE DETAIL, SHEET U-8	APN#139-29-702-006		
								10.4	20.1	RELOCATE EXISTING WATERLINE	"RM" 24+10.970, 3.294M LT. TO	U-3	C
										SEE SHEET U-5 FOR PROFILE	"RM" 23+98.938, 10.133M RT.		
						10.3	9.4			RELOCATE EXISTING WATERLINE PER DETAIL, SHEET U-7	"RM" 25+29.477, 1.576M LT. TO	U-3	F
											"RM" 25+29.536, 8.711M RT.		
										RELOCATED TELEPHONE LINE BY SPRINT		U-3	G
										LOCATE AND RE-ESTABLISH SEWER SERVICE	APN# 139-29-704-035	U-3	J
										WITH DEEP LATERAL CONNECTION (DCSWCS SD-18)			
										TO EXISTING 1500MM SANITARY SEWER			
										SEE DETAIL, SHEET U-8			
232	144	81	5	3	40	21	19	23	54	PROJECT TOTAL			

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPRS-0599(004)	CLARK	TC-1

METRIC NDOT

SUMMARY OF CONSTRUCTION SIGNS NEEDED PER PHASE

NOTE: QUANTITIES SHOWN ARE APPROXIMATE AND ARE SUBJECT TO INCREASE OR DECREASE. ADDITIONAL SIGNS, NOT LISTED, MAY BE REQUIRED AS DIRECTED.

				PHASE 1						PHASE 2						PHASE 3										PHASE 4					
				UTILITY ADJUSTMENTS						ISLAND REMOVAL						CONSTRUCTION OF RANCHO DRAINLINE								COLDMILLING		WASHINGTON AVE DRAINAGE				COLDMILLING	
SIGN NO.	MESSAGE	PANEL SIZE '(MMXMM)	SQM	AT BONANZA		AT WASHINGTON		AT ERNEST MAY		MESQUITE AVE		RANCHO INT.		BONANZA TO WASHINGTON		INTCHG RAMPS		RAMPS TO BONANZA		ERNEST MAY LANE		RANCHO AT WASHINGTON INTERSECTION		RANCHO DRIVE SB LANES		EB LANES WASHINGTON AT RANCHO DR		WB LANES WASHINGTON AT RANCHO DR		RANCHO AT WASHINGTON	
				QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM	QTY	SQM
M1-4	US 95 SHIELD	600 x 600	0.36													12	4.32	1	0.36												
M3-1	NORTH	600 x 300	0.18													6	1.08														
M3-3	SOUTH	600 x 300	0.18													6	1.08	1	0.18												
M4-8	DETOUR	600 x 300	0.18													10	1.80														
M4-8a	END DETOUR	600 x 450	0.27													3	0.81	1	0.27			2	0.54								
M4-9(L)	DETOUR W/LEFT ARROW	750 x 600	0.45													1	0.45	3	1.35			4	1.80								
M4-9(R)	DETOUR W/RIGHT ARROW	750 x 600	0.45			1	0.45									2	0.90	4	1.80			4	1.80								
M5-2	ADVANCE TURN ARROW - 45 °	600 x 300	0.18									1	0.18																		
M6-1	180° ARROW	600 x 300	0.18													6	1.08	1	0.18												
M6-3	90° ARROW	600 x 300	0.18													6	1.08														
NBA-1	BUSINESS, ACCESS, RIGHT ARROW	1050 x 1050	1.10			1	1.10															1	1.10								
NBA-2	BUSINESS, ACCESS, LEFT ARROW	1050 x 1050	1.10																			1	1.10								
NBA-3	BUSINESS ACCESS ONLY	1500 x 600	0.90																			3	2.70								
NC-1	CLOSED	3000 x 900	2.70													1	2.70														
NDR-1	DETOUR W/UP ARROW	750 x 600	0.45			1	0.45									3	1.35	6	2.70			7	3.15								
NFE-1	FREEWAY ENTRANCE	1200 x 600	0.72													1	0.72	1	0.72												
NLU-207	LEFT ARROW, ONLY, THRU ARROW, ONLY	900 x 750	0.68							3	2.03																				
NLU-303	THRU ARROW, ONLY, THRU ARROW, ONLY, RIGHT ARROW, ONLY	1350 x 750	1.01																	1	1.01										
NLU-311	LEFT ARROW, ONLY, THRU ARROW, ONLY, THRU ARROW, ONLY	1350 x 750	1.01											2	2.03					2	2.03										
NLU-313	LEFT ARROW, ONLY, THRU ARROW, ONLY, RIGHT ARROW, ONLY	1350 x 750	1.01													2	2.03											1	1.01		
NPS-1	PREPARE TO STOP	1200 x 1200	1.44	1	1.44			1	1.44																					5	7.20
NRC-1	RAMP CLOSED	1200 x 900	1.08													1	1.08														
NTL-1	LEFT TURN LANE, 180° ARROW	750 x 1200	0.90							3	2.70	2	1.80	2	1.80					1	0.90			2	1.80	1	0.90			2	1.80
NTM-1	THRU TRAFFIC MERGE LEFT	1200 x 1200	1.44									1	1.44			1	1.44											2	2.88		
NTM-1	THRU TRAFFIC MERGE RIGHT	1200 x 1200	1.44							1	1.44																				
NTT-1	THRU TRAFFIC, 90° ARROW	1350 x 1500	2.03							1	2.03					1	2.03	1	2.03	1	2.03			2	4.05	1	2.03				
NWC-1	WALKWAY CLOSED USE OTHER SIDE (RIGHT ARROW)	600 x 600	0.36													1	0.36														
NWC-2	WALKWAY CLOSED USE OTHER SIDE (LEFT ARROW)	600 x 600	0.36													1	0.36			1	0.36										
NWC-3	WALKWAY CLOSED USE OTHER SIDE (DOUBLE ARROW)	600 x 600	0.36													1	0.36														
NWC-4	WALKWAY CLOSED	600 x 300	0.18													2	0.36	4	0.72	3	0.54										
NWC-5	WALKWAY CLOSED AHEAD	600 x 450	0.27															1	0.27												
NWZ-1	BEGIN WORK ZONE	1200 x 600	0.72															1	0.72												
NWZ-2	END WORK ZONE	1200 x 600	0.72															1	0.72												
NWZ-3	DOUBLE PENALTY IN WORK ZONES	1200 x 1200	1.44															1	1.44												
R1-2	YIELD	900 x 900	0.35									1	0.35	2	0.70					2	0.70									2	0.72
R3-1	NO RIGHT TURN	600 x 600	0.36																			1	0.36							1	0.36
R3-2L	NO LEFT TURNS	600 x 600	0.36	3	1.08	3	1.08							3	1.08	3	1.08	2	0.72	2	0.72	5	1.80	4	1.44						
R3-5R	RIGHT TURN ARROW, ONLY	750 x 900	0.68			1	0.68																					2	1.13		
R3-7R	RIGHT LANE MUST TURN RIGHT	750 x 750	0.56					1	0.56					1	0.56			1	0.56	1	0.56										
R4-7A	KEEP RIGHT (RIGHT ARROW)	900 x 1200	1.08							4	4.32			2	2.16	1	1.08			2	2.16	2	2.16	1	1.08	2	2.16	1	1.08		
R6-1R	ONE WAY (RIGHT ARROW)	900 x 300	0.27											2	0.54			1	0.27	1	0.27			2	0.54						
R11-2	ROAD CLOSED	1200 x 750	0.90	2	1.80	5	4.50									3	2.70	3	2.70	1	0.90							2	1.80	2	1.80
R11-4	ROAD CLOSED TO THRU TRAFFIC	1500 x 750	1.13																			3	3.38	2	2.25			1	1.13	1	1.13
W1-4R	DOUBLE REVERSE CURVE (RIGHT)	1200 x 1200	1.44			1	1.44													1	1.44										
W1-6R	LARGE ARROW	910 x 460	0.42													3	1.26	3	1.26	3	1.26										
W4-1aL	THRU TRAFFIC MERGE LEFT	1200 x 1200	1.44													1	1.44														
W4-1aR	THRU TRAFFIC MERGE RIGHT	1200 x 1200	1.44							1	1.44																				
W4-2L	PAVEMENT WIDTH TRANSITION (LEFT)	1200 x 1200	1.44	2	2.88	1	1.44	2	2.88	2	2.88					2	2.88	2	2.88			2	2.88	2	2.88	2	2.88	2	2.88		
W4-2R	PAVEMENT WIDTH TRANSITION (RIGHT)	1200 x 1200	1.44	2	2.88	2	2.88	2	2.88							2	2.88	2	2.88			2	2.88	2	2.88	2	2.88			2	2.88
W6-3	TWO WAY TRAFFIC	1200 x 1200	1.44													2	2.88	1	1.44												
W12-1	DOUBLE ARROW SIGN	600 x 600	0.36									1	0.36			1	0.36	1	0.36												
W13-1	ADVISORY SPEED PLATE (25 MPH)	600 x 600	0.36	8	2.88	7	2.52	8	2.88	5	1.80			4	1.44	7	2.52	7	2.52	5	1.80	8	2.88	8	2.88	8	2.88	6	2.16	4	1.44
W16-5P	ARROW PLAQUES	600 x 300	0.18	2	0.36			2	0.36	2	0.36	7	1.26	8	1.44	4	0.72	4	0.72	10	1.80	4	0.72	12	2.16	2	0.36	2	0.36	7	1.26
W20-1	ROAD WORK AHEAD	1200 x 1200	1.44	10	14.40	6	8.64	10	14.40	8	11.52	10	14.40	15	21.60	10	14.40	9	12.96	16	23.04	11	15.84	22	31.68	7	10.08	6	8.64	6	8.64
W20-2	DETOUR AHEAD	1200 x 1200	1.44															5	7.20			2	2.88								
W20-3	ROAD CLOSED AHEAD	1200 x 1200	1.44													1	1.44	1	1.44			4	5.76								
W20-5L	LEFT LANE CLOSED AHEAD	1200 x 1200	1.44	2	2.88	1	1.44	2	2.88	2	2.88					2	2.88	2	2.88			2	2.88	2	2.88	2	2.88	2	2.88		
W20-5R	RIGHT LANE CLOSED AHEAD	1200 x 1200	1.44	2	2.88	1	1.44	2	2.88							1	1.44	1	1.44			2	2.88	2	2.88	2	2.88			2	2.88
W20-7A	FLAGGER SYMBOL	1200 x 1200	1.44	1	1.44			1	1.44																					5	7.20
TC-1	RANCHO DRIVE, 45° ARROW	3048 x 1524	4.65													1	4.65														
TC-2	RANCHO DRIVE	750 x 600	0.45													6	2.70					17	7.65								
TC-3	RANCHO DR CLOSED USE VALLEY VIEW	3050 1830	5.58													1	5.58														
TC-4	BONANZA ROAD	900 x 600	0.54															16	8.64												
TC-5	WASHINGTON AVE.	900 x 600	0.54			2	1.08															2	1.08								
TC-6	WENDY'S	910 x 460	0.42																	1	0.42	1	0.42								
TC-7	WINCHELL'S, SUBWAY	1070 x 600	0.64																	1	0.64	1	0.64								
TC-8	BURGER KING	1220 x 460	0.56																	1	0.56	1	0.56								
TC-9	CHECKER AUTO	1200 x 460	0.55																	1	0.55	1	0.55								
TC-10	CLOSED	1980 x 750	1.49													1	1.49	1	1.49												
TC-11	CLOSED	4880 x 750	3.66													1	3.66	1	3.66												
TC-12	CLOSED	4350 x 750	3.26													1	3.26	1	3.26												

PROFESSIONAL ENGINEER - STATE OF NEVADA
JESSE M. GALVAN
EXP. 6-30-03
CIVIL
No. 9645

5-12-03

Washington
WASHINGTON INFRASTRUCTURE SERVICES, INC.

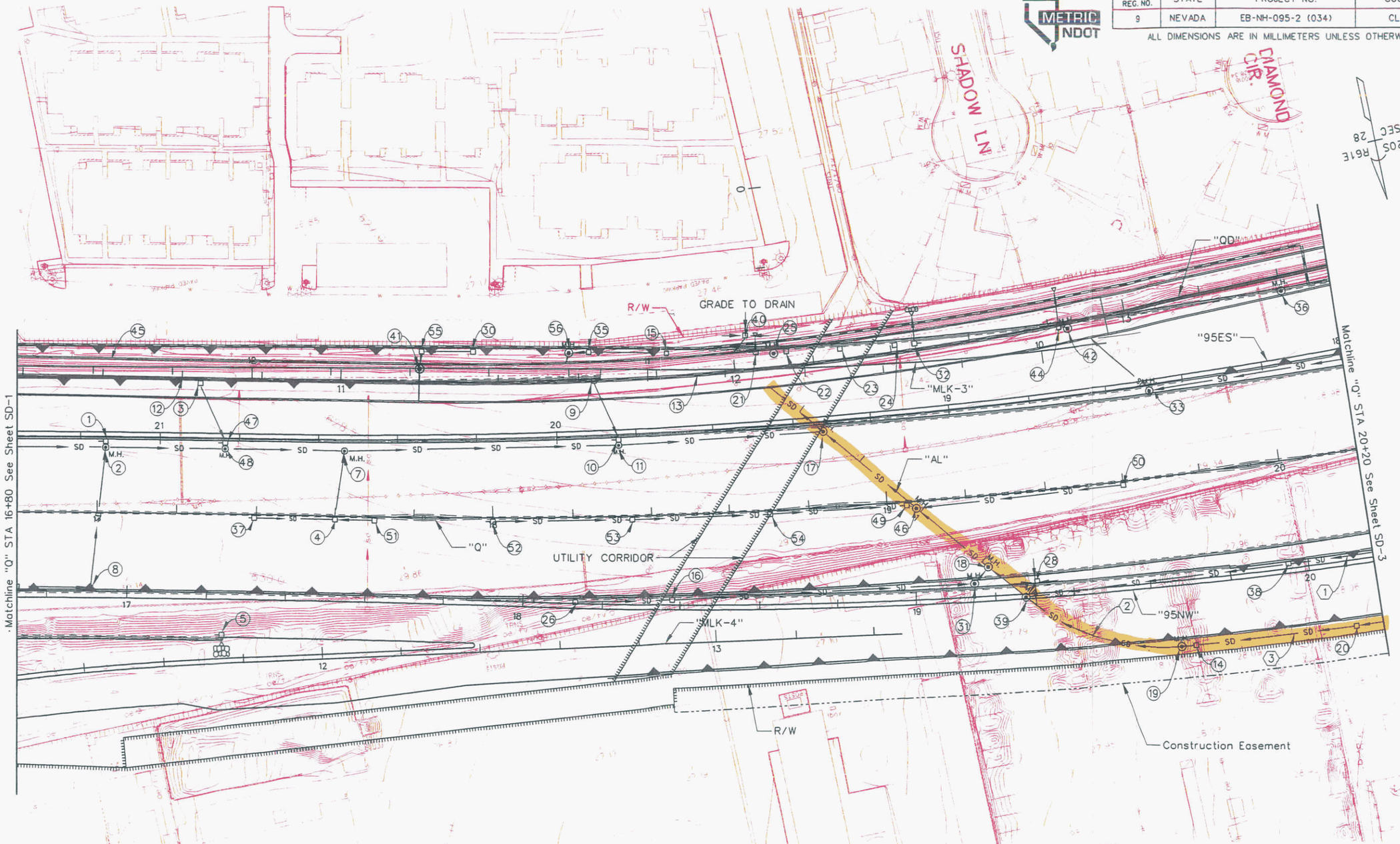
North Channel (Storm Drain) Plans

Not a part of the As-Built Plan Set

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-2

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



Curve Table

Curve #	Radius	Delta	Length	Tangent
1	1197.921m	04° 28'50"	93.676m	49.993m
2	55.290m	43° 31'34"	42.002m	22.073m
3	1215.150m	4° 26'35"	94.232m	47.140m

PROFESSIONAL ENGINEER — DANIEL GENDEL — CIVIL — No. 12806 — Considered Submitted for Construction — Not Valid Without Signature — Date 5/28/2003

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2587

DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JCL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-2A

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"Q" 17+02.000 18.150m LT.	CONSTRUCT TYPE 2 D.I., H=1.100m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 0.750m RCP (SEE SHEET SD-33)
②	"Q" 17+02.000 16.500m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.877m INSTALL 450mm x 28.924m RCP (SEE SHEET SD-35)
③	"95ES" 20+90.000 12.755m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 15.002m RCP (SEE SHEET SD-37 & SD-73)
④	"Q" 17+60.000 0.760m RT.	CONSTRUCT TYPE 2 D.I., H=1.400m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 16.477m RCP (SEE SHEET SD-37)
⑤	"95NW" 17+24.000 9.200m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 375mm x 1.330m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "95NW" 17+24.000, 11.815m RT. (SEE SHEET SD-74)
⑥		NOTE NOT USED
⑦	"Q" 17+62.000 16.500m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.990m INSTALL 600mm x 68.003m RCP (SEE SHEET SD-37)
⑧	"Q" 16+98.500 19.150 RT.	CONSTRUCT TYPE 2 D.I., H=1.400m INSTALL 375mm x 3.400m SLOTTED DRAIN BACK INSTALL 450mm x 34.922m RCP (SEE SHEET SD-33)
⑨	"95ES" 19+90.000 12.750 m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 9.100m SLOTTED DRAIN BACK INSTALL 450mm x 15.527m RCP (SEE SHEET SD-38)
⑩	"Q" 18+32.000 19.563m LT.	CONSTRUCT TYPE 2 D.I. (A=760), H=1.600m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x .663m RCP (SEE SHEET SD-38)
⑪	"Q" 18+32.000 18.000m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=2.094m INSTALL 600mm x 50.103m RCP (SEE SHEET SD-35)
⑫	"QD" 10+56.000 TO "QD" 10+60.000	FLOW TRANSFER STRUCTURE (SEE SHEET B-612)
⑬	"QD" 11+90.000 TO "QD" 11+94.000	FLOW TRANSFER STRUCUTRE (SEE SHEET B-612)
⑭	"95NW" 19+70.000 15.500m RT.	CONSTRUCT TYPE 3 PIPE RISER DI, H=0.579m (SEE SHEET SD-27 & SD-67)
⑮	"MLK-3" 10+95.000 4.360m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 18.900m RCP (SEE SHEET SD-20 & SD-73)
⑯	"95NW" 18+38.000 2.579m LT.	CONSTRUCT TYPE 2 D.I., H=1.600m INSTALL 375mm x 7.600m SLOTTED DRAIN AHEAD INSTALL 450mm 75.883m RCP (SEE SHEET SD-26)
⑰	"AL" 10+18.000 OFFSET = 0	CONSTRUCT TYPE 4 MODIFIED SDMH, H=4.087m INSTALL 1500mm x 17.105m RCP (JACKED) CONNECT TO RCB @ "QD" 12+08.000, 4.610m RT. (SEE SHEET SD-27)
⑱	"AL" 10+72.000 OFFSET = 0	CONSTRUCT TYPE 4 SDMH, H=4.706m INSTALL 1500mm x 21.537m RCP (JACKED) (SEE SHEET SD-27)
⑲	"AL" 11+07.991 OFFSET = 0	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.320m INSTALL 1350mm x 41.218m RCP (SEE SHEET SD-27)
⑳	"95NW" 20+10.000 15.500m RT.	CONSTRUCT TYPE 3 PIPE RISER DI, H=0.473m (SEE SHEET SD-27 & SD-67)
㉑	"MLK-3" 10+72.429 4.410m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD INSTALL 375mm x 4.370m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "MLK-3" 10+72.465, 9.080m RT. (SEE SHEET SD-74)
㉒	"95ES" 19+40.275 17.362m RT.	CONSTRUCT TYPE 2. D.I., H=1.343m CONNECT TO RCB (SEE SHEET SD-11)
㉓	"95ES" 19+26.198 16.849m RT.	CONSTRUCT TYPE 2. D.I., H=1.231m CONNECT TO RCB (SEE SHEET SD-11)
㉔	"95ES" 19+12.111 16.515m RT.	CONSTRUCT TYPE 2. D.I., H=1.169m CONNECT TO RCB (SEE SHEET SD-11)
㉕	"QD" 12+10.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.254m CONNECT TO RCB (SEE SHEET SD-11 & SD-75)
㉖	"95NW" 18+13.070 1.680m LT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 24.302m RCP (SEE SHEET SD-26)
㉗		NOTE NOT USED
㉘	"Q" 19+35.600 22.800m RT.	CONSTRUCT TYPE 2A D.I. (D=600) W/CONCRETE APRON, H=0.800m INSTALL 450mm x 3.452m RCP (SEE SHEET SD-38 & SD-69)
㉙		NOTE NOT USED
㉚	"MLK-3" 11+44.000 4.329m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 11.975m RCP (SEE SHEET SD-42 & SD-73)
㉛	"95NW" 19+15.000 4.609m LT.	CONSTRUCT TYPE 1 SDMH, H=4.159m INSTALL 450mm x 3.903m RCP (SEE SHEET SD-26)
㉜	"95ES" 19+07.000 5.020m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 375mm x 6.786m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "95ES" 19+06.900, 24.350m RT. (SEE SHEET SD-74)
㉝	"Q" 19+70.000 22.000m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=2.627m INSTALL 600mm x 20.013m RCP CONNECT TO RCB @ "QD" 12+90.000, 4.610m RT, (SEE SHEET SD-40)
㉞		NOTE NOT USED
㉟	"MLK-3" 11+15.000 4.360m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.800m INSTALL 450mm x 3.851m RCP (SEE SHEET SD-20 & SD-73)
㊱	"QD" 13+40.000 4.010m RT.	CONSTRUCT TYPE 1 SDMH, H=2.380m CONNECT TO RCB (SEE SHEET SD-11 & SD-75)
㊲	"Q" 17+39.500 0.760m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 450mm x 19.896m RCP (SEE SHEET SD-37)
㊳	"95NW" 19+95.000 2.566m LT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 65.944m RCP (SEE SHEET SD-30 & SD-73)
㊴	"AL" 10+84.097	CONSTRUCT TYPE 4 MODIFIED SDMH, H=4.238m INSTALL 1500mm x 10.222m RCP (SEE SHEET SD-27)
㊵	"MLK-3" 10+75.000 8.500m RT.	CONSTRUCT TYPE 2A D.I. (D=900) w/ CONCRETE APRON, H=1.100m INSTALL 750mm x 5.152m RCP CONNECT TO RCB AT "QD" 12+00.000, 4.610m LT. (SEE SHEET SD-20 & SD-69)
㊶	"QD" 11+20.000 4.010m LT.	CONSTRUCT TYPE 1 SDMH, H=2.787mm CONNECT TO RCB (SEE SHEET SD-11 & SD-75)
㊷	"QD" 12+85.000 0.943m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.320m CONNECT TO RCB (SEE SHEET SD-11 & SD-75)

PROFESSIONAL ENGINEER — DANIEL W. KENDALL — CIVIL — No. 12806 — Working Submittal Not for Construction — 5/28/2003 Revision

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

VTN nevada
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PLANNERS
LAND SURVEYORS
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LAS VEGAS, NEVADA 89146
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CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-2B

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

(43)		NOTE NOT USED
(44)	"95ES" 18+70.000 16.350m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 375mm x 9.658m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "95ES" 18+70.000, 26.308m RT. (SEE SHEET SD-74)
(45)	"QD" 10+18.572 TO "QD" 13+52.767	INSTALL DUAL 4200mm x 2100mm x 334.195m RCB (SEE SHEET SD-12)
(46)	"AL" 10+48.000 OFFSET = 0	CONSTRUCT TYPE 4 MODIFIED SDMH, H=4.437m INSTALL 1500mm x 28.699m RCP (JACKED) (SEE SHEET SD-17)
(47)	"Q" 17+32.000 18.150m LT.	CONSTRUCT TYPE 2 (A=760) D.I., H=1.100m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 0.750m RCP (SEE SHEET SD-37)
(48)	"Q" 17+32.000 16.500m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.941m INSTALL 450mm x 28.923m RCP (SEE SHEET SD-35)
(49)	"Q" 19+05.000 0.755m RT.	CONSTRUCT TYPE 2 D.I., H=1.600m INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 450mm x 1.752m RCP (SEE SHEET SD-42)
(50)	"Q" 19+60.000 0.755m RT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 51.498m RCP (SEE SHEET SD-42)
(51)	"Q" 17+70.000 0.807m RT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 450mm x 9.402m RCP (SEE SHEET SD-37)
(52)	"Q" 18+00.000 0.768m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 450mm x 34.418m RCP (SEE SHEET SD-42)
(53)	"Q" 18+35.000 0.775m RT.	CONSTRUCT TYPE 2 D.I., H=1.300m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 34.419m RCP (SEE SHEET SD-42)
(54)	"Q" 18+70.000 0.780m RT.	CONSTRUCT TYPE 2 D.I., H=1.300m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 34.418m RCP (SEE SHEET SD-42)
(55)	"MLK-3" 11+57.000 4.322m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.800m INSTALL 450mm x 2.265m RCP (SEE SHEET SD-42 & SD-73)
(56)	"MLK-3" 11+20.000 4.000m RT.	CONSTRUCT TYPE 1 SDMH, H=2.552m INSTALL 450mm x 2.199m RCP CONNECT TO RCB @ "QD" 11+57.000, 4.610m LT. (SEE SHEET SD-20)

PROFESSIONAL ENGINEER
DANIEL C. KENNEDY
Expires 12-31-2004
CIVIL
No. 12806
Checking Submittal
Not for Construction
Revision
5/28/2003

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
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DESIGN BY	TM, WT
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REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-3

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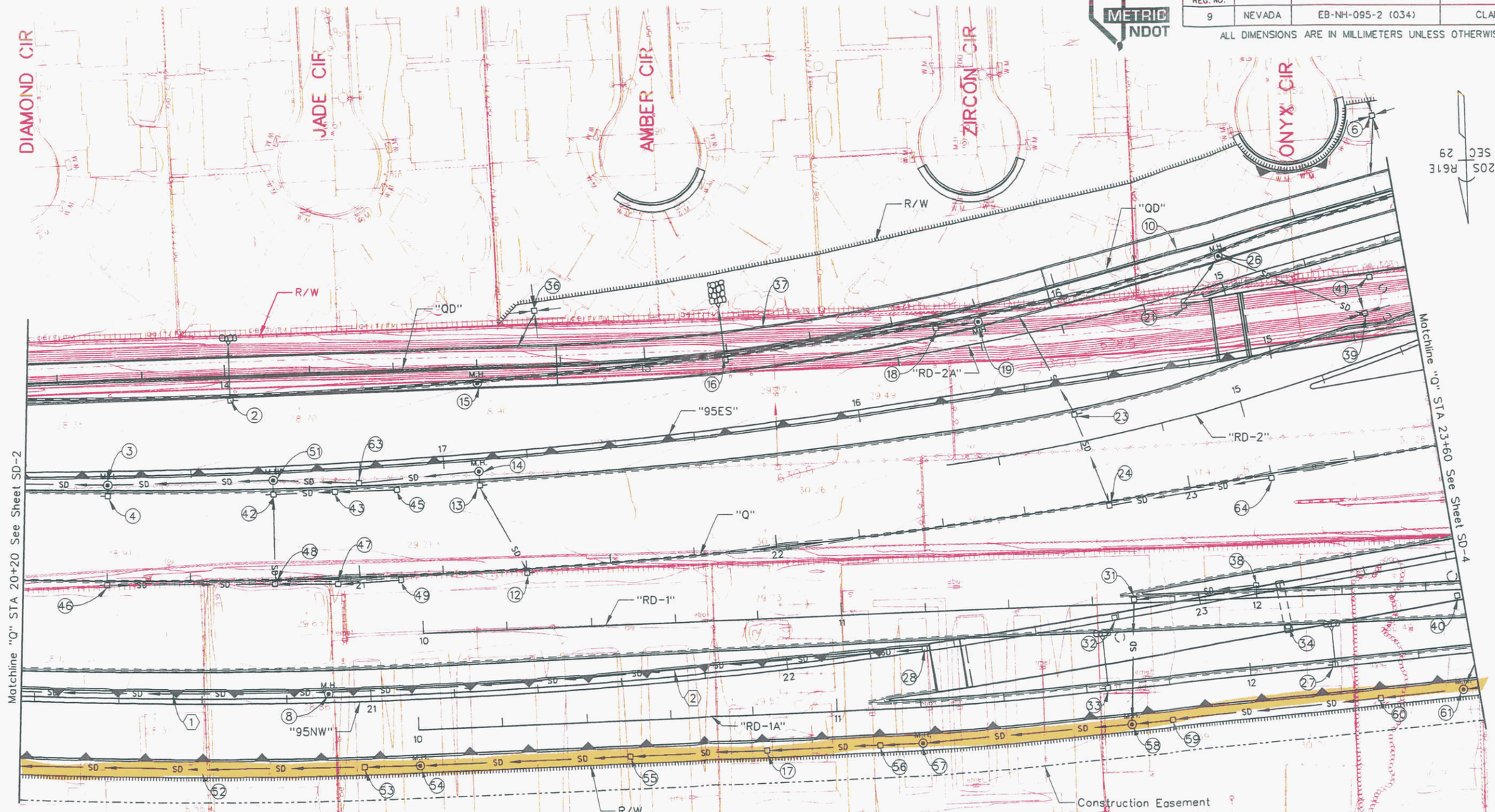
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



Curve Table

Curve #	Radius	Delta	Length	Tangent
⑴	1197.921m	04° 28'50"	93.676m	49.993m
⑵	1197.921m	04° 16'06"	89.241m	47.567m

PROFESSIONAL ENGINEER — DANIEL BENDER — Civil — No. 12806 — Submitted for Construction — 5/28/2003

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-3A

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①		NOTE NOT USED
②	"95ES" 17+50.000 16.350m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 375mm x 13.740m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "95ES" 17+50.000, 60.40m RT. (SEE SHEET SD-74)
③	"Q" 20+40.000 23.000m LT.	CONSTRUCT TYPE 1 SDMH, H=2.342m INSTALL 600mm x 67.675m RCP (SEE SHEET SD-46)
④	"Q" 20+40.000 20.461m LT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 3.000m SLOTTED DRAIN AHEAD INSTALL 450mm x 1.639m RCP (SEE SHEET SD-46)
⑤		NOTE NOT USED
⑥	"RD-2A" 14+55.000 28.000m RT.	CONSTRUCT TYPE 8 D.I., H=0.950m INSTALL 750mm x 13.660m RCP CONNECT TO RCB "QD" 16+80.000, 4.610m LT. (SEE SHEET SD-43)
⑦		NOTE NOT USED
⑧	"95NW" 20+90.000 2.117m LT.	CONSTRUCT TYPE 1 SDMH, H=2.000m INSTALL 450mm x 93.700m RCP (SEE SHEET SD-30)
⑨		NOT USED
⑩	"QD" 16+30.000 TO "QD" 16+34.000	FLOW TRANSFER STRUCTURE (SEE SHEET B-613)
⑪		NOT USED
⑫	"Q" 21+40.000 0.797m RT.	CONSTRUCT TYPE 2 D.I. (A=760), H=0.980m INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 23.249m RCP (SEE SHEET SD-40)
⑬	"Q" 21+30.000 20.826m LT.	CONSTRUCT TYPE 2 D.I. (A=760), H=1.100m INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 2.274m RCP (SEE SHEET SD-40)
⑭	"Q" 21+30.000 24.000m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.927m INSTALL 600mm x 48.037m RCP (SEE SHEET SD-40)
⑮	"QD" 14+60.000 4.010m LT.	CONSTRUCT TYPE 1 SDMH, H=5.204m CONNECT TO RCB (SEE SHEET SD-12, SD-70 & SD-75)
⑯	"95ES" 16+30.000 16.350m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 3.000m SLOTTED DRAIN AHEAD INSTALL 375mm x 13.209m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "95ES" 16+30.000, 29.863m RT. (SEE SHEET SD-74)
⑰	"RD-1A" 10+83.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.566m (SEE SHEET SD-28)
⑱	"RD-2A" 15+70.000 5.551m RT.	CONSTRUCT TYPE 2 D.I., H=1.080m INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 450mm x 9.331m RCP. (SEE SHEET SD-20)
⑲	"QD" 15+80.000 4.010m LT.	CONSTRUCT TYPE 1 SDMH, H=7.506m CONNECT TO RCB (SEE SHEET SD-12, SD-70 & SD-75)
⑳		NOT USED
㉑	"95ES" 15+19.000 12.750m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 450mm x 4.892m RCP (SEE SHEET SD-23)
㉒		NOT USED
㉓	"RD-2" 15+40.000 6.751m RT.	CONSTRUCT TYPE 2 D.I. (A=760), H=1.100m INSTALL 375mm x 4.600m SLOTTED DRAIN BACK INSTALL 450mm x 26.502m RCP CONNECT TO RCB AT "QD" 15+90.000, 4.610m RT. (SEE SHEET SD-46)
㉔	"Q" 22+80.000 0.767m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 450mm x 22.690m RCP (SEE SHEET SD-46)
㉕		NOT USED
㉖	"QD" 16+40.000 4.010m RT.	CONSTRUCT TYPE 1 SDMH, H=8.342m CONNECT TO RCB (SEE SHEET SD-12, SD-23, SD-70 & SD-75)
㉗	"RD-1A" 12+20.000 0.750m LT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 375mm x 5.750m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION LT. INSTALL END SECTION AT "RD-1A" 11+65.000, 0.750m LT. (SEE SHEET SD-74)
㉘	"95NW" 22+33.000 0.823m LT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 141.665m RCP (SEE SHEET SD-30 & SD-73)
㉙		NOT USED
㉚		NOT USED
㉛	"RD-1" 11+70.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.280m INSTALL 450mm x 28.406m RCP (SEE SHEET SD-57)
㉜	"95NW" 22+77.500 0.750m LT.	DECK DRAIN (SEE SHEET B-615)
㉝	"RD-1A" 11+65.000 0.750m LT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 375mm x 5.128m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION LT. INSTALL END SECTION AT "RD-1A" 11+65.000, 0.750m LT. (SEE SHEET SD-74)
㉞	"95NW" 23+20.000 9.150m RT.	DECK DRAIN (SEE SHEET B-615)
㉟		NOT USED
㊱	"95ES" 16+75.000 32.750m RT.	CONSTRUCT TYPE 2A D.I., H=1.100m W/ CONCRETE APRON INSTALL 750mm x 9.212m RCP CONNECT TO RCB AT "QD" 14+70.000, 4.610m LT. (SEE SHEET SD-24 & SD-69)
㊲	"QD" 13+52.769 TO "QD" 16+84.050	INSTALL DUAL 4200mm x 2100mm x 331.28m RCB (SEE SHEET SD-12 & SD-13)
㊳	"RD-1" 12+00.000 3.500m LT.	CONSTRUCT TYPE 2A D.I., H=0.800m INSTALL 450mm x 29.486m RCP (SEE SHEET SD-57)
㊴	"RD-2" 14+65.000 10.411m RT.	CONSTRUCT TYPE 2A (D=600) D.I. w /CONCRETE APRON, H=1.089m INSTALL 450mm x 14.261m RCP CONNECT TO RCB (SEE SHEET SD-23 & SD-69)
㊵	"95NW" 23+61.500 9.150m RT.	DECK DRAIN (SEE SHEET B-615)
㊶	"95ES" 14+70.000 12.758m RT.	DECK DRAIN (SEE SHEET B-300 & B-615)
㊷	"Q" 20+80.000 20.623m LT.	CONSTRUCT TYPE 2 D.I., H=1.300m INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 450mm x 2.549m RCP (SEE SHEET SD-41)
㊸	"Q" 20+94.830 20.704m LT.	CONSTRUCT TYPE 2 D.I., H=1.090m INSTALL 450mm x 13.928m RCP (SEE SHEET SD-41)
㊹		NOT USED
㊺	"Q" 21+09.830 20.745m LT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 450mm x 14.020m RCP (SEE SHEET SD-41)

PROFESSIONAL ENGINEER — DANIEL W. BENDER — No. 12806 — CIVIL — STATE OF NEVADA

Submitted for Bidding — Construction — Record Drawing — Not to be Used for Construction

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada — CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
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REVIEWED BY	DWB

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(46)	"Q" 20+40.000 0.799m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 4.600m SLOTTED DRAIN BACK INSTALL 450mm x 39.251m RCP (SEE SHEET SD-39)
(47)	"Q" 20+94.830 1.184m RT.	CONSTRUCT TYPE 2 D.I., H=1.180m INSTALL 450mm x 14.416m RCP (SEE SHEET SD-39)
(48)	"Q" 20+79.830 0.768m RT.	CONSTRUCT TYPE 2 D.I., H=1.480m INSTALL 450mm x 20.092m RCP (SEE SHEET SD-41)
(49)	"Q" 21+09.830 0.811m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 450mm x 14.416m RCP (SEE SHEET SD-39)
(50)		NOT USED
(51)	"Q" 20+80.000 23.872m LT.	CONSTRUCT TYPE 1 SDMH, H=2.187m INSTALL 600mm x 38.139m RCP (SEE SHEET SD-40)
(52)	"95NW" 20+60.000 15.500m RT.	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.500m INSTALL 1350mm x 92.686m RCP (SEE SHEET SD-27)
(53)	"95NW" 20+98.000 15.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.893m (SEE SHEET SD-27 & SD-67)
(54)	"RD-1A" 10+00.000 8.500m RT.	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.553m INSTALL 1350mm x 46.667m RCP (SEE SHEET SD-27)
(55)	"RD-1A" 10+50.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.484m (SEE SHEET SD-27 & SD-67)
(56)	"RD-1A" 11+10.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.979m (SEE SHEET SD-28 & SD-67)
(57)	"RD-1A" 11+20.000 8.500m RT.	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.638m INSTALL 1350mm x 117.986m RCP (SEE SHEET SD-28)
(58)	"RD-1A" 11+70.000 8.500m RT.	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.320m INSTALL 1350mm x 48.253m RCP (SEE SHEET SD-28)
(59)	"RD-1A" 11+80.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.448m (SEE SHEET SD-28 & SD-67)
(60)	"RD-1A" 12+30.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.320m (SEE SHEET SD-28 & SD-67)
(61)	"RD-1A" 12+50.000 8.500m RT.	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.319m INSTALL 1350mm x 77.847m RCP (SEE SHEET SD-28)
(62)		NOT USED
(63)	"Q" 21+00.701 22.624m LT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.666m (SEE SHEET SD-40 & SD-67)
(64)	"Q" 23+20.000 0.907m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 450mm x 39.450m RCP. (SEE SHEET SD-46)

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-38

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

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PROFESSIONAL ENGINEER - DANIEL GENERAL - CIVIL - No. 12806 - Date of Signature 5/28/2003 - STATE OF NEVADA

Changing Submittal

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

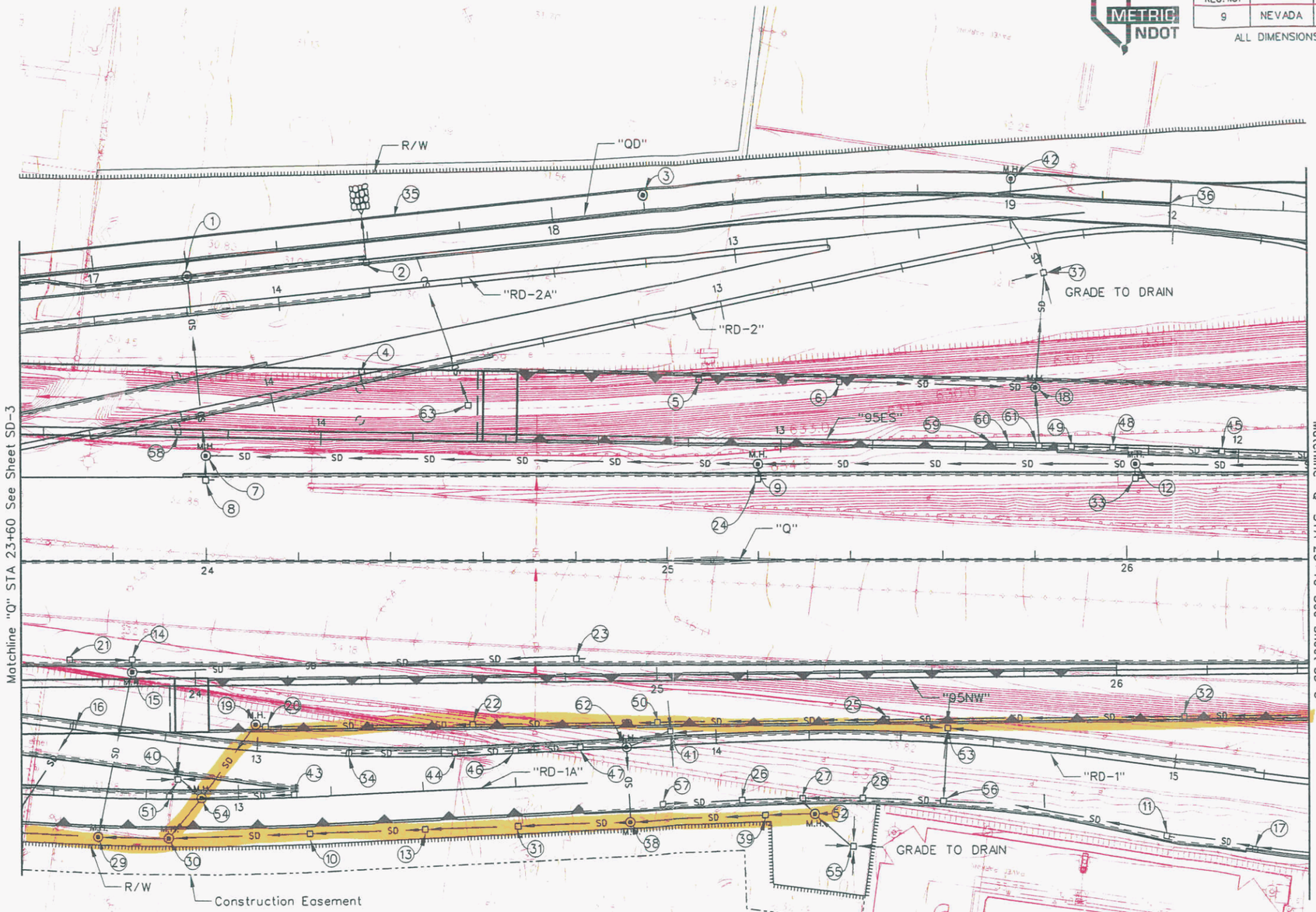
DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-4

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

T20S R61E SEC 29



Curve Table

Curve #	Radius	Delta	Length	Tangent
(1)	28.000m	07° 56'09"	3.878m	1.942m

PROFESSIONAL ENGINEER-STATE OF NEVADA DANIEL W. BENDER Exp. 12-31-2004 CIVIL No. 12806

Submitted for Construction

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
• CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-4A

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"QD" 17+20.000 4.010m RT.	CONSTRUCT TYPE 1 SDMH, H=7.273m CONNECT TO RCB (SEE SHEET SD-12 & SD-75)
②	"RD-2A" 13+80.000 5.550m RT.	CONSTRUCT TYPE 5 EMBANKMENT PROTECTOR INSTALL 375mm x 3.000m SLOTTED DRAIN BACK INSTALL 375mm x 10.750m CMP DOWNDRAIN W/ ANCHOR ASSEMBLY AND END SECTION RT. INSTALL END SECTION AT "RD-2A" 13+80.000, 16.787m RT. (SEE SHEET SD-74)
③	"QD" 18+20.000 4.010m LT.	CONSTRUCT TYPE 1 SDMH, H=1.744m CONNECT TO RCB (SEE SHEET SD-13 & SD-75)
④	"95ES" 13+91.500 12.970m RT.	DECK DRAIN (SEE SHEET B-300 & B-615)
⑤	"95ES" 13+18.000 12.756m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.580m INSTALL 450mm x 29.487m RCP (SEE SHEET SD-24 & SD-73)
⑥	"95ES" 12+87.410 12.756m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.700m INSTALL 450mm x 41.274m RCP (SEE SHEET SD-24 & SD-73)
⑦	"Q" 24+00.000 21.000m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=2.207m INSTALL 450mm x 27.219m RCP (SEE SHEET SD-60)
⑧	"Q" 24+00.000 17.855m LT.	CONSTRUCT TYPE 2 D.I., H=1.640m INSTALL 375mm x 10.700m SLOTTED DRAIN AHEAD INSTALL 450mm x 4.245m RCP (SEE SHEET SD-60)
⑨	"Q" 25+20.000 17.855m LT.	CONSTRUCT TYPE 1 SDMH, H=1.932m INSTALL 450mm x 118.816m RCP (SEE SHEET SD-45)
⑩	"RD-1A" 13+15.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.782m (SEE SHEET SD-28)
⑪	"RD-1" 15+00.000 14.852m RT.	CONSTRUCT TYPE 2 D.I., H=1.480m INSTALL 375mm x 12.200m SLOTTED DRAIN AHEAD INSTALL 450mm x 48.755m RCP (SEE SHEET SD-54)
⑫	"Q" 26+02.000 20.846m LT.	CONSTRUCT TYPE 1 SDMH, H=2.135m INSTALL 450mm x 61.650m RCP (SEE SHEET SD-45)
⑬	"RD-1A" 13+40.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.904m (SEE SHEET SD-28)
⑭	"Q" 23+84.000 21.455m RT.	CONSTRUCT TYPE 2 D.I., H=1.680m INSTALL 375mm x 12.200m SLOTTED DRAIN AHEAD INSTALL 450mm x 1.645m RCP (SEE SHEET SD-61)
⑮	"Q" 23+84.000 24.000m RT.	CONSTRUCT TYPE 2 SDMH, H=2.438m INSTALL 450mm x 34.557m RCP (SEE SHEET SD-44)
⑯	"RD-1" 12+60.000 0.450m RT.	CONSTRUCT TYPE 2 D.I. (A=760), H=0.980m INSTALL 450mm x 25.844m RCP (SEE SHEET SD-56)
⑰	"RD-1" 15+20.000 15.150m RT.	CONSTRUCT TYPE 2 DI,H=1.280m INSTALL 375mm x 12.2m SLOTTED DRAIN AHEAD INSTALL 450mm x 19.406m RCP (SEE SHEET SD-54)
⑱	"95ES" 12+45.000 12.000m RT.	CONSTRUCT TYPE 1 SDMH, H=10.323m INSTALL 450mm x 23.952m RCP (SEE SHEET SD-25)
⑲	"95NW" 24+13.000 8.550m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=9.514m INSTALL 450mm x 18.770m RCP (SEE SHEET SD-34 & SD-70)
⑳	"95NW" 24+15.000 9.150m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.800m INSTALL 450mm x 1.275m RCP (SEE SHEET SD-34 & SD-73)
㉑	"Q" 23+70.500 21.452m RT.	CONSTRUCT TYPE 2 D.I., H=1.080m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 12.901m RCP (SEE SHEET SD-61)
㉒	"95NW" 24+60.000 9.150m RT.	CONSTRUCT SPECIAL D.I. 2., H=1.800m INSTALL 450mm x 43.900m RCP (SEE SHEET SD-34 & SD-73)
㉓	"Q" 23+80.000 21.430m RT.	CONSTRUCT TYPE 2 D.I., H=1.100m INSTALL 375mm x 12.200m SLOTTED DRAIN AHEAD INSTALL 450mm x 94.848m RCP (SEE SHEET SD-44)
㉔	"Q" 25+20.000 17.855m LT.	CONSTRUCT TYPE 2 D.I., H=1.080m INSTALL 375mm x 12.200m SLOTTED DRAIN AHEAD INSTALL 450mm x 2.245m RCP (SEE SHEET SD-25)
㉕	"95NW" 25+50.000 9.160m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.600m INSTALL 450mm x 49.150m RCP (SEE SHEET SD-34 & SD-73)
㉖	"RD-1" 14+05.000 12.750m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 450mm x 12.381m RCP (SEE SHEET SD-54)
㉗	"RD-1" 14+18.390 12.750m RT.	CONSTRUCT TYPE 2 D.I., H=1.480m INSTALL 450mm x 2.976m RCP (SEE SHEET SD-55)
㉘	"RD-1" 14+32.000 12.756m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.300m INSTALL 450mm x 12.342m RCP (SEE SHEET SD-54 & SD-73)
㉙	"RD-1A" 12+70.000 8.500m RT.	CONSTRUCT TYPE 4 MODIFIED SDMH, H=2.364m INSTALL 1350mm x 17.785m RCP (SEE SHEET SD-28)
㉚	"RD-1A" 12+85.000 8.500m RT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.370m INSTALL 1200mm x 13.606m RCP (SEE SHEET SD-28)
㉛	"RD-1A" 13+60.000 8.500m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=1.052m (SEE SHEET SD-28 & SD-67)

METRIC NDOT

PROFESSIONAL ENGINEER - DANIEL G. ENRIGHT - CIVIL - 12806 - STATE OF NEVADA

Checking Submittal - Not for Construction - Plot Date: 28-MAY-2003 - Plot By: Vivian Soh - Revised: 12-JUN-2002 - Last Revision: 28-MAY-2003

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
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LAS VEGAS, NEVADA 89146
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DESIGN BY	TW, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-4B

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

32	"95NW" 26+15.000 9.150m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 63.900 m RCP (SEE SHEET SD-34 & SD-73)
33	"Q" 26+02.000 17.855m LT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 12.200m SLOTTED DRAIN AHEAD INSTALL 450mm x 2.091m RCP (SEE SHEET SD-25)
34	"RD-1" 13+20.000 0.748m LT.	CONSTRUCT TYPE 2 D.I., H=1.180m INSTALL 375mm x 1.500m SLOTTED DRAIN AHEAD INSTALL 450mm x 22.204m RCP (SEE SHEET SD-32)
35	"QD" 16+84.059 TO "QD" 19+35.000	INSTALL DUAL 4200mm x 2100mm x 250.941m RCB (SEE SHEET SD-12 & SD-13)
36	"QD" 19+35.000	BEGIN DUAL 4200mm x 2100mm RCB END TRANSITION STRUCTURE (SEE SHEET SD-13, B-600 & B-602)
37	"RD-2" 12+30.000 8.000m LT.	CONSTRUCT TYPE 2A D.I. (A=760), H=0.950m W/ CONCRETE APRON INSTALL 600mm x 13.647m RCP CONNECT TO RCB AT "QD" 19+00.000, 4.610m RT. (SEE SHEET SD-25 & SD-69)
38	"RD-1" 13+80.000 16.000m RT.	CONSTRUCT TYPE 2 SDMH, H=2.814m INSTALL 1200mm x 97.998m RCP (SEE SHEET SD-28)
39	"RD-1" 14+10.000 TO 16.000m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=0.321m (SEE SHEET SD-28 & SD-67)
40	"RD-1A" 12+87.000 3.500m LT.	CONSTRUCT TYPE 2A D.I. (D=600), H=0.800m INSTALL 450mm x 4.800m RCP (SEE SHEET SD-59)
41	"RD-1" 13+90.000 3.044m LT.	CONSTRUCT TYPE 2A D.I. (D=600), H=0.800m INSTALL 450mm x 9.523m RCP (SEE SHEET SD-57)
42	"QD" 19+00.000 4.010m LT.	CONSTRUCT TYPE 1 SDMH, H=1.730m CONNECT TO RCB (SEE SHEET SD-13 & SD-75)
43	"RD-1A" 13+12.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 450mm x 18.789m RCP (SEE SHEET SD-59)
44	"RD-1" 13+43.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.180m INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 450mm x 12.385m RCP (SEE SHEET SD-32)
45	"95ES" 12+04.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.280m INSTALL 375mm x 18.300m SLOTTED DRAIN BACK INSTALL 450mm x 23.839m RCP (SEE SHEET SD-23)
46	"RD-1" 13+56.000 0.748m LT.	CONSTRUCT TYPE 2 D.I., H=1.280m INSTALL 375mm x 1.500m SLOTTED DRAIN BACK INSTALL 450mm x 13.399m RCP (SEE SHEET SD-32)
47	"RD-1" 13+70.000 0.749m LT.	CONSTRUCT TYPE 2 D.I., H=1.380m INSTALL 375mm x 3.700m SLOTTED DRAIN BACK INSTALL 450mm x 9.118m RCP (SEE SHEET SD-32)
48	"95ES" 12+28.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.380m INSTALL 375mm x 18.300m SLOTTED DRAIN BACK INSTALL 450mm x 8.397m RCP (SEE SHEET SD-23)
49	"95ES" 12+37.000 0.749m LT.	CONSTRUCT TYPE 2 D.I., H=1.480m INSTALL 375mm x 7.600m SLOTTED DRAIN BACK INSTALL 450mm x 6.165m RCP (SEE SHEET SD-23)
50	"95NW" 25+00.000 9.156m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.180m INSTALL 375mm x 1.500m SLOTTED DRAIN AHEAD INSTALL 450mm x 39.152m RCP (SEE SHEET SD-34 & SD-73)
51	"RD-1A" 12+85.000 0.750m LT.	CONSTRUCT TYPE 2 D.I. (A=910), H=1.437m INSTALL 450mm x 11.260m RCP (SEE SHEET SD-59)
52	"RD-1" 14+21.000 16.000m RT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.675m INSTALL 1200mm x 38.583m RCP (SEE SHEET SD-28)
53	"RD-1" 14+50.000 2.500m RT.	CONSTRUCT TYPE 2A D.I., H=0.800m INSTALL 450mm x 15.000m RCP (SEE SHEET SD-62)
54	"RD-1A" 12+92.000 11.325m LT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=3.988m INSTALL 450mm x 9.436m RCP (SEE SHEET SD-34 & SD-70)
55	"RD-1" 14+30.000 23.000m RT.	CONSTRUCT TYPE 2A D.I., H=1.800m W/ CONCRETE APRON INSTALL 450mm x 9.926m RCP (SEE SHEET SD-55 & SD-69)
56	"RD-1" 14+50.000 12.750m RT.	CONSTRUCT SPECIAL D.I. 2, H=1.800m INSTALL 375mm x 3.000m SLOTTED DRAIN AHEAD INSTALL 450mm x 15.592m RCP (SEE SHEET SD-54 & SD-73)
57	"RD-1" 13+87.500 12.750m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 450mm x 16.900m RCP (SEE SHEET SD-58)
58	"95ES" 14+31.000 0.975m LT.	DECK DRAIN (SEE SHEET B-615)
59	"95ES" 12+54.000 0.759m LT.	CONSTRUCT SPECIAL D.I. 2, H=1.200m INSTALL 450mm x 2.900m RCP (SEE SHEET SD-23 & SD-73)
60	"95ES" 12+50.000 0.759m LT.	CONSTRUCT SPECIAL D.I. 2, H=1.300m INSTALL 450mm x 4.896m RCP (SEE SHEET SD-23 & SD-73)
61	"95ES" 12+44.000 0.759m LT.	CONSTRUCT SPECIAL D.I. 2, H=1.600m INSTALL 450mm x 11.047m RCP (SEE SHEET SD-23 & SD-73)
62	"RD-1" 13+80.000 0.149m LT.	CONSTRUCT TYPE 1 SDMH, H=2.592m INSTALL 450mm x 14.949m RCP (SEE SHEET SD-57)
63	"RD-2" 13+58.500 11.097m LT.	CONSTRUCT TYPE 2A D.I., H=0.800m INSTALL 450mm x 33.487m RCP (SEE SHEET SD-21)

PROFESSIONAL ENGINEER - DANIEL GLENDE - 12806 - CIVIL - Checking Submittal - Not for Construction - Revision 1

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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DESIGN BY	TM, WT
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REVIEWED BY	DWB

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FED. RD. REC. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-5

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

Matchline "RD" STA 58+70 See Sheet SD-9

Matchline "Q" STA 26+40 See Sheet SD-4

Matchline "Q" STA 29+80 See Sheet SD-6

Matchline "RD" STA 61+20 See Sheet SD-10

R/W

MARIGOLD LN

DAHLIA LN

T20S R16E SEC 29

"RD-3B"

"QD"

"RL"

"RD-2B"

"RD-2"

"95ES"

"95NW"

"Q"

"RD-1"

"RD-1B"

"RD-4B"

"RD-3"

"RD-4"

"RML"

"RD"

RANCHO DRIVE

GRADE TO DRAIN

EXISTING RCB SEE PROJECT 3A
RANCHO ROADWAY IMPROVEMENTS (SD-3)

M.H.

SD

PROFESSIONAL ENGINEER
DANIEL GENDER
CIVIL
No. 12806
STATE OF NEVADA

Current
Not to be used for construction purposes

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

VTN nevada
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-5A

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"QD" 19+78.000 OFFSET = 0	BEGIN 9.220m TO 13.563m x 43.000m TRANSITION STRUCTURE END CONFLUENCE (SEE SHEET SD-13, B-600 & B-601)
②	"QD" 20+03.500 OFFSET = 0 "RL" 19+79.931 7.124m RT.	BEGIN 13.563m x 25.500m CONFLUENCE END DUAL 4200 mm X 2100mm RCB END 3600mm X 2400mm RANCHO LATERAL (SEE SHEET SD-13, B-600 & B-601)
③	"QD" 20+20.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.498m CONNECT TO RCB (SEE SHEET SD-13 & SD-75)
④	"RD" 58+75.000 20.075m RT.	CONSTRUCT TYPE 3 D.I., H=1.400m INSTALL 450mm x 1.837m RCP (SEE SHEET SD-51)
⑤	"RD" 58+75.000 17.000m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=2.372m INSTALL 600mm x 27.628m RCP (SEE SHEET SD-52)
⑥	"RD-2" 11+41.000 1.325m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=2.000m INSTALL 450mm x 9.060m RCP CONNECT TO CONFLUENCE AT "QD" 19+90.000, 7.856m RT. (SEE SHEET SD-63)
⑦	"RD-2B" 59+35.000 7.400m RT.	CONSTRUCT TYPE 3 D.I., H=1.382m CONNECT TO RCB (SEE SHEET SD-17)
⑧	"RD" 60+80.000 13.500m LT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.819m INSTALL 600mm x 15.870m RCP CONNECT TO RCP STUB (SEE SHEET SD-64)
⑨	"95ES" 11+80.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.180m INSTALL 375mm x 12.200m SLOTTED DRAIN BACK INSTALL 450mm x 23.243m RCP (SEE SHEET SD-23)
⑩	"Q" 26+44.800 20.500m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.510m INSTALL 450mm x 60.758m RCP (SEE SHEET SD-45)
⑪	"95ES" 11+60.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.180m 375mm x 12.200m SLOTTED DRAIN BACK INSTALL 450mm x 19.393m RCP (SEE SHEET SD-23)
⑫	"Q" 26+80.000 0.750m LT.	CONSTRUCT TYPE 2 D.I. (A=1295), H=0.980m INSTALL 375mm x 4.600m SLOTTED DRAIN AHEAD INSTALL 450mm x 39.274m RCP (SEE SHEET SD-45)
⑬	"RD-3" 14+92.000 1.325m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.500m INSTALL 450mm x 12.051m RCP (SEE SHEET SD-33)
⑭	"RD" 59+20.000 18.714m LT.	CONSTRUCT TYPE 3 D.I., H=1.500m INSTALL 450mm x 6.594m RCP CONNECT TO RCB AT "QD" 20+65.000, 4.610m LT. (SEE SHEET SD-49)
⑮	"RD3" 14+79.000 1.325m LT.	CONSTRUCT 3.000 TYPE 11 D.I., H=1.500m INSTALL 450mm x 11.958m RCP. (SEE SHEET SD-33)
⑯	"RD" 59+58.000 16.475m RT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.200m INSTALL 450mm x 21.810m RCP (SEE SHEET SD-50)
⑰	"RD" 59+60.000 16.200m LT.	CONSTRUCT TYPE 3 D.I., H=1.700m INSTALL 450mm x 16.756m RCP (SEE SHEET SD-52)
⑱	"RD-2" 11+00.000 1.325m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.400m INSTALL 450mm x 22.652m RCP (SEE SHEET SD-50)
⑲	"RD" 59+73.000 16.200m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H = 1.500m INSTALL 450mm x 12.068m RCP (SEE SHEET SD-52)
⑳	"RD-3" 13+50.000 17.700m RT.	CONSTRUCT TYPE 2A D.I. (D=600), H = 1.400m INSTALL 450mm x 4.961m RCP CONNECT TO RCB AT "QD" 22+60.000, 4.610m LT. (SEE SHEET SD-24)
㉑	"95NW"26+95.000 9.150m RT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 7.000m SLOTTED DRAIN AHEAD INSTALL 450mm x 79.151m RCP (SEE SHEET SD-34)
㉒	"RD-1" 15+40.000 15.300m RT.	CONSTRUCT TYPE 2 D.I., H=1.380m INSTALL 375mm x 12.200m SLOTTED DRAIN AHEAD INSTALL 450mm x 19.400m RCP (SEE SHEET SD-54)
㉓	"RD-1B" 16+00.000 8.100m RT.	CONSTRUCT TYPE 2 D.I., H=1.500m INSTALL 375mm x 3.000m SLOTTED DRAIN AHEAD INSTALL 450mm x 9.498m RCP (SEE SHEET SD-44)
㉔	"RD-1" 15+81.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 14.976m RCP (SEE SHEET SD-58)
㉕	"RD-3B" 14+72.000 12.636m RT.	CONSTRUCT 1.500m SPECIAL D.I., H=1.400m INSTALL 450mm x 9.802m RCP CONNECT TO RCB AT "QD" 21+35.000, 4.610m LT. (SEE SHEET SD-32 & SD-616)
㉖	"RD-3" 14+62.000 2.500m LT.	CONSTRUCT TYPE 2A D.I., H=0.800m INSTALL 450mm x 15.776m RCP (SEE SHEET SD-33)
㉗	"RD-1" 16+20.000 0.900m LT.	CONSTRUCT TYPE 2 D.I., H=1.400m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 7.501m RCP (SEE SHEET SD-66)
㉘	"RD-2B" 59+33.000 7.232m RT.	CONSTRUCT TYPE 3 D.I., H=0.800m INSTALL 350mm x 575mm x 10.874m OVAL RCP (SEE SHEET SD-31)
㉙	"RD" 60+33.160 16.475m RT.	CONSTRUCT TYPE 3 D.I., H=1.300m INSTALL 450mm x 2.349m RCP (SEE SHEET SD-53)
㉚	"RD-2B" 59+42.000 7.755m RT.	CONSTRUCT TYPE 3 D.I., H=1.382 CONNECT TO RCB (SEE SHEET SD-17)
㉛	"RD" 60+48.000 16.475m RT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.300m INSTALL 450mm x 10.430m RCP (SEE SHEET SD-53)
㉜	"RD" 60+44.500 16.175m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.700m INSTALL 450mm x 8.103m RCP (SEE SHEET SD-54)
㉝	"RD-1B" 16+65.000. 8.250m RT.	CONSTRUCT TYPE 2 D.I. (A=760), H=1.400m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 13.126m RCP (SEE SHEET SD-32)
㉞	"RD" 60+60.000 16.175m LT.	CONSTRUCT 2.100m TYPE 11 D.I., H=1.500m INSTALL 450mm x 14.535m RCP (SEE SHEET SD-54)
㉟	"RD" 59+03.000 16.000m RT.	CONSTRUCT TYPE 1 SDMH, H=2.634m INSTALL 600mm x 8.320m RCP CONNECT TO RCP STUB AT "QD" 20+30.000, 4.610m LT. (SEE SHEET SD-52)
㊱	"RD-2B" 11+18.000 1.325m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.400m INSTALL 450mm x 22.106m RCP (SEE SHEET SD-63)
㊲	"RD-4" 11+42.000 2.940m LT.	CONSTRUCT TYPE 2A D.I. W/CONCRETE APRON, H=1.100m INSTALL 600mm x 2.541m RCP (SEE SHEET SD-53 & SD-69)
㊳	"RD-4" 11+00.000 1.325m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=2.000m INSTALL 750mm x 22.293m RCP (SEE SHEET SD-53)
㊴	"RD-4" 11+45.000 11.200m RT.	CONSTRUCT TYPE 2A D.I., w/CONCRETE APRON H=1.000m INSTALL 450mm x 13.577m RCP (SEE SHEET SD-64)
㊵	"RD-4" 11+17.000 0.900m LT.	CONSTRUCT TYPE 2 D.I., H=1.700m INSTALL 375mm x 9.100m SLOTTED DRAIN BACK INSTALL 750mm x 16.186m RCP (SEE SHEET SD-53)

PROFESSIONAL ENGINEER - DANIEL GENDRON - CIVIL - No. 12806 - Expires: 12/31/2004 - STATE OF NEVADA

Checked
Submitted
Approved
for Construction
NDOT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD., LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550 FAX (702) 362-2597

DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-5B

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ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

(41)	"RD" 61+04.000 20.075m RT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.300m INSTALL 450mm x 17.099m RCP (SEE SHEET SD-32)
(42)	"RD-1" 16+20.000 7.500m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=2.074m INSTALL 450mm x 16.860m RCP (SEE SHEET SD-44)
(43)	"RD" 61+05.000 20.486m LT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.100m INSTALL 450mm x 24.229m RCP (SEE SHEET SD-38)
(44)	"RD" 60+36.500 20.000m RT.	CONSTRUCT TYPE 1 SDMH, H=2.500m INSTALL 450mm x 3.200m RCP (SEE SHEET SD-44)
(45)	"RD" 60+36.500 15.000m RT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.440m INSTALL 600mm x 2.437m RCP CONNECT TO RCP STUB AT "RL" 18+35.000, 4.267 LT. (SEE SHEET SD-44)
(46)	"RD-1" 15+60.000 15.300m RT.	CONSTRUCT TYPE 2 D.I., H=1.180m INSTALL 375mm x 12.200 SLOTTED DRAIN AHEAD INSTALL 450mm x 19.400m RCP (SEE SHEET SD-54)
(47)	"RD-1" 15+80.000 15.300m RT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 1.500 SLOTTED DRAIN AHEAD INSTALL 450mm x 19.400m RCP (SEE SHEET SD-44)
(48)	"RD-1" 16+00.000 6.500m RT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.000m INSTALL 450mm x 22.061m RCP (SEE SHEET SD-44)
(49)	"QD" 21+20.000 4.010m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.119m CONNECT TO RCB (SEE SHEET SD-13 & SD-75)
(50)	"RD-3" 15+05.000 0.900m LT.	CONSTRUCT TYPE 2 D.I., H=1.600m INSTALL 375mm x 6.100m SLOTTED DRAIN BACK INSTALL 450mm x 9.920m RCP (SEE SHEET SD-33)
(51)	"RD" 60+35.000 15.500m LT.	CONSTRUCT TYPE 2 SDMH, H=2.918m INSTALL 750mm x 17.730m RCP CONNECT TO RCP STUB AT "RL" 18+37.000, 4.267m RT. (SEE SHEET SD-53)
(52)	"RD-3" 15+07.000 10.000m RT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.400m INSTALL 450mm x 15.141m RCP CONNECT TO RCB AT "QD" 21+00.000, 4.610m RT. (SEE SHEET SD-52)
(53)	"QD" 21+85.000 4.010m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.330m CONNECT TO RCB (SEE SHEET SD-14 & SD-75)
(54)	"RML" 11+54.074 0.314m RT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=2.623m CONNECT TO RCB (SEE SHEET SD-18 & SD-75)
(55)	"QD" 22+00.000 OFFSET = 0	BEGIN DUAL 4200mm x 2100mm x 216.50m RCB END 11.607m TO 9.220m x 12.000m TRANSITION STRUCTURE (SEE SHEET SD-14, B-603 TO B-605)
(56)	"QD" 22+12.000 OFFSET = 0	BEGIN TRANSITION STRUCTURE END 11.607m x 22.000m CONFLUENCE (SEE SHEET SD-14, B-603 TO B-605)
(57)	"RD-3" 13+60.000 3.400m LT.	CONSTRUCT TYPE 2A D.I. (D=600), H=1.200m INSTALL 450mm x 8.381m RCP (SEE SHEET SD-62)
(58)	"QD" 22+34.000 OFFSET = 0= "RML" 11+79.834 (6.083m RT.)	BEGIN 11.607m x 22.000m CONFLUENCE END DUAL 4200mm x 2100mm RCB END 1800mm x 1800mm RCB (SEE SHEET SD-14, B-603 TO B-605)
(59)	"95NW" 29+00.000 10.350m RT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL DEEP MH CONNECTION, H=4.998 INSTALL 375mm x 7.600m SLOTTED DRAIN BACK INSTALL 450mm x 9.030m RCP INSTALL END SECTION RIPRAP APRON (SEE SHEET SD-43)
(60)	"Q" 29+00.000 0.725m LT.	CONSTRUCT TYPE 2 D.I., H=0.980m INSTALL 375mm x 9.100m SLOTTED DRAIN BACK INSTALL 450mm x 28.778m RCP (SEE SHEET SD-43)
(61)	"QD" 23+14.000 TO "QD" 22+34.000	INSTALL DUAL 4200mm x 2100mm RCB (SEE SHEET SD-14)
(62)	"RML" 10+20.000 TO "RML" 11+79.934	INSTALL 1800mm x 1800mm x 159.934m RCB (SEE SHEET SD-18)
(63)	"RL" 19+14.714 TO "RL" 19+79.931	CONSTRUCT 3600mm x 2400mm x 63.130m RCB (SEE SHEET SD-17)
(64)	"QD" 20+10.000 OFFSET = 0	CONSTRUCT ACCESS / VENT GRATE (SEE SHEET B-602)
(65)	"RL" 19+14.714	END OF 3600mm x 2400mm RCB CONNECT TO EXISTING 3600mm x 2400mm RCB REFER TO RANCHO ROADWAY IMPROVEMENT FOR DETAIL
(66)	"RL" 19+50.000 1.228m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.912m CONNECT TO RCB (SEE SHEET SD-17 & SD-75)
(67)	"RD-1" 16+09.000 0.900m LT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 10.165m RCP (SEE SHEET SD-66)
(68)	"RD-1" 16+35.000 1.350m LT.	CONSTRUCT TYPE 3 D.I., H=1.200m INSTALL 450mm x 15.173m RCP (SEE SHEET SD-32)
(69)	"RD-1" 15+97.000 0.750m LT.	CONSTRUCT TYPE 2 D.I., H=1.400m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 9.716m RCP (SEE SHEET SD-58)
(70)	"RD" 60+75.000 20.000m RT.	CONSTRUCT TYPE 2 MODIFIED SDMH, H=2.100m INSTALL 450mm x 37.490m RCP (SEE SHEET SD-32)
(71)	"RD-1B" 16+18.000 8.100m RT.	CONSTRUCT TYPE 2 D.I., H=1.200m INSTALL 375mm x 3.000m SLOTTED DRAIN AHEAD INSTALL 450mm x 15.006m RCP (SEE SHEET SD-59)
(72)	"RD-4B" 61+40.522 6.513m RT.	CONSTRUCT TYPE 3 D.I., H=1.800m INSTALL 450mm x 1.946m RCP (SEE SHEET SD-64)
(73)	"RD-4" 11+30.000 1.325m LT.	CONSTRUCT TYPE 3 D.I., H=1.500m INSTALL 750mm x 12.218m RCP (SEE SHEET SD-53)
(74)	"RD-1B" 16+35.000 8.100m RT.	CONSTRUCT TYPE 2 D.I., H=1.400m INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 13.094m RCP (SEE SHEET SD-59)
(75)	"RD-4" 11+40.000 1.325m LT.	CONSTRUCT TYPE 3 D.I., H=1.400m INSTALL 600mm x 9.144m RCP (SEE SHEET SD-53)
(76)	"RD-3B" 15+31.000 6.150m RT.	CONSTRUCT TYPE 3 D.I., H=1.233m CONNECT TO RCB (SEE SHEET SD-13)
(77)	"RD-3B" 15+08.000 6.150m RT.	CONSTRUCT TYPE 3 D.I., H=1.814m CONNECT TO RCB (SEE SHEET SD-13)
(78)	"RD-3B" 15+20.000 6.150m RT.	CONSTRUCT TYPE 3 D.I., H=1.649m CONNECT TO RCB (SEE SHEET SD-13)
(79)	"RD-1B" 16+50.000 8.100m RT.	CONSTRUCT TYPE 2 D.I., H=1.600m INSTALL 375mm x 9.100m SLOTTED DRAIN AHEAD INSTALL 450mm x 12.163m RCP (SEE SHEET SD-59)
(80)	"RD-3" 15+20.000 1.050m LT.	CONSTRUCT TYPE 2 D.I., H=1.300m INSTALL 375mm x 9.100m SLOTTED DRAIN BACK INSTALL 450mm x 14.070m RCP (SEE SHEET SD-62)
(81)	"RD-4B" 61+43.000 6.400m RT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.700m INSTALL 450mm x 1.159m RCP (SEE SHEET SD-64)
(82)	"RD-4B" 61+37.000 6.654m RT.	CONSTRUCT 3.000m TYPE 11 D.I., H=2.000m INSTALL 450mm x 27.596m RCP (SEE SHEET SD-64)
(83)	"RD-2B" 59+18.000 6.090m RT.	CONSTRUCT 3.000m TYPE 11 D.I., H=1.250m INSTALL 450mm x 1.803m RCP (SEE SHEET SD-31)
(84)	"RD-3B" 14+90.000 7.300m RT.	CONSTRUCT TYPE 2A D.I., H=1.400m INSTALL 450mm x 3.595m RCP (SEE SHEET SD-55)

PROFESSIONAL ENGINEER - DANIEL G. BAKER - STATE OF NEVADA - No. 12806 - Civil - Checked Superficial

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PLAN

vtn nevada
• CONSULTING ENGINEERS
• PLANNERS
• LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-27

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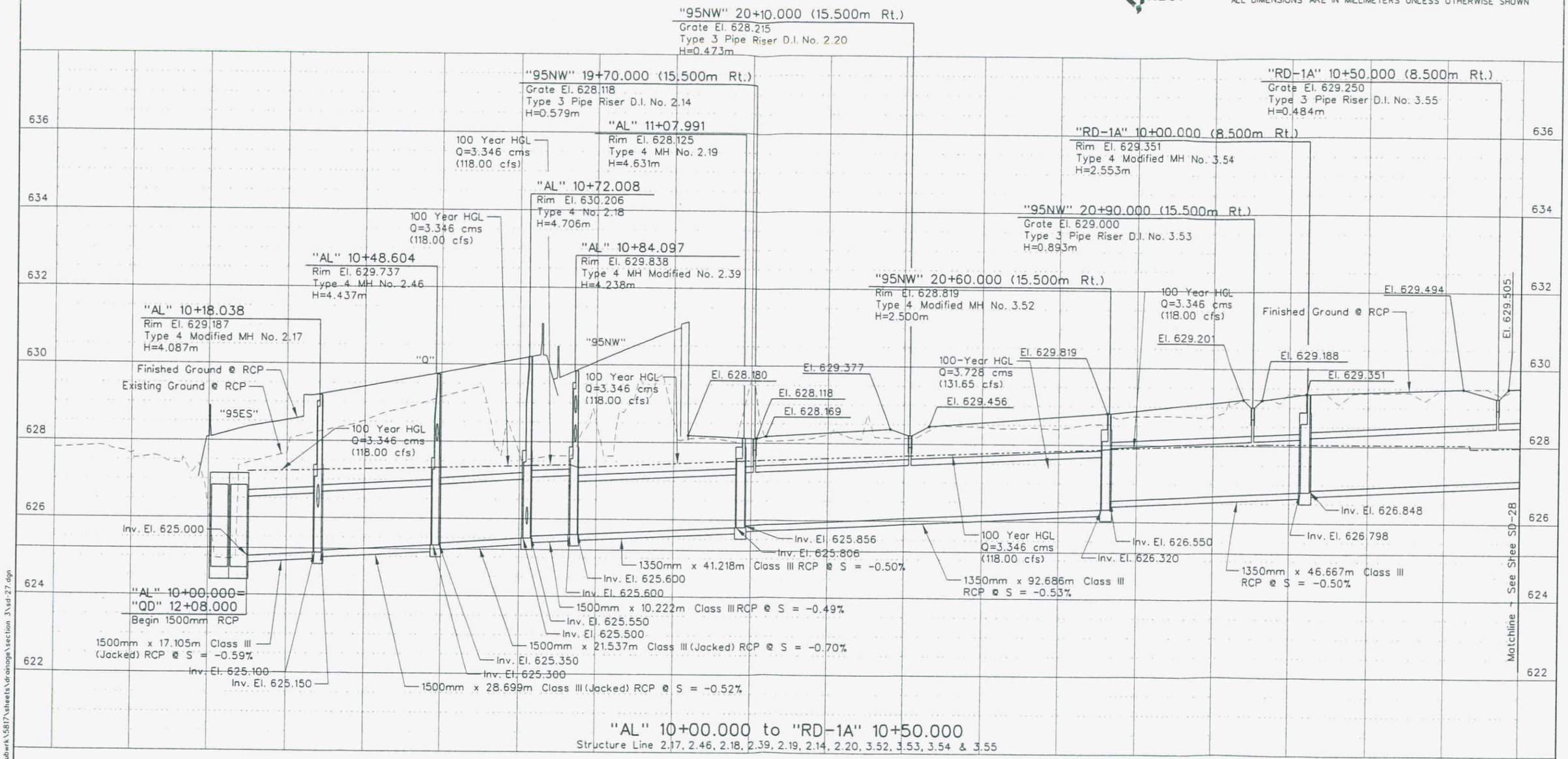

"AL" 10+00.000 to "RD-1A" 10+50.000

Structure Line 2.17, 2.46, 2.18, 2.39, 2.19, 2.14, 2.20, 3.52, 3.53, 3.54 & 3.55

PROFESSIONAL ENGINEER - DANIEL GENRICH - CIVIL - No. 12806 - Checking Submittal - Not for Construction

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PROFILE

VTN nevada — CONSULTING ENGINEERS, PLANNERS, LAND SURVEYORS — 2727 S. RAINBOW BLVD. LAS VEGAS, NEVADA 89146 — PHONE (702) 873-7550 — FAX (702) 362-2597

DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWR

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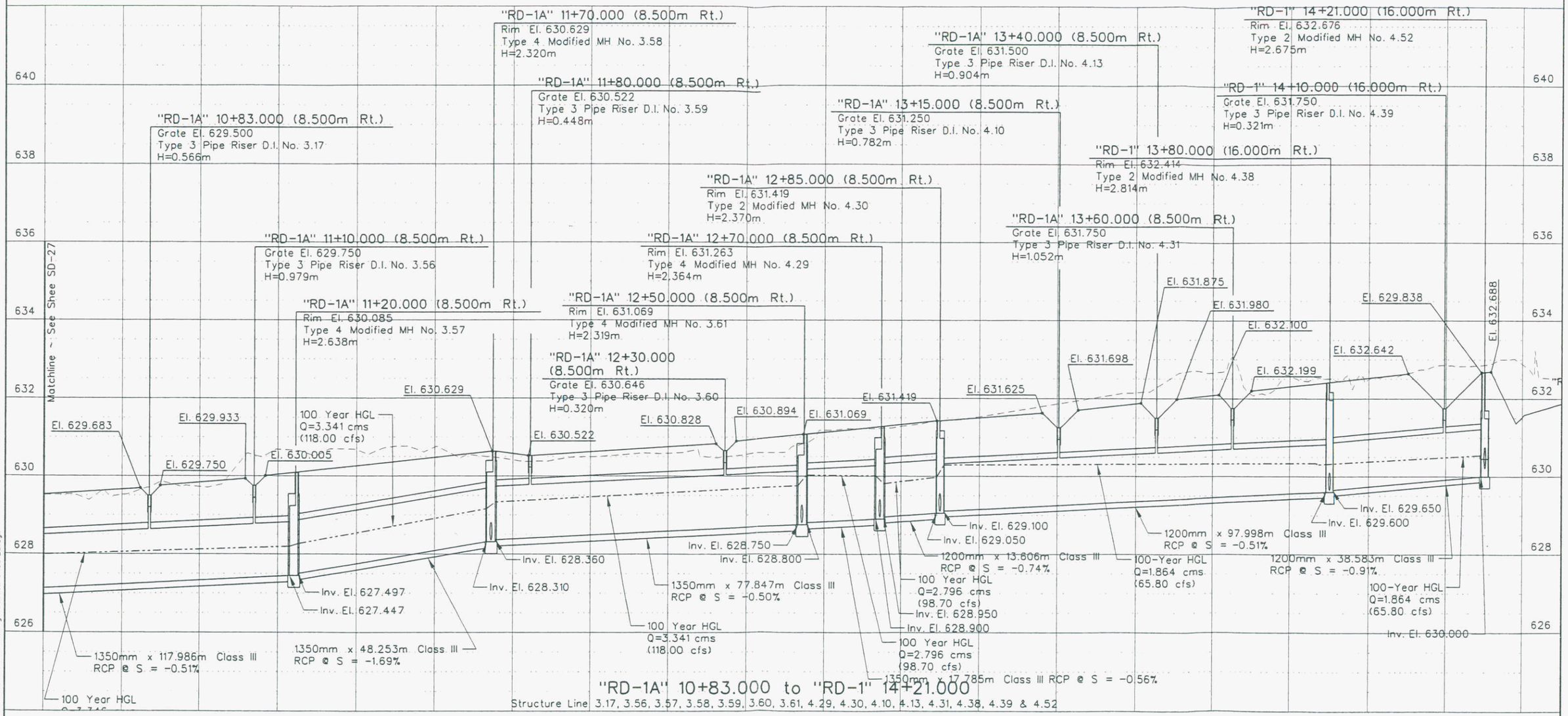
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (034)	CLARK	SD-28

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



"RD-1A" 10+83.000 to "RD-1" 14+21.000

Structure Line 3.17, 3.56, 3.57, 3.58, 3.59, 3.60, 3.61, 4.29, 4.30, 4.10, 4.13, 4.31, 4.38, 4.39 & 4.52

PROFESSIONAL ENGINEER — DANIEL G. BENNETT — CIVIL — No. 12806 — Expires 12/31/2004

Signature

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3

DRAINAGE PROFILE

vtn nevada
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

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DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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APPENDIX F

Data CD

07-09-0594P

RESPONSE TO COMMENTS
US 95 WIDENING – RANCHO ROADWAY IMPROVEMENTS
REQUEST FOR
LETTER OF MAP REVISION

Case No.: 06-09-BB52P
Community: City of Las Vegas, Nevada
Community No.: 325276

Prepared for:

Clark County Regional Flood Control District
600 South Grand Central Parkway
Las Vegas, NV 89155

Prepared by:

PBS&J
2270 Corporate Circle, Suite 100
Henderson, Nevada 89074

Reference Number: 511606.00
October, 2006

PBS&J

ENGINEERING • PLANNING
CONSTRUCTION SERVICES
SURVEYING

October 6, 2006

Ms. Sheila M. Norlin
National LOMC Manager
Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Alexandria, Virginia 22304-6425

RE: CASE NO.: 06-09-BB52P
COMMUNITY: CITY OF LAS VEGAS, NEVADA
COMMUNITY NO.: 325276

Dear Ms. Norlin:

Submitted for your review is the Response to Comments for the US 95 Widening – Rancho Roadway Improvements Request for Letter of Map Revision.

If you have any questions regarding this report, please contact our office at (702) 263-7275.

Sincerely,

PBS&J

10/9/06

Brian K. Loffman, CFM
Hydrologist

Matt Baird, P.E., CFM
Associate Vice President

2270 Corporate Circle • Suite 100 • Henderson, Nevada 89074-6382 • Telephone 702/263-7275 • Fax 702/263-7200

The response to comments in a letter dated July 10, 2006 from Michael Baker Jr., Inc. (MBJ) are included below, see Appendix A for a copy of the comment letter.

Comment 1: **Our preliminary review revealed that the submitted work map entitled "Figure 5: US 95 Widening – Rancho Lateral Work Map", prepared by PBS&J, dated April 17, 2006, does not show the cross-sections used in the Rancho Lateral and Main Line facility WSPG hydraulic analyses. Please submit a work map showing the location and alignment of all cross sections used in the WSPG hydraulic analyses. The scale of the map must be sufficient to provide reasonable accuracy and it must be certified by a registered professional engineer.**

Response 1: The WSPG stations for the Rancho Lateral facility have not been plotted on the Figure 5: Work Map submitted in the original LOMR request due to its large scale (1" = 300'). Also, the WSPG model and stationing was prepared in metric units while the certified topographic work map (Figure 5) was prepared in English units. Note that three alignments for Rancho Road were created for this project: "LM", "RM", and "RL". The WSPG cross-sections were plotted on the drainage plan sheets (SD-1 through SD-3) from the final design plan set, see Appendix B. The WSPG model prepared by VTN uses the "RM" alignment for the model stationing. The "RM" alignment is the primary alignment and stationing for the construction sheets of the design plans. The "RL" alignment is the primary alignment for the drainage plan and profile sheets. The "RL" and "RM" alignments are not true parallel alignments and show divergence and offsets and thus a uniform conversion cannot be applied between them. Since a uniform conversion cannot be applied between "RM" and "RL", the WSPG stations were correctly plotted on the drainage sheets by matching up the inverts from the WSPG model to the inverts shown on the drainage profile sheets. Note that the drainage profile sheets were prepared using the "RL" alignment. The drainage profile sheets for the Rancho Lateral have also been included in Appendix B.

Comment 2: **Please provide "as-built" plans, certified by a registered professional engineer or licensed land surveyor, for the reach of the Main Line facility from the Rancho Lateral outfall to the US 95/I-15 intersection.**

Response 2: The plans for a portion of the Main Line facility (Contract 3193) are included in Appendix D. Please refer to Appendix C for the as-built certification letter provided by the Nevada Department of Transportation. Note that the certification letter also applies to Contract 3167 for the Rancho Lateral that was submitted with the original LOMR request.

Comment 3: **Please submit a digital and hardcopy annotated FIRM, at the scale of the effective FIRM that shows the proposed floodplain boundary delineations of the flood having a 1% chance of being equaled or exceeded in any given year (base flood). In addition, please delineate the Rancho Lateral and Main Line facility on the annotated FIRM.**

Response 3: The annotated FIRM exhibit has been revised accordingly and can be found in Appendix E.

Appendix A: Comment Letter

NATIONAL FLOOD INSURANCE PROGRAM

FEMA NATIONAL SERVICE PROVIDER

51-1666

July 10, 2006

Mr. Kevin Eubanks, P.E., CFM
Assistant General Manager
Clark County Regional Flood Control District
600 South Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511

IN REPLY REFER TO:
Case No.: 06-09-BB52P
Community: City of Las Vegas, NV
Community No.: 325276

316-AD

Dear Mr. Baird:

This responds to your request dated June 22, 2006, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Rancho Roadway Improvements
Flooding Source:	Unnamed Wash
FIRM Panel(s) Affected:	32003C2170 E

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fee for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

If you have specific questions concerning your request, please call the Revisions Coordinator for your State, Mr. Sacha Tohme, CFM, who may be reached at (703) 960-8800, ext. 3028.

Sincerely,

Sheila M. Norlin, CFM
National LOMC Manager
Michael Baker Jr., Inc.

Enclosures

cc: Mr. Randy Fultz, P.E., CFM
Assistant City Engineer
City of Las Vegas

Mr. Matthew S. Baird, P.E., CFM
Associate Vice President
PBS&J

NATIONAL FLOOD INSURANCE PROGRAM

FEMA NATIONAL SERVICE PROVIDER

Summary of Additional Data Required to Support a
Letter of Map Revision

Case No.: 06-09-BB52P

Requester: Mr. Kevin Eubanks, P.E., CFM

Community: City of Las Vegas, NV

Community No.: 325276

The issues listed below must be addressed before we can continue the review of your request.

1. Our preliminary review revealed that the submitted work map entitled "Figure 5: U.S. 95 Widening – Rancho Lateral Work Map", prepared by PBS&J, dated April 17, 2006, does not show the cross sections used in the Rancho Lateral and Main Line facility WSPG hydraulic analyses. Please submit a work map showing the location and alignment of all cross sections used in the WSPG hydraulic analyses. The scale of the map must be sufficient to provide reasonable accuracy and it must be certified by a registered professional engineer.

2. Please provide "as-built" plans, certified by a registered professional engineer or licensed land surveyor, for the reach of the Main Line facility from the Rancho Lateral outfall to the US-95 and I-15 intersection.

3. Please submit a digital and hard copy annotated Flood Insurance Rate Map (FIRM), at the scale of the effective FIRM, that shows the proposed floodplain boundary delineations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). In addition, please delineate the Rancho Lateral and Main Line facility on the annotated FIRM.

Please send the required data directly to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

Effective October 30, 2005, the Federal Emergency Management Agency (FEMA) revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register*, is enclosed for your information. In accordance with this schedule, the fee for your request is $4,400 and must be submitted before we can continue processing your request. Payment of this fee must be made in the form of a check or money order, payable in U.S. funds to the National Flood Insurance Program, or a credit card payment. For identification purposes, the case number referenced above must be included on the check or money order. We will not perform a detailed technical review of your request until we receive this payment.

Payment must be forwarded to one of the addresses listed below.

Using U.S. Postal Service:
Federal Emergency Management Agency
Fee-Charge System Administrator
P.O. Box 22787
Alexandria, VA 22304

Using overnight service:
FEMA Fee-Charge System Administrator
c/o Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Alexandria, VA 22304

Appendix B: WSPG Cross-Section Exhibits

VERTICAL DATUM: ELEVATIONS ARE BASED ON NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) CONTROL POINT 420047M AS SHOWN ON NDOT SURVEY MONUMENT CONTROL REPORT

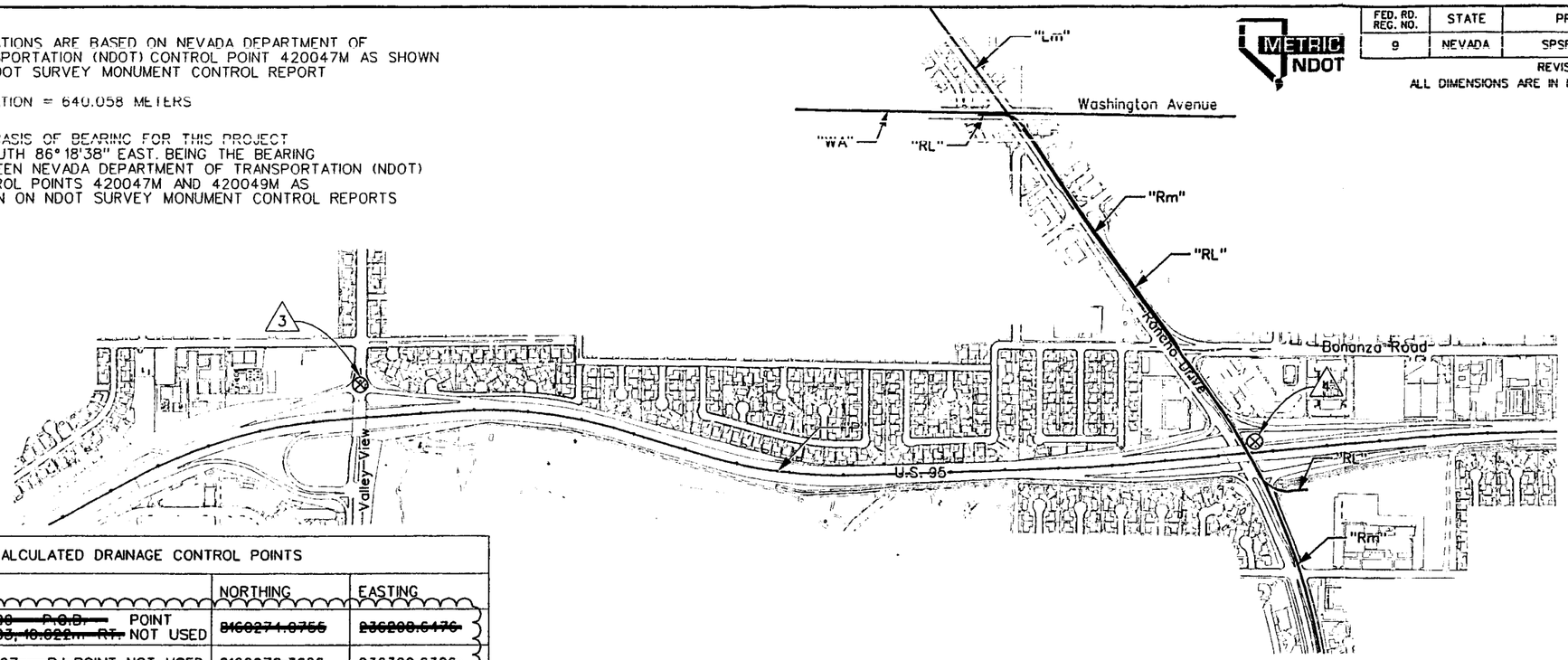
ELEVATION = 640.058 METERS

BEARING SOURCE: THE BASIS OF BEARING FOR THIS PROJECT IS SOUTH 86°18'38" EAST. BEING THE BEARING BETWEEN NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) CONTROL POINTS 420047M AND 420049M AS SHOWN ON NDOT SURVEY MONUMENT CONTROL REPORTS

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	3G

REVISED 06/06/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



SCALE 1:5,000

CALCULATED DRAINAGE CONTROL POINTS			
POINT No.	DESCRIPTION	NORTHING	EASTING
◇1	~~"RL" 8+00.000 — P.O.B. — "WA" 8+11.883, 18.622m — RT.~~ POINT NOT USED	~~8160274.8755~~	~~236288.6476~~
◇2	~~"RL" 10+00.997 — P.I.~~ POINT NOT USED	~~8160272.3000~~	~~236389.8386~~
◇3	~~"RL" 10+09.543 — P.I.~~ POINT NOT USED	~~8160273.0688~~	~~236347.4134~~
◇4	~~"RL" 10+14.534 — P.I.~~ POINT NOT USED	~~8160272.9941~~	~~236323.1429~~
◇5	"RL" 10+32.500 - P.I. - BEGIN RCB	8160278.5702	236340.2124
◇6	"RL" 10+54.926 - P.C.	8160278.1908	236362.6346
◇7	"RL" 10+60.938 - P.R.C.	8160278.5404	236368.6309
◇8	"RL" 10+66.950 - P.T.	8160278.8899	236374.6271
◇9	"RL" 10+77.078 - P.C.	8160278.7186	236384.7535
◇10	"RL" 11+22.740 - P.T.	8160258.6107	236423.9937
◇11	"RL" 11+43.002 - P.C.	8160242.3667	236436.1039
◇12	"RL" 11+50.152 - P.T.	8160236.5584	236440.2746
◇13	"RL" 13+00.745 - P.C.	8160112.6844	236525.9104
◇14	"RL" 13+64.096 - P.T.	8160061.3503	236563.0245
◇15	"RL" 16+10.001 - P.C.	8159865.1593	236711.2758
◇16	"RL" 16+29.420 - P.R.C.	8159848.3315	236720.8583
◇17	"RL" 16+84.839 - P.T.	8159831.5036	236730.4407
◇18	"RL" 16+91.132 - P.C.	8159797.7608	236755.9384
◇19	"RL" 19+04.504 - P.R.C.	8159617.1584	236869.0485
◇20	"RL" 19+75.534 - P.T.	8159584.6526	236927.5834
◇21	"RL" 20+05.432 - P.O.E.= "Rm" 20+58.937, 67.785m RT.	8159587.1909	236957.3728

MONUMENTED CONTROL POINTS				
NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
△3	8159784.206	235197.1936	658.331	NDOT-420049-M
△4	8159676.901	236861.2721	640.058	NDOT-420047-M

CALCULATED CONTROL POINTS			
POINT No.	DESCRIPTION	NORTHING	EASTING
1	"Lm" 4+00.000 - P.O.T.	8160324.1104	236363.0788
2	"Lm" 3+04.801 - P.O.T. = "Rm" 28+97.668, 6.706m LT. P.O.E.	8160247.7767	236419.9647
3	"Rm" 28+74.567 - P.I.	8160233.2642	236439.1480
4	"Rm" 26+65.882 - P.I.	8160061.6054	236557.8181
5	"Rm" 23+35.936 - P.T.	8159798.3637	236756.7362
6	"Rm" 19+00.000 - P.O.C.	8159411.4361	236952.4682
7	"WA" 9+00.000 - P.O.T.	8160283.2411	236294.8124
8	"WA" 10+00.000 - P.O.T.= "Rm" 3+46.920 - P.O.T.	8160281.5491	236394.7981
9	"WA" 11+00.000 - P.O.T.	8160279.8625	236494.7839
10	"VTN" 0+00.000 - P.O.B.= "Rm" 24+03.071 - P.O.C.	8159851.9264	236716.2617
11	"VTN" 1+19.856 - P.O.E.	8159852.2455	236836.1170

LEGEND

[9] CALCULATED CONTROL POINTS

⊗ MONUMENTED CONTROL POINTS

◇9 CALCULATED DRAINAGE CONTROL POINTS

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/6/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

SURVEY CONTROL PLAN

VTN nevada
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	JPL
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-1

REVISED 09/08/03 REVISED 10/27/03 REVISED 12/02/03

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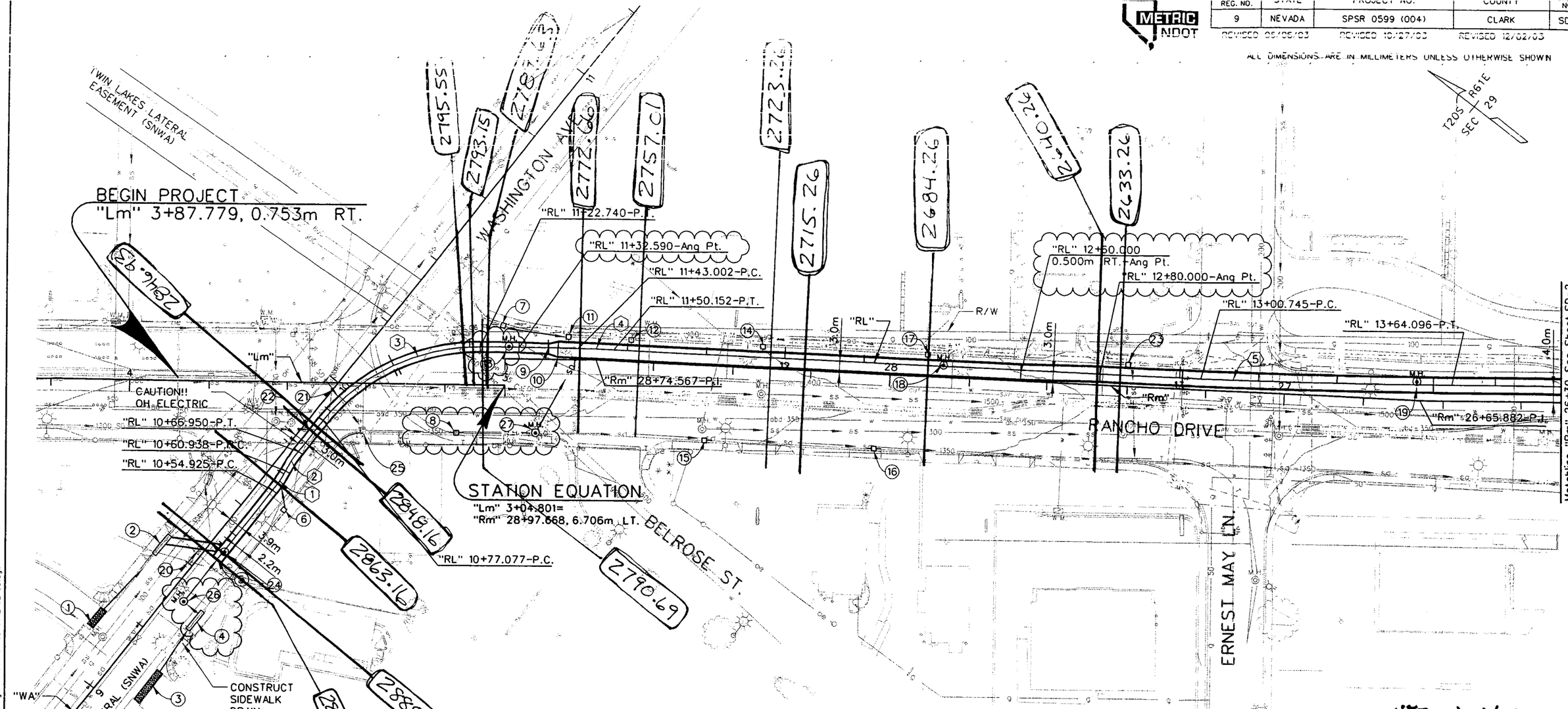

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances including, But Not Limited to, AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

12-4-03
SNWA DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

Curve Table

Curve #	Radius	Length	Tangent	Delta
1	40.000m	6.012m	3.012m	8° 36'42"
2	40.000m	6.012m	3.012m	8° 36'42"
3	50.000m	45.663m	24.563m	52° 19'31"
4	200.000m	7.151m	3.576m	2° 02'55"
5	1,500.000m	63.350m	31.680m	3° 49'11"

NOTE
CONTRACTOR TO MAINTAIN 2.87m HORIZONTAL SEPARATION BETWEEN THE RCB AND 400mm WATERLINE. IF RCB IS LESS THAN 2.87m HORIZONTALLY FROM THE 400mm WATERLINE, DRAPE THE RCB WITH 8 MIL POLYETHYLENE SHEETING w/ POLYURETHANE ELASTOMERIC SEALANT PER U.D.A.C.S. AT NO TIME WILL HORIZONTAL SEPARATION OF LESS THAN 1.8m BE ACCEPTED BETWEEN THE RCB AND THE WATERLINE.

SNWA Engineering
ELPER/DPR Office
DEC 3 2003

1st Rtnd. 6/27/03
LVVWD 12/03/03 DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
12/2/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	JPL WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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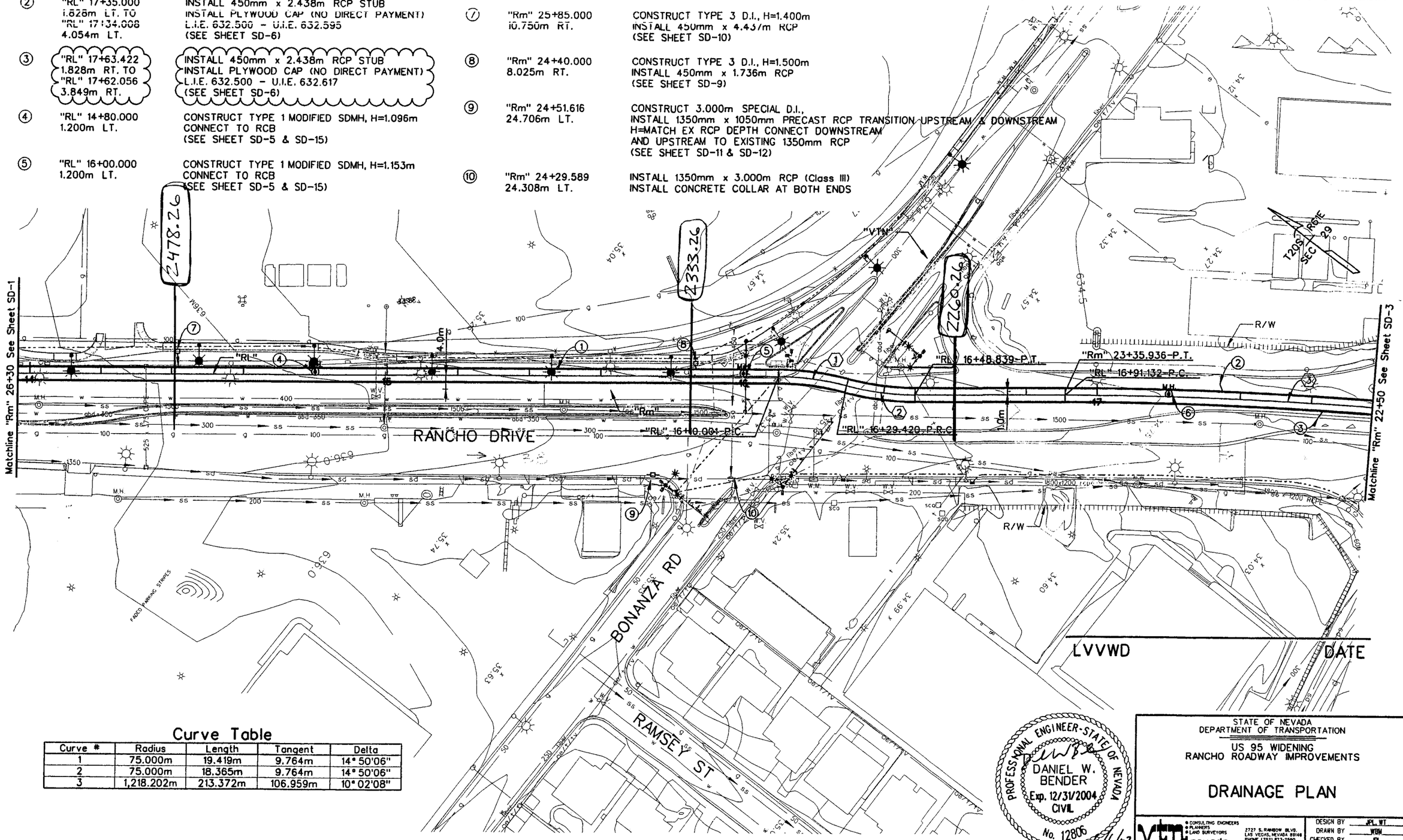
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-2

REVISED 06/06/03

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"RL" 13+96.651 TO "RL" 17+76.951	3600mm x 1800mm x 380.300m RCB (SEE SHEET SD-5 & SD-6)
②	"RL" 17+35.000 1.828m LT. TO "RL" 17+34.008 4.054m LT.	INSTALL 450mm x 2.438m RCP STUB INSTALL PLYWOOD CAP (NO DIRECT PAYMENT) L.I.E. 632.500 - U.I.E. 632.595 (SEE SHEET SD-6)
③	"RL" 17+63.422 1.828m RT. TO "RL" 17+62.056 3.849m RT.	INSTALL 450mm x 2.438m RCP STUB INSTALL PLYWOOD CAP (NO DIRECT PAYMENT) L.I.E. 632.500 - U.I.E. 632.617 (SEE SHEET SD-6)
④	"RL" 14+80.000 1.200m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.096m CONNECT TO RCB (SEE SHEET SD-5 & SD-15)
⑤	"RL" 16+00.000 1.200m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.153m CONNECT TO RCB (SEE SHEET SD-5 & SD-15)
⑥	"RL" 17+20.000 1.200m LT.	CONSTRUCT TYPE 1 MODIFIED SDMH, H=1.251m CONNECT TO RCB (SEE SHEET SD-6 & SD-15)
⑦	"Rm" 25+85.000 10.750m RT.	CONSTRUCT TYPE 3 D.I., H=1.400m INSTALL 450mm x 4.457m RCP (SEE SHEET SD-10)
⑧	"Rm" 24+40.000 8.025m RT.	CONSTRUCT TYPE 3 D.I., H=1.500m INSTALL 450mm x 1.736m RCP (SEE SHEET SD-9)
⑨	"Rm" 24+51.616 24.706m LT.	CONSTRUCT 3.000m SPECIAL D.I., INSTALL 1350mm x 1050mm PRECAST RCP TRANSITION UPSTREAM & DOWNSTREAM H=MATCH EX RCP DEPTH CONNECT DOWNSTREAM AND UPSTREAM TO EXISTING 1350mm RCP (SEE SHEET SD-11 & SD-12)
⑩	"Rm" 24+29.589 24.308m LT.	INSTALL 1350mm x 3.000m RCP (Class III) INSTALL CONCRETE COLLAR AT BOTH ENDS



Curve Table

Curve #	Radius	Length	Tangent	Delta
1	75.000m	19.419m	9.764m	14° 50'06"
2	75.000m	18.365m	9.764m	14° 50'06"
3	1,218.202m	213.372m	106.959m	10° 02'08"

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
6/16/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
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LAS VEGAS, NEVADA 89146
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FAX (702) 362-2597

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CHECKED BY	JPL
REVIEWED BY	DWB

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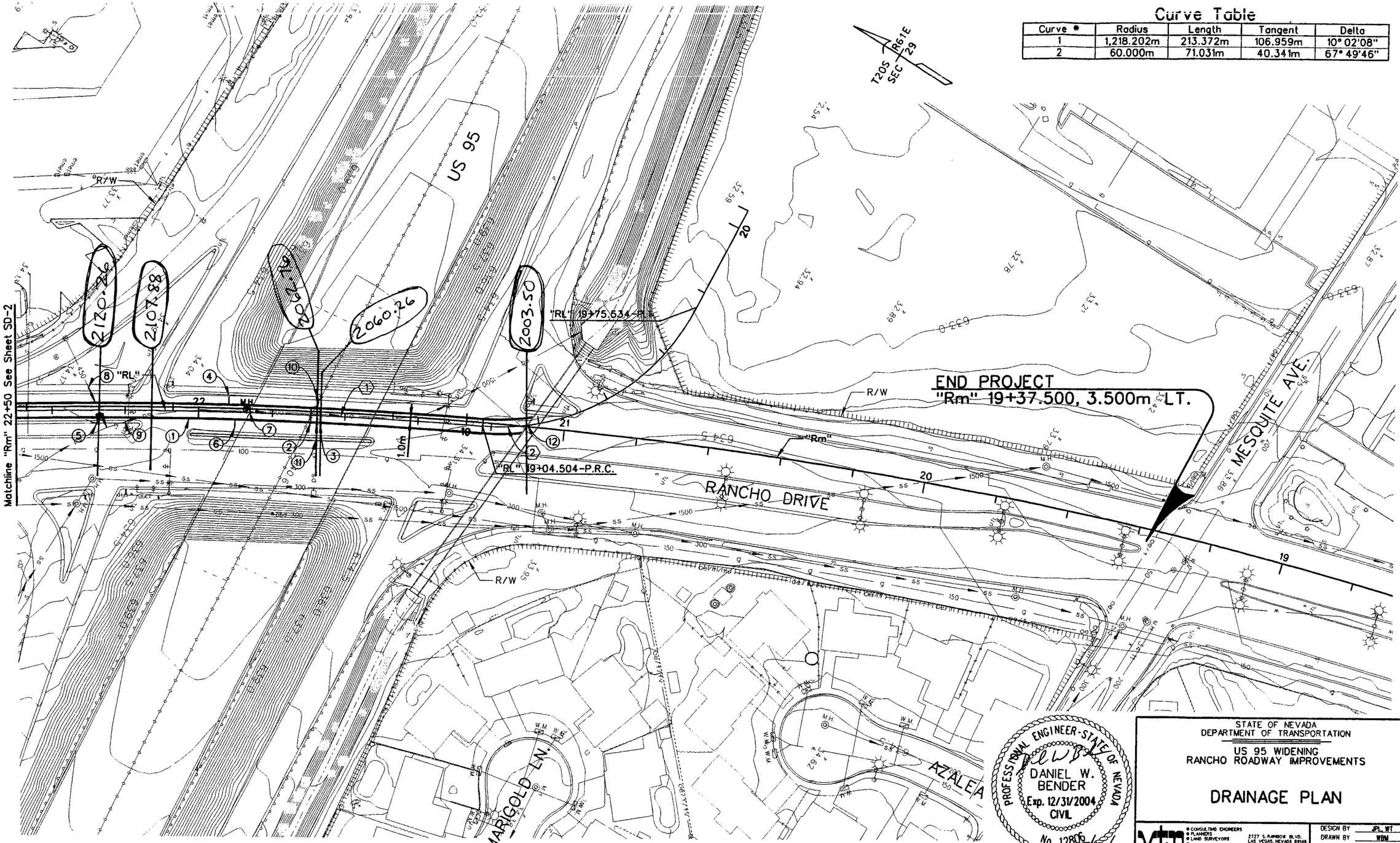
METRIC NDOT	FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
	9	NEVADA	SPSR 0599 (004)	CLARK	SD-3

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

Curve Table

Curve #	Radius	Length	Tangent	Delta
1	1,218.202m	213.372m	106.959m	10° 02'08"
2	60.000m	71.031m	40.341m	67° 49'46"



PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12805
5/12/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PLAN

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METRIC NDOT	FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
	9	NEVADA	SPSR 0599 (004)	CLARK	SD-4

REVISED 06/06/03
REVISED 11/19/03
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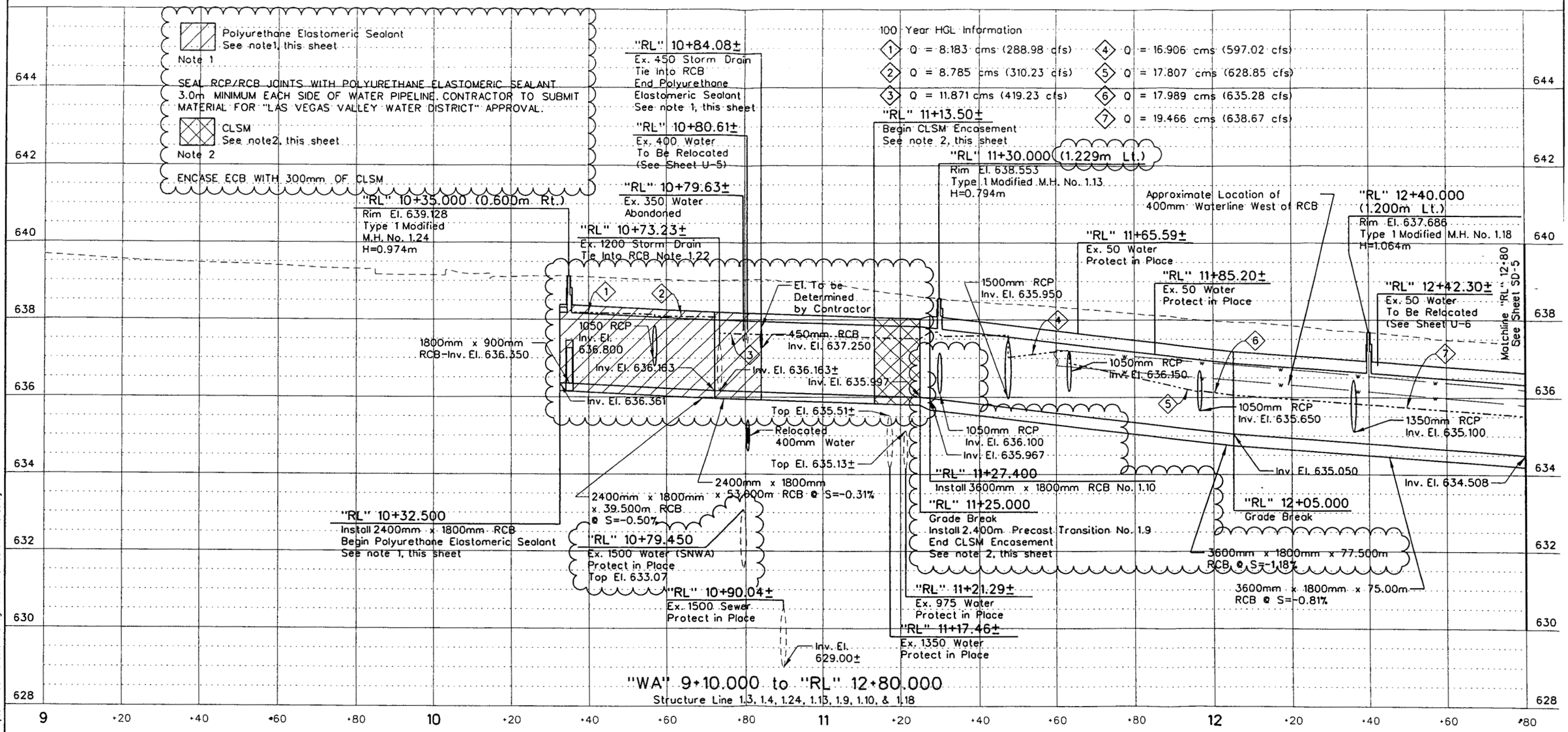

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA — 11-24-03 DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

1st Apprvd 6/27/03

LVVWD — 12/03/03 DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

11/24/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

VTN nevada — CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
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PHONE (702) 873-7550
FAX (702) 362-2567

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METRIC NDOT	FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
	9	NEVADA	SPSR 0599 (004)	CLARK	SD-5

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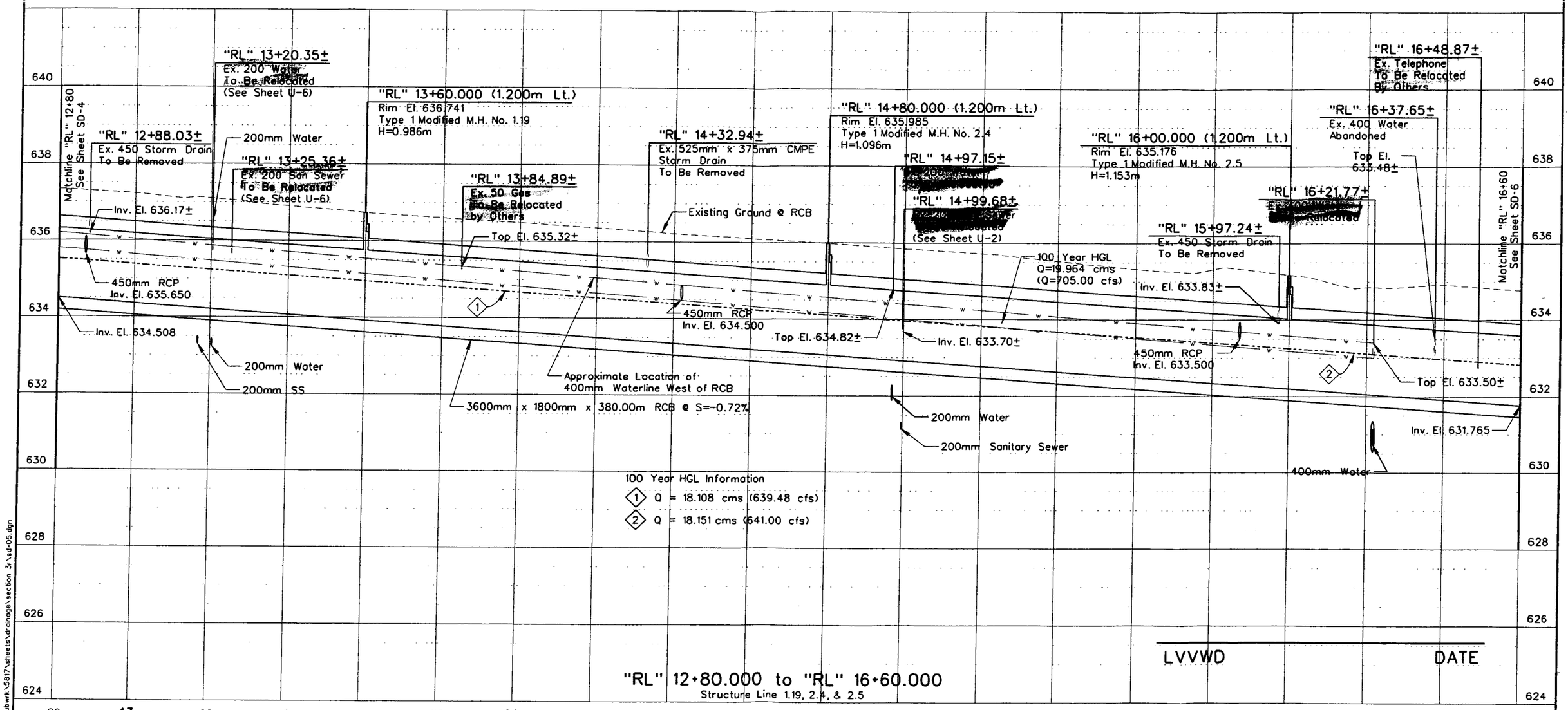

LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/14/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

vtn nevada
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PHONE (702) 873-7550
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-6

METRIC NDOT

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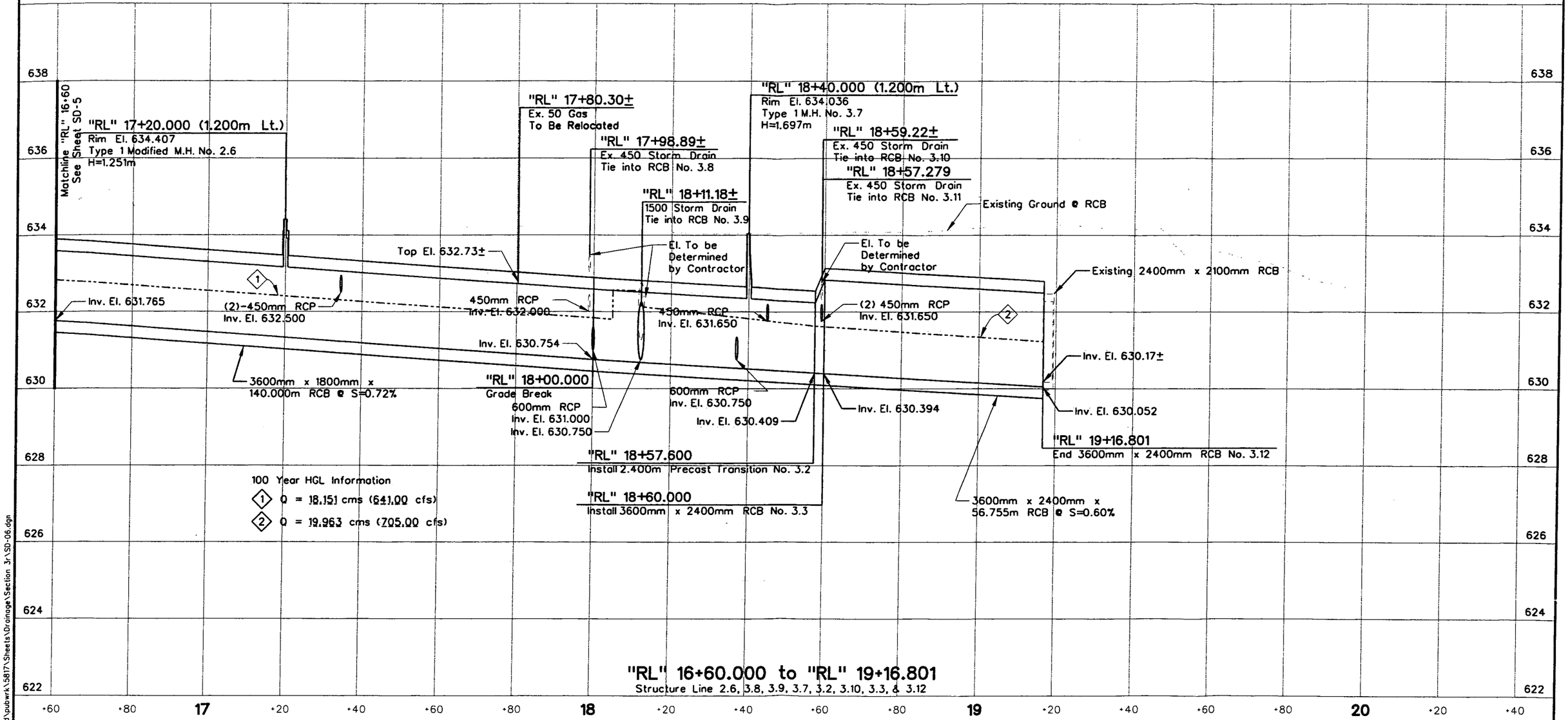

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DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
5/12/03

STATE OF NEVADA
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DRAINAGE PROFILE

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FAX (702) 362-2597

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	SPSR 0599 (004)	CLARK	SD-7

REVISED 06/06/03 REVISED 01/06/04
REVISED 12/02/03

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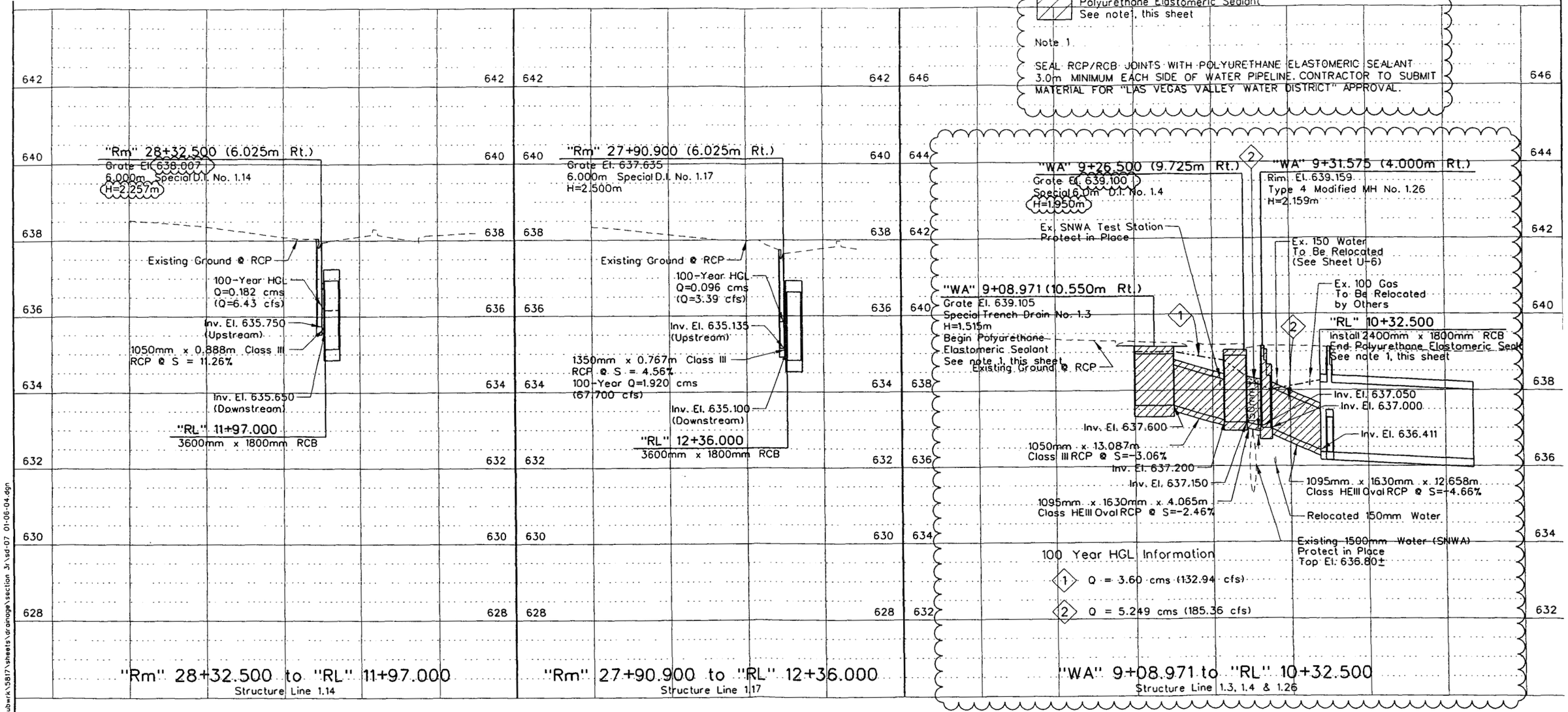

"Rm" 28+32.500 to "RL" 11+97.000
Structure Line 1.14

"Rm" 27+90.900 to "RL" 12+36.000
Structure Line 1.17

"WA" 9+08.971 to "RL" 10+32.500
Structure Line 1.3, 1.4 & 1.26

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Development Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA DATE

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LVVWD DATE

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
1/6/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US 95 WIDENING
RANCHO ROADWAY IMPROVEMENTS

DRAINAGE PROFILE

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DESIGN BY	JPL, TH, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

1/7/2004 8:04:02 AM i:\cad\pubwrk\58177\sheets\drainage\section 3r\sd-07 01-06-04.dgn

Appendix C: NDOT As-Built Certification Letter

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
District One
P.O. Box 170
Las Vegas, NV 89125-0170
September 25, 2006

KENNY C. GUINN, *Governor*

JEFF FONTAINE, P.E., *Director*

Kevin Eubanks, P.E., CFM
Assistant General Manager
Clark County Regional Flood Control District
600 Grand Central Parkway
Las Vegas, Nevada 89106-4511
702.455.3139
KEubanks@ccrfcd.org

Dear Mr. Kevin Eubanks:

Attached are two plan sets for contract 3167 and contract 3193. Consider this document certification that contract 3167 and contract 3193 were constructed within substantial conformance of the contract plans.

If you have any questions or comments regarding this correspondence, please contact this office at 486-0491.

Sincerely,

Tim Rugulejski, P.E.
Resident Engineer

PROFESSIONAL ENGINEER
TIMOTHY RUGULEJSKI
EXP 12/31/07
CIVIL
No. 11679
STATE OF NEVADA

TR: tr
pc: File

Appendix D: As-Built Plans for Contract 3193 (Main Line)

CONTRACT 3193

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	1

INDEX OF SHEETS

1 - 1A	TITLE SHEET, LOCATION SKETCH
2 - 2A	TYPICAL SECTIONS
3 - 3F	GENERAL NOTES, SUMMARIES
3G - 3H	ESTIMATE OF QUANTITIES
4 - 10	REMOVALS
11 - 17	CONSTRUCTION PLANS
18 - 20	PROFILES
21	SPECIAL DETAILS
CP-1 - CP-2	CONTROL POINTS
RW-1 - RW-21	RIGHT-OF-WAY PLANS
GR-1 - GR-7	GRADING PLANS
S1 - S-7	STRUCTURE LIST
SD-00 - SD-34	DRAINAGE PLANS
DR-1 - DR-8	DRAINAGE REMOVALS
U-1 - U-9	UTILITY PLANS
CS-1 - CS-9	CONSTRUCTION STAGING
TC-1 - TC-46	TRAFFIC CONTROL
B-500 - B-513	SOUND WALLS
B-600 - B-613	DRAINAGE STRUCTURES
AR-01 - AR-12	ARCHITECTURAL PLANS

STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

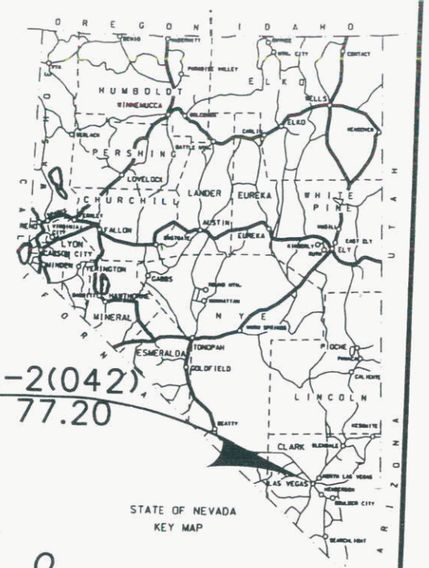
CONSTRUCTION PLANS

CLARK AND NYE COUNTIES

FROM THE JUNCTION OF IR 15 AND IR 515 AT THE DOWNTOWN EXPRESSWAY INTERCHANGE IN LAS VEGAS WESTERLY AND NORTHERLY, THEN NORTHWESTERLY TO THE JUNCTION OF SR 374 IN BEATTY

DESIGN DESIGNATION

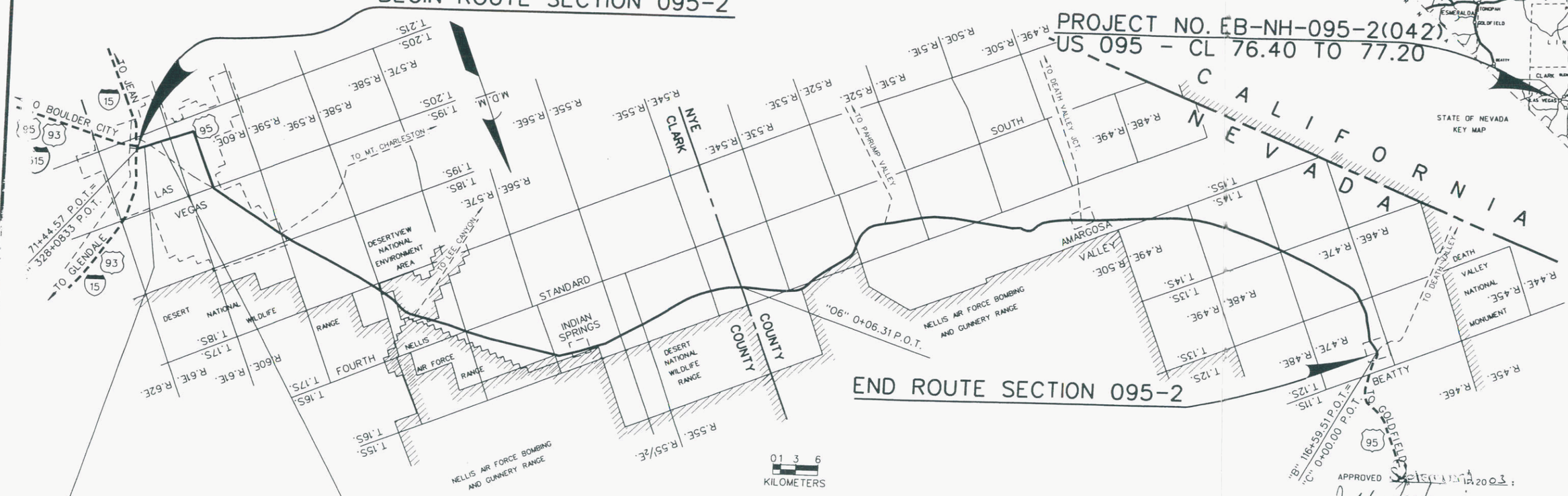
ADT (2025)	302,600
DHV (2025)	22,695
D%	53%
T%	3.5%
V	100 KM/H



STATE OF NEVADA
KEY MAP

BEGIN ROUTE SECTION 095-2

PROJECT NO. EB-NH-095-2(042)
US 095 - CL 76.40 TO 77.20



END ROUTE SECTION 095-2

SEE BOOK OF STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION 2003 METRIC EDITION.

APPROVED February 12, 2003:

Jeffrey A. Fontaine
JEFF A. FONTAINE, P.E., DIRECTOR, DEPT. OF TRANSPORTATION

GOVERNOR KENNY C. GUINN
CHAIRMAN, TRANSPORTATION BOARD

CONTRACT NO. 2818 BACK
BEGIN PROJECT EB-NH-095-2(042)
"O" 21+37.075 P.O.C.

PROJECT NO. EB-NH-095-2(042)
WIDENING OF US 95,
MARTIN L KING BLVD. TO EAST
OF VALLEY VIEW BLVD.

CONSTRUCT DRAINAGE IMPROVEMENTS

LENGTH OF ROUTE	=	185.44 km
LENGTH OF PROJECT	=	1.99 km
LENGTH OF CONSTRUCTION	=	1.99 km

TO BE CONTRACTED

"O" 41+75.000 P.O.T.
CONTRACT NO. 2818 AHEAD
END PROJECT EB-NH-095-2(042)

ALIGNMENT BAR

BEGIN PROJECT EB-NH-095-2(042)
"O" 21+37.075 P.O.C.

END PROJECT EB-NH-095-2(042)
"O" 41+75.000 P.O.C.

PROFESSIONAL ENGINEER
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584
STATE OF NEVADA

11-20-03

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

Gregory D. Nadeau
DIVISION ADMINISTRATOR

12-2-2003
DATE

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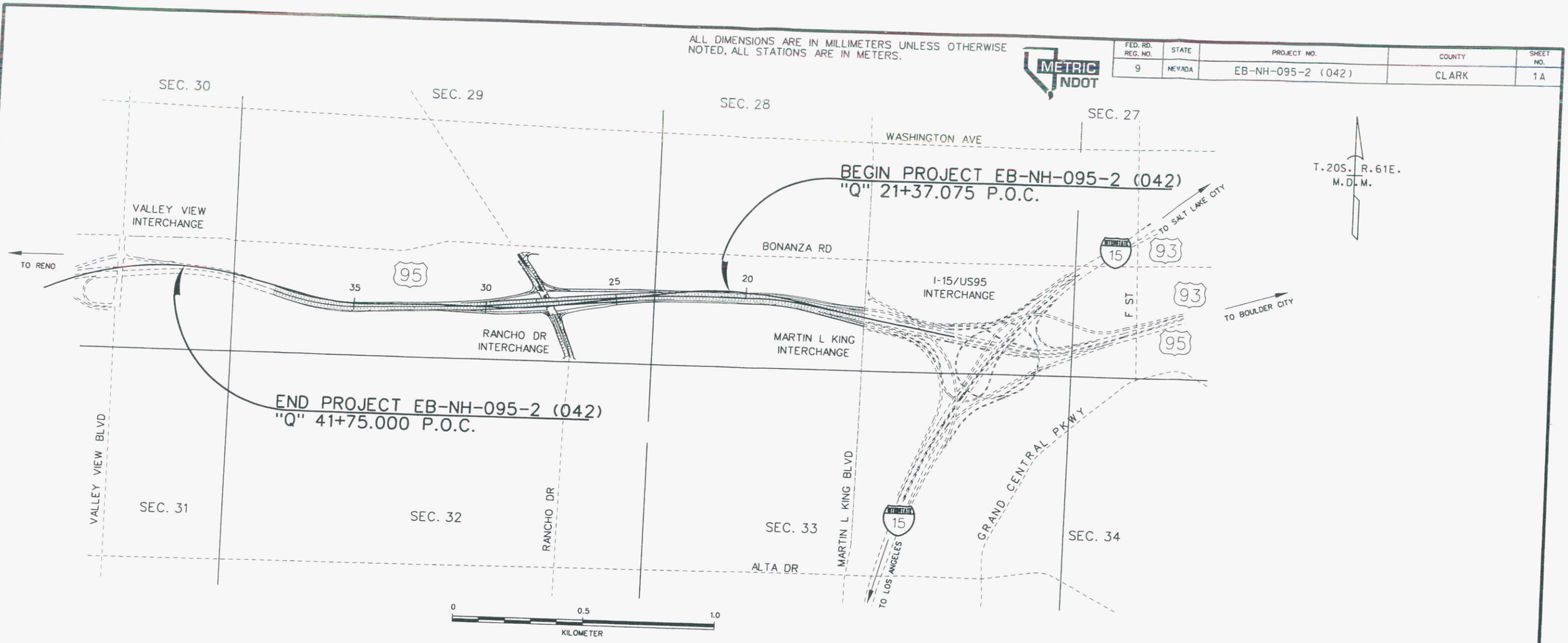
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	1A



MILEPOST SUMMARY		
STATION	MILEPOST	DESCRIPTION
"Q" 21+37.075	US-95-CL 76.40*	BEGIN PROJECT EB-NH-095-2(XXX)
"Q" 31+08.024	US-95-CL 77.00	MILEPOST 77
"Q" 41+75.000	US-95-CL 77.20*	END PROJECT EB-NH-095-2(XXX)

* MP PANEL NOT IN FIELD

PROFESSIONAL ENGINEER
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584
STATE OF NEVADA

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

LOCATION SKETCH

PB PARSONS BRINCKERHOFF

DESIGN BY	PCW
DRAWN BY	RTC/CMM
CHECKED BY	RD
REVIEWED BY	PCW

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ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

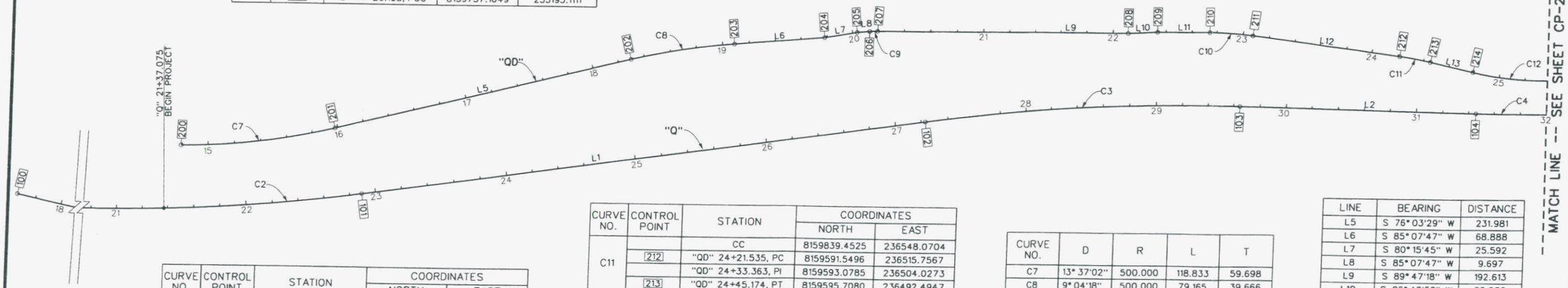
METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	CP-1

CURVE NO.	CONTROL POINT	STATION	COORDINATES NORTH	COORDINATES EAST
C2		CC	8158320.9793	237504.2902
	100	"Q" 17+65.300, PRC	8159683.0935	237827.7792
		"Q" 20+30.427, PI	8159744.3547	237569.8266
	101	"Q" 22+89.349, PT	8159707.0562	237307.3359
C3		CC	8161131.1303	236666.9647
	102	"Q" 27+23.011, PC	8159646.0480	236877.9871
		"Q" 28+44.103, PI	8159629.0125	236758.0993
	103	"Q" 29+64.671, PT	8159631.4290	236637.0314
C4		CC	8157135.5393	236406.1536
	104	"Q" 31+45.696, PC	8159635.0414	236456.0424
		"Q" 32+08.216, PI	8159636.2891	236393.5346
	105	"Q" 32+70.710, PT	8159634.4107	236331.0425
C5		CC	8160549.0691	236139.5103
	106	"Q" 34+34.675, PC	8159629.4844	236167.1512
		"Q" 35+61.314, PI	8159625.6796	236040.5702
	107	"Q" 36+86.370, PT	8159656.2162	235917.6688
	108	"Q" 39+42.371 AP= "Q" 39+42.386 PC	8159717.9457	235669.2225
C6		CC	8158582.7662	235385.9057
	108A	"Q" 39+42.386, PC	8159717.9457	235669.2225
		"Q" 43+48.692, PI	8159815.9233	235274.8901
	109	"Q" 44+20.198, POC	8159737.1049	235195.1111

CURVE NO.	D	R	L	T
C2	21° 26'49"	1400.000	524.049	265.127
C3	9° 13'51"	1500.000	241.660	121.092
C4	2° 51'54"	2500.000	125.015	62.520
C5	15° 40'30"	920.000	251.695	126.638
C6	23° 23'56"	1170.000	477.812	242.283

LINE	BEARING	DISTANCE
L1	S 81° 54'46" W	433.662
L2	N 88° 51'24" W	181.025
L3	S 88° 16'42" W	163.965
L4	N 76° 02'48" W	256.001



CURVE NO.	CONTROL POINT	STATION	COORDINATES NORTH	COORDINATES EAST
C7		CC	8159171.6517	237450.0682
	200	"QD" 14+79.133, PC	8159671.6436	237447.2350
		"QD" 15+38.830, PI	8159671.3054	237387.5383
	201	"QD" 15+97.965, PT	8159656.9220	237329.5993
C8		CC	8160086.2993	236983.9835
	202	"QD" 18+29.946, PC	8159601.0290	237104.4524
		"QD" 18+69.612, PI	8159591.4721	237065.9553
	203	"QD" 19+09.112, PT	8159588.1045	237026.4329
	204	"QD" 19+78.000, PI	8159582.2560	236957.7933
	205	"QD" 20+03.592, PI	8159577.9275	236932.5697
C9		CC	8159651.8335	236916.5407
	206	"QD" 20+13.289, PC	8159577.1043	236922.9081
		"QD" 20+16.339, PI	8159576.8453	236919.8685
	207	"QD" 20+19.387, PT	8159576.8340	236916.8179
	208	"QD" 22+12.000, PI	8159576.1222	236724.2060
	209	"QD" 22+34.032, PI	8159574.8474	236702.2105
C10		CC	8159824.6977	236661.2649
	210	"QD" 22+74.054, PC	8159574.6995	236662.1888
		"QD" 22+90.743, PI	8159574.6378	236645.5001
	211	"QD" 23+07.383, PT	8159576.7949	236628.9512

CURVE NO.	CONTROL POINT	STATION	COORDINATES NORTH	COORDINATES EAST
C11		CC	8159839.4525	236548.0704
	212	"QD" 24+21.535, PC	8159591.5496	236515.7567
		"QD" 24+33.363, PI	8159593.0785	236504.0273
	213	"QD" 24+45.174, PT	8159595.7080	236492.4947
C12		CC	8159359.5089	236403.8270
	214	"QD" 24+79.116, PC	8159603.2533	236459.4027
		"QD" 25+14.739, PI	8159611.1725	236424.6705
	215	"QD" 25+49.886, PT	8159609.0752	236389.1088
	216	"QD" 26+53.000, PI	8159603.0046	236286.1739
	217	"QD" 26+78.620, PI	8159603.9755	236260.5723
C13		CC	8159691.8583	236052.1634
	218	"QD" 28+81.494, PC	8159592.0318	236058.0505
		"QD" 29+36.446, PI	8159588.7966	236003.1934
	219	"QD" 29+81.989, PT	8159633.3691	235971.0521
C14		CC	8159595.1247	235875.3425
	220	"QD" 30+06.949, PC	8159653.6139	235956.4536
		"QD" 30+43.594, PI	8159683.3376	235935.0199
	221	"QD" 30+77.200, PT	8159692.1740	235899.4557
C15		CC	8159239.7150	235646.9301
	222	"QD" 32+13.172, PC	8159724.9611	235767.4961
		"QD" 32+21.512, PI	8159726.9720	235759.4027
	223	"QD" 32+29.849, PT	8159728.7119	235751.2469
C16		CC	8158556.6197	235389.5552
	224	"QD" 33+39.044, PC	8159751.4935	235644.4553
		"QD" 34+19.360, PI	8159768.2502	235565.9067
	225	"QD" 34+99.445, PT	8159774.5798	235485.8403

CURVE NO.	D	R	L	T
C7	13° 37'02"	500.000	118.833	59.698
C8	9° 04'18"	500.000	79.165	39.666
C9	4° 39'30"	75.000	6.098	3.051
C10	7° 38'18"	250.000	33.328	16.689
C11	5° 25'04"	250.000	23.640	11.829
C12	16° 13'10"	250.000	70.771	35.624
C13	57° 34'47"	100.000	100.496	54.952
C14	40° 15'05"	100.000	70.252	36.646
C15	1° 54'40"	500.000	16.677	8.339
C16	7° 31'20"	1221.760	160.401	80.316

LINE	BEARING	DISTANCE
L5	S 76° 03'29" W	231.981
L6	S 85° 07'47" W	68.888
L7	S 80° 15'45" W	25.592
L8	S 85° 07'47" W	9.697
L9	S 89° 47'18" W	192.613
L10	S 86° 40'59" W	22.032
L11	S 89° 47'18" W	40.022
L12	N 82° 34'24" W	114.152
L13	N 77° 09'20" W	33.941
L14	S 86° 37'29" W	103.114
L15	N 87° 49'41" W	25.620
L16	S 86° 37'30" W	202.874
L17	N 35° 47'43" W	24.959
L18	N 76° 02'48" W	135.972
L19	N 77° 57'28" W	109.194

PROFESSIONAL ENGINEER
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584
STATE OF NEVADA

11-20-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

HORIZONTAL CONTROL
1 OF 2

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	GMM
CHECKED BY	DWR
REVIEWED BY	PCW

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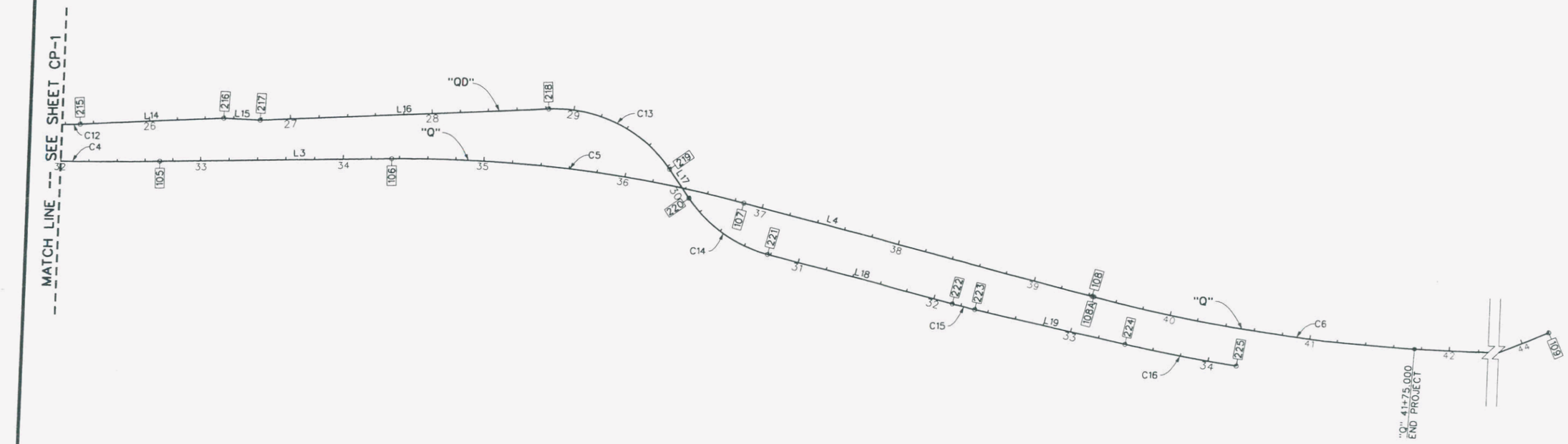
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	CP-2



NOTE:
SEE SHEET CP-1 FOR DETAILS

PROFESSIONAL ENGINEER
PAUL C. WOLF
Exp 06/30/04
CIVIL
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STATE OF NEVADA

11-20-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

HORIZONTAL CONTROL
2 OF 2

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	GMM
CHECKED BY	DWR
REVIEWED BY	PCW

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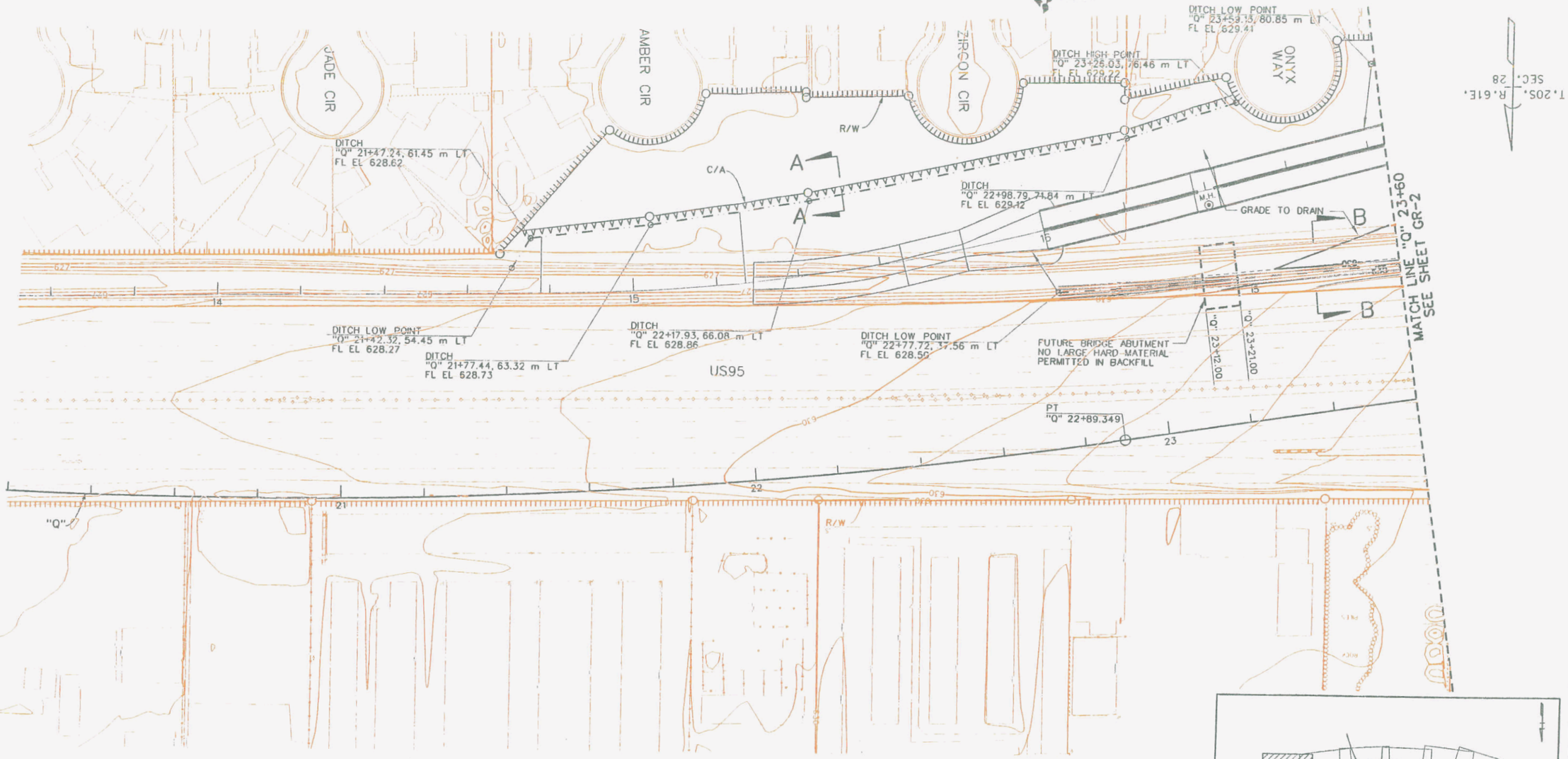
METRIC NDOT

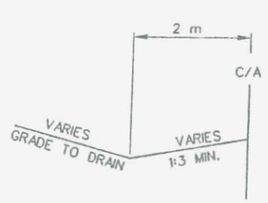
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-1



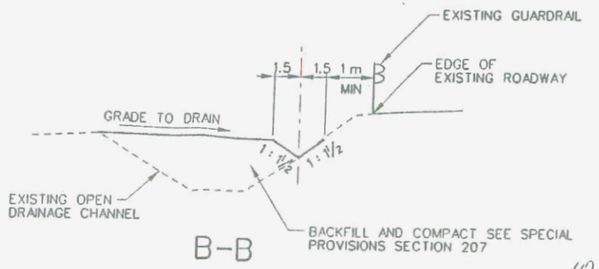
T.20S. R.61E. SEC. 28

NOTES:

1. SEE SD SHEETS FOR INFORMATION ON DROP INLETS AT DITCH LOW POINTS.
2. AREAS BETWEEN US95 AND R/W SHALL BE GRADED INTO SURFACE DITCHES.



A–A



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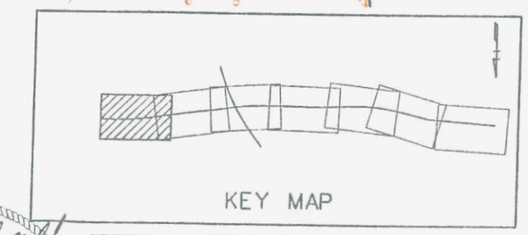

KEY MAP

ENGINEER PAUL C. WOLF Exp 06/30/04 CIVIL No. 14584 STATE OF NEVADA PROFESSIONAL

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING – DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	GMM
CHECKED BY	DT
REVIEWED BY	PCW

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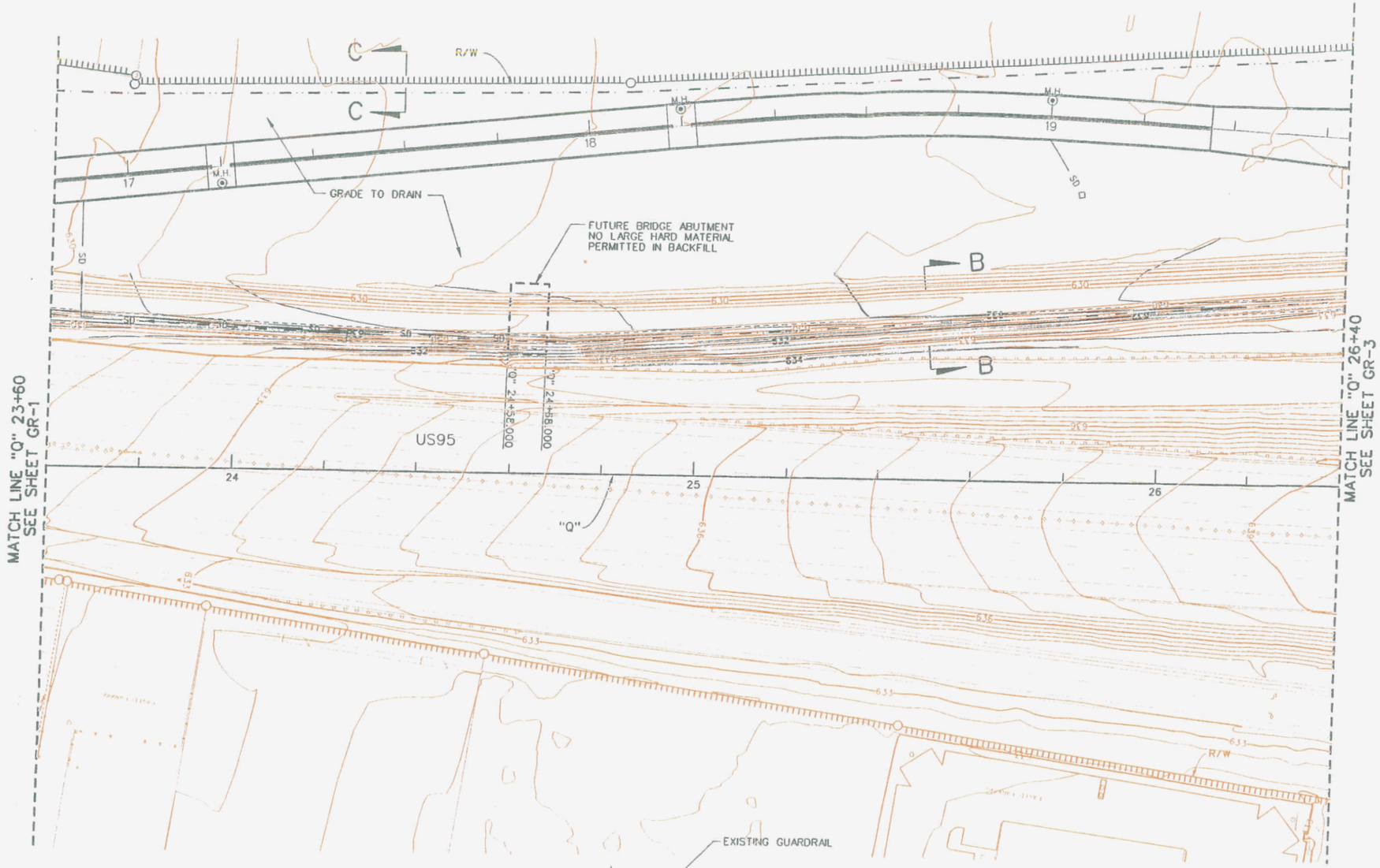
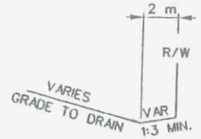
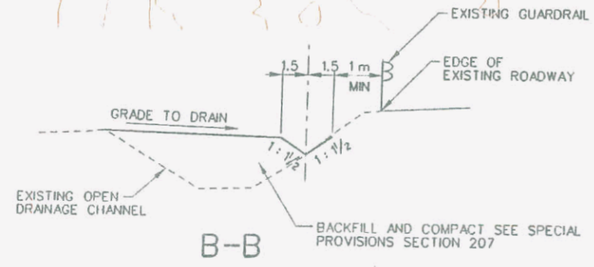
METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-2

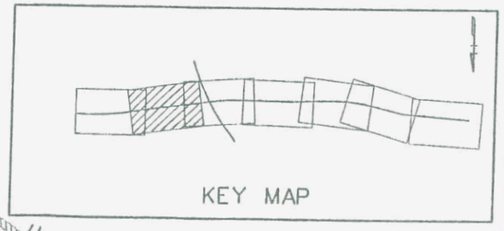




C-C



B-B



KEY MAP

PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	RD
CHECKED BY	DT
REVIEWED BY	PCW

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ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-3

DITCH HIGH POINT
"Q" 26+96.20, 95.62 m LT
FL EL 632.94

R/W

RANCHO DR

DITCH LOW POINT
"Q" 27+92.39, 70.23 m LT
FL EL 633.82

MARIGOLD LN

DITCH HIGH POINT
"Q" 29+02.50, 66.10 m LT
FL EL 635.39

DAHLIA LN

DITCH LOW POINT
"Q" 29+26.89, 65.22 m LT
FL EL 635.35

T. 20S., R. 61E., SEC. 29

GRADE TO DRAIN

20

M.H.

21

22

23

12

C/A

D

B

DITCH HIGH POINT
"Q" 26+97.29, 38.50 m LT
FL EL 632.54

DITCH LOW POINT
"Q" 27+85.31, 30.85 m LT
FL EL 632.15

SD

633

634

635

636

639

DITCH
"Q" 28+00.78, 24.44 m LT
FL EL 632.445

27

28

29

"Q"

US95

MATCH LINE "Q" 26+40
SEE SHEET GR-2

MATCH LINE "Q" 29+80
SEE SHEET GR-4

RANCHO DR

R/W

B-B

EXISTING GUARDRAIL

EDGE OF EXISTING ROADWAY

1.5 1.5 1 m MIN

GRADE TO DRAIN

1:1½ 1:1½

EXISTING OPEN DRAINAGE CHANNEL

BACKFILL AND COMPACT SEE SPECIAL PROVISIONS SECTION 207

D-D

VARIES 2 m MIN

SOUNDWALL

VARIES GRADE TO DRAIN

VARIES 1:6 MIN

KEY MAP

PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	RD
CHECKED BY	DT
REVIEWED BY	PCW

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ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-4

HOLLYHOCK LN

NARCISSUS LN

HYACINTH LN

R/W

C/A

DITCH "Q" 30+52.70, 53.40 m LT FL EL 635.68

DITCH "Q" 30+60.10, 44.56 m LT FL EL 635.72

DITCH "Q" 31+11.82, 39.74 m LT FL EL 635.86

MH

GRADE TO DRAIN

B

B

DITCH LOW POINT "Q" 31+20.00, 26.62 m LT FL EL 635.28

DITCH HIGH POINT "Q" 31+53.44, 37.10 m LT FL EL 636.00

US95

DITCH LOW POINT "Q" 32+22.00, 34.30 m LT FL EL 637.10

DITCH LOW POINT "Q" 32+21.41, 10.11 m LT FL EL 638.06

MATCH LINE "Q" 29+80 SEE SHEET GR-3

MATCH LINE "Q" 33+20 SEE SHEET GR-5

"Q"

G-G

R/W 1.5 m VARIES 1:6 MIN VARIES GRADE TO DRAIN

F-F

2 m EDGE OF TEMPORARY PAVEMENT VARIES 1:6 MIN VARIES 1:6 MIN

B-B

EXISTING GUARDRAIL

EDGE OF EXISTING ROADWAY

1.5 1.5 1 m MIN

GRADE TO DRAIN

1:1½ 1:1½

EXISTING OPEN DRAINAGE CHANNEL

BACKFILL AND COMPACT SEE SPECIAL PROVISIONS SECTION 207

E-E

R/W 2 m VARIES 1:3 MIN GRADE TO DRAIN 0.6 m MIN COVER RCB

E

F

G

DITCH LOW POINT "Q" 29+89.68, 32.44 m LT FL EL 635.40

AUSTIN AVE

DITCH "Q" 31+59.72, 34.57 m RT FL EL 635.92

R/W

C/A

DITCH HIGH POINT "Q" 32+27.00, 34.46 m RT FL EL 637.30

DITCH LOW POINT "Q" 32+74.96, 39.94 m RT FL EL 637.50

AUSTIN AVE

RAMSEY ST

DELAMAR ST

ELDORADO CANYON ST

NORTON ST

T.20S. R.61E. SEC. 29

KEY MAP

PROFESSIONAL ENGINEER STATE OF NEVADA PAUL C. WOLF Exp 06/30/04 CIVIL No. 14584

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	RD
CHECKED BY	DT
REVIEWED BY	PCW

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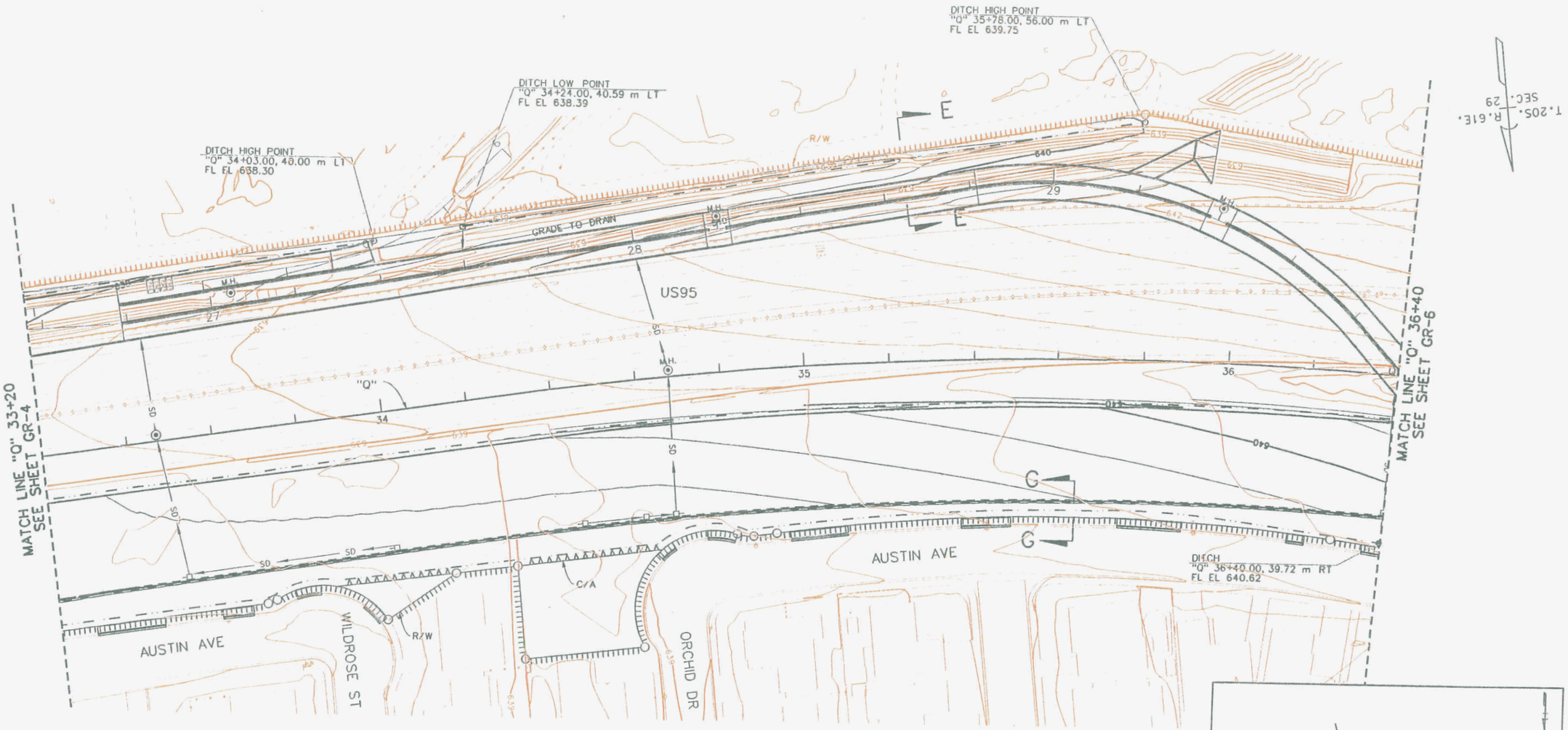
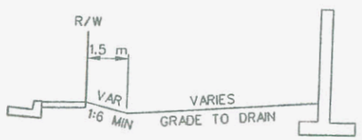
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

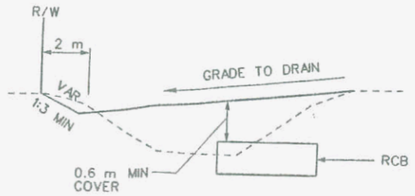
METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-5





G-G



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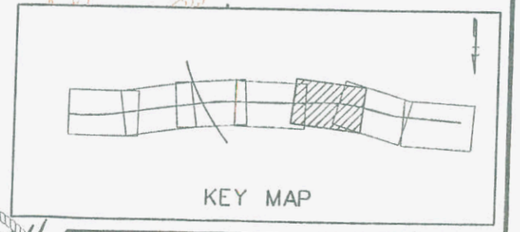

KEY MAP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584

10-22-03

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	RD
CHECKED BY	DT
REVIEWED BY	PCW

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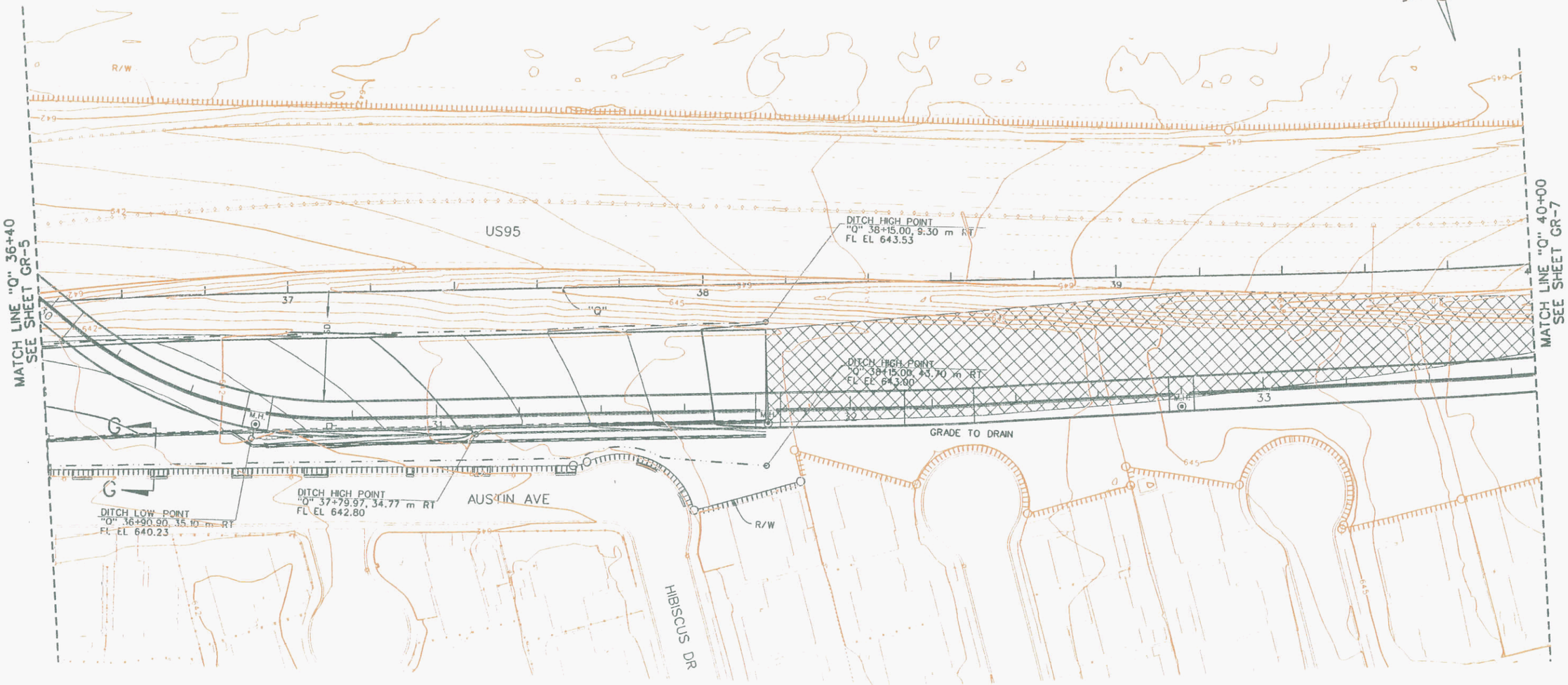
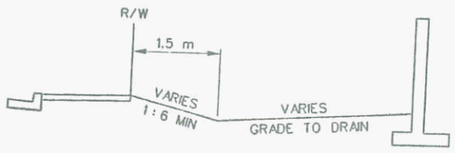
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. ALL STATIONS ARE IN METERS.

METRIC NDOT

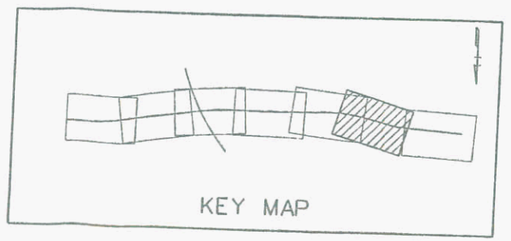
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-6

T.20S. R.61E. SEC. 29





G-G



KEY MAP

PROFESSIONAL ENGINEER
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584
STATE OF NEVADA

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	RD
CHECKED BY	DT
REVIEWED BY	PCW

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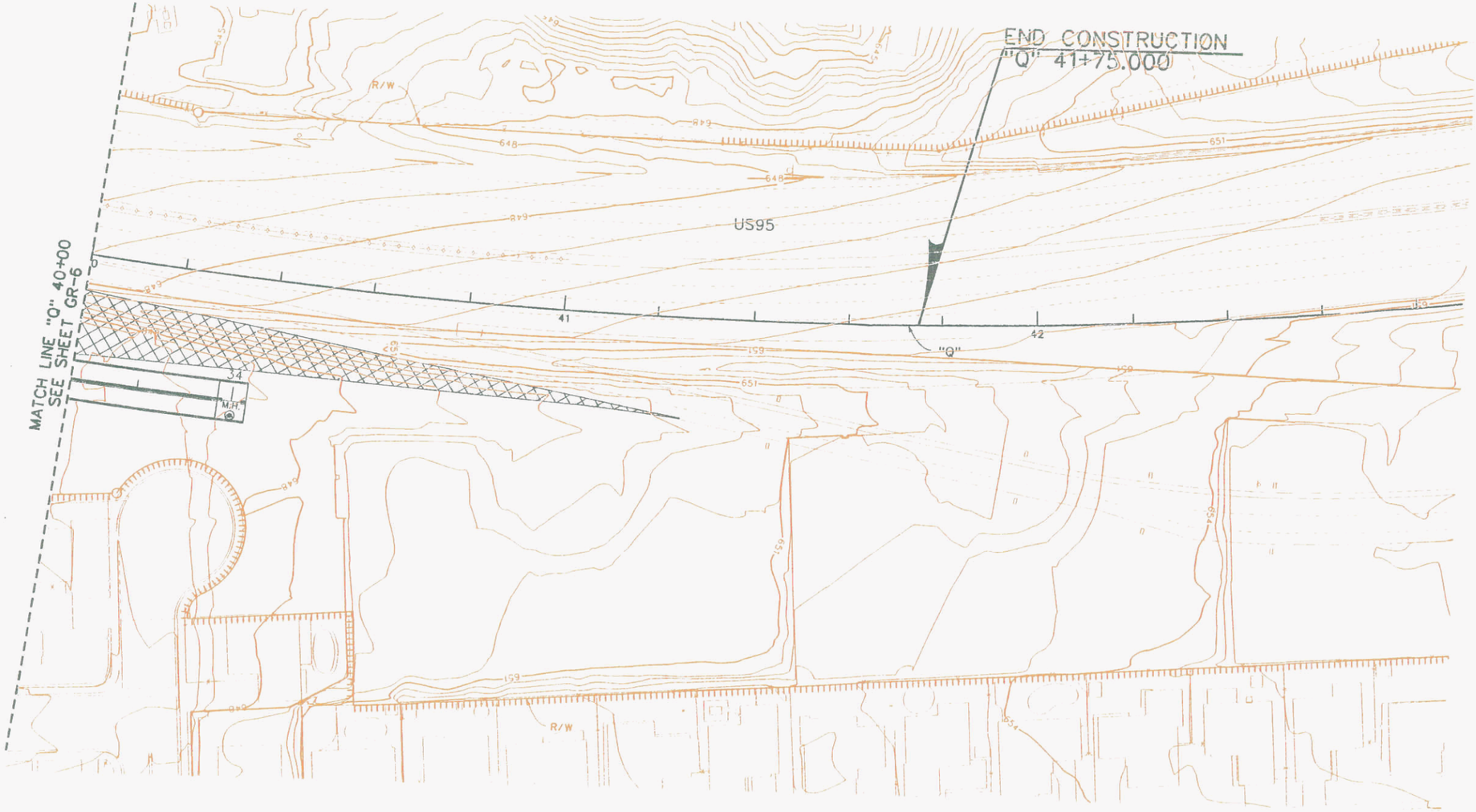
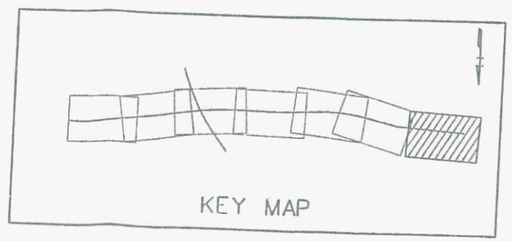
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	GR-7



T.20S. R.61E. SEC. 29



PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584

10-22-03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

US95 WIDENING - DRAINAGE IMPROVEMENTS
MARTIN L KING TO VALLEY VIEW

GRADING PLAN

PB PARSONS BRINCKERHOFF

DESIGN BY	RD
DRAWN BY	RD
CHECKED BY	DT
REVISED BY	PCW

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ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	S-1

STRUCTURE LIST: REMOVALS

PROFESSIONAL ENGINEER PAUL C. WOLF Exp 06/30/04 CIVIL No. 14584 STATE OF NEVADA

10-22-03

623 0764 REMOVAL OF EXISTING LIGHTING SYSTEM (LS)	202 2268 REMOVE CHAIN LINK FENCE (LINM)	202 2200 REMOVE CURB AND GUTTER (LINM)	202 2128 REMOVE BITUMINOUS SURFACE (SQM)	202 2108 REMOVE COMPOSITE SURFACE (SQM)	202 2092 REMOVE GUARDRAIL (LINM)	202 2064 REMOVE MASONRY WALL (LINM)	202 2012 REMOVE CONCRETE SLAB (SQM)	201 0008 REMOVE TREES (EACH)	LOCATION	SHEET / NOTE	
						218			"0" 21+37.075, 58.284 m LT TO 23+60.000, 42.213 m LT	4	4
				10					"0" 21+69.436, 87.358 m LT TO 21+90.794, 91.597 m LT	4	7
				12					"0" 22+47.839, 85.545 m LT TO 22+72.013, 84.044 m LT	4	7
		23		16					"0" 23+26.596, 80.815 m LT TO 23+50.670, 84.861 m LT	4	7
		28							"0" 21+69.436, 87.358 m LT TO 21+90.794, 91.597 m LT	4	14
		35							"0" 22+47.839, 85.545 m LT TO 22+72.013, 84.044 m LT	4	14
	218								"0" 23+26.596, 80.815 m LT TO 23+50.670, 84.861 m LT	4	14
							35		"0" 21+37.067, 57.764 m LT TO 23+60.000, 42.142 m LT	4	16
							43		"0" 21+69.436, 87.358 m LT TO 21+90.794, 91.597 m LT	4	24
							53		"0" 22+47.839, 85.545 m LT TO 22+72.013, 84.044 m LT	4	24
			740						"0" 23+26.596, 80.815 m LT TO 23+50.670, 84.861 m LT	4	24
						54			"0" 25+50.900, 88.600 m LT TO 26+04.800, 91.900 m LT	5	2
								18	"0" 23+60.000, 42.323 m LT TO 23+76.610, 82.498 m LT	5	4
	280								"0" 25+50.900, 88.600 m LT TO 26+04.800, 91.900 m LT	5	9
						161			"0" 23+60.000, 42.145 m LT TO 26+40.000, 51.604 m LT	5	16
				26					"0" 28+24.029, 38.256 m LT TO 29+80.000, 40.751 m LT	6	4
				18					"0" 28+03.647, 76.577 m LT TO 28+49.028, 85.994 m LT	6	7
				3					"0" 29+01.374, 77.846 m LT TO 29+24.936, 79.860 m LT	6	7
LS									"0" 29+74.938, 80.228 m LT TO 29+75.683, 75.102 m LT	6	7
		60							"0" 27+51.450, 63.160 m LT & "0" 28+26.876, 73.030 m LT	6	10
		39							"0" 28+03.647, 76.577 m LT TO 28+49.028, 85.994 m LT	6	14
		6							"0" 29+01.374, 77.846 m LT TO 29+24.936, 79.860 m LT	6	14
	27								"0" 29+74.938, 80.228 m LT TO 29+75.683, 75.102 m LT	6	14
	77								"0" 26+40.000, 51.604 m LT TO 27+05.500, 73.500 m LT	6	16
	106								"0" 27+02.734, 39.696 m LT TO 26+95.034, 111.545 m LT	6	16
	10								"0" 27+49.817, 80.543 m LT TO 28+24.029, 38.256 m LT	6	16
									"0" 27+78.469, 26.890 m LT TO 27+79.584, 36.060 m LT	6	16
							85		"0" 28+03.647, 76.577 m LT TO 28+49.028, 85.994 m LT	6	24
							59		"0" 29+01.374, 77.846 m LT TO 29+24.936, 79.860 m LT	6	24
							8		"0" 29+74.938, 80.228 m LT TO 29+75.683, 75.102 m LT	6	24
						201			"0" 29+80.000, 40.751 m LT TO 31+80.267, 33.425 m LT	7	4
						176			"0" 31+44.978, 13.154 m RT TO 33+20.000, 7.860 m RT	7	4
					190				"0" 31+30.000, 24.331 m LT TO 33+20.000, 26.610 m LT	7	5
				10					"0" 29+84.328, 67.193 m LT TO 29+99.267, 80.352 m LT	7	7
				3					"0" 30+51.754, 74.617 m LT TO 30+51.765, 79.417 m LT	7	7
				7					"0" 30+58.174, 65.791 m LT TO 30+71.482, 67.218 m LT	7	7
				11					"0" 31+29.737, 67.563 m LT TO 31+50.246, 66.443 m LT	7	7
				5					"0" 32+17.759, 54.628 m RT TO 32+24.399, 43.675 m RT	7	7
				2					"0" 32+37.867, 41.130 m RT TO 32+41.610, 42.590 m RT	7	7
				6					"0" 32+57.306, 43.159 m RT TO 32+71.431, 43.107 m RT	7	7
				3					"0" 32+82.678, 43.095 m RT TO 32+90.131, 43.085 m RT	7	7
				3					"0" 32+99.121, 43.072 m RT TO 33+06.389, 43.062 m RT	7	7
LS	718	191	740	135	190	810	283	18	SHEET TOTAL		

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED, ALL STATIONS ARE IN METERS.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	S-3

STRUCTURE LIST: REMOVALS

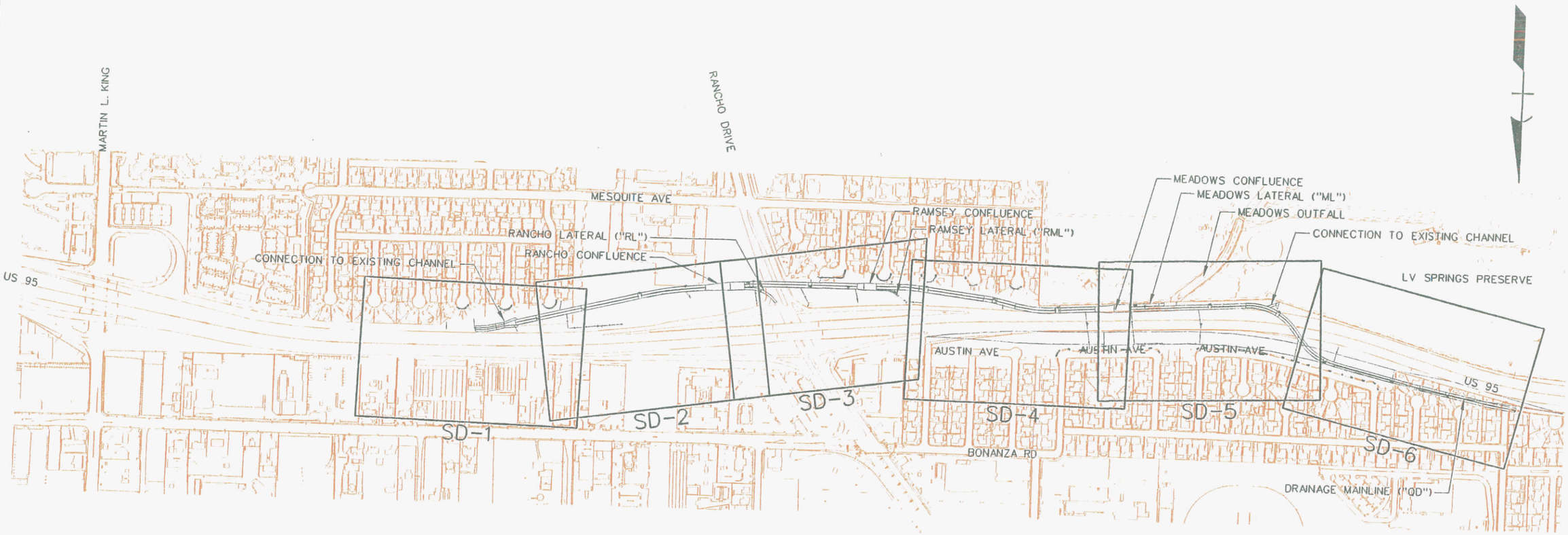
PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL C. WOLF
Exp 06/30/04
CIVIL
No. 14584

10-22-03

REMOVAL OF EXISTING LIGHTING SYSTEM (LS)	REMOVE CHAIN LINK FENCE (LINM)	REMOVE CURB AND GUTTER (LINM)	REMOVE BITUMINOUS SURFACE (SQM)	REMOVE COMPOSITE SURFACE (SQM)	REMOVE GUARDRAIL (LINM)	REMOVE MASONRY WALL (LINM)	REMOVE CONCRETE SLAB (SQM)	REMOVE TREES (EACH)	LOCATION	SHEET / NOTE	
623 0764	202 2268	202 2200	202 2128	202 2108	202 2092	202 2064	202 2012	201 0008			
		16							"Q" 33+28.218, 43.054 m RT TO 33+44.237, 43.046 m RT	8	14
		7							"Q" 33+57.953, 43.034 m RT TO 33+65.315, 43.097 m RT	8	14
		5							"Q" 33+75.584, 40.687 m RT TO 33+81.347, 40.320 m RT	8	14
		5							"Q" 33+91.000, 44.684 m RT TO 33+94.370, 49.026 m RT	8	14
		4							"Q" 34+63.014, 42.407 m RT TO 34+66.393, 40.198 m RT	8	14
		6							"Q" 34+74.509, 38.416 m RT TO 34+81.288, 39.759 m RT	8	14
		13							"Q" 34+95.106, 40.134 m RT TO 35+09.165, 39.428 m RT	8	14
		11							"Q" 35+36.713, 38.688 m RT TO 35+49.044, 38.438 m RT	8	14
		15							"Q" 35+75.063, 38.704 m RT TO 35+90.624, 39.090 m RT	8	14
		4							"Q" 36+16.715, 40.366 m RT TO 36+21.204, 40.655 m RT	8	14
		4							"Q" 36+35.379, 41.609 m RT TO 36+40.537, 41.931 m RT	8	14
	320								"Q" 33+20.000, 8.683 m RT TO 36+40.000, 8.626 m RT	8	16
							24		"Q" 33+28.218, 43.054 m RT TO 33+44.237, 43.046 m RT	8	24
							11		"Q" 33+57.953, 43.034 m RT TO 33+65.315, 43.097 m RT	8	24
							7		"Q" 33+75.584, 40.687 m RT TO 33+81.347, 40.320 m RT	8	24
							7		"Q" 33+91.000, 44.684 m RT TO 33+94.370, 49.026 m RT	8	24
							6		"Q" 34+63.014, 42.407 m RT TO 34+66.393, 40.198 m RT	8	24
							9		"Q" 34+74.509, 38.416 m RT TO 34+81.288, 39.759 m RT	8	24
							20		"Q" 34+95.106, 40.134 m RT TO 35+09.165, 39.428 m RT	8	24
							17		"Q" 35+36.713, 38.688 m RT TO 35+49.044, 38.438 m RT	8	24
							23		"Q" 35+75.063, 38.704 m RT TO 35+90.624, 39.090 m RT	8	24
							6		"Q" 36+16.715, 40.366 m RT TO 36+21.204, 40.655 m RT	8	24
							6		"Q" 36+35.379, 41.609 m RT TO 36+40.537, 41.931 m RT	8	24
					83				"Q" 36+40.000, 38.827 m LT TO 37+20.000, 40.627 m LT	9	5
				2					"Q" 36+45.963, 42.239 m RT TO 36+51.048, 42.501 m RT	9	7
				2					"Q" 36+65.714, 43.078 m RT TO 36+69.864, 43.199 m RT	9	7
				2					"Q" 36+86.226, 43.510 m RT TO 36+91.121, 43.563 m RT	9	7
				3					"Q" 37+03.833, 43.707 m RT TO 37+09.661, 43.773 m RT	9	7
				1					"Q" 37+28.294, 43.960 m RT TO 37+30.121, 44.017 m RT	9	7
				2					"Q" 37+44.581, 44.181 m RT TO 37+48.394, 44.224 m RT	9	7
				2					"Q" 37+64.247, 44.386 m RT TO 37+69.190, 44.388 m RT	9	7
				2					"Q" 37+84.049, 42.204 m RT TO 37+88.771, 44.177 m RT	9	7
				2					"Q" 37+95.707, 52.692 m RT TO 37+94.295, 49.679 m RT	9	7
		5							"Q" 36+45.963, 42.239 m RT TO 36+51.048, 42.501 m RT	9	14
		4							"Q" 36+65.714, 43.078 m RT TO 36+69.864, 43.199 m RT	9	14
		5							"Q" 36+86.226, 43.510 m RT TO 36+91.121, 43.563 m RT	9	14
		6							"Q" 37+03.833, 43.707 m RT TO 37+09.661, 43.773 m RT	9	14
		2							"Q" 37+28.294, 43.960 m RT TO 37+30.121, 44.017 m RT	9	14
		4							"Q" 37+44.581, 44.181 m RT TO 37+48.394, 44.224 m RT	9	14
		5							"Q" 37+64.247, 44.386 m RT TO 37+69.190, 44.388 m RT	9	14
		5							"Q" 37+84.049, 42.204 m RT TO 37+88.771, 44.177 m RT	9	14
		4							"Q" 37+95.707, 52.692 m RT TO 37+94.295, 49.679 m RT	9	14
	230								"Q" 36+40.000, 8.626 m RT TO 39+80.915, 55.493 m RT	9	16
0	550	130	0	18	83	0	136	0	SHEET TOTAL		

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-00

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



FOR EROSION CONTROL DETAILS
SEE SHEETS SD-24 & SD-25

NOTE:
STRUCTURE NOTATION IS READ AS FOLLOWS:

Structure reference 3.4 on profile sheet references keynote 4 on sheet SD-3

3.4

- 3 — SD Plan Sheet Number
- 4 — Keynote Number

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PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

SHEET INDEX

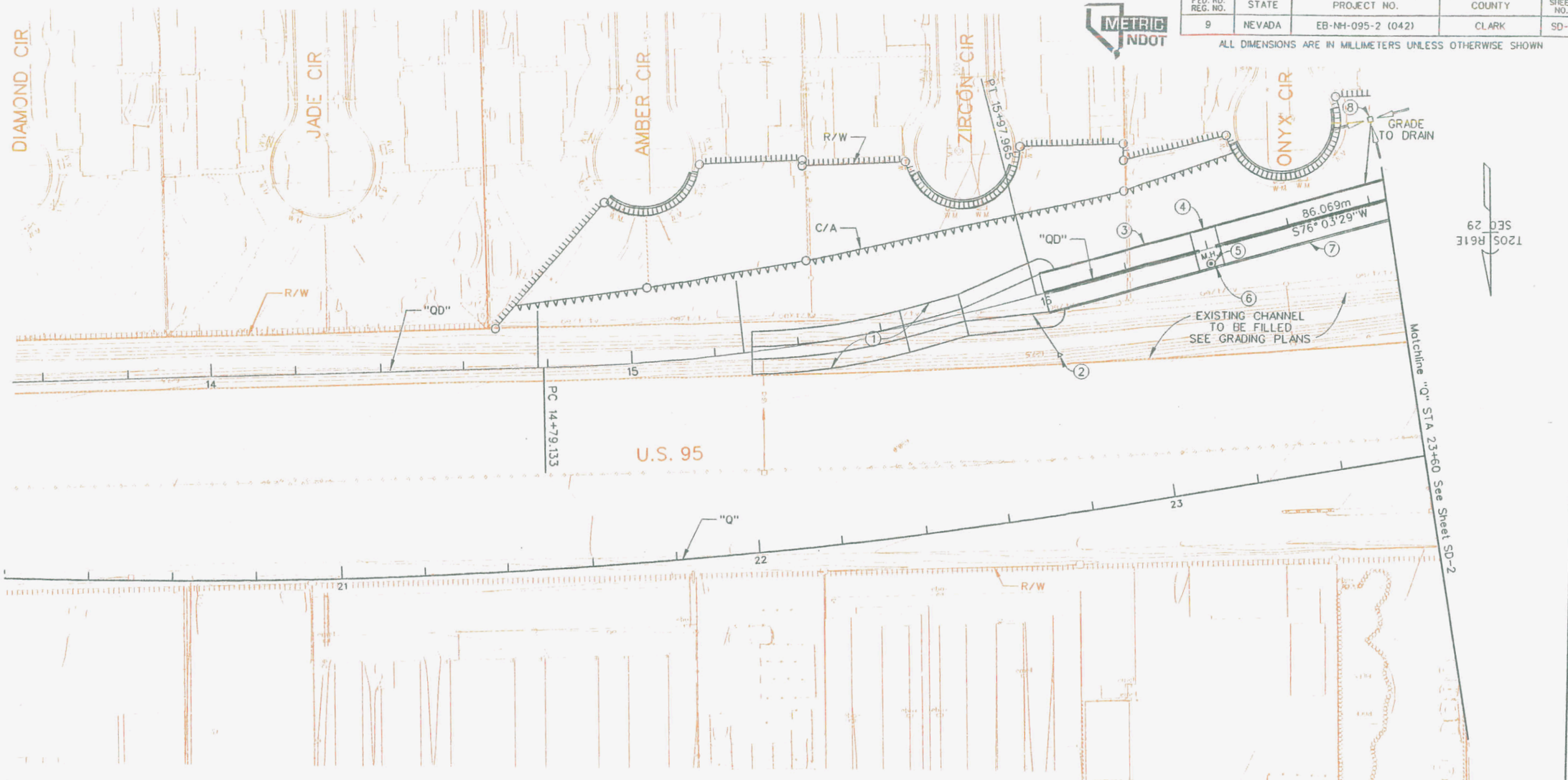
vtn nevada
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE: (702) 873-7550
FAX: (702) 362-2567

DESIGN BY	JPL
DRAWN BY	JJK
CHECKED BY	JPL
REVIEWED BY	DWB

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-1

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



① "QD" 16+00.000 TO "QD" 15+28.917 0.291m RT.
CONSTRUCT CONCRETE CHANNEL CONNECTION MATCH EXISTING CHANNEL (SEE SHEET SD-7 & SD-23)

② "QD" 16+00.000 15.400m RT.
INSTALL 450mm x 10.852m RCP
INSTALL RCP END SECTION
CONNECT TO CONCRETE CHANNEL AT "QD" 15+96.000, 3.990m RT.
U.I.E. = 628.500
L.I.E. = 627.035

③ "QD" 16+37.000 TO "QD" 16+00.000
INSTALL DUAL 4200mm x 2100mm x 37.000m RCB (SEE SHEET SD-7)

④ "QD" 16+43.000 TO "QD" 16+37.000
CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-7, B-607 & B-608)

⑤ "QD" 16+40.000 4.010m RT.
CONSTRUCT TYPE 1 MODIFIED MH, H=0.908m
CONNECT TO RCB
(SEE SHEET SD-7, B-607 & B-608)

⑥ "QD" 16+40.823 4.610m RT.
INSTALL 450mm RCP BLOCK-OUT
BLOCK-OUT INV. EL. 628.000
(SEE SHEET SD-7, SD-21 & B-609)

⑦ "QD" 16+84.054 TO "QD" 16+43.000
INSTALL DUAL 4200mm x 2100mm x 41.054m RCB
(SEE SHEET SD-7)

⑧ "Q" 23+59.072 80.843m LT.
CONSTRUCT TYPE 8 D.I., H=1.050m
CONSTRUCT CONCRETE APRON
INSTALL 750mm x 15.185m RCP
CONNECT TO RCB "QD" 16+80.000, 4.610m LT.
(SEE SHEET SD-14 & SD-20)

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

vtn nevada
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE: (702) 873-7500
FAX: (702) 362-2592

DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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Curve Table

Curve #	Radius	Delta	Length	Tangent
1	500.000m	09° 04'18"	79.165m	39.666m

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-2
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

T20S R61E SEC 29

PC 18+29.946

PT 19+09.112

R/W

"QD"

145.82m
S76° 03'29"W

55.896m
S85° 07'47"W

17 18 19

MH

SD

GRADE TO DRAIN

EXISTING CHANNEL TO BE FILLED SEE GRADING PLANS

U.S. 95

"Q"

24 25 26

Matchline "Q" STA 23+60 See Sheet SD-1

Matchline "Q" STA 26+40 See Sheet SD-3

R/W

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	TM, WT
DRAWN BY	WRM
CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-2A
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"QD" 17+17.000 TO "QD" 16+84.054	INSTALL DUAL 4200mm x 2100mm x 32.946m RCB (SEE SHEET SD-7)
②	"QD" 17+20.000 4.010m RT.	CONSTRUCT TYPE 1 MODIFIED MH, H=0.908m CONNECT TO RCB (SEE SHEET SD-7, B-607 & B-608)
③	"QD" 17+23.000 TO "QD" 17+17.000	CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-7, B-607 & B-608)
④	"QD" 18+17.000 TO "QD" 17+23.000	INSTALL DUAL 4200mm x 2100mm x 94.000m RCB (SEE SHEET SD-7)
⑤	"QD" 17+70.000 4.610m RT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 629.500 (SEE SHEET SD-7, SD-21 & B-609)
⑥	"QD" 18+20.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED MH, H=1.020m CONNECT TO RCB (SEE SHEET SD-7, B-607 & B-608)
⑦	"QD" 18+23.000 TO "QD" 18+17.000	CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-7, B-609, B-607 & B-608)
⑧	"QD" 19+35.000 TO "QD" 18+23.000	INSTALL DUAL 4200mm x 2100mm x 112.000m RCB (SEE SHEET SD-7 & SD-8)
⑨	"QD" 19+00.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED MH, H=1.314m CONNECT TO RCB (SEE SHEET SD-7)
⑩	"Q" 23+66.513 32.260m LT.	CONSTRUCT 450mm x 750mm CMP TEE CONNECT TO 750mm RCP U.I.E. = 629.32± CONNECT TO EXISTING RCP L.I.E. = 628.421 CONNECT TO 750mm CMP (SEE SHEET SD-19)
⑪	"Q" 24+23.931 27.679m LT. TO "Q" 24+24.203 30.355m LT.	INSTALL 450mm x 2.690m CMP CONSTRUCT 450mm x 750mm CMP TEE U.I.E. = 630.72± CONNECT TO EXISTING RCP L.I.E. = 629.023 CONNECT TO 750mm CMP (SEE SHEET SD-19)
⑫	"Q" 24+59.985 29.174m LT. TO "QD" 16+90.000 4.610m RT.	INSTALL 750mm x 118.837m CMP CONNECT TO RCB AT "QD" 16+90.000, 4.610m RT. (SEE SHEET SD-19)
⑬	"Q" 25+82.157 62.177m LT.	CONSTRUCT TYPE 2A D.I. (D=750), H=0.950m CONSTRUCT CONCRETE APRON INSTALL 600mm x 13.647m RCP CONNECT TO RCB AT "QD" 19+00.000, 4.610m RT. (SEE SHEET SD-16 & SD-20)
⑭	"Q" 25+97.119 62.927m LT.	CONSTRUCT TYPE 2A D.I., H=0.800m CONSTRUCT CONCRETE APRON INSTALL 450mm x 14.383m RCP (SEE SHEET SD-16 & SD-20)
⑮	"Q" 23+94.159 80.810m LT.	CONSTRUCT TYPE 2A D.I., H=0.800m CONSTRUCT CONCRETE APRON INSTALL 750mm x 10.766m RCP CONNECT TO RCB AT "QD" 17+20.000, 4.610m LT. (SEE SHEET SD-17 & SD-20)

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PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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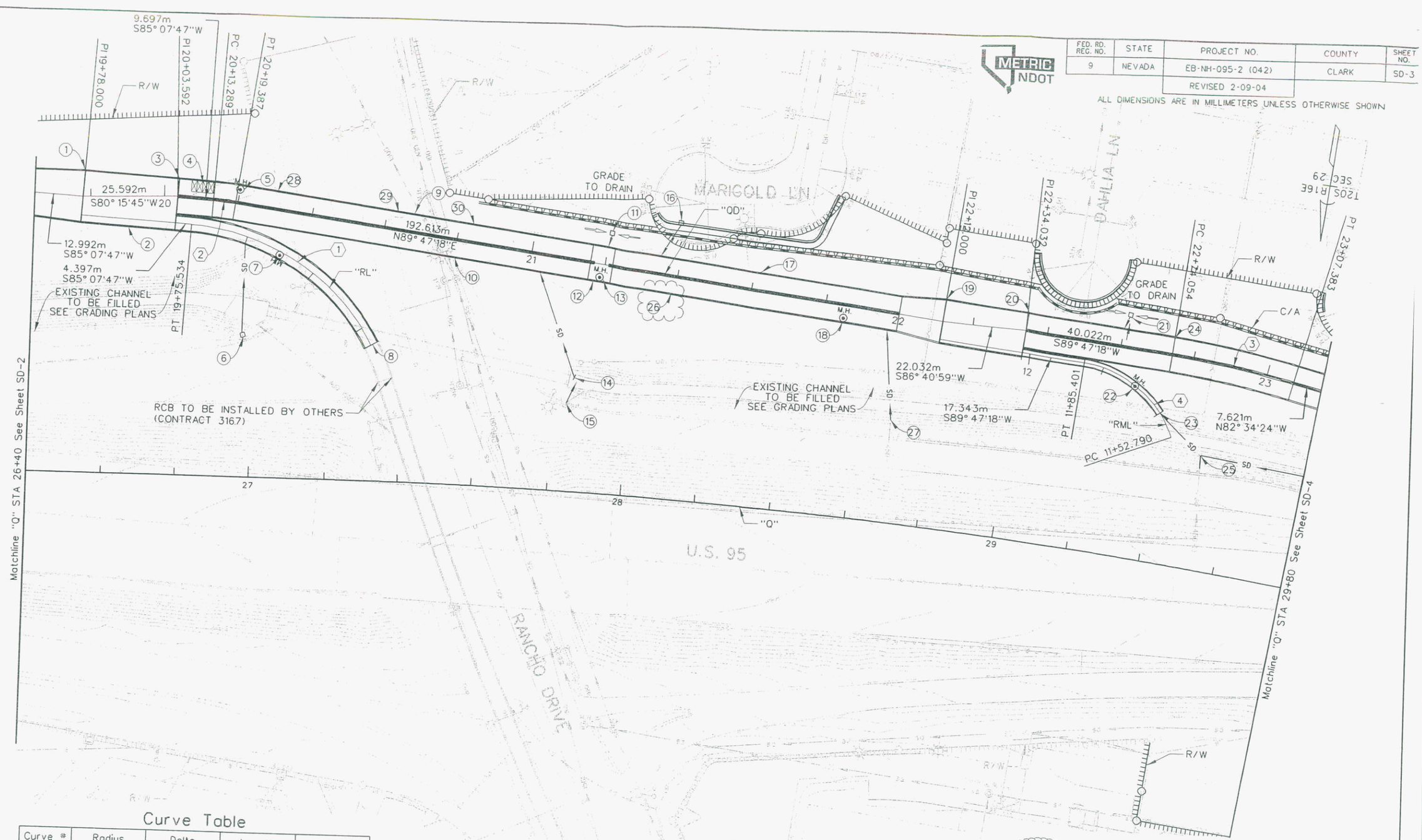
DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-3
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



Curve Table

Curve #	Radius	Delta	Length	Tangent
1	60.000m	58° 04'41"	60.819m	33.312m
2	75.000m	4° 39'30"	6.098m	3.051m
3	250.000m	7° 38'18"	33.328m	16.689m
4	30.000m	48° 30'44"	25.401m	13.518m

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
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DESIGN BY	T.M. WT
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CHECKED BY	JPL
REVIEWED BY	DWB

02/18/2004 11:46:49 AM i:\cad\pubwrk\5817\sheets\drainage\section 3b\sd-03.dgn

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-3A
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① "QD" 19+78.000 TO "QD" 19+35.000	CONSTRUCT TRANSITION STRUCTURE (SEE SHEET SD-8, B-600 TO B-602)
② "QD" 19+90.000 7.828m RT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 630.500 (SEE SHEET SD-8, SD-21 & B-609)
③ "QD" 20+03.592 TO "QD" 19+78.000	CONSTRUCT CONFLUENCE STRUCTURE SEE SHEET SD-8, B-600 TO B-602)
④ "QD" 20+10.000 3.110m LT.	CONSTRUCT ACCESS / VENT GRATE TOP OF GRATE EL. 633.200 (SEE SHEET SD-8, B-601 & B-602)
⑤ "QD" 20+20.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED MH, H=1.364m CONNECT TO RCB (SEE SHEET SD-8)
⑥ "Q" 26+97.291 38.504m LT.	CONSTRUCT TYPE 2A D.I., H=0.800m CONSTRUCT CONCRETE APRON INSTALL 450mm x 24.376m RCP CONNECT TO RCB AT "RL" 19+60.000 (SEE SHEET SD-18 & SD-20)
⑦ "RL" 19+50.000 1.228m LT.	CONSTRUCT TYPE 1 MODIFIED MH, H=0.911m CONNECT TO RCB (SEE SHEET SD-12)
⑧ "RL" 19+14.715 TO "RL" 19+79.932	INSTALL PRECAST 3600mm x 2400mm x 65.217m RCB CONNECT TO EXISTING 3600mm x 2400mm RCB TO BE INSTALLED IN CONTRACT 3167 (SEE SHEET SD-12)
⑨ "QD" 21+16.000 TO "QD" 20+03.592	INSTALL DUAL 4200mm x 2100mm x 112.408m RCB (W/52.0m PRECAST RCB) (SEE SHEET SD-8)
⑩ "QD" 20+80.000 4.610m RT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 631.750 (SEE SHEET SD-8, SD-21 & B-609)
⑪ "Q" 27+92.425 70.391m LT.	CONSTRUCT TYPE 2A D.I., H=1.400m CONSTRUCT CONCRETE APRON INSTALL 450mm x 3.783m RCP CONNECT TO RCB AT "QD" 21+20.000, 4.610m LT. (SEE SHEET SD-14 & SD-20)
⑫ "QD" 21+22.000 TO "QD" 21+16.000	CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-8, B-609, B-607 & B-608)
⑬ "QD" 21+19.000 4.010m RT.	CONSTRUCT TYPE 1 MODIFIED MH, H=1.541m CONNECT TO RCB (SEE SHEET SD-8, B-607 & B-608)
⑭ "Q" 27+85.310 30.850m LT.	INSTALL RCP HEADWALL (SKEW=45°) INSTALL 900mm x 30.226m RCP CONNECT TO RCB AT "QD" 21+02.875, 4.610m RT. (SEE SHEET SD-12)
⑮ "Q" 27+83.576 23.779 LT. TO "Q" 27+85.673 29.004 LT.	INSTALL 300mm x 6.659m CMP U.I.E. = 633.45±, MATCH EXISTING D.I. L.I.E. = 632.500
⑯ "Q" 28+09.935 74.165m LT.	CONSTRUCT 1.500m SPECIAL D.I., H=1.400m INSTALL 450mm x 9.802m RCP CONNECT TO RCB AT "QD" 21+35.000, 4.610m LT. (SEE SHEET SD-14 & B-612)
⑰ "QD" 22+00.000 TO "QD" 21+22.000	INSTALL DUAL 4200mm x 2100mm x 78.000m RCB (SEE SHEET SD-8)
⑱ "QD" 21+85.000 4.010m RT.	CONSTRUCT TYPE 1 MODIFIED MH, H=1.645m CONNECT TO RCB (SEE SHEET SD-8 & SD-23)
⑲ "QD" 22+12.000 TO "QD" 22+00.000	CONSTRUCT TRANSITION STRUCTURE (SEE SHEET SD-8, B-603 & B-604)
⑳ "QD" 22+34.032 TO "QD" 22+12.000	CONSTRUCT CONFLUENCE STRUCTURE (SEE SHEET SD-8, SD-12 & B-603 & B-604)
㉑ "Q" 29+27.000 65.217m LT.	CONSTRUCT TYPE 2A D.I. (D=600), H=1.400m CONSTRUCT CONCRETE APRON INSTALL 450mm x 4.088m RCP CONNECT TO RCB AT "QD" 22+60.000, 4.610m LT. (SEE SHEET SD-15 & SD-20)
㉒ "RML" 11+70.000 0.314m LT.	CONSTRUCT TYPE 1 MH, H=2.327m CONNECT TO RCB (SEE SHEET SD-12 & SD-22)
㉓ "RML" 12+02.189 "RML" 11+60.000 TO	BRICK AND MORTAR PLUG INSTALL 1800mm x 1800mm x 42.189m RCB (SEE SHEET SD-12)
㉔ "QD" 23+15.558 TO "QD" 22+34.032	INSTALL DUAL 4200mm x 2100mm x 81.526m RCB (SEE SHEET SD-8 & SD-9)
㉕ "Q" 29+51.588 27.395m LT. TO "Q" 29+51.194 30.850m RT.	INSTALL 450mm x 3.478m CMP CONSTRUCT 450mm x 750mm CMP TEE U.I.E. = 634.48± CONNECT TO EXISTING RCP L.I.E. = 633.012 CONNECT TO 750mm CMP (SEE SHEET SD-19)
㉖ "QD" 21+39.000 4.610m RT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 632.250 (SEE SHEET SD-8, SD-21 & B-609)
㉗ "QD" 22+03.10± 28.65m RT.± TO "QD" 21+97.445 4.610m RT.	INSTALL 450mm x 22.569m RCP U.I.E. = 633.58± CONNECT TO EXISTING RCP L.I.E. = 632.500 CONNECT TO RCB (SEE SHEET SD-8 & SD-21)
㉘ "QD" 20+30.000 4.610m LT.	INSTALL 600mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 630.750 (SEE SHEET SD-8, SD-21 & B-609)
㉙ "QD" 20+63.000 4.610m LT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 631.250 (SEE SHEET SD-8, SD-21 & B-609)
㉚ "QD" 20+83.900 4.610m LT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 631.750 (SEE SHEET SD-8, SD-21 & B-609)

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PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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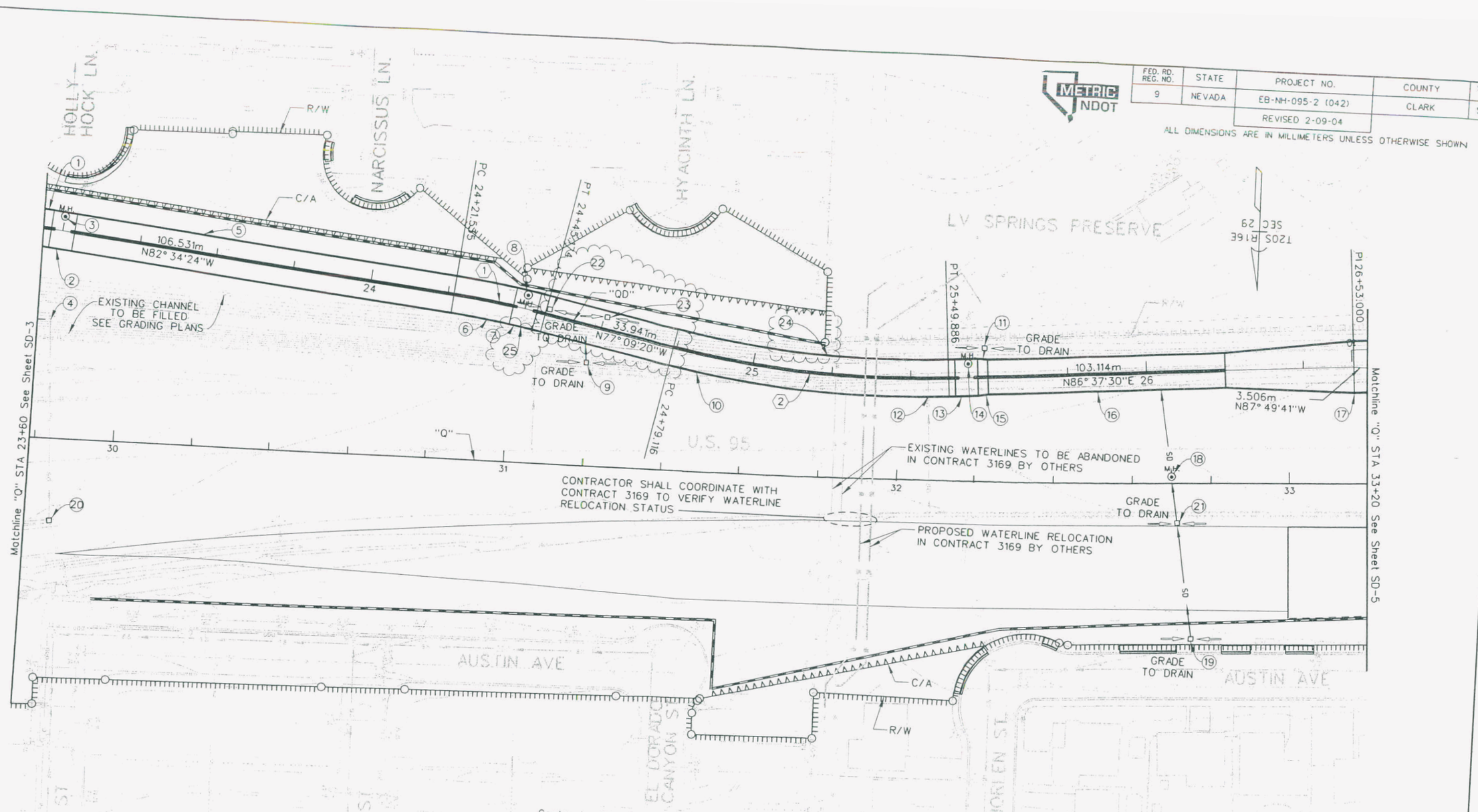
DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-4
		REVISED 2-09-04		

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



Curve Table

Curve #	Radius	Delta	Length	Tangent
1	250.000m	5° 25'04"	23.640m	11.829m
2	250.000m	16° 13'10"	70.771m	65.624m

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Abover Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Develpoment Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA 03/02/04 DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS · PLANNERS · LAND SURVEYORS
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-4A
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

①	"QD" 23+17.000 TO "QD" 23+15.558	INSTALL DUAL 4200mm x 2100mm x 0.671m RCB (SEE SHEET SD-9)
②	"QD" 23+23.000 TO "QD" 23+17.000	CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-9, B-607 & B-608)
③	"QD" 23+20.000 4.010m LT.	CONSTRUCT TYPE 1 MH, H=2.212m CONNECT TO RCB (SEE SHEET SD-9, B-607 & B-608)
④	"Q" 29+82.313 30.484m LT. TO "RML" 11+60.000	INSTALL 750mm CMP ELBOW INSTALL 750mm x 47.252m CMP CONNECT TO RCB AT "RML" 11+60.000 (SEE SHEET SD-19)
⑤	"QD" 24+37.000 TO "QD" 23+23.000	INSTALL DUAL 4200mm x 2100mm x 114.000m RCB (SEE SHEET SD-9)
⑥	"QD" 24+31.171 4.610m RT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 633.750 (SEE SHEET SD-9, SD-21 & B-609)
⑦	"QD" 24+43.000 TO "QD" 24+37.000	CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-9, B-607 & B-608)
⑧	"QD" 24+40.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED MH, H=2.472m CONNECT TO RCB (SEE SHEET SD-9, B-607 & B-608)
⑨	"Q" 31+19.609 26.621m LT.	CONSTRUCT TYPE 2A D.I., H=0.800 CONSTRUCT CONCRETE APRON INSTALL 450mm x 4.790m RCP CONNECT TO RCB AT "QD" 24+57.000, 4.6910m RT. (SEE SHEET SD-16 & SD-20)
⑩	"QD" 25+51.500 TO "QD" 24+43.000	INSTALL DUAL 4200mm x 2100mm x 108.500m RCB (SEE SHEET SD-9)
⑪	"Q" 32+22.000 34.300m LT.	CONSTRUCT TYPE 2A D.I., H=2.000m CONSTRUCT CONCRETE APRON INSTALL 450mm x 2.284m RCP CONNECT TO RCB AT "QD" 25+58.750, 4.457m LT. (SEE SHEET SD-16 & SD-20)
⑫	"QD" 25+44.62± 4.610m RT.	CONNECT EXISTING 450mm RCP TO RCB CONNECT TO RCB AT "QD" 25+44.62, 4.610m RT. (SEE SHEET SD-9 & SD-20)
⑬	"QD" 25+57.500 TO "QD" 25+51.500	CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-9, B-607 & B-608)
⑭	"QD" 25+55.000 4.010m LT.	CONSTRUCT TYPE 1 MODIFIED MH, H=0.919m CONNECT TO RCB (SEE SHEET SD-9, B-607, & B-608)
⑮	"QD" 25+60.000 TO "QD" 25+57.500	INSTALL TRANSITION STRUCTURE (SEE SHEET SD-9, & B-609)
⑯	"QD" 26+20.000 TO "QD" 25+60.000	INSTALL DUAL 3900mm x 2100mm x 60.000m RCB (SEE SHEET SD-9)
⑰	"QD" 26+53.000 TO "QD" 26+20.000	CONSTRUCT TRANSITION STRUCTURE (SEE SHEET SD-9, B-605 & B-606)
⑱	"Q" 32+70.000 1.800m LT.	CONSTRUCT TYPE 1 MH, H=1.800m BURY RIM UNDER EXISTING A.C. INSTALL 450mm x 21.996m RCP CONNECT TO RCB AT "QD" 26+03.550, 4.305m RT. (SEE SHEET SD-15 & SD-21)
⑲	"Q" 32+75.000 39.900m RT.	CONSTRUCT TYPE 2A D.I., H=0.950m CONSTRUCT CONCRETE APRON INSTALL 450mm x 41.103m RCP (SEE SHEET SD-15 & SD-20)
⑳	"Q" 29+84.884 21.043m RT.	CONSTRUCT TYPE 2A D.I. HEIGHT TO MATCH EXISTING RCP MATCH EXISTING RCP ON BOTH ENDS
㉑	"Q" 32+71.427 10.107m RT.	CONSTRUCT TYPE 3 PIPE RISER D.I., H=1.337m (SEE SHEET SD-15)
㉒	"Q" 31+09.553 39.763 LT.	CONSTRUCT TYPE 2A D.I., H=1.308m CONSTRUCT CONCRETE APRON CONNECT TO RCB (SEE SHEET SD-9, SD-20, & B-610)
㉓	"Q" 31+24.500 38.500 LT.	CONSTRUCT TYPE 2A D.I., H=1.163m CONSTRUCT CONCRETE APRON CONNECT TO RCB (SEE SHEET SD-9, SD-20, & B-610)
㉔	"QD" 25+18.500 4.610m LT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 634.200 (SEE SHEET SD-9, SD-21 & B-609)
㉕	"QD" 24+40.000 4.610m RT.	INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 633.822 (SEE SHEET SD-9, SD-21 & B-609)

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PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
CONSULTING ENGINEERS
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DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-5

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

LV SPRINGS PRESERVE

T20S R61E SEC 30

PI 26+78.620

76.764m S86° 37'30"W

PT 10+09.312

PC 10+00.129

PT 10+00.000

PC 9+77.711

9+50.672

R/W

PC 28+81.494

"ML"

"QD"

GRADE TO DRAIN

22.114m N87° 49'41"W

202.874m S86° 37'30"W

M.H.

U.S. 95

"Q"

PT 29+81.989

24.959m N35° 47'43"W

PC 30+06.949

Matchline "Q" STA 33+20 See Sheet SD-4

Matchline "Q" STA 36+80 See Sheet SD-6

AUSTIN AVE

C/A

R/W

GRADE TO DRAIN

WILDROSE ST.

ORCHID DR.

POMEGRANATE CIR.

Curve Table

Curve #	Radius	Delta	Length	Tangent
①	50.217m	25° 25'51"	22.289m	11.331m
②	100.000m	57° 34'47"	100.495m	54.952m
③	100.000m	8° 43'41"	15.228m	7.629m

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
ENGINEERING ENGINEERS & PLANNERS
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REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-5A
		REVISED 2-9-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① "QD" 26+78.620 TO "QD" 26+53.000 — CONSTRUCT CONFLUENCE STRUCTURE (SEE SHEET SD-9, SD-10, B-605 & B-606)

② "QD" 26+89.250 7.453m LT. — CONSTRUCT ACCESS / VENT GRATE; GRATE EL. 638.950 (SEE SHEET SD-10, B-605 & B-606)

③ "QD" 27+05.000 3.400m LT. — CONSTRUCT TYPE 1 MODIFIED MH, H=2.730m; CONNECT TO RCB (SEE SHEET SD-10)

④ "ML" 10+00.000 "ML" 10+60.075 — INSTALL 4200mm x 2400mm x 60.075m RCB; CONNECT EXISTING RCB (SEE SHEET SD-13)

⑤ "QD" 28+17.000 TO "QD" 26+78.620 — INSTALL DUAL 3600mm x 1800mm x 138.380m RCB (SEE SHEET SD-10)

⑥ "QD" 28+20.000 3.400m LT. — CONSTRUCT TYPE 1 MODIFIED MH, H=2.331m; CONNECT TO RCB (SEE SHEET SD-10, B-607 & B-608)

⑦ "QD" 28+23.000 TO "QD" 28+17.000 — CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-10, B-607 & B-608)

⑧ "QD" 29+37.000 TO "QD" 28+23.000 TO — INSTALL DUAL 3600mm x 1800mm x 114.000m RCB (SEE SHEET SD-10)

⑨ "QD" 29+29.504 13.500m LT. — CONSTRUCT TYPE 1 HEADWALL (SKEW = 45°); INSTALL 3600mm x 1800mm x 14.432m RCB; CONNECT TO RCB AT "QD" 29+19.500, 4.000m LT. (SEE SHEET SD-13 & B-611)

⑩ "QD" 29+33.809 14.463m LT. TO "QD" 29+29.504 13.500m LT. — CONSTRUCT CONCRETE APRON; CONNECT TO EXISTING TRAPEZOIDAL CHANNEL; CONNECT TO RCB HEADWALL (SEE SHEET SD-13 & SD-23)

⑪ "QD" 29+43.000 TO "QD" 29+37.000 — CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-10, B-607 & B-608)

⑫ "QD" 29+40.000 3.400m LT. — CONSTRUCT TYPE 1 MODIFIED MH, H=3.521m; CONNECT TO RCB (SEE SHEET SD-10, B-607 & B-608)

⑬ "QD" 30+22.731 TO "QD" 29+43.000 — INSTALL DUAL 3600mm x 1800mm x 79.731m RCB (SEE SHEET SD-10)

⑭ "Q" 36+38.500 0.835m LT. — CONSTRUCT TYPE 2 D.I. H=2.079m; CONNECT TO RCB (SEE SHEET SD-10 & B-610)

⑮ "Q" 33+47.000 1.500m LT. — CONSTRUCT TYPE MODIFIED 1 MH, H=1.800m; BURY RIM UNDER EXISTING A.C.; INSTALL 600mm x 22.338m RCP; CONNECT TO RCB AT "QD" 26+82.500, 4.000m RT. (SEE SHEET SD-17 & SD-21)

⑯ "Q" 33+51.000 32.788m RT. — CONSTRUCT SPECIAL D.I. 2, H=1.600m; INSTALL 375mm x 6.100m SLOTTED DRAIN BACK; INSTALL 450mm x 32.821m RCP (SEE SHEET SD-17 & B-613)

⑰ "Q" 34+00.000 32.210m RT. — CONSTRUCT SPECIAL D.I. 2, H=1.200m; INSTALL 375mm x 6.100m SLOTTED DRAIN BACK; INSTALL 450mm x 47.614m RCP (SEE SHEET SD-17 & B-613)

⑱ "Q" 34+45.000 32.210m RT. — CONSTRUCT SPECIAL D.I. 2, H=1.200m; INSTALL 375mm x 1.500m SLOTTED DRAIN BACK; INSTALL 450mm x 13.088m RCP (SEE SHEET SD-17 & B-613)

⑲ "Q" 34+60.000 32.210m RT. — CONSTRUCT SPECIAL D.I. 2, H=1.300m; INSTALL 450mm x 5.607m RCP (SEE SHEET SD-17 & B-613)

⑳ "Q" 34+67.255 32.210m RT. — CONSTRUCT SPECIAL D.I. 2, H=1.450m; INSTALL 375mm x 1.500m SLOTTED DRAIN AHEAD; INSTALL 450mm x 32.014m RCP (SEE SHEET SD-17 & B-613)

㉑ "Q" 34+68.000 1.500m LT. — CONSTRUCT TYPE 1 MH, H=2.750m; BURY RIM UNDER EXISTING A.C.; INSTALL 600mm x 26.693m RCP; CONNECT TO RCB AT "QD" 28+00.000, 4.000m RT. (SEE SHEET SD-17 & SD-21)

㉒ "Q" 36+40.000 32.245m RT. — CONSTRUCT TYPE 2 D.I., H=1.600m; INSTALL 375mm X 4.600m SLOTTED DRAIN AHEAD; INSTALL 450mm X 28.065m RCP; CONNECT TO RCB AT "QD" 29+99.500, 4.000m RT. (SEE SHEET SD-18)

㉓ "Q" 36+40.000 39.460m RT. — CONSTRUCT TYPE 2A D.I., H=1.400m; INSTALL 450mm x 6.614m RCP (SEE SHEET SD-18)

㉔ "Q" 34+24.000 40.593m LT. — CONSTRUCT TYPE 2A D.I., H=1.400m; CONSTRUCT CONCRETE APRON; CONNECT TO RCB AT "QD" 27+60.000, 4.000m LT.; INSTALL 450mm x 5.686m RCP (SEE SHEET SD-19 & SD-20)

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DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
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2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PLAN

VTN nevada
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-6
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

① "QD" 30+54.000 TO "QD" 30+22.731 — INSTALL DUAL 3600mm x 1800mm x 31.269m RCB (SEE SHEET SD-10 & SD-11)

② "QD" 30+57.000 3.400m RT. — CONSTRUCT TYPE 1 MODIFIED MH, H=1.060m CONNECT TO RCB (SEE SHEET SD-11, B-607 & B-608)

③ "QD" 30+60.000 TO "QD" 30+54.000 — CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-11, B-607 & B-608)

④ "Q" 37+09.990 0.608m RT. — INSTALL 450mm x 27.060m RCP CONNECT TO RCB AT "QD" 30+73.000, 4.610m LT. INSTALL PLYWOOD CAP (SEE SHEET SD-13)

⑤ "Q" 37+10.000 32.255m RT. — CONSTRUCT TYPE 2 D.I. H=1.263m INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD CONNECT TO RCB (SEE SHEET SD-11 & B-610)

⑥ "QD" 31+77.000 TO "QD" 30+60.000 — INSTALL DUAL 3600mm x 1800mm x 117.000m RCB (SEE SHEET SD-11)

⑦ "QD" 31+83.000 TO "QD" 31+77.000 — CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-11, B-607 & B-608)

⑧ "QD" 31+80.000 3.400m RT. — CONSTRUCT TYPE 1 MH, H=3.005m CONNECT TO RCB (SEE SHEET SD-11, B-607 & B-608)

⑨ "QD" 32+77.000 TO "QD" 31+83.000 — INSTALL DUAL 3600mm x 1800mm x 94.000m RCB (SEE SHEET SD-11)

⑩ "QD" 32+80.000 TO 3.400m RT. — CONSTRUCT TYPE 1 MH, H=1.776m CONNECT TO RCB (SEE SHEET SD-11)

⑪ "QD" 32+83.000 TO "QD" 32+77.000 — CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-11, B-607 & B-608)

⑫ "QD" 33+97.000 TO "QD" 32+83.000 — INSTALL DUAL 3600mm x 1800mm x 114.000m RCB (SEE SHEET SD-11)

⑬ "QD" 34+00.000 3.400m RT. — CONSTRUCT TYPE 1 MH, H=1.709m CONNECT TO RCB (SEE SHEET SD-11)

⑭ "QD" 34+03.000 TO "QD" 33+97.000 — CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-11, B-607 & B-608)

⑮ "QD" 34+03.000 — INSTALL BRICK & MORTAR PLUG (SEE SHEET SD-11)

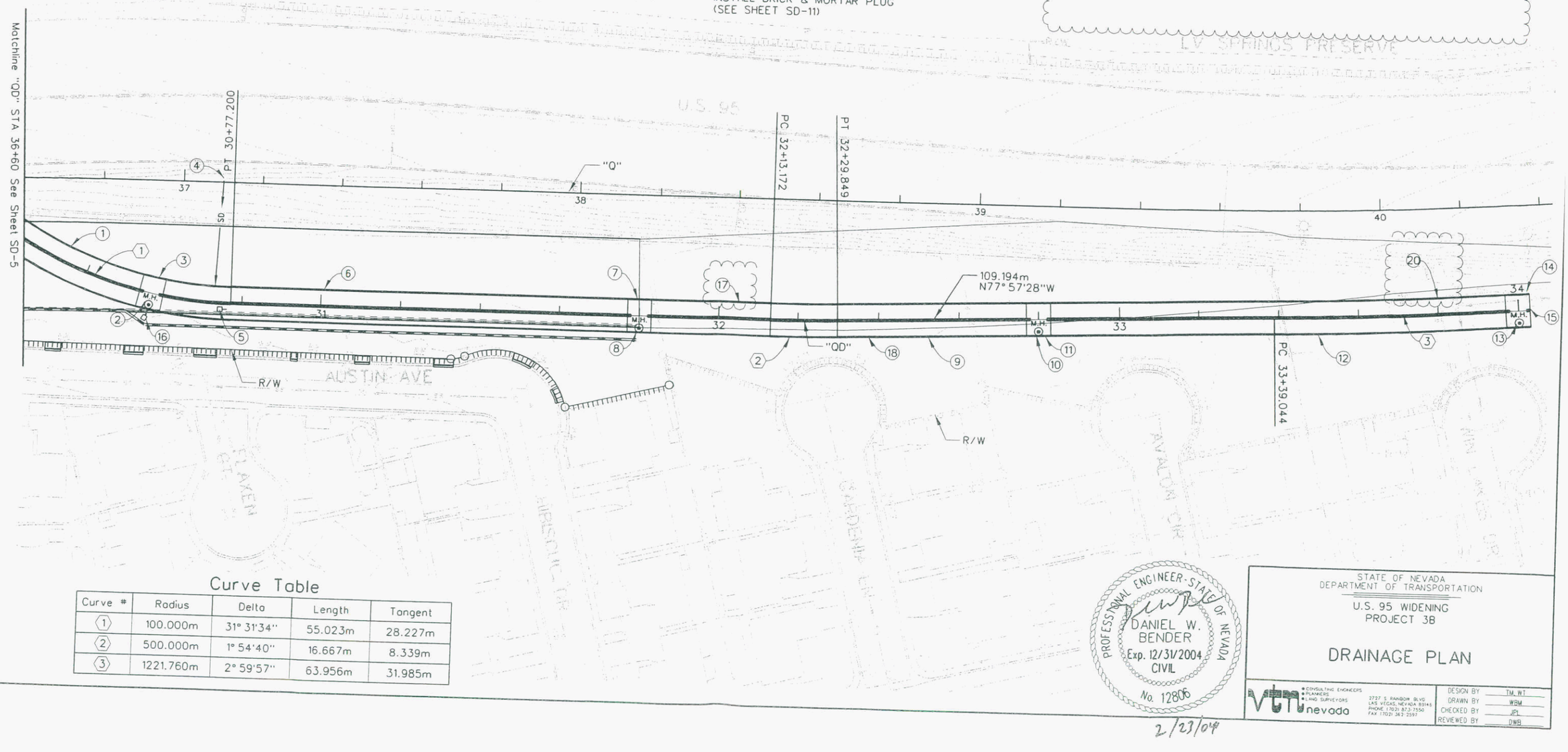
⑯ "QD" 36+91.000 34.760m RT. — CONSTRUCT TYPE 2A D.I., H=1.400m CONNECT TO RCB AT "QD" 30+58.000, 4.610m RT. INSTALL 450mm x 1.924m RCP (SEE SHEET SD-18)

⑰ "QD" 32+05.000 4.000m LT. — INSTALL 750mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 640.250 (SEE SHEET SD-11, SD-21 & B-609)

⑱ "QD" 32+37.445 4.000m RT. — INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 641.200 (SEE SHEET SD-11, SD-21 & B-609)

⑲ NOTE NOT USED

⑳ "QD" 33+80.000 4.000m LT. — INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 644.500 (SEE SHEET SD-11, SD-21 & B-609)



Curve Table

Curve #	Radius	Delta	Length	Tangent
①	100.000m	31° 31'34"	55.023m	28.227m
②	500.000m	1° 54'40"	16.667m	8.339m
③	1221.760m	2° 59'57"	63.956m	31.985m

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STATE OF NEVADA
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U.S. 95 WIDENING
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DRAINAGE PLAN

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-7
		REVISED 2-09-04		

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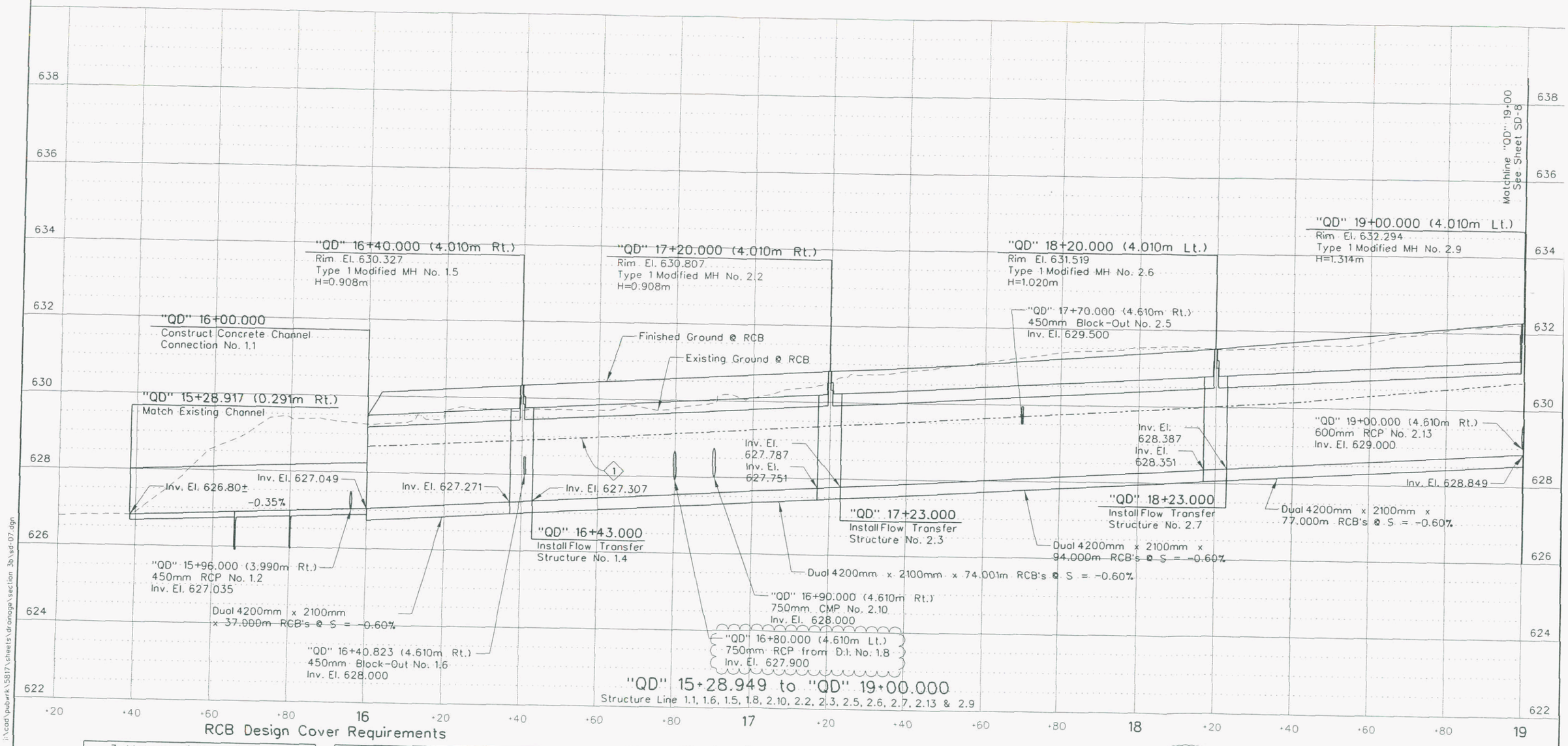

"QD" 15+28.949 to "QD" 19+00.000
Structure Line 1.1, 1.6, 1.5, 1.8, 2.10, 2.2, 2.3, 2.5, 2.6, 2.7, 2.13 & 2.9

RCB Design Cover Requirements

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"QD" 18+30.000	"QD" 19+00.000

3 to 6 Meters of Cover (See Standard Plans)	
To Station	From Station
"QD" 17+50.000	"QD" 18+30.000

Greater Than 6 Meters of Cover (See Sheet B-602)	
From Station	To Station
"QD" 16+00.000	"QD" 17+50.000

100 Year HGL Information

1 Q=75.578 cms (2,669.00 cfs)

NOTES:
1. Existing & Proposed Ground Surfaces are on RCB ℄.
2. Rim Elevations of Manholes Are NOT on RCB ℄.
3. 600mm Minimum Cover Required Over RCB.

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DRAINAGE PROFILE

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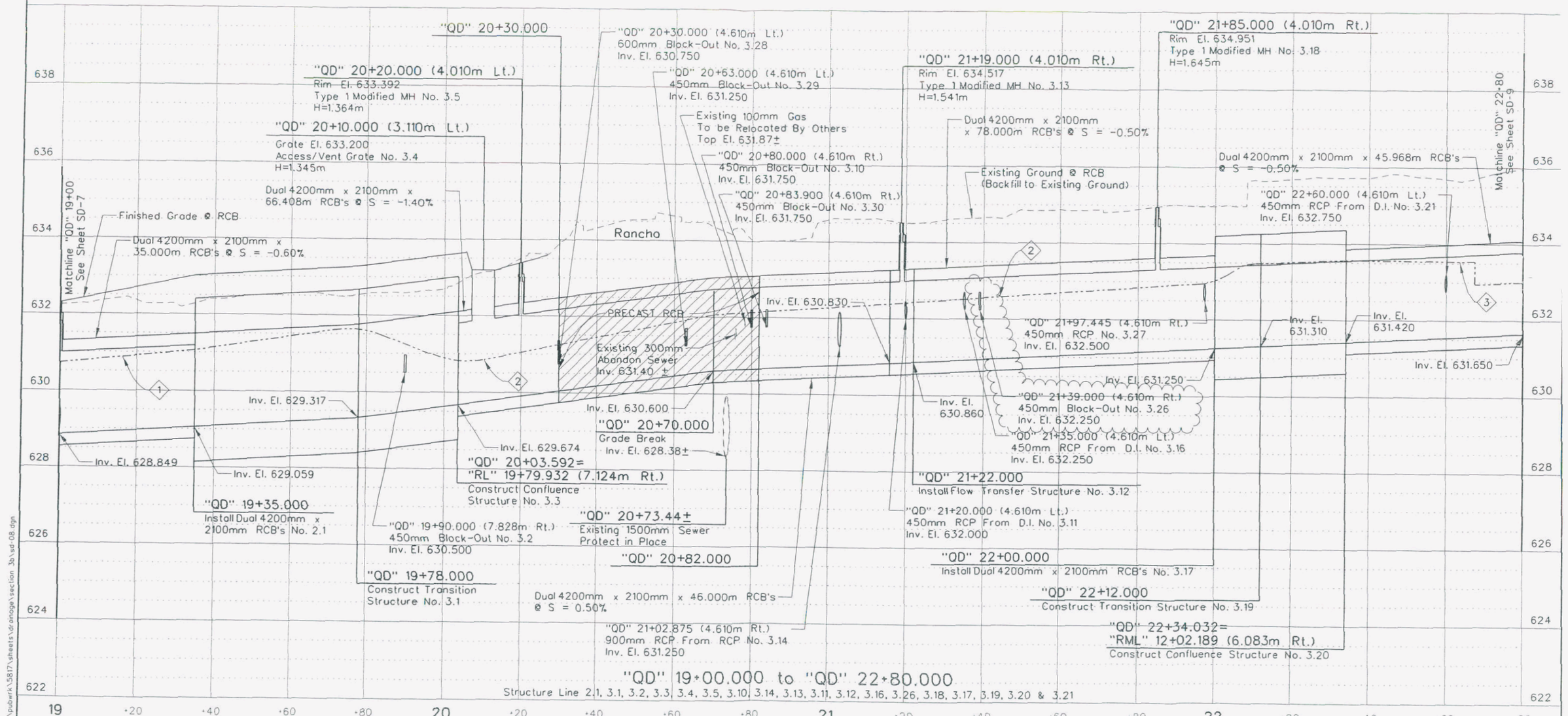
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-8
		REVISED 2-09-04		

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



RCB Design Cover Requirements

3 Meters of Cover or Less (See Standard Plans)	
From Station	To Station
"QD" 19+00.000	"QD" 22+80.000

100 Year HGL Information

1. Q=75.578 cms (2,640.00 cfs)
2. Q=60.740 cms (2,145.00 cfs)
3. Q=56.408 cms (1,992.00 cfs)

NOTES:

1. Existing & Proposed Ground Surfaces are on RCB ℄.
2. Rim Elevations of Manholes Are NOT on RCB ℄.
3. 600mm Minimum Cover Required Over RCB.

PROFESSIONAL ENGINEER-STATE OF NEVADA
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STATE OF NEVADA
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U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

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Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Develpoment Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

JHanson 03/02/04
SNWA DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

METRIC NDOT

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-9
		REVISED 2-09-04		

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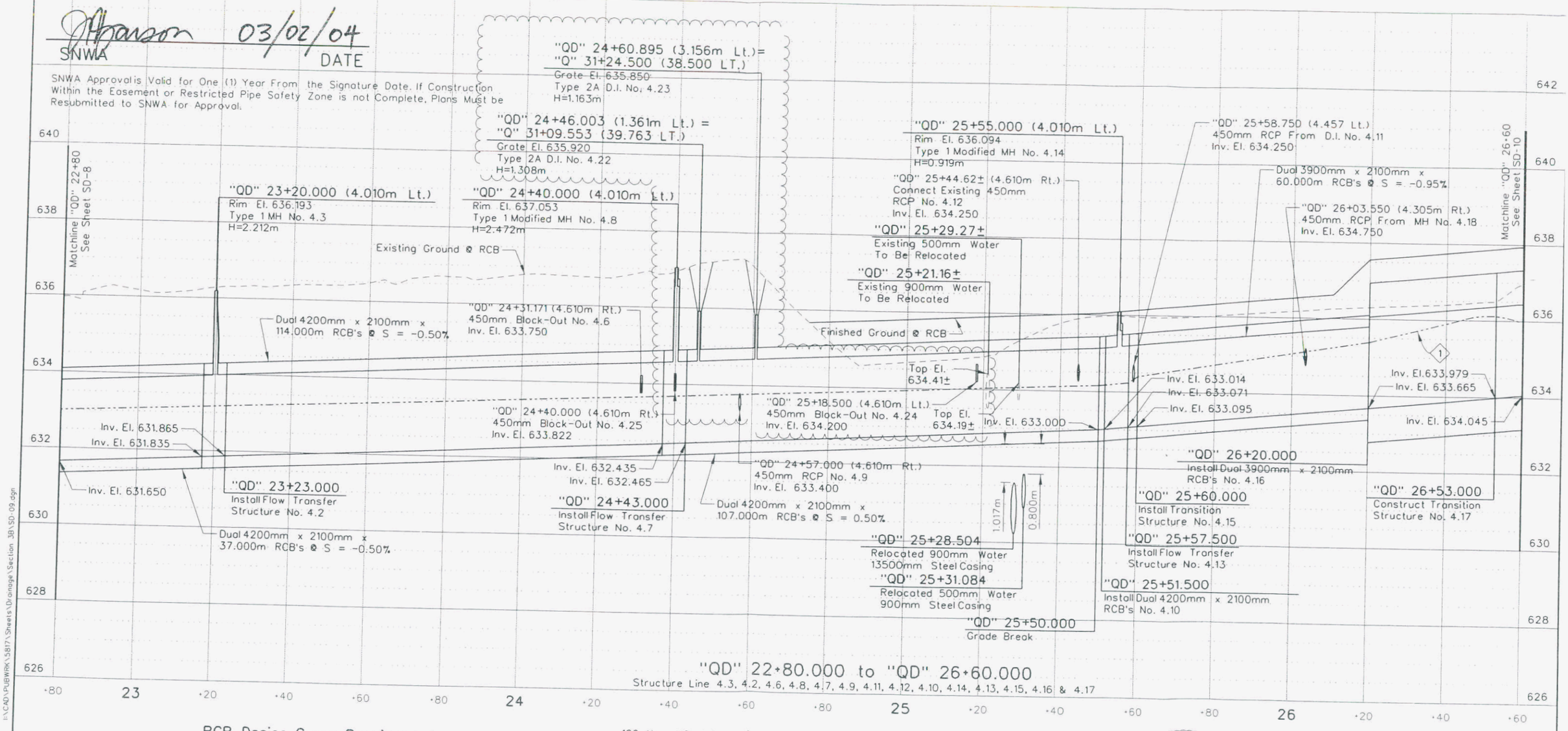

RCB Design Cover Requirements

3 Meters of Cover or Less (See Standard Plans)	
From Station	To Station
"QD" 22+80.000	"QD" 26+60.000

100 Year HGL Information

◇1 Q=56.408 cms (1,992.00 cfs)

NOTES:
1. Existing & Proposed Ground Surfaces are on RCB ℄.
2. Rim Elevations of Manholes Are NOT on RCB ℄.
3. 600mm Minimum Cover Required Over RCB.

PROFESSIONAL ENGINEER STATE OF NEVADA
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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
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DRAINAGE PROFILE

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9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-10

METRIC NDOT

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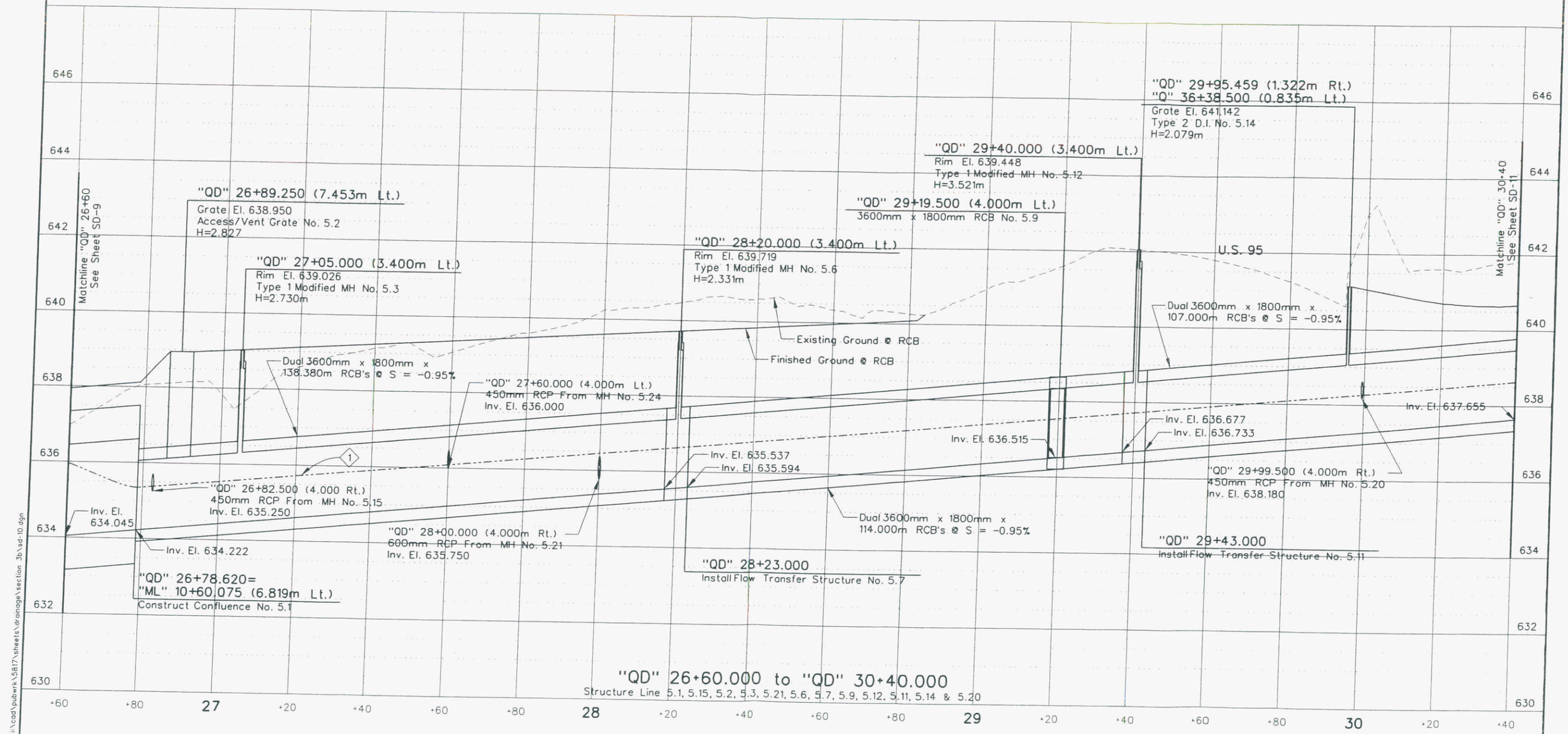

"QD" 26+60.000 to "QD" 30+40.000

Structure Line 5.1, 5.15, 5.2, 5.3, 5.21, 5.6, 5.7, 5.9, 5.12, 5.11, 5.14 & 5.20

RCB Design Cover Requirements

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"QD" 26+60.000	"QD" 27+60.000
"QD" 29+50.000	"QD" 30+40.000

3 to 6 Meters of Cover (See Standard Plans)	
To Station	From Station
"QD" 27+60.000	"QD" 29+50.000

100 Year HGL Information

◇1 Q=47.856 cms (1,690.00 cfs)

NOTES:
1. Existing & Proposed Ground Surfaces are on RCB ℄.
2. Rim Elevations of Manholes Are NOT on RCB ℄.
3. 600mm Minimum Cover Required Over RCB.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
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10/22/03

STATE OF NEVADA
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U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-11
		REVISED 2-09-04		

METRIC NDOT

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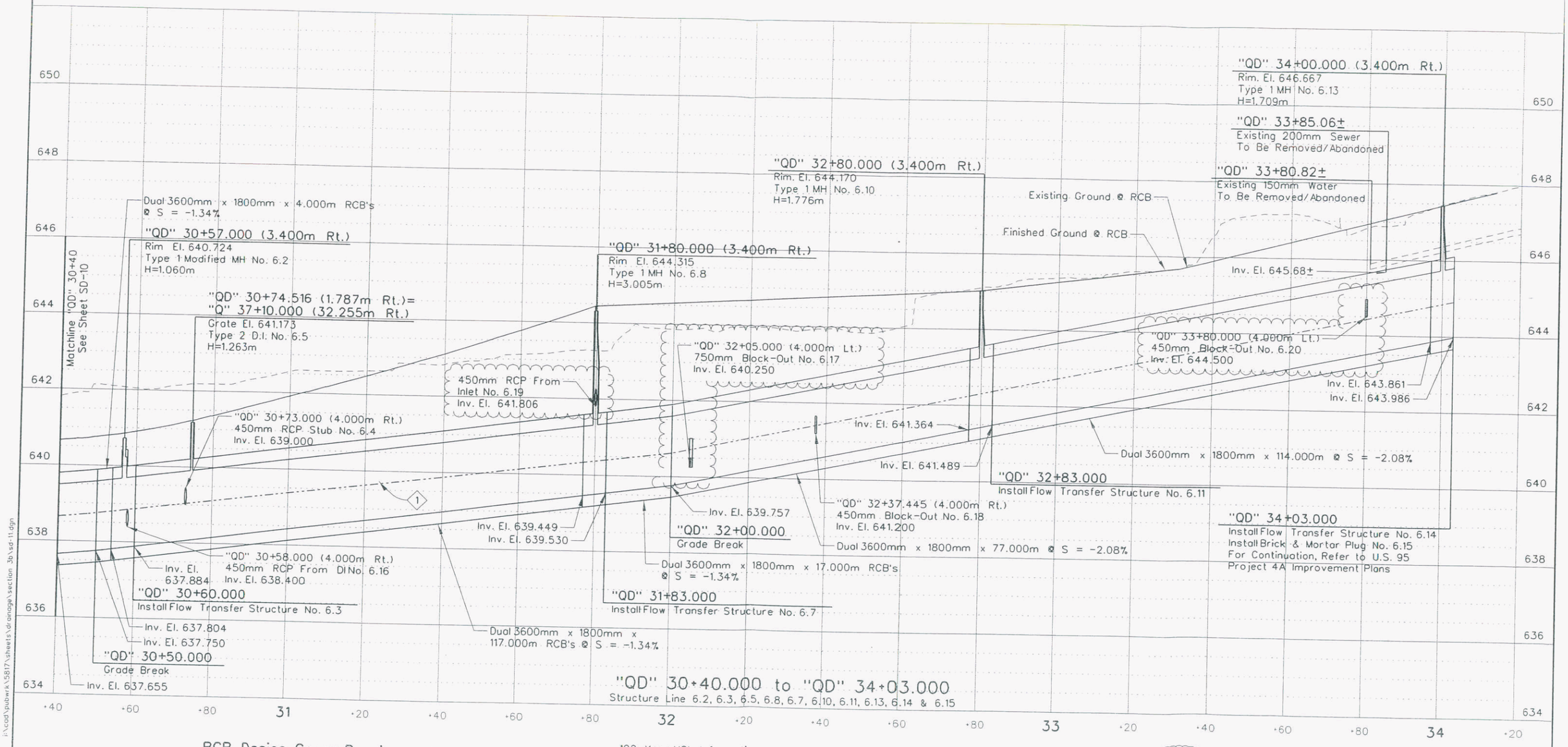

RCB Design Cover Requirements

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"QD" 30+40.000	"QD" 31+80.000

3 to 6 Meters of Cover (See Standard Plans)	
To Station	From Station
"QD" 31+80.000	"QD" 34+03.000

100 Year HGL Information

1 Q=47.856 cms (1,690.00 cfs)

NOTES:
1. Existing & Proposed Ground Surfaces are on RCB ℄.
2. Rim Elevations of Manholes Are NOT on RCB ℄.
3. 600mm Minimum Cover Required Over RCB.

PROFESSIONAL ENGINEER-STATE OF NEVADA
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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

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9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-12

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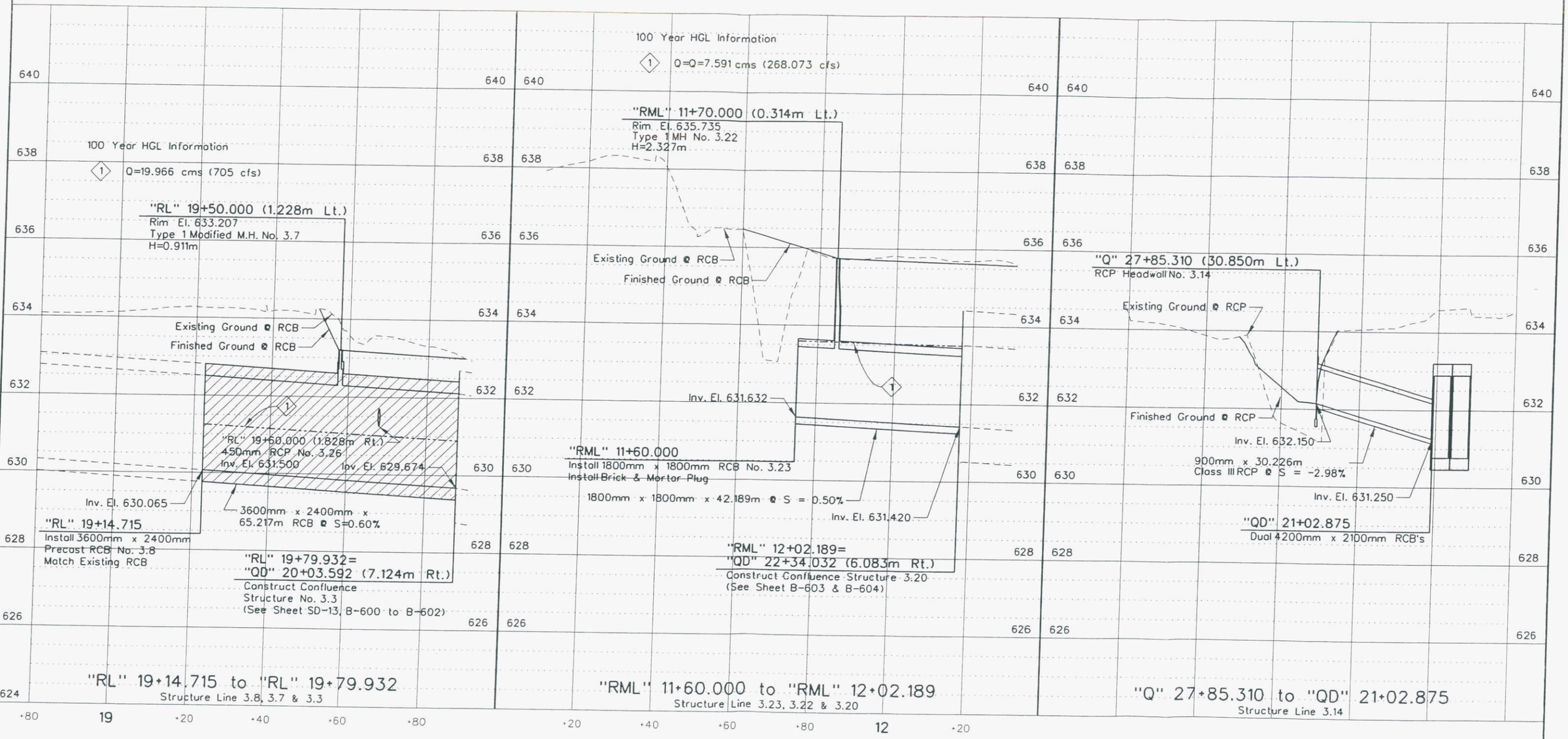

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"RL" 19+14.715	"RL" 19+79.932

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"RML" 11+60.000	"RML" 12+02.189

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STATE OF NEVADA
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U.S. 95 WIDENING
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DRAINAGE PROFILE

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9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-13

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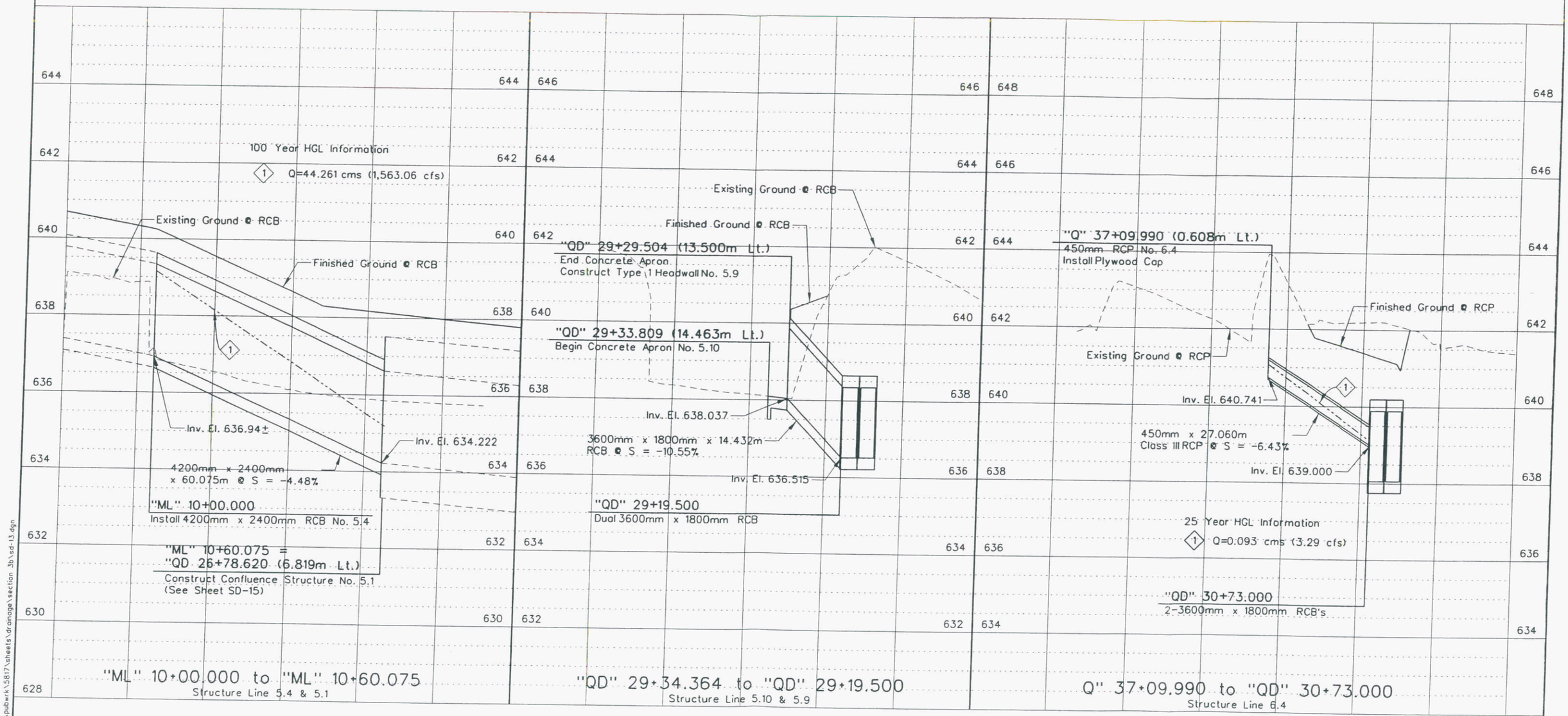

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"ML" 10+00.000	"ML" 10+60.075

3 Meters of Cover or Less (See Standard Plans)	
To Station	From Station
"QD" 29+34.364	"QD" 29+19.500

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STATE OF NEVADA
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U.S. 95 WIDENING
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DRAINAGE PROFILE

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REVIEWED BY	DWB

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Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3800 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr. Metal Pipe (1.6-mm)	450 mm Corr. Metal Pipe (1.6-mm)	750 mm Corr. Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA
		1986.2			98.0		276.2			276.2		149																			
		25.5		10.5	12.2									10.9																	
																			1												
242.9	485.8	1249.7	84.1		383.0	72.9	56.1			737.0		41625																			
43.6	87.2	220.4	15.1		91.4	13.1	10.1			88.5		6968																			
																									136			1			
Quantities included with RCB structure																															
269.5	539.1	1386.6	93.3		424.9	80.9	62.2			817.8		46187																			
		7.5			3.3						1.3	40																			
		2.2									3.1															76					
		43.4		7.4	25.7												15.2														
216.3	432.6	1220.8	74.9	0.0	341.0	64.9	49.9			656.3		37064																			
																									136			1			
43.6	87.2	241.4	15.1		91.4	13.1	10.1			88.5		6968																			
611.9	1223.8	4447.3	211.8	805.8	960.5	183.6	150.3			1158.2		101194																			
Quantities included with RCB structure																															
																									136			1			
43.6	87.2	308.6	15.1		91.4	13.1	10.1			77.8		6535																			
1471.4	2942.9	11139.6	509.4	823.7	2522.8	441.6	625.0	0.0	0.0	3900.2	4.4	246730	0	10.9	0.0	0.0	15.2	0.0	1	0.0	0.0	0.0	0.0	0	408	76	0	3	0.0	0	0

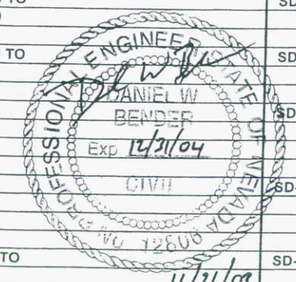
NEVADA DOT

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	27

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

ITEM NUMBER			
UNIT			
DESCRIPTION	STATION TO STATION	DWG.	NOTE
NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
CONSTRUCT CONCRETE CHANNEL CONNECTION MATCH EXISTING CHANNEL (SEE SHEET SD-7 & SD-23)	"QD" 16+00.000 TO "QD" 15+28.917 0.291m RT.	SD-1	1
INSTALL 450mm x 10.852m RCP INSTALL RCP END SECTION CONNECT TO CONCRETE CHANNEL AT "QD" 15+96.000, 3.990m RT. U.I.E. = 628.500 L.I.E. = 627.035	"QD" 16+00.000 15.400m RT.	SD-1	2
INSTALL DUAL 4200mm x 2100mm x 37.000m RCB (SEE SHEET SD-7)	"QD" 16+37.000 TO "QD" 16+00.000	SD-1	3
CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-7, B-607 & B-608)	"QD" 16+43.000 TO "QD" 16+37.000	SD-1	4
CONSTRUCT TYPE 1 MODIFIED MH, H=0.908m CONNECT TO RCB (SEE SHEET SD-7, B-607 & B-608)	"QD" 16+40.000 4.010m RT.	SD-1	5
INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 628.000 (SEE SHEET SD-7, SD-21 & B-609)	"QD" 16+40.823 4.610m RT.	SD-1	6
INSTALL DUAL 4200mm x 2100mm x 41.054m RCB (SEE SHEET SD-7)	"QD" 16+84.054 TO "QD" 16+43.000	SD-1	7
CONSTRUCT TYPE 8 D.I., H=1.050m CONSTRUCT CONCRETE APRON INSTALL 750mm x 15.185m RCP CONNECT TO RCB "QD" 16+80.000, 4.610m LT. (SEE SHEET SD-14 & SD-20)	"Q" 23+59.072 80.843m LT.	SD-1	8
INSTALL DUAL 4200mm x 2100mm x 32.946m RCB (SEE SHEET SD-7)	"QD" 17+17.000 TO "QD" 16+84.054	SD-2A	1
CONSTRUCT TYPE 1 MODIFIED MH, H=0.908m CONNECT TO RCB (SEE SHEET SD-7, B-607 & B-608)	"QD" 17+20.000 4.010m RT.	SD-2A	2
CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-7, B-607 & B-608)	"QD" 17+23.000 TO "QD" 17+17.000	SD-2A	3
INSTALL DUAL 4200mm x 2100mm x 94.000m RCB (SEE SHEET SD-7)	"QD" 18+17.000 TO "QD" 17+23.000	SD-2A	4
INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 629.500 (SEE SHEET SD-7, SD-21 & B-609)	"QD" 17+70.000 4.610m RT.	SD-2A	5
CONSTRUCT TYPE 1 MODIFIED MH, H=1.020m CONNECT TO RCB (SEE SHEET SD-7, B-607 & B-608)	"QD" 18+20.000 4.010m LT.	SD-2A	6
CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-7, B-609, B-607 & B-608)	"QD" 18+23.000 TO "QD" 18+17.000	SD-2A	7
PAGE SUBTOTAL			



Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr, Metal Pipe (1.6-mm)	450 mm Corr, Metal Pipe (1.6-mm)	750 mm Corr, Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA
723.1	1446.2	5473.5	250.3	1526.4	1051.7	216.9	166.9			765.2		110824																			
																									136			1			
Quantities included w/ CMP											0.1	3																			
		0.6			2.5																2.7										
											0.1	3																			
		89.1			165.7																	118.8									
		4.4			3.2						0.7	23														66					
		2.2									2.2																				
		79.9		54.7	19.1																			13.6							
729.7	1459.3	3773.7	164.2		780.3	142.3	109.5	See 3A, note 3 for combined conc. & steel																							
Quantities included with RCB structure																															
432.7	865.4	2237.9	97.4		462.7	84.4	64.9			2040.0		277711																			
													306													1872					
																									136			1			
		3.3			2.5						0.5	18														54					
		2.2									2.2																				
		72.7		39.0	27.3																	24.4								
																									136			1			
216.2	432.4	2511.2	74.8	541.2	794.3	64.9	49.9		65.2																					
2101.7	4203.3	14250.7	586.7	2161.3	3309.3	508.5	391.2	0.0	65.2	2805.2	5.7	388582	306	24.4	0.0	13.6	0.0	0.0	0	0.0	2.7	118.8	0.0	0	408	1992	0	3	0.0	0	0

NEVADA DOT	FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
	9	NEVADA	EB-NH-095-2(042)	CLARK	SD	28

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

ITEM NUMBER			
UNIT			
DESCRIPTION	STATION TO STATION	DWG.	NOTE
INSTALL DUAL 4200mm x 2100mm x 112.000m RCB	"QD" 19+35.000 TO	SD-2A	8
(SEE SHEET SD-7 & SD-8)	"QD" 18+23.000		
CONSTRUCT TYPE 1 MODIFIED MH, H=1.314m	"QD" 19+00.000	SD-2A	9
CONNECT TO RCB	4.010m LT.		
(SEE SHEET SD-7)			
CONSTRUCT 450mm x 750mm CMP TEE	"Q" 23+66.513	SD-2A	10
CONNECT TO 750mm RCP	32.260m LT.		
U.I.E. = 629.32| CONNECT TO EXISTING RCP			
L.I.E. = 628.421 CONNECT TO 750mm CMP			
(SEE SHEET SD-19)			
INSTALL 450mm x 2.690m CMP	"Q" 24+23.931	SD-2A	11
CONSTRUCT 450mm x 750mm CMP TEE	27.679m LT. TO		
U.I.E. = 630.72| CONNECT TO EXISTING RCP	"Q" 24+24.203		
L.I.E. = 629.023 CONNECT TO 750mm CMP	30.355m LT.		
(SEE SHEET SD-19)			
INSTALL 750mm x 118.837m CMP	"Q" 24+59.985	SD-2A	12
CONNECT TO RCB AT "QD" 16+90.000, 4.610m RT.	29.174m LT. TO		
(SEE SHEET SD-19)	"QD" 16+90.000		
	4.610m RT.		
CONSTRUCT TYPE 2A D.I. (D=750), H=0.950m	"Q" 25+82.157	SD-2A	13
CONSTRUCT CONCRETE APRON	62.177m LT.		
INSTALL 600mm x 13.647m RCP			
CONNECT TO RCB AT "QD" 19+00.000, 4.610m RT.			
CONSTRUCT TRANSITION STRUCTURE	"QD" 19+78.000 TO	SD-3A	1
(SEE SHEET SD-8, B-600 TO B-602)	"QD" 19+35.000		
INSTALL 450mm RCP BLOCK-OUT	"QD" 19+90.000	SD-3A	2
BLOCK-OUT INV. EL. 630.500	7.828m RT.		
(SEE SHEET SD-8, SD-21 & B-609)			
CONSTRUCT CONFLUENCE STRUCTURE	"QD" 20+03.592 TO	SD-3A	3
SEE SHEET SD-8, B-600 TO B-602)	"QD" 19+78.000		
CONSTRUCT ACCESS / VENT GRATE	"QD" 20+10.000	SD-3A	4
TOP OF GRATE EL. 633.200	3.110m LT.		
(SEE SHEET SD-8, B-601 & B-602)			
CONSTRUCT TYPE 1 MODIFIED MH, H=1.364m	"QD" 20+20.000	SD-3A	5
CONNECT TO RCB	4.010m LT.		
(SEE SHEET SD-8)			
CONSTRUCT TYPE 2A D.I., H=0.800m	"Q" 26+97.291	SD-3A	6
CONSTRUCT CONCRETE APRON	38.504m LT.		
INSTALL 450mm x 24.376m RCP			
CONNECT TO RCB AT "RL" 19+60.000			
(SEE SHEET SD-18 & SD-20)			
CONSTRUCT TYPE 1 MODIFIED MH, H=0.911m	"RL" 19+50.000	SD-3A	7
CONNECT TO RCB	1.228m LT.		
(SEE SHEET SD-12)			
INSTALL PRECAST 3600mm x 2400mm x 65.217m RCB	"RL" 19+14.715 TO	SD-3A	8
CONNECT TO EXISTING 3600mm x 2400mm RCB	"RL" 19+79.932		
TO BE INSTALLED IN CONTRACT 3167			
(SEE SHEET SD-12)			
PAGE SUBTOTAL			

12/21/04

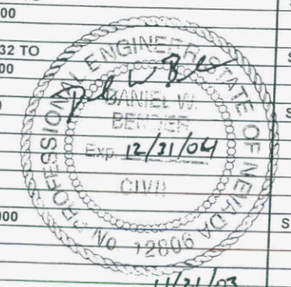
11/21/07

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	29

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr. Metal Pipe (1.6-mm)	450 mm Corr. Metal Pipe (1.6-mm)	750 mm Corr. Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection	ITEM NUMBER	DESCRIPTION	STATION TO STATION	DWG.	NOTE
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626					
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA					
725.5	1451.1	6581.5	251.2	2643.9	1049.8	217.7	167.5			402.9		59502																				UNIT				
								52.0																								INSTALL DUAL 4200mm x 2100mm x 112.408m RCB (W/52.0m PRECAST RCB) (SEE SHEET SD-8)	"QD" 21+16.000 TO "QD" 20+03.592	SD-3A	9
Quantities included w/ RCB Structure																																			
		5.7			4.2						0.9	29																				INSTALL 450mm RCP BLOCK-OUT BLOCK-OUT INV. EL. 631.750 (SEE SHEET SD-8, SD-21 & B-609)	"QD" 20+80.000 4.610m RT.	SD-3A	10
		2.2									2.2															54								
		20.5		15.3	4.2									3.8																		CONSTRUCT TYPE 2A D.I., H=1.400m CONSTRUCT CONCRETE APRON INSTALL 450mm x 3.783m RCP CONNECT TO RCB AT "QD" 21+20.000, 4.610m LT. (SEE SHEET SD-14 & SD-20)	"Q" 27+92.425 70.391m LT.	SD-3A	11
43.6	87.2	357.0	15.1		91.4	13.1	10.1			56.1		6225																							
																									136		1					CONSTRUCT FLOW TRANSFER STRUCTURE (SEE SHEET SD-8, B-609, B-607 & B-608)	"QD" 21+22.000 TO "QD" 21+16.000	SD-3A	12
		4.5			3.2						1.7	40																				CONSTRUCT TYPE 1 MODIFIED MH, H=1.541m CONNECT TO RCB (SEE SHEET SD-8, B-607 & B-608)	"QD" 21+19.000 4.010m RT.	SD-3A	13
		263.5		173.0	61.6																				30.2							INSTALL RCP HEADWALL (SKEW=45^) INSTALL 900mm x 30.226m RCP CONNECT TO RCB AT "QD" 21+02.875, 4.610m RT. (SEE SHEET SD-12)	"Q" 27+85.310 30.850m LT.	SD-3A	14
		3.0			4.8																6.7											INSTALL 300mm x 6.659m CMP U.I.E. = 633.45|, MATCH EXISTING D.I. L.I.E. = 632.500	"Q" 27+83.576 23.779 LT. TO "Q" 27+85.673 29.004 LT.	SD-3A	15
		9.5			4.5						5.3	209								1														
		38.9		25.2	11.1									9.8												239						CONSTRUCT 1.500m SPECIAL D.I., H=1.400m INSTALL 450mm x 9.802m RCP CONNECT TO RCB AT "QD" 21+35.000, 4.610m LT. (SEE SHEET SD-14 & B-612)	"Q" 28+09.935 74.165m LT.	SD-3A	16
503.5	1006.9	4725.0	174.3	1992.8	728.4	151.0	116.2			520.3		76830																				INSTALL DUAL 4200mm x 2100mm x 78.000m RCB (SEE SHEET SD-8)	"QD" 22+00.000 TO "QD" 21+22.000	SD-3A	17
																									136		1					CONSTRUCT TYPE 1 MODIFIED MH, H=1.645m CONNECT TO RCB (SEE SHEET SD-8 & SD-23)	"QD" 21+85.000 4.010m RT.	SD-3A	18
177.8	355.5	800.2	40.0		207.4	34.7	26.7			See 3A, note 20 for combined conc. & steel																								
325.9	651.8	1467.0	73.3		380.2	63.5	48.9			827.0		140387																				CONSTRUCT TRANSITION STRUCTURE (SEE SHEET SD-8, B-603 & B-604)	"QD" 22+12.000 TO "QD" 22+00.000	SD-3A	19
		5.7			4.2						0.9	29																				CONSTRUCT CONFLUENCE STRUCTURE (SEE SHEET SD-8, SD-12 & B-603 & B-604)	"QD" 22+34.032 TO "QD" 22+12.000	SD-3A	20
		2.2									2.2														60									
		31.3		24.3	5.6									4.1																		CONSTRUCT TYPE 2A D.I. (D=600), H=1.400m CONSTRUCT CONCRETE APRON INSTALL 450mm x 4.088m RCP CONNECT TO RCB AT "QD" 22+60.000, 4.610m LT. (SEE SHEET SD-15 & SD-20)	"Q" 29+27.000 65.217m LT.	SD-3A	21
																									136		1					CONSTRUCT TYPE 1 MH, H=2.327m CONNECT TO RCB (SEE SHEET SD-12 & SD-22)	"RML" 11+70.000 0.314m RT.	SD-3A	22
1050.7	2101.4	7736.2	302.7	2230.6	1510.8	262.3	201.8	52.0	0.0	1403.4	13.3	223749	0	17.7	0.0	0.0	0.0	30.2	1	6.7	0.0	0.0	0.0	0	408	353	1	2	0.0	0	0		PAGE SUBTOTAL			



Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr. Metal Pipe (1.6-mm)	450 mm Corr. Metal Pipe (1.6-mm)	750 mm Corr. Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA
83.9	167.8	1501.2	29.0	1038.3	244.4	25.2	19.4			62.4		7763												1							
526.2	1052.4	4938.6	182.1	2082.9	761.4	157.9	121.4			543.8		80303																			
		4.3		0.5	3.3									21.0							3.5										
											0.1	3																			
Included w/ RCB Structure																															
		69.1		25.3	37.9						0.1	3		22.6																	
4.3	8.7	42.0	1.5	18.5	6.3	1.3	1.0			4.5		661																			
43.6	87.2	490.7	15.1	110.5	91.4	13.1	10.1			56.1		6225																			
																								136		1					
Included w/ CMP Quantities																															
		105.6		18.1	66.3																47.3										
735.8	1471.6	8113.1	254.7	4119.8	1064.6	220.7	169.8			760.4		112290																			
Quantities included with RCB structure																															
43.6	87.2	490.7	15.1	110.5	91.4	13.1	10.1			56.1		6225																			
																								136		1					
		3.6		2.6						0.6	20																				
		2.2								2.2															60						
		17.9		11.2	5.4								4.8																		
700.3	1400.6	5100.7	242.4	1300.1	1013.3	210.1	161.6			723.7		106873																			
2137.7	4275.5	20879.7	740.0	8835.8	3388.3	641.4	493.3	0.0	0.0	2207.0	3.0	320365	0	48.4	0.0	0.0	0.0	0.0	0	0.0	3.5	47.3	0.0	1	272	60	1	1	0.0	0	0

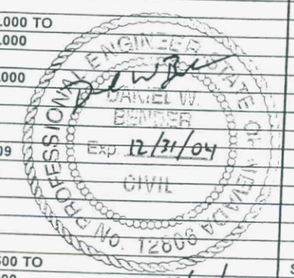
NEVADA DOT

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	30

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

ITEM NUMBER			
UNIT			
DESCRIPTION	STATION TO STATION	DWG.	NOTE
BRICK AND MORTAR PLUG	"RML" 12+02.189		
INSTALL 1800mm x 1800mm x 42.189m RCB	"RML" 11+60.000 TO	SD-3A	23
(SEE SHEET SD-12)			
INSTALL DUAL 4200mm x 2100mm x 81.526m RCB	"QD" 23+15.558 TO		
(SEE SHEET SD-8 & SD-9)	"QD" 22+34.032	SD-3A	24
INSTALL 450mm x 3.478m CMP	"Q" 29+51.588		
CONSTRUCT 450mm x 750mm CMP TEE	27.395m LT. TO	SD-3A	25
U.I.E. = 634.48| CONNECT TO EXISTING RCP	"Q" 29+51.194		
L.I.E. = 633.012 CONNECT TO 750mm CMP	30.850m RT.		
(SEE SHEET SD-19)			
INSTALL 450mm RCP BLOCK-OUT	"QD" 21+49.000		
BLOCK-OUT INV. EL. 632.250	4.610m RT.	SD-3A	26
(SEE SHEET SD-8, SD-21 & B-609)			
INSTALL 450mm x 22.569m RCP	"QD" 22+03.10|		
U.I.E. = 633.58| CONNECT TO EXISTING RCP	28.65m RT.| TO	SD-3A	27
L.I.E. = 632.500 CONNECT TO RCB	"QD" 21+97.445		
(SEE SHEET SD-8 & SD-21)	4.610m RT.		
INSTALL DUAL 4200mm x 2100mm x 0.671m RCB	"QD" 23+17.000 TO		
(SEE SHEET SD-9)	"QD" 23+15.558	SD-4A	1
CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 23+23.000 TO		
(SEE SHEET SD-9, B-607 & B-608)	"QD" 23+17.000	SD-4A	2
CONSTRUCT TYPE 1 MH, H=2.212m	"QD" 23+20.000		
CONNECT TO RCB	4.010m LT.	SD-4A	3
(SEE SHEET SD-9, B-607 & B-608)			
INSTALL 750mm CMP ELBOW	"Q" 29+82.313		
INSTALL 750mm x 47.252m CMP	30.484m LT. TO	SD-4A	4
CONNECT TO RCB AT "RML" 11+60.000	"RML" 11+60.000		
(SEE SHEET SD-19)			
INSTALL DUAL 4200mm x 2100mm x 114.000m RCB	"QD" 24+37.000 TO		
(SEE SHEET SD-9)	"QD" 23+23.000	SD-4A	5
INSTALL 450mm RCP BLOCK-OUT	"QD" 24+31.171		
BLOCK-OUT INV. EL. 633.750	4.610m RT.	SD-4A	6
(SEE SHEET SD-9, SD-21 & B-609)			
CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 24+43.000 TO		
(SEE SHEET SD-9, B-607 & B-608)	"QD" 24+37.000	SD-4A	7
CONSTRUCT TYPE 1 MODIFIED MH, H=2.472m	"QD" 24+40.000		
CONNECT TO RCB	4.010m LT.	SD-4A	8
(SEE SHEET SD-9, B-607 & B-608)			
CONSTRUCT TYPE 2A D.I., H=0.800	"Q" 31+19.609		
CONSTRUCT CONCRETE APRON	26.621m LT.	SD-4A	9
INSTALL 450mm x 4.790m RCP			
CONNECT TO RCB AT "QD" 24+57.000, 4.6910m RT.			
(SEE SHEET SD-16 & SD-20)			
INSTALL DUAL 4200mm x 2100mm x 108.500m RCB	"QD" 25+51.500 TO		
(SEE SHEET SD-9)	"QD" 24+43.000	SD-4A	10
PAGE SUBTOTAL			

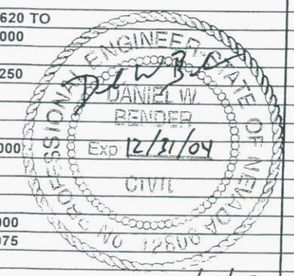


FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	31

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr, Metal Pipe (1.6-mm)	450 mm Corr, Metal Pipe (1.6-mm)	750 mm Corr, Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection	ITEM NUMBER			
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626				
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA	UNIT			
		7.8			5.7						1.4	42														60						DESCRIPTION	STATION TO STATION	DWG.	NOTE
		2.2									2.2																					CONSTRUCT TYPE 2A D.I., H=2.000m	"Q" 32+22.000		11
		9.8		6.6	2.6									2.3																		CONSTRUCT CONCRETE APRON	34.300m LT.		
																																INSTALL 450mm x 2.284m RCP			
																																CONNECT TO RCB AT "QD" 25+58.750, 4.457m LT.			
																																(SEE SHEET SD-16 & SD-20)			
No Direct Payment																																			
																																CONNECT EXISTING 450mm RCP TO RCB	"QD" 25+44.62	SD-4A	12
																																CONNECT TO RCB AT "QD" 25+44.62, 4.610m RT.	4.610m RT.		
																																(SEE SHEET SD-9 & SD-20)			
43.6	87.2	296.9	15.1		91.4	13.1	10.1			56.1		6225																				CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 25+57.500 TO	SD-4A	13
																																(SEE SHEET SD-9, B-607 & B-608)	"QD" 25+51.500		
																									136		1					CONSTRUCT TYPE 1 MODIFIED MH, H=0.919m	"QD" 25+55.000	SD-4A	14
																																CONNECT TO RCB	4.010m LT.		
																																(SEE SHEET SD-9, B-607, & B-608)			
25.4	50.9	124.4	5.7	38.1	19.9	5.0	3.8			16.7		2463																				INSTALL TRANSITION STRUCTURE	"QD" 25+60.000 TO	SD-4A	15
																																(SEE SHEET SD-9, & B-609)	"QD" 25+57.500		
363.9	727.7	2381.9	126.0	392.8	549.5	109.2	84.0			400.2		59100																				INSTALL DUAL 3900mm x 2100mm x 60.000m RCB	"QD" 26+20.000 TO	SD-4A	16
																																(SEE SHEET SD-9)	"QD" 25+60.000		
538.2	1076.4	2805.7	121.1		595.5	104.9	80.7			See 5A, note 1 for combined conc. & steel																						CONSTRUCT TRANSITION STRUCTURE	"QD" 26+53.000 TO	SD-4A	17
																																(SEE SHEET SD-9, B-605 & B-606)	"QD" 26+20.000		
																									136		1					CONSTRUCT TYPE 1 MH, H=1.800m	"Q" 32+70.000	SD-4A	18
		85.6		55.1	24.7									22.0																		BURY RIM UNDER EXISTING A.C.	1.800m LT.		
																																INSTALL 450mm x 21.996m RCP			
																																CONNECT TO RCB AT "QD" 26+03.550, 4.305m RT.			
																																(SEE SHEET SD-15 & SD-21)			
		3.8			2.9						0.6	21																				CONSTRUCT TYPE 2A D.I., H=0.950m	"Q" 32+75.000	SD-4A	19
		2.2									2.2															54						CONSTRUCT CONCRETE APRON	39.900m RT.		
		159.9		103.1	46.1									41.1																		INSTALL 450mm x 41.103m RCP			
																																(SEE SHEET SD-15 & SD-20)			
		4.0			3.0						0.7	23																				CONSTRUCT TYPE 2A D.I.	"Q" 29+84.884	SD-4A	20
																									54							HEIGHT TO MATCH EXISTING RCP	21.043m RT.		
											0.3	10																				MATCH EXISTING RCP ON BOTH ENDS			
																									77							CONSTRUCT TYPE 3 PIPE RISER D.I., H=1.337m	"Q" 32+71.427	SD-4A	21
415.9	831.8	2168.1	93.6	0.0	460.2	81.1	62.4			1653.0		362101																						(SEE SHEET SD-15)	10.107m RT.		
																																CONSTRUCT CONFLUENCE STRUCTURE	"QD" 26+78.620 TO	SD-5A	1
													306																			(SEE SHEET SD-9, SD-10, B-605 & B-606)	"QD" 26+53.000		
																										1872						CONSTRUCT ACCESS / VENT GRATE	"QD" 26+89.250	SD-5A	2
																																GRATE EL. 638.950	7.453m LT.		
																																(SEE SHEET SD-10, B-605 & B-606)			
																									136		1					CONSTRUCT TYPE 1 MODIFIED MH, H=2.730m	"QD" 27+05.000	SD-5A	3
																																CONNECT TO RCB	3.400m LT.		
219.9	439.8	1589.5	76.1	191.1	526.2	66.0	50.7			212.8		40501																				(SEE SHEET SD-10)			
																																INSTALL 4200mm x 2400mm x 60.075m RCB	"ML" 10+00.000	SD-5A	4
																																CONNECT EXISTING RCB	"ML" 10+60.075		
784.3	1568.6	3614.3	271.5	4851.1	1129.6	97.0	181.0			820.1		117014																						(SEE SHEET SD-13)			
																																INSTALL DUAL 3600mm x 1800mm x 138.380m RCB	"QD" 28+17.000 TO	SD-5A	5
2391.2	4782.4	13256.1	709.0	5637.9	3457.4	476.3	472.7	0.0	0.0	3158.9	7.3	587500	306	65.4	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	539	1986	1	2	0.0	0	0	(SEE SHEET SD-10)	"QD" 26+78.620		
																																PAGE SUBTOTAL			

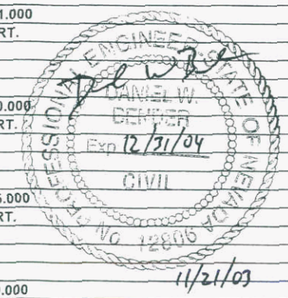


FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	32

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr. Metal Pipe (1.6-mm)	450 mm Corr. Metal Pipe (1.6-mm)	750 mm Corr. Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection	ITEM NUMBER			
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626				
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA	UNIT			
																																DESCRIPTION	STATION TO STATION	DWG.	NOTE
																									136			1				CONSTRUCT TYPE 1 MODIFIED MH, H=2.331m	"QD" 28+20.000	SD-5A	6
																																CONNECT TO RCB	3.400m LT.		
																																(SEE SHEET SD-10, B-607 & B-608)			
38.9	77.9	554.6	13.5	326.0	60.5	11.7	9.0			77.8		6535																				CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 28+23.000 TO	SD-5A	7
																																(SEE SHEET SD-10, B-607 & B-608)	"QD" 28+17.000		
646.9	1293.8	8435.9	223.9	5031.3	979.1	194.1	149.3			808.3		102486																				INSTALL DUAL 3600mm x 1800mm x 114.000m RCB	"QD" 29+37.000 TO	SD-5A	8
																																(SEE SHEET SD-10)	"QD" 28+23.000 TO		
		2.0			7.8					11.3		782																				CONSTRUCT TYPE 1 HEADWALL (SKEW = 45^)	"QD" 29+29.504	SD-5A	9
81.7	163.4	224.9	28.3	0.0	113.5	24.5	18.9			73.7		11661																				INSTALL 3600mm x 1800mm x 14.432m RCB	13.500m LT.		
																																CONNECT TO RCB AT "QD" 29+19.500, 4.000m LT.			
																																(SEE SHEET SD-13 & B-611)			
		2.2									2.2	347																				CONSTRUCT CONCRETE APRON	"QD" 29+33.809	SD-5A	10
																																CONNECT TO EXISTING TRAPEZOIDAL CHANNEL	14.463m LT. TO		
																																CONNECT TO RCB HEADWALL	"QD" 29+29.504		
																																(SEE SHEET SD-13 & SD-23)	13.500m LT.		
1.0	77.9	482.8	13.5	254.2	60.5	11.7	9.0			77.8		6535																				CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 29+43.000 TO	SD-5A	11
																																(SEE SHEET SD-10, B-607 & B-608)	"QD" 29+37.000		
																									136			1				CONSTRUCT TYPE 1 MODIFIED MH, H=3.521m	"QD" 29+40.000	SD-5A	12
																																CONNECT TO RCB	3.400m LT.		
																																(SEE SHEET SD-10, B-607 & B-608)			
451.3	902.6	5210.9	156.2	3023.6	631.8	135.4	104.1			421.1		65035																				INSTALL DUAL 3600mm x 1800mm x 79.731m RCB	"QD" 30+22.731 TO	SD-5A	13
																																(SEE SHEET SD-10)	"QD" 29+43.000		
		7.4			5.6						1.2	42														110						CONSTRUCT TYPE 2 D.I. H=2.079m	"Q" 36+38.500	SD-5A	14
																																CONNECT TO RCB	0.835m LT.		
																																(SEE SHEET SD-10 & B-610)			
																									136			1				CONSTRUCT TYPE MODIFIED 1 MH, H=1.800m	"Q" 33+47.000	SD-5A	15
		95.9		65.0	25.1										22.3																	BURY RIM UNDER EXISTING A.C.	1.500m LT.		
																																INSTALL 450mm x 22.338m RCP			
																																CONNECT TO RCB AT "QD" 26+82.500, 4.000m RT.			
																																(SEE SHEET SD-17 & SD-21)			
		6.6			4.7						0.7	38														171						CONSTRUCT SPECIAL D.I. 2, H=1.600m	"Q" 33+51.000	SD-5A	16
																								6.1								INSTALL 375mm x 6.100m SLOTTED DRAIN BACK	32.788m RT.		
		64.8		19.4	36.8								32.8																			INSTALL 450mm x 32.821m RCP			
																																(SEE SHEET SD-17 & B-613)			
		4.0			3.2						0.5	31														171						CONSTRUCT SPECIAL D.I. 2, H=1.200m	"Q" 34+00.000	SD-5A	17
																								6.1								INSTALL 375mm x 6.100m SLOTTED DRAIN BACK	32.210m RT.		
		57.6		1.7	53.4								47.6																			INSTALL 450mm x 47.614m RCP			
																																(SEE SHEET SD-17 & B-613)			
		4.0			3.2						0.5	31														171						CONSTRUCT SPECIAL D.I. 2, H=1.200m	"Q" 34+45.000	SD-5A	18
																								1.5								INSTALL 375mm x 1.500m SLOTTED DRAIN BACK	32.210m RT.		
		18.6		0.5	14.7								13.1																			INSTALL 450mm x 13.088m RCP			
																																(SEE SHEET SD-17 & B-613)			
		4.6			3.6						0.6	33														171						CONSTRUCT SPECIAL D.I. 2, H=1.300m	"Q" 34+60.000	SD-5A	19
		8.4		0.6	6.3								5.6																			INSTALL 450mm x 5.607m RCP	32.210m RT.		
																																(SEE SHEET SD-17 & B-613)			
1219.8	2515.6	15185.2	435.4	8722.3	2009.7	377.4	290.2	0.0	0.0	1469.9	5.7	193556	0	99.1	22.3	0.0	0.0	0.0	0	0.0	0.0	0.0	13.7	0	408	794	0	3	0.0	0	0	PAGE SUBTOTAL			



Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr, Metal Pipe (1.6-mm)	450 mm Corr, Metal Pipe (1.6-mm)	750 mm Corr, Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA
		5.6			4.1						0.4	27														171					
		106.9		62.6	35.9									32.0									1.5								
																									136		1				
		288.2		239.0	37.4											26.7															
		5.9			4.4						1.0	33														110					
		91.3		53.5	31.5									28.1									4.6								
		5.7			4.2						0.9	29														60					
		10.2		1.1	7.4									6.6																	
		5.7			4.2						0.9	29																			
		2.2									2.2															60					
		15.3		7.4	6.4																		5.7								
182.8	365.5	2043.6	63.3	1152.3	257.4	54.8	42.2			174.8		26528																			
																									136		1				
38.9	77.9	377.2	13.5	148.6	60.5	11.7	9.0			56.1		6225																			
		72.0		34.5	30.3									27.1																	
		4.8			3.6						0.8	26														110					
662.4	1324.8	6707.4	229.3	3523.8	920.0	198.7	152.9			597.9		94536																			
38.9	77.8	352.4	13.5	80.5	71.2	11.7	9.0			77.8		6535																			
																									136		1				
																									136	1					
923.0	1846.0	10094.4	319.5	5303.4	1478.5	276.9	213.0	0.0	0.0	906.5	6.2	133968	0	93.8	5.7	26.7	0.0	0.0	0	0.0	0.0	0.0	6.1	0	544	511	2	2	0.0	0	0

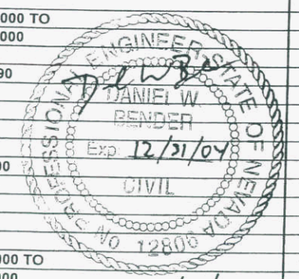
NEVADA DOT

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	33

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

ITEM NUMBER			
UNIT			
DESCRIPTION	STATION TO STATION	DWG.	NOTE
CONSTRUCT SPECIAL D.I. 2, H=1.450m	"Q" 34+67.255	SD-5A	20
INSTALL 375mm x 1.500m SLOTTED DRAIN AHEAD	32.210m RT.		
INSTALL 450mm x 32.014m RCP			
(SEE SHEET SD-17 & B-613)			
CONSTRUCT TYPE 1 MH, H=2.750m	"Q" 34+68.000	SD-5A	21
BURY RIM UNDER EXISTING A.C.	1.500m LT.		
INSTALL 600mm x 26.693m RCP			
CONNECT TO RCB AT "QD" 28+00.000, 4.000m RT.			
(SEE SHEET SD-17 & SD-21)			
CONSTRUCT TYPE 2 D.I., H=1.600m	"Q" 36+40.000	SD-5A	22
INSTALL 375mm X 4.600m SLOTTED DRAIN AHEAD	32.245m RT.		
INSTALL 450mm X 28.065m RCP			
CONNECT TO RCB AT "QD" 29+99.500, 4.000m RT.			
(SEE SHEET SD-18)			
CONSTRUCT TYPE 2A D.I., H=1.400m	"Q" 36+40.000	SD-5A	23
INSTALL 450mm x 6.614m RCP	39.460m RT.		
(SEE SHEET SD-18)			
CONSTRUCT TYPE 2A D.I., H=1.400m	"Q" 34+24.000	SD-5A	24
CONSTRUCT CONCRETE APRON	340.593m LT.		
CONNECT TO RCB AT "QD" 27+60.000, 4.000m LT.			
INSTALL 450mm x 5.686m RCP			
(SEE SHEET SD-19 & SD-20)			
INSTALL DUAL 3600mm x 1800mm x 32.267m RCB	"QD" 30+55.000 TO	SD-6	1
(SEE SHEET SD-10 & SD-11)	"QD" 30+22.731		
CONSTRUCT TYPE 1 MODIFIED MH, H=1.060m	"QD" 30+57.000	SD-6	2
CONNECT TO RCB	3.400m RT.		
(SEE SHEET SD-11, B-607 & B-608)			
CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 30+60.000 TO	SD-6	3
(SEE SHEET SD-11, B-607 & B-608)	"QD" 30+54.000		
INSTALL 450mm x 27.060m RCP	"Q" 37+09.990	SD-6	4
CONNECT TO RCB AT "QD" 30+73.000, 4.610m LT.	0.608m RT.		
INSTALL PLYWOOD CAP			
(SEE SHEET SD-13)			
CONSTRUCT TYPE 2 D.I. H=1.263m	"Q" 37+10.000	SD-6	5
INSTALL 375mm x 6.100m SLOTTED DRAIN AHEAD	32.255m RT.		
CONNECT TO RCB			
(SEE SHEET SD-11 & B-610)			
INSTALL DUAL 3600mm x 1800mm x 117.000m RCB	"QD" 31+77.000 TO	SD-6	6
(SEE SHEET SD-11)	"QD" 30+60.000		
CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 31+83.000 TO	SD-6	7
(SEE SHEET SD-11, B-607 & B-608)	"QD" 31+77.000		
CONSTRUCT TYPE 1 MODIFIED SDMH, H=0.920m	"QD" 31+80.000	SD-6	8
CONNECT TO RCB	3.400m RT.		
(SEE SHEET SD-11, SD-20, B-611 & B-612)			
CONSTRUCT TYPE 1 MH, H=3.005m	"QD" 31+80.000	SD-6	9
CONNECT TO RCB	3.400m RT.		
(SEE SHEET SD-11, B-607 & B-608)			
PAGE SUBTOTAL			



Geogrid	Geotextile	Structure Excavation	Structure Excavation (Special)	Backfill	Granular Backfill	Drain Backfill	Type 1 Class B Aggregate Base	4200 mm x 2100 mm Precast Concrete Box Culvert	3600 mm x 2400 mm Precast Concrete Box Culvert	Class A Concrete, Modified (Major)	Class A Concrete, Modified (Minor)	Reinforcing Steel	Structural Steel	450 mm Reinforced Concrete Pipe, Class III	450 mm Reinforced Concrete Pipe, Class IV	600 mm Reinforced Concrete Pipe, Class III	750 mm Reinforced Concrete Pipe,Class V	900 mm Reinforced Concrete Pipe,Class III	450mm Precast End Section	300 mm Corr. Metal Pipe (1.6-mm)	450 mm Corr. Metal Pipe (1.6-mm)	750 mm Corr. Metal Pipe (1.6-mm)	375-mm Slotted Corr Metal Pipe Drain (1.6-mm)	Brick & Mortar Plug	Castings	Structural Steel Grates	1200-mm Precast Reinforced Concrete Manhole, Type 1	1200-mm Precast Reinforced Concrete Manhole, Type 1 (Modified)	Sediment Log	Roadway Inlet Protection	Infield Inlet Protection
203 2150	203 2152	206 2000	206 2001	207 2000	207 2004	209 2000	302 2008	502 2319	502 2321	502 2332	502 2336	505 2000	506 2000	603 2024	603 2028	603 2048	603 2080	603 2096	603 3008	604 4024	604 4040	604 4074	604 4601	609 0090	609 2000	609 2002	609 2504	609 2506	637 2003	637 0625	637 0626
SQM	SQM	CUM	CUM	CUM	CUM	CUM	CUM	LINM	LINM	CUM	CUM	KG	KG	LINM	LINM	LINM	LINM	LINM	EA	LINM	LINM	LINM	LINM	EA	KG	KG	EA	EA	LINM	EA	EA
533.4	1066.8	5397.1	184.6	2589.7	807.4	160.0	123.1			666.5		84506																			
																									136		1				
38.9	77.9	605.7	13.5	77.1	60.5	11.7	9.0			77.8		6535																			
646.9	1293.8	6324.4	223.9	2919.8	979.1	194.1	149.3			808.3		102486																			
38.9	77.9	328.8	13.5	100.2	60.5	11.7	9.0			77.8		6535																			
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		5.7			4.2						0.9	29														60					
		4.1		1.5	2.2									1.9																	
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1258.2	2516.4	12665.8	435.5	5688.3	1913.8	377.5	290.3	0.0	0.0	1630.2	0.9	200091	0	1.9	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	1	136	60	1	0	45.0	5	12
12553.8	25183.3	105207.7	4038.3	39403.3	19590.6	3361.9	2977.6	52.0	65.2	17481.3	46.7	2294541	612	361.5	28.0	40.3	15.2	30.2	2	6.7	6.2	166.1	19.8	2	3123	5832	6	16	45.0	5	12

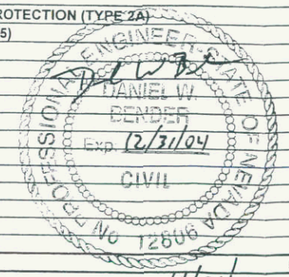
NEVADA DOT

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.	
9	NEVADA	EB-NH-095-2(042)	CLARK	SD	34

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - DRAINAGE

ITEM NUMBER			
UNIT			
DESCRIPTION	STATION TO STATION	DWG.	NOTE
INSTALL DUAL 3600mm x 1800mm x 94.000m RCB	"QD" 32+77.000 TO	SD-6	10
(SEE SHEET SD-11)	"QD" 31+83.000		
CONSTRUCT TYPE 1 MH, H=1.776m	"QD" 32+80.000 TO	SD-6	11
CONNECT TO RCB	3.400m RT.		
(SEE SHEET SD-11)			
CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 32+83.000 TO	SD-6	12
(SEE SHEET SD-11, B-607 & B-608)	"QD" 32+77.000		
INSTALL DUAL 3600mm x 1800mm x 114.000m RCB	"QD" 33+97.000 TO	SD-6	13
(SEE SHEET SD-11)	"QD" 32+83.000		
CONSTRUCT FLOW TRANSFER STRUCTURE	"QD" 34+03.000 TO	SD-6	14
(SEE SHEET SD-11, B-607 & B-608)	"QD" 33+97.000		
INSTALL BRICK & MORTAR PLUG	"QD" 34+03.000	SD-6	15
(SEE SHEET SD-11)			
CONSTRUCT TYPE 2A D.I., H=1.400m	"QD" 36+91.000	SD-6	16
CONNECT TO RCB AT "QD" 30+58.000, 4.610m RT.	34.760m RT.		
INSTALL 450mm x 1.924m RCP			
(SEE SHEET SD-18)			
SEDIMENT LOG	"Q" 21+50.000, 61.646m LT.	SD-24	
(SEE SHEET SD-25)	"Q" 22+00.000, 64.997m LT.		
	"Q" 24+00.000, 80.914m LT.		
	"Q" 25+00.000, 83.410m LT.		
	"Q" 26+00.000, 89.635m LT.		
	"Q" 28+00.000, 23.878m LT.		
	"Q" 30+00.000, 27.762M LT.		
	"Q" 31+00.000, 26.591m LT.		
	"Q" 23+00.000, 34.690m LT.		
	"Q" 24+00.000, 25.806m LT.		
	"Q" 25+00.000, 24.122m LT.		
	"Q" 256+00.000, 28.755m LT.		
	"Q" 29+00.000, 25.932m LT.		
	"Q" 31+00.000, 33.821m RT.		
	"Q" 36+10.000, 35.234m LT.		
ROADWAY INLET PROTECTION (TYPE 2)	"Q" 27+83.576, 23.779 LT.	SD-25	
(SEE SHEET SD-25)	"Q" 28+09.935, 74.165m LT.		
	"Q" 34+45.000, 32.210M RT.		
	"Q" 34+60.000, 32.210m RT.		
	"Q" 34+67.255, 32.210m RT.		
INFIELD INLET PROTECTION (TYPE 2A)	"Q" 23+59.072, 80.843m LT.	SD-25	
(SEE SHEET SD-25)	"Q" 25+82.157, 62.177m LT.		
	"Q" 26+97.291, 38.504m LT.		
	"Q" 27+92.425, 70.391m LT.		
	"Q" 29+27.000, 65.217m LT.		
	"Q" 31+19.609, 26.621m LT.		
	"Q" 32+22.000, 34.300m LT.		
	"Q" 32+75.000, 39.900m RT.		
	"Q" 29+84.884, 21.043m RT.		
	"Q" 36+40.000, 39.460m RT.		
	"Q" 34+24.000, 340.593m LT.		
	"QD" 36+91.000, 34.760m RT.		
PAGE SUBTOTAL			
GRAND TOTAL			

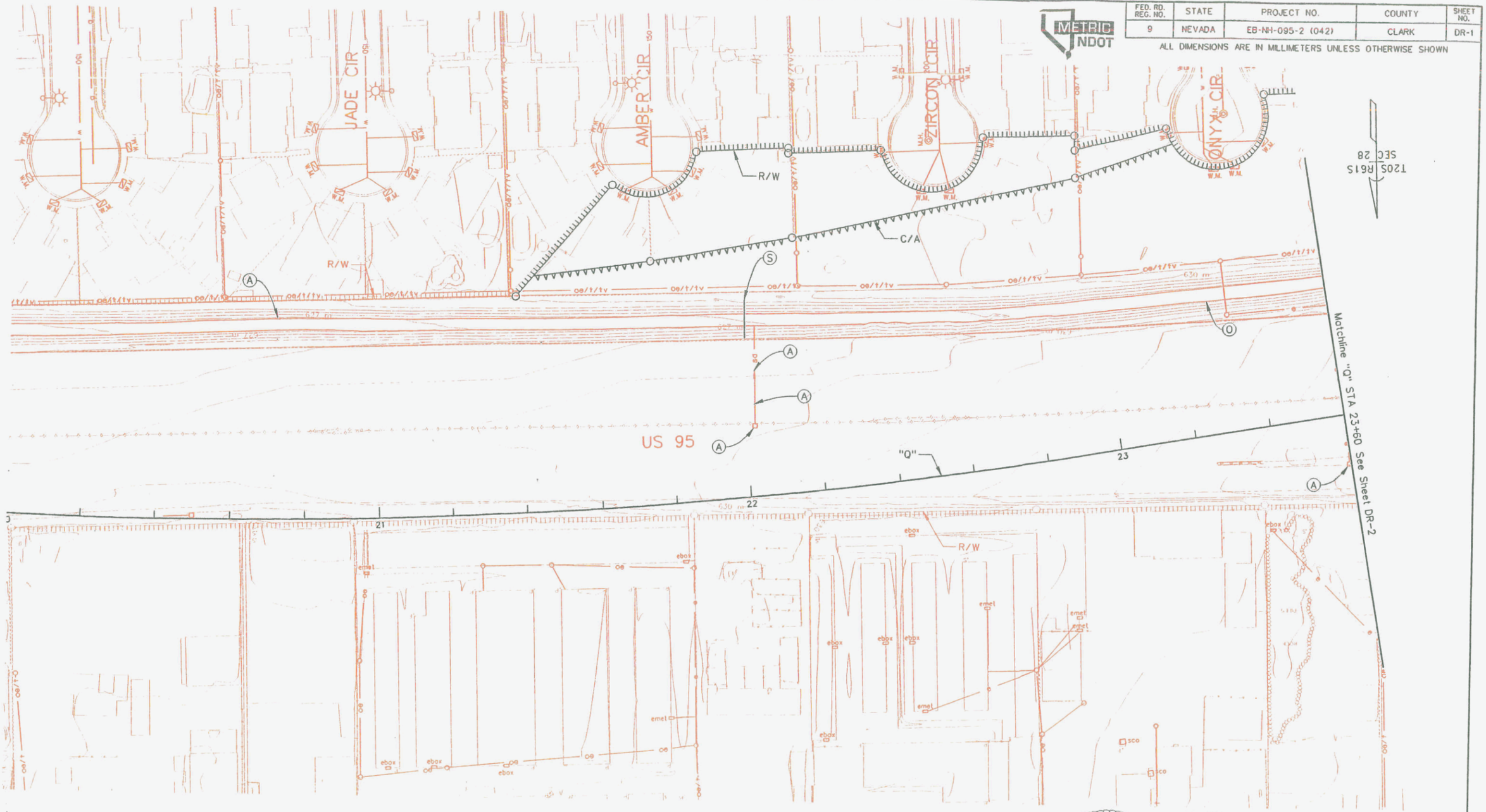


11/21/03

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	DR-1

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



Ⓐ PROTECT IN PLACE

Ⓞ REMOVE CONCRETE CHANNEL — "Q" 22+05.52, 47.3m LT. TO "Q" 23+60.00, 36.1m LT. (152.3m)

Ⓢ SAWCUT CONCRETE CHANNEL (NO DIRECT PAYMENT) — "Q" 22+02.81, 52.67m LT. TO "Q" 22+01.962, 42.500m LT. (9.9m)

NOTE:

FOR ROADWAY AND ALL OTHER REMOVALS SEE 4 THRU 10

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE REMOVAL PLAN

VTN nevada — CIVIL ENGINEERS & PLANNERS — 2727 S. RAINBOW BLVD. LAS VEGAS, NEVADA 89146 PHONE: (702) 873-7550 FAX (702) 362-2567

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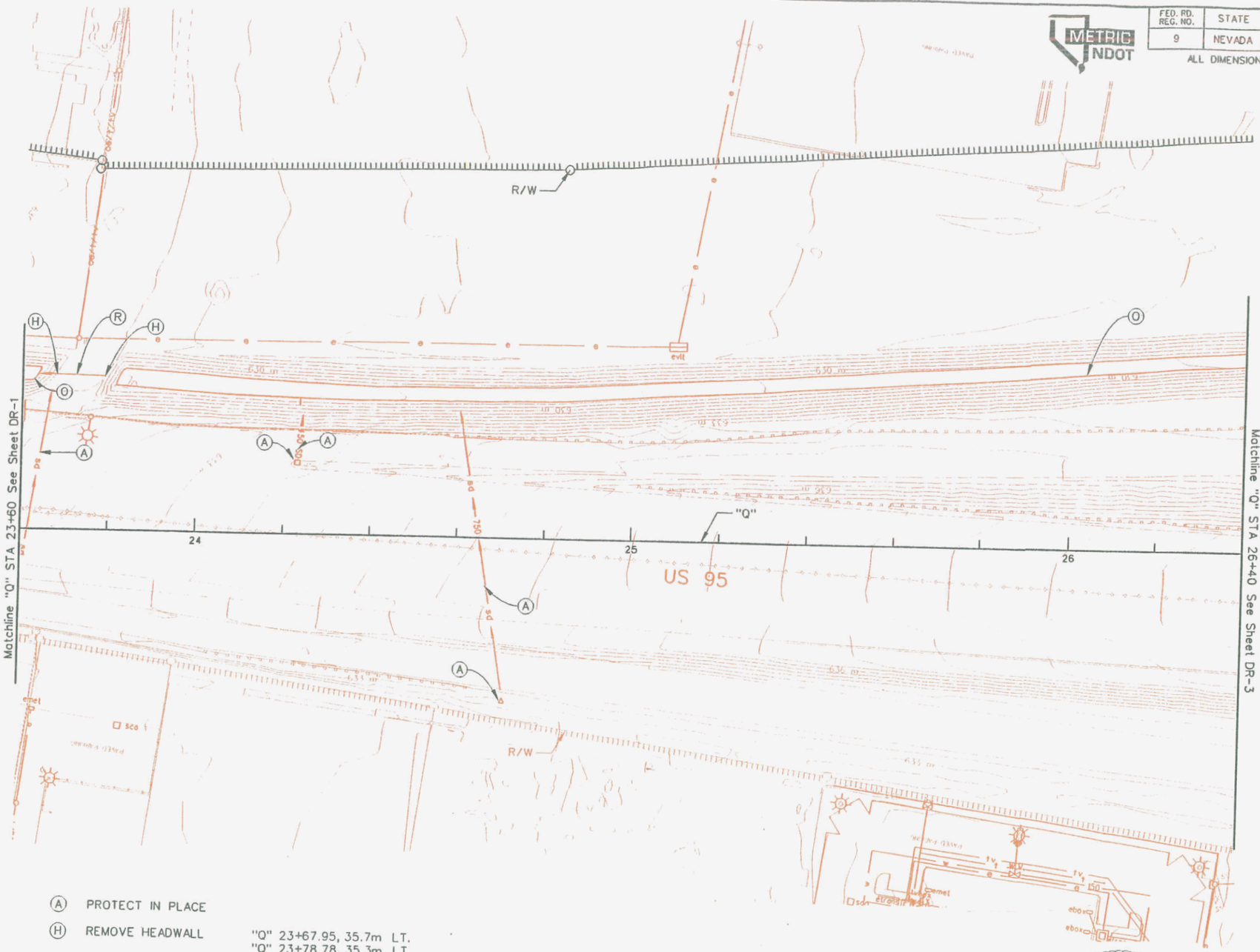
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	DR-2

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

T20S R61E SEC 29



(A)	PROTECT IN PLACE	
(H)	REMOVE HEADWALL	"Q" 23+67.95, 35.7m LT. "Q" 23+78.78, 35.3m LT.
(R)	REMOVE RCB	"Q" 23+67.95, 35.7m LT. TO "Q" 23+78.78, 35.3m LT. (10.8m)
(O)	REMOVE CONCRETE CHANNEL	"Q" 23+60.00, 36.1m LT. TO "Q" 23+63.38, 36.0m LT. (3.4m) "Q" 23+81.64, 35.2m LT. TO "Q" 26+40.00, 44.7m LT. (258.7m)

NOTE:

FOR ROADWAY AND ALL OTHER REMOVALS SEE 4 THRU 10

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE REMOVAL PLAN

VTN nevada
CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS
2727 S. RAINBOW BLVD. LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550 FAX (702) 362-2597

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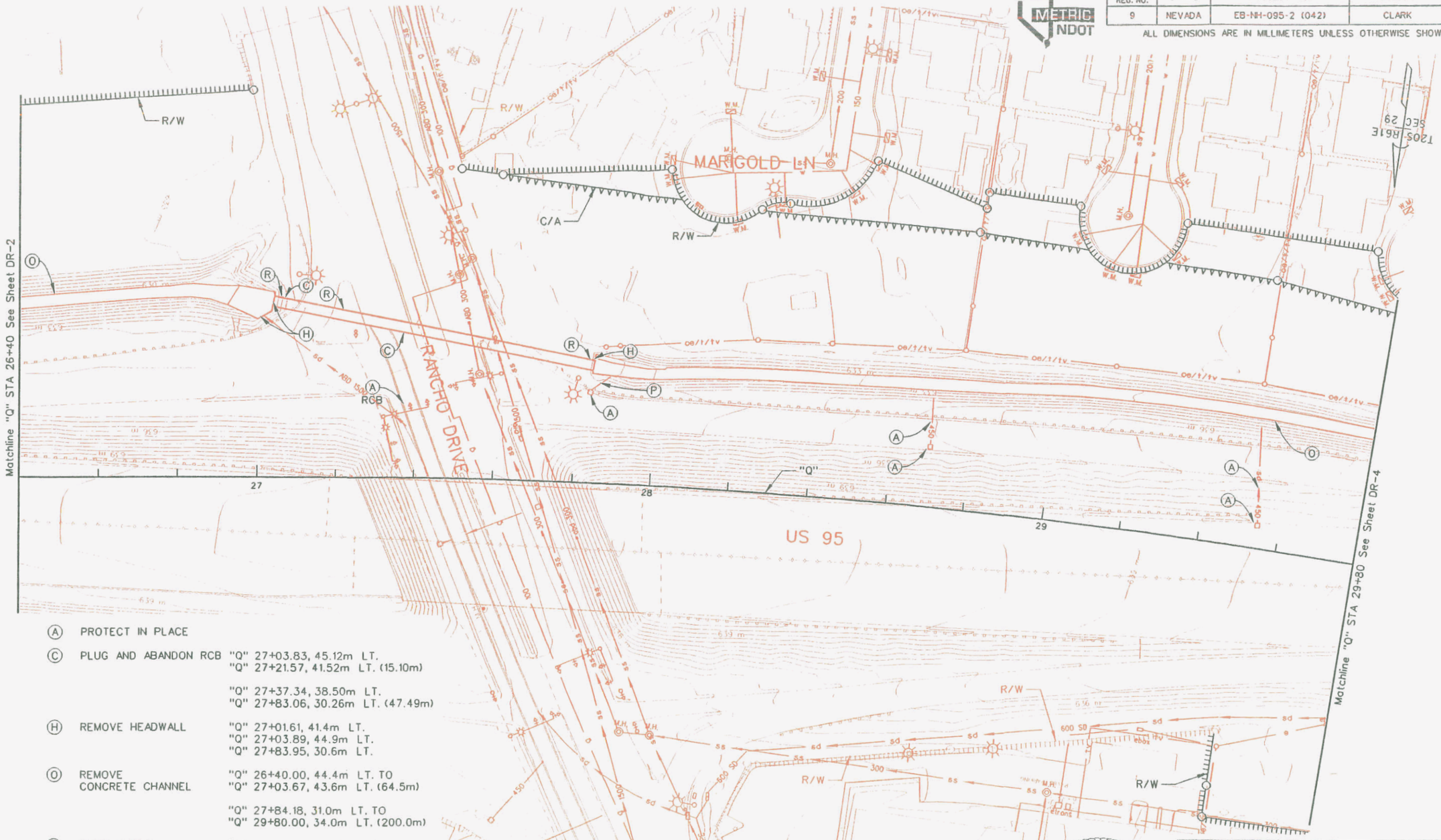
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	DR-3

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



(A) PROTECT IN PLACE

(C) PLUG AND ABANDON RCB
"Q" 27+03.83, 45.12m LT.
"Q" 27+21.57, 41.52m LT. (15.10m)

"Q" 27+37.34, 38.50m LT.
"Q" 27+83.06, 30.26m LT. (47.49m)

(H) REMOVE HEADWALL
"Q" 27+01.61, 41.4m LT.
"Q" 27+03.89, 44.9m LT.
"Q" 27+83.95, 30.6m LT.

(O) REMOVE CONCRETE CHANNEL
"Q" 26+40.00, 44.4m LT. TO
"Q" 27+03.67, 43.6m LT. (64.5m)

"Q" 27+84.18, 31.0m LT. TO
"Q" 29+80.00, 34.0m LT. (200.0m)

(R) REMOVE RCB
"Q" 27+06.77, 44.55m LT.
"Q" 27+03.83, 45.12m LT. (3.00m)

"Q" 27+21.57, 41.52m LT.
"Q" 27+37.34, 38.50m LT. (16.43m)
(No Direct Payment)

"Q" 27+83.06, 30.26m LT.
"Q" 27+84.03, 30.11m LT. (1.00m)

(P) REMOVE STORM
"Q" 27+83.58, 23.78m LT. TO

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CIVIL
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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE REMOVAL PLAN

VTN nevada
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LAND SURVEYORS
2727 S. Rainbow Blvd.
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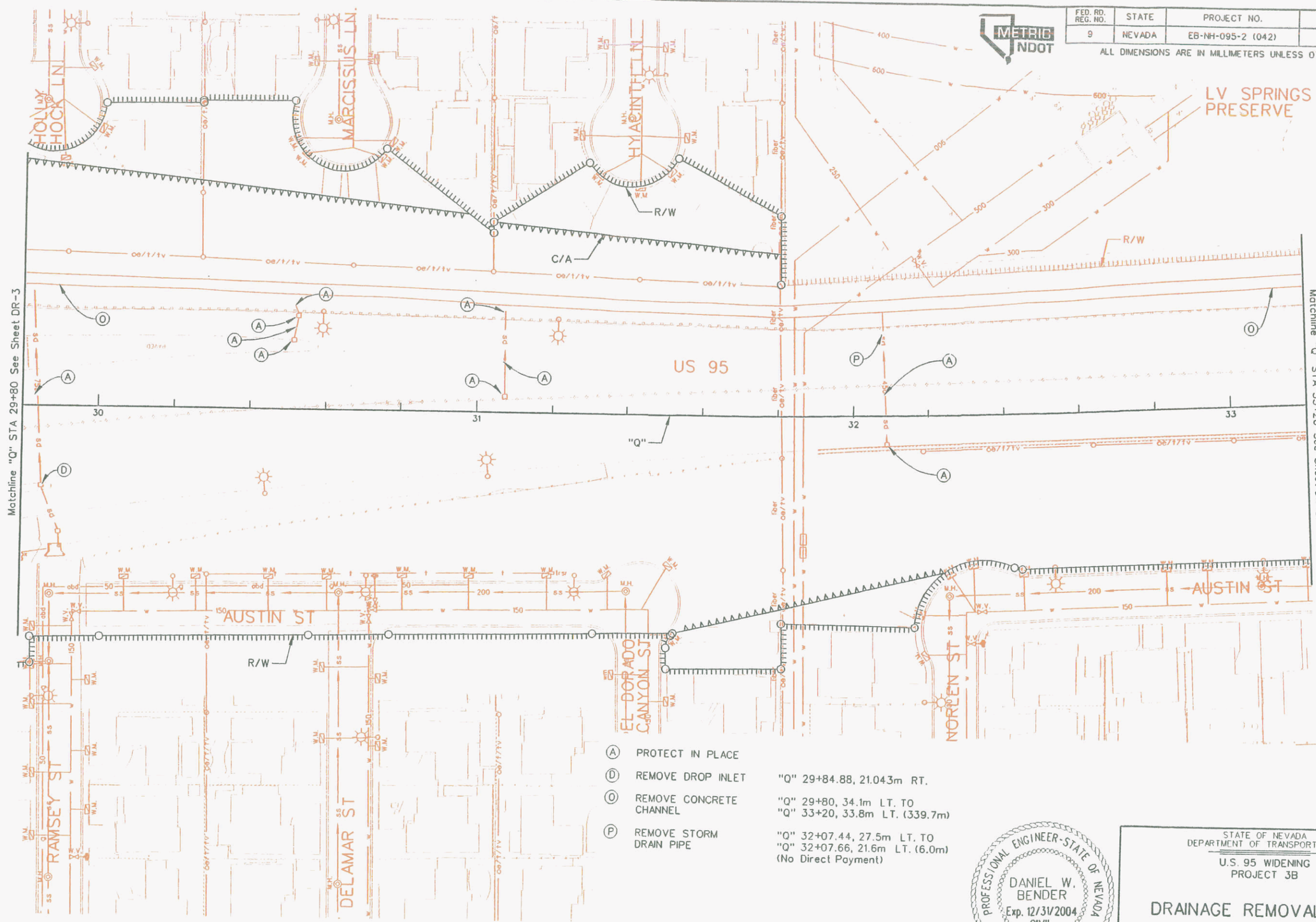
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	DR-4

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



(A)	PROTECT IN PLACE	
(D)	REMOVE DROP INLET	"Q" 29+84.88, 21.043m RT.
(O)	REMOVE CONCRETE CHANNEL	"Q" 29+80, 34.1m LT. TO "Q" 33+20, 33.8m LT. (339.7m)
(P)	REMOVE STORM DRAIN PIPE	"Q" 32+07.44, 27.5m LT. TO "Q" 32+07.66, 21.6m LT. (6.0m) (No Direct Payment)

NOTE:

FOR ROADWAY AND ALL OTHER REMOVALS SEE 4 THRU 10

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE REMOVAL PLAN

VTN nevada
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	DR-5

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

(A) PROTECT IN PLACE

(O) REMOVE CONCRETE CHANNEL — "Q" 33+20.00, 33.0m LT. TO "Q" 35+94.31, 49.7m LT. (299.4m)

(S) SAWCUT CONCRETE CHANNEL — "Q" 34+01.34, 40.0m LT. TO "Q" 34+03.91, 28.116 LT. (12.2m) (No Direct Payment)

"Q" 35+94.71, 53.69m LT. TO "Q" 35+93.77, 44.39m LT. (9.4m) (No Direct Payment)

NOTE:
FOR ROADWAY AND ALL OTHER REMOVALS SEE 4 THRU 10

T20S R61E SEC 30

LV SPRINGS PRESERVE

US 95

R/W

"Q"

34

35

36

C/A

R/W

Matchline "Q" STA 33+20 See Sheet DR-4

Matchline "Q" STA 36+60 See Sheet DR-8

AUSTIN AVE

WILDROSE ST.

ORCHARD ST.

POMEGRANATE CIR.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE REMOVAL PLAN

VTN nevada
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS
2127 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	DR-6

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

(A) PROTECT IN PLACE

(B) PLUG & ABANDON RCP "Q" 37+52.00, 5.95m LT. (No Direct Payment)

(D) REMOVE DROP INLET "Q" 37+51.98, 5.35m LT.

NOTE:
FOR ROADWAY AND ALL OTHER REMOVALS SEE 4 THRU 10

LV SPRINGS PRESERVE

T20S R61E SEC 30

Matchline "QD" STA 36+60 See Sheet SD-5

R/W

US 95

2400mm x 1800mm RCB

"Q"

37 38 39 40

AUSTIN AVE

FLAXEN CT.

HIBISCUS DR

GARDENIA LN

AVALON CIR

R/W

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE REMOVAL PLAN

vtn nevada
CIVIL ENGINEERS
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FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2(042)	CLARK	DR 7

NEVADA DOT

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - REMOVALS

REMOVAL OF HEADWALL	REMOVAL OF DROP INLET	REMOVE REINFORCED CONCRETE BOX	REMOVE CONCRETE CHANNEL	REMOVAL OF STORM DRAIN PIPE	BRICK & MORTAR PLUG	ITEM NUMBER	DESCRIPTION	STATION TO STATION	DWG.	NOTE
202 0356	202 0328	202 2008	202 2009	202 2244	609 0090					
EA	EA	LINM	LINM	LINM	EA	UNIT				
							NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
			152.3				REMOVE CONCRETE CHANNEL	"Q" 22+05.52, 47.3m LT. TO "Q" 23+60.00, 36.1m LT. (152.3m)	DR-1	O
			(No Direct Payment)				SAWCUT CONCRETE CHANNEL (NO DIRECT PAYMENT)	"Q" 22+02.81, 52.67m LT. TO "Q" 22+01.962, 42.500m LT. (9.9m)	DR-1	S
2.0							REMOVE HEADWALL	"Q" 23+67.95, 35.7m LT. "Q" 23+78.78, 35.3m LT.	DR-2	H
		10.8					REMOVE RCB	"Q" 23+67.95, 35.7m LT. TO "Q" 23+78.78, 35.3m LT. (10.8m)	DR-2	R
			3.4				REMOVE CONCRETE CHANNEL	"Q" 23+60.00, 36.1m LT. TO "Q" 23+63.38, 36.0m LT. (3.4m)	DR-2	O
			258.7					"Q" 23+81.64, 35.2m LT. TO "Q" 26+40.00, 44.7m LT. (258.7m)		
					1.0		PLUG AND ABANDON RCB	"Q" 27+03.83, 45.12m LT.	DR-3	C
					1.0			"Q" 27+21.57, 41.52m LT. (15.10m) "Q" 27+37.34, 38.50m LT.		
3.0							REMOVE HEADWALL	"Q" 27+83.06, 30.26m LT. (47.49m) "Q" 27+01.61, 41.4m LT.	DR-3	H
			64.5				REMOVE CONCRETE CHANNEL	"Q" 27+03.89, 44.9m LT. "Q" 27+83.95, 30.6m LT. "Q" 26+40.00, 44.4m LT. TO "Q" 27+03.67, 43.6m LT. (64.5m)	DR-3	O
			200.0					"Q" 27+84.18, 31.0m LT. TO "Q" 29+80.00, 34.0m LT. (200.0m)		
		3.0					REMOVE RCB	"Q" 27+06.77, 44.55m LT.	DR-3	R
			(No Direct Payment)					"Q" 27+03.83, 45.12m LT. (3.00m) "Q" 27+21.57, 41.52m LT. "Q" 27+37.34, 38.50m LT. (16.43m) (No Direct Payment)		
		1.0						"Q" 27+83.06, 30.26m LT. "Q" 27+84.03, 30.11m LT. (1.00m)		
				6.0			REMOVE STORM DRAIN PIPE	"Q" 27+83.58, 23.78m LT. TO "Q" 27+88.26, 27.38m LT. (5.97m)	DR-3	P
	1.0						REMOVE DROP INLET	"Q" 29+84.88, 21.043m RT.	DR-4	D
			339.7				REMOVE CONCRETE CHANNEL	"Q" 29+80, 34.1m LT. TO "Q" 33+20, 33.8m LT. (339.7m)	DR-4	O
			(No Direct Payment)				REMOVE STORM DRAIN PIPE	"Q" 32+07.44, 27.5m LT. TO "Q" 32+07.66, 21.6m LT. (6.0m) (No Direct Payment)	DR-4	P
5.0	1.0	14.8	1018.6	6.0	2.0			PAGE SUBTOTAL		

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
No. 12606
10/22/03

FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2(042)	CLARK	DR 8

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

STRUCTURE LIST - REMOVALS

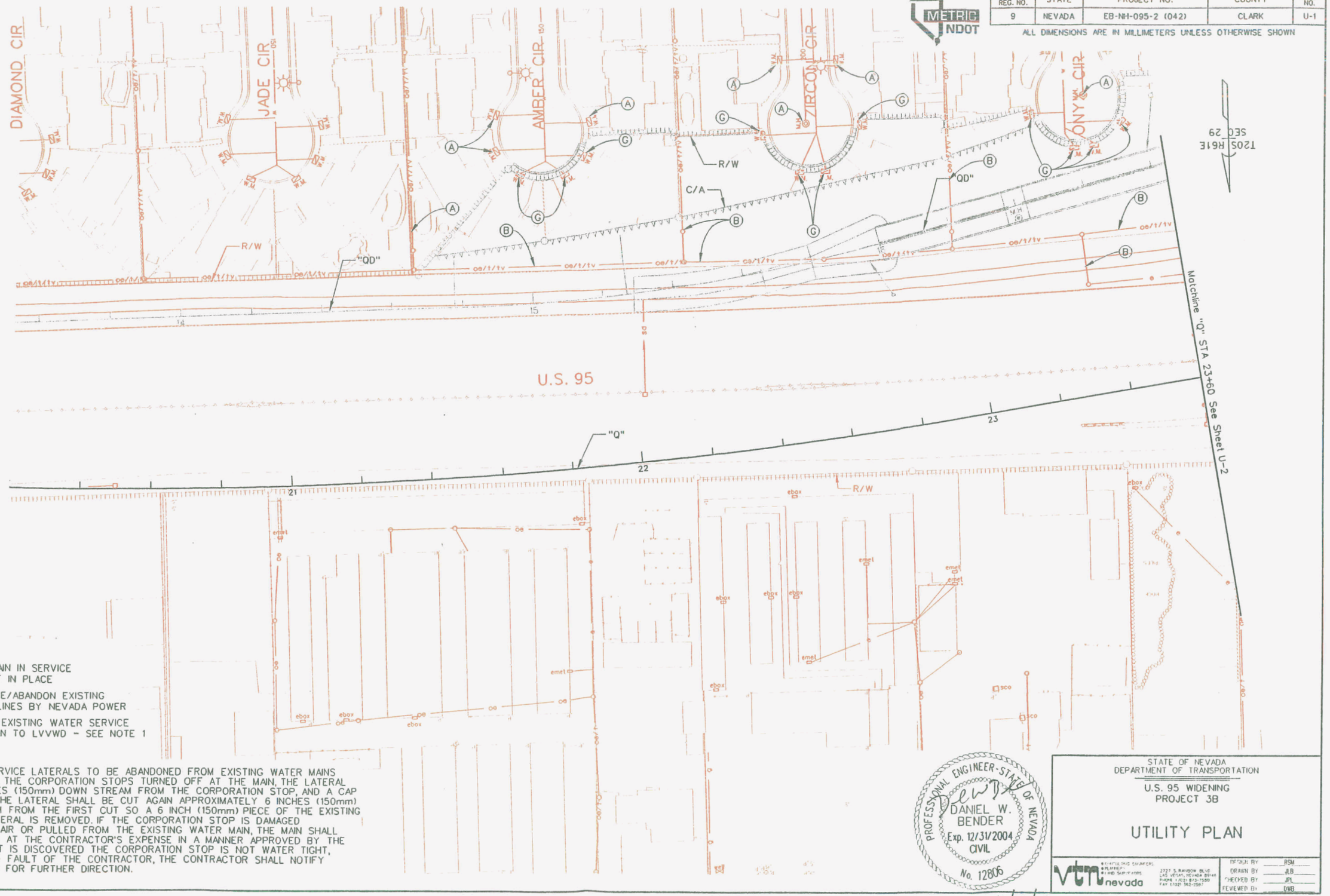
REMOVAL OF HEADWALL	REMOVAL OF DROP INLET	REMOVE REINFORCED CONCRETE BOX	REMOVE CONCRETE CHANNEL	REMOVAL OF STORM DRAIN PIPE	BRICK & MORTAR PLUG	ITEM NUMBER	DESCRIPTION	STATION TO STATION	DWG.	NOTE
202 0356	202 0328	202 2008	202 2009	202 2244	609 0090					
EA	EA	LINM	LINM	LINM	EA	UNIT				
			299.4				REMOVE CONCRETE CHANNEL	"Q" 33+20.00, 33.0m LT. TO "Q" 35+94.31, 49.7m LT. (299.4m)	DR-5	O
		(No Direct Payment)					SAWCUT CONCRETE CHANNEL	"Q" 34+01.34, 40.0m LT. TO "Q" 34+03.91, 28.116 LT. (12.2m)	DR-5	S
		(No Direct Payment)						(No Direct Payment) "Q" 35+94.71, 53.69m LT. TO "Q" 35+93.77, 44.39m LT. (9.4m) (No Direct Payment)		
		(No Direct Payment)					PLUG & ABANDON RCP	"Q" 37+52.00, 5.95m LT. (No Direct Payment)	DR-6	B
	1.0						REMOVE DROP INLET	"Q" 37+51.98, 5.35m LT.	DR-6	D
0.0	1.0	0.0	299.4	0.0	0.0			PAGE SUB TOTAL		
5.0	2.0	14.8	1318.0	6.0	2.0			GRAND TOTAL		

PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp: 12/31/04
CIVIL
NO. 12806
10/22/03

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	U-1

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



(A) TO REMAIN IN SERVICE
PROTECT IN PLACE

(B) RELOCATE/ABANDON EXISTING
POWER LINES BY NEVADA POWER

(G) REMOVE EXISTING WATER SERVICE
& RETURN TO LVVWD - SEE NOTE 1

NOTE 1

EXISTING SERVICE LATERALS TO BE ABANDONED FROM EXISTING WATER MAINS SHALL HAVE THE CORPORATION STOPS TURNED OFF AT THE MAIN, THE LATERAL CUT 6 INCHES (150mm) DOWN STREAM FROM THE CORPORATION STOP, AND A CAP INSTALLED. THE LATERAL SHALL BE CUT AGAIN APPROXIMATELY 6 INCHES (150mm) DOWNSTREAM FROM THE FIRST CUT SO A 6 INCH (150mm) PIECE OF THE EXISTING SERVICE LATERAL IS REMOVED. IF THE CORPORATION STOP IS DAMAGED BEYOND REPAIR OR PULLED FROM THE EXISTING WATER MAIN, THE MAIN SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY THE AGENCY. IF IT IS DISCOVERED THE CORPORATION STOP IS NOT WATER TIGHT, THROUGH NO FAULT OF THE CONTRACTOR, THE CONTRACTOR SHALL NOTIFY THE AGENCY FOR FURTHER DIRECTION.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

UTILITY PLAN

VTN nevada
ENGINEERS · PLANNERS · LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7580
FAX (702) 362-2597

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REVIEWED BY	DWB

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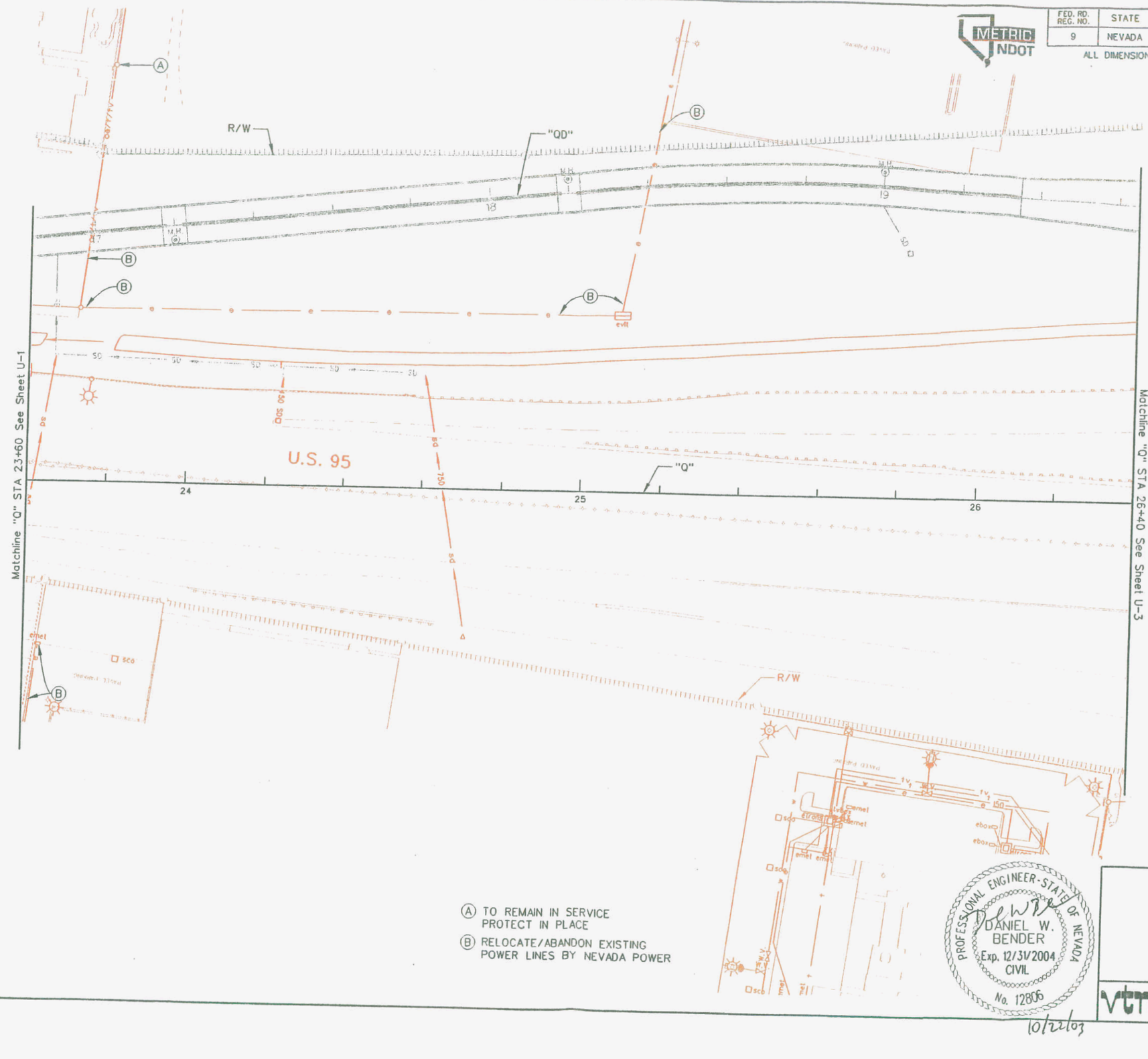
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	U-2

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

T20S R61E SEC 29



(A) TO REMAIN IN SERVICE
PROTECT IN PLACE

(B) RELOCATE/ABANDON EXISTING
POWER LINES BY NEVADA POWER

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

UTILITY PLAN

vtn nevada
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS
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LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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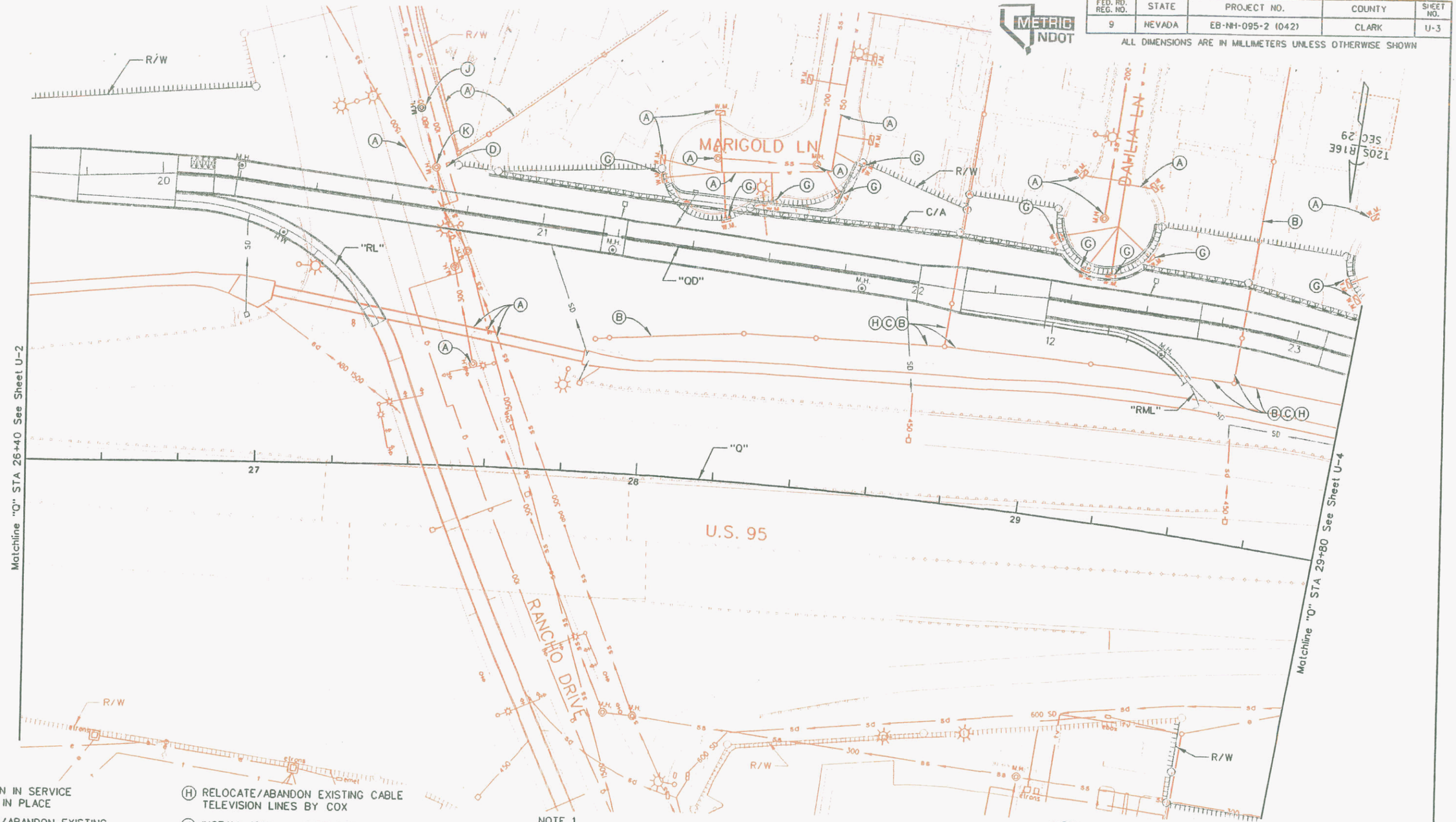
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	U-3

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



(A) TO REMAIN IN SERVICE PROTECT IN PLACE

(B) RELOCATE/ABANDON EXISTING POWER LINES BY NEVADA POWER

(C) RELOCATE / ABANDON EXISTING TELEPHONE LINES BY SPRINT

(D) RELOCATE / ABANDON EXISTING GAS LINES BY SWG

(G) REMOVE EXISTING WATER SERVICE & RETURN TO LVVWD - SEE NOTE 1

(H) RELOCATE/ABANDON EXISTING CABLE TELEVISION LINES BY COX

(J) INSTALL 1200mm TYPE 1 SSMH "O" STA. 27+40.893, 93.002m LT. CUT & CAP UPSTREAM SS

(K) REMOVE SEWER MANHOLE (NO DIRECT PAYMENT)

(K) REMOVE ABANDONED SEWER LINE. (NO DIRECT PAYMENT)

NOTE 1

EXISTING SERVICE LATERALS TO BE ABANDONED FROM EXISTING WATER MAINS SHALL HAVE THE CORPORATION STOPS TURNED OFF AT THE MAIN, THE LATERAL CUT 6 INCHES (150mm) DOWN STREAM FROM THE CORPORATION STOP, AND A CAP INSTALLED. THE LATERAL SHALL BE CUT AGAIN APPROXIMATELY 6 INCHES (150mm) DOWNSTREAM FROM THE FIRST CUT SO A 6 INCH (150mm) PIECE OF THE EXISTING SERVICE LATERAL IS REMOVED. IF THE CORPORATION STOP IS DAMAGED BEYOND REPAIR OR PULLED FROM THE EXISTING WATER MAIN, THE MAIN SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY THE AGENCY. IF IT IS DISCOVERED THE CORPORATION STOP IS NOT WATER TIGHT, THROUGH NO FAULT OF THE CONTRACTOR, THE CONTRACTOR SHALL NOTIFY THE AGENCY FOR FURTHER DIRECTION.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12805

11/14/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

UTILITY PLAN

VTN nevada
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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DESIGN BY	RSM
DRAWN BY	JLB
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REVIEWED BY	DWB

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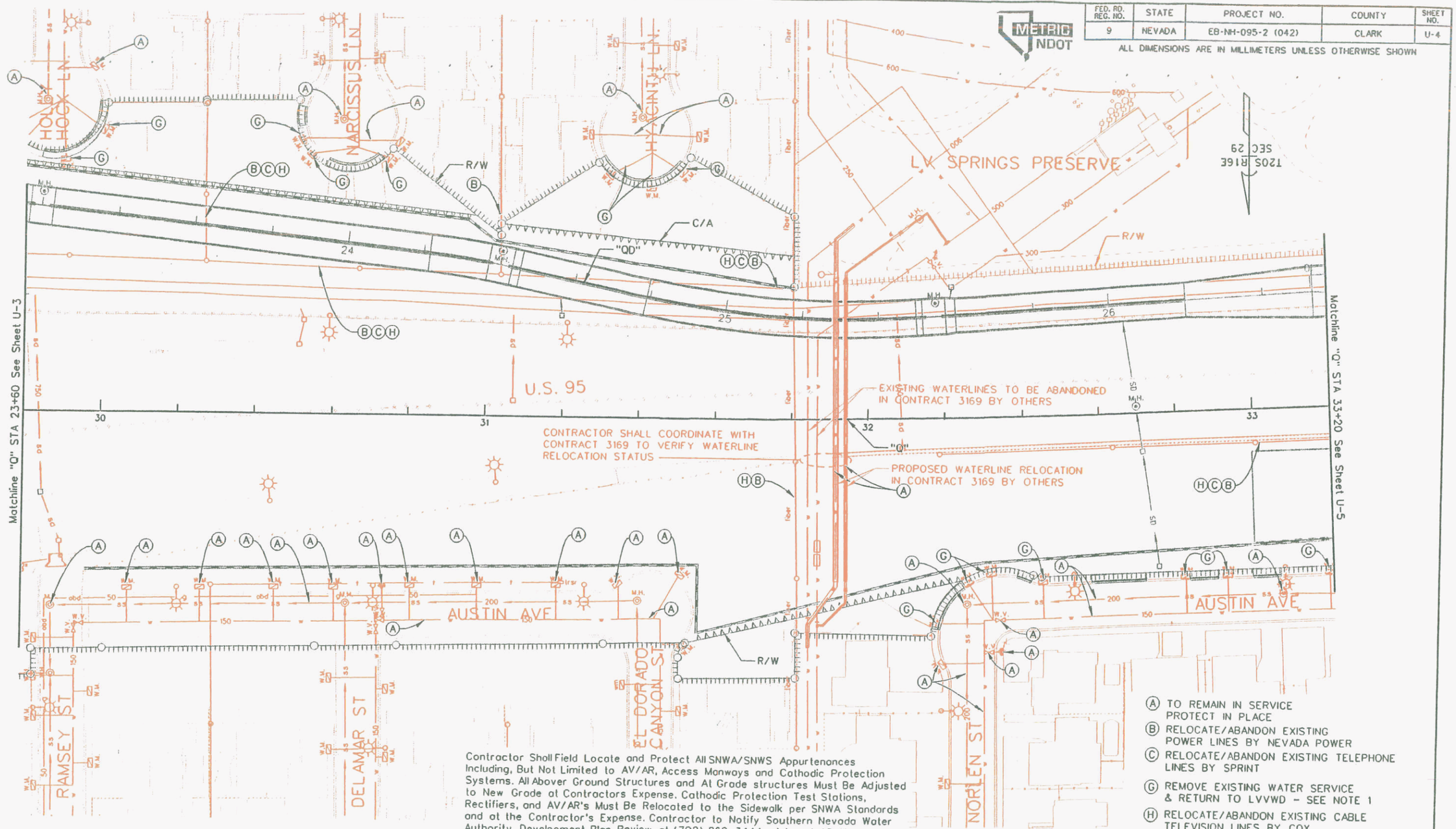
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	U-4

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



NOTE 1

EXISTING SERVICE LATERALS TO BE ABANDONED FROM EXISTING WATER MAINS SHALL HAVE THE CORPORATION STOPS TURNED OFF AT THE MAIN, THE LATERAL CUT 6 INCHES (150mm) DOWN STREAM FROM THE CORPORATION STOP, AND A CAP INSTALLED. THE LATERAL SHALL BE CUT AGAIN APPROXIMATELY 6 INCHES (150mm) DOWNSTREAM FROM THE FIRST CUT SO A 6 INCH (150mm) PIECE OF THE EXISTING SERVICE LATERAL IS REMOVED. IF THE CORPORATION STOP IS DAMAGED BEYOND REPAIR OR PULLED FROM THE EXISTING WATER MAIN, THE MAIN SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY THE AGENCY. IF IT IS DISCOVERED THE CORPORATION STOP IS NOT WATER TIGHT, THROUGH NO FAULT OF THE CONTRACTOR, THE CONTRACTOR SHALL NOTIFY THE AGENCY FOR FURTHER DIRECTION.

Contractor Shall Field Locate and Protect All SNWA/SNWS Appurtenances Including, But Not Limited to AV/AR, Access Manways and Cathodic Protection Systems. All Above Ground Structures and At Grade structures Must Be Adjusted to New Grade at Contractors Expense. Cathodic Protection Test Stations, Rectifiers, and AV/AR's Must Be Relocated to the Sidewalk per SNWA Standards and at the Contractor's Expense. Contractor to Notify Southern Nevada Water Authority, Develpoment Plan Review, at (702) 862-3444 at Least 48 Hours Prior to Construction Activity.

SNWA DATE

SNWA Approval is Valid for One (1) Year From the Signature Date. If Construction Within the Easement or Restricted Pipe Safety Zone is not Complete, Plans Must be Resubmitted to SNWA for Approval.

(A) TO REMAIN IN SERVICE PROTECT IN PLACE
(B) RELOCATE/ABANDON EXISTING POWER LINES BY NEVADA POWER
(C) RELOCATE/ABANDON EXISTING TELEPHONE LINES BY SPRINT
(G) REMOVE EXISTING WATER SERVICE & RETURN TO LVVWD - SEE NOTE 1
(H) RELOCATE/ABANDON EXISTING CABLE TELEVISION LINES BY COX

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
11/14/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 38

UTILITY PLAN

VTN nevada
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
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CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	U-5

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

LV SPRINGS PRESERVE

T20S R61E SEC 30

R/W

"ML"

"QD"

U.S. 95

"Q"

Matchline "O" STA 33+20 See Sheet U-4

Matchline "O" STA 36+60 See Sheet U-6

AUSTIN AVE

C/A

R/W

WILDROSE ST.

POMEGRANATE CIR.

(A) TO REMAIN IN SERVICE PROTECT IN PLACE

(B) RELOCATE/ABANDON EXISTING POWERLINES BY NEVADA POWER

(C) RELOCATE/ABANDON EXISTING TELEPHONE LINES BY SPRINT

(G) REMOVE EXISTING WATER SERVICE & RETURN TO LVVWD - SEE NOTE 1

(H) RELOCATE/ABANDON EXISTING CABLE TELEVISION LINE BY COX

NOTE 1

EXISTING SERVICE LATERALS TO BE ABANDONED FROM EXISTING WATER MAINS SHALL HAVE THE CORPORATION STOPS TURNED OFF AT THE MAIN, THE LATERAL CUT 6 INCHES (150mm) DOWN STREAM FROM THE CORPORATION STOP, AND A CAP INSTALLED. THE LATERAL SHALL BE CUT AGAIN APPROXIMATELY 6 INCHES (150mm) DOWNSTREAM FROM THE FIRST CUT SO A 6 INCH (150mm) PIECE OF THE EXISTING SERVICE LATERAL IS REMOVED. IF THE CORPORATION STOP IS DAMAGED BEYOND REPAIR OR PULLED FROM THE EXISTING WATER MAIN, THE MAIN SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY THE AGENCY. IF IT IS DISCOVERED THE CORPORATION STOP IS NOT WATER TIGHT, THROUGH NO FAULT OF THE CONTRACTOR, THE CONTRACTOR SHALL NOTIFY THE AGENCY FOR FURTHER DIRECTION.

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

UTILITY PLAN

VTN nevada
2727 S. Fairview Blvd.
Las Vegas, Nevada 89144
Phone (702) 873-7550
Fax (702) 367-2597

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CHECKED BY	JPS
REVIEWED BY	DWB

10/22/2003 11:37:44 AM i:\cad\pubwrk\58173\sheets\utilities\section 3b\u-05.dgn

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	U-6

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

(A) TO REMAIN IN SERVICE
PROTECT IN PLACE

(B) RELOCATE/ABANDON EXISTING
POWER LINES BY NEVADA POWER

(C) RELOCATE/ABANDON EXISTING
TELEPHONE LINES BY SPRINT

(G) REMOVE EXISTING WATER SERVICE
& RETURN TO LVVWD - SEE NOTE 1

(H) RELOCATE/ABANDON EXISTING
CABLE TELEVISION LINES BY COX

(S) REMOVE & ABANDON SEWER FACILITIES
(NO DIRECT PAYMENT)

(W) REMOVE & ABANDON WATER LINE
(NO DIRECT PAYMENT)

NOTE 1

EXISTING SERVICE LATERALS TO BE ABANDONED FROM EXISTING WATER MAINS SHALL HAVE THE CORPORATION STOPS TURNED OFF AT THE MAIN, THE LATERAL CUT 6 INCHES (150mm) DOWN STREAM FROM THE CORPORATION STOP, AND A CAP INSTALLED. THE LATERAL SHALL BE CUT AGAIN APPROXIMATELY 6 INCHES (150mm) DOWNSTREAM FROM THE FIRST CUT SO A 6 INCH (150mm) PIECE OF THE EXISTING SERVICE LATERAL IS REMOVED. IF THE CORPORATION STOP IS DAMAGED BEYOND REPAIR OR PULLED FROM THE EXISTING WATER MAIN, THE MAIN SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY THE AGENCY. IF IT IS DISCOVERED THE CORPORATION STOP IS NOT WATER TIGHT, THROUGH NO FAULT OF THE CONTRACTOR, THE CONTRACTOR SHALL NOTIFY THE AGENCY FOR FURTHER DIRECTION.

T20S R61E SEC. 30

LV SPRINGS PRESERVE

U.S. 95

R/W

2400mm x 1800mm RCB

"Q"

"QD"

Matchline "QD" STA 36+60 See Sheet U-5

AUSTIN AVE

EL AXEN CT.

HIBISCUS DR.

GARDENIA LN

AVALON CIR

TWIN LAKES DR

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

UTILITY PLAN

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
11/14/03

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2567

DESIGN BY	RSM
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CHECKED BY	JPL
REVIEWED BY	DWB

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FED. RD. REG. NO.	STATE	PROJECT NO	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2(042)	CLARK	U 7

U.S. 95 WIDENING PROJECT 3B - MARTIN LUTHER KING BOULEVARD TO VALLEY VIEW BOULEVARD

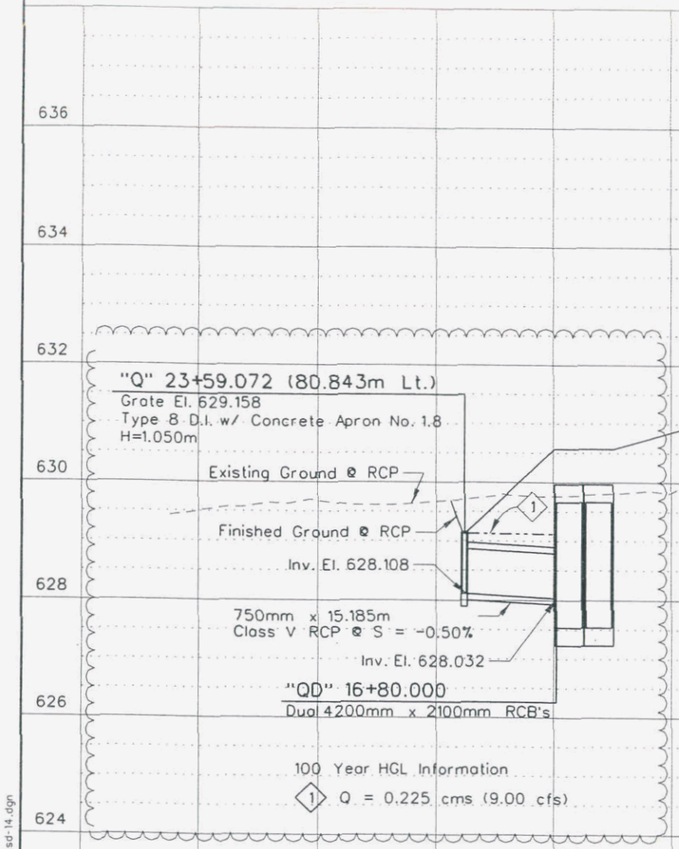
STRUCTURE LIST - UTILITIES

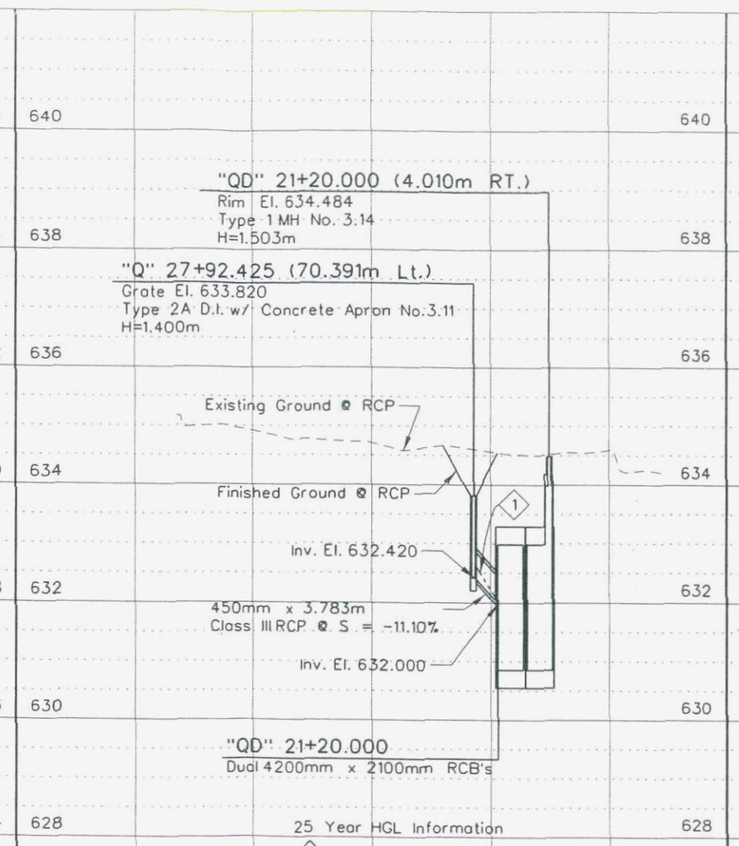
1200-MM PRECAST REINFORCED COCNRETE MANHOLE, TYPE 1	CUT AND PLUG WATERLINE	ITEM NUMBER / UNIT / DESCRIPTION	STATION TO STATION	DWG.	NOTE
609 2504	650 0056	ITEM NUMBER			
EA	EA	UNIT			
		NOTE: ALL LOCATIONS ARE APPROXIMATE & MAY BE ADJUSTED BY THE ENGINEER			
	11.0	REMOVE EXISTING WATER SERVICE AND RETURN TO LVVWD - SEE NOTE 1	(11 TOTAL THIS SHEET)	U-1	G
	11.0	REMOVE EXISTING WATER SERVICE AND RETURN TO LVVWD - SEE NOTE 1	(11 TOTAL THIS SHEET)	U-3	G
1.0		INSTALL 1200mm TYPE 1 SSMH "Q" STA. 27+40.893, 93.002m LT. CUT & CAP UPSTREAM SS		U-3	J
(No Direct Payment)		REMOVE SEWER MANHOLE (NO DIRECT PAYMENT)		U-3	K
(No Direct Payment)		REMOVE ABANDONED SEWER LINE. (NO DIRECT PAYMENT)		U-3	K
	15.0	REMOVE EXISTING WATER SERVICE & RETURN TO LVVWD - SEE NOTE 1	(15 TOTAL THIS SHEET)	U-4	G
	15.0	REMOVE EXISTING WATER SERVICE & RETURN TO LVVWD - SEE NOTE 1	(15 TOTAL THIS SHEET)	U-5	G
	20.0	REMOVE EXISTING WATER SERVICE & RETURN TO LVVWD - SEE NOTE 1	(20 TOTAL THIS SHEET)	U-6	G
(No Direct Payment)		REMOVE & ABANDON SEWER FACILITIES (NO DIRECT PAYMENT)		U-6	S
(No Direct Payment)		REMOVE & ABANDON WATER LINE (NO DIRECT PAYMENT)		U-6	W
1.0	72.0	PAGE TOTAL			

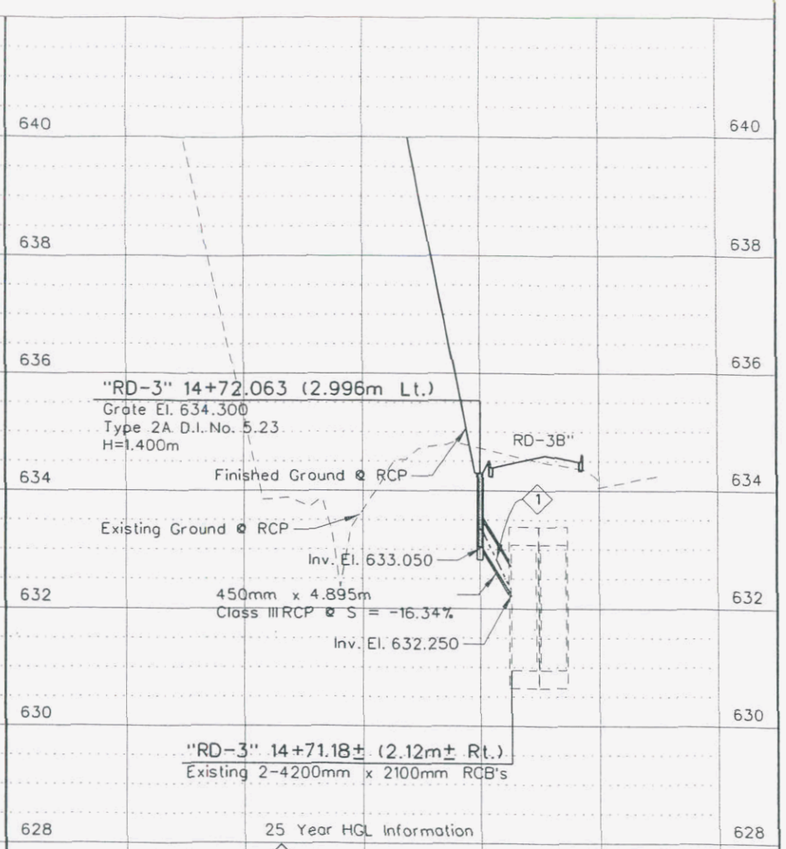
PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/04
CIVIL
No. 12806
10/22/03

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-14
		REVISED 2-09-04		

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN







PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

VTN nevada
• CONSULTING ENGINEERS
• PLANNERS
• LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-7597

DESIGN BY	TM, WT
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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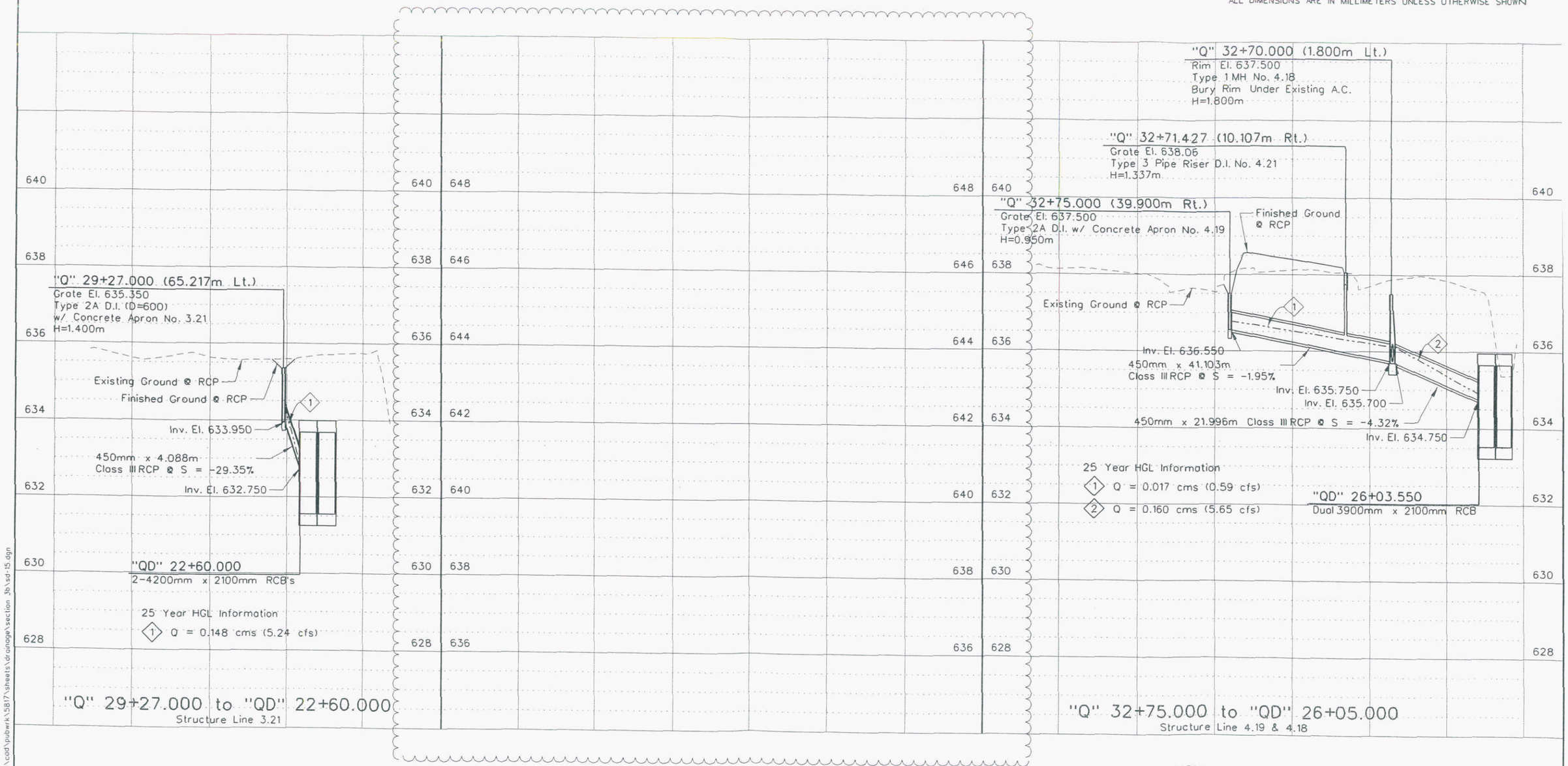
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-15
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



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DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
2/23/04

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

VTN nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	TM, WT
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CHECKED BY	JPL
REVIEWED BY	DWB

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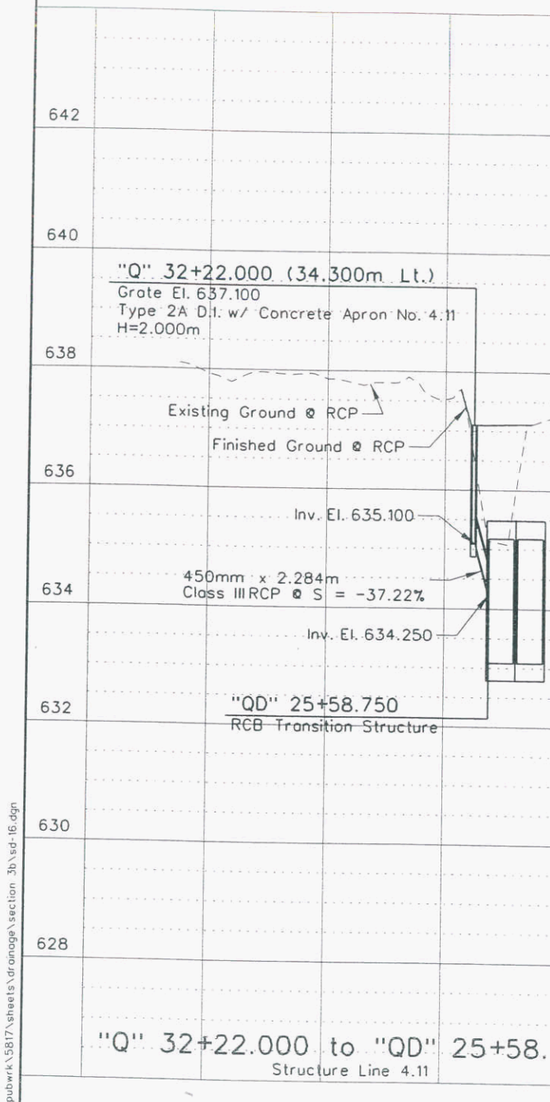
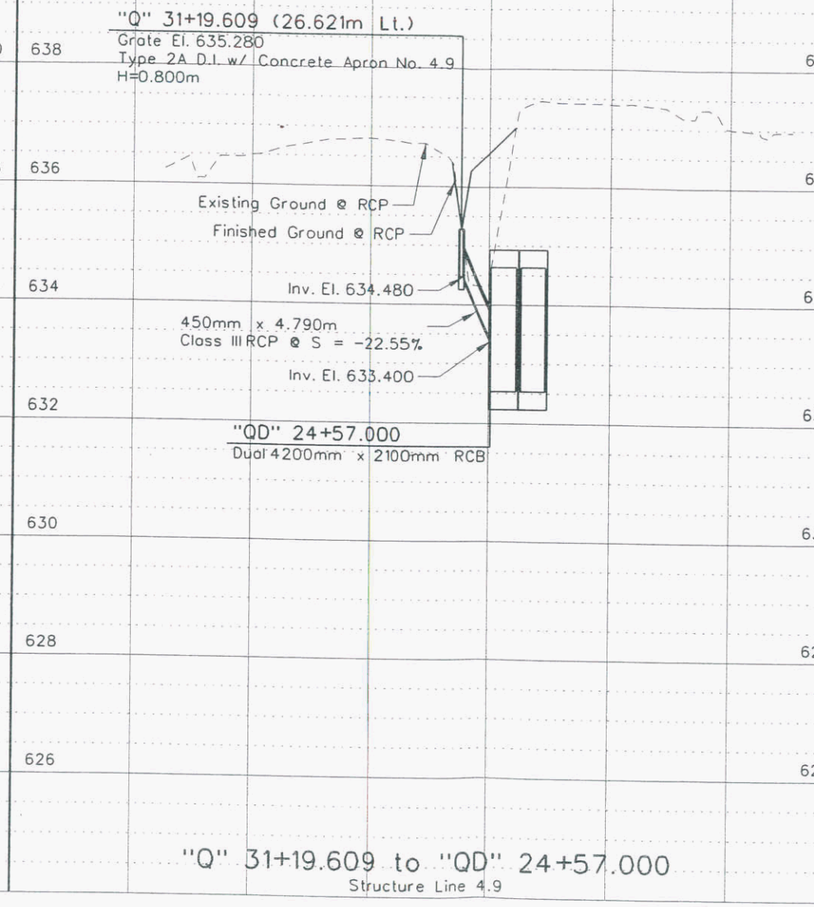
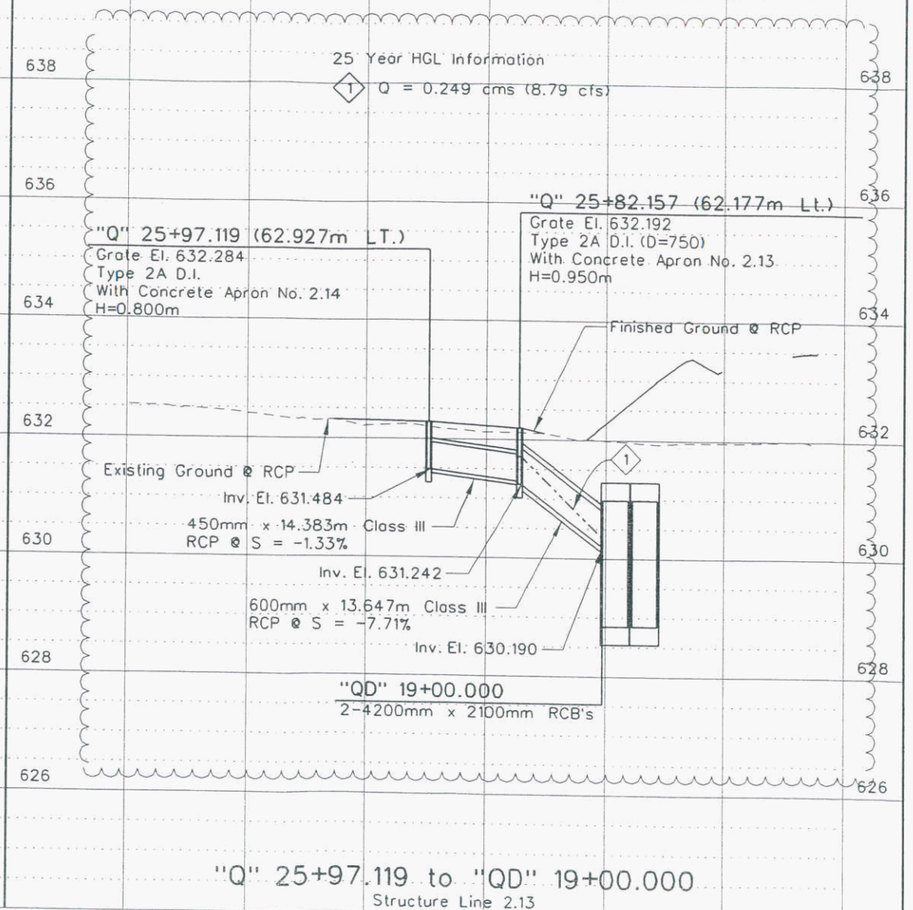
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-16
		REVISED 2-09-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN







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Exp. 12/31/2004
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2/23/04

STATE OF NEVADA
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U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

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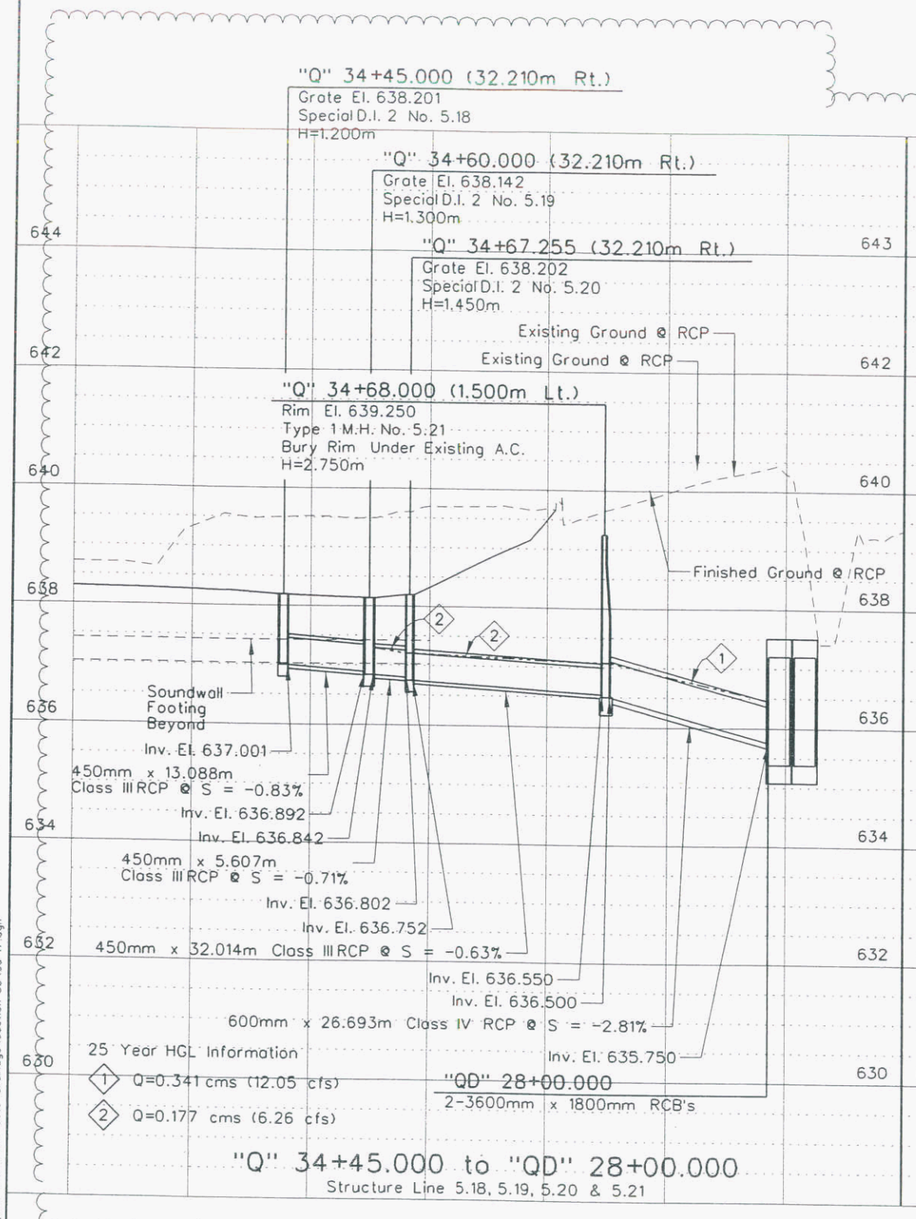
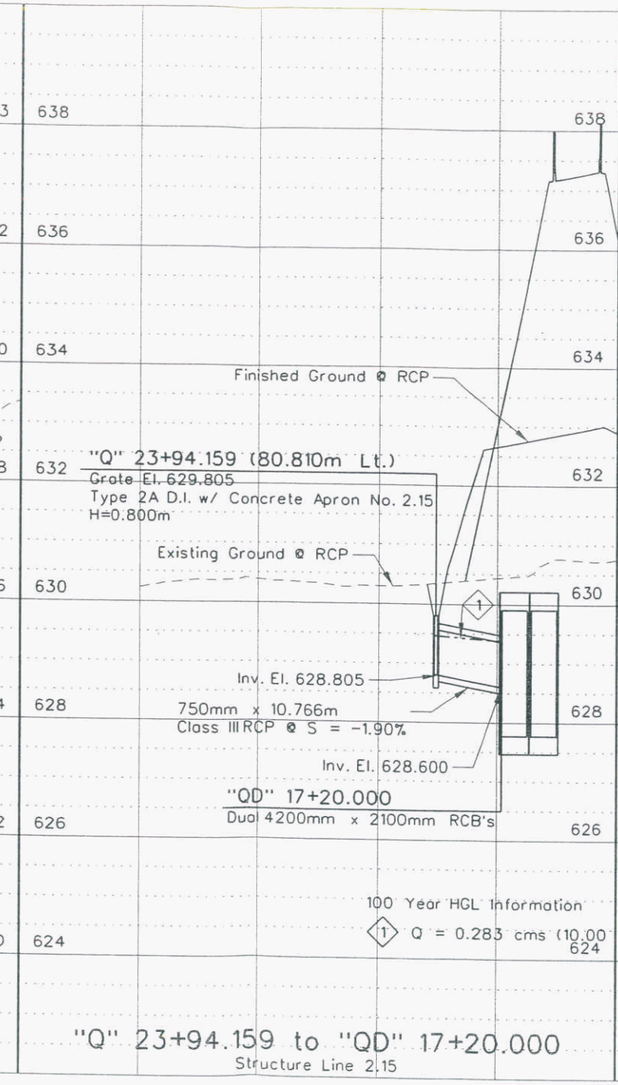
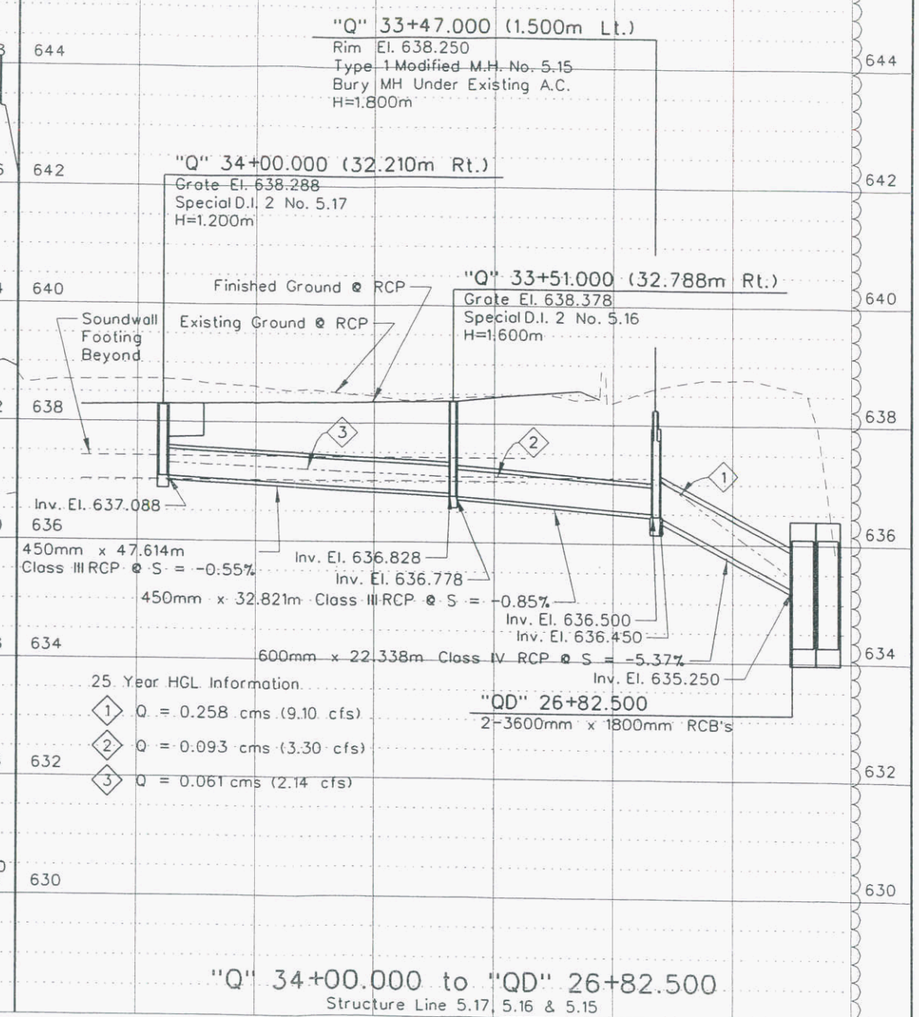
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-17
		REVISED 2-16-04		

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN







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STATE OF NEVADA
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DRAINAGE PROFILE

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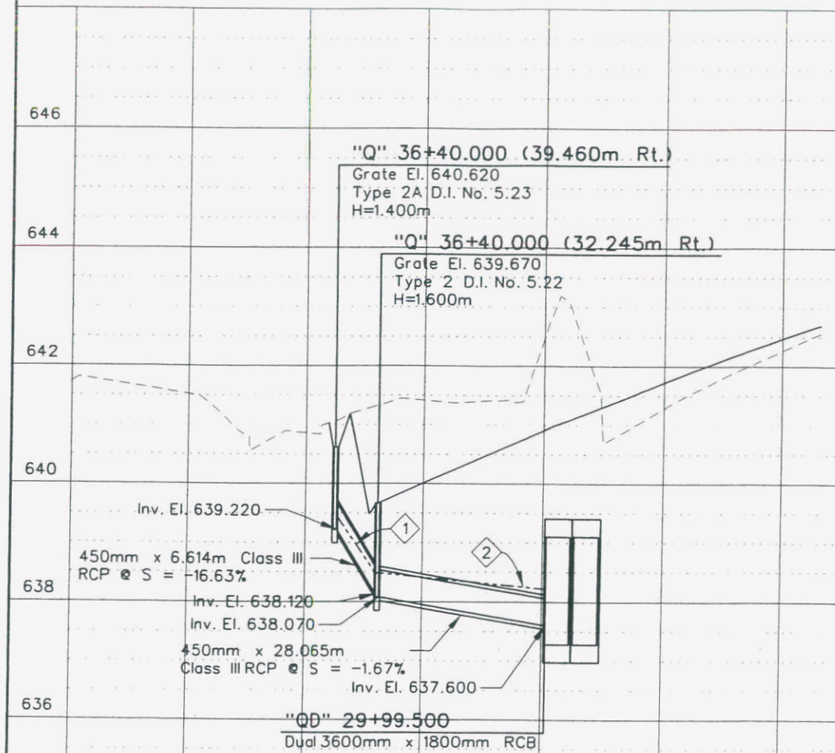
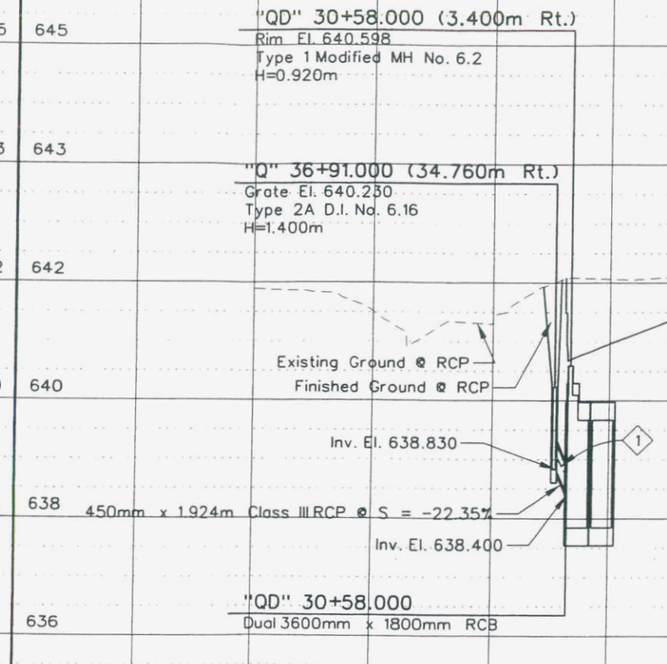
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-18

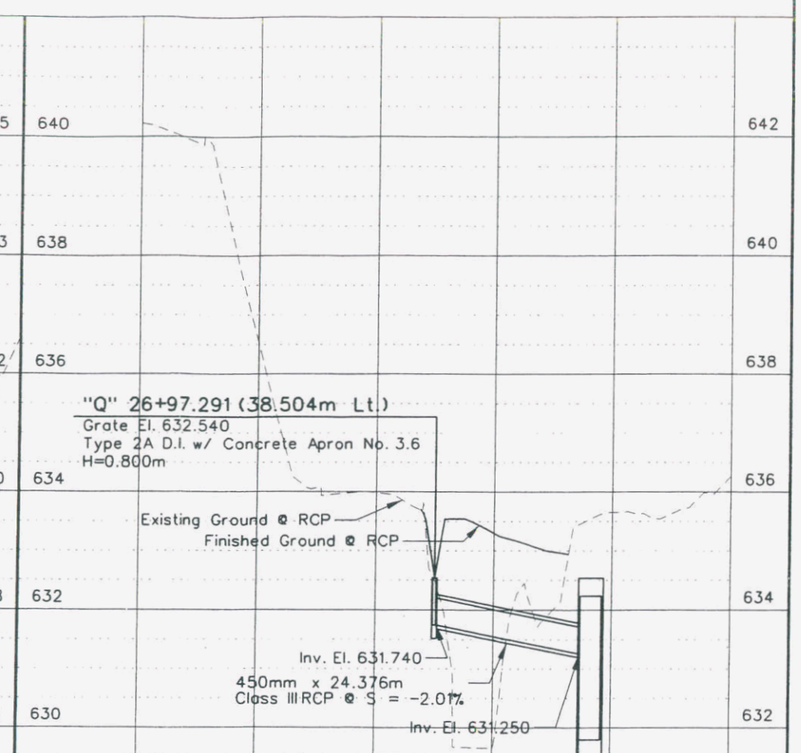
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



"Q" 36+40.000 to "QD" 29+95.500
Structure Line 5.23 & 5.22



"Q" 36+91.000 to "QD" 30+58.000
Structure Line 6.16 & 6.2



"Q" 26+97.291 to "RL" 19+60.000
Structure Line 3.6

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PROJECT 3B

DRAINAGE PROFILE

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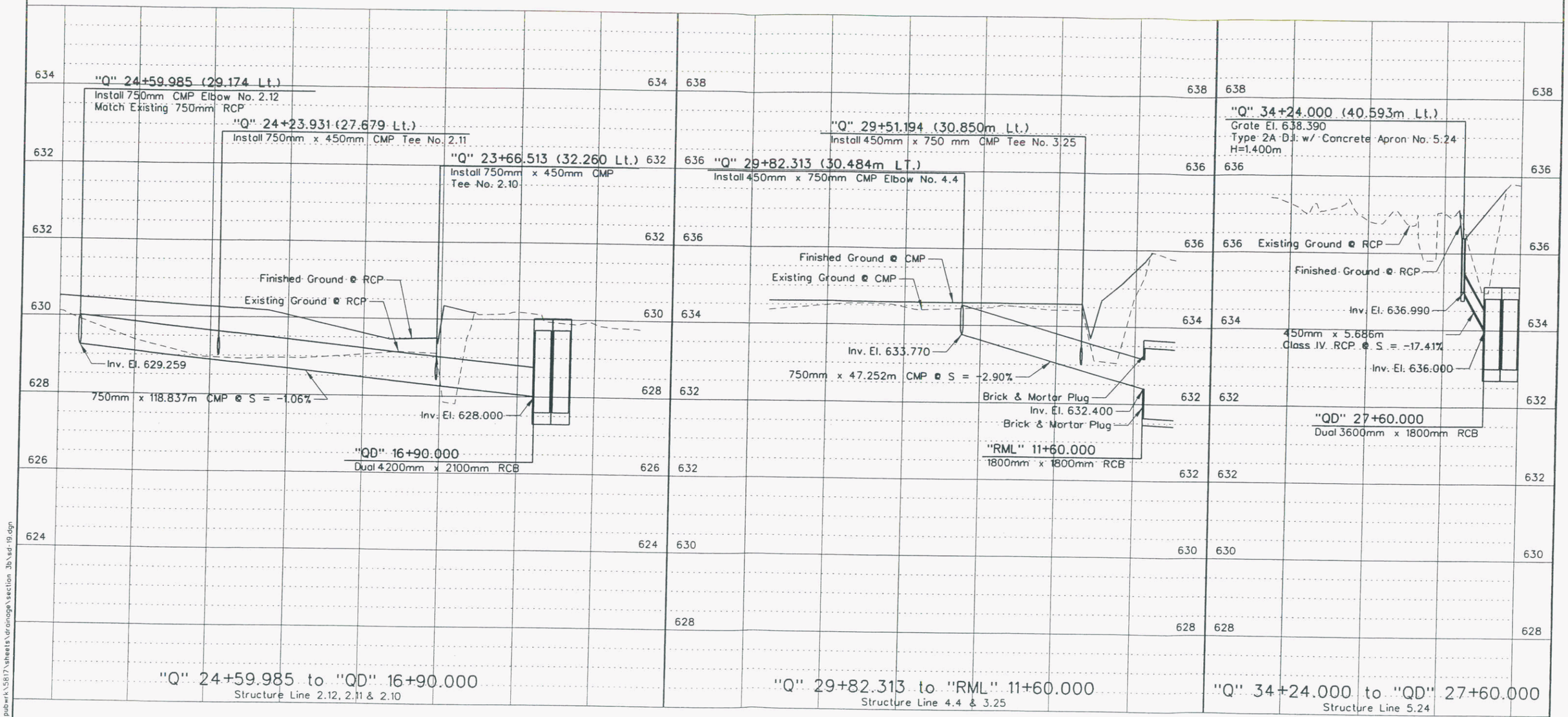
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-19

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



"Q" 24+59.985 to "QD" 16+90.000
Structure Line 2.12, 2.11 & 2.10

"Q" 29+82.313 to "RML" 11+60.000
Structure Line 4.4 & 3.25

"Q" 34+24.000 to "QD" 27+60.000
Structure Line 5.24

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U.S. 95 WIDENING
PROJECT 3B

DRAINAGE PROFILE

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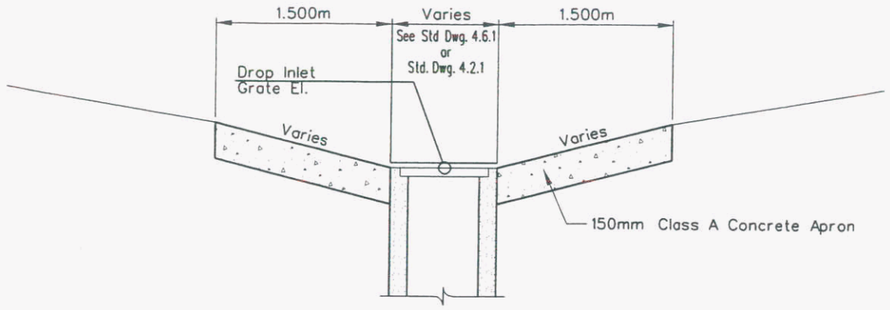
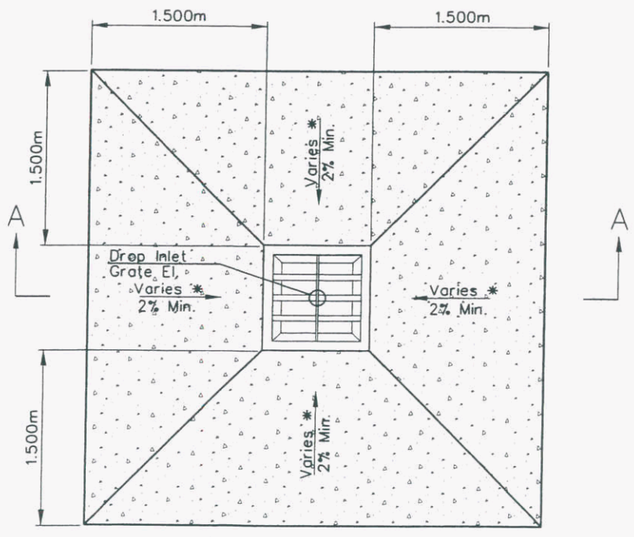
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-20

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



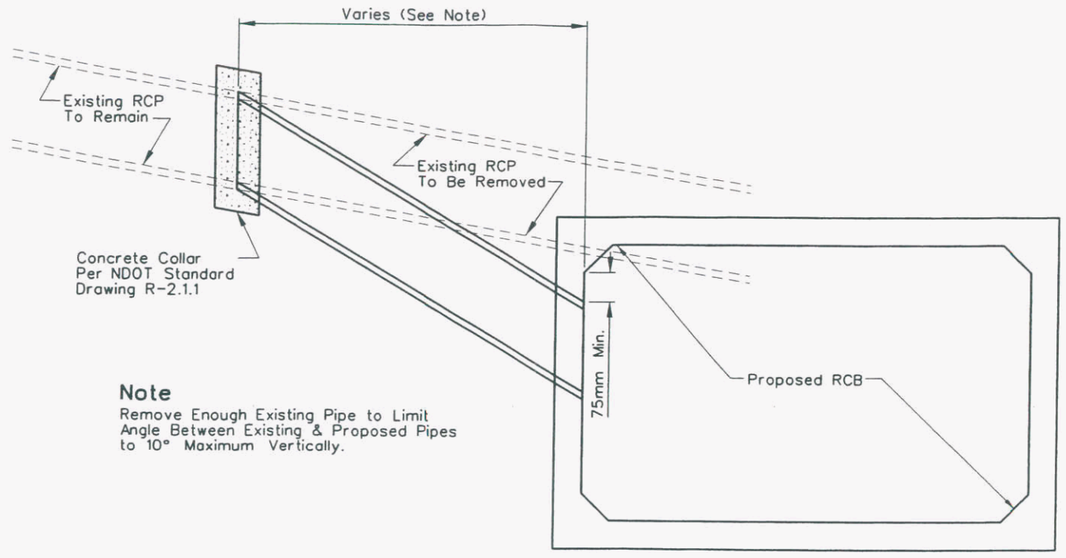
SECTION A-A



* Apron Slope Shall NOT Exceed 1(V) : 2(H).
Slopes Flatter Than 1:2 are Acceptable.

APRON PLAN

CONCRETE APRON



Note
Remove Enough Existing Pipe to Limit Angle Between Existing & Proposed Pipes to 10° Maximum Vertically.

EXISTING RCP/CMP CONNECTION TO PROPOSED RCB

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No. 12806
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STATE OF NEVADA
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U.S. 95 WIDENING
PROJECT 3B

DRAINAGE DETAILS

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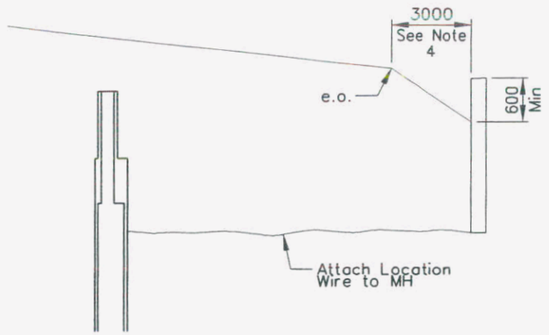
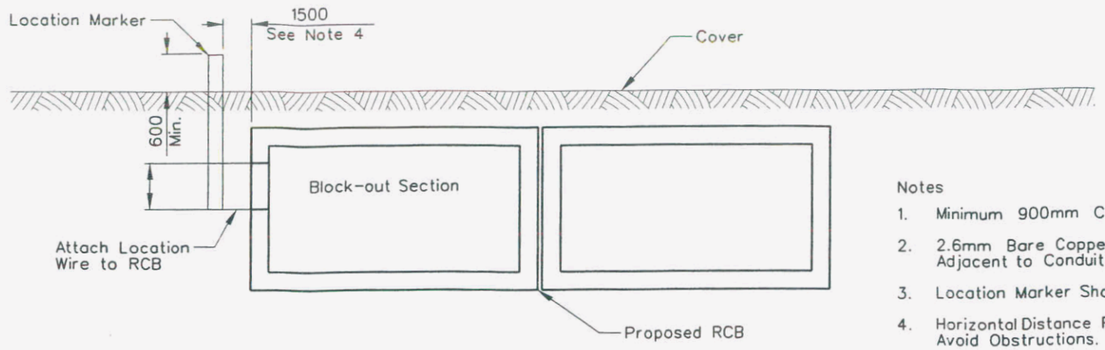
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-21

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



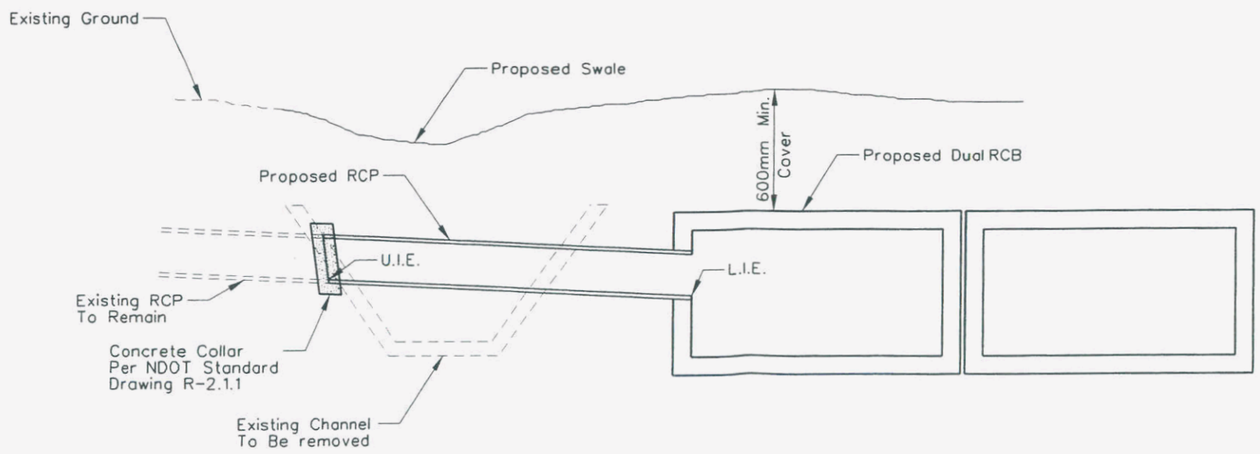
LOCATION MARKER CROSS-SECTION AT BURIED MANHOLE LOCATIONS



RCP BLOCK-OUT LOCATION MARKER CROSS-SECTION

Notes

1. Minimum 900mm CoverOver Top of Conduit at Shoulder Line.
2. 2.6mm Bare Copper Detection Wire to Lay in Trench Adjacent to Conduit and Attach to Location Marker at Each End.
3. Location Marker Shall be 50mm P.V.C.
4. Horizontal Distance From RCB May be Modified as Needed to Avoid Obstructions.



EXISTING RCP/CMP CONNECTION TO PROPOSED RCB

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE DETAILS

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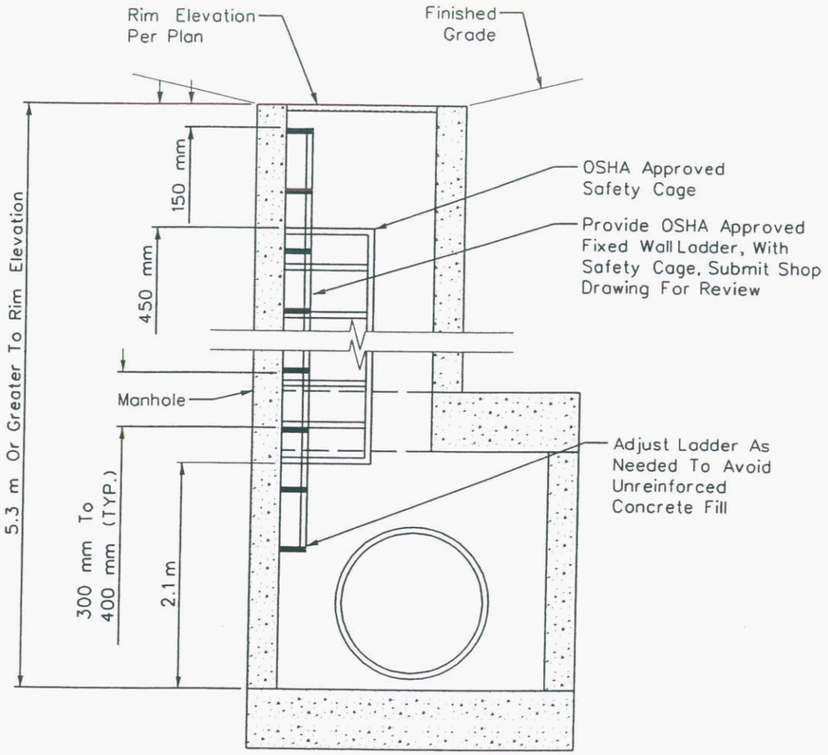
METRIC NDOT	FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
	9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-22

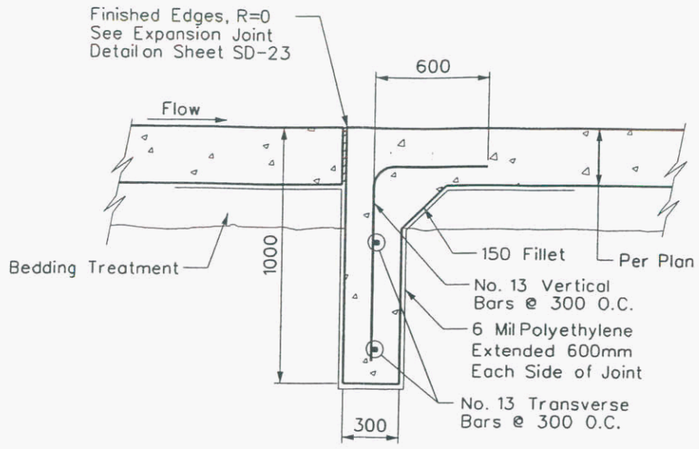
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



NOTE:

1. To Be Used When Manhole Is Greater Than 5.3 m Measured From Invert To Rim As Noted On The Drawings
2. Refer To SD-1 To SD-18 For Risers Which Require Safety Cages

SAFETY CAGE



CUTOFF WALL DETAIL

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

MISCELLANEOUS DETAILS

vtn nevada
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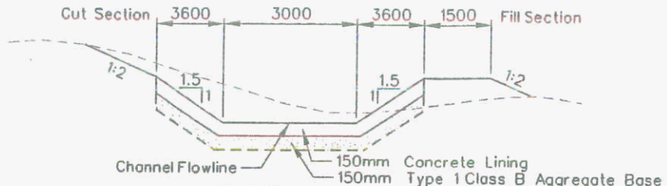
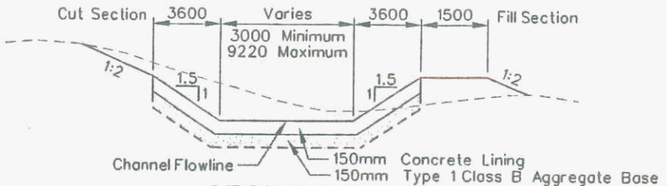
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-23

METRIC NDOT

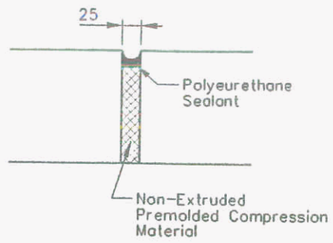
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



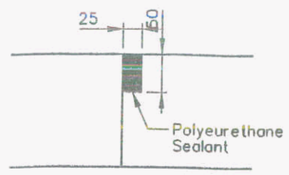
SECTION A



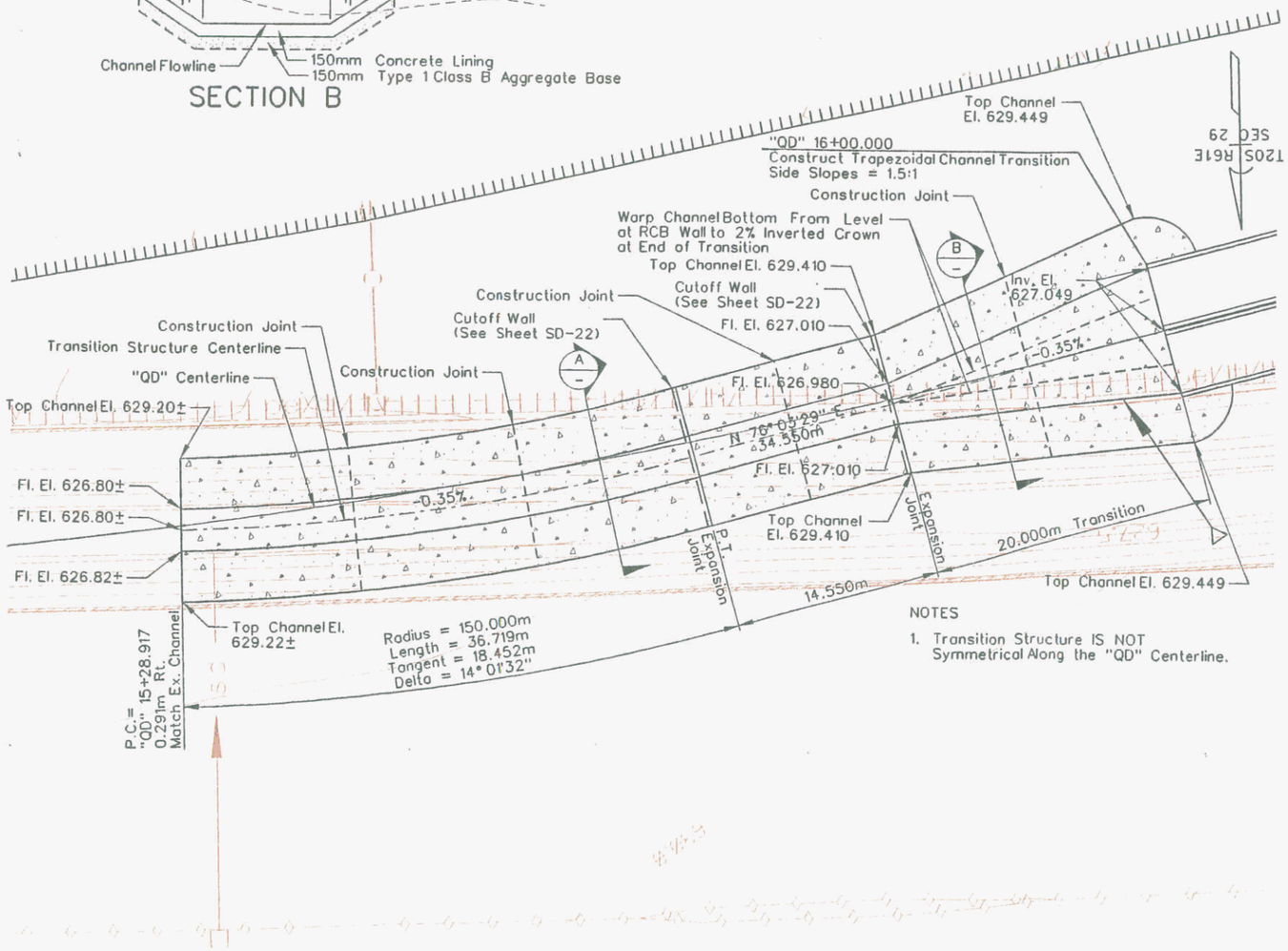
SECTION B



EXPANSION JOINT



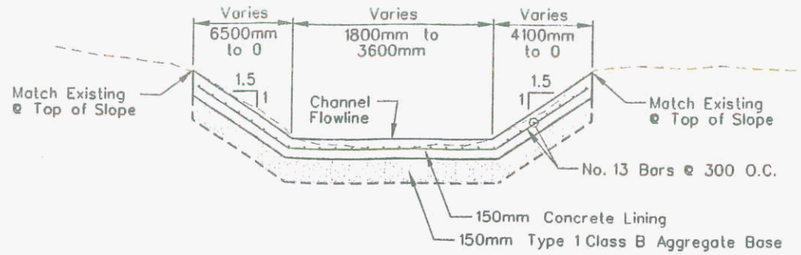
CONSTRUCTION JOINT



NOTES

1. Transition Structure IS NOT Symmetrical Along the "QD" Centerline.

CHANNEL CONNECTION DETAIL



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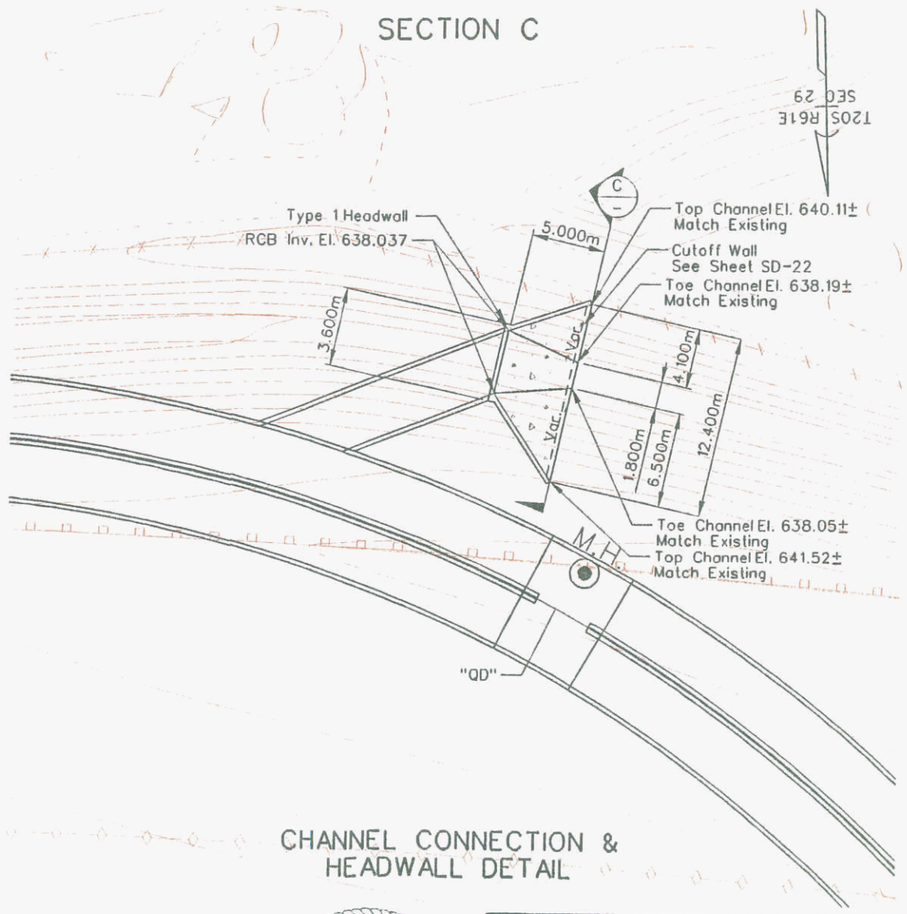

CHANNEL CONNECTION & HEADWALL DETAIL

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10/22/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE DETAILS

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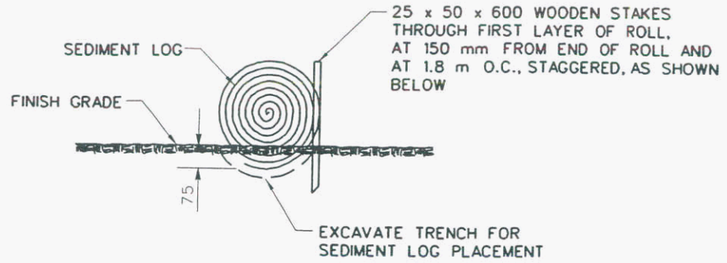
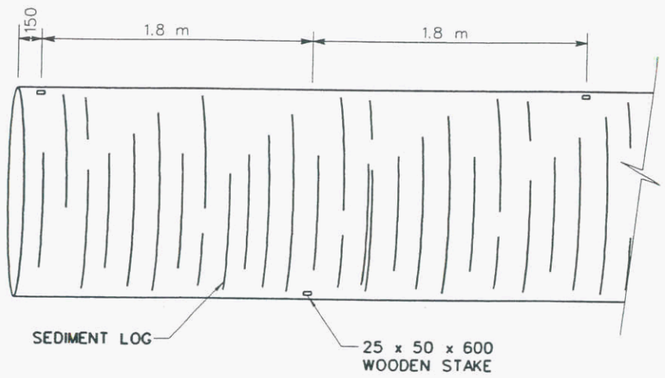
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-24



PLACING DETAIL

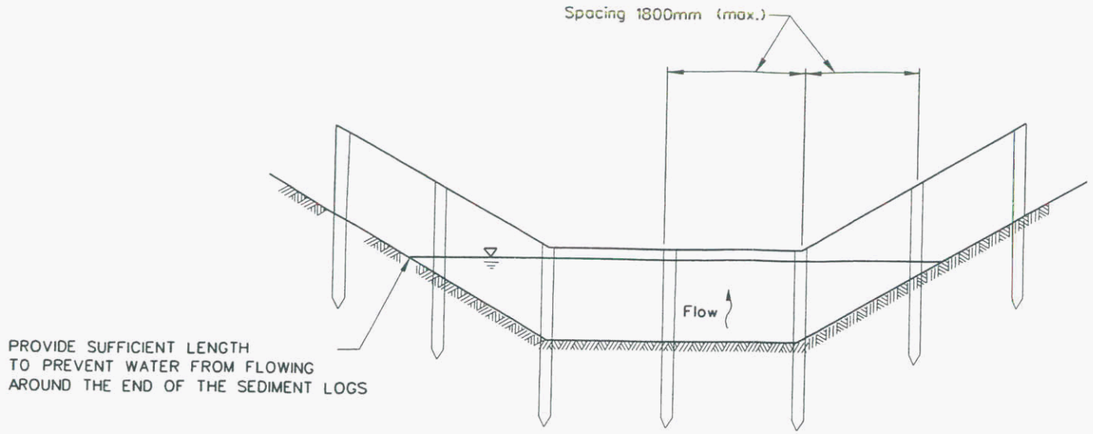


STAKING DETAIL

NOTES:

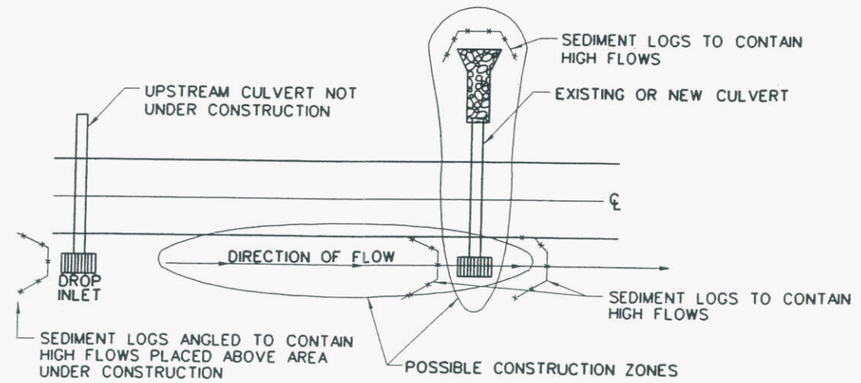
1. SEDIMENT LOGS ARE TUBES MADE FROM BIO-DEGRADABLE MATERIAL WITH PHOTO-DEGRADABLE NETTING. THEY ARE 305 mm IN DIAMETER AND AS LONG AS CAN BE CONVENIENTLY PLACED.
2. SEDIMENT LOGS SHOULD BE PLACED INTO A TRENCH, APPROXIMATELY 75 mm DEEP, AND SECURELY STAKED AT 1.80 m O.C., STAGGERED, WITH 25 mm x 50 mm x 600 mm WOODEN STAKES.

SEDIMENT LOGS



SEDIMENT LOG INSTALLATION IN A DRAINAGE DITCH
(See note 2)

SEDIMENT LOGS LOCATIONS
"Q" 21+50.000, 61.646m LT.
"Q" 22+00.000, 64.997m LT.
"Q" 24+00.000, 80.914m LT.
"Q" 25+00.000, 83.410m LT.
"Q" 26+00.000, 89.635m LT.
"Q" 28+00.000, 23.878m LT.
"Q" 30+00.000, 27.762m LT.
"Q" 31+00.000, 26.591m LT.
"Q" 23+00.000, 34.690m LT.
"Q" 24+00.000, 25.806m LT.
"Q" 25+00.000, 24.122m LT.
"Q" 26+00.000, 28.755m LT.
"Q" 29+00.000, 25.932m LT.
"Q" 31+00.000, 33.821m RT.
"Q" 36+10.000, 35.234m LT.



TYPICAL TEMPORARY EROSION CONTROL FOR CONSTRUCTION ACTIVITIES

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

11/21/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

EROSION CONTROL DETAIL

vtn nevada
CONSULTING ENGINEERS
PLANNERS
LAND SURVEYORS
2727 S. RAINBOW BLVD.
LAS VEGAS, NEVADA 89146
PHONE (702) 873-7550
FAX (702) 362-2597

DESIGN BY	JPL TH
DRAWN BY	HWB
CHECKED BY	JPL
REVIEWED BY	DWB

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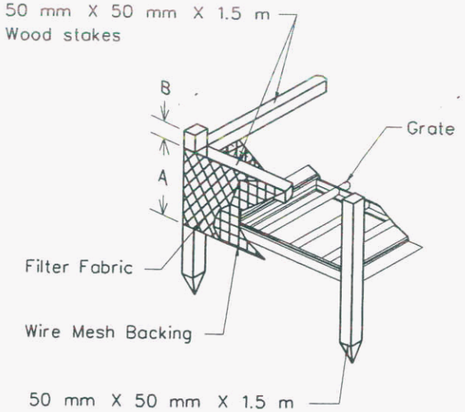
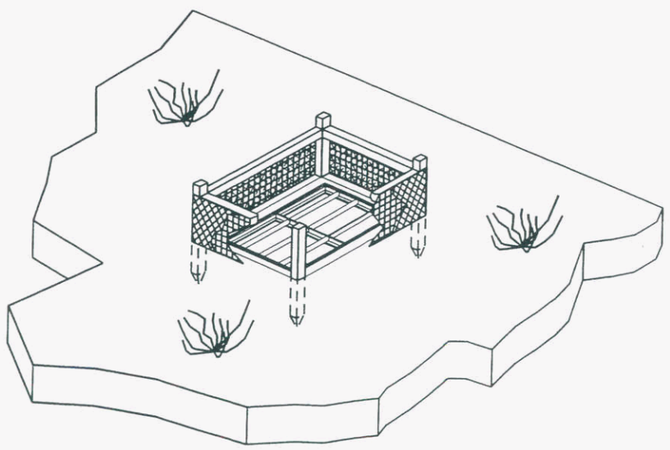
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-25

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



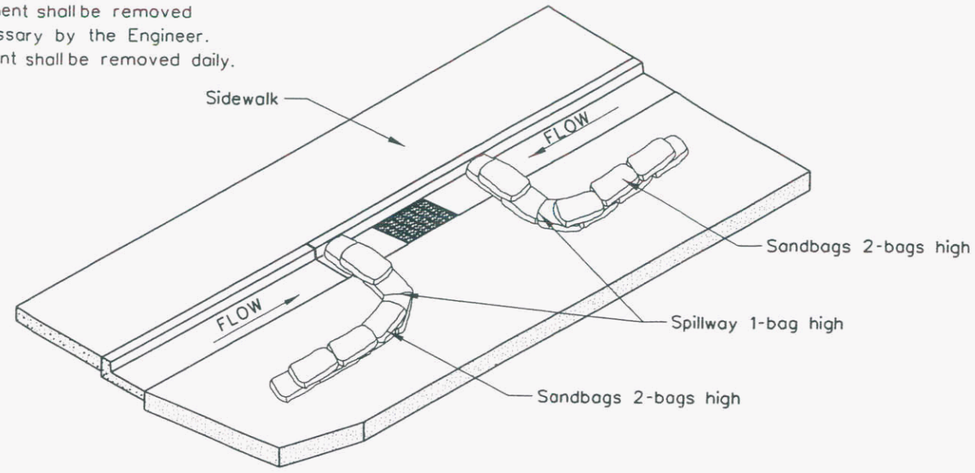
INFIELD PROTECTION LOCATIONS	
1.8	"Q" 23+59.072, 80.843m LT.
2.13	"Q" 25+82.157, 62.177m LT.
3.6	"Q" 26+97.291, 38.504m LT.
3.11	"Q" 27+92.425, 70.391m LT.
3.21	"Q" 29+27.000, 65.217m LT.
4.9	"Q" 31+19.609, 26.621m LT.
4.11	"Q" 32+22.000, 34.300m LT.
4.19	"Q" 32+75.000, 39.900m RT.
4.20	"Q" 29+84.884, 21.043m RT.
5.23	"Q" 36+40.000, 39.460m RT.
5.24	"Q" 34+24.000, 340.593m LT.
6.16	"QD" 36+91.000, 34.760m RT.



INFIELD INLET PROTECTION
IN MEDIAN, DITCH OR QUADRANT
(TYPE 2A SHOWN)

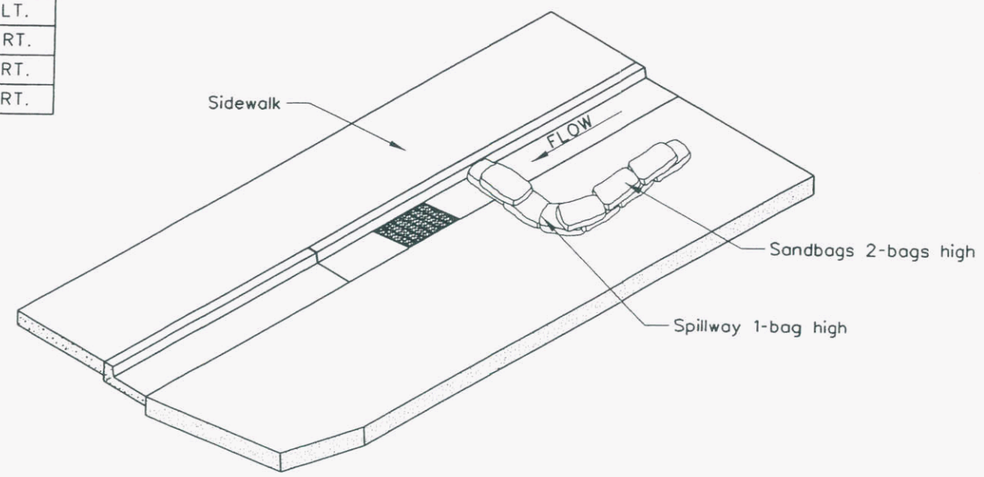
GENERAL NOTES:

1) Inlet protection shall be removed prior to work stoppages of 1 week or greater.
2) Materials shall conform to Section 637 of the Special Provisions.
3) Grates on grade - sediment shall be removed daily or as deemed necessary by the Engineer.
4) Grates in sump - sediment shall be removed daily.



INLET IN SUMP

ROADWAY PROTECTION LOCATIONS	
3.15	"Q" 27+83.576, 23.779m LT.
3.16	"Q" 28+09.935, 74.165m LT.
5.18	"Q" 34+45.000, 32.210m RT.
5.19	"Q" 34+60.000, 32.210m RT.
5.20	"Q" 34+67.255, 32.210m RT.



INLET ON GRADE

ROADWAY INLET PROTECTION
(TYPE 2 SHOWN)

PROFESSIONAL ENGINEER-STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806
11/21/03

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

EROSION CONTROL DETAIL

VTN nevada
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DESIGN BY	JPL TH
DRAWN BY	HWB
CHECKED BY	JPL
REVIEWED BY	DWB

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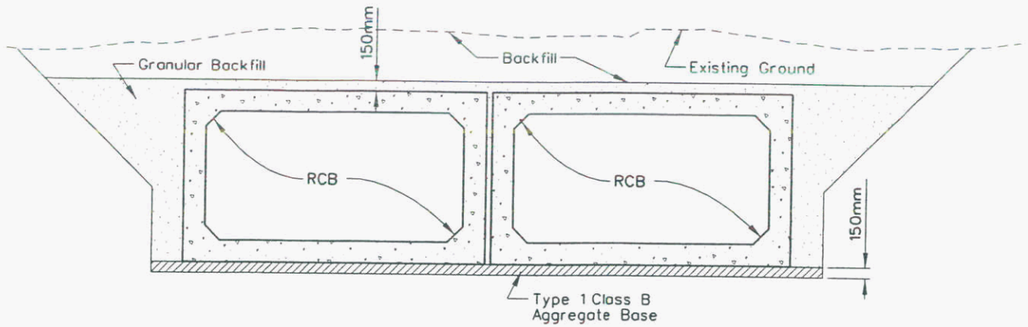
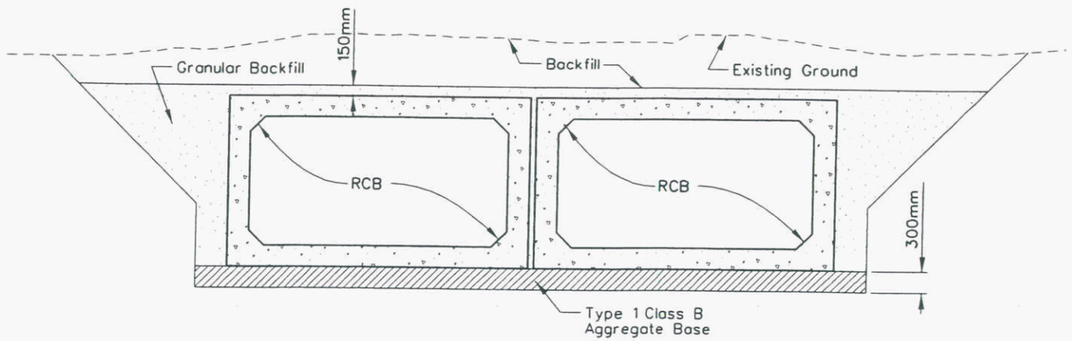
FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	EB-NH-095-2 (042)	CLARK	SD-26

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



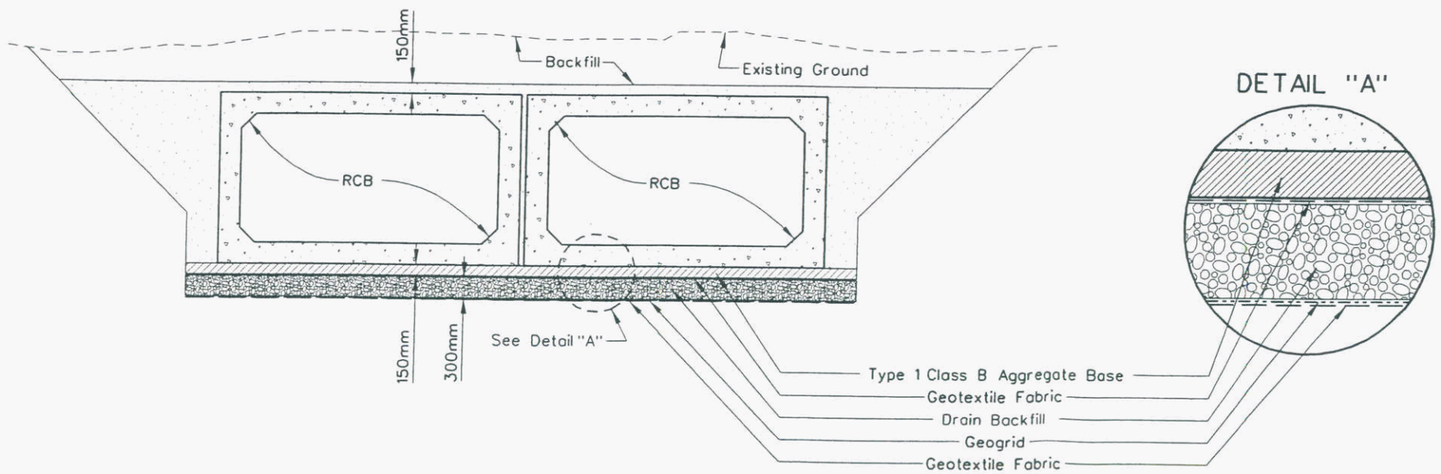
TYPICAL TRENCHING DETAIL - STABLE NON-CEMENTED SOIL

Engineer Estimate - 15% of RCB Area



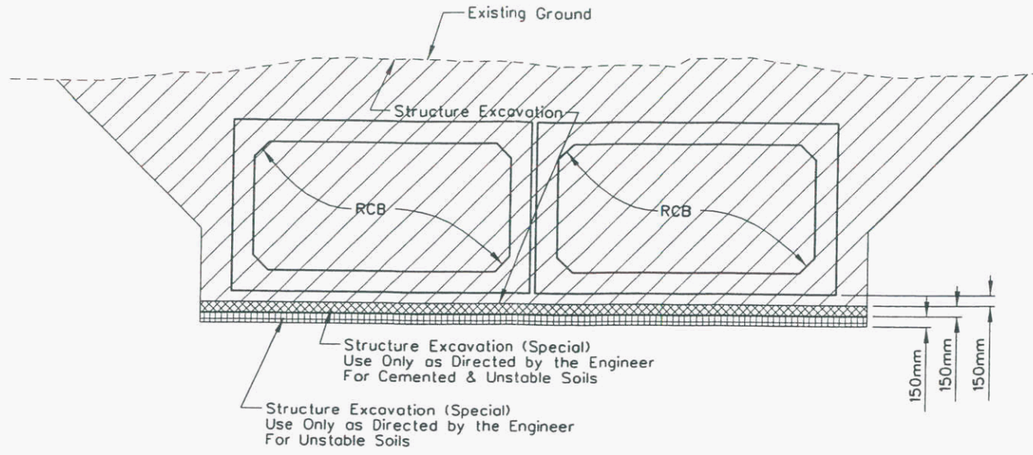
TYPICAL TRENCHING DETAIL - CEMENTED SOIL

Engineer Estimate - 20% of RCB Area



TYPICAL TRENCHING DETAIL - UNSTABLE SOIL

Engineer Estimate - 65% of RCB Area



TYPICAL TRENCHING DETAIL

Notes

1. Not to be Used for Structure Excavation and Backfill Quantities.
2. Structure Excavation & Granular Backfill Quantities are per NDOT Std. Dwg. R-1.1.4.
3. Backfill per section 207 of the Standard Specifications and Special Provisions to be Used Outside the Limits of Granular Backfill.
4. See NDOT Standard Plans for Geogrid Fabric.
5. Additional Excavation Beyond 150mm Below Bottom of Box Paid Under Structure Excavation (Special).

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL W. BENDER
Exp. 12/31/2004
CIVIL
No. 12806

11/21/07

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

U.S. 95 WIDENING
PROJECT 3B

DRAINAGE DETAILS

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PLANNERS
LAND SURVEYORS
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DESIGN BY	JPL
DRAWN BY	WBM
CHECKED BY	JPL
REVIEWED BY	DWB

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Appendix E: Revised Annotated FIRM Map

JOINS PANEL 2160

ZONE X

ZONE AO
(DEPTH 1)

29

100-YEAR FLOOD CONTAINED IN CHANNEL/STORM DRAIN

ZONE X

RANCHO LATERAL

MAIN LINE

GR1298

GR1115

GR1114

GR1113

GR1104

LA MARK AVENUE
SUTRO WAY
LA HARVE DRIVE
CANARY WAY
FAIR AVE
SUTRO LANE
MILLS CIRCLE
FAIR AVE
OPHIR DRIVE
GOLD AVENUE
VAN BUREN AVENUE
JACKSON AVENUE
MONROE AVENUE
HAND PLACE
MADISON AVENUE
JEFFERSON AVE
M ST ADAMS AVE
REED PL
MORGAN AVENUE
GERSON AVENUE
MCWILLIAMS AVENUE
WASHINGTON AVENUE
MAY LANE
SLEEPY COURT
ERNEST
BONANZA ROAD
AVALON AVENUE
MESQUITE AVENUE
GRANITE AVENUE
ALTA DRIVE
RAMONA CIRCLE
TAMERACK AVE
DUNE DRIVE
OASIS AVE
ARROWHEAD AVENUE
TUMBLEWEED AVENUE
RANCHO DRIVE
ARROW PL DRIVE
RIVERSIDE DRIVE
SILVER AVE
MAGNOLIA AVENUE
ORANGE AVE
VERNON LAKE DR
BAKER AVE
HAZARD AVE
SAHARA AVENUE
ROBIN STREET
NYE STREET
SPRUCE CIRCLE
MAENPAH DRIVE
MEZPAH DRIVE
VIRGINIA CITY AVENUE
COMSTOCK DRIVE
RALSTON DRIVE
SHARON ROAD
BOULEVARD
N STREET
J STREET
H STREET
G STREET
IVY LANE
I STREET
CUNNINGHAM DRIVE
M STREET
DOWN WAY
LEVY LANE
CARTER STREET
DIKE LANE
EVERBACK LANE
KAPLAN WAY
ROAD
TONOPAH
CLARKWAY DRIVE
SUNNY PL
L KING
BELROSE STREET
RAMSEY STREET
ONYX WAY
ZIRCON CIR
AMBER CIR
JADE CIR
DIAMOND CIRCLE
LANE
SHADOW
MARTIN

GRAPHIC SCALE

1000 0 500 1000 2000 4000

(IN FEET)

1 inch = 1000 ft.

PANEL 2170 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2170 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2170	E
NORTH LAS VEGAS, CITY OF	320007	2170	E
LAS VEGAS, CITY OF	320276	2170	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2170 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

N

PBSJ

511606 February 2006

FIGURE 4
ANNOTATED FEMA MAP

US 95 Widening - Rancho Lateral LOMR

PBSJ
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200

ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

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