

DS #: 455.0

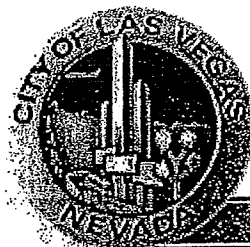
APN: 138-28-401-015

PROJECT: Westcliff Pines 2 - Update #1

SUBMITTAL: 3rd

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:

August 29, 2012

TO:

Land Development Services
Department of Public Works

FROM:

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

SUBJECT:

Drainage Study for:

Westcliff Pines 2 – Update #1

COPIES TO:

L.R. Nelson Consulting Engineers

HAND Property Holding Company

Bart Anderson, P.E., DevCo

Cross Streets:

SEQ of Summerlin Pkwy. & Durango Drive

File Number:

F:\Depot\DSMemos\DS4550C.doc

Parcel Number:

138-28-401-015

Zoning Action:

SDR-44166

FEMA Flood Zone

YES

NO

X

Proposed Storm Drain

YES

NO

X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	2/9/2012	2/23/2012	Not Approved	\$400.00	273967: \$400
2 nd Submittal & Supplement	3/6/2012 & 3/21/2012	3/22/2012	Approved	\$400.00	276483: \$400
3 rd Submittal	8/20/2012	8/29/2012	See Comments Below	\$100.00	293292: \$100
TOTAL FEES (LDDRS):				\$900.00	----

REMARKS:

3rd Submittal: Update #1 to modify building footprint on the northern half of the development with addition of a pool and a community recreation building

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

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

The following conditions are repeated until they are complete:

- Per Condition #17 of SDR-44166: Contact the *City Engineer's Office* at 229-6272 to coordinate the development of this project with the "*Summerlin Parkway Widening Improvement Project*" (H#12970) and any other public improvement projects adjacent to this site. Comply with the recommendations of the *City Engineer*.
- Add a note in all grading plans for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on **July 1, 2011**. If there are any questions regarding these new requirements, please contact Albert Sung in the Flood Section at (702) 229-2001 or Rick Schroder in Traffic Engineering at (702) 229-6327.

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

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

END OF REMARKS

ays

T/R/S: T20S/R60E/28
AREA L-28

**UPDATE #1
TECHNICAL DRAINAGE
STUDY FOR
WESTCLIFF PINES 2**

CITY OF LAS VEGAS, NEVADA

Project Number: 818-021-111

August 2012

Prepared For: Nevada H.A.N.D.
295 Warm Springs Road, Suite 101
Las Vegas, Nevada 89119
Phone: (702) 739-3345
Fax: (702) 739-3305

Prepared By: L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Westcliff Pines 2 Date: August 14, 2012
Location of Development: a) Descriptive (Cross Streets) North/South: Roland Wiley
East/West: Silver Sky
b) Section: 28 Township: 20S Range: 60E
c) APN: 138-28-401-015

Name of Owner: HAND Property Holding Company
Telephone No.: 739-3345 Fax No.: 739-3305 E-Mail Address: _____
Address: 295 E. Warm Springs Road, #101, Las Vegas, NV 89119

Contact Person-Name: Jon Hayslip Telephone No.: (702) 798-7978
* E-Mail Address: jon.hayslip@lrneng.com Fax No.: (702) 451-2296
Firm: L. R. Nelson Consulting Engineers, Inc.
Address: 6765 W. Russell Road, Suite 200, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 5.24 ac Being Developed/Disturbed: 5.16 ac
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes** ☒ No
4. Proposed type of development (Residential, Commercial, Etc.): Multi-family residential
5. Approximate upstream land area which drains to the subject site: 10.62 ac (ref. DS3640)
6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Silver Sky Assisted Living, TRC 2004 (DS3640); Westcliff Pines 2, LRN 2012 (DS4550)
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Roland Wiley & private offsite storm drains existing d/s of site
8. Briefly describe your proposed schedule for the subject project: As soon as possible.

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

***New Required Field**

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

Exp. 6/30/13
Engineer's Seal

DS4550
Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Project Number: 818-021-081

August 20, 2012

Mr. Albert Sung, P.E.
City of Las Vegas
Engineering Planning
Development Services Center
Flood Control Section
333 N. Rancho Drive
7th Floor
Las Vegas, Nevada 89106

**Re: Update #1 to the Technical Drainage Study for Westcliff Pines 2
(DS4450)**

Dear Mr. Sung:

The Technical Drainage Study for Westcliff Pines 2 was conditionally approved by the City of Las Vegas on February 23, 2012. Since the last approval of this project, the site plan has been revised per the owners request to modify the building footprint on the northern half of the site, add a pool and community recreation building for the residents.

Site Revisions

The original configuration for Building No. 1 was in the shape of "U" where the proposed footprint was shown in a North-South direction for the West and East portion connected by East-West section adjoining the two halves in one continuous structure. The proposed revision will eliminate the North-South building portion on the East half as shown on Sheet GR1 and will be replaced with a Community Recreation building along with a pool area. Proposed revisions are enclosed with a red bubble.

The area drains and connecting storm drain system within the original courtyard area have been eliminated within the Northern building. With addition of the Community Recreation building and pool area, the drainage patterns have been revised slightly to surface flow in the adjacent parking areas and drive aisle. The proposed site revisions for Westcliff Pines 2 are outlined within the red bubbled area shown on Sheets GR1, GR2, SD1 and DT1 with this submittal. With these changes, the drainage basins have been revised accordingly along with the northern onsite storm drain conveyance flow rate.

Hydrologic Revisions

Revisions to the onsite drainage basins are shown on Revised Figure 11 in Appendix A. Basins ON2D, ON3D and ON4D configurations changed the storm runoff calculations were revised and results from the updated HEC-1 (Appendix B) indicate the 100-Year design storm flow rate remains unchanged. The 10-Year design storm flow rate is reduced by 1 cfs. Since the courtyard area storm drain system has been eliminated and the 1 cfs originally capture will now surface flow into the parking area and drive aisle along the northeast side of property. The 100-Year flow captured in the 10-ft Type 'A' drop inlet has increased from 6 cfs to 7 cfs.

Hydraulic Revisions

The minor changes to the drainage basins and updated hydrologic analysis indicate the previously design storm drain system will accommodate the revisions. Depth of flow calculations (Appendix C) are provided for cross-section 3 and 4 along the northern drive aisle for the 100-Year design storm flow rate. A revised capture depth at the entrance to the 10-ft Type 'A' drop inlet for the 7 cfs is included in Appendix C. An updated WSPG analysis (Appendix C) for the northern storm drain system has been provided for the 1 cfs removed from the courtyard area drain/storm drain system and added to the 10-ft Type 'A' drop inlet at COM2 node shown on the revised drainage basin map shown in Appendix A. Sheet SD1 profiles the revised storm drain system and updated 100-Year HGL.

Referenced Documents & Information

With this submittal, the following items are provided in support of this update:

- Standard Form 1,
- Check in the Amount of \$100 for the review of this Update,
- Updated drawings with the revisions shown in red,
- A copy of the previous approval letter dated March 22, 2012,
- A copy of the previously approved plans.
- One (CD) of Update #1 drainage study & plans.

If you have any questions regarding Update #1, please contact this office at (702) 798-7978.

Appendix A: Figures

Basin	Area (ac)	CN Value	Q10 (cfs)	Q100 (cfs)	Remarks
ON1D	0.53	94.4	1	2	DRAINS TO STREET
ON2D	2.08	94.4	3	6	DRAINS TO COM1
ON3D	0.69	94.4	1	2	DRAINS TO COM2
ON4D	1.46	94.4	2	5	DRAINS TO COM2
ON5D	0.41	94.4	1	1	DRAINS TO COM1
COM1	2.49	n/a	4	7	OUTLET TO EX OFFSITE SD
COM2	2.15	n/a	3	7	OUTLET TO EX OFFSITE SD

LEGEND

BASIN BOUNDARY LINE

FLOW DIRECTION

OFF1

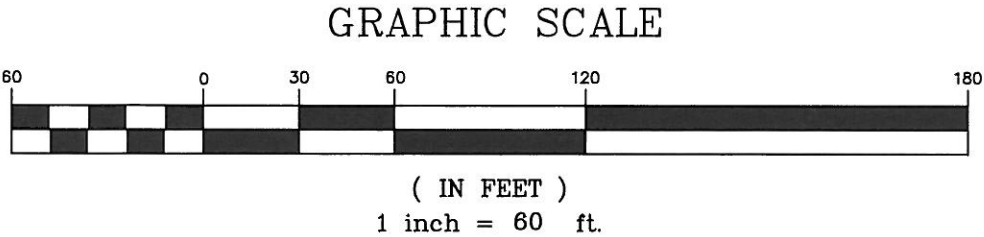
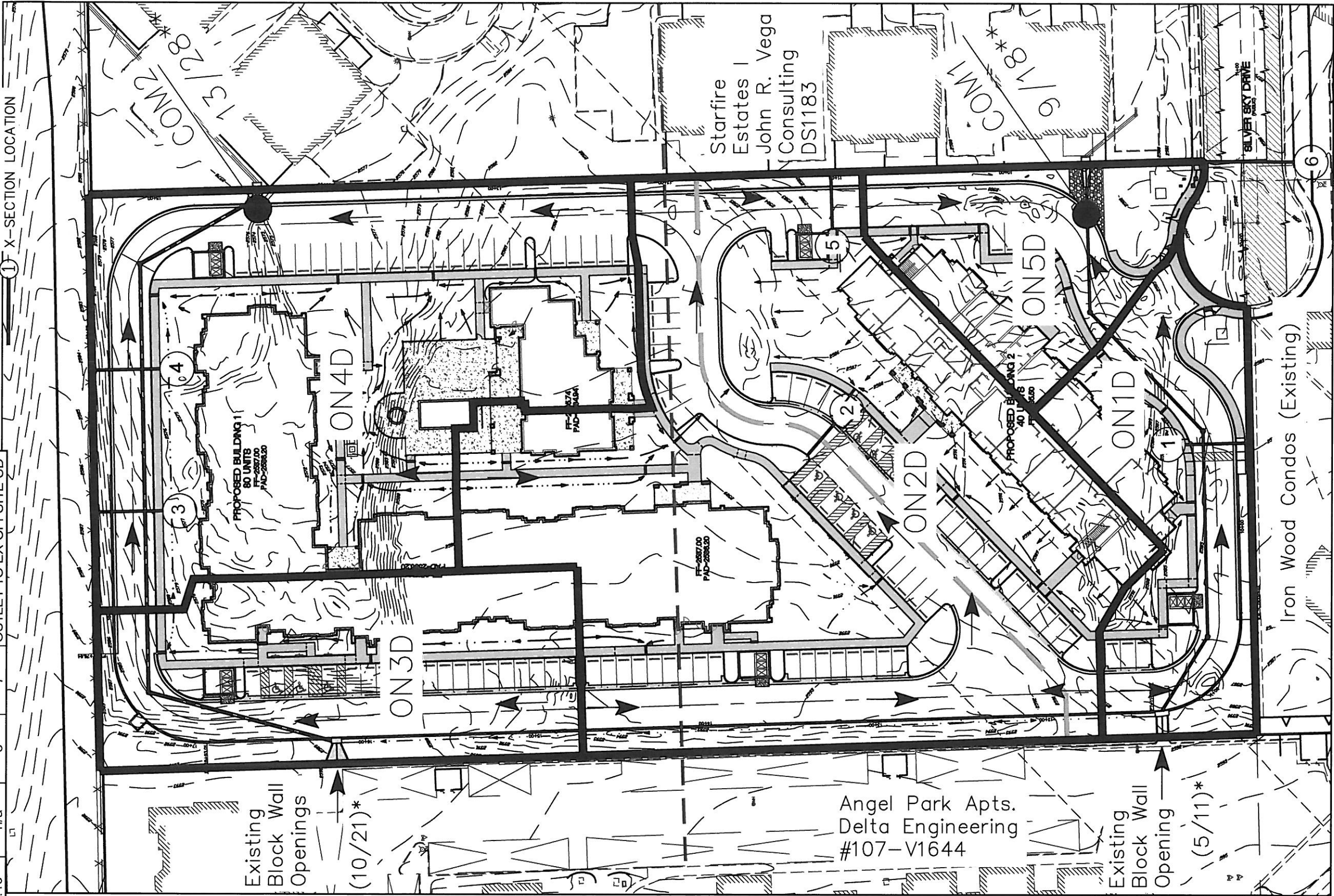
BASIN NAME

CONCENTRATION/COMBINATION POINT

COM1

COMBINATION POINT NAME

X-SECTION LOCATION



*REFER. 10-YR/100-YR FLOW RATE
SILVER SKY ASSISTED LIVING TDS
TRC 2004, DS3640

** OFFSITE + ONSITE FLOW RATES COMBINED

FIGURE 11
REVISED

PROPOSED ONSITE DRAINAGE BASIN MAP

Appendix B: Hydrologic Analysis

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 16AUG12 TIME 10:36:38
*
*****

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```

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

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

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

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

1

HEC-1 INPUT

PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1          ID
2          ID      TECHNICAL DRAINAGE STUDY FOR WESTCLIFF PINES
3          ID      CITY OF LAS VEGAS, NEVADA
4          ID
5          ID      PREPARED BY:      L.R. NELSON CONSULTING ENGINEERS, INC.
6          ID      6765 W. RUSSELL ROAD, SUITE 200
7          ID      LAS VEGAS, NV 89118
8          ID
9          ID      FILENAME:WPDEV2R3.DAT
10         ID      JOB# 818-018-111
11         ID      DEVELOPED CONDITION - UPDATE #1
12         ID      TECHNICAL DRAINAGE STUDY
13         ID      RATIOS APPLIED FOR 10-YEAR (0.57) AND 100-YEAR (1.0) DESIGN STORM
14         ID
15         *DIAGRAM
16         IT      5      0      0      300
17         IO      5
18         IN      5
19         JR      PREC      0.57      1.0
20
21         KK      ON2D
22         KM      DEVELOPED ONSITE BASIN ON2D
23         BA      .00326
24         PB      2.77
25         PC      .000      .020      .057      .070      .087      .108      .124      .130      .130      .130
26         PC      .130      .130      .130      .133      .140      .142      .148      .158      .172      .181
27         PC      .190      .197      .199      .200      .201      .204      .214      .229      .241      .249
28         PC      .251      .256      .270      .278      .281      .283      .295      .322      .352      .409
29         PC      .499      .590      .710      .744      .781      .812      .819      .835      .851      .856
30         PC      .860      .868      .876      .888      .910      .926      .937      .950      .970      .976
31         PC      .982      .985      .987      .989      .990      .993      .993      .994      .995      .998
32         PC      .998      .999      1.00
33         LS      0      94.4
34         UD      .089
35         *
36
37         KK      RTE1
38         KM      ROUTE ON2D THROUGH ON5D
39         RD      130      .005      .013      TRAP      24      0
40         *
41
42         KK      ON5D
43         KM      DEVELOPED ONSITE BASIN ON5D - Tc SET TO 5 MIN SINCE CALC'D = 4.9 MIN
44         BA      .00064
45         LS      0      94.4
46         UD      .050
47         *
48
49         KK      COM1
50         KM      COMBINE BASIN FLOW INTO SUMP
51         HC      2
52         *

```

LINE	ID	1	2	3	4	5	6	7	8	9	10
44	KK	ON1D									
45	KM	DEVELOPED ONSITE BASIN ON1D - DRAINS TO SILVER SKY									
46	BA	.00080									
47	LS	0	94.4								
48	UD	.06									
	*										
49	KK	ON3D									
50	KM	DEVELOPED ONSITE BASIN ON3D									
51	BA	.00108									
52	LS	0	94.4								
53	UD	.066									
	*										
54	KK	RTE2									
55	KM	ROUTE ON3D TO SUMP DROP INLET IN ON4D									
56	RD	320	.0062	.013			TRAP	24		0	
	*										
57	KK	ON4D									
58	KM	DEVELOPED ONSITE BASIN ON4D									
59	BA	.00228									
60	LS	0	94.4								
61	UD	.065									
	*										
62	KK	COM2									
63	KM	COMBINE BASINS IN SUMP DROP INLET IN ON4D									
64	HC	2									
	*										
65	ZZ										

1

```

SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
LINE      (V) ROUTING      (--->) DIVERSION OR PUMP FLOW
NO.      (.) CONNECTOR    (<---) RETURN OF DIVERTED OR PUMPED FLOW

19      ON2D
        V
        V
33      RTE1
        .
        .
36      .      ON5D
        .
        .
41      COM1.....
        .
        .
44      .      ON1D
        .
        .
49      .      .      ON3D
        .      .      V
        .      .      V
54      .      .      RTE2
        .      .
57      .      .      .      ON4D
        .      .      .
62      .      .      COM2.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   JUN 1998                  *
*   VERSION 4.1              *
* RUN DATE 16AUG12 TIME 10:36:38 *
*****

```

```

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

```

TECHNICAL DRAINAGE STUDY FOR WESTCLIFF PINES CITY OF LAS VEGAS, NEVADA

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

FILENAME:WPDEV2R3.DAT
JOB# 818-018-111
DEVELOPED CONDITION - UPDATE #1
TECHNICAL DRAINAGE STUDY
RATIOS APPLIED FOR 10-YEAR (0.57) AND 100-YEAR (1.0) DESIGN STORM

```

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

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

           COMPUTATION INTERVAL      .08 HOURS
           TOTAL TIME BASE      24.92 HOURS

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

JP         MULTI-PLAN OPTION
           NPLAN      1  NUMBER OF PLANS

JR         MULTI-RATIO OPTION
           RATIOS OF PRECIPITATION
           .57      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	RATIO 2
				.57	1.00
HYDROGRAPH AT					
+	ON2D	.00	1	FLOW TIME	3. 3.50
ROUTED TO					
+	RTE1	.00	1	FLOW TIME	3. 3.50
HYDROGRAPH AT					
+	ON5D	.00	1	FLOW TIME	1. 3.50
2 COMBINED AT					
+	COM1	.00	1	FLOW TIME	4. 3.50
HYDROGRAPH AT					
+	ON1D	.00	1	FLOW TIME	1. 3.50
HYDROGRAPH AT					
+	ON3D	.00	1	FLOW TIME	1. 3.50
ROUTED TO					
+	RTE2	.00	1	FLOW TIME	1. 3.58
HYDROGRAPH AT					
+	ON4D	.00	1	FLOW TIME	2. 3.50
2 COMBINED AT					
+	COM2	.00	1	FLOW TIME	3. 3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL		VOLUME
							PEAK	TIME TO PEAK	
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1	RATIO=	.00							
RTE1	MANE	1.10	3.10	211.04	1.04	5.00	3.00	210.00	1.04
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1806E+00 EXCESS= .0000E+00 OUTFLOW= .1806E+00 BASIN STORAGE= .1939E-03 PERCENT ERROR= -.1									
FOR PLAN = 1	RATIO=	.00							
RTE1	MANE	.84	6.15	210.90	2.17	5.00	6.03	210.00	2.17
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3767E+00 EXCESS= .0000E+00 OUTFLOW= .3768E+00 BASIN STORAGE= .1945E-03 PERCENT ERROR= -.1									
FOR PLAN = 1	RATIO=	.00							
RTE2	MANE	3.25	1.04	214.50	1.04	5.00	1.01	215.00	1.04
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5974E-01 EXCESS= .0000E+00 OUTFLOW= .5985E-01 BASIN STORAGE= .4701E-03 PERCENT ERROR= -1.0									
FOR PLAN = 1	RATIO=	.00							
RTE2	MANE	2.92	2.10	213.38	2.17	5.00	1.99	210.00	2.17
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1249E+00 EXCESS= .0000E+00 OUTFLOW= .1251E+00 BASIN STORAGE= .4981E-03 PERCENT ERROR= -.6									

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

Appendix C: Hydraulic Analysis

Cross Section for Onsite Section 3 - Q100

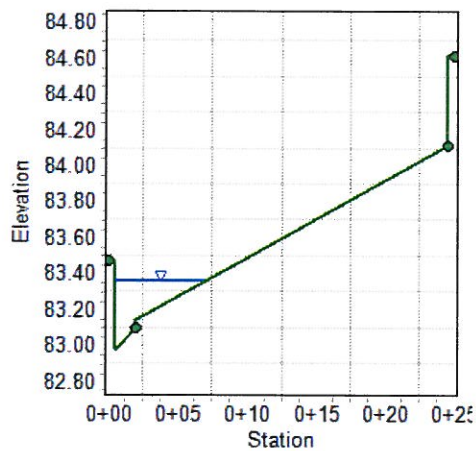
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.39	ft
Discharge	2.00	ft ³ /s

Cross Section Image



Worksheet for Onsite Section 3 - Q100

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 2.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	83.47
0+00.50	83.47
0+00.50	82.97
0+02.00	83.10
0+02.00	83.14
0+24.50	84.12
0+24.50	84.62
0+25.00	84.62

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 83.47)	(0+02.00, 83.10)	0.013
(0+02.00, 83.10)	(0+24.50, 84.12)	0.016
(0+24.50, 84.12)	(0+25.00, 84.62)	0.013

Options

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

Results

Normal Depth 0.39 ft
Elevation Range 82.97 to 84.62 ft
Flow Area 1.03 ft²

L. R. Nelson Consulting Engineers, Inc.

Worksheet for Onsite Section 3 - Q100

Results

Wetted Perimeter	6.96	ft
Hydraulic Radius	0.15	ft
Top Width	6.52	ft
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Critical Slope	0.00696	ft/ft
Velocity	1.93	ft/s
Velocity Head	0.06	ft
Specific Energy	0.45	ft
Froude Number	0.86	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00696	ft/ft

Messages

Notes

Q100 = 2 cfs from ON3D

Cross Section for Onsite Section 4 - Q100

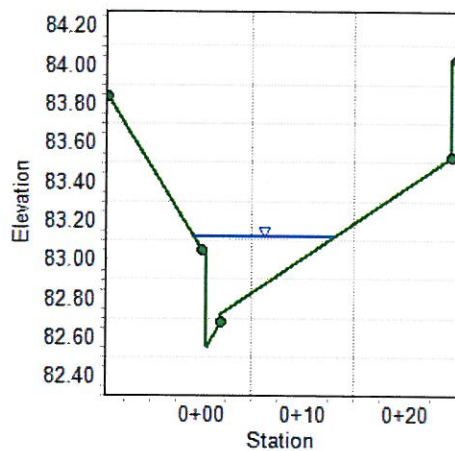
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Normal Depth 0.57 ft
Discharge 7.00 ft³/s

Cross Section Image



Worksheet for Onsite Section 4 - Q100

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 7.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
-0+09.21	83.84
0+00.00	83.05
0+00.50	83.05
0+00.50	82.55
0+02.00	82.68
0+02.00	82.72
0+24.50	83.53
0+24.50	84.03
0+25.00	84.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+09.21, 83.84)	(0+00.00, 83.05)	0.025
(0+00.00, 83.05)	(0+02.00, 82.68)	0.013
(0+02.00, 82.68)	(0+24.50, 83.53)	0.016
(0+24.50, 83.53)	(0+25.00, 84.03)	0.013

Options

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

Results

Normal Depth 0.57 ft

L. R. Nelson Consulting Engineers, Inc.

Worksheet for Onsite Section 4 - Q100

Results

Elevation Range	82.55 to 84.03 ft	
Flow Area	3.05	ft ²
Wetted Perimeter	14.50	ft
Hydraulic Radius	0.21	ft
Top Width	13.94	ft
Normal Depth	0.57	ft
Critical Depth	0.54	ft
Critical Slope	0.00680	ft/ft
Velocity	2.30	ft/s
Velocity Head	0.08	ft
Specific Energy	0.65	ft
Froude Number	0.87	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.54	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00680	ft/ft

Messages

Notes

Q100 = 2 cfs (ON3D) + 5 cfs (ON4D) = 7 cfs

Hydraulic Analysis Report

Project Data

Project Title:	Onsite
Designer:	Staff
Project Date:	August 8, 2012
Project Units:	U.S. Customary Units
Notes:	Updated Design

Curb and Gutter Analysis: Curb Analysis - 10 ft Type "A" - Updated

Notes:

Gutter Input Parameters

Longitudinal Slope of Road:	0.0050 (ft/ft)
Cross-Slope of Pavement:	0.0542 (ft/ft)
Depressed Gutter Geometry	
Cross-Slope of Gutter:	0.0867 (ft/ft)
Manning's n:	0.0160
Gutter Width:	1.5000 (ft)
Design Flow:	7.0000 (cfs)

Gutter Result Parameters

Width of Spread:	9.0108 (ft)
Gutter Depression:	0.5850 (in)
Area of Flow:	2.2369 (ft ²)
Eo (Gutter Flow to Total Flow):	0.4067
Gutter Depth at Curb:	6.4456 (in)

Inlet Input Parameters

Inlet Location:	Inlet in Sag
Percent Clogging:	50.0000 %
Inlet Type:	Curb Opening
Length of Inlet:	10.0000 (ft)
Curb opening height:	6.0000 (in)
Local Depression:	2.0000 (in)

Inlet Result Parameters

Perimeter:	12.7000 (ft)
Effective Perimeter:	6.3500 (ft)
Area:	6.6667 (ft^2)
Effective Area:	3.3333 (ft^2)
Depth at curb face (upstream of local depression):	0.6124 (ft)
Computed Width of Spread at Sag:	10.4002 (ft)
Flow type:	Weir Flow
Efficiency:	1.0000

T1 Westcliff Pines 2
 T2 Onsite Storm Drain System - North - Revised August 2012
 T3 Job No. 818-021-011

SO	1000.000	63.830	3						.000									
R	1234.000	65.690	3	.013						.000	30.000	1						
R	1369.000	66.830	3	.013						.000	-40.000	1						
R	1374.000	70.810	3	.013														
R	1379.000	71.200	3	.013						.000	-89.271	0						
WE	1379.000	71.200	2	.500														
JX	1384.590	76.630	2	3	.013	7.000		82.000		90.0		.000						
WX	1384.590	76.630	2															
R	1384.590	76.630	3	.013														
R	1455.340	77.350	3	.013						.000	61.969	1						
JX	1457.840	77.450	3	.013														
R	1460.340	77.550	3	.013														
REM R	1562.690	78.080	3	.013						.000	.000	1						
REM Junction Removed JX	1565.190	78.180	3	1	.013	0.500					78.280		90.0		.000			
REM R	1567.690	78.280	3	.013						.000	.000	0						
REM R	1593.690	78.440	3	.013						.000	.000	1						
REM Junction Removed JX	1596.190	78.540	3	1	.013	0.500					78.540		90.0		.000			
REM R	1598.690	78.640	3	.013														
R	1705.530	79.200	3	.013						.000	-74.005	1						
JX	1708.030	79.300	3	.013														
R	1710.530	79.400	3	.013														
R	1818.780	80.970	3	.013														
SH			3															
CD	1	4	1	.000	1.500	.000	.000	.000	.00									
CD	2	3	0	.000	9.800	10.000	.000	.000	.00									
CD	3	4	1	.000	2.000	.000	.000	.000	.00									
Q				21.000	.0													

FILE: wp2ar1.WSW

W S P G W - EDIT LISTING - Version 14.06

Date: 8-15-2012 Time: 1:55:58

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
 CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)
 CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH
 CD 1 4 1 1.500
 CD 2 3 0 .000 9.800 10.000 .000 .000 .00
 CD 3 4 1 2.000

W S P G W

PAGE NO 1

HEADING LINE NO 1 IS - WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 2 IS - Westcliff Pines 2

HEADING LINE NO 3 IS - Onsite Storm Drain System - North - Revised August 2012

Job No. 818-021-011

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET
 U/S DATA STATION INVERT SECT
 1000.000 63.830 3
 W S ELEV .000
 ELEMENT NO 2 IS A REACH
 U/S DATA STATION INVERT SECT N
 1234.000 65.690 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 30.000 1
 ELEMENT NO 3 IS A REACH
 U/S DATA STATION INVERT SECT N
 1369.000 66.830 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 -40.000 1
 ELEMENT NO 4 IS A REACH
 U/S DATA STATION INVERT SECT N
 1374.000 70.810 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 .000 0
 ELEMENT NO 5 IS A REACH
 U/S DATA STATION INVERT SECT N
 1379.000 71.200 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 -89.271 0
 ELEMENT NO 6 IS A WALL ENTRANCE
 U/S DATA STATION INVERT SECT FP
 1379.000 71.200 2 .500
 ELEMENT NO 7 IS A JUNCTION
 U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
 1384.590 76.630 2 3 0 .013 7.000 .000 82.000 .000 90.000 .000
 RADIUS ANGLE
 .000 .000
 ELEMENT NO 8 IS A WALL EXIT
 U/S DATA STATION INVERT SECT
 1384.590 76.630 2

WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 9 IS A REACH
 U/S DATA STATION INVERT SECT N
 1384.590 76.630 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 .000 0
 ELEMENT NO 10 IS A REACH
 U/S DATA STATION INVERT SECT N
 1455.340 77.350 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 61.969 1
 ELEMENT NO 11 IS A JUNCTION
 U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
 1457.840 77.450 3 0 0 .013 .000 .000 .000 .000 .000 .000
 RADIUS ANGLE
 .000 .000

W S P G W

PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 12 IS A REACH
 U/S DATA STATION INVERT SECT N
 1460.340 77.550 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 .000 0
 REMARKS: R 1562.690 78.080 3 .013 .000 .000 1
 REMARKS: Junction Removed JX 1565.190 78.180 3 1 .013 0.500 78.280 90.0
 REMARKS: R 1567.690 78.280 3 .013 .000 .000 0
 REMARKS: R 1593.690 78.440 3 .013 .000 .000 1
 REMARKS: Junction Removed JX 1596.190 78.540 3 1 .013 0.500 78.540 90.0
 REMARKS: R 1598.690 78.640 3 .013
 ELEMENT NO 13 IS A REACH
 U/S DATA STATION INVERT SECT N
 1705.530 79.200 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 -74.005 1
 ELEMENT NO 14 IS A JUNCTION
 U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
 1708.030 79.300 3 0 0 .013 .000 .000 .000 .000 .000 .000
 RADIUS ANGLE
 .000 .000
 ELEMENT NO 15 IS A REACH
 U/S DATA STATION INVERT SECT N
 1710.530 79.400 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 .000 0
 ELEMENT NO 16 IS A REACH
 U/S DATA STATION INVERT SECT N
 1818.780 80.970 3 .013 RADIUS ANGLE ANG PT MAN H
 .000 .000 .000 0
 ELEMENT NO 17 IS A SYSTEM HEADWORKS
 U/S DATA STATION INVERT SECT
 1818.780 80.970 3
 W S ELEV .000

W S P G W

PAGE NO 4

WATER SURFACE PROFILE - ELEMENT CARD LISTING

WATER SURFACE PROFILE LISTING

Date: 8-15-2012 Time: 1:56: 3

Westcliff Pines 2
Onsite Storm Drain System - North - Revised August 2012
Job No. 818-021-011

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	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
1000.000	63.830	1.828	65.658	28.00	9.30	1.34	67.00	.00	1.83	1.12	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.519	.0079					.0139	.15	1.83	1.00	2.00	.013	.00	.00	PIPE
1010.519	63.914	2.000	65.914	28.00	8.91	1.23	67.15	.00	1.83	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
223.481	.0079					.0149	3.32	2.00	.00	2.00	.013	.00	.00	PIPE
1234.000	65.690	3.706	69.396	28.00	8.91	1.23	70.63	.00	1.83	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135.000	.0084					.0153	2.07	3.71	.00	2.00	.013	.00	.00	PIPE
1369.000	66.830	4.859	71.689	28.00	8.91	1.23	72.92	.00	1.83	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.309	.7960					.0153	.02	4.86	.00	.50	.013	.00	.00	PIPE
1370.309	67.872	3.836	71.707	28.00	8.91	1.23	72.94	.00	1.83	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HYDRAULIC JUMP														
1370.309	67.872	.971	68.842	28.00	18.52	5.32	74.17	.00	1.83	2.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.066	.7960					.0670	.00	.97	3.75	.50	.013	.00	.00	PIPE
1370.375	67.924	.977	68.902	28.00	18.35	5.23	74.13	.00	1.83	2.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.597	.7960					.0623	.04	.98	3.70	.50	.013	.00	.00	PIPE
1370.972	68.400	1.015	69.414	28.00	17.50	4.75	74.17	.00	1.83	2.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.530	.7960					.0549	.03	1.01	3.45	.50	.013	.00	.00	PIPE
1371.502	68.822	1.054	69.876	28.00	16.68	4.32	74.20	.00	1.83	2.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.471	.7960					.0484	.02	1.05	3.21	.50	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 8-15-2012 Time: 1:56: 3

Westcliff Pines 2

Onsite Storm Drain System - North - Revised August 2012

Job No. 818-021-011

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top	Height/Dia.-FT	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
1371.973	69.197	1.095	70.291	28.00	15.91	3.93	74.22	.00	1.83	1.99	2.000	.000	.00	1 .0
.417	.7960					.0427	.02	1.09	2.98	.50	.013	.00	.00	PIPE
1372.390	69.528	1.138	70.666	28.00	15.17	3.57	74.24	.00	1.83	1.98	2.000	.000	.00	1 .0
.368	.7960					.0377	.01	1.14	2.77	.50	.013	.00	.00	PIPE
1372.758	69.821	1.184	71.005	28.00	14.46	3.25	74.25	.00	1.83	1.97	2.000	.000	.00	1 .0
.324	.7960					.0334	.01	1.18	2.57	.50	.013	.00	.00	PIPE
1373.081	70.079	1.232	71.311	28.00	13.79	2.95	74.26	.00	1.83	1.95	2.000	.000	.00	1 .0
.283	.7960					.0296	.01	1.23	2.38	.50	.013	.00	.00	PIPE
1373.365	70.304	1.283	71.588	28.00	13.15	2.68	74.27	.00	1.83	1.92	2.000	.000	.00	1 .0
.246	.7960					.0262	.01	1.28	2.20	.50	.013	.00	.00	PIPE
1373.610	70.500	1.338	71.838	28.00	12.53	2.44	74.28	.00	1.83	1.88	2.000	.000	.00	1 .0
.211	.7960					.0233	.00	1.34	2.03	.50	.013	.00	.00	PIPE
1373.822	70.668	1.397	72.065	28.00	11.95	2.22	74.28	.00	1.83	1.84	2.000	.000	.00	1 .0
.178	.7960					.0208	.00	1.40	1.86	.50	.013	.00	.00	PIPE
1374.000	70.810	1.460	72.270	28.00	11.39	2.02	74.29	.00	1.83	1.78	2.000	.000	.00	1 .0
.542	.0780					.0194	.01	1.46	1.71	.93	.013	.00	.00	PIPE
1374.542	70.852	1.477	72.329	28.00	11.26	1.97	74.30	.00	1.83	1.76	2.000	.000	.00	1 .0
1.810	.0780					.0181	.03	1.48	1.67	.93	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 8-15-2012 Time: 1:56: 3

Westcliff Pines 2

Onsite Storm Drain System - North - Revised August 2012

Job No. 818-021-011

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	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
1376.352	70.993	1.548	72.541	28.00	10.73	1.79	74.33	.00	1.83	1.67	2.000	.000	.00	1 .0
1.362	.0780					.0164	.02	1.55	1.52	.93	.013	.00	.00	PIPE
1377.714	71.100	1.626	72.726	28.00	10.23	1.63	74.35	.00	1.83	1.56	2.000	.000	.00	1 .0
.914	.0780					.0149	.01	1.63	1.36	.93	.013	.00	.00	PIPE
1378.627	71.171	1.716	72.887	28.00	9.76	1.48	74.37	.00	1.83	1.40	2.000	.000	.00	1 .0
.373	.0780					.0138	.01	1.72	1.20	.93	.013	.00	.00	PIPE
1379.000	71.200	1.828	73.028	28.00	9.30	1.34	74.37	.00	1.83	1.12	2.000	.000	.00	1 .0
WALL ENTRANCE														
1379.000	71.200	4.393	75.593	28.00	.64	.01	75.60	.00	.62	10.00	9.800	10.000	.00	0 .0
JUNCT STR	.9714							4.39	.05		.013	.00	.00	BOX
1384.590	76.630	.516	77.146	21.00	4.07	.26	77.40	.00	.52	10.00	9.800	10.000	.00	0 .0
WALL EXIT														
1384.590	76.630	.516	77.146	21.00	4.07	.26	77.40	.00	.52	10.00	9.800	10.000	.00	0 .0
1384.590	76.630	1.488	78.118	21.00	8.38	1.09	79.21	.00	1.64	1.75	2.000	.000	.00	1 .0
3.739	.0102					.0106	.04	1.49	1.23	1.51	.013	.00	.00	PIPE
1388.329	76.668	1.485	78.153	21.00	8.39	1.09	79.25	.00	1.64	1.75	2.000	.000	.00	1 .0
41.916	.0102					.0112	.47	1.49	1.24	1.51	.013	.00	.00	PIPE
1430.245	77.095	1.420	78.515	21.00	8.80	1.20	79.72	.00	1.64	1.82	2.000	.000	.00	1 .0
25.095	.0102					.0126	.32	1.42	1.35	1.51	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 8-15-2012 Time: 1:56: 3

Westcliff Pines 2

Onsite Storm Drain System - North - Revised August 2012

Job No. 818-021-011

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1455.340	77.350	1.360	78.710	21.00	9.23	1.32	80.03	.00	1.64	1.87	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0125	.03	1.36	1.47		.013	.00	.00	PIPE
1457.840	77.450	1.431	78.881	21.00	8.73	1.18	80.06	.00	1.64	1.80	2.000	.000	.00	1 .0
1.285	.0400					.0111	.01	1.43	1.33	.96	.013	.00	.00	PIPE
1459.125	77.501	1.488	78.990	21.00	8.38	1.09	80.08	.00	1.64	1.75	2.000	.000	.00	1 .0
.904	.0400					.0100	.01	1.49	1.23	.96	.013	.00	.00	PIPE
1460.030	77.538	1.560	79.098	21.00	7.99	.99	80.09	.00	1.64	1.66	2.000	.000	.00	1 .0
.310	.0400					.0090	.00	1.56	1.12	.96	.013	.00	.00	PIPE
1460.340	77.550	1.642	79.192	21.00	7.61	.90	80.09	.00	1.64	1.53	2.000	.000	.00	1 .0
7.373	.0067					.0082	.06	1.64	1.00	2.00	.013	.00	.00	PIPE
1467.713	77.600	1.735	79.334	21.00	7.26	.82	80.15	.00	1.64	1.36	2.000	.000	.00	1 .0
44.429	.0067					.0077	.34	1.73	.88	2.00	.013	.00	.00	PIPE
1512.142	77.899	1.851	79.750	21.00	6.92	.74	80.49	.00	1.64	1.05	2.000	.000	.00	1 .0
94.622	.0067					.0078	.74	1.85	.72	2.00	.013	.00	.00	PIPE
1606.765	78.535	2.000	80.535	21.00	6.68	.69	81.23	.00	1.64	.00	2.000	.000	.00	1 .0
98.765	.0067					.0084	.83	2.00	.00	2.00	.013	.00	.00	PIPE
1705.530	79.200	2.200	81.400	21.00	6.68	.69	82.09	.00	1.64	.00	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0086	.02	2.20	.00		.013	.00	.00	PIPE

Westcliff Pines 2

Onsite Storm Drain System - North - Revised August 2012

Job No. 818-021-011

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top	Height/Dia.-FT	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
1708.030	79.300	2.122	81.422	21.00	6.68	.69	82.12	.00	1.64	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.500	.0400					.0086	.02	2.12	.00	.96	.013	.00	.00	PIPE
1710.530	79.400	2.043	81.443	21.00	6.68	.69	82.14	.00	1.64	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.389	.0145					.0085	.06	2.04	.00	1.32	.013	.00	.00	PIPE
1717.919	79.507	2.000	81.507	21.00	6.68	.69	82.20	.00	1.64	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.072	.0145					.0085	.02	2.00	.00	1.32	.013	.00	.00	PIPE
1719.990	79.537	2.000	81.537	21.00	6.68	.69	82.23	.00	1.64	.00	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HYDRAULIC JUMP														
1719.990	79.537	1.327	80.864	21.00	9.49	1.40	82.26	.00	1.64	1.89	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48.324	.0145					.0137	.66	1.33	1.55	1.32	.013	.00	.00	PIPE
1768.314	80.238	1.362	81.600	21.00	9.21	1.32	82.92	.00	1.64	1.86	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29.633	.0145					.0125	.37	1.36	1.47	1.32	.013	.00	.00	PIPE
1797.947	80.668	1.423	82.091	21.00	8.78	1.20	83.29	.00	1.64	1.81	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.022	.0145					.0112	.15	1.42	1.35	1.32	.013	.00	.00	PIPE
1810.969	80.857	1.488	82.345	21.00	8.38	1.09	83.43	.00	1.64	1.75	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.050	.0145					.0100	.06	1.49	1.23	1.32	.013	.00	.00	PIPE
1817.019	80.944	1.560	82.505	21.00	7.99	.99	83.49	.00	1.64	1.66	2.000	.000	.00	1 .0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.761	.0145					.0090	.02	1.56	1.12	1.32	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 8-15-2012 Time: 1:56: 3

Westcliff Pines 2

Onsite Storm Drain System - North - Revised August 2012

Job NO. 818-021-011

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	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
1818.780	80.970	1.642	82.612	21.00	7.61	.90	83.51	.00	1.64	1.53	2.000	.000	.00	1 .0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Appendix D: Referenced Information

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		March 22, 2012
TO: Land Development Services Department of Public Works		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Westcliff Pines 2	
Cross Streets:	SEQ of Summerlin Pkwy. & Durango Drive	COPIES TO: L.R. Nelson Consulting Engineers
File Number:	F:\Depot\DSMemos\DS4550B.doc	HAND Property Holding Company
Parcel Number:	138-28-401-015	Bart Anderson, P.E., DevCo
Zoning Action:	SDR-44166	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	2/9/2012	2/23/2012	Not Approved	\$400.00	273967: \$400
2 nd Submittal & Supplement	3/6/2012 & 3/21/2012	3/22/2012	See Comments Below	\$400.00	276483: \$400
TOTAL FEES (LDDRS):				\$800.00	----

REMARKS:

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

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

1. Per Condition #17 of SDR-44166: Contact the *City Engineer's Office* at 229-6272 to coordinate the development of this project with the "*Summerlin Parkway Widening Improvement Project*" (H#12970) and any other public improvement projects adjacent to this site. Comply with the recommendations of the *City Engineer*.
2. Add a note in all grading plans for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on **July 1, 2011**. If there are any questions regarding these new requirements, please contact Albert Sung in the Flood Section at (702) 229-2001 or Rick Schroder in Traffic Engineering at (702) 229-6327.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in

a Drainage Study Amendment and accepted by the *City of Las Vegas Flood Control Section*. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

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

END OF REMARKS

ays

T/R/S: T20S/R60E/28
AREA L-28

**TECHNICAL DRAINAGE
STUDY FOR
WESTCLIFF PINES 2**

**CITY OF LAS VEGAS, NEVADA
Project Number: 818-021-111
February 2011**

Prepared For: Nevada H.A.N.D.
295 Warm Springs Road, Suite 101
Las Vegas, Nevada 89119
Phone: (702) 739-3345
Fax: (702) 739-3305

Prepared By: L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Westcliff Pines 2 Date: Feb. 7, 2012

Location of Development: a) Descriptive (Cross Streets) North/South: Roland Wiley
East/West: Silver Sky

b) Section: 28 Township: 20S Range: 60E

c) APN: 138-28-401-015

Name of Owner: HAND Property Holding Company

Telephone No.: 739-3345 Fax No.: 739-3305 E-Mail Address: _____

Address: 295 E. Warm Springs Road, #101, Las Vegas, NV 89119

Contact Person-Name: Jon Hayslip Telephone No.: (702) 798-7978

* E-Mail Address: jon.hayslip@lrneng.com Fax No.: (702) 451-2296

Firm: L. R. Nelson Consulting Engineers, Inc.

Address: 6765 W. Russell Road, Suite 200, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 5.24 ac Being Developed/Disturbed: 5.16 ac

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

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

4. Proposed type of development (Residential, Commercial, Etc.): Multi-family residential

5. Approximate upstream land area which drains to the subject site: 10.62 ac (ref. DS3640)

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Silver Sky Assisted Living, by TRC, 2004 (DS3640)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Roland Wiley & private offsite storm drains existing d/s of site

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

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

***New Required Field**

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

Revision	Date

Engineer's Seal

Local Entity File No.

REFERENCE: STANDARD FORM 1

These referenced offsite flows will be routed into an onsite underground storm drain system where the storm water generated onsite will be combined near the east boundary of the site to be delivered existing Starfire Estates. The onsite flow generated in the north half of the site will be routed 10-ft Type "A" Drop Inlet per Clark County Area Uniform Standard Drawings (CCAUSD) drawing number 410 located on Sheet GR1 on the enclosed improvement plans.

A majority of the surface flow generated in the south half of the development will be routed to low point at the southeast corner of the site. From there it will combine with the southern storm drain outflow and proceed to existing blockwall opening and storm drain constructed with the Starfire Estates development.

The remaining small portion of the onsite area will drain to top of the Silver Sky cul-de-sac and combine with the flows determined in the Silver Sky Assisted Living (DS3640) technical drainage study.

The HEC-1 hydrologic analysis is summarized in the following table and the onsite area is divided into five (5) basins and is shown in Figure 11, *Proposed Onsite Drainage Basin Map*, in Appendix A.

Table 4: Future Onsite Runoff Summary

BASIN NAME / CONCENTRATION POINT	AREA (ac)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
ON1D	0.53	1	2
ON2D	1.97	3	6
ON3D	1.12	2	3
ON4D	1.15	2	4
ON5D	0.41	1	1
COM1	2.38	4	7
COM2	2.27	4	7

These flows combine with offsite flow generated from the existing Angel Park Apartments as noted on Figure 11, *Proposed Onsite Drainage Basin Map*, in Appendix A. The nodes COM1 and COM2 will drain the existing storm drain systems located on Starfire Estates, while the onsite basin ON5D will flow into the public right-of-way at the top of the cul-de-sac of Silver Sky Drive.

Table 5: Future Onsite + Offsite Runoff Summary

CONCENTRATION POINT	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)	REMARKS
ON1D	1	2	Drains to top of cul-de-sac – Silver Sky Drive
COM1	9	18	Drains to Wall Opening in Starfire Estates I @ SEC
COM2	14	28	Drains to Drop Inlet that connects to Starfire Estates I RCP @ NEC

C. Roadway Depth of Flow Calculations

Onsite and offsite street flow calculations for the 10-year and 100-year, 6-hour storm events are summarized in the following tables. The hydraulic calculations are included in Appendix C.

Table 6: Onsite Street Flow Calculations

Street	Slope (%)	Q ₁₀₀ (cfs)	D ₁₀₀ (ft)	V ₁₀₀ (ft/s)	DV
Onsite Street – Sec. 1	0.53	2	0.35	1.61	0.6
Onsite Street – Sec. 2	0.50	6	0.48	2.09	1.0
Onsite Street – Sec. 3	0.50	3	0.44	2.12	0.9
Onsite Street – Sec. 4	0.50	6	0.54	2.25	1.2
Onsite Street – Sec. 5	0.53	1	0.29	1.42	0.4

Based upon the above FlowMaster calculations for the onsite conditions, the computed 100-Year design storm flow rates are contained within the drive aisle areas and the minimum finish floor criterion is met for all the buildings. Depth of flow cross section locations are shown on Figure 11, *Onsite Drainage Basin Map*, in Appendix A.

Table 7: Offsite Street Flow Calculations

Street	Slope (%)	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	DV	Dry Lane (ft)
Silver Sky – Sec. 6	2.95	12/24	0.46/0.56	4.57/4.95	2.1/2.8	18.1/13.2

The referenced study (DS3640) indicates the estimated 10- and 100-Year flow rate in Silver Sky Drive cul-de-sac is 11 and 22 cfs, respectively, and denoted as PT6A on Figure 10 in Appendix A. The hydrologic analysis for basin ON1D adds an additional 1 and 2 cfs for the 10- and 100-Year design storm for the totals shown in the proceeding table.

The street calculations show that the *CCRFCD Hydrologic Criteria & Drainage Design Manual* criteria for *Velocity times Depth product* of less than 6 and 8 for the 10- and 100-Year design storms along with the *Dry Lane requirements* of 12-ft for the 10-Year design storm for the onsite and offsite streets has been satisfied.

Southern System

The southern storm drain system will pick up the offsite flow along the west property line from the single 6-ft wall opening in Angel Park Apartments and deliver it via a 6-ft wide concrete flume that will tie into a CCUASD 6-ft Type “A” drop inlet. Due to the steep slope into the inlet, flow hydraulics were assumed to be open channel condition and supporting calculations labeled *SWC FLUME INLET* are provide in Appendix C.

No additional flow is added to the system along the southern reach which daylights approximately 13-ft upstream of the existing block wall opening and storm drain system of Starfire Estates. The southern portion of the site has been graded to allow the surface flow to combine with the storm drain outflow prior to entering the existing block wall opening. The tailwater (TW) boundary condition for the southern WSPG hydraulic analysis was based upon the existing block wall opening and storm drain system constructed for Starfire Estates. The existing block wall opening was assumed to have a 50% clogging factor (CF) and it appears the hydraulic analysis indicates the rectangular weir controls; therefore the downstream starting HGL within the WSPG model was based upon this method. The TW rectangular weir calculation is included in Appendix C. Erosion protection at the downstream end of the 24-in RCP outlet will consist of a concrete flume tapered from the RCP to match the width of the block wall opening. The overbank area will consist of grouted rip-rap as shown on sheet G1 of the enclosed improvement plans.

The WSPG hydraulic grade line (HGL) for the southern storm drain system is plotted on sheet PP2 of the enclosed improvement plans. Based upon the HGL profile, the storm drain system conveys the 100-Year design flow and meets the criteria of the HGL being 1-ft or greater below finished grade.

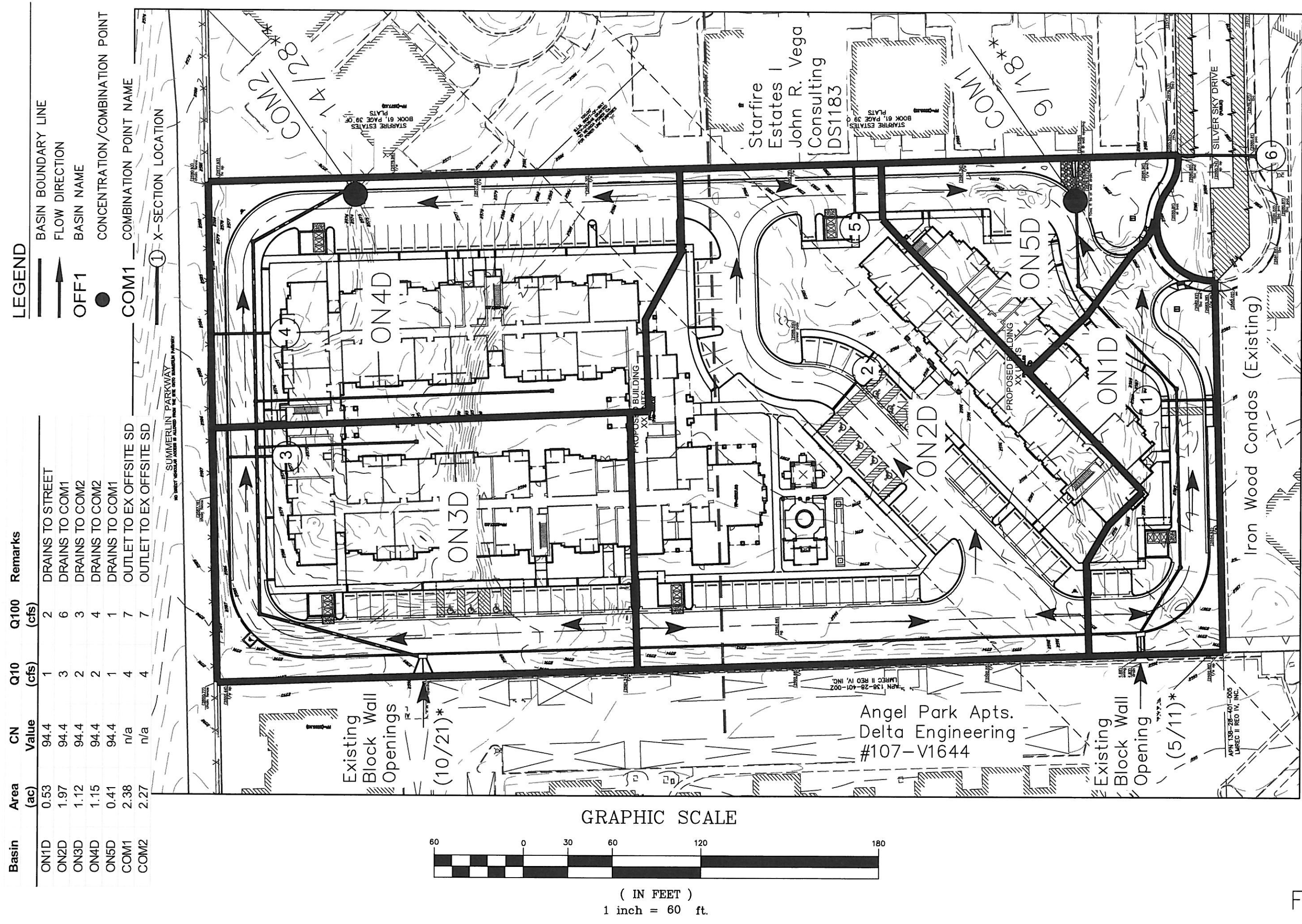
IV. CONCLUSIONS

Based upon a comparison of the original analysis prepared for the Silver Sky Assisted Living ultimate developed condition for the affected watershed, the proposed development shows a small net increase of approximately 1 cfs for the 10- and 100-Year design storm. The comparison has been summarized in the table below and compared with Figure 10, Silver Sky Assisted Living Ultimate Condition, versus Figure 11, Westcliff Pine 2, Drainage Basin Map, both located in Appendix A.

Table 8: Runoff Summary Comparison

CONCENTRATION POINT or LOCATION	10 / 100-YEAR FLOW (cfs)	10 / 100-YEAR FLOW (cfs)	Δ 10 / 100-YEAR FLOW (cfs)
PT2 vs. COM2	13 / 28	14 / 28	1 / 0
PT1 vs. COM1	10 / 21	9 / 18	-1 / -3
PT6A vs. XS1	11 / 22	12 / 24	1 / 2
Totals	34 / 71	35 / 70	1 / -1

Nuisance flow will be carried onsite within the onsite curb and gutter and be released into the storm drain systems within the site.



*REFER. 10-YR/100-YR FLOW RATE

SILVER SKY ASSISTED LIVING TDS

TRC 2004, DS3640

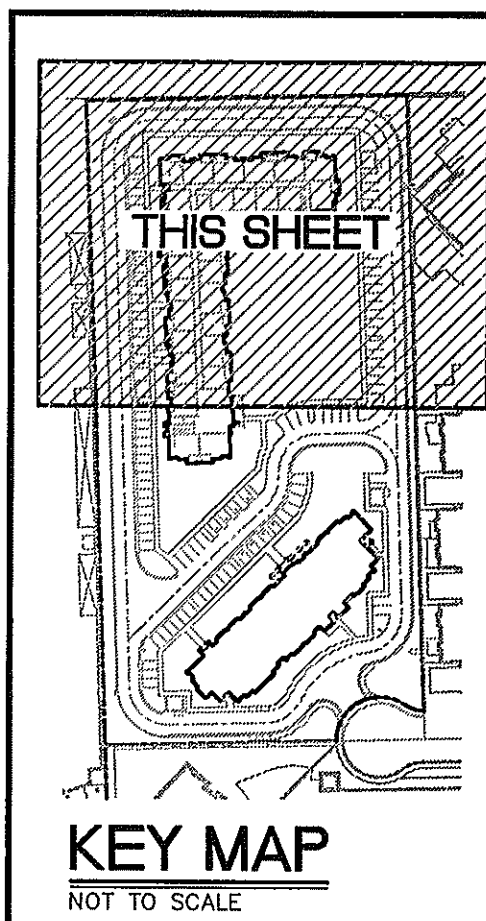
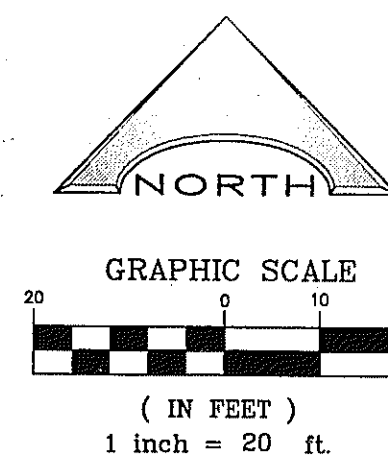
** OFFSITE + ONSITE FLOW RATES COMBINED

NORTH

PROPOSED ONSITE DRAINAGE BASIN MAP

FIGURE 11

SUMMERLIN PARKWAY
NO DIRECT VEHICULAR ACCESS IS ALLOWED FROM THE SITE ONTO SUMMERLIN PARKWAY



SOILS REPORT

GEOTEK, INC. - NEVADA
DATED FEBRUARY 3, 2011
PROJECT NO. 10251-LV6
UPDATED: MARCH 12, 2012

CONSTRUCTION NOTES

- CONSTRUCT 5' WIDE CONCRETE SIDEWALK PER U.S.D. DWG. #234
- CONSTRUCT 5' CURB TRANSITION PER DETAIL 3, SHEET DT1
- CONSTRUCT 3' VALLEY GUTTER PER DETAIL 8, SHEET DT1
- CONSTRUCT SIDEWALK UNDERDRAIN PER DETAIL 6, SHEET DT1
- MIN. 5' LANDINGS SHALL BE INSTALLED AT ALL DOORS PER ANSI 404.2.5 (1/4-INCH MAX BELOW THRESHOLD) 2.0% MAX. SLOPE
- CONSTRUCT COMMERCIAL DRIVEWAY PER USD. STD. DWG. No. 225 and 225A
- CONSTRUCT "A" TYPE CURB PER DETAIL 1, SHEET DT1
- CONSTRUCT CONCRETE FLUME PER DETAIL 7, SHEET DT1
- CONSTRUCT ASPHALT PER PAVEMENT DETAIL 4, SHEET DT1
- INSTALL CONCRETE BUMPERS PER DETAIL 9, SHEET DT1
- CONSTRUCT "L" TYPE CURB & GUTTER PER USD DWG. #216, WHERE LONGITUDINAL SLOPE IS LESS THAN 0.4%, THE FLOW LINE SHALL BE WATER TESTED.
- CONSTRUCT STEPS AS NEEDED
- INSTALL HANDICAP SIGNAGE PER U.B.C. 1103.2.4.1, 1108.3 AND ANSI 4.3 AND 4.28
- CONSTRUCT 8" CONCRETE CROSS GUTTER PER STD. DWG. 228
- 24"x24" JENSEN DROP INLET OR EQUIVALENT
- CONSTRUCT DRAINAGE SWALE @ 1.0% MIN.
- RAMP @ 1:12 MAX. (TYP.)
- CONSTRUCT DEPRESSIONED CURB PER DETAIL 5, SHEET DT1
- INSTALL ADA HAND RAILING PER ADA STANDARDS
- CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCASUB No. 235 (CASE 1)
- CONSTRUCT 8" THICKENED EDGE
- OFFSITE AC SHALL BE 3" ASPHALT OVER 4" TYPE II
- STORM DRAIN INLET TO BE CONSTRUCTED AND MUST COMPLY WITH USDOCA DWG. PER CCASUB No. 235 (CASE 1)
- REFER TO DETAIL 13 AND 15 ON SHEET DT2

NOTE:

- ALL ABOVE GROUND UTILITY APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF TITLE 19.08.010
- FINAL SIDEWALK ELEVATION TO MATCH FINISH FLOOR ELEVATION AFTER FLOORING MATERIAL HAS BEEN PLACED.
- ALL ONSITE STORM DRAINS AND ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE PRIVATELY MAINTAINED.
- THE OWNER UNDERSTANDS THAT THE COURTYARD DOES NOT HAVE A DRAINAGE OVERFLOW PATH AND ABSOLVES THE CITY OF LAS VEGAS FROM ANY LIABILITY IN REGARDS TO THIS CONDITION.

BASIS OF BEARING

NORTH 88°31'18" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SE 1/4) OF SECTION 28, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 109, PAGE 2 OF PARCEL MAPS.

FEMA FLOOD PLAIN INFORMATION

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANE NUMBERS 32003C 2145E, DATE SEPTEMBER 27, 2002, THE SITE IS LOCATED WITHIN A ZONE "X". A ZONE "X" IS DESCRIBED BY FEMA AS AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BENCHMARK

FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE NW CORNER OF WESTCLIFF AND CIMARRON
#909 OLVOO 2854
777.844 (m) 2551.98 (ft)

DEVELOPER

NEVADA H.A.N.D.
295 WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 430-9025 CONTACT: ROBERT FEIBLEMAN

OWNER

WESTCLIFF PINES 2, L.P.
295 WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 430-9025 CONTACT: ROBERT FEIBLEMAN

DISCLAIMER NOTE

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

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

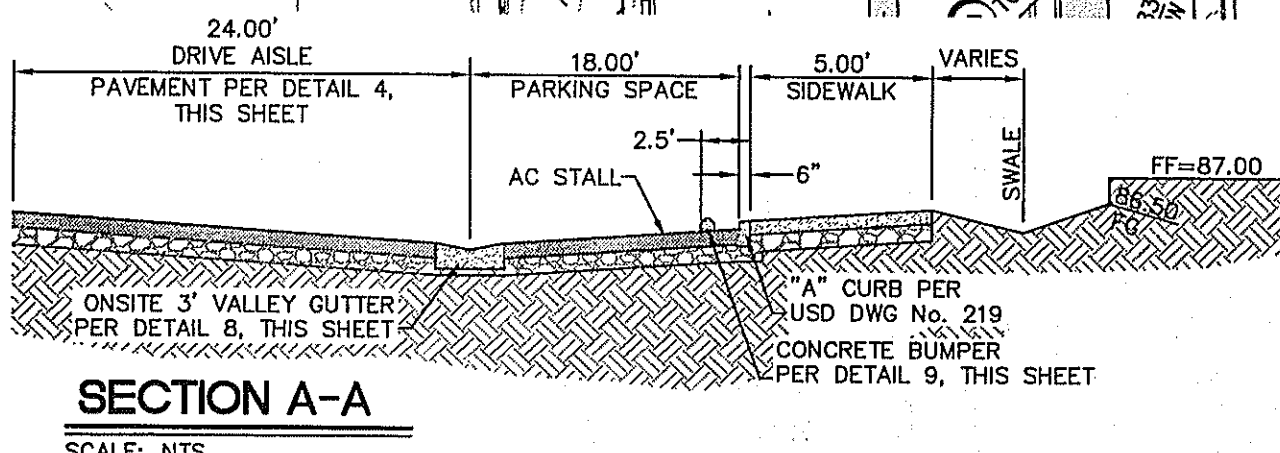
Avoid overhead power line contact
Call before you Dig
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

Avoid hitting underground traffic signal systems and street light system conduits
Call before you Dig
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-5300
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

ENGINEER'S OPINION OF CUT AND FILL QUANTITIES

TOTAL CUT 22,890 CUBIC YARDS
TOTAL FILL 20,005 CUBIC YARDS
NET CUT 2,885 CUBIC YARDS
NOTE: THIS OPINION OF CUT & FILL QUANTITIES IS PROVIDED AS REQUIRED BY THE CLARK COUNTY BUILDING CODE AND SHOULD NOT BE USED FOR BIDDING PURPOSES. ALL CONTRACTORS ARE RESPONSIBLE FOR THEIR OWN QUANTITIES.
ALL GRADING SHALL CONFORM TO THE RECOMMENDATIONS OF THE SOILS ENGINEER AS CONTAINED IN THE GEOTECHNICAL EVALUATION REPORTS PREPARED BY GEOTEK, INC. NEVADA, DATED FEBRUARY 3, 2011, PROJECT NO. 10251-LV6, UPDATED MARCH 12, 2012

WE CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS 4550A).
VERNON R. HARKINS P.E. NO. 009898 DATE 8/2/12



SECTION A-A
SCALE: NTS

NEVADA H.A.N.D.
295 EAST WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 430-9025 CONTACT: ROBERT FEIBLEMAN

L.R. NELSON CONSULTING ENGINEERS, INC.
6765 West Russell Road
Suite 200
Las Vegas, Nevada 89118
(702) 451-2266 FAX

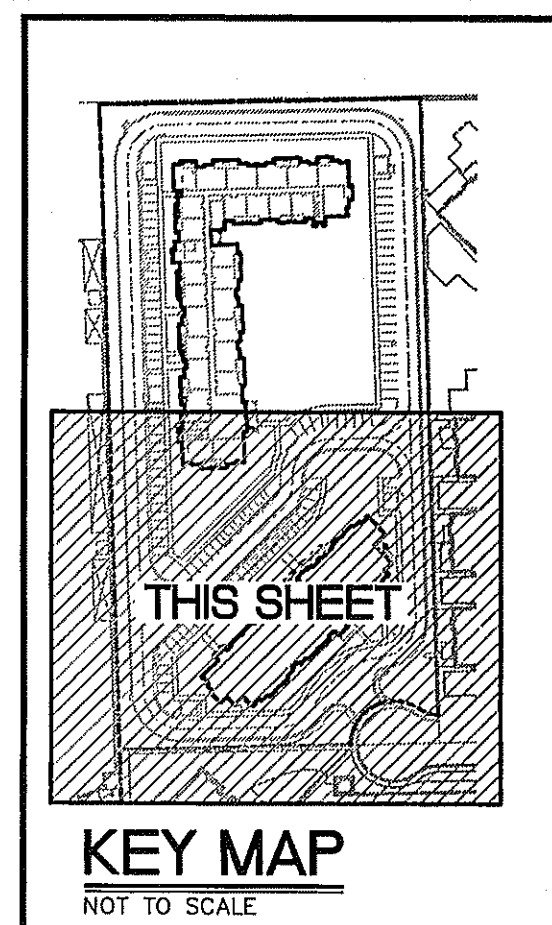
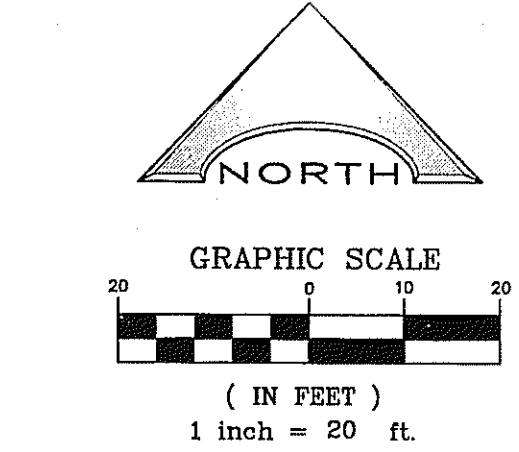
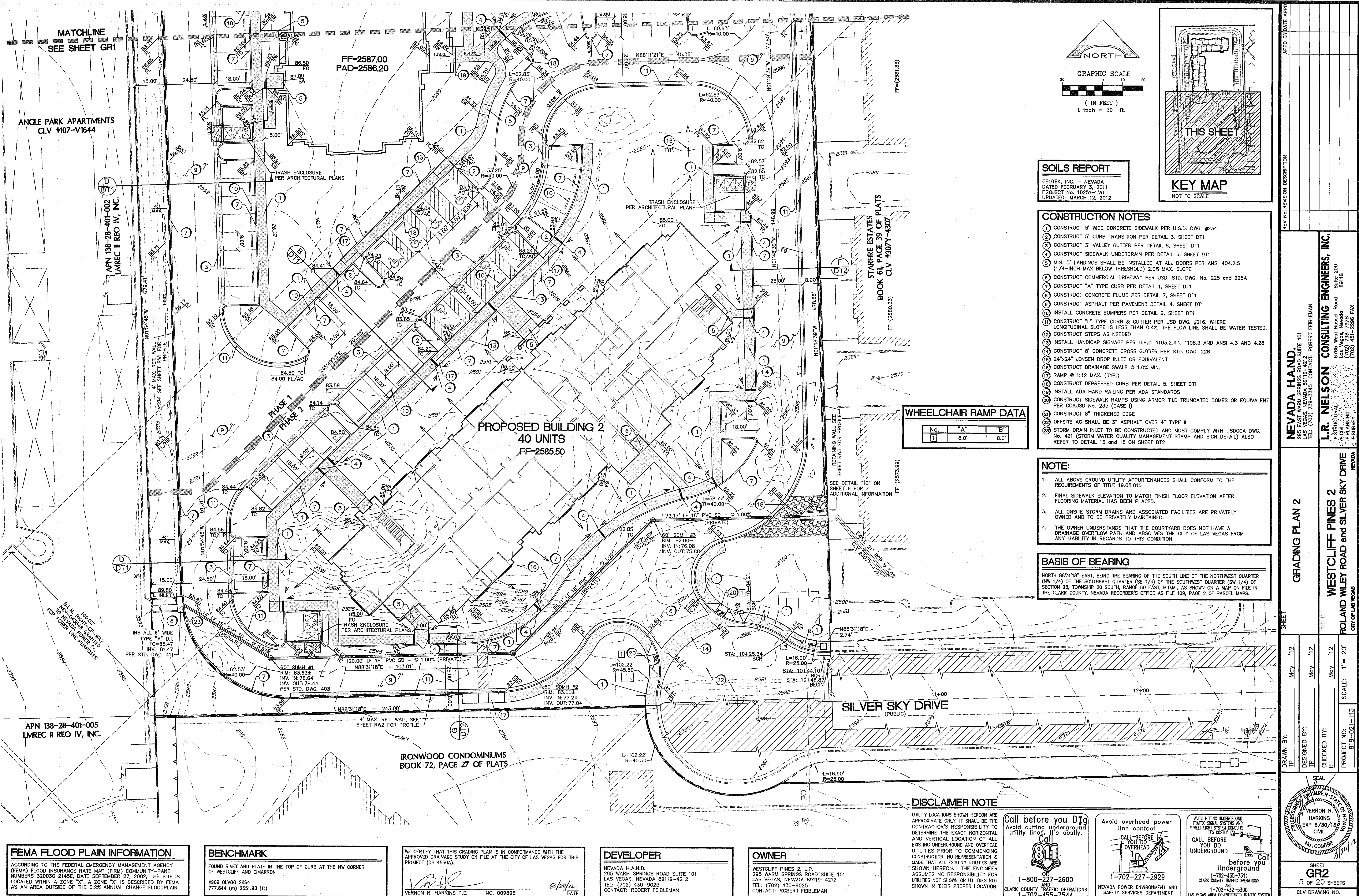
GRADING PLAN 1

WESTCLIFF PINES 2
ROLAND WILEY ROAD and SILVER SKY DRIVE
CITY OF LAS VEGAS

SHEET
DRAWN BY: May '12
DESIGNED BY: May '12
CHECKED BY: May '12
PROJECT NO: 818-021-113
SCALE: 1"= 20'

VERNON R. HARKINS
P.E. NO. 009898
EXP 6/30/13
CIVIL

SHEET
GR1
4 OF 20 SHEETS
CLV DRAWING NO.



SOILS REPORT
GEOTEK, INC. - NEVADA
DATED FEBRUARY 3, 2011
PROJECT No. 10251-LV6
UPDATED: MARCH 12, 2012

- CONSTRUCTION NOTES**
1. CONSTRUCT 5' WIDE CONCRETE SIDEWALK PER U.S.D. DWG. #234
 2. CONSTRUCT 5' CURB TRANSITION PER DETAIL 3, SHEET DT1
 3. CONSTRUCT 3' VALLEY GUTTER PER DETAIL 8, SHEET DT1
 4. CONSTRUCT SIDEWALK UNDERDRAIN PER DETAIL 6, SHEET DT1
 5. MIN. 5' LANDINGS SHALL BE INSTALLED AT ALL DOORS PER ANSI 404.2.5 (1/4-INCH MAX BELOW THRESHOLD) 2.0% MAX. SLOPE
 6. CONSTRUCT COMMERCIAL DRIVEWAY PER USD. STD. DWG. No. 225 and 225A
 7. CONSTRUCT "A" TYPE CURB PER DETAIL 1, SHEET DT1
 8. CONSTRUCT CONCRETE FLUME PER DETAIL 7, SHEET DT1
 9. CONSTRUCT ASPHALT PER PAVEMENT DETAIL 4, SHEET DT1
 10. INSTALL CONCRETE BUMPERS PER DETAIL 9, SHEET DT1
 11. CONSTRUCT "L" TYPE CURB & GUTTER PER USD DWG. #216, WHERE LONGITUDINAL SLOPE IS LESS THAN 0.4%, THE FLOW LINE SHALL BE WATER TESTED.
 12. CONSTRUCT STEPS AS NEEDED
 13. INSTALL HANDICAP SIGNAGE PER U.B.C. 1103.2.4.1, 1108.3 AND ANSI 4.3 AND 4.28
 14. CONSTRUCT 8" CONCRETE CROSS GUTTER PER STD. DWG. 228
 15. 24"x24" JENSEN DROP INLET OR EQUIVALENT
 16. CONSTRUCT DRAINAGE SWALE @ 1.0% MIN.
 17. RAMP @ 1:12 MAX. (TYP.)
 18. CONSTRUCT DEPRESSED CURB PER DETAIL 5, SHEET DT1
 19. INSTALL ADA HAND RAILING PER ADA STANDARDS
 20. CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CALSD No. 235 (CASE I)
 21. CONSTRUCT 8" THICKENED EDGE
 22. OFFSITE AC SHALL BE 3" ASPHALT OVER 4" TYPE II
 23. STORM DRAIN INLET TO BE CONSTRUCTED AND MUST COMPLY WITH USDOCA DWG. No. 421 (STORM WATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL) ALSO REFER TO DETAIL 13 AND 15 ON SHEET DT2

WHEELCHAIR RAMP DATA

No.	"A"	"B"
1	8.0'	8.0'

- NOTE:**
1. ALL ABOVE GROUND UTILITY APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF TITLE 19.08.010
 2. FINAL SIDEWALK ELEVATION TO MATCH FINISH FLOOR ELEVATION AFTER FLOORING MATERIAL HAS BEEN PLACED.
 3. ALL ONSITE STORM DRAINS AND ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE PRIVATELY MAINTAINED.
 4. THE OWNER UNDERSTANDS THAT THE COURTYARD DOES NOT HAVE A DRAINAGE OVERFLOW PATH AND ASSUMES THE CITY OF LAS VEGAS FROM ANY LIABILITY IN REGARDS TO THIS CONDITION.

BASIS OF BEARING
NORTH 88°31'18" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 28, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M. AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 109, PAGE 2 OF PARCEL MAPS.

DISCLAIMER NOTE

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

Call before you Dig
Avoid cutting underground utility lines. It's costly.

1-800-227-2600
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-7544

Avoid overhead power line contact

1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

Call before you Dig
Underground

1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-7500
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

FEMA FLOOD PLAIN INFORMATION
ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANE NUMBERS 320030 2145E, DATE SEPTEMBER 27, 2002, THE SITE IS LOCATED WITHIN A ZONE "X". A ZONE "X" IS DESCRIBED BY FEMA AS AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BENCHMARK
FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE NW CORNER OF WESTCLIFF AND CIMARRON
#909 OLVOO 2854
777.844 (m) 2551.98 (ft)

WE CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS 4550A).

VERNON R. HARKINS P.E. NO. 009898 8/20/12 DATE

DEVELOPER
NEVADA H.A.N.D.
295 WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 430-9025
CONTACT: ROBERT FEIBLEMAN

OWNER
WESTCLIFF PINES 2, L.P.
295 WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 430-9025
CONTACT: ROBERT FEIBLEMAN

NEVADA H.A.N.D.
295 EAST WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 739-3346 CONTACT: ROBERT FEIBLEMAN

LR NELSON CONSULTING ENGINEERS, INC.
675 West Nevada Road
Las Vegas, Nevada 89116
(702) 798-7978
FAX: (702) 451-2296

GRADING PLAN 2

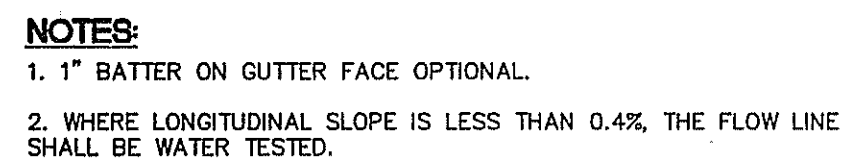
WESTCLIFF PINES 2
ROLAND WILEY ROAD and SILVER SKY DRIVE
CITY OF LAS VEGAS, NEVADA

PROJECT NO: 818-021-113
SCALE: 1" = 20'

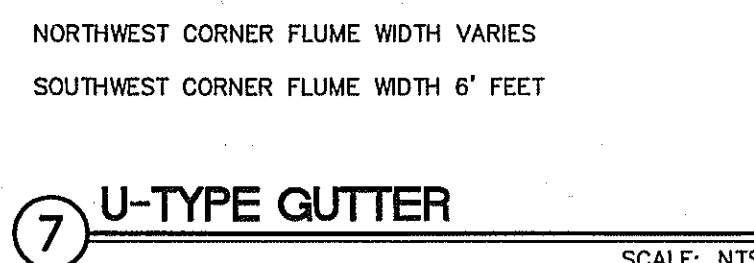
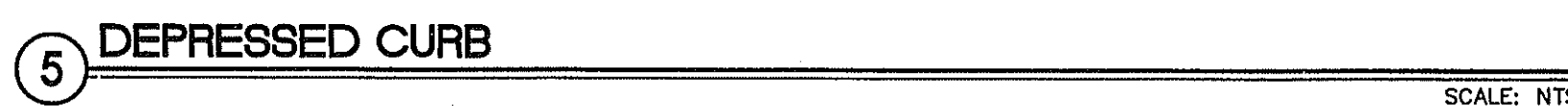
SHEET
DRAWN BY: MGV '12
DESIGNED BY: MGV '12
CHECKED BY: MGV '12
PROJECT NO: 818-021-113
SCALE: 1" = 20'

SEAL
VERNON R. HARKINS
P.E. No. 009898
8/20/12

GR2
5 OF 20 SHEETS
CLV DRAWING NO.

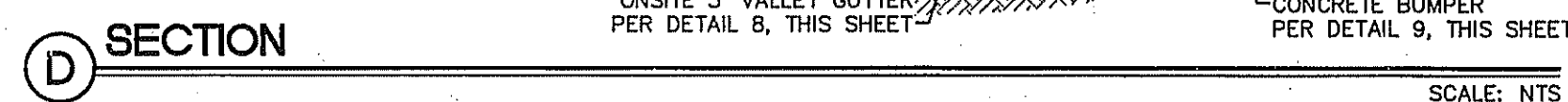
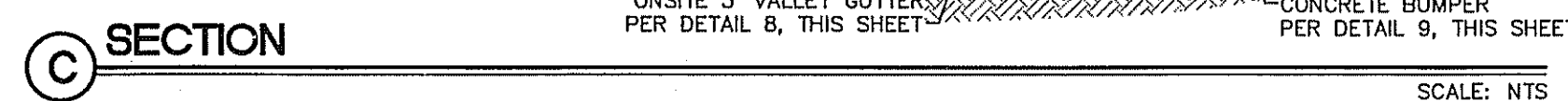
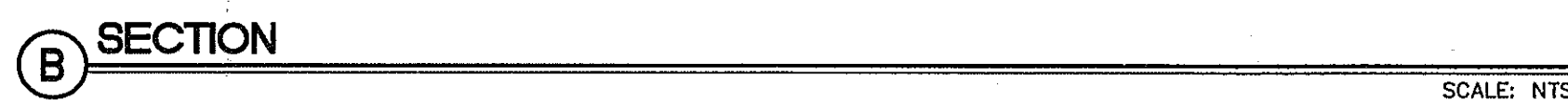
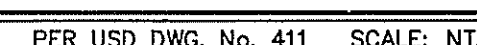
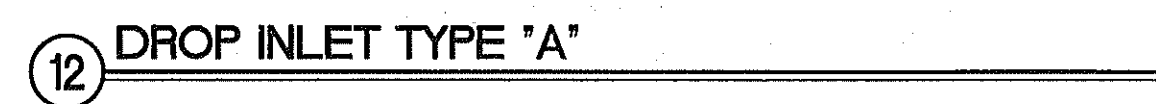


PER USD DWG. No. 216 SCALE: NTS



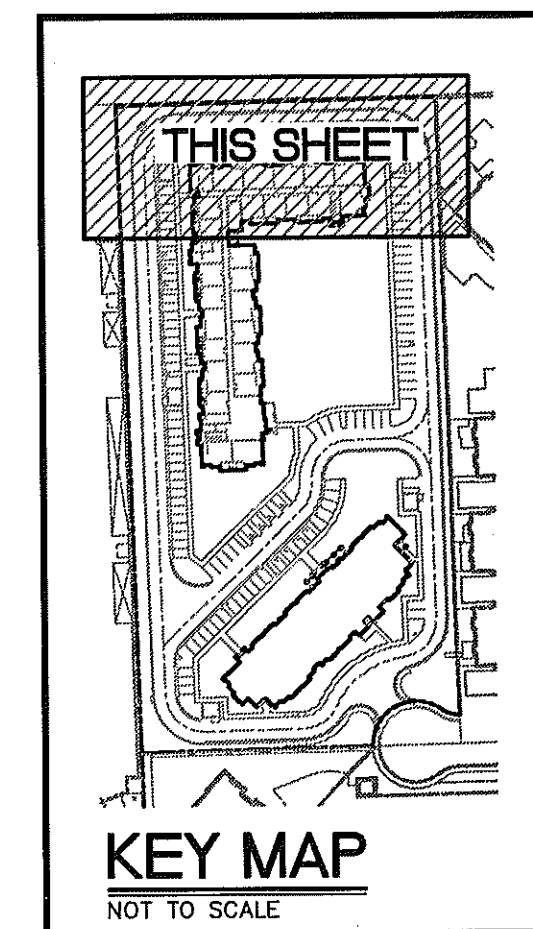
JENSEN
PRECAST

SCALE: NOT TO SCALE



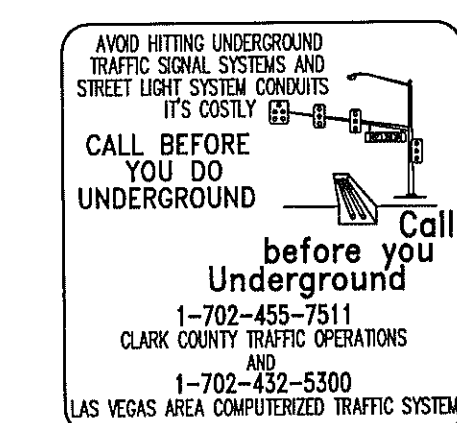
GEOTEK, INC. - NEVADA
DATED FEBRUARY 3, 2011
PROJECT No. 10251-LV6
UPDATED: MARCH 12, 2011

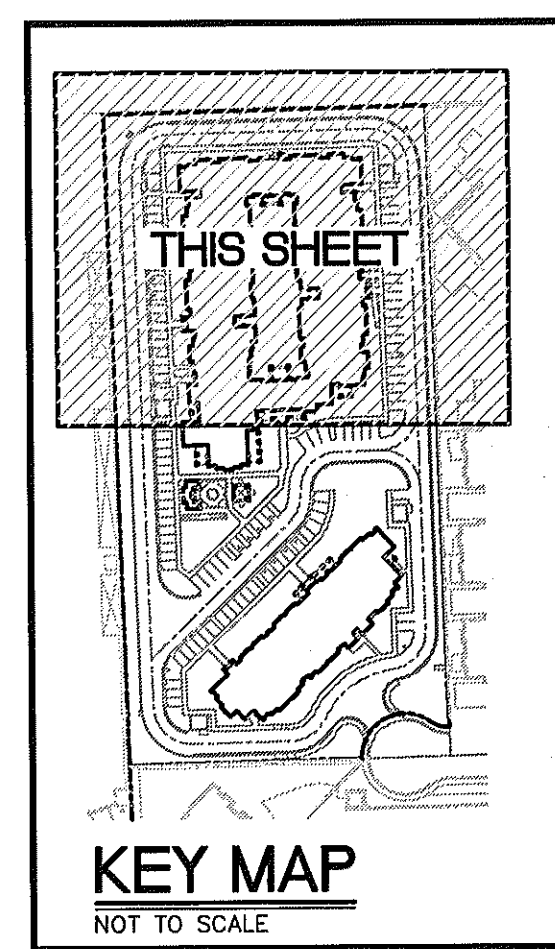
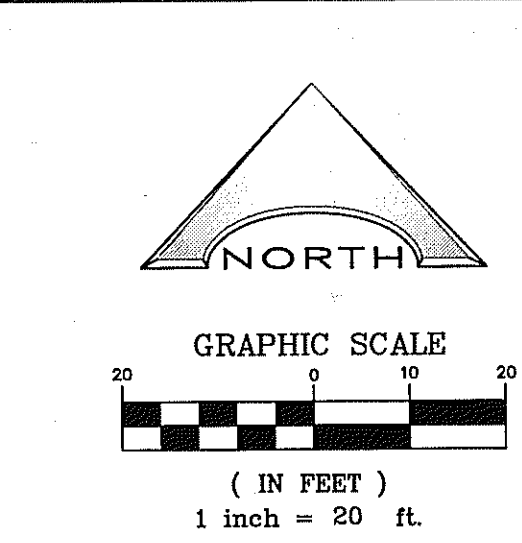
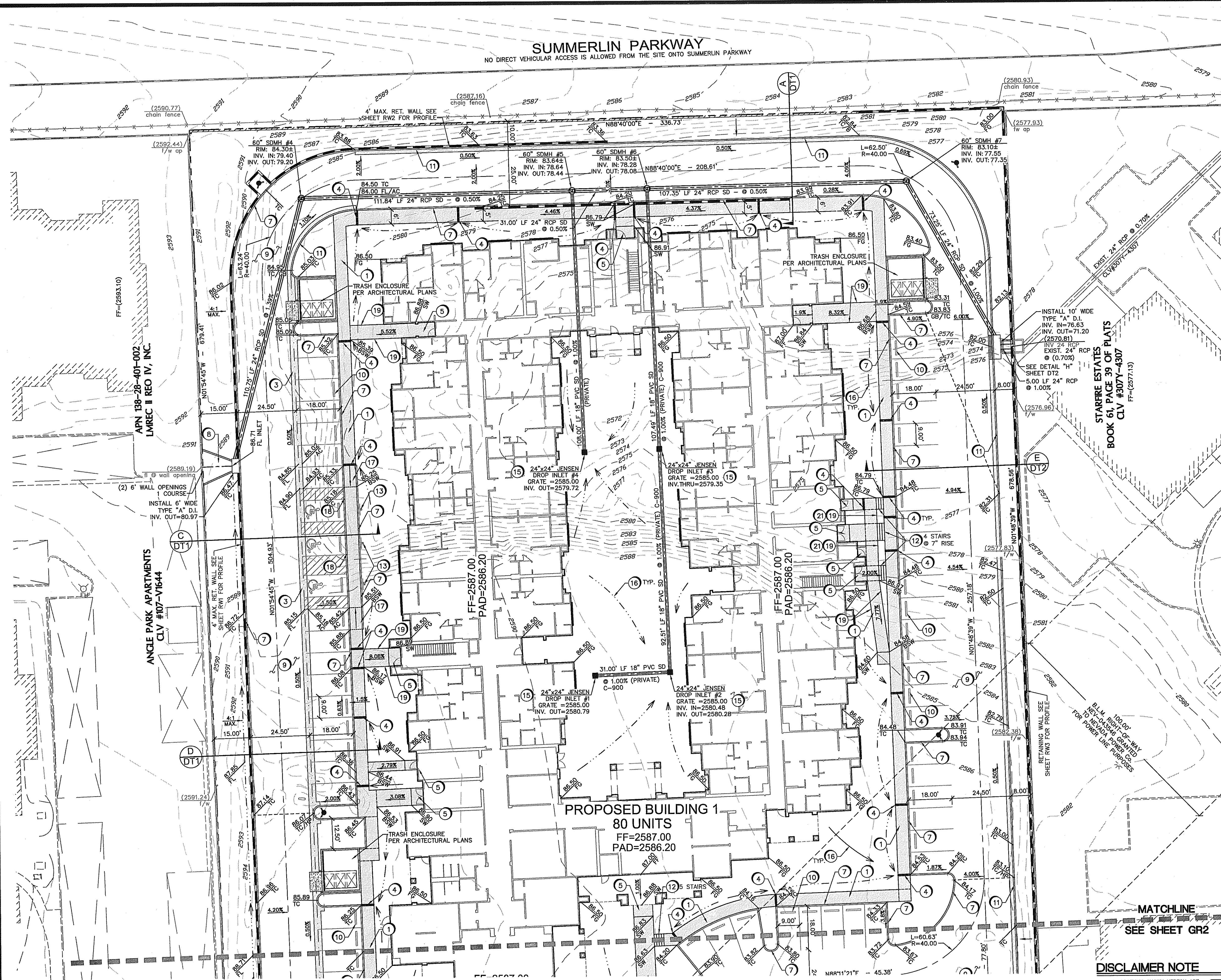
DRAWN BY: _____ TP _____	April	'12
	DESIGNED BY: _____	
	April	'12
	CHECKED BY: _____	
RT	April	'12
PROJECT NO: _____		SCALE: N/A



NORTH 88°31'18" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 28, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 109, PAGE 2 OF PARCEL MAPS.

PROFILE SCALES
HORIZ. = 1"=20'
VERT. = 1"=2'

[illegible]



SOILS REPORT
GEOTEK, INC. - NEVADA
DATED FEBRUARY 3, 2011
PROJECT No. 10251-LV6
UPDATED: MARCH 12, 2012

- CONSTRUCTION NOTES**
1. CONSTRUCT 5' WIDE CONCRETE SIDEWALK PER U.S.D. DWG. #234
 2. CONSTRUCT 5' CURB TRANSITION PER DETAIL 3, SHEET DT1
 3. CONSTRUCT 3' VALLEY GUTTER PER DETAIL 8, SHEET DT1
 4. CONSTRUCT SIDEWALK UNDERDRAIN PER DETAIL 6, SHEET DT1
 5. MIN. 5' LANDINGS SHALL BE INSTALLED AT ALL DOORS PER ANSI 404.2.5 (1/4-INCH MAX BELOW THRESHOLD) 2.0% MAX. SLOPE
 6. CONSTRUCT COMMERCIAL DRIVEWAY PER U.S.D. STD. DWG. No. 225 and 225A
 7. CONSTRUCT "A" TYPE CURB PER DETAIL 1, SHEET DT1
 8. CONSTRUCT CONCRETE FLUME PER DETAIL 7, SHEET DT1
 9. CONSTRUCT ASPHALT PER PAVEMENT DETAIL 4, SHEET DT1
 10. INSTALL CONCRETE BUMPERS PER DETAIL 9, SHEET DT1
 11. CONSTRUCT "L" TYPE CURB & GUTTER PER U.S.D. DWG. #216, WHERE LONGITUDINAL SLOPE IS LESS THAN 0.4%, THE FLOW LINE SHALL BE WATER TESTED.
 12. CONSTRUCT STEPS AS NEEDED
 13. INSTALL HANDICAP SIGNAGE PER U.B.C. 1103.2.4.1, 1108.3 AND ANSI 4.3 AND 4.28
 14. CONSTRUCT 8" CONCRETE CROSS GUTTER PER STD. DWG. 228
 15. 24"x24" JENSEN DROP INLET OR EQUIVALENT
 16. CONSTRUCT DRAINAGE SWALE @ 1.0% MIN.
 17. RAMP @ 1:12 MAX. (TYP.)
 18. CONSTRUCT DEPRESSED CURB PER DETAIL 5, SHEET DT1
 19. INSTALL ADA HAND RAILING PER ADA STANDARDS
 20. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD No. 235 (CASE I)
 21. CONSTRUCT 8" THICKENED EDGE

- NOTE:**
1. ALL ABOVE GROUND UTILITY APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF TITLE 19.12.040
 2. FINAL SIDEWALK ELEVATION TO MATCH FINISH FLOOR ELEVATION AFTER FLOORING MATERIAL HAS BEEN PLACED.
 3. ALL ON SITE STORM DRAINS AND ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE PRIVATELY MAINTAINED.
 4. THE OWNER UNDERSTANDS THAT THE COURTYARD DOES NOT HAVE A DRAINAGE OVERFLOW PATH AND ABSOLVES THE CITY OF LAS VEGAS FROM ANY LIABILITY IN REGARDS TO THIS CONDITION.

BASIS OF BEARING
NORTH 88°31'18" EAST, BEING THE BEARINGS OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 28, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 109, PAGE 2 OF PARCEL MAPS.

FEMA FLOOD PLAIN INFORMATION
ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY-PANE NUMBERS 32003C 2145E, DATE SEPTEMBER 27, 2002, THE SITE IS LOCATED WITHIN A ZONE "X". A ZONE "X" IS DESCRIBED BY FEMA AS AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BENCHMARK
FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE NW CORNER OF WESTCLIFF AND CHARRON
#909 OLV00 2854
777.8633 (m) 2552.04 (ft)

WE CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DS 4550A).

VERNON R. HARKINS P.E. NO. 009898 DATE

OWNER/DEVELOPER
H.A.N.D. PROPERTY HOLDING COMPANY
295 WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (430-9025) CONTACT: ROBERT FEIBLEMAN

DISCLAIMER NOTE

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

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

Avoid hitting underground traffic signal systems and street light system conduits. It's costly.
Call before you dig
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-5300
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

ENGINEER'S OPINION OF CUT AND FILL QUANTITIES			
TOTAL	CUT	FILL	NET
	22.890	20.005	2.885
	CUBIC YARDS	CUBIC YARDS	CUBIC YARDS

NOTE: THIS OPINION OF CUT & FILL QUANTITIES IS PROVIDED AS REQUIRED BY THE CLARK COUNTY BUILDING CODE AND SHOULD NOT BE USED FOR BIDDING PURPOSES. ALL CONTRACTORS ARE RESPONSIBLE FOR THEIR OWN QUANTITIES. ALL GRADING SHALL CONFORM TO RECOMMENDATIONS OF THE SOILS ENGINEER AS CONTAINED IN THE GEOTECHNICAL EVALUATION REPORTS PREPARED BY GEOTEK, INC. - NEVADA, DATED FEBRUARY 3, 2011. PROJECT No. 10251-LV6. UPDATED MARCH 12, 2012

REV NO.	DESCRIPTION	DATE
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2	ISSUED FOR CONSTRUCTION	3/1/12
3	ISSUED FOR CONSTRUCTION	3/1/12
4	ISSUED FOR CONSTRUCTION	3/1/12
5	ISSUED FOR CONSTRUCTION	3/1/12
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99	ISSUED FOR CONSTRUCTION	3/1/12
100	ISSUED FOR CONSTRUCTION	3/1/12

NEVADA HAND
295 EAST WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 739-3345 CONTACT: ROBERT FEIBLEMAN

L.R. NELSON CONSULTING ENGINEERS, INC.
6765 West Russell Road Suite 200
Las Vegas, Nevada 89118
(702) 451-2258 FAX
(702) 451-2258 FAX

GRADING PLAN 1

WESTCLIFF PINES 2

ROLAND WILEY ROAD and SILVER SKY DRIVE

CITY OF LAS VEGAS

SHEET

March 12

March 12

March 12

SCALE: 1" = 20'

PROJECT NO: 818-021-113

SEAL

VERNON R. HARKINS P.E. NO. 009898

DATE

3/1/12

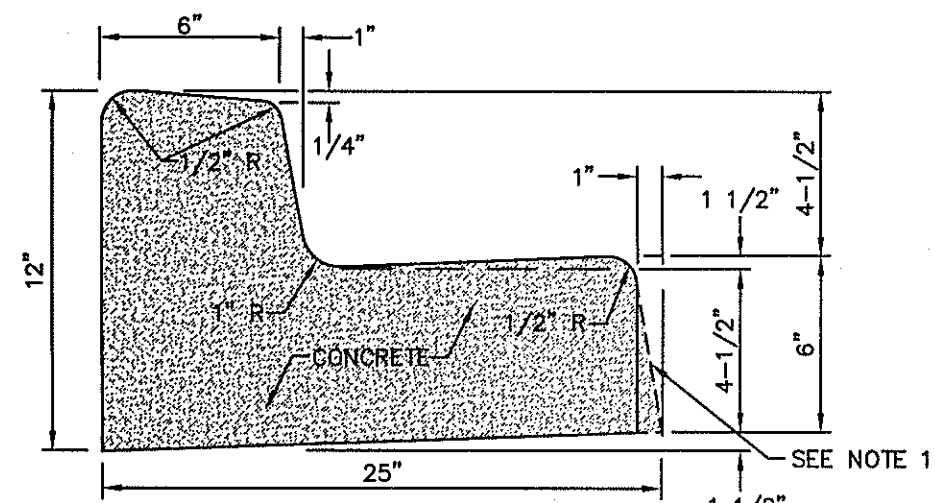
SHEET

GR1

4 OF 20 SHEETS

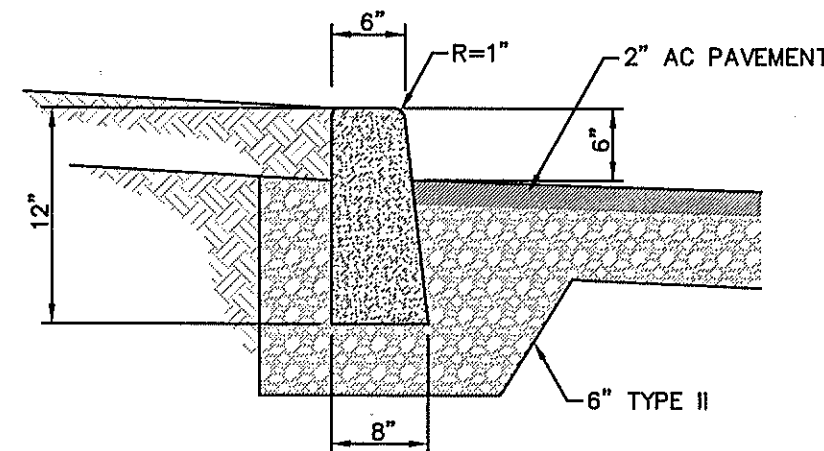
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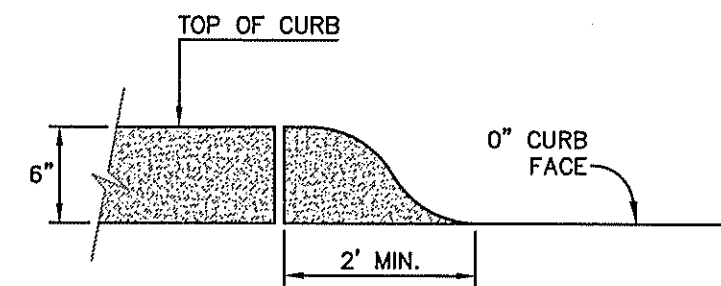


NOTES:
1. 1" BATTER ON GUTTER FACE OPTIONAL.
2. WHERE LONGITUDINAL SLOPE IS LESS THAN 0.4%, THE FLOW LINE SHALL BE WATER TESTED.

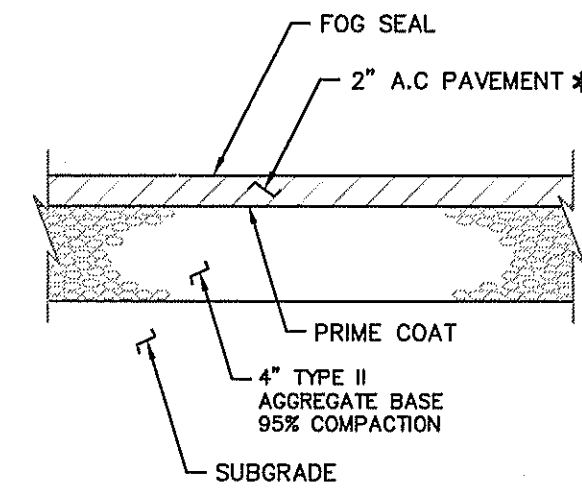
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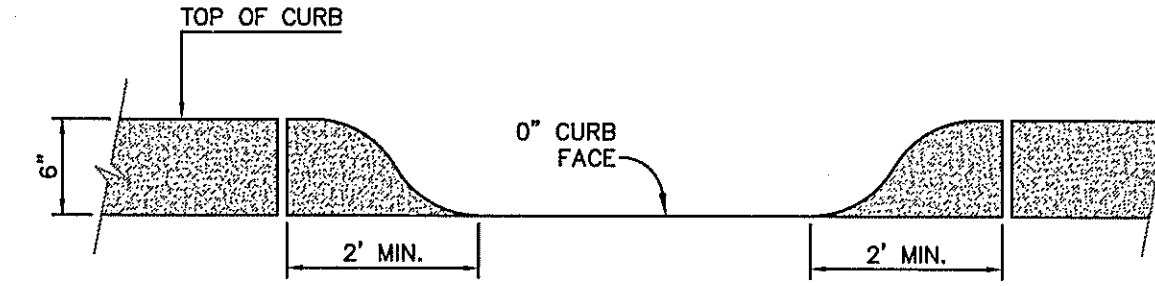
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PER USD DWG. No. 219 SCALE: NTS



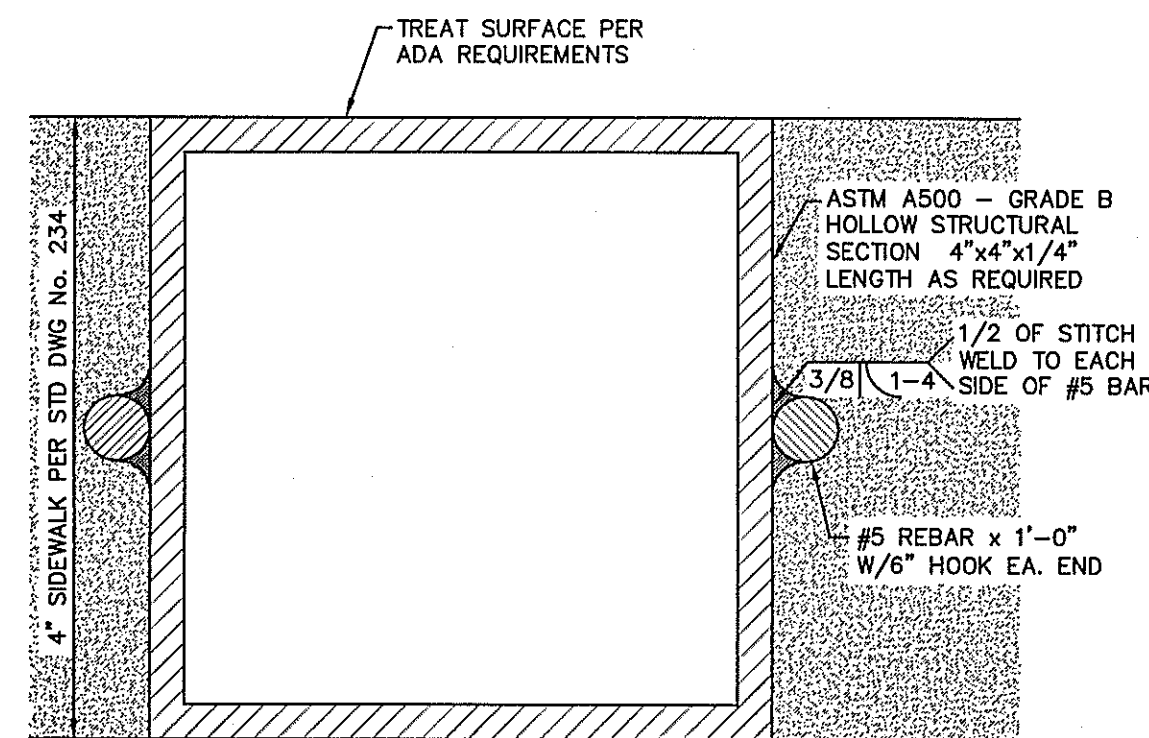
3 2' CURB TRANSITION
SCALE: NTS



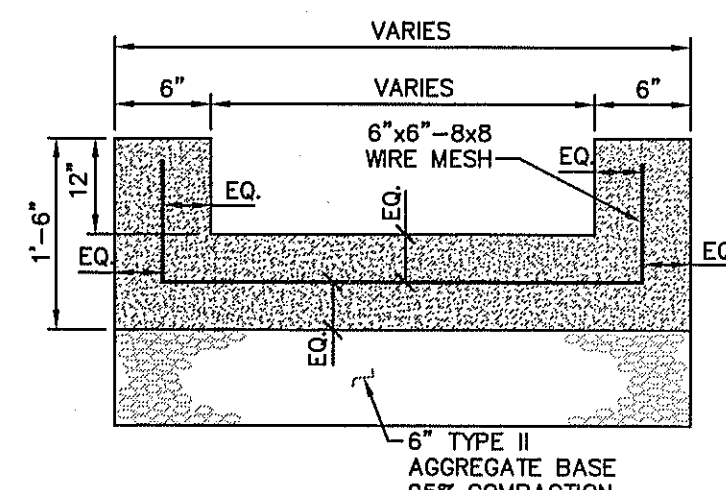
4 ON-SITE A.C. PAVEMENT SECTION
SCALE: NTS



5 DEPRESSED CURB
SCALE: NTS

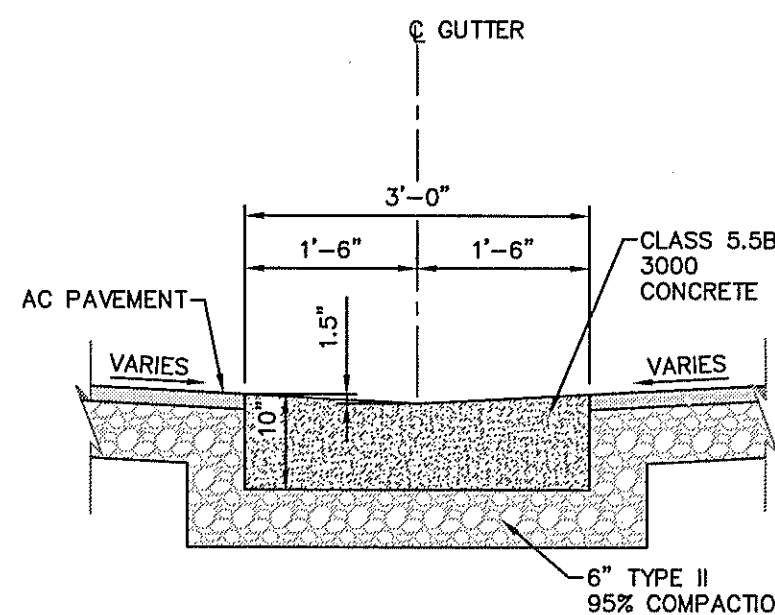


6 ONSITE SIDEWALK UNDERDRAIN
PER USD DWG. No. 216 SCALE: NTS

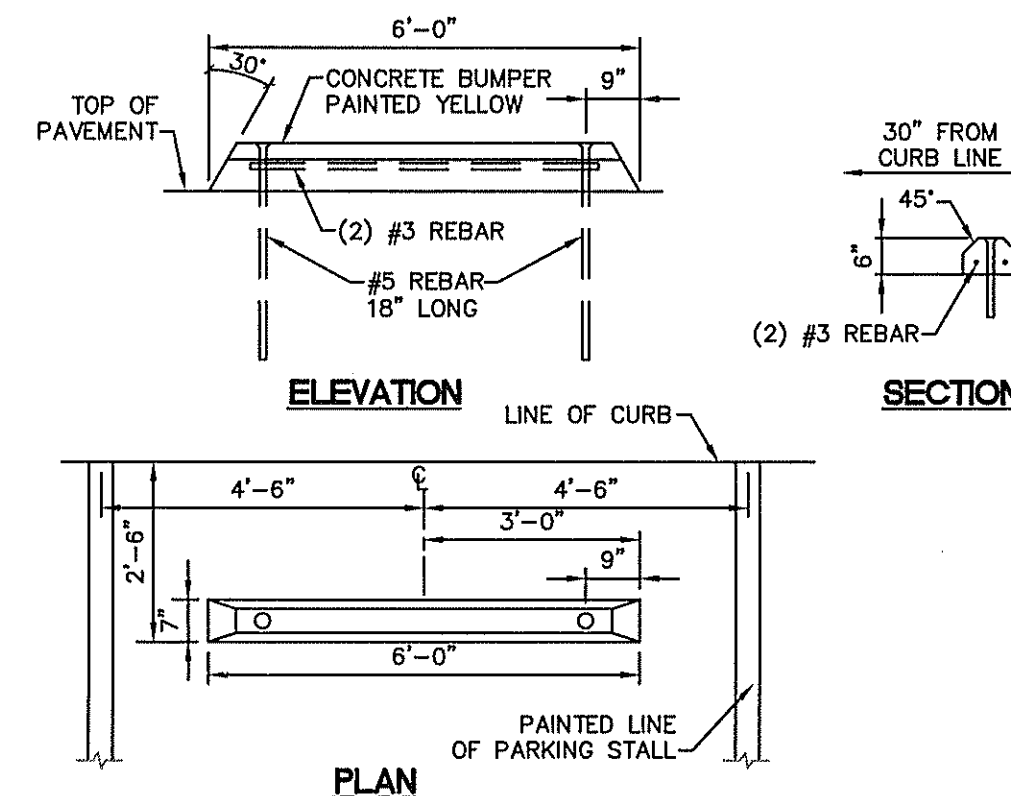


NORTHWEST CORNER FLUME WIDTH VARIES
SOUTHWEST CORNER FLUME WIDTH 6' FEET

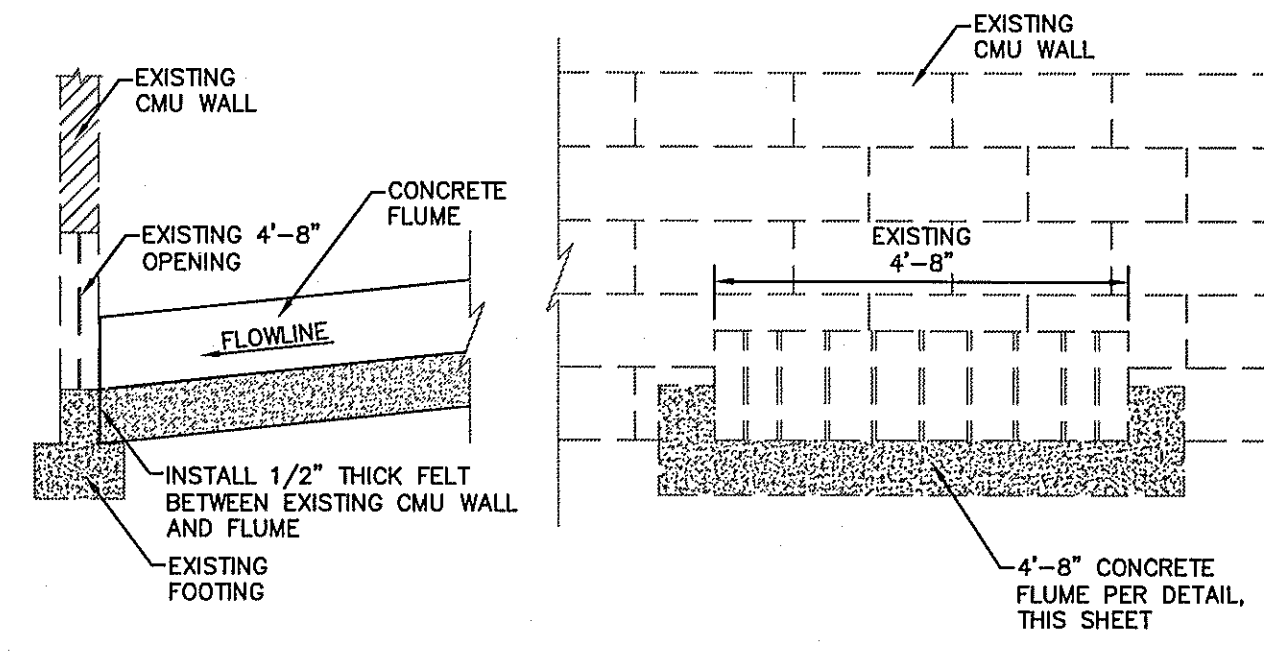
7 U-TYPE GUTTER
SCALE: NTS



8 3' VALLEY GUTTER SECTION
SCALE: NTS



9 CONCRETE BUMPER BLOCKS
SCALE: NTS



10 EXISTING BLOCKWALL OPENING DETAIL
SCALE: NTS

■ FRAME AND GRATE ASSEMBLY AVAILABLE IN TRAFFIC OR PEDESTRIAN MODELS.
■ FRAME AND SOLID COVER ASSEMBLY AVAILABLE IN TRAFFIC OR PEDESTRIAN MODELS.
■ DESIGN FOR H-20-44 BRIDGE LOADING.
■ ASSEMBLY TO BE PLACED ON A 6" BASE OF CRUSHER RUN FOR EASE OF INSTALLATION AND EVEN LOAD DISTRIBUTION.
■ FOR COMPLETE DESIGN AND PRODUCT INFORMATION, CONTACT JENSEN PRECAST.
■ ILLUSTRATION IS TYPICAL ONLY OF GENERAL SERIES CONFIGURATION; FOR SPECIFIC CONFIGURATION, CALL JENSEN PRECAST.

EXTENSION			
MODEL NO.	C	WEIGHT	
RS242406	6"	300 LBS.	
RS242412	12"	600 LBS.	

DROP INLET			
MODEL NO.	A	B	* WEIGHT
DI242436	36"	42"	1900 LBS.
DI242448	48"	54"	2500 LBS.

* BOX ONLY

FRAME AND GRATE			
MODEL NO.	RATING	D	WEIGHT
SC2424-DIP	PEDESTRIAN	1 1/2"	41 LBS.
SC2424-DIT	TRAFFIC	3"	120 LBS.

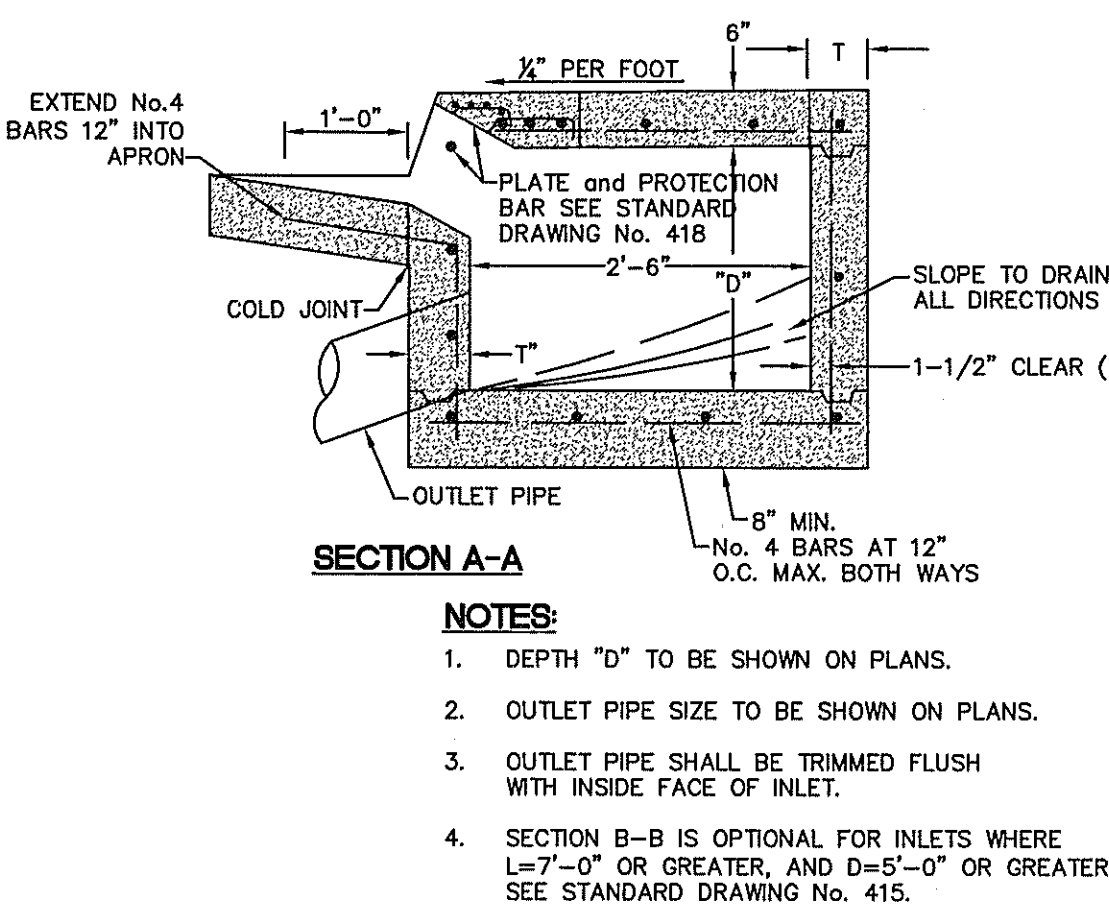
18"x31" THIN WALL KNOCKOUTS, SLEDGE OUT AS REQUIRED (TYP. 4 PLACES)

FRAME MAY BE CAST DIRECTLY INTO BOX (OPTIONAL)

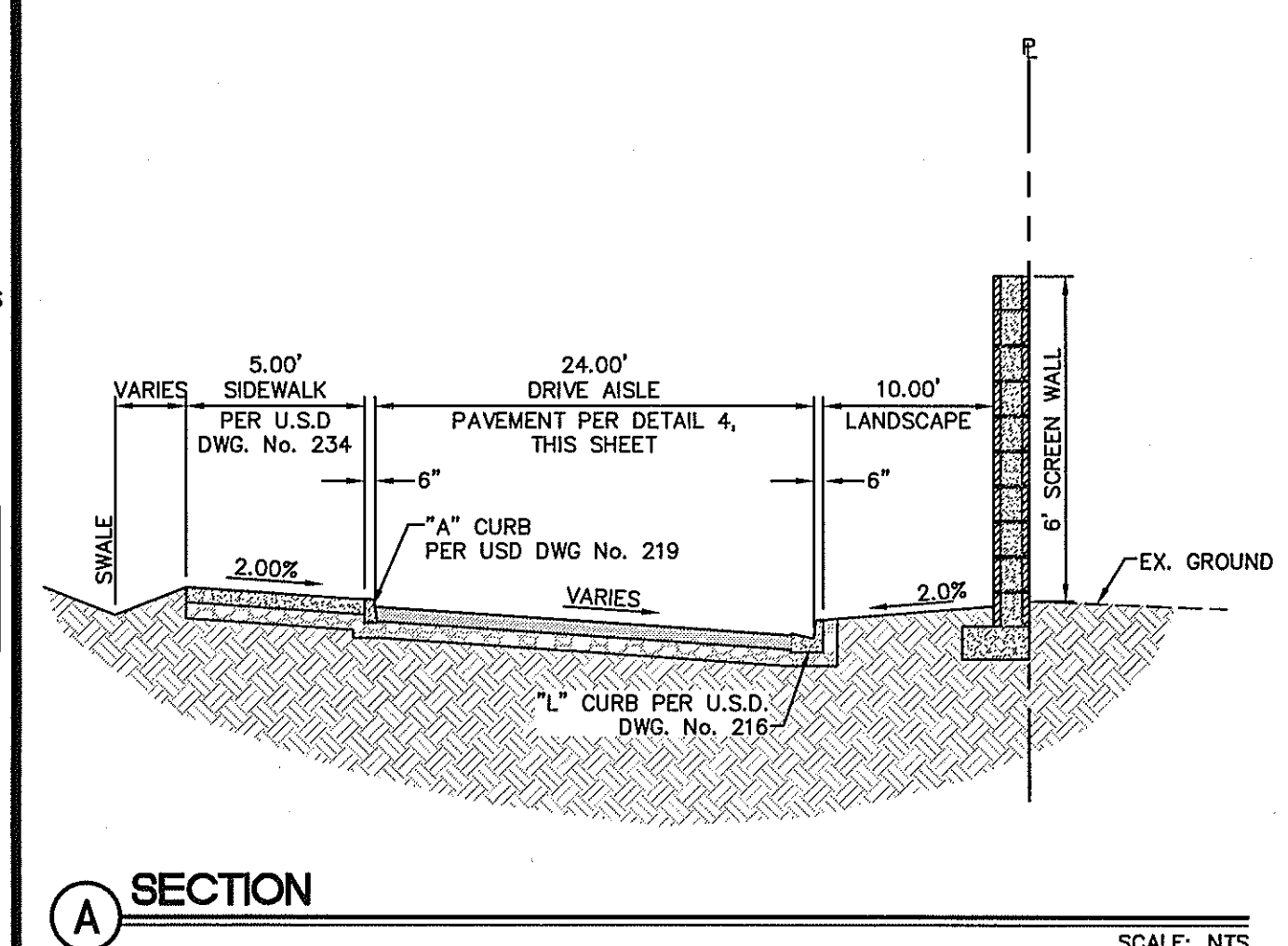
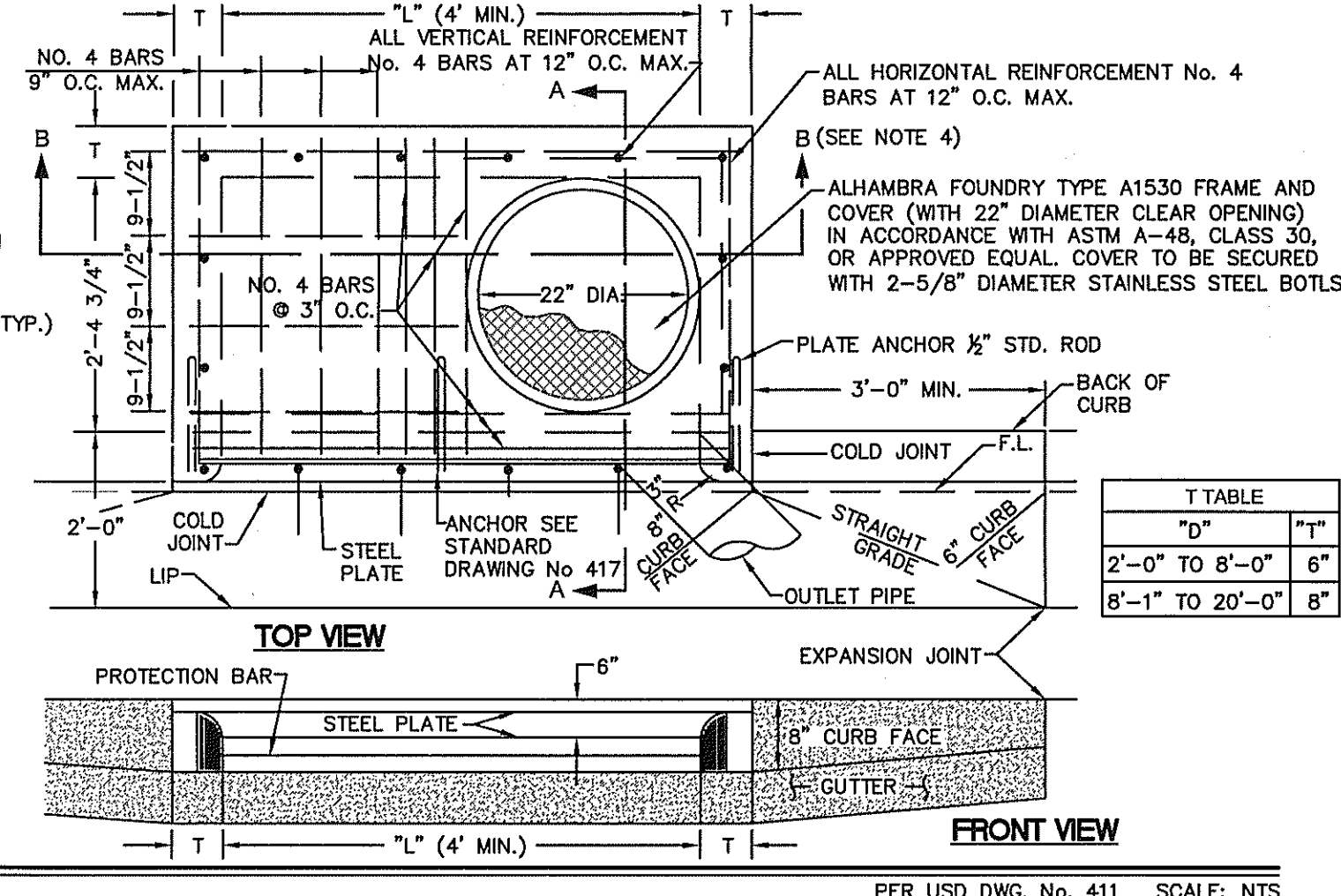
OUTSIDE B HEIGHT OF BOX

OPTIONAL EXTENSION HEIGHT

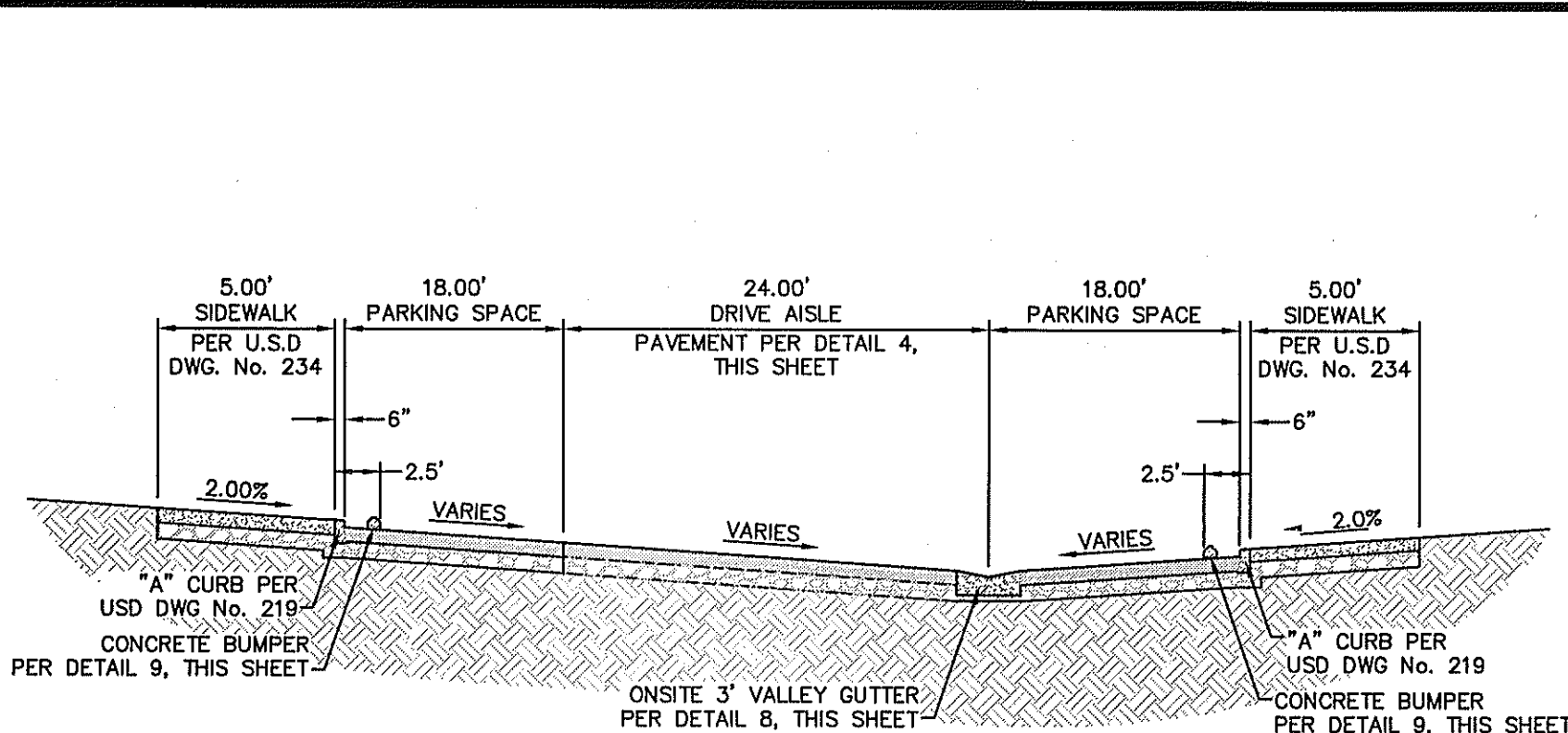
11 24"x24" DRAIN INLET
DI2424 ORG. DWG. DATE: 11-28-00 REV. DWG. DATE: SCALE: NTS



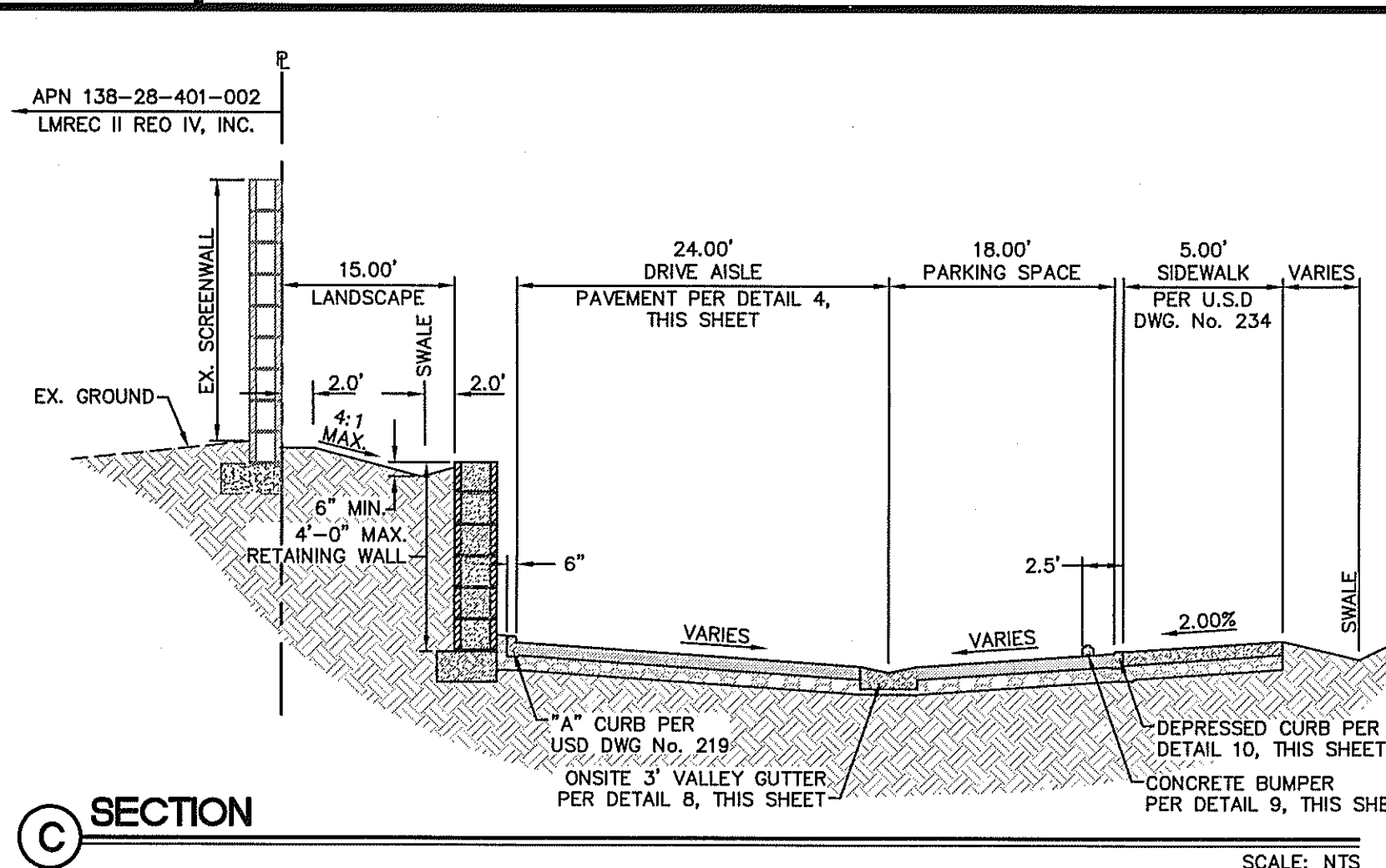
12 DROP INLET TYPE 'A'
SCALE: NTS



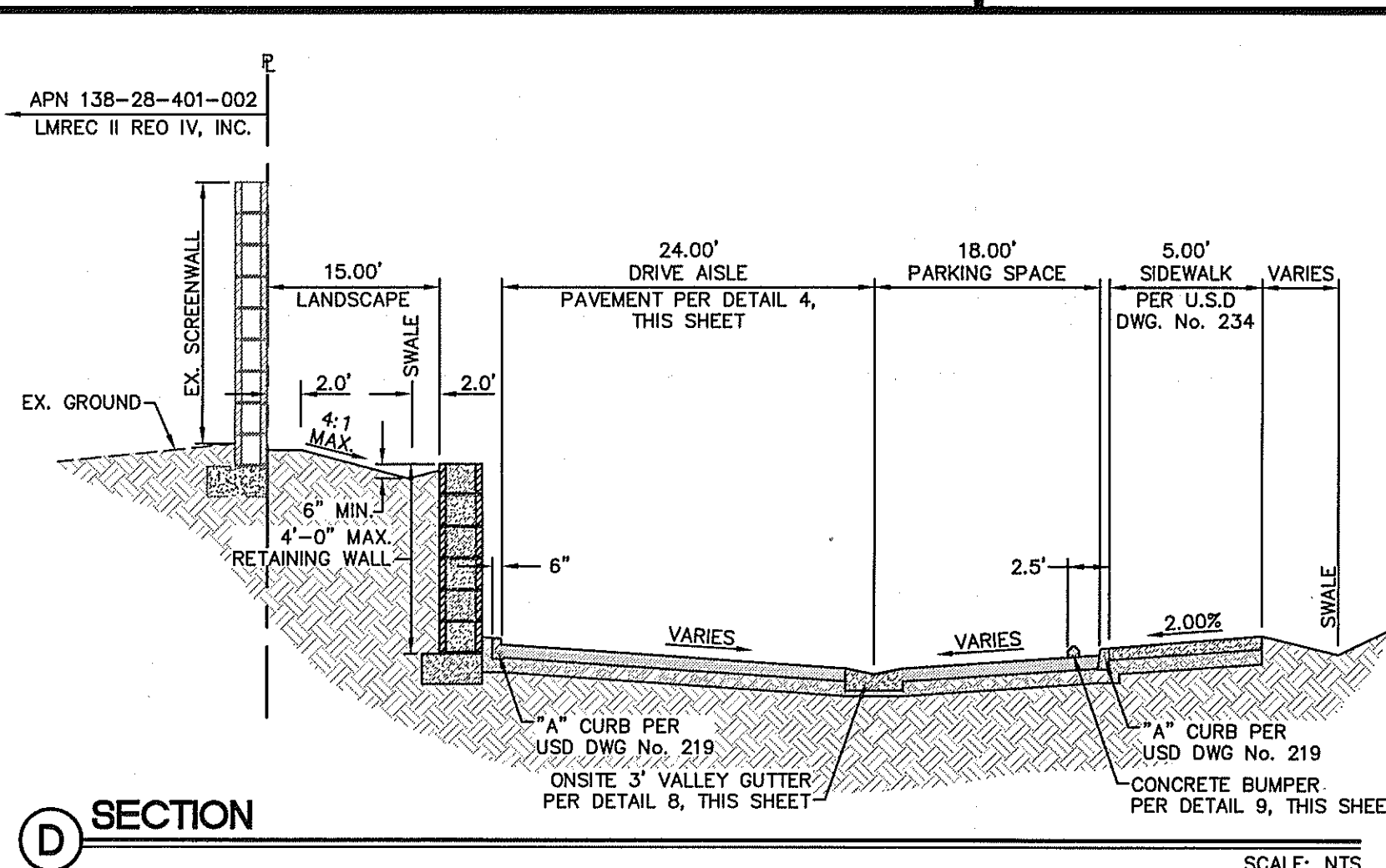
SECTION A
SCALE: NTS



SECTION B
SCALE: NTS



SECTION C
SCALE: NTS



SECTION D
SCALE: NTS

WALL NOTE:
ALL RETAINING AND FENCE WALLS SHALL BE REVIEWED BY THE BUILDING DEPARTMENT. WALL PERMITS ARE ISSUED THROUGH THE BUILDING DEPARTMENT.

SOILS REPORT
GEOTEK, INC. - NEVADA
DATED FEBRUARY 3, 2011
PROJECT No. 10251-LV6
UPDATED: MARCH 12, 2012

APPROVED BY: _____ DATE: _____

REV. NO. REVISION DESCRIPTION

NEVADA HAND:
215 WEST WILLOW ROAD, SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (702) 735-3345 CONTACT: ROBERT FIELEMAN

L.R. NELSON CONSULTING ENGINEERS, INC.
6765 West Russell Road Suite 200
Las Vegas, Nevada 89118
(702) 798-7978
(702) 451-2286 FAX

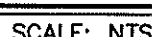
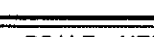
DETAILS SHEET 1

TITLE
WESTCLIFF PINES 2
ROLAND WILEY ROAD and SILVER SKY DRIVE
CITY OF LAS VEGAS

DRAWN BY: _____ **DESIGNED BY:** _____ **CHECKED BY:** _____ **PROJECT NO.:** _____ **SCALE:** N/A

SHEET
March '12 March '12 March '12
DT1
6 OF 20 SHEETS
CLV DRAWING NO.

SEAL
PROFESSIONAL ENGINEER - STATE OF NEVADA
VERNON R. HARKINS
EXP. 6/30/13
No. 009868
3/11/12



STAMP MESSAGES AND SYMBOLS

PER USD DWG. No. 421 SCALE: NTS



1. MESSAGE OR SYMBOL SHALL BE AS SHOWN ON THE DRAWING OR ON THE VERTICAL CURB NEXT TO THE DROP INLET OR AS APPROVED BY THE APPROPRIATE CITY OR COUNTY ENGINEER. LETTERS SHALL BE 1"-7/16" IN HEIGHT. THE MESSAGE SHALL BE CENTERED ON THE BACK OF THE INLET OR CURB.
2. CONCRETE SHALL BE STAMPED IN SUCH A WAY AS TO PROVIDE FOR A CLEAR AND LEGIBLE IMAGE (APPROXIMATE DEPTH OF 1/4").
3. ALL STAMPS SHALL BE APPROVED BY THE CITY OR COUNTY ENGINEER BEFORE BEING USED. STAMPS MAY BE PERMANENTLY CAST INTO IRON FRAME OR PRE-CAST CONCRETE PORTIONS OF INLET.
4. WHERE RETROFITTING IS REQUIRED, AN EPOXYD PLACARD BEARING THE MESSAGE AND SYMBOL SHALL BE AFFIXED TO THE VERTICAL CURB OR THE CITY OR COUNTY ENGINEER SHALL BE PERMANENTLY AFFIXED ON THE TOP OF THE ADJACENT CURB.
5. THIS STANDARD IS REQUIRED IN THE LAS VEGAS VALLEY IN WHICH AREA WATER DRAINS TO

PER USD DWG No 421 SCALE: NTS

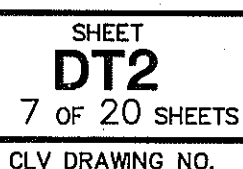


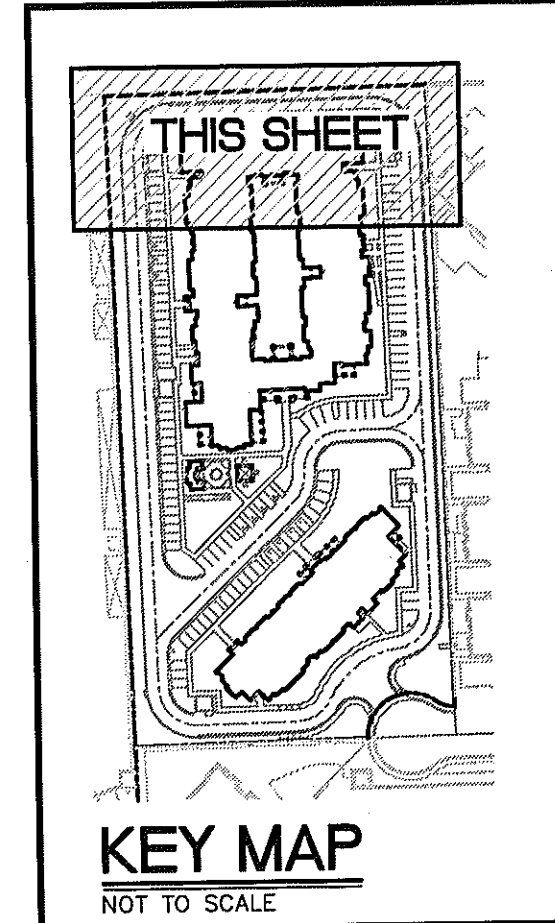
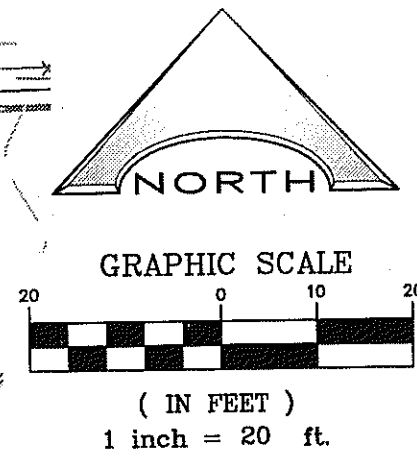
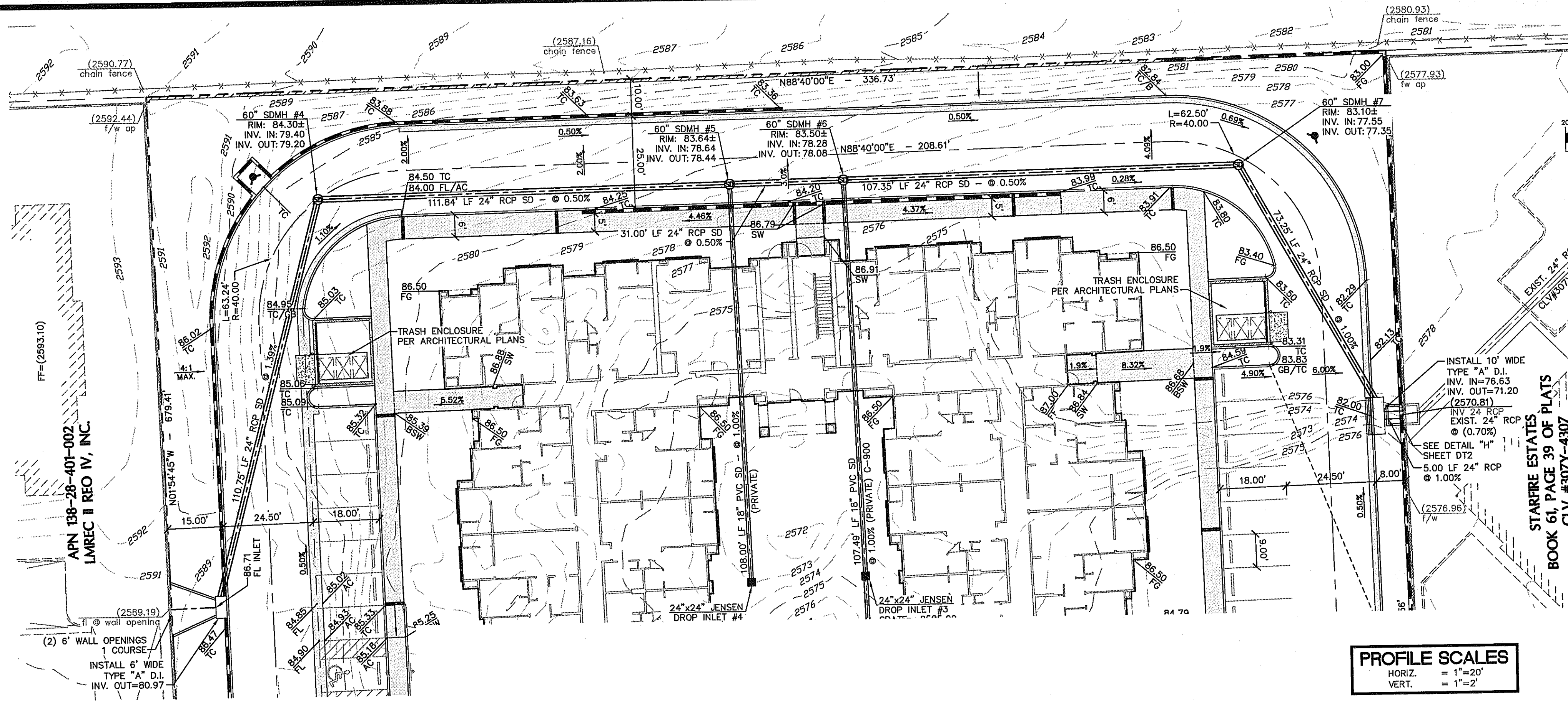
THIS EPOXY PLACARD MESSAGE AND SYMBOL HAS BEEN APPROVED BY THE APPROPRIATE CITY OR COUNTY ENGINEER. ANY OTHER EQUIVALENT MESSAGE AND SYMBOL DESIGNS WILL REQUIRE PRIOR APPROVAL OF THE APPROPRIATE CITY OR COUNTY BEFORE INSTALLATION. THE PLACARD MATERIAL SHALL BE EITHER POLYCARBONATE OR METAL AND THE FINISH SHALL BE UV AND ABRASION RESISTANT.

REF. USD. DWG. No. 421 SCALE: NTS

ALL RETAINING AND FENCE WALLS SHALL BE REVIEWED BY THE BUILDING DEPARTMENT. WALL PERMITS ARE ISSUED THROUGH THE BUILDING DEPARTMENT.

GEOTEK, INC. - NEVADA
DATED FEBRUARY 3, 2011
PROJECT No. 10251-LV6
UPDATED: MARCH 12, 2011



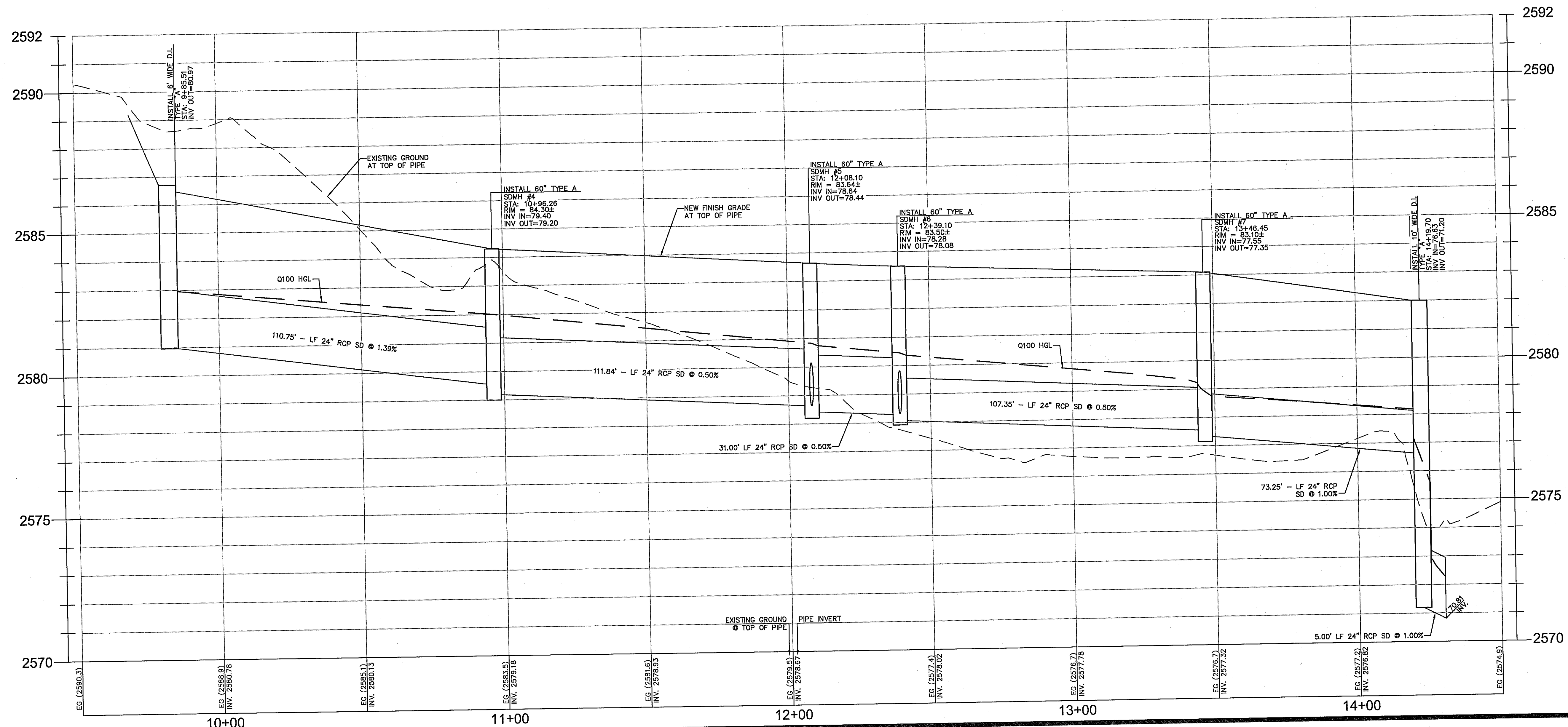


BENCHMARK
FOUND RIVET AND PLATE IN THE TOP OF CURB AT THE NW CORNER OF WESTCLIFF AND CIMARRON
#009 OLVOO 2854
777.8633 (m) 2552.04 (ft)

OWNER/DEVELOPER
H.A.N.D. PROPERTY HOLDING COMPANY
295 WARM SPRINGS ROAD SUITE 101
LAS VEGAS, NEVADA 89119-4212
TEL: (430-9025) CONTACT: ROBERT FEIBLEMAN

BASIS OF BEARING
NORTH 88°31'18" EAST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 28, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN ON A MAP ON FILE IN THE CLARK COUNTY, NEVADA RECORDER'S OFFICE AS FILE 109, PAGE 2 OF PARCEL MAPS.

PROFILE SCALES
HORIZ. = 1"=20'
VERT. = 1"=2'



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

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

Avoid overhead power line contact
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

Avoid hitting underground traffic signal systems and street light system conduits. It's costly.
CALL BEFORE YOU DO UNDERGROUND
before you Underground
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
1-702-432-5300
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

REV. NO. / REVISION DESCRIPTION	
APPRO. BY / DATE	
DRAWN BY: March '12	
DESIGNED BY: March '12	
CHECKED BY: March '12	
PROJECT NO.: 818-021-113	
SCALE: 1"= 20'	
SHEET 14 OF 20 SHEETS	
CLV DRAWING NO.	
NEVADA H.A.N.D. 295 EAST WARM SPRINGS ROAD SUITE 101 LAS VEGAS, NEVADA 89119 TEL: (702) 798-3034 CONTACT: ROBERT FEIBLEMAN	
L.R. NELSON CONSULTING ENGINEERS, INC. 6785 West Main Road Suite 200 Las Vegas, Nevada 89118 (702) 798-7978 (702) 451-2296 FAX	
STORM DRAIN PLAN and PROFILE 1	
WESTCLIFF PINES 2	
ROLAND WILEY ROAD and SILVER SKY DRIVE	
CITY OF LAS VEGAS	

