DS #: 4527

APN: 139-34-211-001

PROJECT: SYMPHONY PARK AT UNION PARK, PARCEL M-3

SUBMITTAL: 3RD

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: July 19, 2011
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: **Symphony Park at Union Park, Parcel M-3**			**COPIES TO:** Martin & Martin Civil Engineers
Cross Streets:	Symphony Park Ave. & Promenade Place			City Parkway V Inc.
File Number:	F:\Depot\DSMemos\DS4527C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	139-34-211-001; 139-33-511-009 & -010			
Zoning Action:	SDR-41033			
FEMA Flood Zone	YES	NO	**X**	
Proposed Storm Drain	YES	NO	**X**	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	4/13/2011	4/27/2011	Not Approved	$400.00	166609: $400
2nd Submittal	5/5/2011	5/9/2011	Not Approved	$400.00	168203: $400
3rd Submittal & Supplement	6/30/2011 & 7/15/2011	7/7/2011 & 7/18/2011	See Comments Below	$400.00	171951: $400
			TOTAL FEES (LDDRS):	**$1,200.00**	----

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.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. **Sheet C4.02**: A proposed 20'-wide public drainage easement (privately maintained) centered to a proposed onsite storm drain system must be granted and recorded by separate document prior to the final acceptance of improvement plans.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soils 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 Robert Welch in the Flood Section at (702) 229-2177 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/R61E/34

AREA M-34

Post-it® Fax Note 7671	Date 7/19/11	# of pages ▶ 2
To Paul Fritz	From Albert Cuvo
Co./Dept. Martin & M.	Co. CLV
Phone #	Phone # 229-200
Fax # 248-8070	Fax #

P.01

TRANSACTION REPORT

JUL-19-2011 TUE 11:01 AM

FOR: CITY OF LAS VEGAS 7023828551

SEND

DATE	START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
JUL-19	11:00 AM	2488070	32"	2	FAX TX	OK	839	

TOTAL : 32S PAGES: 2

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.

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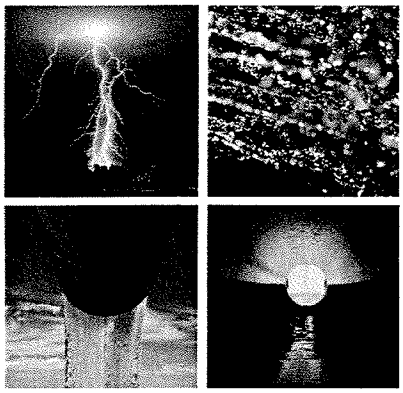
END OF REMARKS
ays

T/R/S: T20S/R61E/34
AREA M-34

Post-it® Fax Note 7671 | Date 7/19/11 | # of pages ▶ 2
To Paul Fritz | From Albert Cung



TECHNICAL DRAINAGE STUDY
Update #2 for Symphony Park
(at Union Park, Parcel M-3)
Las Vegas, NV

Rec'd: 6/30/11
DS4527
M-34
$400

June 2011

MARTIN & MARTIN PROJECT NO. 4021

Prepared for:

LIFESCAPES INTERNATIONAL INC
4930 Campus Drive
Newport Beach, CA 89146
(949) 476-8888

MARTIN & MARTIN
Civil Engineers
2355 Red Rock Street, Suite103
Las Vegas, Nevada 89146
Phone (702) 248-8000
Fax (702) 248-8070
www.mmcivil.com

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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: **Sympmhony Park (at Union Park, Parcel M-3)** Date: **6/27/2011**

Location of Development: a) Descriptive (Cross Streets) **Northeast of Bonneville Ave. and Grand Central Pkwy.**

b) Section **34** Township **20 South** Range **61 East**

Name of Owner: **City Parkway V INC.,** Assessors Parcel Number: **139-34-211-001**
Symphony Park Master Assn INC.

Telephone Number: **(949)-476-8888**

Address: **4930 Campus Drive**
Newport Beach, CA 92660

Contact Person Name: **Paul F. Fritz, PE** Telephone Number: **(702) 834-7706**

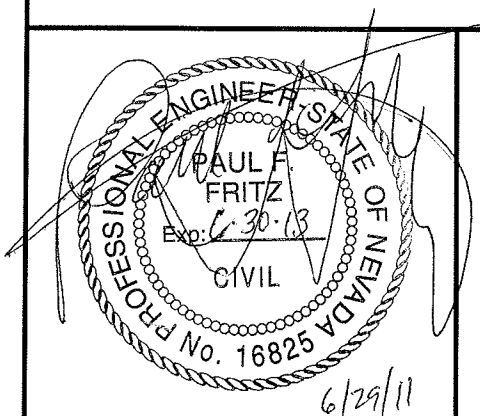
Firm: **Martin & Martin Civil Engineers** Fax Number: **(702) 248-8070**

Address: **2355 Red Rock Street Suite 103** Email: **pfritz@mmcivil.com**
Las Vegas, NV 89146

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	X	Building Permit		

1. Total Owned Land Area: At Site: **± 1.6 Ac** Being Developed: **± 1.6 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.)? **Park**
5. Approximate upstream land area which drains to the subject site? **N/A**
6. Has the site drainage been evaluated in the past? **YES** NO
   If yes, please identify documentation:
   Technical Drainage Study for Union Park by Kimley -Horn
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
   All flow is discharged to the adjacent storm drain as required
8. Briefly describe your proposed schedule for the subject project: **ASAP**



6/29/11

Engineer's Seal

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

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

Revision	Date

Local Entity File No.

REFERENCE: M&M Project No. 4021 **STANDARD FORM 1**

MARTIN & MARTIN
Civil Engineers
A Subsidiary of Civil Squared Engineering, LLC

June 27, 2011

Albert Sung
City of Las Vegas Flood Control
731 South Fourth Street
Las Vegas, Nevada 89101

RE: Technical Drainage Study Update #2 for Symphony Park (at Union Park, Parcel M-3) (APN 139-34-211-001)
Martin & Martin Project No. 4021

Mr. Sung,

Lifescapes International, Inc. has retained Martin & Martin Civil Engineers to provide a Technical Drainage Study Update for the proposed Symphony Park (at Union Park, Parcel M-3). The project site is within APN 139-34-211-001 and located in the City of Las Vegas, Nevada between currently planned Symphony Park Ave one way streets, west of City Parkway. This letter, Standard Form 1, the current proposed Grading Plan & Drainage Basin Map and drainage calculations are to serve as an update to the referenced approved Technical Drainage Study prepared by Kimley Horn and Associates (KHA) and the reviewed Technical Drainage Study Update for Symphony Park (at Union Park, Parcel M-3, M-2, M-1) prepared by Martin & Martin which analyzed the completely developed or "ultimate" condition of the proposed overall Union Park Development.

The purpose of this study is to establish a technical drainage analysis of the 24 hour peak flow rates affecting the site under existing and developed conditions for the 2, 10, and 100 year storm events. It includes an analysis of drainage patterns and flow rates for use in the design of flood protection facilities.

The previously approved Union Park Study by Kimley Horn and Associates, Inc. (KHA) depicts the M-3 project site draining to an existing 24-inch RCP on the south edge of the site, (See Appendix "D") which discharges into the existing 36-inch RCP in City Parkway. The historical basin drainage patterns of the approved Union Park Study will not be altered as part of the proposed improvements; and therefore, this update will conform to the latest City of Las Vegas Approved Drainage Study.

The 100 year runoff (6 cfs) discharging to the on-site southerly 24-inch pipe (per the Union Park Study) was used to design the off-site drop inlets which capture and convey the on-site/off-site flows. The grading plans depict the installation of two offsite Type "DM2" drop inlets designed to capture the runoff from ON26U with each one capturing half the runoff. Since the resulting ponding depths at the drop inlets were below 0.33-feet, upstream flows within the street right-of-way will be below this elevation. The majority of the flow depicted in basin ON26U is captured onsite and hydraulic street cross-sections are not needed. The two onsite 12-inch area drains were designed for the 100 year 24 hour design storm event in lieu of the prorated portion of ON26U from the Union Park Study to be conservative. Note: the 100 year 24 hour peak flow is not added to the storm drain system analysis because the 6 cfs from ON26U includes the project site as well as the adjacent right-of-way. Additional onsite storm drain facilities have been designed to aid in irrigation (through infiltration). These facilities are bypassed in large storm events therefore no design calculations are provided for flood control review.

Originally, the two year 24 hour design storm calculations were to be provided to show compliance to LEED point 6.1 for new construction. This site is no longer going for an independent LEED accreditation at this time but it should be noted that the improvement of the land from western desert to grass reduced the peak flow rate in the 2 year from 1.1 cfs to 0.68 cfs. Since this reduction in peak flow is from infiltration and not attenuation of flow, the volume (quantity) of runoff leaving the project site has also been reduced as part of this project. TR-55 was used in accordance with the criteria set forth by Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (Criteria Manual) to calculate these peak flow rates. (See Appendix "B")

The results of this study indicate that if construction is in accordance with the recommendations of this study, the proposed improvements will not significantly impact surrounding or downstream properties.

We hope all your concerns have been addressed. If you have any comments or questions, please feel free to contact us at any time.

Sincerely,

Paul F. Fritz, P.E.
Sr. Project Manager
Martin & Martin Civil Engineers

Richard Robinson, E.I.
Sr. Hydrologist
Martin & Martin Civil Engineers

H:\Cad\Land\4021\Admin\Drainage\Update M3\Project TDS Letter.doc

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- Developed Drainage Basin Map (Figure 6)

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- Weighted Curve Number Calculations
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- TR-55 INPUT /OUTPUT FILE – Existing and Developed Conditions

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(HYDRAULICS)

- Drop Inlet Calculations
- Storm Drain Capacity Calculations

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(REFERENCE)

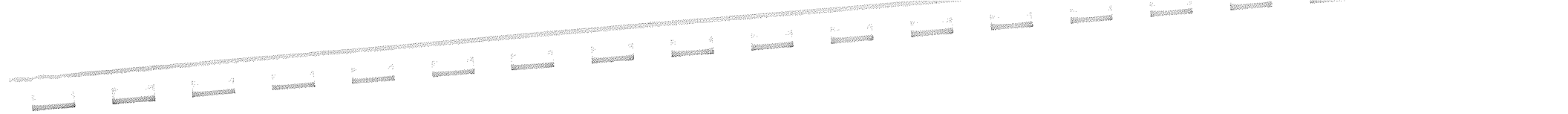
- Kimley-Horn and Associates , *"Technical Drainage Study for Union Park"*
- LEED for New Construction Rating System, *"SS Credit 6.1: Stormwater Design: Quantity Control 1 point"*

APPENDIX D
(IMPROVEMENT PLANS)

- Grading Plans
- Storm Drain Plans
- Detail Sheets

APPENDIX A
(FIGURES)

- Existing Drainage Basin Map (Figure 5)
- Developed Drainage Basin Map (Figure 6)



APPENDIX B
(HYDROLOGY)

- Six-Hour Depth Area Reduction Factors (Table 502)
- Depth-Duration-Frequency Value (Table 505)
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- TR-55 INPUT /OUTPUT FILE – Existing and Developed Conditions

SIX HOUR DEPTH-AREA REDUCTION FACTORS

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

NOTES: 1. A graphical representation of these factors is presented in Figure 514.

2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

	RECURRENCE INTERVAL					
TIME	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

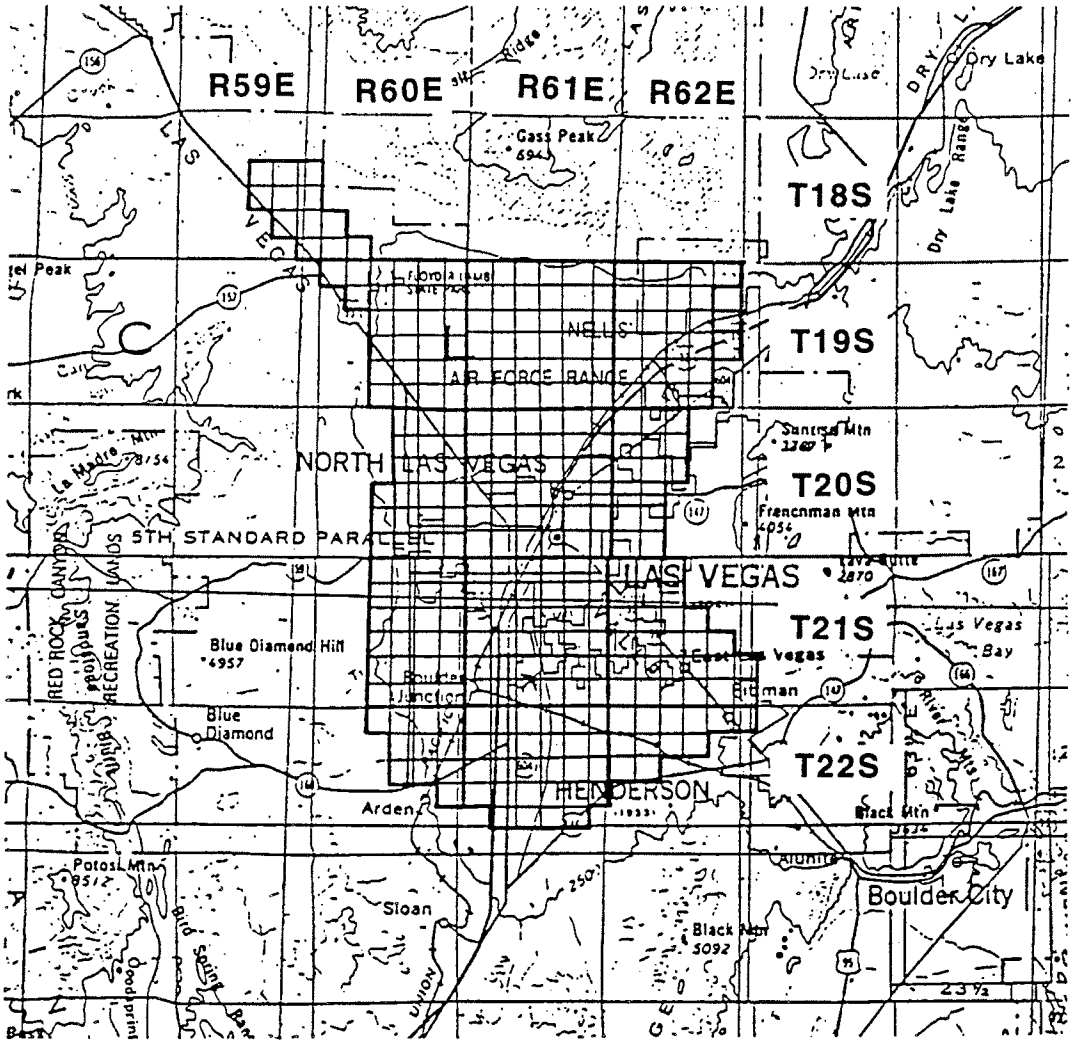
NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.

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

3. Table 501 adjustments not required.

Revision	Date

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

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

Project **Symphony Park** By **RRR** Date **6/16/2011**

Location **Las Vegas** Checked _____ Date _____

Circle one: Present (Developed) **OND1**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1,2] Table 601	CN [1,2] Table 602 1 of 4	CN [1,2] Table 602A	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
C	**Grass**	**74**			**0.77**	**56.98**
C	**Impervious**	**98**			**0.81**	**79.38**
	Totals =				**1.58**	**136.36**

1 Use only one CN source per line
2 Tables from the CCRFCD Hydrologic Criteria and Drainage Design Manual

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{136.36}{1.58} = 86.30$$

Use CN = **86**

TIME OF CONCENTRATION

STANDARD FORM 4

DEVELOPMENT: Symphony Park CALCULATED BY: RRR DATE: 6/27/2011

SUB-BASIN DATA				INITIAL / OVERLAND TIME (t_i)			TRAVEL TIME (t_t)					t_c CHECK (URBANIZED BASINS)		FINAL t_c	REMARKS		
DES.	K	AREA	AREA	LEN.	SLOPE	t_i	LEN	SLOPE	VEL (V_1)	VEL (V_2)	t_t	TOTAL LENGTH	t_c=(L/180) +10		CN	T_{LAG}	T_{LAG} TR-55
		Ac	Sq Mi	Ft	%	Min	Ft	%	fps	fps	Min	Ft	Min	Min		Min	HR
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10a)	(10b)	(11)	(12)	(13)	(14)	(15)	(16)	
EXISTING ONSITE																	
ONX1	0.8112	1.58	0.0025	396	1.1	10.02	0	0.0	0.00	N/A	0.00	396	12.20	10.02	91	0.100	0.17
DEVLOPED ONSITE																	
OND1	0.7452	1.58	0.0025	0	1.0	0.00	85	2.0	2.86	N/A	0.50	85	10.47	5.00	86	0.050	0.10

* - Note minumum T_{LAG} for TR-55 is 6 min of 0.1 hours

* - See CCRFCD HC&DDM Sec. 602.1

K = 0.0132*CN-0.39 $t_l = t_c*0.6$

t_i = 1.8(1.1-K)L^1/2/S^1/3

Velocity obtained from Manning's Equation

Travel Time Velocity Formulas*	
Existing	Developed
V_1 = 14.8*(S/100)^1/2	V_1 = 20.2*(S/100)^1/2
V_2 = 29.4*(S/100)^1/2	V_2 = 30.6*(S/100)^1/2

For the travel time (T_t) calculations:

V_1 applies to the first 500 feet of travel distance

V_2 applies to the remaining travel distance

WinTR-55 Current Data Description

--- Identification Data ---

User: RRR
Project: Symphony Park
SubTitle:
State: Nevada
County: Clark
Filename: H:\Cad\Land\4021\Admin\Drainage\Update M3\hydro\4021-TR55-EX.w55

Date: 6/16/2011
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
ONX1		Outlet	1.58	91	0.170

Total area: 1.58 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.2	1.6	1.8	2.4	2.7	2.96	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

RRR

Symphony Park

Clark County, Nevada

Watershed Peak Table

Sub-Area or Reach Identifier	ANALYSIS: (cfs)	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS			
ONX1	1.10	2.16	4.36
REACHES			
OUTLET	1.10	2.16	4.36

WinTR-55 Current Data Description

--- Identification Data ---

User: RRR
Project: Symphony Park
SubTitle:
State: Nevada
County: Clark
Filename: H:\Cad\Land\4021\Admin\Drainage\Update M3\hydro\4021-TR55-DEV.w55

Date: 6/16/2011
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
OND1		Outlet	1.58	86	0.100

Total area: 1.58 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.2	1.6	1.8	2.4	2.7	2.96	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

RRR

Symphony Park

Clark County, Nevada

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period ANALYSIS: (cfs)	10-Yr (cfs)	100-Yr (cfs)
SUBAREAS			
OND1	0.68	1.68	3.97
REACHES			
OUTLET	0.68	1.68	3.97

APPENDIX C
(HYDRAULICS)

- Drop Inlet Calculations
- Storm Drain Capacity Calculations

Project: Symphony Park
Job Number: 3119
Calculated By: RRR
Checked By: PFF
Date: April 2011

AREA DRAINS- SUMP CONDITION

DI #	Basin(s)	Q_{Design} cfs	Number Inlets	L ft	W ft	A ft^2	P ft	H ft	$Q_{i\ orifice}$	$Q_{orifice}$	$Q_{i\ weir}$ cfs	Q_{weir} cfs	$Q_{Intercepted}$ cfs	$Q_{Intercepted} > Q_{Design}$
1	(OND1)/2	2	1	1	1	1	4	0.60	4.04	2.02	5.58	2.79	**2.0**	OK
6	(OND1)/2	2	1	1	1	1	4	0.60	4.04	2.02	5.58	2.79	**2.0**	OK

Determine Grate Capacity:

Use Weir Flow Equation:

$$Q_{i\ weir} = CPH^{1.5}$$

Use Reduction factor of 0.50

$$Q_{weir} = 0.5Q_i$$

Where:

P = 2(L+ w) without curb
= 2w + L with curb

$Q_{i\ weir}$ = Ideal Inlet Capacity

P = Wetted Perimeter (ft)

H = flow depth (ft)

C = Weir Coefficient = 3.0

Determine Grate Capacity:

Use Orifice Flow Equation:

$$Q_{i\ orifice} = C_dA(2gH)^{0.5}$$

Use Reduction factor of 0.50

$$Q_{orifice} = 0.5Q_i$$

Where:

A = Cross-sectional Area in ft^2

H = flow depth (ft)

$Q_{i\ orifice}$ = Ideal Inlet Capacity

g = gravitational constant = 32.2 ft/sec^2

C_d = Orifice Coefficient = 0.65

$$Q_{intercepted} = Q_{orifice} \text{ or } Q_{weir \text{ (whichever is greater)}}$$

Project: Symphony Park
Job Number: 3119
Calculated By: RRR
Checked By: PFF
Date: April 2011

TYPE 'D' DROP INLETS- SUMP CONDITION

DI #	Basin(s)	Q_{Design} cfs	L ft	W ft	d ft	Q_i cfs	Q_c cfs	Grate Width ft	Grate Length ft	# of Grates	P ft	H ft	Q_i cfs	Q_{grate} cfs	$Q_{Intercepted}$ cfs	$Q_{intercepted} > Q_{Design}$
1	1/2 EX-SD	3	4	1.5	0.33	2.9	1.5	1.5	2.5	1	6	0.33	3.1	1.6	**3.0**	OK
2	1/2 EX-SD	3	4	1.5	0.33	2.9	1.5	1.5	2.5	1	6	0.33	3.1	1.6	**3.0**	OK

Note: The flow rate used to size the drop inlets in the adjacent roadways is conservatively assumed as one half the design flow of the existing downstream storm drain (see appendix D. This is conservative because most the flow is intercepted utilizing the onsite drop inlet.

Determine Curb Opening Capacity:

$Q_i = C(L + 1.8W)d^{1.5}$

Use Reduction factor of 0.50

$Q_c = 0.5Q_i$

Where:

L = Length of Curb opening (ft.)
Q_i = Ideal Inlet Capacity
Qc = Inlet capacity utilizing reduction factor
W = Lateral width of Depression (ft.)
d = Gutter flow depth (ft.)
C = Weir Coefficient = 2.3

Determine Grate Capacity:

Use Weir Flow Equation:*

$Q_i = CPH^{1.5}$

Use Reduction factor of 0.50

$Q_{grate} = 0.5Q_i$

Where:

P = 2(L+ w) without curb
= 2w + L with curb
Q_i = Ideal Inlet Capacity
P = Wetted Perimeter (ft.)
H = flow depth (ft.)
C = Weir Coefficient = 3.0

$$Q_{intercepted} = Q_c + Q_{grate}$$

* Reference - Drainage of Highway Pavements - HEC No.12 - Federal Highway Administration, March 1984

Project: Symphony Park
Job Number: 3119
Calculated By: RRR
Checked By: PFF
Date: April 2011

Storm Drain Capacity Calculations

Upstream Structure	Pipe Length ft	Pipe Slope %	Pipe Diameter in	A	P	R	Manning's N	Calculated Capacity cfs	Velocity fps	Proposed Q_{100} in Pipe cfs	Capacity Check	Velocity Check
SDDI#2	155	0.50%	18	1.77	4.71	0.375	0.013	7.45	4.2	3.0	OK	OK
SDDI#1	8	2.00%	18	1.77	4.71	0.375	0.013	14.90	8.4	3.0	OK	OK
SDMH#3	17	0.50%	18	1.77	4.71	0.375	0.013	7.45	4.2	6.0	OK	OK
SDMH#2	34	0.50%	18	1.77	4.71	0.375	0.013	7.45	4.2	6.0	OK	OK
AD#1	17	3.00%	8	0.35	2.09	0.166667	0.013	2.10	6.0	2.0	OK	OK
AD#6	23	3.00%	8	0.35	2.09	0.166667	0.013	2.10	6.0	2.0	OK	OK

Determine Storm Drain Capacity:

Use Manning's Formula with pipe flowing full.

$$Q_{capacity} = (1.49/n)AR^{2/3}S^{1/2}$$

A = Cross-Sectional Area (ft^2)
n = Manning's Roughness
R = Hydraulic Radius = A/P (ft)
P = Wetted Perimeter (ft)
Qc = Inlet capacity utilizing reduction factor
S = Pipe Slope (%)

APPENDIX D
(REFERENCE MATERIAL)

- Kimley-Horn and Associates , *"Technical Drainage Study for Union Park"*

Albert Sung

From: Paul Fritz [PFritz@mmcivil.com]
Sent: Friday, July 15, 2011 12:27 PM
To: Albert Sung
Cc: Tom Miller
Subject: Symphony Park COA
Attachments: MX-4501N_20110715_122307.pdf

Albert,
Attached are the conditions of approval for the Symphony Park M-3 project. You can send the TDS letter to either me or Tom.

Thank you,

Paul F. Fritz, P.E.
Sr. Project Manager

Martin & Martin Civil Engineers
2355 Red Rock St. Suite 103
Las Vegas, NV 89146
Phone (702) 248-8000
Direct (702) 834-7706
Fax (702) 248-8070
Cell (702) 286-3465
Email pfritz@mmcivil.com

CITY OF LAS VEGAS
DEPARTMENT OF PLANNING
DEVELOPMENT SERVICES CENTER
333 NORTH RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NEVADA 89106

VOICE 702.229.6301
FAX 702.474.0352
TTY 702.386.9108
www.lasvegasnevada.gov

July 13, 2011

Mr. Sam Gladstein
City Parkway V, Inc.
6130 Elton Avenue, Suite #212
Las Vegas, Nevada 89107

RE: ABEYANCE - SDR-41033 - SITE DEVELOPMENT PLAN REVIEW PLANNING COMMISSION MEETING OF JULY 12, 2011

Dear Mr. Gladstein:

Your request for a Site Development Plan Review FOR A PRIVATE PARK on 2.16 acres at the intersection of Symphony Park Avenue and Grand Central Parkway (APNs 139-33-511-009, 010, and 139-34-211-001), PD (Planned Development) Zone, Ward 5 (Barlow), was considered by the Planning Commission on July 12, 2011.

The Planning Commission voted to ***APPROVE*** your request, subject to the following:

Planning

1. Conformance to the Conditions of Approval for Site Development Plan Review (SDR-16267) shall be required.

2. Revised plans and other materials shall be submitted to and approved by the Symphony Park Design Review Committee (SP-DRC) as indicated on the SP-DRC action letter dated 06/09/11 prior to the time application is made for a building permit. Approved plans shall be submitted to the Department of Planning.

3. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.18. An Extension of Time may be filed for consideration by the City of Las Vegas.

4. All development shall be in conformance with the site plan and landscape plan date stamped 06/20/11, except as amended by conditions herein.

5. Any changes based upon right-of-way, traffic or drainage studies or street improvements required by the city or public utilities shall not reduce the widths of perimeter landscape buffers, height of walls or quantities of plant materials from that on submitted landscape plans date stamped 06/20/11. Any changes based upon subsequently submitted studies must be accommodated elsewhere on the site.

6. Prior to occupancy, all necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.

7. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.

8. A technical landscape plan, signed and sealed by a Registered Architect, Landscape Architect, Residential Designer or Civil Engineer, must be submitted prior to or at the same time application is made for a building permit. A permanent underground sprinkler system is required and shall be permanently maintained in a satisfactory manner; the landscape plan shall include irrigation specifications. Installed landscaping shall not impede visibility of any traffic control device.

9. A Comprehensive Construction Staging Plan shall be submitted to the Department of Planning Department for review and approval prior to the issuance of any building permits. The Construction Staging Plan shall include the following information: Design and location of construction trailer(s); design and location of construction fencing; all proposed temporary construction signage; location of materials staging area; and the location and design of parking for all construction workers.

10. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

11. Unless already constructed or guaranteed by the Master Developer, construct all incomplete half street improvements adjacent to this site concurrent with development of this site. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with the development of this site.

12. All plumbing fixtures shall drain into the City of Las Vegas sanitary sewer system.

13. All landscaping and private improvements installed with this project shall be situated and maintained so as to not create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections.

14. An update to the previously approved Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any grading or building permits or submittal of any construction drawings, whichever may occur first. Provide and improve all drainageways as recommended in the approved drainage plan/study.

15. Comply with all applicable previous conditions of approval for SDR-16267 and all other site related actions.

This action by the Planning Commission on **July 12, 2011** is final unless a written appeal is filed with the City Clerk within ten days of the date of the Planning Commission's decision as allowed by code or there is a review action filed by the City Council within the same time period. For additional information on appeals or review requests please access http://www.lasvegasnevada.gov/CheckStatus/DevelopmentApp.htm, or contact the Department of Planning and Development at 702.229.6301 after ***July 25, 2011***. No building permits or business licenses related to these items shall be issued prior to the expiration of the required ten day waiting period, or until any filed appeal is resolved pursuant to LVMC Title 19.18.

Sincerely,

Steve Gebeke, AICP
Planning Supervisor
Case Planning Division

SG:clb

cc: Mr. Sam Gladstein
Symphony Park Master Association, Inc.
6130 Elton Avenue, Suite #212
Las Vegas, Nevada 89107

Mr. Christopher Langham
JW Zunino Landscape Architecture
3191 South Jones Boulevard
Las Vegas, Nevada 89146

LETTER OF TRANSMITTAL

MARTIN & MARTIN
Civil Engineers
2355 Red Rock Street, Suite103
Las Vegas, Nevada 89146
Phone (702) 248-8000
Fax (702) 248-8070
www.mmcivil.com

DATE: 6/30/11

TO: Albert Sung
FIRM: City of Las Vegas Flood Control
ADDRESS: 333 N Rancho Dr
Las Vegas, NV 89107

PROJECT NAME: Symphony Park
PROJECT #: 4021
REGARDING: Update to Technical Drainage Study

TRANSMITTED:	☐	Prints/Mylars/Vellums	☐	Proposal	☒	Studies	☐	CD's/Disks	☐	Other
VIA:	☒	Hand Delivery	☐	Pickup	☐	Air/ Overnight	☐	U.S. Mail	☐	E-Mail

COPIES	NUMBER OF SHEETS	DESCRIPTION (SHEET NAMES)	DATE
1	-	Update to Technical Drainage Study	6/30/11
1	6	Grading Plans	6/30/11
1	-	Electronic copy on CD	6/30/11

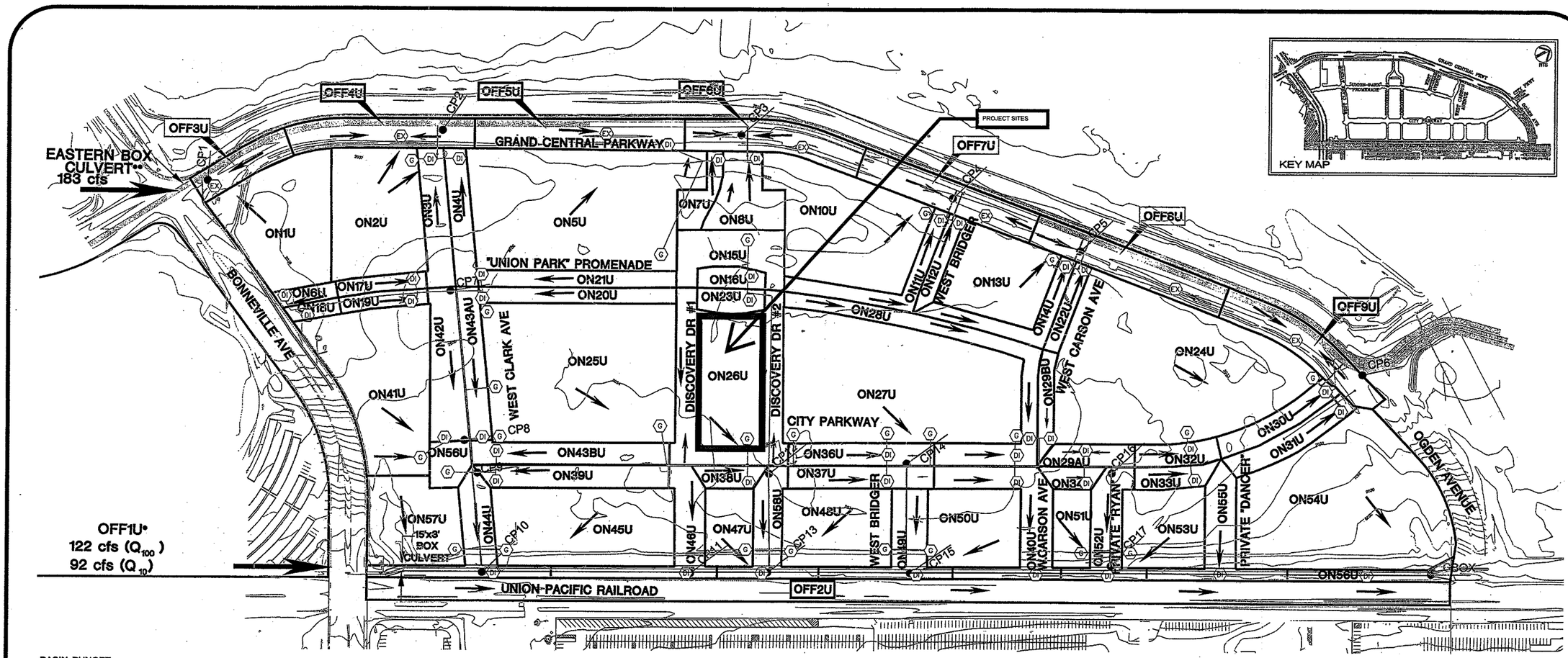
☐	For Your Use	☒	Review	☐	Per Your Request	☐	Signature	☐	Approval	☐	For Your Records

THANK YOU,

FROM: TOM MILLER, P.E.
PRINCIPAL

CC:

H:\Cad\Land\4021\Admin\Drainage\Update M3\Submit\4021 Transmittal.doc



BASIN RUNOFF

BASIN	AREA (AC)	Q_{10} /Q_{100}(cfs)
ON1U	1.83	3/6
ON2U	1.55	2/5
ON3U	0.52	1/2
ON4U	0.46	2/3
ON5U	3.93	5/10
ON6U	0.15	0/0
ON7U	0.30	1/1
ON8U	0.67	1/2
ON10U	2.37	3/7
ON11U	0.53	1/2
ON12U	0.24	1/1
ON13U	1.02	2/3
ON14U	0.49	1/2
ON15U	0.75	1/2
ON16U	0.19	0/0
ON17U	0.25	0/1
ON18U	0.19	0/1
ON19U	0.25	0/1
ON20U	0.47	1/1
ON21U	0.47	1/1
ON22U	0.22	0/1
ON23U	0.19	0/0
ON24U	4.71	7/14
ON25U	3.93	5/10
ON26U	2.56	2/6
ON27U	4.09	5/11
ON28U	1.14	2/4
ON29AU	0.29	1/2
ON29BU	0.25	1/2
ON30U	0.43	1/2
ON31U	0.48	1/2
ON32U	0.29	1/1
ON33U	0.30	1/1
ON34U	0.30	1/1
ON36U	0.50	1/2
ON37U	0.50	1/2
ON38U	0.20	0/1
ON39U	0.64	1/2
ON40U	0.96	1/2
ON41U	2.29	3/7
ON42U	0.87	2/3
ON43AU	0.60	1/2
ON43BU	0.65	1/2
ON44U	0.76	2/3
ON45U	2.16	3/6
ON46U	0.77	2/3
ON47U	0.57	0/1
ON48U	1.32	2/4
ON49U	0.67	1/2
ON50U	1.11	2/3
ON51U	0.46	1/1
ON52U	0.65	1/2
ON53U	1.01	2/3
ON54U	3.95	5/11
ON55U	0.70	1/2
ON56U	0.11	0/0
ON57U	1.23	2/4
ON58U	0.63	1/2
OFF1U	N/A	92/122
OFF2U	3.71	3/7
OFF3U	0.78	1/3
OFF4U	0.82	2/3
OFF5U	0.93	2/3
OFF6U	0.80	2/3
OFF7U	0.82	2/3
OFF8U	0.90	2/3
OFF9U	0.80	2/3

CONCENTRATION POINT RUNOFF

BASIN	AREA (AC)	Q_{10} /Q_{100}(cfs)	COMBINATION POINT	Q_{10} /Q_{100}(cfs)	COMBINATION POINT	Q_{10} /Q_{100}(cfs)
			CP1	4/8	CP10	111/157
			CP2	10/20	CP11	142/159
			CP3	19/38	CP12	8/18
			CP4	26/52	CP13	153/184
			CP5	28/56	CP14	10/18
			CP6	38/77	CP15	166/207
			CP7	3/6	CP16	3/5
			CP8	10/19	CP17	8/14
			CP9	12/22	CPBOX	146/229

NOTES:
* OFF1U REFERENCED FROM 61 ACRES @ 100 GRAND CENTRAL PARKWAY TDS
** FLOWS FOR THE EASTERN BOX CULVERT REFERENCED FROM 61 ACRES @ 100 GRAND CENTRAL PARKWAY TDS

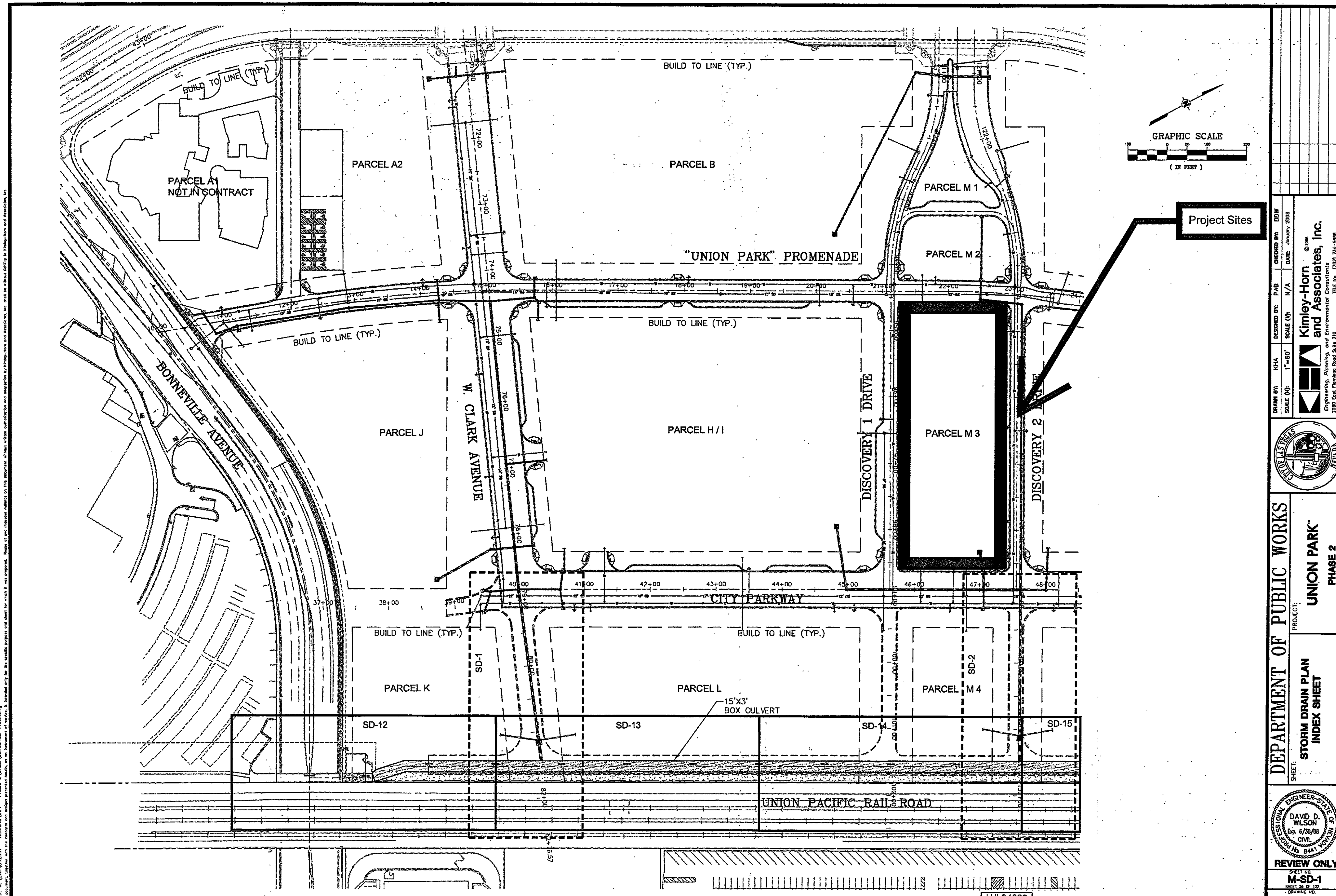
GRAPHIC SCALE
120 0 60 120 240
(IN FEET)
1 inch = 120 ft.

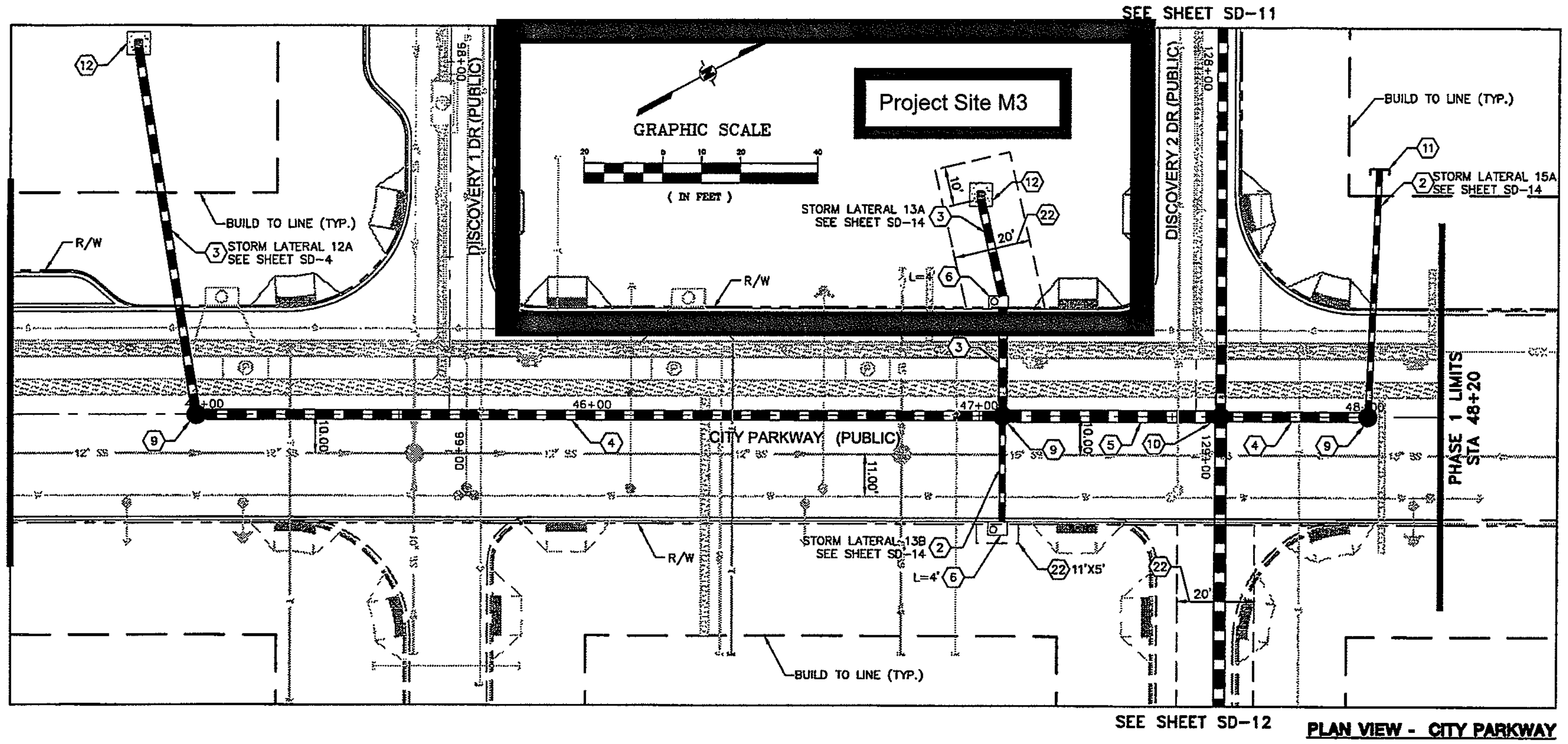
LEGEND
- DIRECTION OF FLOW
- BASIN BOUNDARY
- ON1U — BASIN NAME
- DI — PROPOSED DROP INLET
- G — PROPOSED FRAME AND GRATE
- CP1 — COMBINATION POINT
- EX — EXISTING CURB INLET
- PROPOSED STORM DRAIN

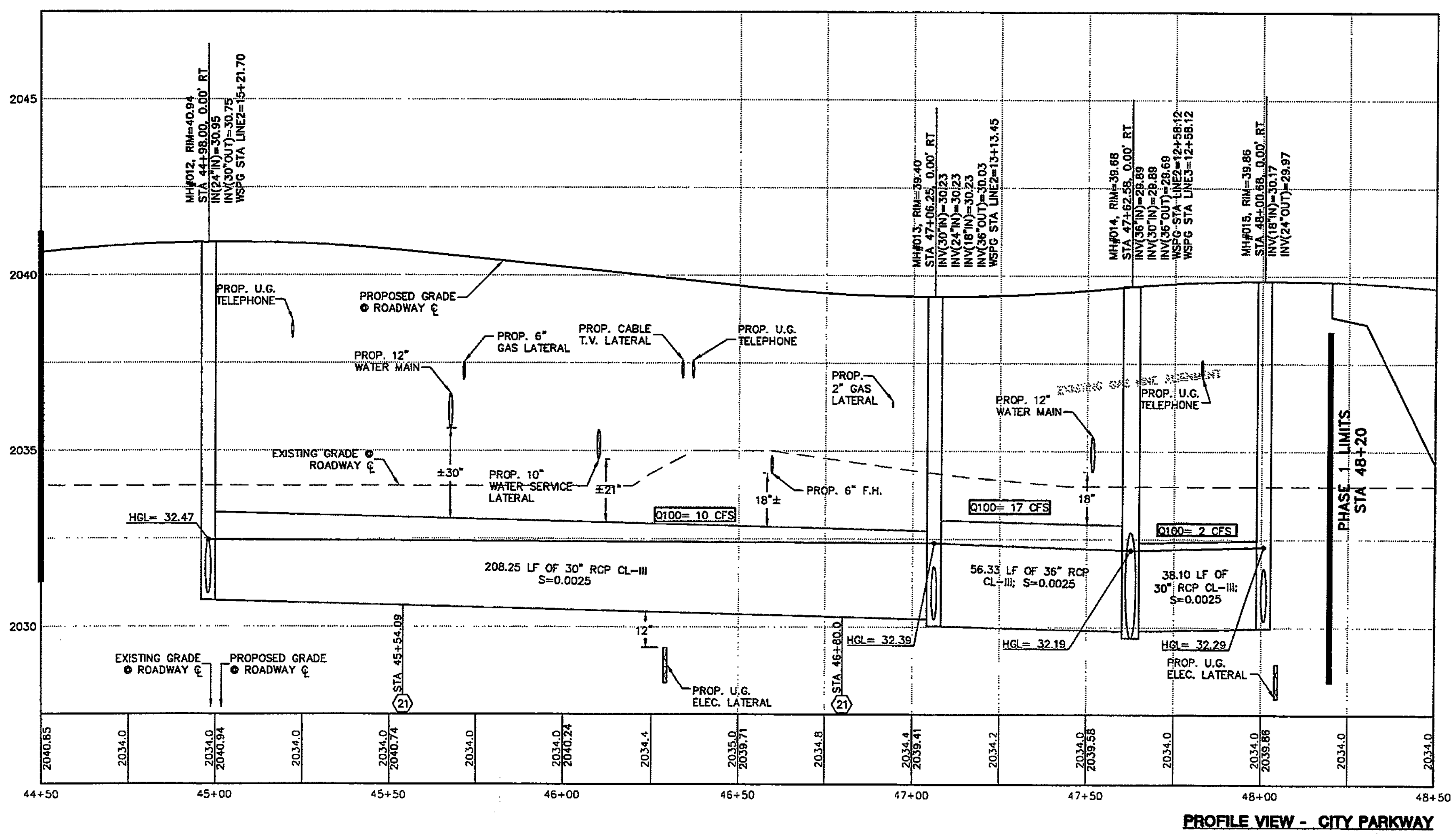
ULTIMATE DRAINAGE BASIN MAP

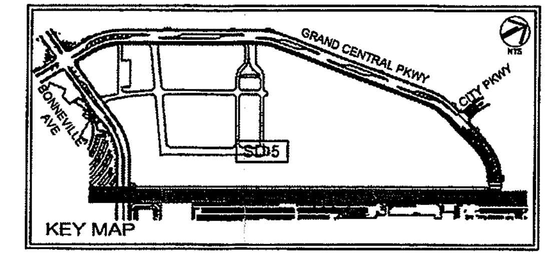
Kimley-Horn © 2007 and Associates, Inc.

Date: September 14, 2007 – 10:48am / User: kenden.mathu
Path: K:\Civil\092442 CityParkway\004\Drainage\TDS Union Park\Drawings\ACAD-Basin Exhibit.dwg


BUILD TO LINE (TYP.)
PARCEL A1
NOT IN CONTRACT
PARCEL A2
PARCEL B
PARCEL M 1
PARCEL M 2
"UNION PARK" PROMENADE
GRAPHIC SCALE
(IN FEET)
Project Sites
PARCEL J
W. CLARK AVENUE
BONNEVILLE AVENUE
PARCEL H / I
DISCOVERY 1 DRIVE
PARCEL M 3
DISCOVERY 2 DRIVE
"CITY PARKWAY"
PARCEL K
PARCEL L
PARCEL M 4
SD-1
SD-2
SD-12
SD-13
SD-14
SD-15
15'X3' BOX CULVERT
UNION PACIFIC RAIL ROAD
H# 24669
DEPARTMENT OF PUBLIC WORKS
PROJECT: "UNION PARK" PHASE 2
SHEET: STORM DRAIN PLAN INDEX SHEET
Kimley-Horn and Associates, Inc.
DRAWN BY: KHA
DESIGNED BY: PAB
CHECKED BY: DDW
SCALE (H): 1"=60'
SCALE (V): N/A
DATE: January 2008
DAVID D. WILSON
Exp. 6/30/08
CIVIL
No. 8441
REVIEW ONLY
M-SD-1
107V4816
092587004 - UNION PARK PHASE 2
BID# 08.1730.32







BASIS OF BEARING

NORTH 03°50'03" WEST, BEING THE BEARING OF A PORTION OF THE CENTERLINE OF GRAND CENTRAL PARKWAY, AS SHOWN ON BOOK 43, PAGE 61 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE

BENCHMARK

CITY OF LAS VEGAS VERTICAL CONTROL POINT "OLV01 33E6", BEING A RIVET AND PLATE IN TOP OF CURB AT NW CORNER OF BONNEVILLE AVENUE & GRAND CENTRAL PARKWAY.

ELEVATION: 2036.09 (FEET)
620.6014 (METERS)
CITY OF LAS VEGAS VERTICAL CONTROL v.2002 BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

STORM DRAIN NOTES

(2) INSTALL 18" RCP STORM DRAIN LATERAL (CLASS III), SEE LATERAL PROFILE ON SHEET NOTED PER PLAN.

(3) INSTALL 24" RCP STORM DRAIN PIPE (CLASS III).

(4) INSTALL 30" RCP STORM DRAIN PIPE (CLASS III).

(5) INSTALL 36" RCP STORM DRAIN PIPE (CLASS III).

(6) INSTALL MODIFIED TYPE "DM" DROP INLET SEE DETAIL ON SHEET DT-3 (LENGTH "L" PER PLAN)

(9) INSTALL 48" TYPE II MANHOLE PER CCAUSD No. 405.

(10) INSTALL 60" TYPE III MANHOLE PER CCAUSD No. 406.

(11) CAP AND MARK END OF DRAIN. SEE DETAIL ON SHEET DT-2.

(12) INSTALL TYPE 2A DROP INLET PER NDOT DETAIL No. R-4.2.1. CONSTRUCT CONCRETE COLLAR AROUND PERIMETER OF INLET(AT GRADE) PER DETAIL D ON SHEET DT-1.

(21) SANITARY SEWER CROSSING LOCATION: ELEVATION IS OUTSIDE THE PROFILE.

(22) STORM DRAIN EASEMENT, SIZE NOTED PER PLAN.

GENERAL NOTES

1. PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE DURING EXCAVATION BACKFILL.
2. ALL SD PLAN-VIEW DIMENSIONS ARE SHOWN FROM ℄ OF PIPE TO ℄ OF PIPE (OR OUTSIDE DIAMETER OF SDMH TO OUTSIDE DIAMETER OF ADJACENT SSMH).

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PROJECT# 114260 DATE

H# 18393

DEPARTMENT OF PUBLIC WORKS

PROJECT: "UNION PARK" PHASE 1

SHEET: CITY PARKWAY STORM DRAIN STA: 44+50 - 48+20

Kimley-Horn and Associates, Inc.
Engineering, Planning, and Environmental Consultants
2080 East Flamingo Road Suite 210 Las Vegas, Nevada 89119
TEL No. (702) 734-5655 FAX No. (702) 735-4949

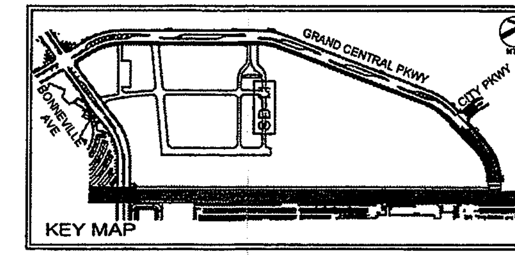
DRAWN BY: KHA | DESIGNED BY: PAB | CHECKED BY: DDW
SCALE (H): 1"=20' | SCALE (V): 1"=2' | DATE: January 2008

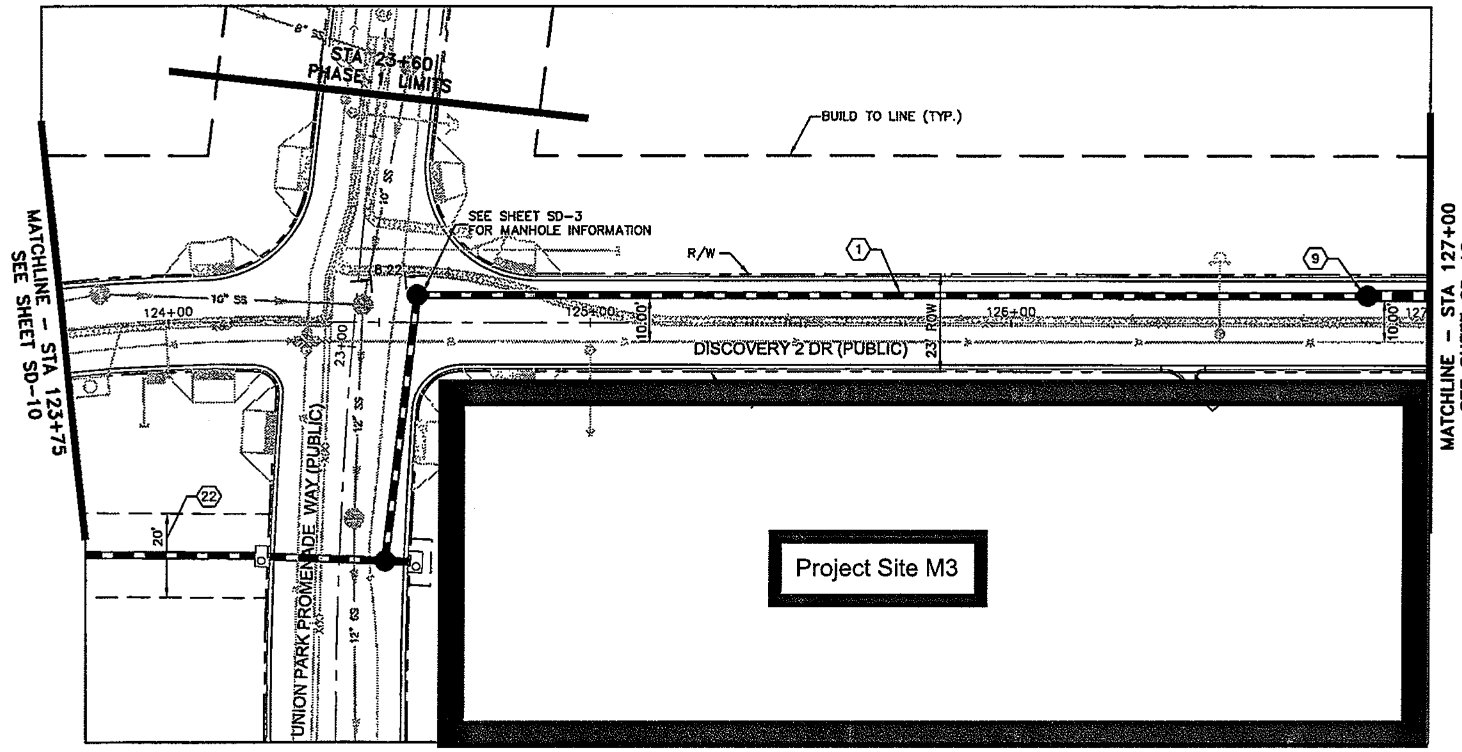
DAVID D. WILSON Exp. 6/30/08 CIVIL No. 8441

SHEET NO. SD-5
DRAWING NO. 107V4816

09258703 - UNION PARK PHASE 1

BID# 08.17OO.11

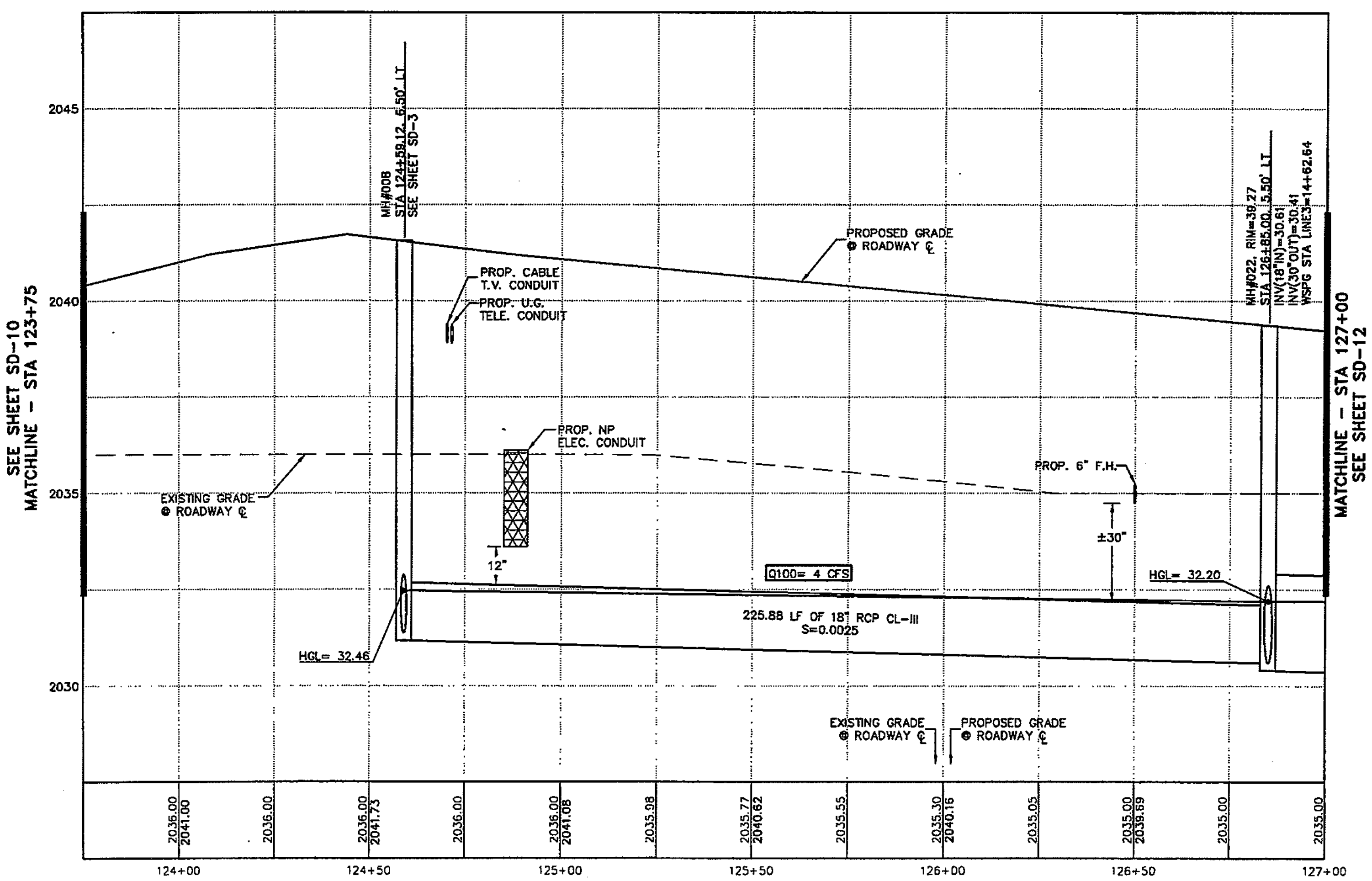




PLAN VIEW - DISCOVERY 2 DRIVE

GRAPHIC SCALE

(IN FEET)



PROFILE VIEW - DISCOVERY 2 DRIVE

SCALE: (H) 1" = 20'
(V) 1" = 2'

BASIS OF BEARING

NORTH 03°50'03" WEST, BEING THE BEARING OF A PORTION OF THE CENTERLINE OF GRAND CENTRAL PARKWAY, AS SHOWN ON BOOK 43, PAGE 61 OF PLATS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE

BENCHMARK

CITY OF LAS VEGAS VERTICAL CONTROL POINT "OLVO1 33E6", BEING A RIVET AND PLATE IN TOP OF CURB AT NW CORNER OF BONNEVILLE AVENUE & GRAND CENTRAL PARKWAY.

ELEVATION: 2036.09 (FEET)
620.6014 (METERS)
CITY OF LAS VEGAS VERTICAL CONTROL v.2002 BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

STORM DRAIN NOTES

(1) INSTALL 18" RCP STORM DRAIN PIPE (CLASS III).

(9) INSTALL 48" TYPE II MANHOLE PER CCAUSD No. 405.

(22) STORM DRAIN EASEMENT, SIZE NOTED PER PLAN.

GENERAL NOTES

1. PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE DURING EXCAVATION BACKFILL.
2. ALL SD PLAN-VIEW DIMENSIONS ARE SHOWN FROM ℄ OF PIPE TO ℄ OF PIPE (OR OUTSIDE DIAMETER OF SDMH TO OUTSIDE DIAMETER OF ADJACENT SSMH).

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PROJECT# 114260 DATE

Avoid cutting underground utility lines. It's costly. Call before you Dig 811

SAFETY ALERT Call Before You Overhead 1-702-227-2929

Call before you UnderGround 1-702-455-7511 1-702-229-6611

H# 18393

DEPARTMENT OF PUBLIC WORKS

PROJECT: UNION PARK PHASE 1

SHEET: DISCOVERY 2 DRIVE STORM DRAIN STA: 123+75 - 127+00

Kimley-Horn and Associates, Inc.

DRAWN BY: KHA DESIGNED BY: PAB CHECKED BY: DDW
SCALE (H): 1"=20' SCALE (V): 1"=2' DATE: January 2008

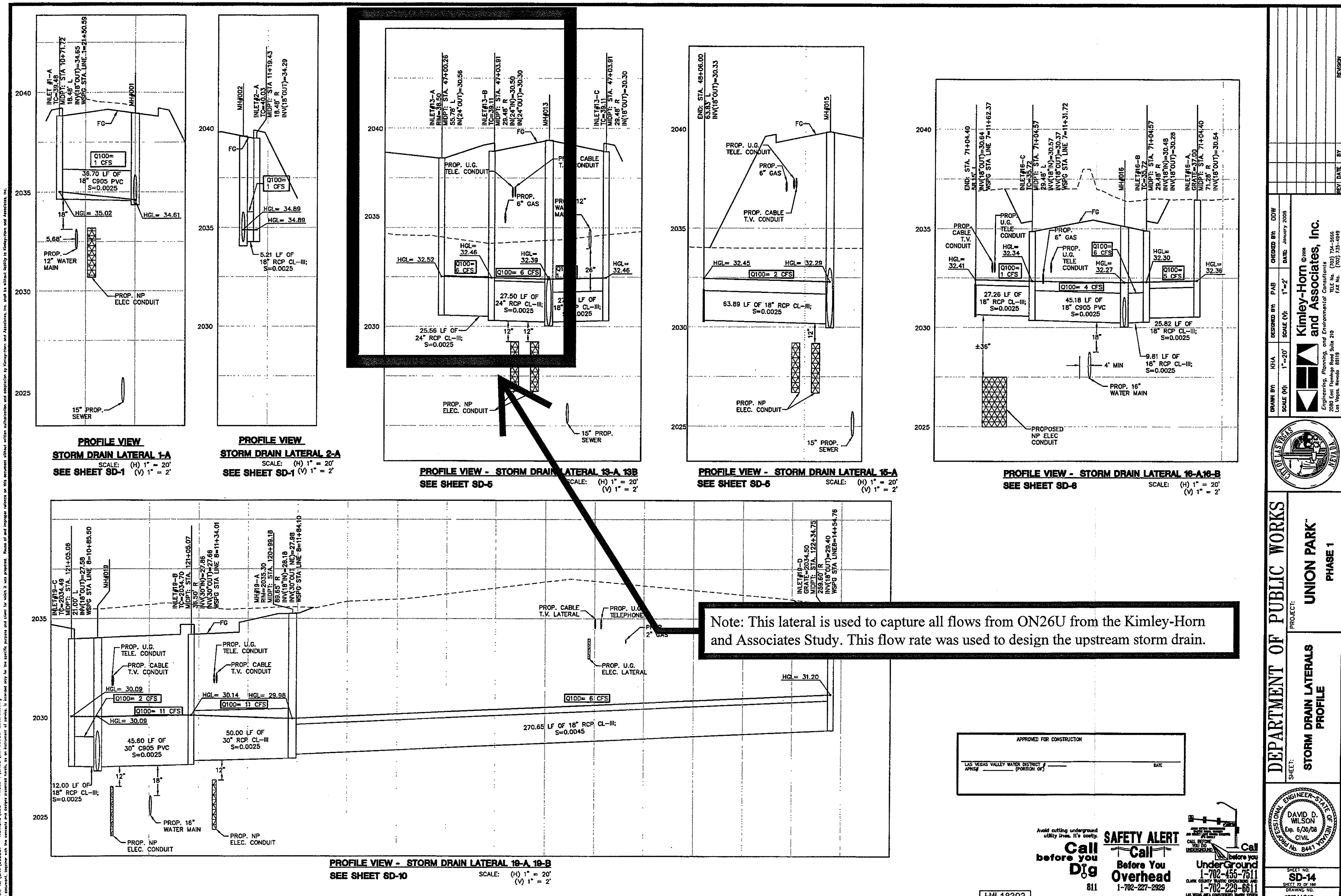
DAVID D. WILSON Exp. 6/30/08 CIVIL No. 8441

SHEET NO. SD-11

DRAWING NO. 107V4816

092587003 - UNION PARK PHASE 1

BID# 08.1730.11



PROFILE VIEW
STORM DRAIN LATERAL 1-A
SEE SHEET SD-1
SCALE: (H) 1" = 20' (V) 1" = 2'
PROFILE VIEW
STORM DRAIN LATERAL 2-A
SEE SHEET SD-1
SCALE: (H) 1" = 20' (V) 1" = 2'
PROFILE VIEW - STORM DRAIN LATERAL 13-A, 13B
SEE SHEET SD-5
SCALE: (H) 1" = 20' (V) 1" = 2'
PROFILE VIEW - STORM DRAIN LATERAL 15-A
SEE SHEET SD-5
SCALE: (H) 1" = 20' (V) 1" = 2'
PROFILE VIEW - STORM DRAIN LATERAL 16-A,16-B
SEE SHEET SD-6
SCALE: (H) 1" = 20' (V) 1" = 2'
PROFILE VIEW - STORM DRAIN LATERAL 19-A, 19-B
SEE SHEET SD-10
SCALE: (H) 1" = 20' (V) 1" = 2'
Note: This lateral is used to capture all flows from ON26U from the Kimley-Horn and Associates Study. This flow rate was used to design the upstream storm drain.
27.50 LF OF 24" RCP CL-III; S=0.0025
25.56 LF OF 24" RCP CL-III; S=0.0025
63.89 LF OF 18" RCP CL-III; S=0.0025
45.18 LF OF 18" C905 PVC S=0.0025
27.26 LF OF 18" RCP CL-III; S=0.0025
25.82 LF OF 18" RCP CL-III; S=0.0025
9.81 LF OF 18" RCP CL-III; S=0.0025
36.70 LF OF 18" C905 PVC S=0.0025
5.21 LF OF 18" RCP CL-III; S=0.0025
45.60 LF OF 30" C905 PVC S=0.0025
50.00 LF OF 30" RCP CL-III S=0.0025
270.65 LF OF 18" RCP CL-III; S=0.0045
12.00 LF OF 18" RCP CL-III; S=0.0025
APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT
DEPARTMENT OF PUBLIC WORKS
CITY OF LAS VEGAS NEVADA
Kimley-Horn and Associates, Inc.
Engineering, Planning, and Environmental Consultants
PROJECT: UNION PARK PHASE 1
SHEET: STORM DRAIN LATERALS PROFILE
092587003 - UNION PARK PHASE 1
DAVID D. WILSON Exp. 6/30/08 CIVIL No. 8441
SHEET NO. SD-14
DRAWING NO. 107V4816
BID# 08.1780.11
H# 18393
Call before you Dig 811
SAFETY ALERT Call Before You Overhead 1-702-227-2929
Call before you UnderGround 1-702-455-7511 1-702-229-6611