DS #: ~~365~~ 2989

APN:

PROJECT: Deer Springs Master Drainage Plan

SUBMITTAL: ~~1~~ 4TH Submittal

SCANNED BY/DATE:

CHECKED BY/DATE:

Rec'd 2/4/05
DS 2989
~~DS 3651~~
G-21
$400

Stantec

Technical Drainage Study
For
Update #1
Deer Springs Master Drainage Plan
February 2, 2005

181200259

Prepared for

The City of Las Vegas
400 Stewart Avenue
Las Vegas, Nevada 89101

Prepared by

Stantec Consulting
7251 West Charleston Boulevard
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February 2, 2005

Greg McDermott, P.E.
City of Las Vegas
Department of Public Works
731 S. Fourth Street
Las Vegas, NV 89101

Re: Update #1 to the Deer Springs Master Drainage Plan

Dear Mr. McDermott:

An update to the drainage study is necessary due to road changes with the design of Deer Springs Way. Changes to the street include eliminating the super elevation in the road and providing a crown. Also, the storm drain design has been modified due to comments from the park department. Therefore, this update addresses the overflow within Deer Springs Way into the north half of the park, flow to the intersection with John Herbert Drive, and the installation of inlets with the construction of Deer Springs Way.

Currently flows from the west within Deer Springs Way are approved to flow into Pond-1 on the north side of the road. Flows to the pond are then diverted northward or eastward to the intersection of John Herbert Drive and Buffalo Drive. Please refer to the referenced drainage exhibits DR-3 and DR-4 from the approved technical drainage study for "Deer Springs Master Drainage Plan." This flow pattern is being changed for two reasons. First, due to the proposed crown in Deer Springs Way a certain flow will continue within the roadway. Second, the parks department would like to see enough flow remain in the street to avoid having the approved existing flow of 180 cfs flowing through the park. Currently a library is planned at the northwest intersection of Deer Springs Way and Buffalo.

Due to the changes, the 176 and 84 cfs (existing 100 and 10-year events) that were approved to flow eastward within the ditch along the north side of Deer Springs Way will now remain within the street. This is a change from the flow entering Pond-3 then draining towards Deer Springs and allowing 90 cfs to John Herbert.

The calculated flow remaining within Deer Springs Way is 163 and 114 cfs (existing 100 and 10-year events). These flows were determined from the existing flows at the top of Deer

Springs Way. It was assumed that flows on the south side of the street, below the crown, were contained within the street. Also, contained were flows below the top of walk on the north side. Please refer to the cross sections within the appendix of this report and to "Exhibit-1, Proposed Conditions." To help contain flows within the south side of Deer Springs Way, the cross slope was increased to 3% from Stations 1+25 to 4+75.

Per our conversations and meeting, with the City, this flow change was acceptable since we would be diverting flows down John Herbert Drive from Deer Springs Way east of Buffalo. All existing flows currently flow down Deer Springs Way east of Buffalo. However, we were asked to look at the ability to divert flows down John Herbert since the high point in Buffalo is minimal. In other words, how much flow is possible to divert into John Hebert? Please refer to the calculations for the flow split at the high point within the appendix. Results show that 58 cfs flows northward within Buffalo till flows reach the top of crown while 47 cfs flows into John Herbert. At the crown elevation the flows weir over with approximately 20% flowing northward in Buffalo and 80% into John Herbert. Please refer to Exhibit-1. Elevations for the cross sections were taken from the existing survey information for "Deer Springs Way Phase-1" prepared by Stantec Consulting Ltd. July, 2003. Please refer to Exhibit-2.

Proposed inlets within Deer Springs Way were sized from the future flows. Since existing flows are higher, it was assumed that a greater flow would enter at this time. However, the maximum flow we can add to the storm drain system is approximately 60 cfs (95-35 =60 cfs). The capacity of the existing elliptical pipe at 0.4% (48-inch equivalent) is approximately 95 cfs while the capacity of the upstream 24-inch RCP is 35 cfs. Therefore, inlets were sized based off the lower future flow to maximize the capacity of the system. Please refer to Standard Form 6 for storm drain calculations. Storm drain manhole-9 will be locked since the HGL is above the rim.

The result of having flows remain within Deer Springs Way west of Buffalo does not adversely affect property down stream. Deer Springs Way east of Buffalo will have less water flowing to it than at the present time. John Herbert Drive meets criteria based upon the existing and future flows. Two 12-foot dry lanes will be provided during the 10-year event and Depth times Velocity (D*V) products are less than 6 for both events. Please refer to Table-1.

Should you have any questions or require additional information please call me at 258-0115.

Thank You,

Matthew Haskin, P.E.
Stantec Consulting Group Inc.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Update #1 to Deer Springs Master D.P. Date: JAN 18, 2005

Location of Development: a) Descriptive (Cross Streets) North/South Buffalo East/West Deer Springs

b) Sect. 21 Twn. 19S Rng. 60E

Name of Owner: City of Las Vegas Assessors Parcel No: _____

Telephone No: 229-6535 Facsimile No: _____

Address: 400 Stewart Ave.

Las Vegas, NV 89101

Contact Person-Name: Matthew Haskin, P.E. Telephone No: 258-0115

Firm: Stantec Consulting Inc.

Address: 7251 W. Charleston Blvd. Las Vegas, NV 89117

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 90 ± Being Developed/Disturbed: 10 ±
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 w/ infrastructure
5. Approximate upstream land area which drains to the subject site? 10 Square Miles
6. Has the site drainage been evaluated in the past? (YES) NO If yes, please identify documentation:

TDS for "Deer Springs Master Drainage Plan" Stantec Oct 2001 with Addendum.

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

Deer Springs Way + John Herbert Drive.

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

PROFESSIONAL ENGINEER-STATE OF NEVADA
MATTHEW T. HASKIN
CIVIL
2/6/05
No. 14910
EXP 6/30/05

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: **STANDARD FORM 1**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Deer Springs Park	Map ID:
Firm Name: Stantec Consulting	Engineer:
Address: 7251 W. Charleston Blvd.	
City: Las Vegas State: NV Zip: 89117	
Phone Number: 258-0115	Fax Number: 258-0865
Property Owner: City of Las Vegas	
Address: 400 Stewart Ave	
City: Las Vegas State: NV Zip: 89101	

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

Yes	No	
X		A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X		A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
X		Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
X		On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
N/A		Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

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

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
N/A		Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
X		Proposed typical street sections.
X		Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
N/A		Delineation of proposed on-site drainage basin s indicating area and 10-year and 100-year storm peak flows at basin concentration points. referenced
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows. EL + PC / PT
X		Location and cross-section of street capacity calculations. Figure-1
N/A		Cross-sectional detail for channels, including cutoff wall locations.
X		Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
N/A		Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
N/A		Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
X		Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc. Berm

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
N/A	____	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
N/A	____	Building and/or lot numbers.
N/A	____	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
N/A	____	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
N/A	____	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
X	____	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X	____	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

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

REFERENCE: | **STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

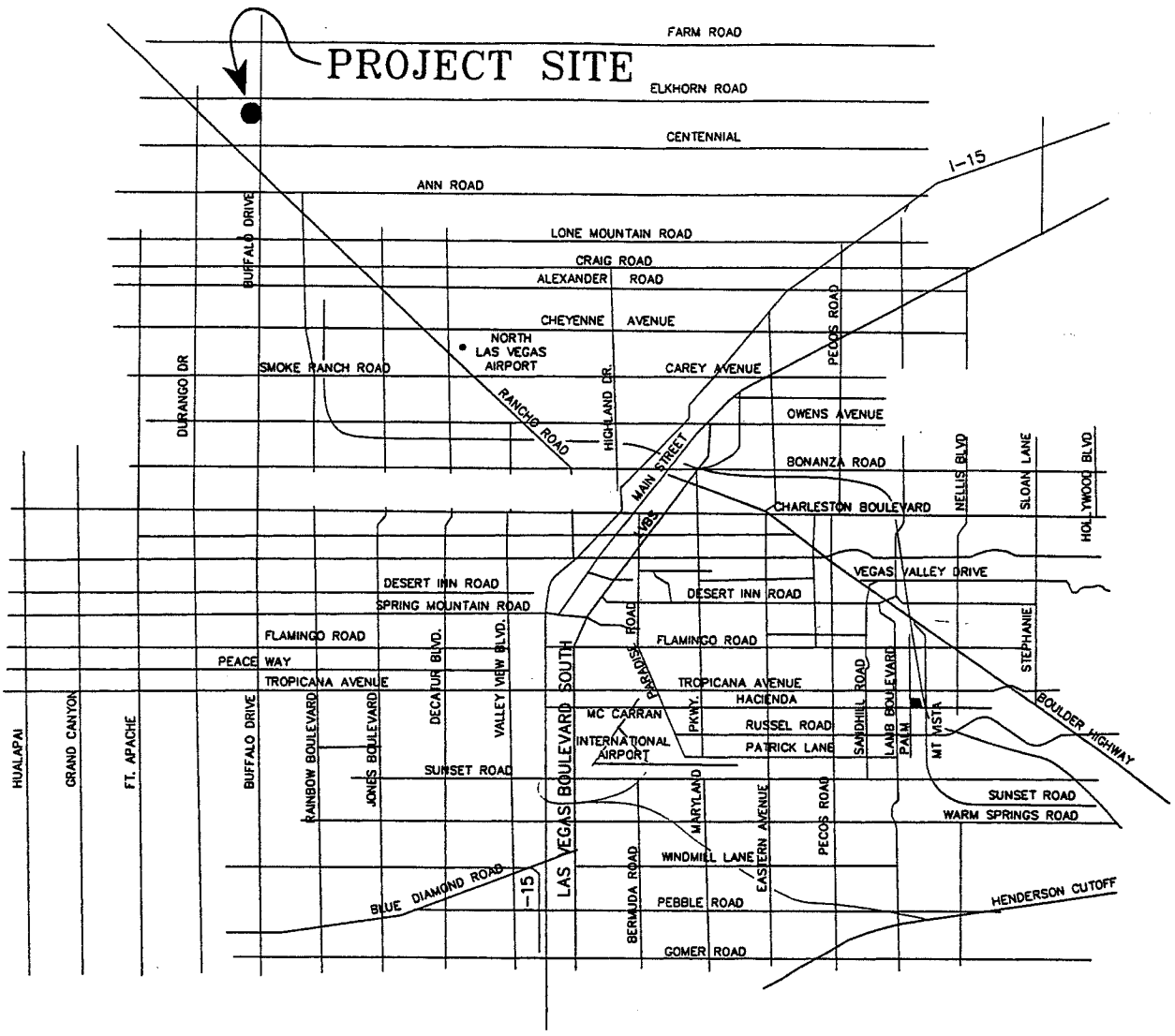
Yes	No	
N/A	____	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	____	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows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

REFERENCE:	STANDARD FORM 2

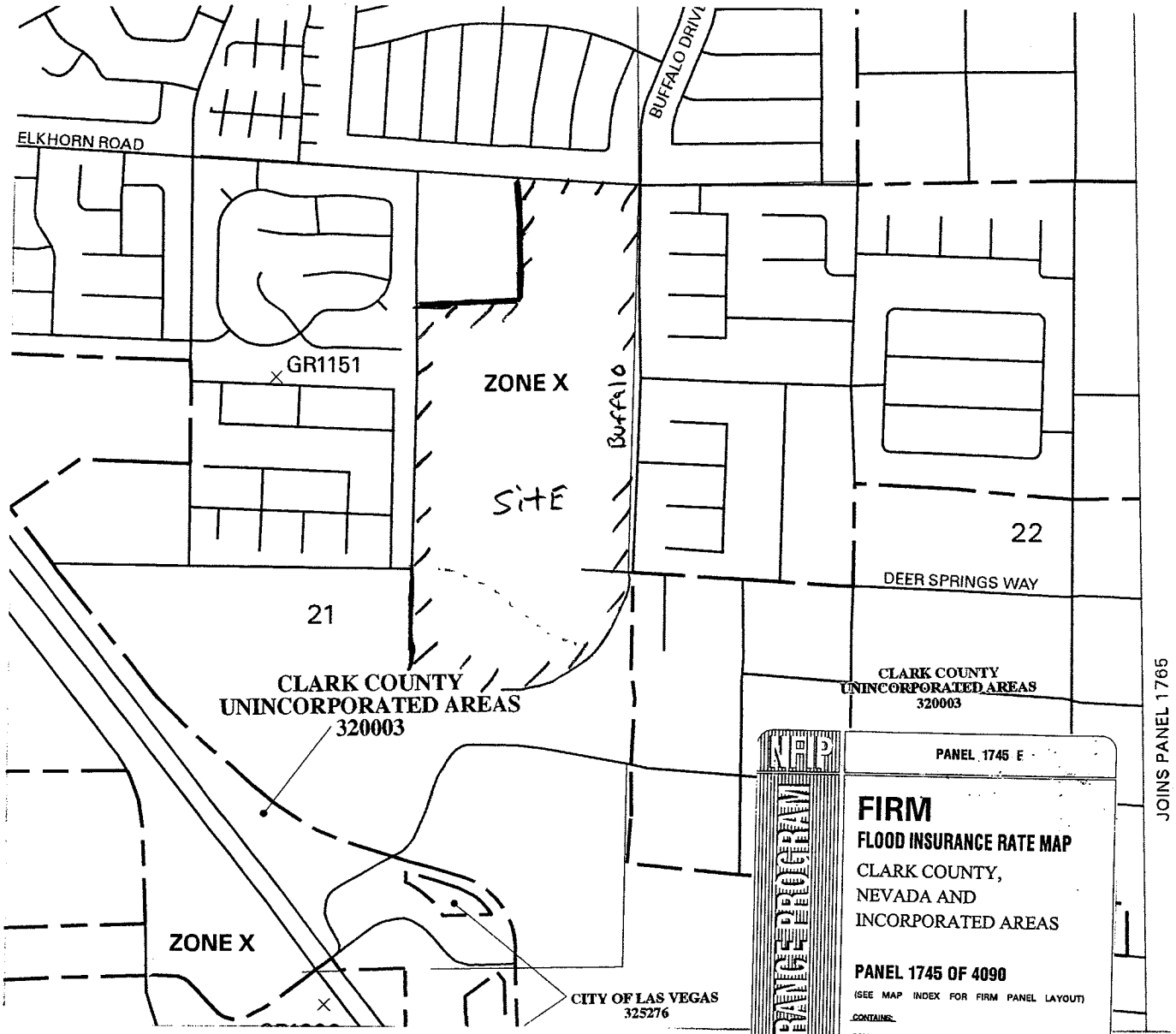
TABLE-1
STREET PARAMETERS

Cross Section	Flow Qcfs	Depth Dft	Velocity Vft/s	D*V product
X-Section A	Far west side of Deer Springs Way, S=2.9%			
EX- 10-yr	114	0.72	6.37	4.6
EX-100-yr	163	0.79	7.00	5.5
FT-10-year	33	05.0	5.27	2.6
FT-100-year	81	0.66	5.85	3.9
X-Section B	Deer Springs Way just past west driveway S=0.8%			
PR-100-yr	163	0.95	4.69	4.4
FT-10-year	33	0.61	2.91	1.8
FT-100-year	81	0.78	3.64	2.8
X-Section C	Deer Springs Way just before east driveway S=0.8%			
PR-100-yr	163	0.79	7.00	5.5
FT-10-year	22	0.44	4.89	2.2
FT-100-year	62	0.61	5.49	3.3
X-Section D	Deer Springs Way just before Buffalo S=0.8%			
PR-100-yr	195	0.91	5.84	5.3
FT-10-year	30	0.55	3.63	2.0
FT-100-year	78	0.72	4.35	3.1
X-Section E	John Herbert Way S=0.4%			
PR-100-yr	180	1.07	4.02	4.3
FT-10-year	30	0.64	2.15	1.4
FT-100-year	93	0.87	3.12	2.7
X-Section F	Buffalo north of John Herbert S=2.4%			
PR-100-yr	91	0.57	4.51	2.6
FT-10-year	38	0.51	4.30	2.2
FT-100-year	69	0.53	4.30	2.3

VICINITY MAP



VICINITY MAP
ENCLOSURE 1



DATE: 1-17-05

1812-00-259

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Client/Project
CITY OF LAS VEGAS
DEER SPRINGS PARK

Figure No.
FIGURE-2

Title
FEMA FIRM PANEL
1745