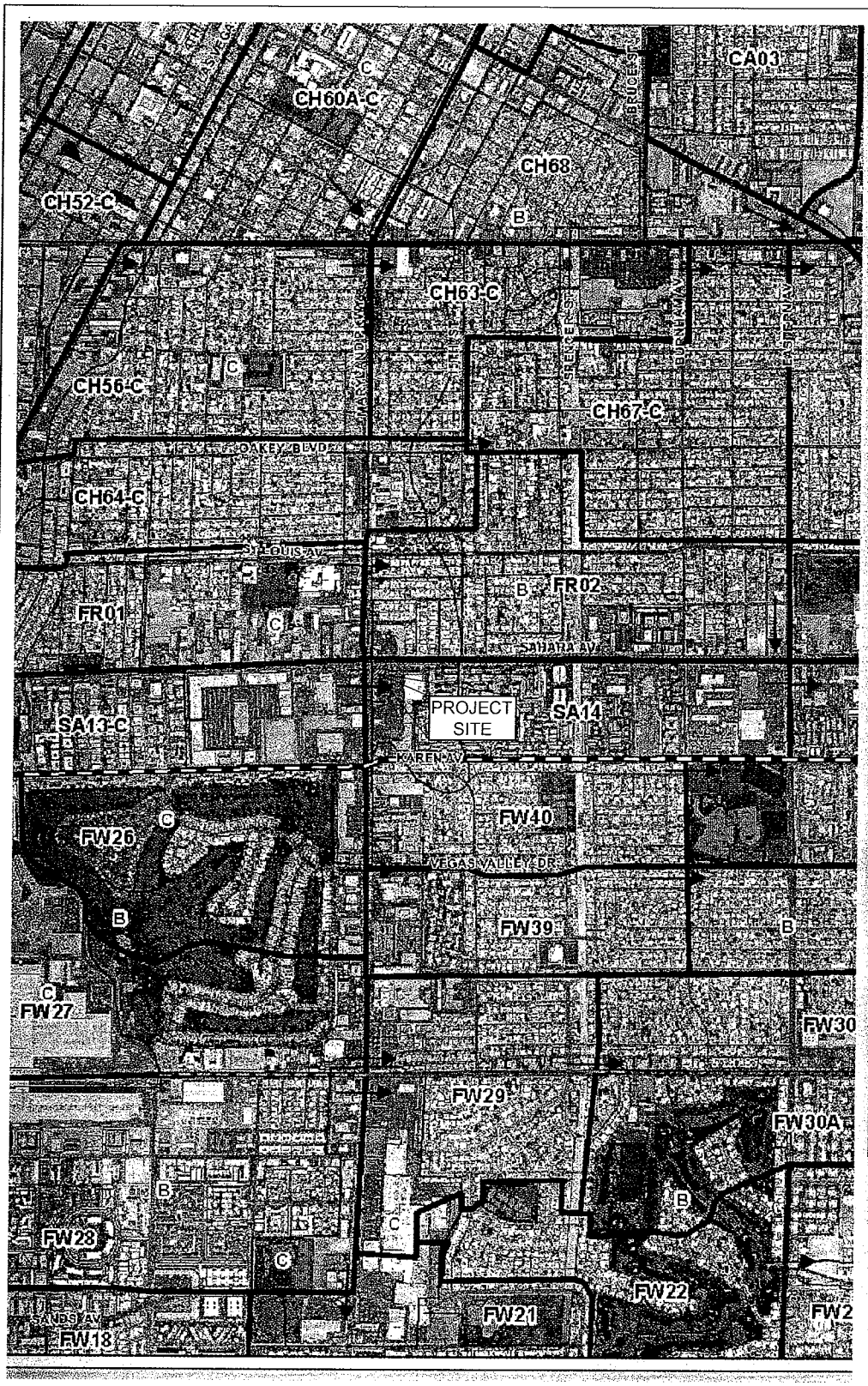


REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H-32
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subbasin Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/ Parallel Facilities
- Category B Remove & Replace/ Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

- 1 Undeveloped Land, Open Desert
- 2 Parks, Golf Courses
- 3 Rural
- 4 / 14* Low Density Residential
- 5 / 15* Medium Density Residential
- 6 / 16* High Density Residential
- 7 / 17* Public Facility, Residential
- 8 / 18* Very High Density Residential
- 9 / 19* Commerical, Retail, Casino, High Rise Condominiums
- 10 / 20* Light Industrial
- 11 / 21* Heavy Industrial
- 12 / 22* Schools
- 13 Lakes

* Drought Ordinance Applied

N

0 500 1,000 2,000 3,000
Feet
Scale: 1 inch = 2,000 feet

PBSJ PB

WALKER ENGINEERING, LLC
5765 S. RAINBOW BLVD.
SUITE 101
LAS VEGAS, NV 89118
TEL: 702.873.5197
FAX: 702.873.5346
meeting your land development needs

HYDROLOGIC SUBAREAS, LAND USE & SOILS

Department of Comprehensive Planning
Land Use Planning

500 S Grand Central Pky • Box 551744 • Las Vegas NV 89155-1744
(702) 455-4314 • Fax (702) 455-3271

Barbara Ginoulias, Director

NOTICE OF FINAL ACTION

March 10, 2010

RECEIVED
MAR 11 2010
NADEL

NADEL ARCH/SUZANNE WEBER
7180 DEAN MARTIN #800
LAS VEGAS, NV 89118

REFERENCE: DR-0050-10

On the date indicated above, a Notice of Final Action was filed with the Clark County Clerk, Commission Division, pursuant to NRS 278.0235 and marking the commencement of the twenty-five (25) day limitation period specified wherein.

The above referenced application was presented before the Clark County Planning Commissioners at their regular meeting of **March 2, 2010** and was **APPROVED** subject to the conditions listed below and/or on the attached sheet. You will be required to comply with all conditions prior to the issuance of a building permit or a business license whichever occurs first.

Time limits to commence, complete or review this approval apply only to this specific application. A property may have several approved applications on it; each will have its own expiration date. **It is the applicant's responsibility to keep the application current, and also provide a current contact name, address, and phone number to this department at the above address. This information must be submitted in writing with the application number referenced.**

CONDITIONS:

Current Planning

- **Certificate of Occupancy and/or business license shall not be issued without final zoning inspection;**
- **All applicable standard conditions for this application type.**
- **Applicant is advised that any change in circumstances or regulations may be justification for the denial of an extension of time; and that this application must commence within 2 years of approval date or it will expire.**

Civil Engineering

- **Traffic study update and compliance;**
- **Nevada Department of Transportation approval.**

Southern Nevada Health District (SNHD) – Subdivision

- **Applicant is advised that if approved, revised civil Improvement Plans (IPs) will be required for the restaurant to bank building replacement; a set of IPs will need to be submitted to SNHD for review; and to contact SNHD Subdivision Program at 702-759-0661 for more information.**

BOARD OF COUNTY COMMISSIONERS
RORY REID, Chairman • SUSAN BRAGER, Vice-Chair
LARRY BROWN • TOM COLLINS • CHRIS GIUNCHIGLIANI • STEVE SISOLAK • LAWRENCE WEEKLY
VIRGINIA VALENTINE, P.E., County Manager

STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

JIM GIBBONS, *Governor*

SUSAN MARTINOVICH, P.E., *Director*

September 13, 2010

Project: Sahara Avenue Bus Rapid Transit

Via Certified Mail No. 7010 0780 0001 0303 3092

SAHARA TOWNE SQUARE L L C
3275 S JONES BLVD #105
LAS VEGAS NV 89146-6768

Re: Sahara Avenue Bus Rapid Transit Station Improvements at 2520 S MARYLAND PKWY

Dear Sir/Madam:

The Nevada Department of Transportation (NDOT), in cooperation with the Regional Transportation Commission of Southern Nevada (RTC) is preparing to incorporate bus rapid transit (BRT) along Sahara Avenue from Hualapai Way to Boulder Highway within NDOT right-of-way. The Project includes roadway improvements to accommodate the BRT vehicles, traffic signal improvements, nearly 80 transit stops and pedestrian and landscape enhancements. As part of the project, sidewalks and driveways along many parts of Sahara Avenue will be upgraded to meet local standards and to comply with the Americans with Disability Act (ADA) access requirements.

This letter is to inform you that the construction plans for the Sahara Avenue BRT project indicate you have improvements within the NDOT right-of-way that will require removal or modification. Research of our records indicate that you do not have a valid Right-of-Way Occupancy Permit granted by NDOT for your driveway, landscaping or other improvements within NDOT right-of-way. Under NRS 408.423, a Right-of-way Occupancy Permit is required for the use of driveways and other encroachments within NDOT right-of-way.

The RTC plans to construct the improvements on Sahara Avenue shown in the attached drawing. As part of the Sahara Avenue BRT project, the RTC will remove existing landscaping and construct the improvements as shown on the attached drawing **at no cost to you**. Project construction is currently scheduled to begin in January 2011 and be completed in February 2012.

DISTRICT 1
P.O. BOX 170
Las Vegas, NV 89125-0170

September 13, 2010

Optionally, you may elect to remove, at your own cost, any improvements and landscaping within NDOT right-of-way which will be affected by the proposed construction. If you elect this option, in order to avoid construction delays, your improvements must be removed by December 13, 2010.

With either option, the NDOT will work with you to establish a valid permit for your driveways, landscaping and other improvements which will remain within NDOT right-of-way.

Please check the appropriate box below to indicate your preference and sign and return this form to the RTC's Engineering Consultant, in the stamped, self-addressed envelope provided, **on or before October 13, 2010:**

☐ **I authorize the NDOT to modify my improvements that are located within the NDOT right-of-way at no cost to me in order to accommodate the RTC project construction as shown on the enclosed exhibit, and, I request a Right-of-Way Occupancy Permit at no cost to me.**

OR

☐ **I will remove my improvements that are located within the NDOT right-of-way at my own cost before December 13, 2010 in order to accommodate the RTC project construction as shown on the enclosed exhibit, and, I request a Right-of-Way Occupancy Permit at no cost to me.**

Print Name	Signature	(____) Phone	Date

SAHARA TOWNE SQUARE L L C
3275 S JONES BLVD #105
LAS VEGAS NV 89146-6768

If there are tenants on the premises, please contact them and advise us as to the decisions you have made. Additionally, please provide a tenant contact:

Tenant Name	Email Address	(____) Phone

DISTRICT 1
P.O. BOX 170
Las Vegas, NV 89125-0170

September 13, 2010

If you have questions regarding the removal or reconstruction of your improvements, please contact James Ragan, NDOT Project Manager at (702) 671-8854 or jragan@dot.state.nv.us.

Thank you for your prompt attention to this matter.

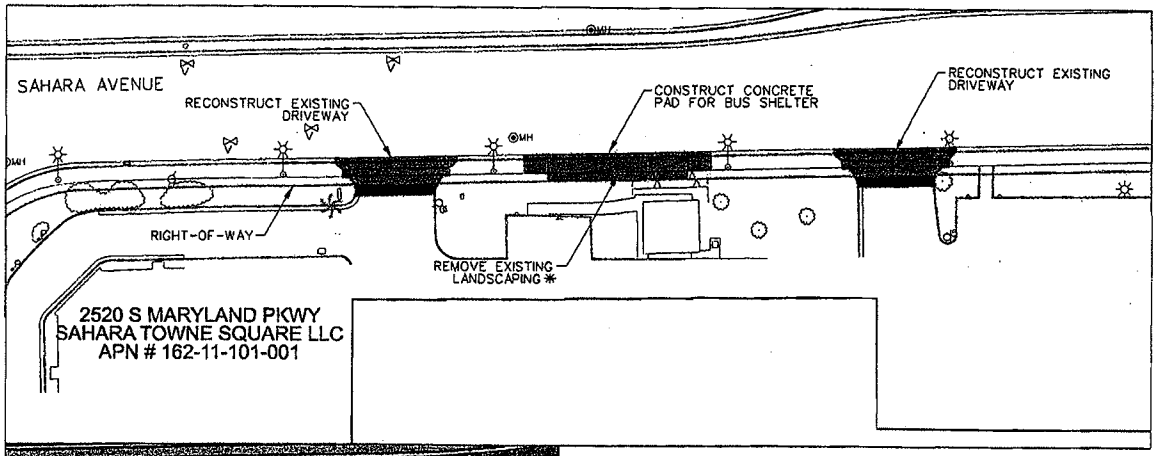
Sincerely,

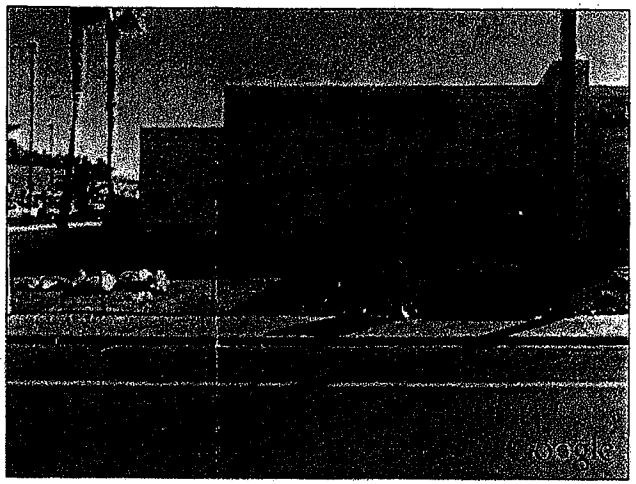
Asst. Distr. Engr.

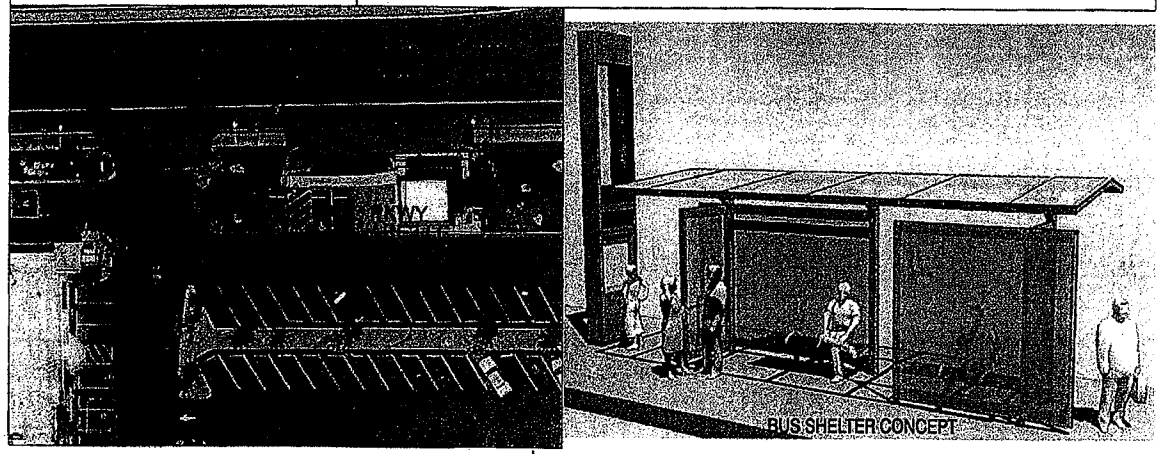
for Mary Martini, P.E.
NDOT District 1 Engineer

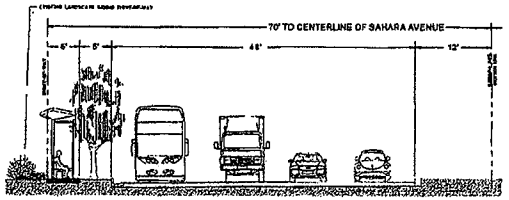
Enclosure

Cc: Eduardo Miranda, P.E., Senior Project Manager
Kent Sears, P.E., District 1 Traffic Engineer
Rudye Lucero, Permit Coordinator
David Swallow, P.E., Regional Transportation Commission of Southern Nevada
Roger Patton, P.E., The Louis Berger Group, Inc.
File









PROJECT CROSS SECTION

* LANDSCAPING IN CONFLICT WITH NEW SIDEWALK TO BE REMOVED

60 25 0 50 100
GRAPHIC SCALE

LEGEND

- PROPOSED NEW SIDEWALK
- REGRADE EXISTING DRIVEWAY TO MATCH NEW SIDEWALK
- RIGHT-OF-WAY (R/W) LINE

NOTE: ALL DOCUMENTS PRESENTED ARE SUBJECT TO REVISION

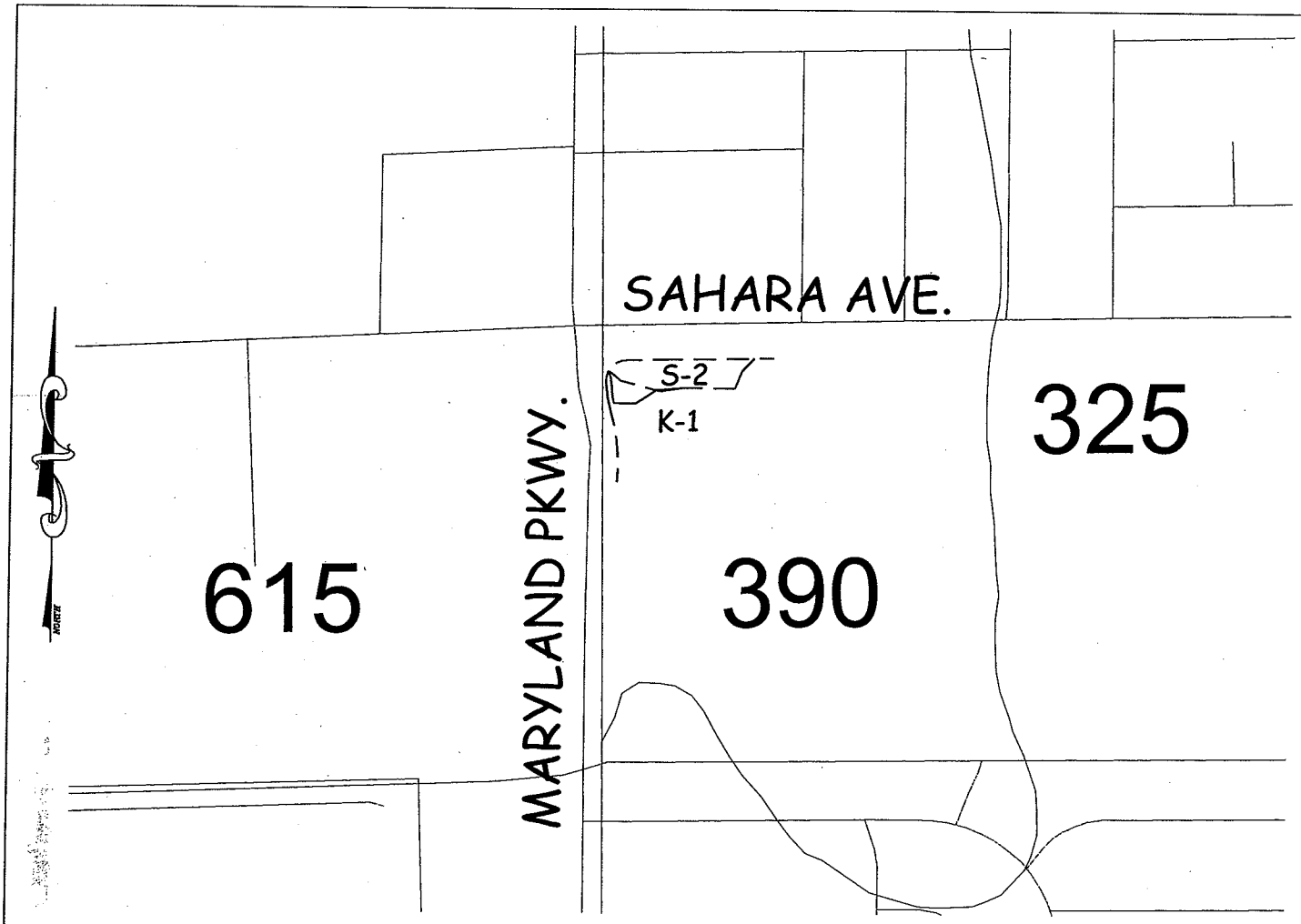
RTC OF SOUTHERN NEVADA | NEVADA DOT

SAHARA AVENUE RAPID TRANSIT PROJECT

IMPROVEMENT EXHIBIT
APN: 162-11-101-001
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

THE Louis Berger Group, INC.

FILE : P:\RTC\SNV\CB\083 Sahara Ave BRT Project\Exhibits\20100901 - NDOT ROW Letters\S 2520 MARYLAND.dgn - 9/1/2010 - 8:49:23 JPS



BASIN	AREA (ACRES)	*SOIL TYPE	SOIL CLASS	WEIGHTED CURVE NO.
S-2	0.60	390 (100%)	C (100%)	98
K-1	4.80	390 (100%)	C (100%)	98

EXISTING BASIN DELINEATION

PROPOSED DELINEATION CHANGE WITH NEW BANK BUILDING

*SOIL TYPES AND BOUNDARIES ARE REFERECED FROM THE "SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA, PART OF CLARK COUNTY" PERFORMED BY THE SOIL CONSERVATION SERVICE, ISSUED IN JULY 1985. REFER TO MAP SHEET 6.

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)

1 inch = 500 feet

WALKER ENGINEERING, LLC
5765 S. RAINBOW BLVD.
SUITE 101
LAS VEGAS, NV 89118
TEL: 702.873.5197
FAX: 702.873.5346
meeting your land development needs

CHASE @ MARYLAND & SAHARA

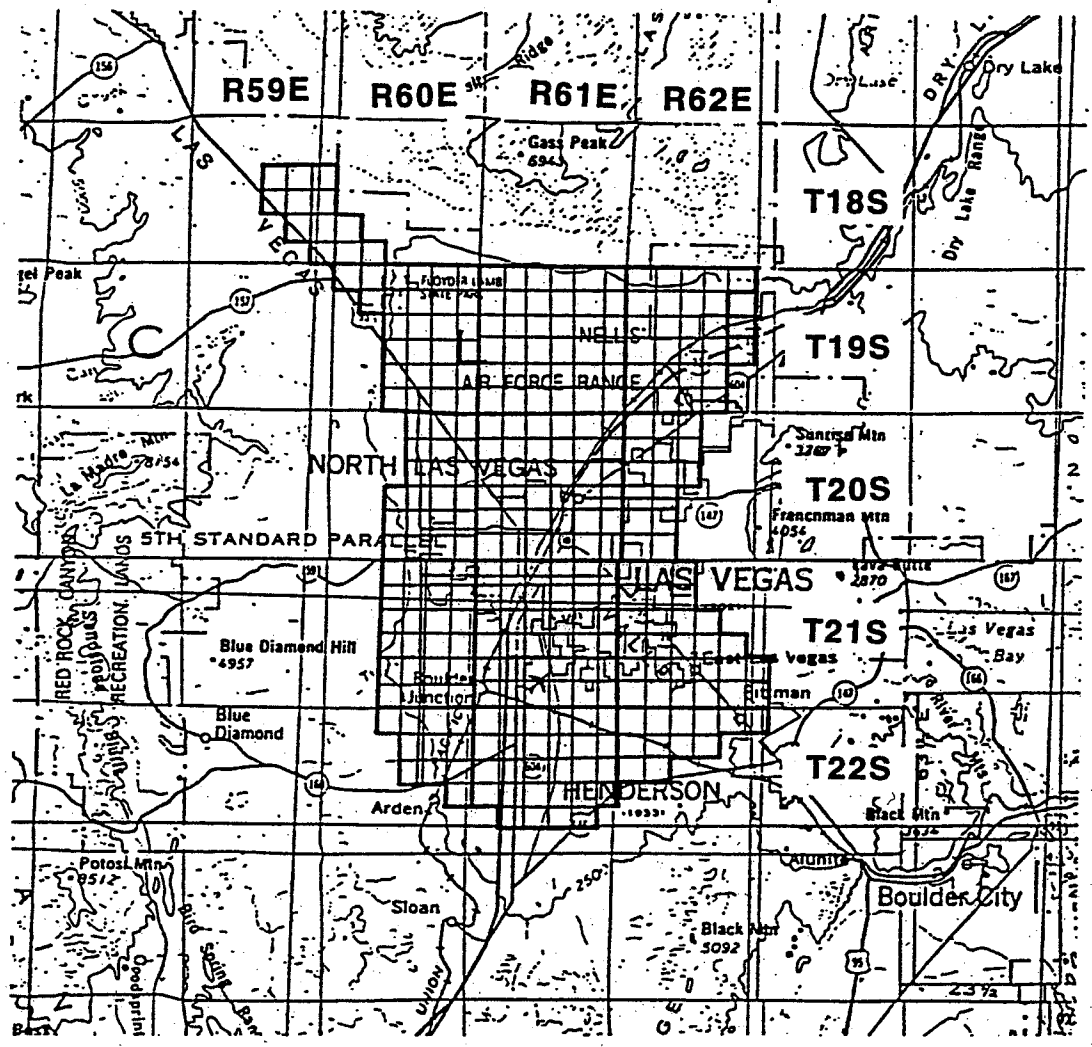
EXISTING/PROPOSED SOILS MAP

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

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

See footnote at end of table.

McCARRAN AIRPORT RAINFALL AREA



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

TOWNSHIP	RANGE	SECTIONS
20 South	62 East	4-9,16-20,29-32
21 South	60 East	1-4,9-16,21-28,33-36
21 South	61 East	ALL SECTIONS *
21 South	62 East	4-9,15-23, 25-36
22 South	60 East	1-4,10-15,24
22 South	61 East	1-24,26-29
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

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA (IN INCHES)

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

NOTE:
1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.
2. The 24 hour values presented above are for use with TR-55 only.
3. Table 501 adjustments not required.

Revision	Date

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

Worksheet for SECTION 1-SAHARA 10-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01270	ft/ft
Discharge	365.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	100.93
0+06.85	98.81
0+12.85	98.80
0+13.35	98.80
0+13.35	98.11
0+14.85	98.30
0+60.71	99.43
0+62.21	99.26
0+62.21	99.76
0+62.71	99.76
0+66.87	100.11
0+67.37	100.11
0+67.37	99.61
0+68.87	99.76
1+38.87	98.36
1+40.37	98.19
1+40.37	98.69
1+40.87	98.69
1+46.87	98.81
1+46.87	104.81

$d * V = 1.23 * 6.41 = 7.88 < 8$ OK

dry lane:

$\frac{99.43 - 99.34}{0.0246} = 3.66 < 19$

DOES NOT MEET DRY LAN EX. CONDITION

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 100.93)	(0+06.85, 98.81)	0.030

Worksheet for SECTION 1-SAHARA 10-YR

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+06.85, 98.81)	(0+14.85, 98.30)	0.013
(0+14.85, 98.30)	(0+60.71, 99.43)	0.017
(0+60.71, 99.43)	(0+68.87, 99.76)	0.013
(0+68.87, 99.76)	(1+38.87, 98.36)	0.017
(1+38.87, 98.36)	(1+46.87, 104.81)	0.013

Results

Normal Depth		1.23	ft
Elevation Range	98.11 to 104.81 ft		
Flow Area		56.94	ft²
Wetted Perimeter		111.42	ft
Top Width		109.49	ft
Normal Depth		1.23	ft
Critical Depth		1.43	ft
Critical Slope		0.00482	ft/ft
Velocity		6.41	ft/s
Velocity Head		0.64	ft
Specific Energy		1.87	ft
Froude Number		1.57	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.23	ft
Critical Depth	1.43	ft
Channel Slope	0.01270	ft/ft
Critical Slope	0.00482	ft/ft

Cross Section for SECTION 1-SAHARA 10-YR

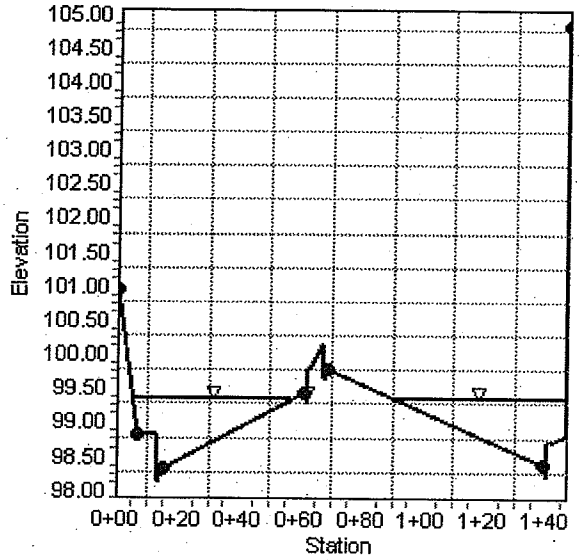
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01270	ft/ft
Normal Depth	1.23	ft
Discharge	365.00	ft³/s

Cross Section Image



Worksheet for SECTION 1-SAHARA 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01270	ft/ft
Discharge	701.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	100.93
0+06.85	98.81
0+12.85	98.80
0+13.35	98.80
0+13.35	98.11
0+14.85	98.30
0+60.71	99.43
0+62.21	99.26
0+62.21	99.76
0+62.71	99.76
0+66.87	100.11
0+67.37	100.11
0+67.37	99.61
0+68.87	99.76
1+38.87	98.36
1+40.37	98.19
1+40.37	98.69
1+40.87	98.69
1+46.87	98.81
1+46.87	104.81

$d * V = 1.51 * 7.75 = 11.70 > 8$

EX. CONDITION

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 100.93)	(0+06.85, 98.81)	0.030

Worksheet for SECTION 1-SAHARA 100-YR

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+06.85, 98.81)	(0+14.85, 98.30)	0.013
(0+14.85, 98.30)	(0+60.71, 99.43)	0.017
(0+60.71, 99.43)	(0+68.87, 99.76)	0.013
(0+68.87, 99.76)	(1+38.87, 98.36)	0.017
(1+38.87, 98.36)	(1+46.87, 104.81)	0.013

Results

Normal Depth		1.51	ft
Elevation Range	98.11 to 104.81 ft		
Flow Area		90.41	ft²
Wetted Perimeter		131.37	ft
Top Width		128.83	ft
Normal Depth		1.51	ft
Critical Depth		1.79	ft
Critical Slope		0.00438	ft/ft
Velocity		7.75	ft/s
Velocity Head		0.93	ft
Specific Energy		2.44	ft
Froude Number		1.63	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.51	ft
Critical Depth	1.79	ft
Channel Slope	0.01270	ft/ft
Critical Slope	0.00438	ft/ft

Cross Section for SECTION 1-SAHARA 100-YR

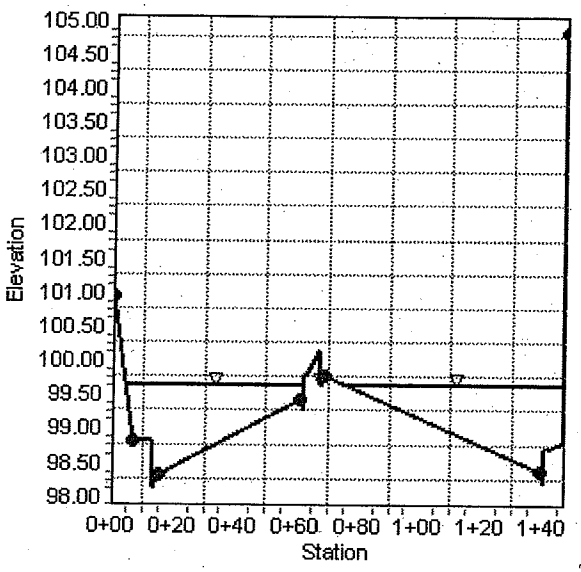
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01270	ft/ft
Normal Depth	1.51	ft
Discharge	701.00	ft³/s

Cross Section Image



WSE = 98.11 + 1.51 = 99.62'

WSE + 18" = 99.62' + 1.5' = 101.12'

FF ELEV = 101.64' > 101.12'

∴ BLDG. PROTECTED

Worksheet for SECTION 2-SAHARA 10-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00524	ft/ft
Discharge	365.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	99.80
0+44.15	98.25
0+50.22	97.70
0+50.72	97.66
0+52.22	97.58
0+97.94	98.84
0+99.44	98.67
0+99.94	99.17
0+99.94	99.17
1+04.04	99.05
1+04.54	99.05
1+04.54	98.55
1+05.54	98.72
1+75.54	97.32
1+77.04	97.15
1+77.04	97.65
1+77.54	97.65
1+83.54	97.77
1+83.54	103.77

d*V = 1.48 * 4.62 = 6.84 < 8

OK

dry lane:

WSE > FS

DOES NOT MEET DRY LANE

EX. CONDITION

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 99.80)	(0+44.15, 98.25)	0.017
(0+44.15, 98.25)	(0+52.22, 97.58)	0.013

Worksheet for SECTION 2-SAHARA 10-YR

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+52.22, 97.58)	(0+97.94, 98.84)	0.017
(0+97.94, 98.84)	(1+05.54, 98.72)	0.013
(1+05.54, 98.72)	(1+75.54, 97.32)	0.017
(1+75.54, 97.32)	(1+83.54, 103.77)	0.013

Results

Normal Depth		1.48	ft
Elevation Range	97.15 to 103.77 ft		
Flow Area		79.00	ft²
Wetted Perimeter		132.44	ft
Top Width		130.92	ft
Normal Depth		1.48	ft
Critical Depth		1.50	ft
Critical Slope		0.00475	ft/ft
Velocity		4.62	ft/s
Velocity Head		0.33	ft
Specific Energy		1.81	ft
Froude Number		1.05	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.48	ft
Critical Depth	1.50	ft
Channel Slope	0.00524	ft/ft
Critical Slope	0.00475	ft/ft

Cross Section for SECTION 2-SAHARA 10-YR

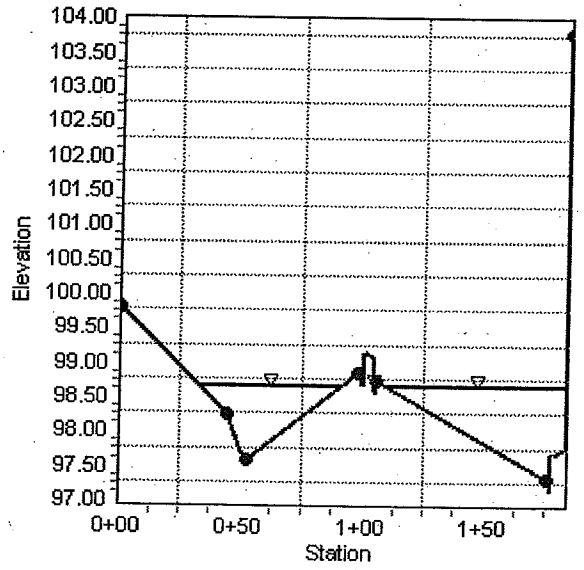
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00524	ft/ft
Normal Depth	1.48	ft
Discharge	365.00	ft³/s

Cross Section Image



Worksheet for SECTION 2-SAHARA 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00524	ft/ft
Discharge	701.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	99.80
0+44.15	98.25
0+50.22	97.70
0+50.72	97.66
0+52.22	97.58
0+97.94	98.84
0+99.44	98.67
0+99.94	99.17
0+99.94	99.17
1+04.04	99.05
1+04.54	99.05
1+04.54	98.55
1+05.54	98.72
1+75.54	97.32
1+77.04	97.15
1+77.04	97.65
1+77.54	97.65
1+83.54	97.77
1+83.54	103.77

$d * V = 1.80 * 5.61 = 10.10 > 8$

EX. CONDITION

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 99.80)	(0+44.15, 98.25)	0.017
(0+44.15, 98.25)	(0+52.22, 97.58)	0.013

Worksheet for SECTION 2-SAHARA 100-YR

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+52.22, 97.58)	(0+97.94, 98.84)	0.017
(0+97.94, 98.84)	(1+05.54, 98.72)	0.013
(1+05.54, 98.72)	(1+75.54, 97.32)	0.017
(1+75.54, 97.32)	(1+83.54, 103.77)	0.013

Results

Normal Depth		1.80	ft
Elevation Range	97.15 to 103.77 ft		
Flow Area		125.06	ft²
Wetted Perimeter		156.67	ft
Top Width		154.37	ft
Normal Depth		1.80	ft
Critical Depth		1.85	ft
Critical Slope		0.00427	ft/ft
Velocity		5.61	ft/s
Velocity Head		0.49	ft
Specific Energy		2.28	ft
Froude Number		1.10	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.80	ft
Critical Depth	1.85	ft
Channel Slope	0.00524	ft/ft
Critical Slope	0.00427	ft/ft

Cross Section for SECTION 2-SAHARA 100-YR

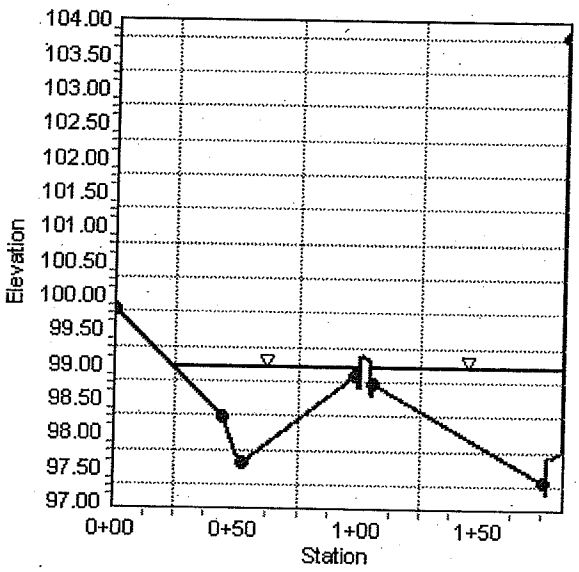
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00524	ft/ft
Normal Depth	1.80	ft
Discharge	701.00	ft³/s

Cross Section Image



WSE = 97.58 + 1.80 = 99.38'

WSE + 18" = 99.38' + 1.5' = 100.88'

FF ELEV = 101.64' > 100.88'

∴ BLDG. PROTECTED

REFERENCE MATERIALS
SAHARA TOWNE SQUARE

D R A I N A G E

DRAINAGE STUDY NUMBER:

000 361

NAME:

SAHARA TOWNE SQ.

SECTION / TOWNSHIP/ RANGE:

SEC 11 T21S R.61E

CROSS STREETS:

MARYLAND PKY/ JAHARA

ASSESSOR'S PARCEL NUMBER:

120-490-008

NEW ASSESSOR'S PARCEL NUMBERS:

ACREAGE:

15.8. AC.

SUBMITTAL DATE:

6-16-87

A:\WORK\DRAINAGE

Sahara Towne Square

11-21-61

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