HYDROLOGY STUDY
SUPPLEMENT #1

for

Rainbow Car Wash

CLARK COUNTY, NEVADA

Sam Dunnam

From: Sam Dunnam
Sent: Wednesday, May 11, 2022 8:29 AM
To: Crissy Riland
Subject: RE: PW22-10974 items
Attachments: Fig 10 DEV cond basin map.pdf; Calc Shts 2_4_13.pdf; 2022 05 11 TDS plans.pdf

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From: Crissy Riland <Christine.Riland@ClarkCountyNV.gov>
Sent: Tuesday, May 10, 2022 4:32 PM
To: Sam Dunnam <sam.dunnam@tylin.com>
Subject: PW22-10974 items

Hi Sam,

I'm reviewing PW22-10974 and need some things so I can finalize the study.

Please take a look at the following. Figure 10 has been attached and sheets C3.01 and C5.01 from the plans.

1. Revise the BMP swale calculations for Sections #3 and #4 on Figure 10. The Manning's "n" for 3-inch rip rap is 0.031. See calc sht #13
2. Your swale calculations are the exact same so revise the table on Figure 10 to show the correct values for "Section", "Calc Sht", "V100" and "D100". Different swales, different calcs. IE #3 & #4
3. On Figure 10, revise the values in your table to show Basin off1 with <1/<1 cfs. Not zero. There is some flow. The HEC-1 model just doesn't show flow less than 1 cfs. OK
4. Also on Figure 10, Basin FUT has a flow of 2/1 cfs per the HEC-1 model. You are detaining 1 cfs of the 2 so the flow discharging onto Nellis is not more in the developed condition than in the existing condition. However you'd like to convey this information is up to you, but you need to show that. This way someone can look at the figures and know the existing is 1/1, developed is 2/1 and in the developed you are retaining 1 cfs so the flow stays the same. Also, it's understood where the 2 cfs in the swales came from. RETAIN is now in table
5. Check Detail W1 on Sheet C3.01. It looks like the flow in the rip rap drains to a low point at the sidewalk underdrain. Correct. The v-ditch does not look correct. I've attached the grading plan sheets for your review.

You can email the swale calculations and Figure 10 to me and I can print them out. Let me know about Detail W1 and we can go from there. I am hoping we can handle this as a supplement.

I will put the study on hold until I receive the information.
Please call me if you have any questions. I'd love to get this one finished.

Thanks,
Crissy

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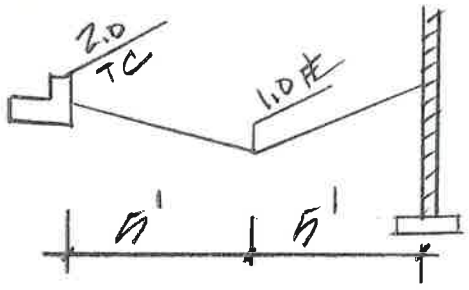
East PL swale - Q100=2 cfs

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.031
Channel Slope	0.004 ft/ft
Left Side Slope	10.000 H:V
Right Side Slope	10.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	5.2 in = 0.43'
Flow Area	1.8 ft²
Wetted Perimeter	8.6 ft
Hydraulic Radius	2.6 in
Top Width	8.59 ft
Critical Depth	3.6 in
Critical Slope	0.026 ft/ft
Velocity	1.08 ft/s
Velocity Head	0.02 ft
Specific Energy	0.45 ft
Froude Number	0.412
Flow Type	Subcritical



GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.2 in
Critical Depth	3.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.026 ft/ft

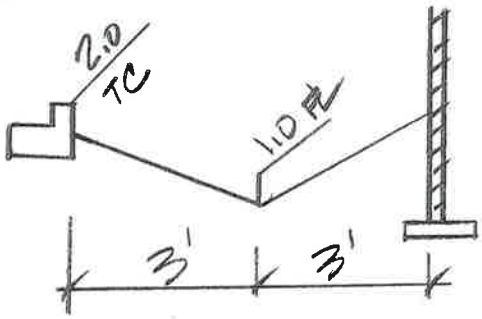
REVISED CALC SHT # 3

South PL swale - Q100=2 cfs

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.031
Channel Slope	0.004 ft/ft
Left Side Slope	6.000 H:V
Right Side Slope	6.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	6.3 in = 0.53'
Flow Area	1.6 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	3.1 in
Top Width	6.26 ft
Critical Depth	4.4 in
Critical Slope	0.025 ft/ft
Velocity	1.23 ft/s
Velocity Head	0.02 ft
Specific Energy	0.54 ft
Froude Number	0.423
Flow Type	Subcritical



GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	6.3 in
Critical Depth	4.4 in
Channel Slope	0.004 ft/ft
Critical Slope	0.025 ft/ft

REVISED CALC SHT #4

Given; STR & E FL SHALES

d_{50} Rip-Rap = 3"

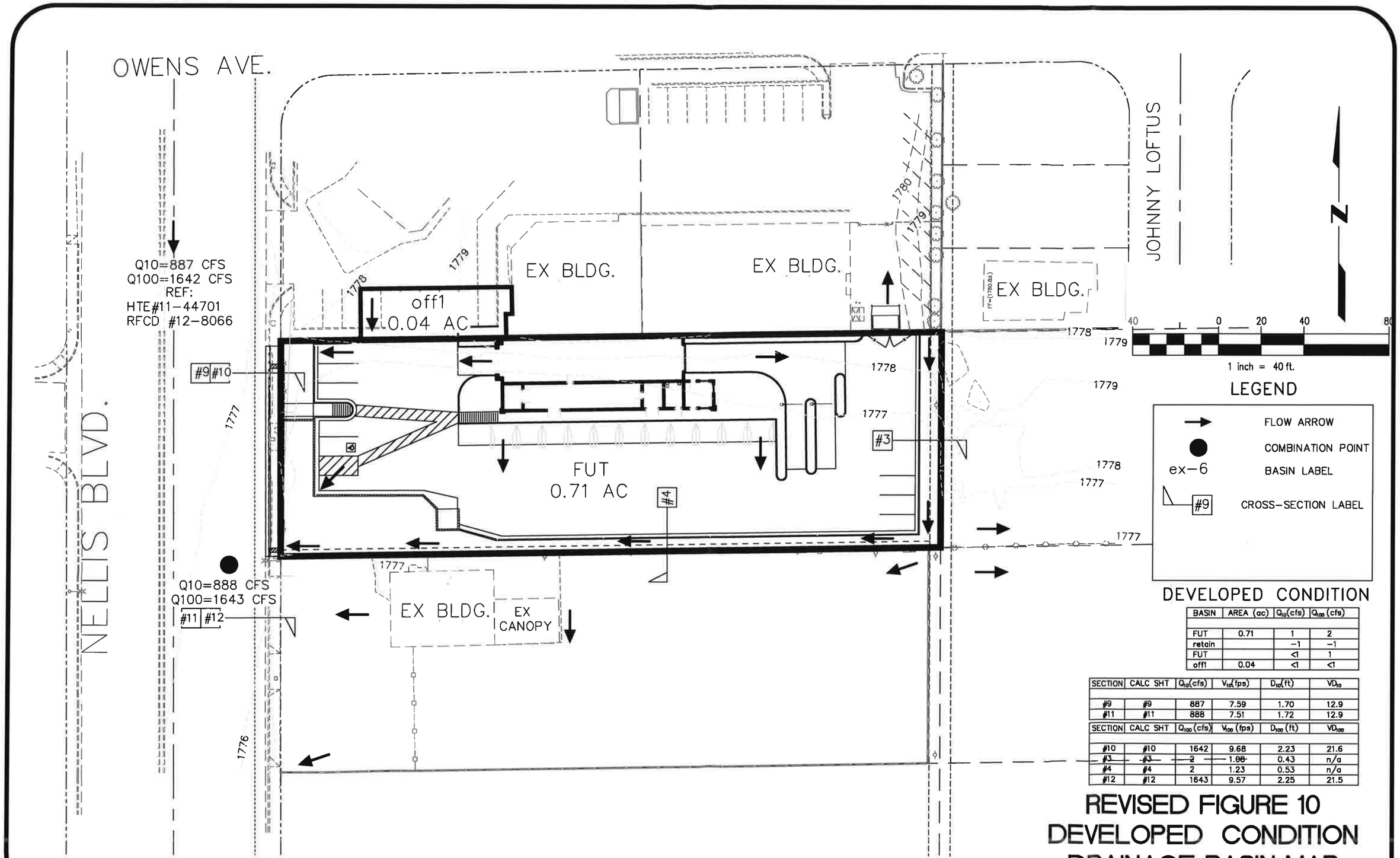
FIND; N-VALUE

Eq. 732 $n = .0395 (d_{50})^{1/6}$

$= .0395 (0.25)^{1/6}$

$= 0.031$

CALC SHT # 13



DEVELOPED CONDITION

BASIN	AREA (ac)	Q_{10}(cfs)	Q_{100}(cfs)
FUT	0.71	1	2
retain		-1	-1
FUT		<1	1
off1	0.04	<1	<1

SECTION	CALC SHT	Q_{10}(cfs)	V_{10}(fps)	D_{10}(ft)	VD_{10}
#9	#9	887	7.59	1.70	12.9
#11	#11	888	7.51	1.72	12.9

SECTION	CALC SHT	Q_{100}(cfs)	V_{100}(fps)	D_{100}(ft)	VD_{100}
#10	#10	1642	9.68	2.23	21.6
~~#3~~	~~#3~~	~~2~~	~~1.98~~	0.43	n/a
#4	#4	2	1.23	0.53	n/a
#12	#12	1643	9.57	2.25	21.5

REVISED FIGURE 10
DEVELOPED CONDITION
DRAINAGE BASIN MAP