



Drainage Calculations for
The City of Maitland, FL

Enzian Theater Expansion Maitland, FL

Prepared by:

Kimley-Horn and Associates, Inc.
Orlando, Florida
149490001

November 19, 2015

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Prepared for:

H.J. High Construction Company

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NOV 19 2015

TABLE OF CONTENTS

1	SUMMARY	1
2	EXISTING CONDITIONS.....	1
2.1	SOILS.....	1
2.2	EXISTING DRAINAGE.....	1
2.2.1	BASIN.....	1
2.2.2	CN CALCULATIONS	2
2.2.3	TIME OF CONCENTRATION	2
2.2.4	EXISTING DEVELOPMENT RUNOFF.....	2
3	PROPOSED DEVELOPMENT.....	3
3.1	REQUIRED PERMITS AND REVIEWS	3
3.2	STORMWATER MANAGEMENT.....	3
3.2.1	BASINS	4
3.2.1	CN CALCULATIONS	4
3.2.2	TIME OF CONCENTRATION	4
3.2.3	GROUNDWATER ELEVATIONS.....	4
3.2.4	REQUIRED TREATMENT VOLUME (TV)	4
3.2.5	TREATMENT VOLUME RECOVERY	5
3.2.6	PROPOSED DEVELOPMENT RUNOFF.....	5
4	CONCLUSION.....	6

APPENDICES

VICINITY MAPS APPENDIX A

- General Location Map
- Aerial Photograph

SUPPORTING DOCUMENTATION..... APPENDIX B

- Pre-Development Curve Number
- Pre-Development Basin Map
- Post-Development Curve Number
- Post-Development Basin Map
- Pond Treatment Volume and Stage Storage Calculations
- ICPR Reports
- Dry Pond Recovery Analysis

1 SUMMARY

The Enzian Theater Expansion project is an existing theater with associated parking on a 3.00 acre site. The site is located on the northeast corner of US 17-92 and Magnolia Road intersection in Maitland, Florida - Section 19, Township 22 South, and Range 30 East. In **Appendix A**, the limits of the project site have been superimposed on a general location map and an aerial photograph.

The project consists expanding the existing theater building and revising a portion of the existing parking area. A dry-retention pond will be used for water quality treatment of the stormwater runoff generated from the additional impervious area. Stormwater exfiltration will be used to provide additional attenuation only.

It should be noted that all elevations within this report are based upon the 1988 North American Vertical Datum (NAVD).

2 EXISTING CONDITIONS

The existing site is currently developed with a theater building and associated parking infrastructure. The site gradually slopes from south to north and discharges to Lake Maitland by way of the creek along the northern property boundary. The elevation of the property ranges from 85 ft NAVD to 71 ft NAVD.

2.1 SOILS

Soil types were mapped by the United States Department of Agriculture Soil Conservation Service, August 1989 Soil Survey for Orange County, Florida. Per the soils maps, the site consists mostly of soil classified as a Type "A" soil. Terracon Consultants, Inc. (Terracon) performed a geotechnical engineering investigation for the proposed site. Please refer to the Geotechnical Engineering Report prepared by Terracon, which has been included with this application submittal, for details.

2.2 EXISTING DRAINAGE

The existing site contains neither primary nor secondary stormwater management/collection systems. Existing runoff sheet flows overland north to the Lake Maitland creek adjacent to the property. A portion of the parking area is collected by an underground pipe network and discharged near the northeast property corner. Please refer to the Pre-Development Basin Map in **Appendix B**.

2.2.1 BASIN

The existing site was analyzed using two (2) pre-development drainage basins.

Please refer to the Pre-Development Drainage Basin Map in **Appendix B** for details.

Table 1: Existing Pre-Development Basin Summary Table

	PRE-1	PRE-2
Drainage Basin Area	1.32 acres	1.68 acres
Impervious Area	0.42 acres	0.46 acres
% Impervious	31.8 %	27.4%
Time of Conc., Tc	10 min.	10 min.
Curve Number, CN	57.8	55.2

2.2.2 CN CALCULATIONS

The pre-development basins “Pre-1” and “Pre-2” are currently developed with high landscape and grass coverage. The site contains Type “A” soils resulting in SCS Curve Numbers (CN) of 57.8, and 55.2, respectively. The CN calculations for the pre-development conditions can be found in **Appendix B**.

2.2.3 TIME OF CONCENTRATION

The minimum time of concentration of 10 minutes has been used in the calculations.

2.2.4 EXISTING DEVELOPMENT RUNOFF

The stormwater runoff from the pre-development basins was determined using Advanced Interconnected Channel & Pond Routing (ICPR Ver. 3.02) by Streamline Technologies, Inc. Per the model, the existing site peak discharge rate to the adjacent creek for the 25-year/24-hour storm event is 7.45 cfs.

Please refer to **Appendix B** for the nodal diagram, input report, and node min/max report.

3 PROPOSED DEVELOPMENT

The Enzian Theater Expansion project will be constructed as a single phase. Stormwater runoff from the proposed improvements will be managed through a dry detention pond prior to discharging to the adjacent Lake Maitland creek. Per a meeting between SJRWMD and H.J. High Construction Company, SJRWMD will require water quality treatment only for any additional impervious area constructed with the project. The dry pond has been designed to provide the required water quality treatment.

3.1 REQUIRED PERMITS AND REVIEWS

- City of Maitland, FL
- St. Johns River Water Management District (SJRWMD)

3.2 STORMWATER MANAGEMENT

The proposed stormwater system will utilize one dry detention pond to treat stormwater runoff. Although not required by SJRWMD, the pond, combined with an underground exfiltration system, will also provide stormwater attenuation to meet pre development discharge rates.

Please see the stage/storage for both the pond and exfiltration system within **Appendix B**. The proposed pond will outfall via one control structure to the adjacent Lake Maitland Creek.

The tables below summarize the parameters of the stormwater pond and proposed control structure:

Table 2: Stormwater Pond Design

	Top of Pond Elevation (ft.) (NAVD)	Slope	Bottom of Pond Elevation (ft.) (NAVD)
Pond	77.00	4:1	73.00

Table 3: Control Structure Detail

Post-Development Link	Weir Dimensions (in)	Weir Elevation (ft.) (NAVD)	Structure Type	Top of Structure Elevation (ft.) (NAVD)
CS	6" x 22.8"	74.80	Mod. C Inlet	76.70

3.2.1 BASINS

The on-site, post-development drainage conditions were analyzed as two (2) drainage basins (POST-1, & POST-2). Basin "POST-1" is the western half of the site that will remain relatively unmodified. Basin "POST-2" is the eastern half of the site that will include the building expansion and parking modifications. Please refer to the table below for the post-development contributing basin summary and the Post-Development Drainage Basin Map located in **Appendix B** for details.

Table 4: Post-Development Basin Summary Table

	POST-1	POST-2
Drainage Basin Area	1.32 acres	1.68 acres
Impervious Area	0.43 acres	0.90 acres
% Impervious	32.6%	53.6%
Time of Conc., Tc	10 min.	10 min.
Curve Number, CN	58.2	70.6

3.2.1 CN CALCULATIONS

Basin "POST-1" consists of an impervious area of 32.6%, which results in a SCS Curve Number (CN) of 58.2. Basin "POST-2" consists of an impervious area of 53.6% resulting in a CN of 70.6. The CN calculations for the post-development conditions can be seen in **Appendix B**. Please also refer to the Post-Development Drainage Basin Map in **Appendix B**.

3.2.2 TIME OF CONCENTRATION

The time of concentration ('Tc') for the post-development drainage basins were determined to be the minimum of 10 minutes.

3.2.3 GROUNDWATER ELEVATIONS

The groundwater levels were determined by Terracon Consultants Inc. and included as part of their Geotechnical Engineering Report. Per the report, the groundwater level in the proposed pond area is approximately 7 feet below existing ground. Please refer to the Geotechnical Report prepared by Terracon, which has been included with this application submittal, for details.

3.2.4 REQUIRED TREATMENT VOLUME (TV)

Per a meeting between SJRWMD and H.J. High Construction Company, SJRWMD will require water quality treatment only for any additional impervious

area constructed with the project. A small portion of additional impervious area is located in Basin #1, which discharges directly to the creek with no treatment. Additional treatment volume will be provided in the pond to account for the impervious area located in Basin #1. The SJRWMD requirement for the dry retention pond treatment volume is 1.25" of runoff over the impervious area.

Table 5: Dry Retention Pond Treatment Volume - Required vs. Provided

	Total Pre-Development Imp. Area (acres)	Total Post-Development Imp. Area (acres)	Total Imp. Area Difference (acres)	Required TV	Provided TV
				1.25" Over Impervious Area	
Pond	0.88	1.33	0.45	0.05 ac-ft	0.05 ac-ft
				2,042 CF	2,087 CF

The Required Treatment Volume is established within the pond at an elevation of 74.77-ft. However, the Provided Treatment Volume is established at an elevation of 74.80-ft. Please see **Appendix B** for treatment volume calculations.

3.2.5 TREATMENT VOLUME RECOVERY

The dry retention pond has been designed to drawdown the required treatment volume by means of percolation through the soil within 72 hours (3 days) following a storm event. A Vertical Coefficient of Permeability Rate (K_{vertical}) of 25 feet/day and a horizontal permeability ($K_{\text{horizontal}}$) of 38 feet/day was provided in the Terracon Geotechnical Report. Recovery time was determined by using Ponds (v.3.3) software. As designed, the pond will drawdown the provided water quality volumes of 2,087 CF within approximately 1.5 hours. Please see **Appendix C** for supporting recovery analysis.

3.2.6 PROPOSED DEVELOPMENT RUNOFF

The proposed development discharge rate was determined using Interconnected Channel & Pond Routing (ICPR v3.02) by Streamline Technologies, Inc. Please refer to **Appendix B** for the nodal diagram, input report, basin summary, and drainage analysis summary. Please refer to *Table 6* below for a summary of the proposed development discharge rates (Q) and the resulting maximum stage for each pond.

Table 6: Runoff Analysis

Storm Event	PRE-CREEK Max. Q (CFS)	POST-CREEK Max Q (CFS)	POND Max Stage (FT.)
Mean Annual	1.25	0.68	75.21
25yr-24hr	7.45	6.99	76.70

4 CONCLUSION

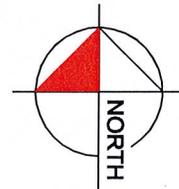
The design of the proposed stormwater management system meets or exceeds all the requirements of SJRWMD by providing sufficient treatment volume within the pond and limiting the proposed development discharge for the SJRWMD 25year/24hour storm and the Mean Annual storm.

APPENDIX A

VICINITY MAPS

**General Location Map
Aerial Photograph**

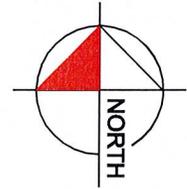
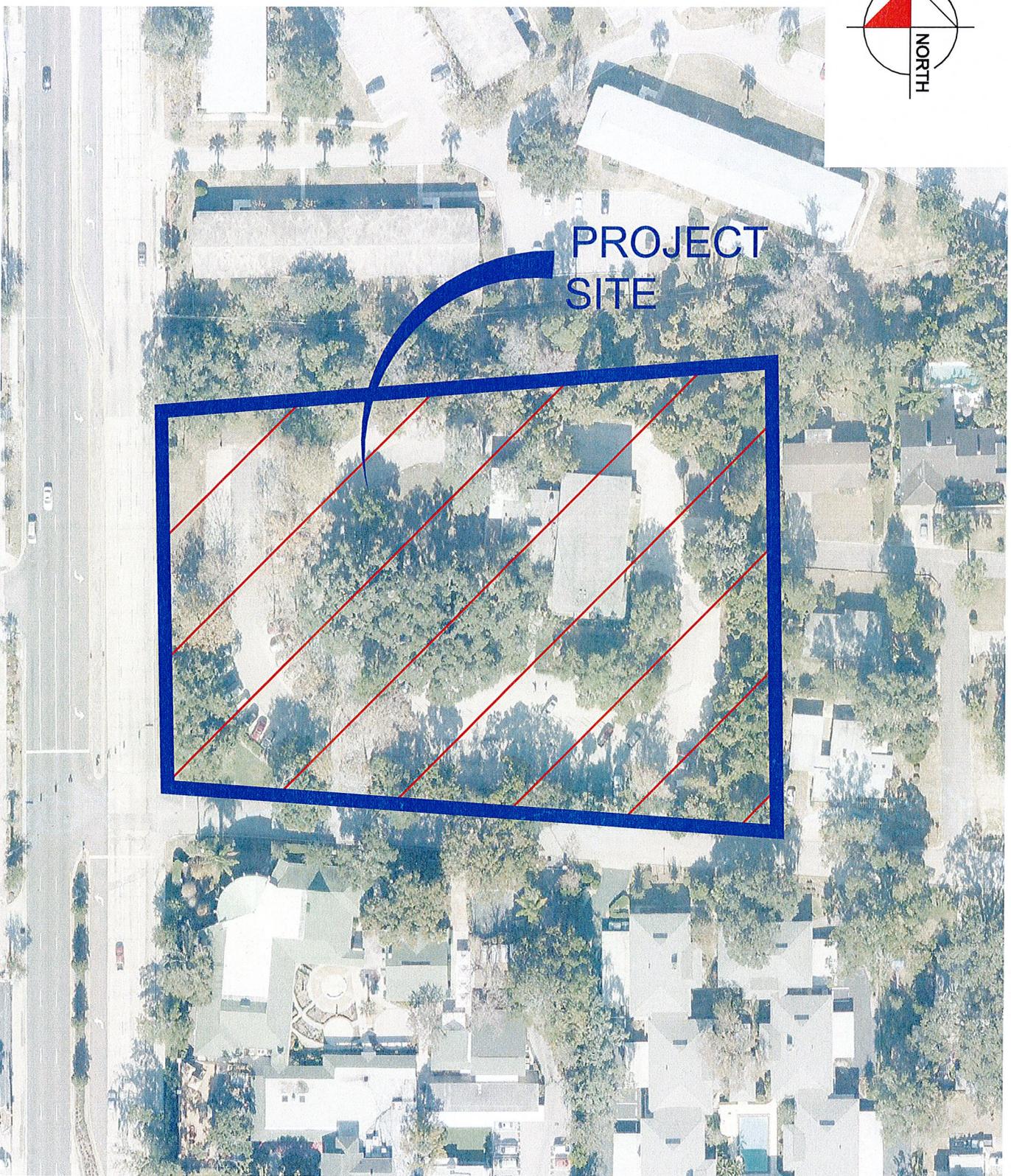
Drawing name: K:\ORL_Civil\149490001-Enzian Theatre Expansion\CADD\EXHIBITS\Drainage\MAP EXHIBITS.dwg location Nov 19, 2015 2:46pm by wolly.brinkman
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ORANGE COUNTY, FLORIDA
 SECTION 19, TOWNSHIP 22 SOUTH, RANGE 30 EAST

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DESIGNED BY DRAWN BY CHECKED BY		PROJECT NO. 149490001		

Drawing name: K:\ORL_Civil\149490001-Enzian Theatre Expansion\CADD\EXHIBITS\Drainage\MAP EXHIBITS.dwg Aerial Nov 19, 2015 2:46pm by: wally.brinkman
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PROJECT
SITE

ORANGE COUNTY, FLORIDA
SECTION 19, TOWNSHIP 22 SOUTH, RANGE 30 EAST

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DESIGNED BY		PROJECT NO. 149490001		FLORIDA P.E. LICENSE NUMBER:	
DRAWN BY					
CHECKED BY					

APPENDIX B

SUPPORTING DOCUMENTATION

**PRE-DEVELOPMENT
CURVE NUMBER**

CURVE NUMBER WORKSHEET
 PRE-DEVELOPMENT BASIN FOR "PRE-1"

Basin Area = 1.32 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Cover < 50%	68	0.0
	A	Cover 50% to 75%	49	0.0
0.90	A	Cover > 75%	39	35.1
		Grass (Lawns, Parks, Golf Courses, etc.)		
	B	Cover < 50%	79	0.0
	B	Cover 50% to 75%	69	0.0
	B	Cover > 75%	61	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	C	Cover < 50%	86	0.0
	C	Cover 50% to 75%	79	0.0
	C	Cover > 75%	74	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	D	Cover < 50%	89	0.0
	D	Cover 50% to 75%	84	0.0
	D	Cover > 75%	80	0.0
		Woods(Forest, Orchard)		
	A	Cover < 50%	45	0.0
	A	Cover 50% to 75%	35	0.0
	A	Cover > 75%	25	0.0
		Woods(Forest, Orchard)		
	B	Cover < 50%	66	0.0
	B	Cover 50% to 75%	60	0.0
	B	Cover > 75%	55	0.0
		Woods(Forest, Orchard)		
	C	Cover < 50%	77	0.0
	C	Cover 50% to 75%	74	0.0
	C	Cover > 75%	70	0.0
		Woods(Forest, Orchard)		
	D	Cover < 50%	83	0.0
	D	Cover 50% to 75%	80	0.0
	D	Cover > 75%	77	0.0
0.42	A,B,C,D	Impervious (Pavement, Concrete, Roofs, Pond)	98	41.2

WEIGHTED CURVE NUMBER = 57.8

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

CURVE NUMBER WORKSHEET
PRE-DEVELOPMENT BASIN FOR "PRE-2"

Basin Area = 1.68 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Cover < 50%	68	0.0
	A	Cover 50% to 75%	49	0.0
1.22	A	Cover > 75%	39	47.6
		Grass (Lawns, Parks, Golf Courses, etc.)		
	B	Cover < 50%	79	0.0
	B	Cover 50% to 75%	69	0.0
	B	Cover > 75%	61	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	C	Cover < 50%	86	0.0
	C	Cover 50% to 75%	79	0.0
	C	Cover > 75%	74	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	D	Cover < 50%	89	0.0
	D	Cover 50% to 75%	84	0.0
	D	Cover > 75%	80	0.0
		Woods(Forest, Orchard)		
	A	Cover < 50%	45	0.0
	A	Cover 50% to 75%	35	0.0
	A	Cover > 75%	25	0.0
		Woods(Forest, Orchard)		
	B	Cover < 50%	66	0.0
	B	Cover 50% to 75%	60	0.0
	B	Cover > 75%	55	0.0
		Woods(Forest, Orchard)		
	C	Cover < 50%	77	0.0
	C	Cover 50% to 75%	74	0.0
	C	Cover > 75%	70	0.0
		Woods(Forest, Orchard)		
	D	Cover < 50%	83	0.0
	D	Cover 50% to 75%	80	0.0
	D	Cover > 75%	77	0.0
0.46	A,B,C,D	Impervious (Pavement, Concrete, Roofs, Pond)	98	45.1

WEIGHTED CURVE NUMBER = 55.2

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

PRE-DEVELOPMENT DRAINAGE BASIN MAP

**POST-DEVELOPMENT
CURVE NUMBER**

CURVE NUMBER WORKSHEET
 POST-DEVELOPMENT BASIN FOR "POST-1"

Basin Area = 1.32 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
0.89	A	Cover < 50%	68	0.0
	A	Cover 50% to 75%	49	0.0
	A	Cover > 75%	39	34.7
		Grass (Lawns, Parks, Golf Courses, etc.)		
	B	Cover < 50%	79	0.0
	B	Cover 50% to 75%	69	0.0
	B	Cover > 75%	61	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	C	Cover < 50%	86	0.0
	C	Cover 50% to 75%	79	0.0
	C	Cover > 75%	74	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	D	Cover < 50%	89	0.0
	D	Cover 50% to 75%	84	0.0
	D	Cover > 75%	80	0.0
		Woods(Forest, Orchard)		
	A	Cover < 50%	45	0.0
	A	Cover 50% to 75%	35	0.0
	A	Cover > 75%	25	0.0
		Woods(Forest, Orchard)		
	B	Cover < 50%	66	0.0
	B	Cover 50% to 75%	60	0.0
	B	Cover > 75%	55	0.0
		Woods(Forest, Orchard)		
	C	Cover < 50%	77	0.0
	C	Cover 50% to 75%	74	0.0
	C	Cover > 75%	70	0.0
		Woods(Forest, Orchard)		
	D	Cover < 50%	83	0.0
	D	Cover 50% to 75%	80	0.0
	D	Cover > 75%	77	0.0
0.43	A,B,C,D	Impervious (Pavement, Concrete, Roofs, Pond)	98	42.1

WEIGHTED CURVE NUMBER = 58.2

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

CURVE NUMBER WORKSHEET
 POST-DEVELOPMENT BASIN FOR "POST-2"

Basin Area = 1.68 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
0.78	A	Cover < 50%	68	0.0
	A	Cover 50% to 75%	49	0.0
	A	Cover > 75%	39	30.4
		Grass (Lawns, Parks, Golf Courses, etc.)		
	B	Cover < 50%	79	0.0
	B	Cover 50% to 75%	69	0.0
	B	Cover > 75%	61	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	C	Cover < 50%	86	0.0
	C	Cover 50% to 75%	79	0.0
	C	Cover > 75%	74	0.0
		Grass (Lawns, Parks, Golf Courses, etc.)		
	D	Cover < 50%	89	0.0
	D	Cover 50% to 75%	84	0.0
	D	Cover > 75%	80	0.0
		Woods(Forest, Orchard)		
	A	Cover < 50%	45	0.0
	A	Cover 50% to 75%	35	0.0
	A	Cover > 75%	25	0.0
		Woods(Forest, Orchard)		
	B	Cover < 50%	66	0.0
	B	Cover 50% to 75%	60	0.0
	B	Cover > 75%	55	0.0
		Woods(Forest, Orchard)		
	C	Cover < 50%	77	0.0
	C	Cover 50% to 75%	74	0.0
	C	Cover > 75%	70	0.0
		Woods(Forest, Orchard)		
	D	Cover < 50%	83	0.0
	D	Cover 50% to 75%	80	0.0
	D	Cover > 75%	77	0.0
0.90	A,B,C,D	Impervious (Pavement, Concrete, Roofs, Pond)	98	88.2

WEIGHTED CURVE NUMBER = 70.6

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

POST-DEVELOPMENT BASIN MAP

**POST-DEVELOPMENT
TREATMENT VOLUME AND STAGE STORAGE
CALCULATIONS**

REQUIRED TREATMENT VOLUME & STAGE/STORAGE
DRY RETENTION POND

Total Basin Area = 3.00 acres
 Total Pre-Development Impervious Area = 0.88 acres
 Total Post-Development Impervious Area = 1.33 acres
 Net Impervious Area Increase = 0.45 acres
 1.25" of runoff from additional imp. area = [(Imp Area)x(1.25"/12")] = 0.05 acre-ft.

TOTAL REQUIRED TREATMENT VOLUME =	0.05	acre-ft.
	2,042	CF
Required Treatment Volume at Elevation =	74.77	ft

PROVIDED TREATMENT VOLUME =	0.05	acre-ft.
	2,087	CF
Provided Treatment Volume at Elevation =	74.80	ft

	Elevation (FT)	Feet	Area (SF)	Area (AC)	Volume Sum (CF)	Volume Sum (Ac-Ft)
T.O.B.	77	4	3,523	0.081	7,709	0.18
	76	3	2,637	0.061	4,629	0.11
	75	2	1,851	0.042	2,385	0.05
	74	1	1,167	0.027	876	0.02
BOTTOM	73	0	585	0.013	0	0.00

EQUIVALENT LENGTH AND WIDTH OF POND

Back of Berm
 Perimeter (P) = **234**
 Volume (V) = 2,087
 height (h) = 1.80

Back of Berm

Length (L) = $\{(P/2) + \text{SQRT}[(P^2/4) - (4V/h)]\}/2 = 106 \text{ ft.}$
 Width (W) = $\{(P/2) - \text{SQRT}[(P^2/4) - (4V/h)]\}/2 = 11 \text{ ft.}$

Enzian Theater Expansion

November 18, 2015

Job # 149490001

EXFILTRATION TRENCH '2' DESIGN

PIPE PARAMETERS	
PIPE DIAMETER, D (FT)	2.00
PIPE AREA, A (SF)	3.142
PIPE LENGTH, L _P (FT)	229.0
PIPE RUNS, R	1.0
PIPE BEDDING, S (FT)	0.00
SIDE BEDDING, X (FT)	1.50

TRENCH PARAMETERS	
BEDDING DEPTH, H ₁ (FT)	1.00
COVER, H ₂ (FT)	1.00
TRENCH WIDTH, W (FT)	5.0
TRENCH LENGTH, L _T (FT)	236.0
TRENCH AREA (SQ.FT.)	1180.0

PIPE VOLUME = V_P

$$V_P = (A)(L_P)[R + \{(W - (2 \cdot X)) / L_P\} \cdot X^2] = 732.0 \text{ CF}$$

TRENCH VOLUME = V_T

$$V_T = (H_1 + H_2 + D)(L_T)(W) = 4720.0 \text{ CF}$$

ROCK VOLUME = V_R (40% VOIDS)

$$V_R = (V_T - V_P)(0.4) = 1595.2 \text{ CF}$$

VOLUME PROVIDED BY EXFILTRATION TRENCH 'A' = V_{XΔ}

$$V_X = (V_R + V_P) = 2327.2 \text{ CF}$$
$$0.0534 \text{ AC.-FT.}$$

EXFILTRATION STAGE / STORAGE

	Elevation (FT)	Feet	Area (SF)	Area (AC)	Avg. Area (SF)	Volume (CF)	Volume Sum (CF)	Volume Sum (Ac-Ft)
Top of Trench	77.00	4	472	0.011		472	2,596	0.0596
					472			
	76	3	472	0.011		826	2,124	0.0488
					826			
	75	2	1,180	0.027		826	1,298	0.0298
					826			
	74.00	1.0	472	0.011		472	472	0.0108
					472			
Bottom of Trench	73	0	472	0.011		0	0	0.0000

ICPR REPORTS

Enzian Theater Expansion
Input Report

TABLE

Count: 1
Type: Vertical: Mavis
Flow: Both
Geometry: Rectangular
Span(in): 6.00
Rise(in): 22.80
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600
Invert(ft): 74.800
Control Elev(ft): 74.800

==== Bridges =====

Name: From Node: Flow: Both
Group: BASE To Node: Run WSPRO: No

XSEC TYPE	NAME	INV(ft)	STAT(ft)	SKEW(deg)	EXPAN	CONTRAC
Exit		0.000	0.00	0.000	0.500	0.000
Full Valley		0.000	0.00	0.000	0.500	0.000
Approach		0.000	0.00	0.000	0.500	0.000
Roadway		0.000	0.00	0.000		

Road Surface Material: Paved
Road Embankment Top Width(ft): 0.00
Road Unsubmerged Weir Q Coef: 0.000

RATING CURVE CONTROL

TW(ft)	QMin(cfs)	QMax(cfs)	QInc(cfs)
0.000	0.000	0.000	0.000

==== Percolation Links =====

Name: From Node: Flow: Both
Group: BASE To Node: Count: 1

Surface Area Option: Use 1st Point in Stage/Area Table
Vertical Flow Termination: Horizontal Flow Algorithm

Aquifer Base Elev(ft): 0.000	Perimeter 1(ft): 0.000
Water Table Elev(ft): 0.000	Perimeter 2(ft): 0.000
*****0.000	Perimeter 3(ft): 0.000
Horiz Conductivity(ft/day): 0.000	Distance 1 to 2(ft): 0.000
Vert Conductivity(ft/day): 0.000	Distance 2 to 3(ft): 0.000
Effective Porosity(dec): 0.000	Num Cells 1 to 2: 0
Suction Head(in): 0.000	Num Cells 2 to 3: 0
Layer Thickness(ft): 0.000	

==== Hydrology Simulations =====

Name: 100YR-24HR
Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRainage\ICPR\100YR-24HR.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Flmod
Rainfall Amount(in): 10.60

Time (hrs)	Print Inc(min)
8.000	30.00
14.000	15.00
24.000	30.00

Name: 10YR-24HR
Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRainage\ICPR\10YR-24HR.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Flmod
Rainfall Amount(in): 7.90

Time (hrs)	Print Inc(min)
8.000	30.00

149490001

Enzian Theater Expansion
Input Report

14.000 15.00
24.000 30.00

Name: 25YR-24HR

Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRAINAGE\ICPR\25YR-24HR.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
 Rainfall File: Flmod
Rainfall Amount(in): 8.60

Time(hrs)	Print Inc(min)
8.000	30.00
14.000	5.00
24.000	30.00

Name: MEAN ANNUAL

Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRAINAGE\ICPR\MEAN ANNUAL.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
 Rainfall File: Flmod
Rainfall Amount(in): 4.30

Time(hrs)	Print Inc(min)
8.000	30.00
14.000	5.00
24.000	30.00

==== Routing Simulations =====

Name: 100YR-24HR Hydrology Sim: 100YR-24HR

Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRAINAGE\ICPR\100YR-24HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
8.000	30.000
14.000	15.000
24.000	30.000

Group	Run
BASE	Yes

Name: 10YR-24HR Hydrology Sim: 10YR-24HR

Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRAINAGE\ICPR\10YR-24HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
8.000	30.000
14.000	15.000
24.000	30.000

Group	Run
BASE	Yes

149490001

Enzian Theater Expansion
Input Report

Name: 25YR-24HR Hydrology Sim: 25YR-24HR
Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRAINAGE\ICPR\25YR-24HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time (hrs)	Print Inc(min)
8.000	30.000
14.000	5.000
24.000	30.000

Group	Run
BASE	Yes

Name: MEAN ANNUAL Hydrology Sim: MEAN ANNUAL
Filename: K:\ORL_Civil\149490001-Enzian Theatre Expansion\DRAINAGE\ICPR\MEAN ANNUAL.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time (hrs)	Print Inc(min)
8.000	30.000
14.000	5.000
24.000	30.000

Group	Run
BASE	Yes

Enzian Theater Expansion
Nodal Diagram

Nodes

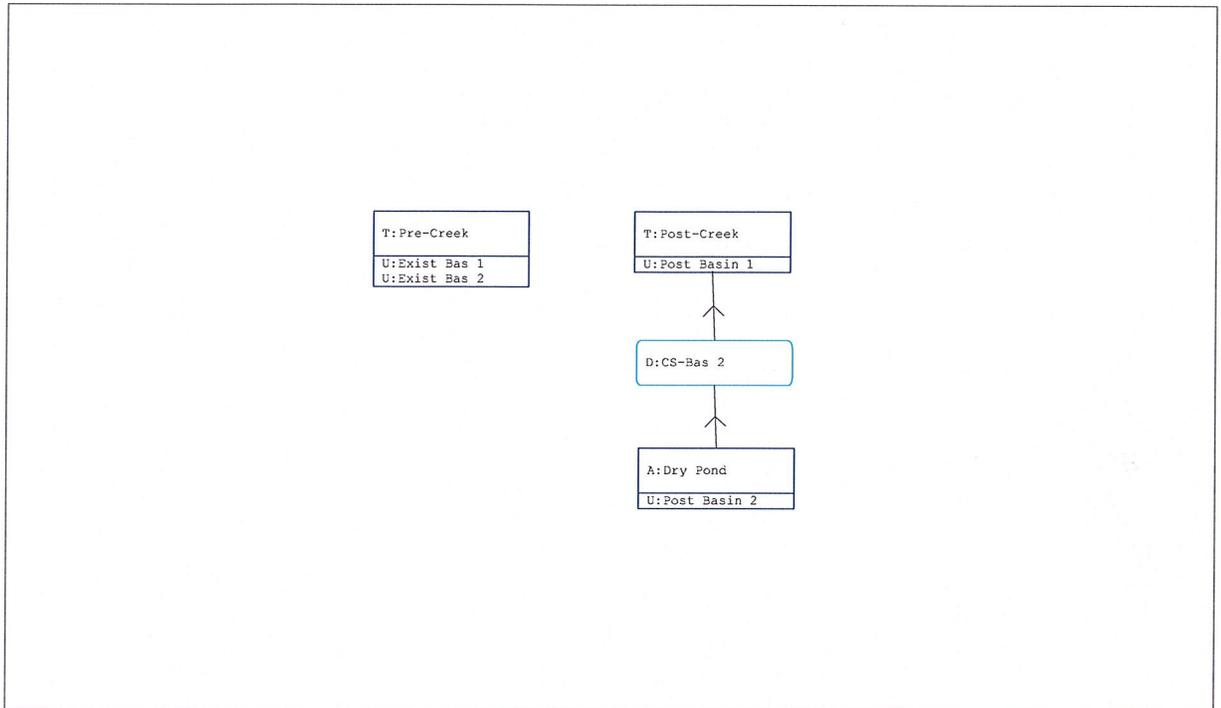
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins

O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links

P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



Enzian Theater Expansion
Node Min/Max Report

Name	Simulation	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Inflow cfs	Max Outflow cfs
Dry Pond	25YR-24HR	76.70	77.00	0.0050	3735	6.43	4.20
Dry Pond	MEAN ANNUAL	75.21	77.00	0.0050	3058	1.94	0.42
Post-Creek	25YR-24HR	70.00	70.00	0.0000	0	6.99	0.00
Post-Creek	MEAN ANNUAL	70.00	70.00	0.0000	0	0.68	0.00
Pre-Creek	25YR-24HR	70.00	70.00	0.0000	0	7.45	0.00
Pre-Creek	MEAN ANNUAL	70.00	70.00	0.0000	0	1.25	0.00

DRY POND RECOVERY ANALYSIS

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Project Data

Project Name: Enzian Theater Expansion
Simulation Description: Slug Load of Dry Pond
Project Number: 149490001
Engineer : Wally Brinkman, E.I.
Supervising Engineer: Jay R. Jackson, P.E.
Date: 11-18-2015

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum): 61.00
Water Table Elevation, [WT] (ft datum): 69.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day): 38.00
Fillable Porosity, [n] (%): 30.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day): 25.0
Maximum Area For Unsaturated Infiltration, [Av] (ft²): 585.0

Geometry Data

Equivalent Pond Length, [L] (ft): 234.0
Equivalent Pond Width, [W] (ft): 11.0
Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft ²)
73.00	585.0
74.00	1167.0
75.00	1851.0
76.00	2637.0
77.00	3523.0

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Retention Pond Recovery - Refined Method
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Detailed Results :: Scenario 1 :: 2087 ft³ slug load

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	347.8333	0.00000	69.00000	0.00000	0	0.000	0.00000	0	N.A.
0.002	347.8333	0.00000	74.83332	0.16932	0	2087.000	1.01563	0	U/P
2.400	0.0000	0.00000	70.84352	0.14500	0	2087.000	2087.00000	0	U/S
6.000	0.0000	0.00000	70.08719	0.00000	0	2087.000	2087.00000	0	S
12.000	0.0000	0.00000	69.72913	0.00000	0	2087.000	2087.00000	0	S
24.000	0.0000	0.00000	69.48946	0.00000	0	2087.000	2087.00000	0	S
36.000	0.0000	0.00000	69.37404	0.00000	0	2087.000	2087.00000	0	S
48.000	0.0000	0.00000	69.30627	0.00000	0	2087.000	2087.00000	0	S
60.000	0.0000	0.00000	69.26129	0.00000	0	2087.000	2087.00000	0	S
72.000	0.0000	0.00000	69.22900	----	----	2087.000	2087.00000	0	N.A.

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Summary of Results :: Scenario 1 :: 2087 ft³ slug load

	Time (hours)	Stage (ft datum)	Rate (ft ³ /s)	Volume (ft ³)
Stage				
Minimum	0.000	69.00		
Maximum	0.002	74.83		
Inflow				
Rate - Maximum - Positive	0.002		347.8333	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			2087.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	72.000			2087.0
Infiltration				
Rate - Maximum - Positive	0.002		0.1693	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	2.400			2087.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	72.000			2087.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	72.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	69.37		2087.0
72 Hour Stage and Infiltration Volume	72.000	???		2087.0

Plot of Flow Rates and Pond Stage vs Elapsed Time

Scenario 1 :: 2087 ft³ slug load

