Conceptual Drainage Retrofit & Nutrient Load Reduction For Two (2) Land-Locked Basins

TOWN OF OAKLAND DRAINAGE IMPROVEMENTS

Within Historic Part of Town of Oakland
Orange County, Florida

JULY 2012

Prepared by

DEVO Engineering
CONSULTING GEOTECHNICAL ENGINEERS

DEVO SEEREERAM, PH.D., P.E., LLC.
5500 ALHAMBRA DR. ORLANDO, FL-32808
PHONE: (407) 290-2371 - FAX: (407) 298-9011

Prepared for

Roberts Engineering
5764 N. Orange Blossom Trail
Suite 140
Orlando, FL 32810

Town of OAKLAND Florida

DEVO SEEREERAM, PH.D., P.E., LLC

CONSULTING GEOTECHNICAL ENGINEER

FLORIDA REGISTRATION NO. 48303

Geotechnical Engineering • Ground Water Modeling • Hydrogeologic/Geo-Environmental Engineering

5500 Alhambra Drive ❄ Orlando, Florida 32808 ❄ Phone: 407-290-2371 ❄ Fax: 407-298-9011

e-mail: devo@devoeng.com | www.devoeng.com

Date: July 31, 2012	*Devo's Project No:* 11-831.04
To: Roberts Engineering 5764 N Orange Blossom Trail #140 Orlando, Fl. 32810 phone: 407-886-1821 fax: 407-886-7891 email: robertseng@embarqmail.com attention: **LARRY ROBERTS, P.E.**	*cc:* CPH Engineers, Inc. 1117 E. Robinson Street Orlando, FL 32801 phone: 407-425-0452 fax: 407-648-1036 email: alane@cphengineers.com attention: **ALLEN C. LANE, JR., P.E.**

Ref:

CONCEPTUAL DRAINAGE RETROFIT & NUTRIENT REDUCTION PLAN FOR TWO (2) LAND-LOCKED BASINS

SJRWMD PERMIT # SEQUENCE: 42-095-86986-1

WITHIN HISTORIC PART OF TOWN OF OAKLAND, ORANGE COUNTY, FLORIDA

Dear Mr. Roberts:

The attached report documents the above-captioned study and it contains the following key elements:

- A concise description of the two (2) land-locked surface water drainage basins of interest within the historic park of Oakland.
- The flooding issues at the lowest elevations of these two (2) basins.
- Concept retrofits for each depressional area which meet the pre-post phosphorus discharge criteria to Lake Apopka, including supporting calculations and specifications.

The actual drainage plans for the project will be prepared by CPH Engineers based on this concept plan. This report will also be used as supporting documentation for the SJRWMD permit.

We trust that the information contained herein is clearly explained and sufficient for review and permitting of the stormwater retrofit. Please do not hesitate to contact us if you have an further questions.

Sincerely,

Devo Seereeram

Devo Seereeram, Ph.D., P.E.
Florida Registration No. 48303
Date: July 31, 2012

TABLE OF CONTENTS

Page #

TABLE OF CONTENTS (CONTINUED)

List of Tables

List of Exhibits

List of Attached Figures (Oakland Drainage Retrofit)

List of Appendices

1.0 BACKGROUND INFORMATION

1.1 Location

The Town of Oakland is located in Orange County (Fl) and lies on the south shoreline of Lake Apopka, near the midpoint of the county's western boundary line. The image in Exhibit 1 below highlights Orange County among all counties in the state of Florida, while the image on the left in Exhibit 1 shows the limits of the Town of Oakland within the county boundary.

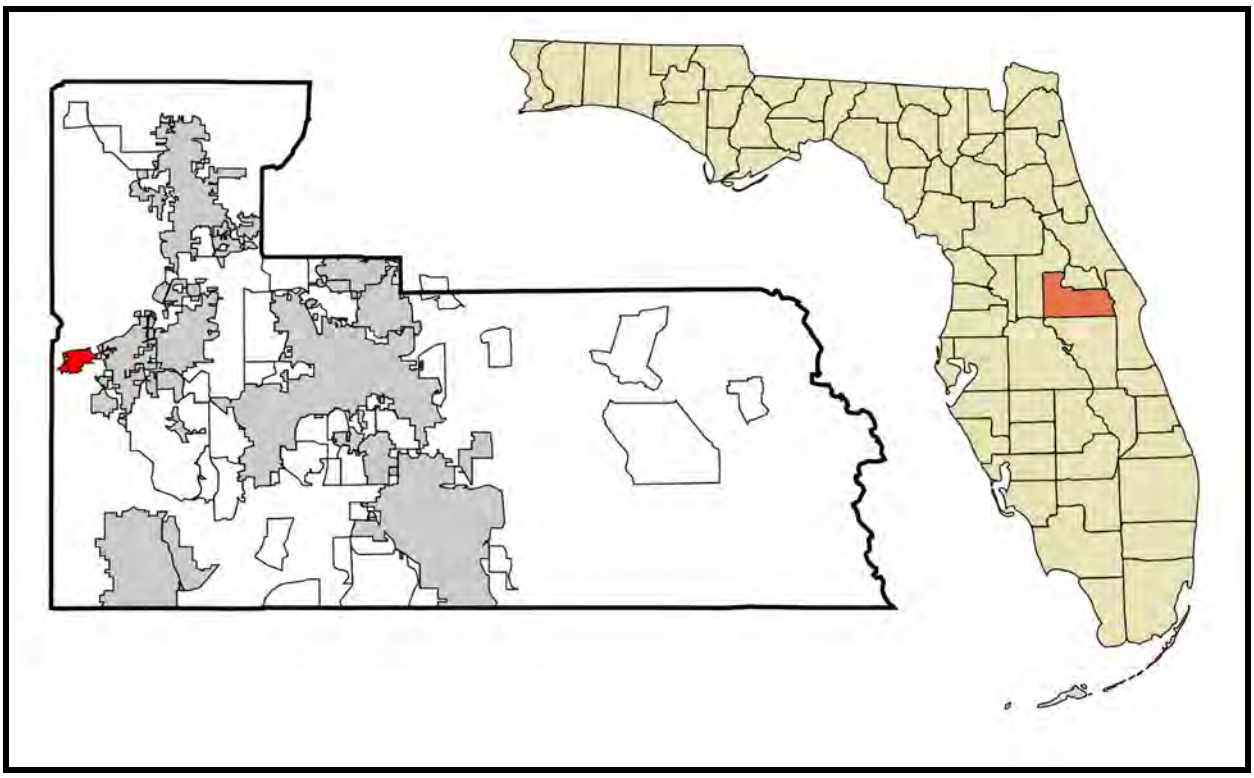


Exhibit 1. Location of Oakland Within State of Florida & Within Orange County

1.2 History of Development

For the interested reader, a description of the historical development of the Town of Oakland is at this internet link:

http://www.oaktownusa.com/oakland/oaklands-history/

1.3 USGS Quadrangle Maps

Figure 1.1 (attached) shows the area of interest on the USGS Clermont East and Winter Garden 7.5 minute series quadrangle maps. The basin limits of the two (2) land-locked watersheds of interest are outlined on this map exhibit, and, for the purpose of this report, they are named the "**Lower Basin**" (comprising 32.9± acres) and the "**Upper Basin**" (55± acres). Published land surface elevation contours on the quadrangle map are bolded so the reader can readily appreciate the "lay of the land" in our study area. The flood-susceptible natural depressions within these two (2) basins are also shaded on Figure 1.1 for easy visual identification. Note that the shaded limits of flooding is based on a superposition of the more precise Orange County LIDAR topographic contours and do not follow the trace of the less precise USGS quadrangle map contours. It is also of interest to point out that there is a 4-inch diameter drainage well within the depression of the Lower Basin to provide a very slow-rate bleed-down of flood waters.

1.4 Land Use Map

Figure 1.2 is the 2009 (FLUCCS) land use map overlay for the study area and the majority of the land cover within the two (2) watersheds is classified as "medium density residential".

1.5 NRCS Soils Map

The next figure in the sequence is Figure 1.3 which shows the NRCS soil map units within the same coverage area. As noted, the Hydrologic Soil Group (HSG) "A" soils are mapped within the entirety of the Upper Basin (even the flooding area) and extends to cover the western half of the Lower Basin. Site-specific geotechnical data in the Upper Basin ponds are documented in a later subsection of this chapter.

Zolfo and Seffner fine sands (HSG "C") occupy most of the eastern half of the Lower Basin.

1.6 LIDAR Topographic Contours

The Orange County LIDAR topographic contours (in ft NAVD) are overlaid on the aerial image in Figure 1.4. The elevation datum of the LIDAR is ft NAVD which is different from ft NGVD, and explained further in Section 2 of this report. These contours are at 1 ft intervals and are more accurate than the published 5 ft interval contours on the quadrangle map.

1.7 Critical Elevations in Depressions of Upper and Lower Basins

Figure 1.5 is a magnified view of the lowest area of the Upper Basin showing the LIDAR topographic contours (ft NAVD) and the Finished Floor Elevations of the lowermost structures. Note that the Oakland Town Center stormwater management ponds (dry retention) are within this low area and their outlines are displayed in Figure 2.1.

Figure 1.6 is a similar image for the Lower Basin and Exhibit 2 is a diagram showing the key elevations on a vertical scale. Note that "OACS" is an abbreviation for "Oakland Avenue Charter School" in both Figure 1.6 and Exhibit 2. To reiterate, although the drainage well's invert elevation is low, its discharge capacity is relatively small and tantamount to a 4-inch diameter orifice in the horizontal plane.

1.8 Geotechnical Investigation - Upper Basin

As part of the current evaluation, a geotechnical investigation was conducted in the Oakland Town Center stormwater ponds (SJRWMD Permit #42-095-86986-1) and the results of this subsurface investigation are presented in Figures 2.1 and 2.2. The boreholes in Figure 2.1 are located within the pond bottom.

The sands are of relatively low permeability (range 1 to 5 ft/day) which results in the slow drainage/pond recovery in this locale. Note that the groundwater at this location flows northwest toward Lake Apopka (following the trend of the land surface contours, see Figure 1.1). The soil and water table conditions encountered in these ponds are typical of prior subsurface investigations we have performed in this part of Oakland.

Note that the water table readings in Figure 2.2 were taken following a rainfall event and therefore reflects mounding of the water table.

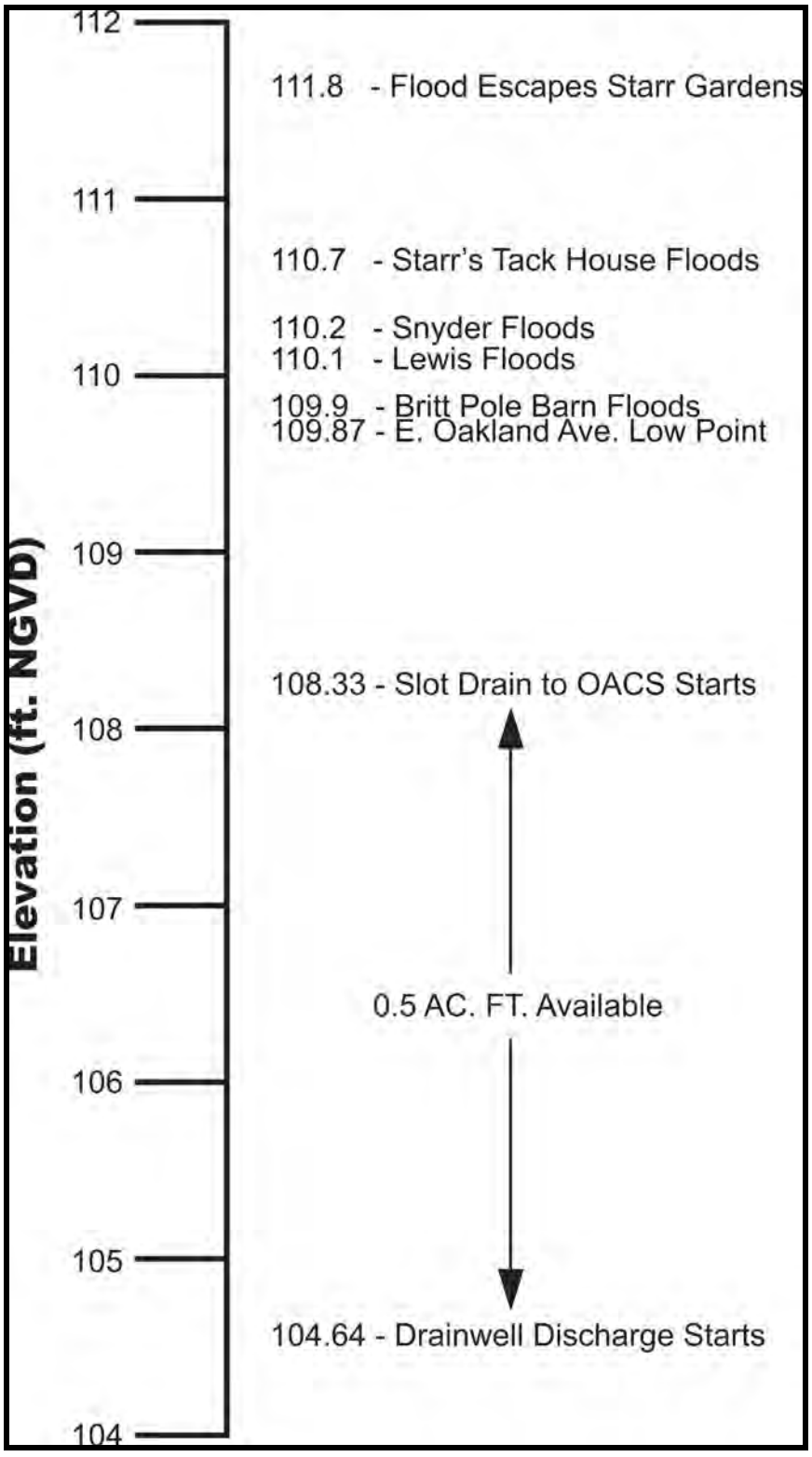


Exhibit 2. Critical Elevations in Lower Basin

2.0 NOTE ON ELEVATION DATUM USED IN MODELS

Note that modeling results in this report (from both PONDS & adICPR simulations) are expressed in an elevation datum of NGVD, whereas the LIDAR data in Figure 1.4 is referenced to the NAVD datum. To convert from NAVD to NGVD, add 0.889 ft to the NAVD elevation to convert to NGVD. Figures 1.5 and 1.6 also only use ft NAVD for consistency.

What is a Vertical Datum?

A vertical datum is a set of constants that defines a system for comparison of elevations. Otherwise, surveys using different datums would have different elevations for the same point. Historically, land surface elevations have referenced the National Geodetic Vertical Datum of 1929 (NGVD 29) but a more accurate vertical datum is being adopted as new surveys are performed and updated and it is called the North American Vertical Datum of 1988 (NAVD 88).

Why is the Vertical Datum Changing?

A datum needs to be updated periodically because geologic changes to the surface of the earth occur; these changes are due to subsidence and uplift or gradual changes in sea level. In addition, the older vertical datum (NGVD 29) was flawed because of erroneous assumptions that mean sea level at different tidal stations represented the same elevation (zero). With the outdated vertical datum, points at 0.0' NGVD 29 have, in fact, different elevations for a variety of reasons. We can now more accurately measure these elevation differences with an expanded geodetic network, further warranting the use of the new vertical datum.

How are NGVD 29 Elevations Converted to NAVD 88?

The difference between the two datums varies from location to location within continental North America. VERTCON is an online software developed by the National Geodetic Survey (NGS) and allows the user to input the latitude and longitude of a location to obtain the offset height between NGVD 29 and NAVD 88. The link for this software is: http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl

What is the offset height in Oakland?

+100 ft NAVD = +100.889 ft NGVD, so the shift is 0.889 ft with NGVD being higher than NAVD.

3.0 PROBLEM STATEMENT

The topographic low areas in both the Upper Basin and the Lower Basin are subject to high water conditions during intense rainfall events which threaten residential structures. Figures 1.5 and 1.6 show the critical Finished Floor Elevations (FFEs) within the low areas of the Upper Basin and the Lower Basin, respectively.

Problematic flooding in the Lower Basin is considered to occur when the water level in the Lower Basin reaches an elevation of approximately +109 ft NGVD. Exhibit 2 (presented previously) shows the finished floor elevations for some of the existing structures in the Lower Basin which are most susceptible to flooding. It also shows the elevation at which flood waters cross East Oakland Avenue creating a traffic hazard.

4.0 OBJECTIVES

The purpose of this study is to prepare concept retrofits for both the Upper and Lower Basins to mitigate their flood hazard in the Lower Basin and reduce the duration of inundation in the Upper Basin. A lowered structural surface water outfall is not feasible for the Upper Basin since there is no predevelopment outfall structure for that basin.

Any retrofit solution which involves outfall modifications from these basins will have to demonstrate no net increase in phosphorus loading to Lake Apopka, a phosphorus-impaired receiving water body. This "no net increase" demonstration is for average annual loading demonstrated by 10 years of continuous simulation (at daily intervals, although the computational time step may be smaller).

This memo presents drainage calculations and conceptual design details to support the SJRWMD permit application to modify Permit #42-095-86986-1. The construction plans will be prepared by CPH Engineers, Inc. (CPH), the town's engineering consultant.

5.0 DESCRIPTIONS OF BASINS

5.1 Upper Basin

The drainage basin line for the Upper Basin is shown on the base maps in Figures 1.1 to 1.4 and it is roughly centered around E/W Henschen Ave, between Cross St and Arrington St. This basin limit was field verified during a rainfall event and were also guided by the detailed LIDAR topography in Figure 1.4.

The approximate flood-prone area is shaded in Figure 1.1 and the lowest FFEs are annotated in Figure 1.5 together with the LIDAR contours in this locality. While this depressional area is not entirely land-locked, it does not contain an outfall at an elevation sufficiently low to prevent flooding during intense storm events. In the Upper Basin, discharge occurs by overland flow to the Lower Basin at an elevation of approximately +121.75 ft NGVD which is higher than the FFEs shown in Figure 1.5.

5.2 Lower Basin

The Lower Basin's watershed boundary is also shown in Figures 1.1 to 1.4, and its flood-susceptible zone is also shaded in Figure 1.1 with the critical FFEs annotated in Figure 1.6. This basin is centered roughly between E. Henschen Ave. and E. Oakland Ave and east of N Starr St.

In the Lower Basin, some relief is provided by a 4-inch diameter drainage well with a control elevation of +104.80 ft NGVD. However, this drainage well has limited capacity and is not sufficient for flood control. At an elevation of +108.33 ft NGVD, stormwater begins to flow towards the Oakland Avenue Charter School retention pond through an existing stormwater sewer system. At an elevation of about +112.8 ft NGVD stormwater begins to flow out of the Lower Basin discharging eastward over E Oakland Ave.

5.3 Basin Parameters for Computing Stormwater Runoff

Table 1 summarizes the drainage basin parameters for both the Upper and Lower Basins.

Table 1. Existing Conditions Drainage Basin Parameters

PARAMETER DESCRIPTION	LOWER BASIN	UPPER BASIN
Basin Area (acres)	32.9	55
Time of Concentration (min)	35	30
DCIA (%)	4.6	10
non-DCIA Curve Number	59.3	48.6
Unit Hydrograph	UH323	UH323

6.0 CONCEPT RETROFIT FOR UPPER BASIN

- The retrofit plan for the Upper Basin does not entail any surface water outfall structures since none exist in the predevelopment condition, except for the natural overland flow at an approximate elevation of +121.75 ft NGVD which discharges into the Lower Basin.

- Infiltrated stormwater in the Town Center ponds (see Figure 2.1) migrates to and discharges into Lake Apopka without any proactive removal of phosphorus.

- The proposed plan for the Upper Basin targets the removal of phosphorus from the infiltrated stormwater within the existing Town Center ponds, providing treatment prior to discharge into Lake Apopka.

- The duration of inundation in this locality will also decrease with this plan, while providing a significant water quality improvement using a state of the art Best Management Practice (BMP). Note that the peak flood stages in this area will not be lowered but the duration of flooding will be reduced.

- Details of the plan are shown in Figures 3.1 to 3.4 and involves an underdrain system underlying a bed of phosphorus adsorption media. The plans in Figures 3.1 to 3.4 are self-explanatory and includes inset tables with material quantities.

- The outfall system will be designed by CPH using the flow rates shown on Figure 4.1.

- Based on information provided by Marty Wanielista of the University of Central Florida (UCF) Stormwater Academy, the following are the specifications for the phosphorus adsorption media to be used in this application.

    1. Sorption capacity (>0.005 mg OP/mg media).
    2. No more than 10% of the particles less than 0.05 mm in size.
    3. Infiltration rate by double ring infiltrometer exceeds 3 inch/hr.
    4. Permeability of at least 0.04 cm/sec.
    5. Water-holding capacity of at least 35%.
    6. No more than 5% organics by volume.
    7. Unit weight is no more than 45 pounds per cubic foot when dry and no more than 65 pounds per cubic foot when wet.
    8. pH between 6.5 and 8.0.
    9. Soluble salts less than 3.5 g (KCL)/L.

    The bio sorption activated media being considered for this project is called "Bold & Gold Phosphorus" with a permeability of about 0.04 cm/sec. At 12 inch thickness, the life time is estimated to be approximately 10-12 years, based on an influent concentration of about 0.25 mg/L P. With the sand above it, the life span will increase to 15-17 years. The actual

life span is expected to be longer when bio removal is factored into the life time and the UCF Stormwater Academy is working on this quantification.

7.0 CONCEPT RETROFIT FOR LOWER BASIN

7.1 Approach & Methodologies

Unlike the Upper Basin, the Lower Basin has an existing surface water structural outfall to Lake Apopka and its location and dimensions are described in the next subsection of the narrative. As a result, the design strategy for the Lower Basin's retrofit differs from the Upper Basin's in that it targets modification of the existing outfall structure to accomplish the following dual objectives:

- A reduction in total cumulative discharge volume (and by extension Total Phosphorus loading) to Lake Apopka for a continuous 10 year rainfall period. Because of its reliability and completeness (i.e., no missing data points), the daily rainfall used in this analysis is the most recent 10 year period (2002 to 2011) measured at the Orlando International Airport (OIA). The modeling for this part of the analysis is performed using the PONDS 3.3 Refined Method Module which has built-in continuous simulation capabilities.

- A reduction in peak stage elevations for the typical design storm events (including the 100 yr/24 hr event) to provide flood protection for the lowest lying residential structures on the rim of the depression. The design storm event modeling is performed using adICPR.

The selection of the elevation and dimension for the replacement outfall structure was based on a trial and error approach to simultaneously accomplish both water management objectives.

7.2 Existing Outfalls

In the existing conditions, stormwater discharge from the Lower Basin occurs via the following mechanisms:

① A 4-inch diameter drainage well [with a control elevation of +104.8 ft NGVD] which discharges into the Upper Floridan aquifer.

② A drop structure on the north side of Oakland Avenue with a 30-inch wide weir slot (in the vertical plane) at an elevation of +108.33 ft NGVD, and a top grate inlet with dimensions of 49" × 37" at an elevation of +109.09 ft NGVD. This outfall structure is roughly equivalent to:

- a 2.5 ft wide weir (in the vertical plane) at elevation +108.33 ft NGVD, and
- an 11.8 ft wide weir (also in the vertical plane) at elevation +109.09 ft NGVD.

This inlet is routed through the Oakland Avenue Charter School (OACS) retention pond before discharging into Lake Apopka via the Motamassek Canal. The location of this structure is labeled in Figure 1.6.

③ At higher elevations, discharge can leave the basin via overland flow at an elevation of +112.8 ft NGVD along Oakland Avenue [from west to east] across a crest in the roadway. This water ultimately enters the Motamassek Canal which discharges into Lake Apopka.

④ At an elevation of +111.8 ft NGVD, water can flow overland through the Starr Gardens subdivision (refer to Figure 1.6 for path).

7.3 Proposed Outfall Modification

Supporting calculations are presented in the next subsection to justify the single proposed modification which is described below:

- The outfall structure to the Oakland Avenue Charter School pond will be removed and replaced with a larger stormwater inlet at elevation +108.5 ft NGVD, which will be routed to the north, discharging into an existing ditch adjacent to the West Orange Trail, then to the Motamassek Canal and on to Lake Apopka. A schematic of this replacement system is illustrated on Figure 4.1 together with the computed design flow rates for the purpose of sizing storm sewer.

For modeling purposes, the discharge structure size was chosen such that it did not impose a significant hydraulic restriction on the flow rates through the discharge structure and subsequent pipe routing. An FDOT Type H, 4-grate inlet structure was assumed, with interior dimensions of 8.75 ft × 3 ft. This outfall structure is roughly equivalent to a 23.5 ft wide weir (in the vertical plane).

7.4 Continuous Simulation Model

Appendix A contains the computer printouts for the existing conditions and proposed conditions scenarios for the 10 year continuous simulation model. Drainage basin parameters used in the analyses were listed previously in Table 1 of this report (Section 5.3). These routings are performed with the infiltration component set to practically zero.

Exhibit 3 shows the results of sensitivity analyses with respect to the proposed conditions discharge elevation and the rational for selecting +108.5 ft NGVD is apparent from this chart as it reduces discharge to Lake Apopka.

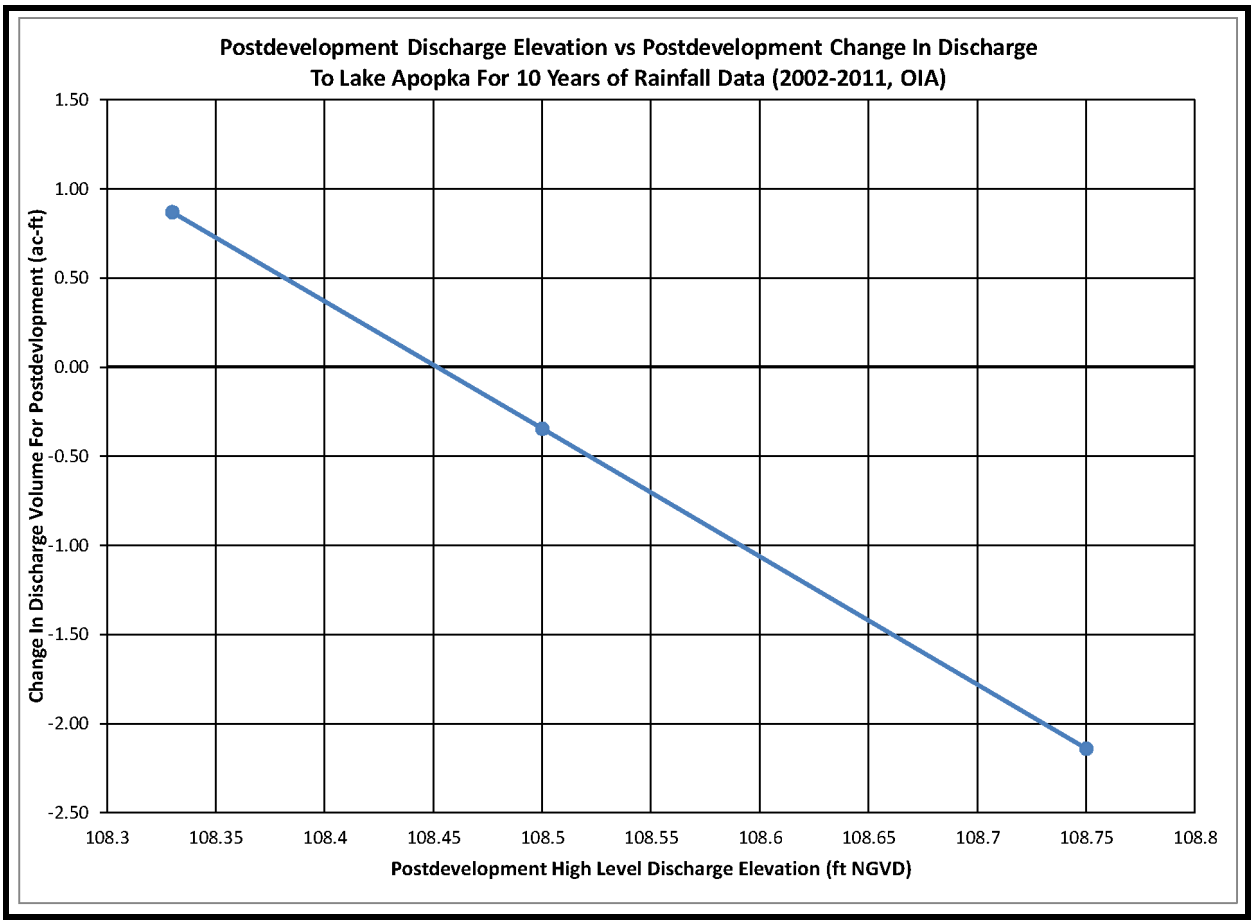


Exhibit 3. Change in Cumulative Discharge Volume for various discharge elevations

7.5 Design Storm Event Routings

The tables in Appendix B summarize the storm events simulated in adICPR for the existing conditions and proposed conditions and they include:

- a known calibration event of August 27, 2010 when 4.3 inches of rainfall occurred in 30 minutes;
- 1-inch, 2-inches, 3-inches, and 4-inches of rainfall in one hour (4 simulations); and
- mean annual storm, 10 yr/24 hr, 25 yr/24 hr, 100 yr/24 hr, and 25 yr/96 hr events.

Peak stage comparisons are shown in the tables in Appendix B. As seen in Appendix B, the proposed discharge structure retrofit is predicted to result in a flood stage reduction which protects all the habitable residential structures. As seen in Exhibit 2 (previously), residential flooding begins to occur at an elevation of +110.1 ft NGVD (Lewis residence), and the predicted peak stage for the 100 year/24 hour storm is approximately +109.15 ft NGVD in Appendix B.

The supporting calculations for the Lower Basin are contained in

Appendix C. Lower Basin Design Storm Event Routing Using Adicpr, Existing Conditions
Appendix D. Lower Basin Design Storm Event Routing Using Adicpr, Proposed Conditions

7.6 Peak Flow Rates for Conveyance System Design

Figure 4.1 shows the minimum flow rates for the design of the conveyance system at key junction points in the outfall system of the retrofit plan. These peak flow rates were obtained from the adICPR model for the 100 yr/24 hr storm.

FIGURES

NORTH

GRAPHIC SCALE
1 INCH = 400 FEET
200 0 100 200 400 800

LEGEND

- APPROXIMATE FLOOD PRONE AREAS
- UPPER BASIN AREA (55 ACRES)
- LOWER BASIN AREA (32.9 ACRES)
- 120 ELEV. in ft. NGVD

Oakland

Oaklan

W VICK AV

N DANIELS ST

TUBB ST

N STARR ST

N JEFFERSON ST

LINE

BM

20

124

103

WINTER LANDING DR

STARR ST

119.1

110.1

W OAKLAND AV

STATE ROAD 438

High Sch

W SADLER

W SADLER AV

Cem

W COLONIAL DR

W COLONIAL DR

W COLONIAL DR

DEVO Engineering

CONSULTING GEOTECHNICAL ENGINEERS

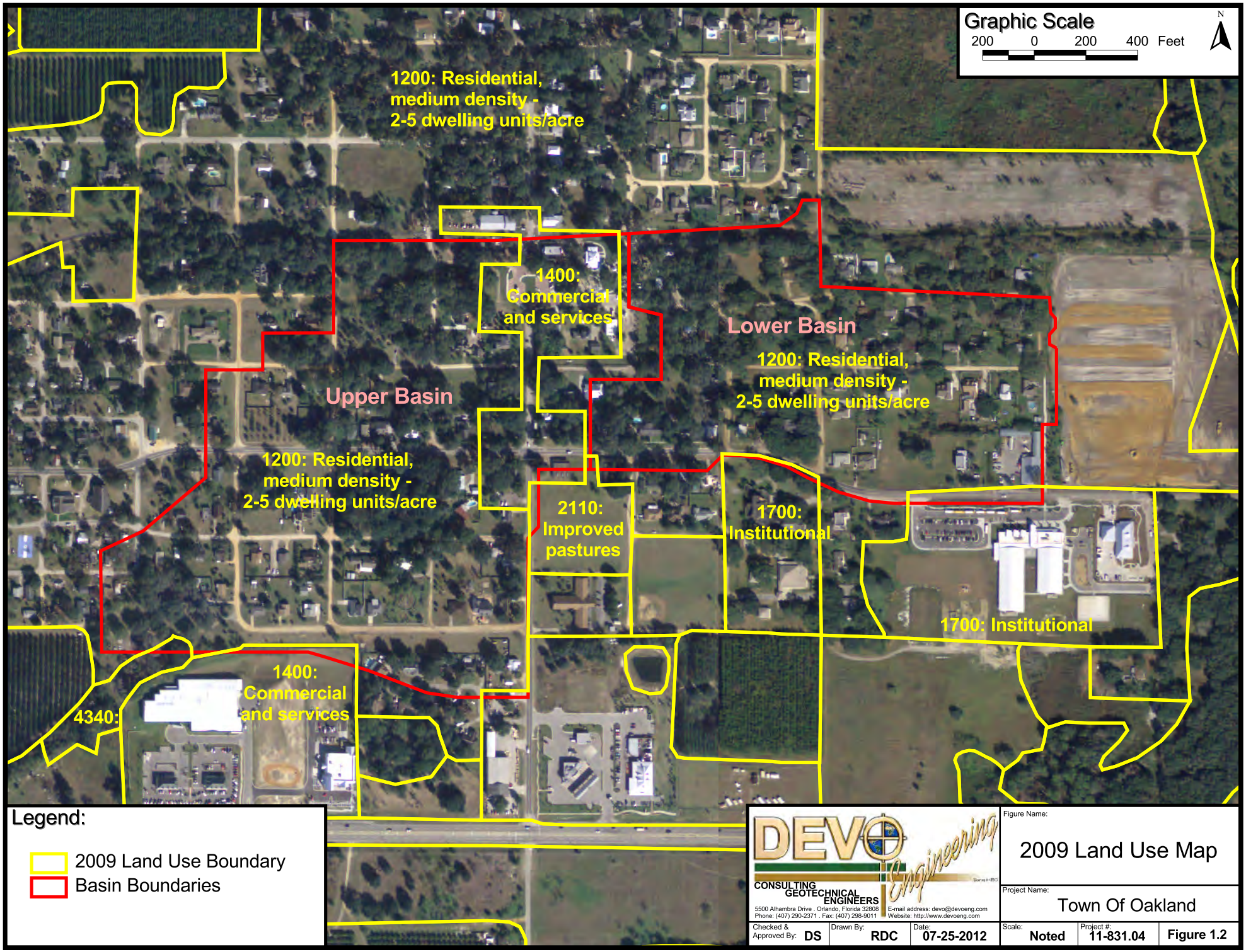
5500 Alhambra Dr . ORLANDO, FL - 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011

E-Mail address: devo@devoeng.com
website: http://www.devoeng.com

Figure Name:
SITE VICINITY MAP
Source: Clermont East and Winter Garden, FL
Photo Revised 1980, Sections 20 & 21
Township 22 S, Range 27 E

Project Name:
TOWN OF OAKLAND

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-08-2012	NOTED	11-831.04	Figure 1.1

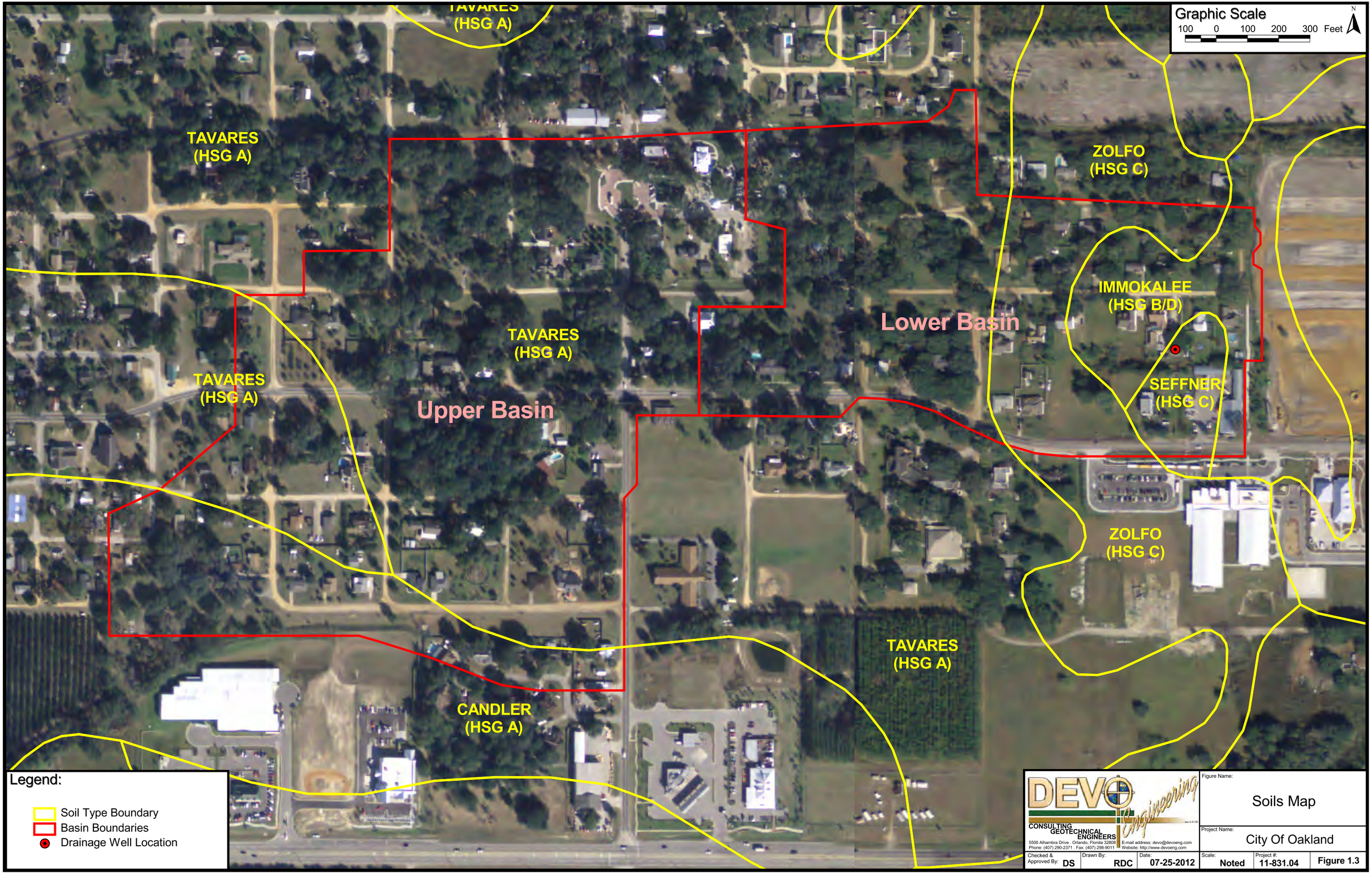


DEVO Engineering
CONSULTING GEOTECHNICAL ENGINEERS
5500 Alhambra Drive . Orlando, Florida 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011
E-mail address: devo@devoeng.com
Website: http://www.devoeng.com

Figure Name: 2009 Land Use Map

Project Name: Town Of Oakland

Checked & Approved By:	Drawn By:	Date:	Scale:	Project #:	
DS	RDC	07-25-2012	Noted	11-831.04	Figure 1.2



DEVO Engineering
CONSULTING GEOTECHNICAL ENGINEERS
5500 Alhambra Drive . Orlando, Florida 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011
E-mail address: devo@devoeng.com
Website: http://www.devoeng.com

Figure Name: Soils Map

Project Name: City Of Oakland

Checked & Approved By:	Drawn By:	Date:	Scale:	Project #:	
DS	RDC	07-25-2012	Noted	11-831.04	Figure 1.3

NORTH

GRAPHIC SCALE
1 INCH = 300 FEET

150 0 75 150 300 600

LEGEND

- Elevation (ft NAVD)
- Elevation 120 ft NAVD (Upper Basin Depression)
- Elevation 121 ft
- Elevation 111 ft NAVD (Lower Basin Depression)
- Elevation 112 ft NAVD
- UPPER BASIN AREA (55 ACRES)
- LOWER BASIN AREA (32.9 ACRES)

NOTE:

- Add 0.889 ft to NAVD to obtain NGVD
- Topography is compiled from **LI**ght **D**etection **A**nd **R**anging (LIDAR) remote sensing and provided by Orange County Public Works Department, Roads and Drainage Division

FUTURE WATER TREATMENT FACILITY

W VICK AV · E VICK AV · BRILEY AV · MATHER SMITH DR · MACCHI AV · W RAILROAD AV · E RAILROAD AV · PETRIS AV · W GULLEY AV · E GULLEY AV · W HENSCHEN AV · E HENSCHEN AV · W OAKLAND AV · E OAKLAND AV · W HULL AV · E HULL AV · W SADLER AV · E SADLER AV · RYAN CT · HICKMAN DR

N DANIELS ST · N NIXON ST · N WALKER ST · N CROSS ST · N TUBB ST · N ARRINGTON ST · EDGEGROVE LN · N BROOKS ST · N STARR ST · S NIXON ST · S WALKER ST · S DANIELS ST · S CROSS ST · S TUBB ST · S ARRINGTON ST · S BROOKS ST · S STARR ST

DEVO Engineering
CONSULTING GEOTECHNICAL ENGINEERS
5500 Alhambra Dr . ORLANDO, FL - 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011
E-Mail address: devo@devoeng.com
website: http://www.devoeng.com

Figure Name: **LIDAR ELEVATION CONTOURS MAP**

Project Name: **TOWN OF OAKLAND**

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-13-2012	Noted	11-831.04	Figure 1.4

NORTH

GRAPHIC SCALE
1 INCH = 100 FEET

50 0 25 50 100 200

LEGEND

UPPER BASIN AREA (55 ACRES)

LOWER BASIN AREA (32.9 ACRES)

NOTE:

ALL ELEVATIONS ARE IN ft. NAVD

100 N. TUBB ST. (MAIN HOUSE)
FFE = 120.57' (NAVD)

100 N. TUBB ST. (GARAGE)
FFE = 118.72' (NAVD)

100 N. CROSS ST. (GARAGE)
FFE = 118.91' (NAVD)

34 E. GULLEY AVE. (OUTBUIDLING)
FFE = 120.42' (NAVD)

34 E. GULLEY AVE. (WOOD SHED)
FFE = 119.87' (NAVD)

21 N. TUBB ST. (GARAGE)
FFE = 119.10' (NAVD)

21 N. TUBB ST. (MAIN HOUSE)
FFE = 120.55' (NAVD)

E RAILROAD AV

FUTURE WATER TREAMENT FACILITY

N. ARRINGTON ST.

N DANIELS ST

W HENSCHEN AV

W OAKLAND AV

BB ST

N BROCK ST

120 121 120 120 120 120 120 121

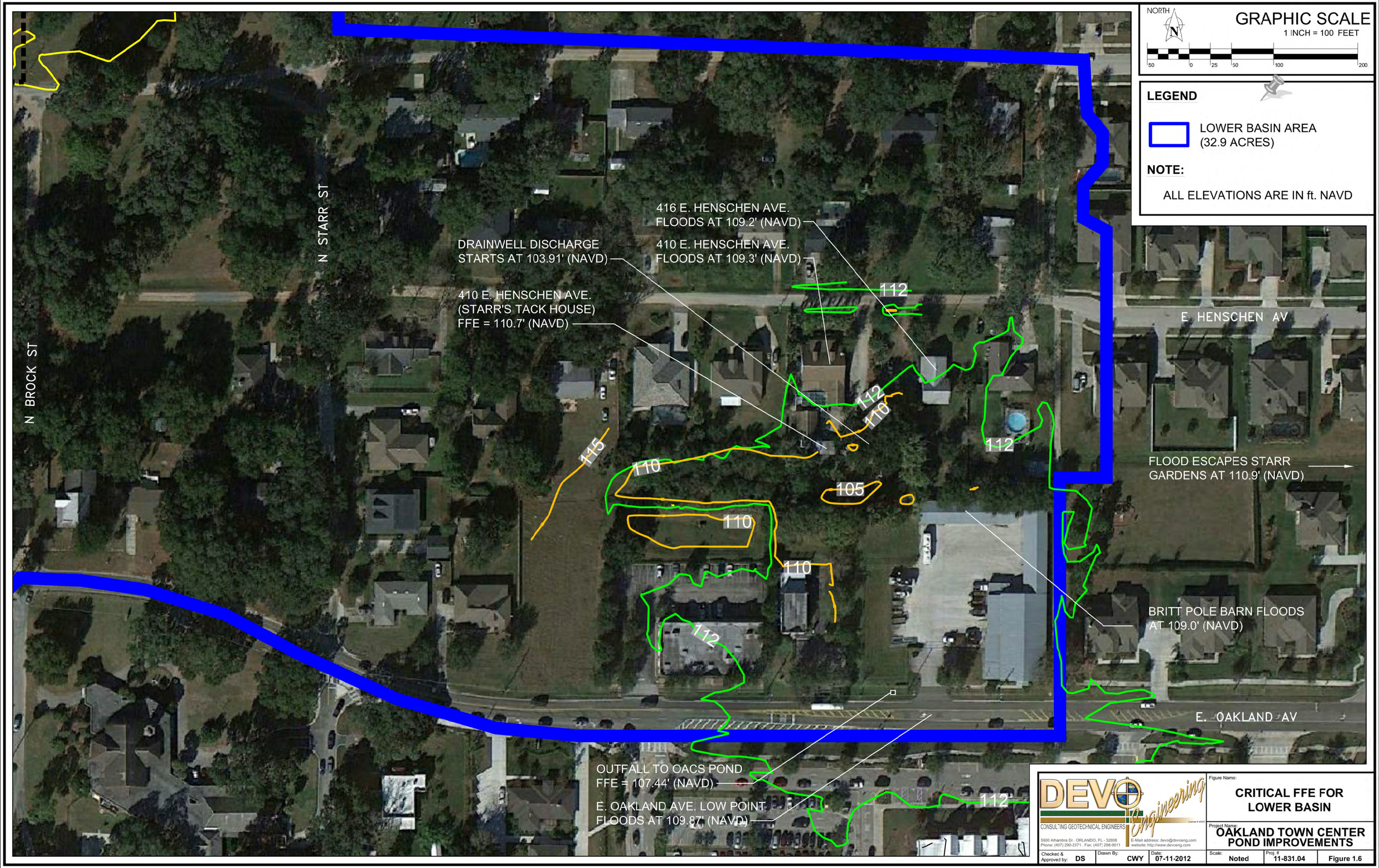
DEVO Engineering
CONSULTING GEOTECHNICAL ENGINEERS
5500 Alhambra Dr . ORLANDO, FL - 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011
E-Mail address: devo@devoeng.com
website: http://www.devceng.com

Checked & Approved by:	Drawn By:	Date:
DS	CWY	07-11-2012

Figure Name:
CRITICAL FFE FOR UPPER BASIN

Project Name:
OAKLAND TOWN CENTER POND IMPROVEMENTS

Scale:	Proj. #	
Noted	11-831.04	Figure 1.5



NORTH

GRAPHIC SCALE

1 INCH = 100 FEET

50 0 25 50 100 200

LEGEND

LOWER BASIN AREA
(32.9 ACRES)

NOTE:

ALL ELEVATIONS ARE IN ft. NAVD

DEVO Engineering
CONSULTING GEOTECHNICAL ENGINEERS
5500 Alhambra Dr . ORLANDO, FL - 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011
E-Mail address: devo@devoeng.com
website: http://www.devceng.com

Figure Name:
CRITICAL FFE FOR LOWER BASIN

Project Name:
OAKLAND TOWN CENTER POND IMPROVEMENTS

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	07-11-2012	Noted	11-831.04	Figure 1.6

NORTH

GRAPHIC SCALE
1 INCH = 40 FEET
20 0 10 20 40 80

LEGEND

HA-4 Hand Auger Boring Locations

NOTE:
- ft. NAVD = ft. NGVD - 0.889 ft.

50 E. Gulley Ave.

34 E. Gulley Ave.

104 E. Gulley Ave.

N. ARRINGTON ST.

POND 1
BTM ELEV. = 117.25' NGVD
HA-1
29.5'
117.5 118.0 118.0

POND 2
BOTTOM ELEVATION = 118.5' NGVD
20.0'
HA-2
HA-3A
HA-3
121.5 121.5 120.5 119.5 119.5 120.5 121.5

POND 3
BTM ELEV. = 118.5' NGVD
HA-4
20.0'
121.5 120.5 119.5 119.5 120.5 121.5

E. HENSCHEN AVE.

N TUBB ST

34 E. Henschen Ave.

30 E. Henschen Ave.

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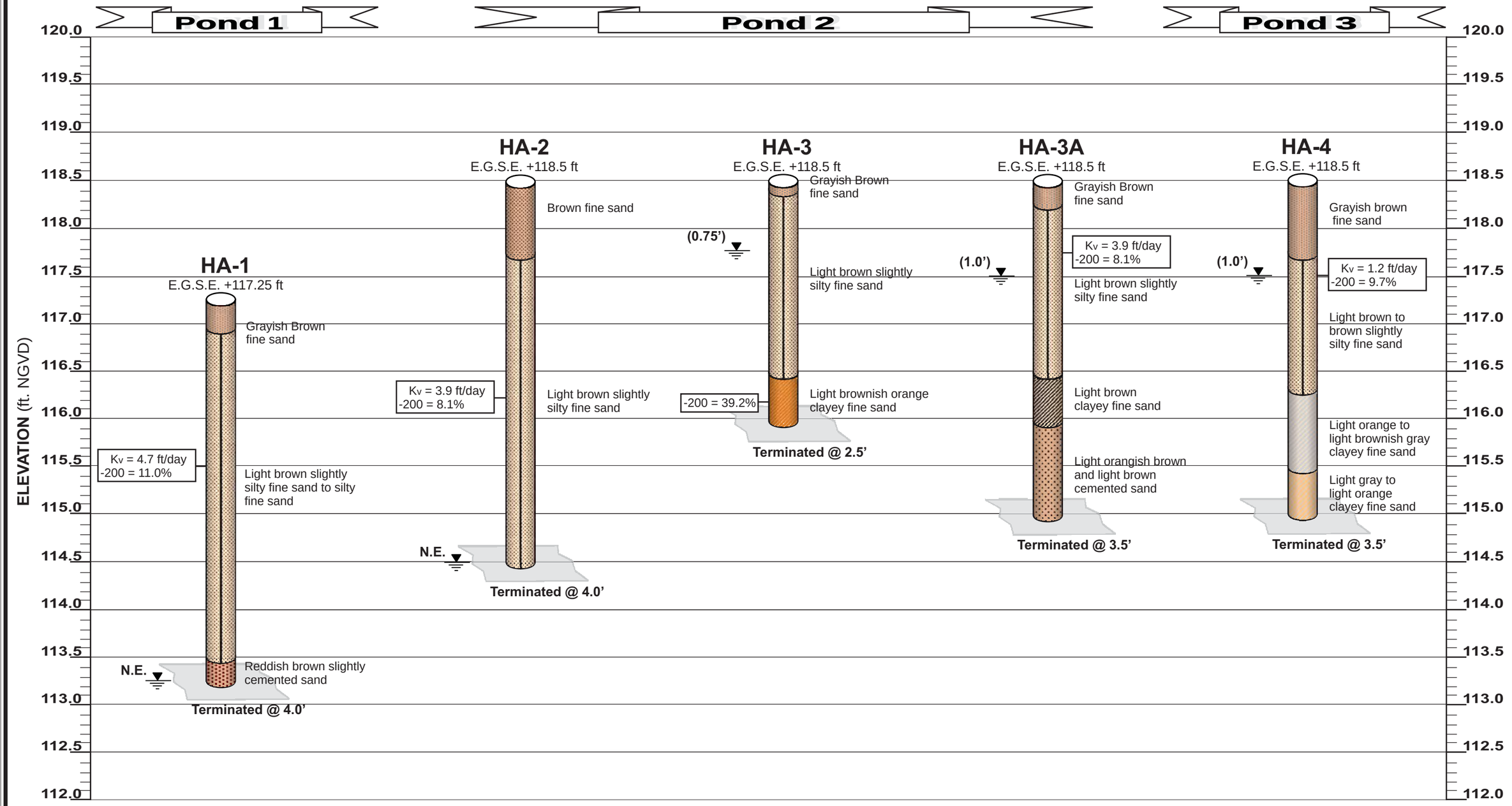
CONSULTING GEOTECHNICAL ENGINEERS
5500 Alhambra Dr., ORLANDO, FL - 32808
Phone: (407) 290-2371 . Fax: (407) 298-9011
E-Mail address: devo@devoeng.com
website: http://www.devceng.com

Figure Name: **BORING LOCATION PLAN**

Project Name: **OAKLAND TOWN CENTER POND IMPROVEMENTS**

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-13-2012	Noted	11-831.04	Figure 2.1



NOTES:

Borings drilled on date on June 12, 2012

Water level measured on date of drilling

N.E. Water table not encountered within depth of exploration on date of exploration

NOTES:

-200 = Percent passing US #200 Sieve

Kv Vertical hydraulic conductivity (ft/day)

E.G.S.E. Estimated Ground Surface Elevation (ft NGVD) From Topographic Survey Performed by CPH

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CONSULTING GEOTECHNICAL ENGINEERS
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Phone: (407) 290-2371 . Fax: (407) 298-9011
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Website: http://www.devoeng.com

Figure Name:

SOIL PROFILES FOR HA-1 TO HA-4

Project Name:

OAKLAND TOWN CENTER POND IMPROVEMENTS

Checked & Approved By:	Drawn By:	Date:	Scale:	Project #	
DS	CWY	06-13-2012	NOTED	11-831.04	Figure 2.2

NORTH

GRAPHIC SCALE
1 INCH = 40 FEET
20 0 10 20 40 80

NOTE:

- ft. NAVD = ft. NGVD - 0.889 ft.

50 E. Gulley Ave.

34 E. Gulley Ave.

104 E. Gulley Ave.

N. ARRINGTON ST.

N TUBB ST

E. HENSCHEN AVE.

34 E. Henschen Ave.

30 E. Henschen Ave.

CLEANOUT (TYP.)

6" DIA. FILTER WRAPPED PERFORATED UNDERDRAIN PIPE (TYP.)

CONCRETE WEIR

19" x 30" ERCP INFLOW PIPE FROM TOWN CENTER

19" x 30" ERCP

POND 1

POND 2

POND 3

117.5 118.0 118.0

119.5 120.5 121.5 121.5

119.5 120.5 121.5 121.5

119.5 120.5 121.5 121.5

A A'

B B'

C C'

10" DIA. PVC HEADER PIPE

3' x 3' MANHOLE (TYP.)

12" DIA. PVC HEADER PIPE

18" DIA. PVC PIPE

10" DIA. PVC HEADER PIPE

3' x 3' MANHOLE (TYP.)

NOTE:
DESIGN OF CONVEYANCE SYSTEM TO UPPER BASIN OUTFALL TO BE DONE BY CPH.
MAX. INVERT ELEVATION = 115 FT. NGVD
MIN. FLOW CAPACITY = 5 CFS

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Phone: (407) 290-2371 . Fax: (407) 298-9011
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website: http://www.devceng.com

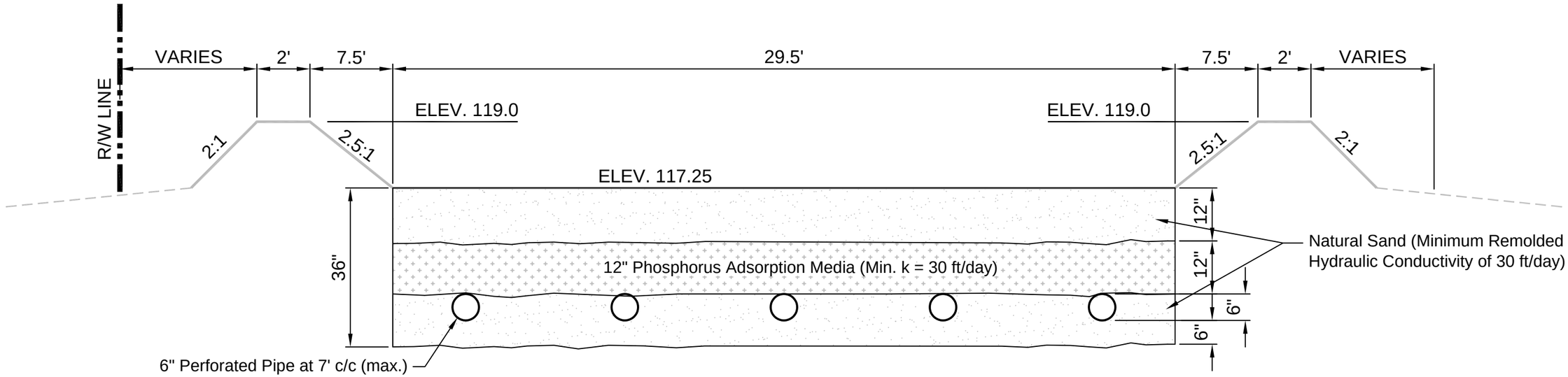
Figure Name:
PROPOSED UNDERDRAIN LAYOUT PLAN

Project Name:
OAKLAND TOWN CENTER POND IMPROVEMENTS

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-13-2012	Noted	11-831.04	Figure 3.1

NOTES:

- All elevations shown are in ft. NGVD
- ft. NAVD = ft. NGVD - 0.889 ft.



SECTION A-A': POND 1

HORIZONTAL SCALE: 1" = 4'-0"
VERTICAL SCALE: 1" = 2'-0"

Principal Quantities for Proposed Underdrain System

Item #	Description	unit	Quantity
	EARTHWORKS		
G-1	Excavation and Disposal	yd^3	280
G-2	Imported Natural Sand	yd^3	180
G-3	Phosphorus Adsorption Media	yd^3	100
	UNDERDRAINS		
U-1	6" dia. Filter Wrapped Perforated Underdrain Pipe	lf	375
U-2	10" dia. PVC Header Pipe	lf	35
U-3	Cleanouts	each	5

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website: http://www.devoeng.com

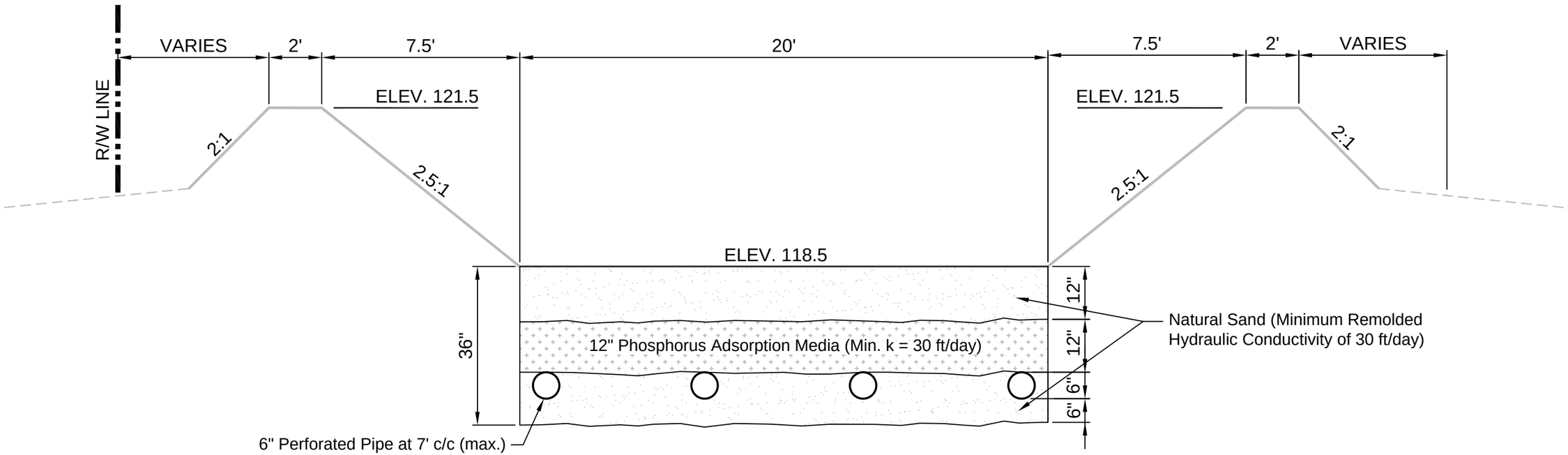
Figure Name: CROSS-SECTION OF UNDERDRAINED POND 1

Project Name: OAKLAND TOWN CENTER POND IMPROVEMENTS

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-13-2012	Noted	11-831.04	Figure 3.2

NOTES:

- All elevations shown are in ft. NGVD
- ft. NAVD = ft. NGVD - 0.889 ft.



SECTION B-B': POND 2

HORIZONTAL SCALE: 1" = 4'-0"
VERTICAL SCALE: 1" = 2'-0"

Principal Quantities for Proposed Underdrain System

Item #	Description	unit	Quantity
	EARTHWORKS		
G-1	Excavation and Disposal	yd^3	500
G-2	Imported Natural Sand	yd^3	330
G-3	Phosphorus Adsorption Media	yd^3	170
	UNDERDRAINS		
U-1	6" dia. Filter Wrapped Perforated Underdrain Pipe	lf	810
U-2	12" dia. PVC Header Pipe	lf	35
U-3	Cleanouts	each	8

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Phone: (407) 290-2371 . Fax: (407) 298-9011
E-Mail address: devo@devoeng.com
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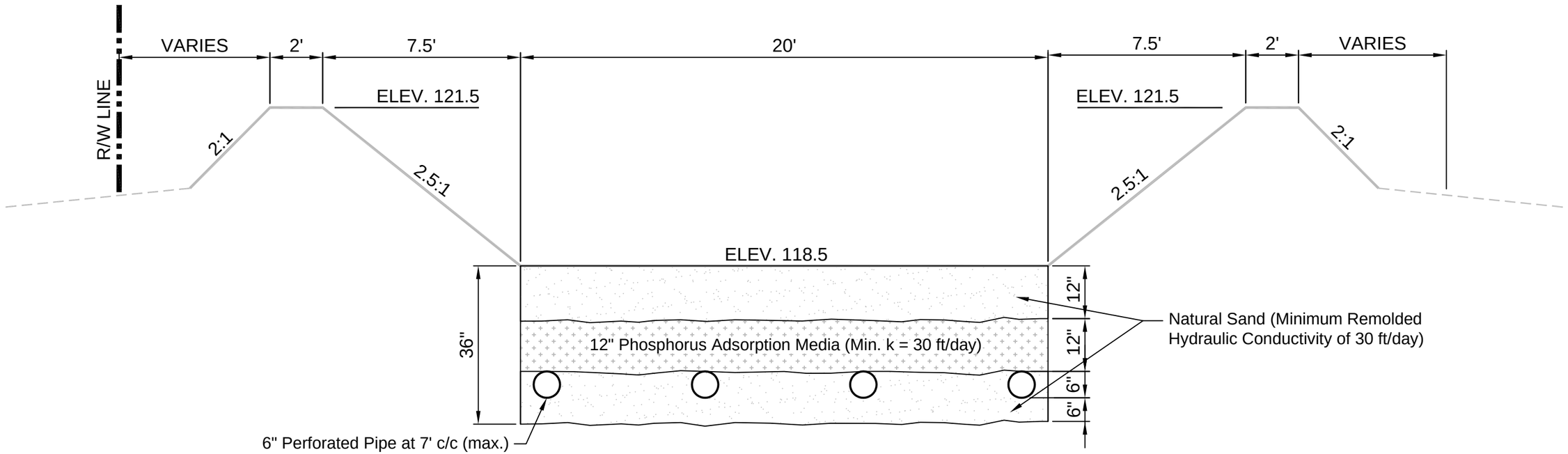
Figure Name: **CROSS-SECTION OF UNDERDRAINED POND 2**

Project Name: **OAKLAND TOWN CENTER POND IMPROVEMENTS**

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-13-2012	Noted	11-831.04	Figure 3.3

NOTES:

- All elevations shown are in ft. NGVD
- ft. NAVD = ft. NGVD - 0.889 ft.



SECTION C-C': POND 3

HORIZONTAL SCALE: 1" = 4'-0"
VERTICAL SCALE: 1" = 2'-0"

Principal Quantities for Proposed Underdrain System

Item #	Description	unit	Quantity
	EARTHWORKS		
G-1	Excavation and Disposal	yd^3	235
G-2	Imported Natural Sand	yd^3	155
G-3	Phosphorus Adsorption Media	yd^3	80
	UNDERDRAINS		
U-1	6" dia. Filter Wrapped Perforated Underdrain Pipe	lf	385
U-2	10" dia. PVC Header Pipe	lf	40
U-3	Cleanouts	each	4

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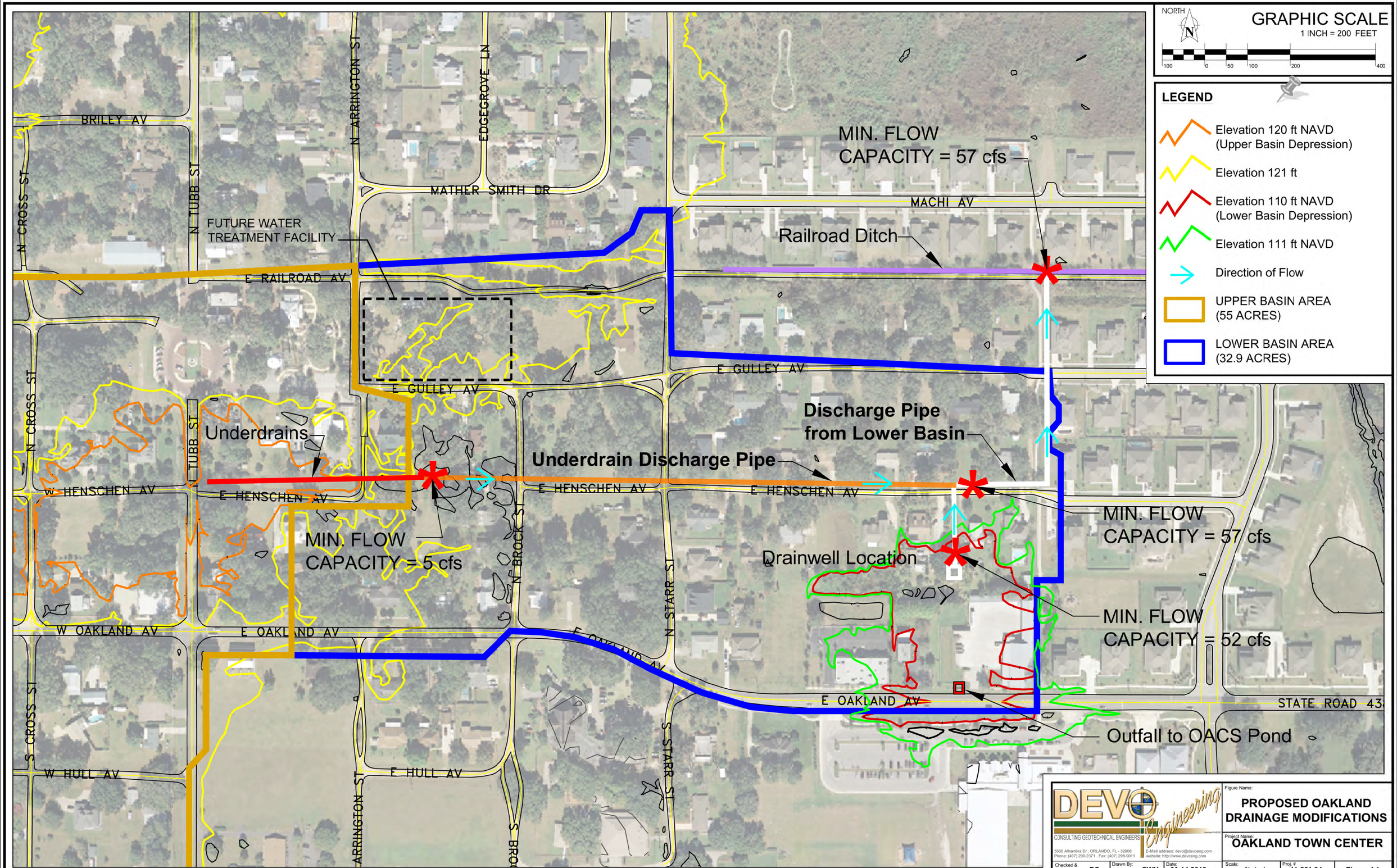
Figure Name: CROSS-SECTION OF UNDERDRAINED POND 3

Project Name: OAKLAND TOWN CENTER POND IMPROVEMENTS

Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-13-2012	Noted	11-831.04	Figure 3.4



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5500 Alhambra Dr . ORLANDO, FL - 32808
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E-Mail address: devo@devoeng.com
website: http://www.devoeng.com

Figure Name: **PROPOSED OAKLAND DRAINAGE MODIFICATIONS**

Project Name: **OAKLAND TOWN CENTER**

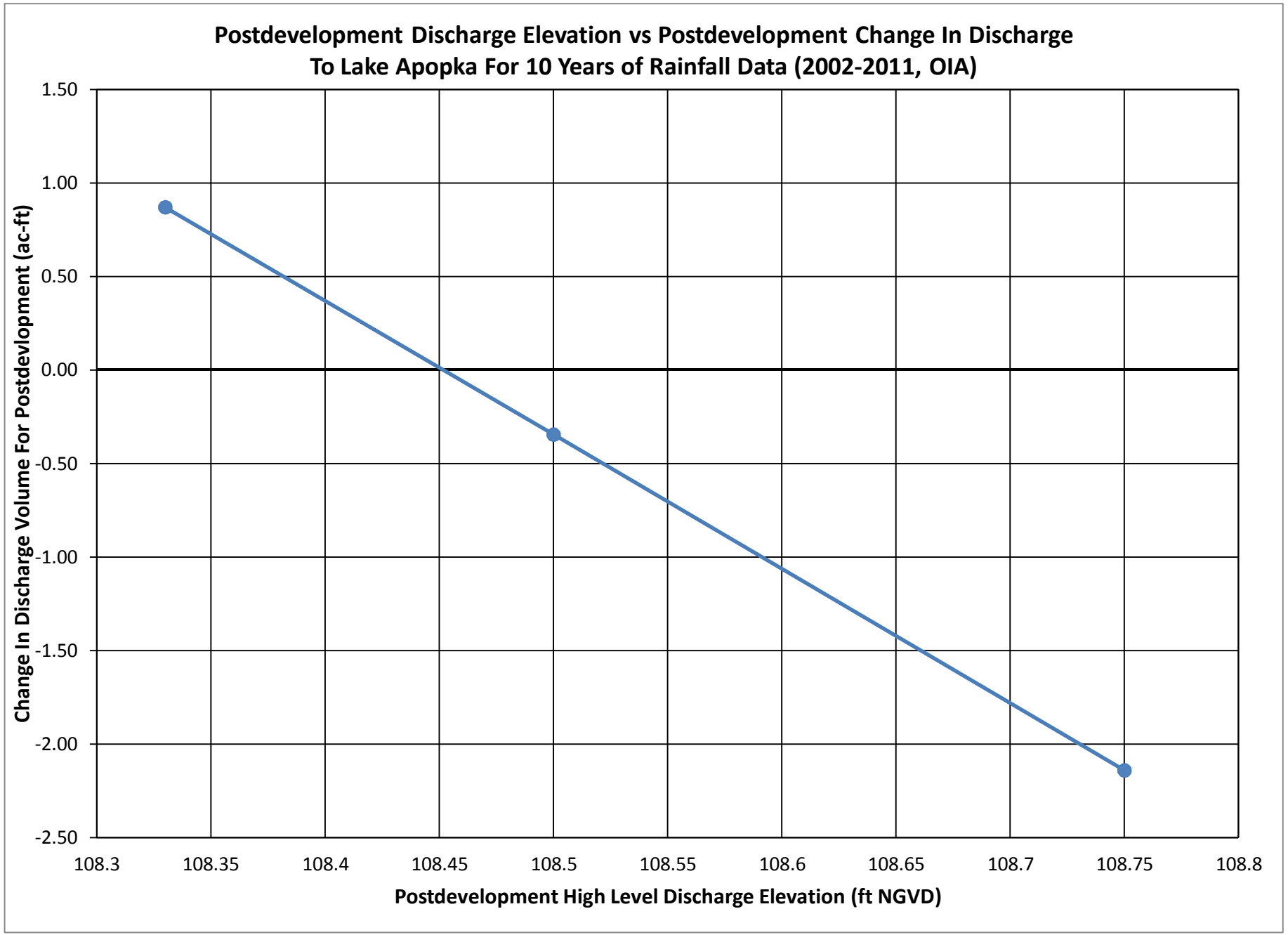
Checked & Approved by:	Drawn By:	Date:	Scale:	Proj. #	
DS	CWY	06-14-2012	Noted	11-831.04	Figure 4.1

APPENDIX A:

LOWER BASIN

10 YEAR CONTINUOUS SIMULATION MODEL USING PONDS© FOR

EXISTING & PROPOSED CONDITIONS


Postdevelopment Discharge Elevation vs Postdevelopment Change In Discharge
To Lake Apopka For 10 Years of Rainfall Data (2002-2011, OIA)
Change In Discharge Volume For Postdevlopment (ac-ft)
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
108.3
108.35
108.4
108.45
108.5
108.55
108.6
108.65
108.7
108.75
108.8
Postdevelopment High Level Discharge Elevation (ft NGVD)

PONDS Version 3.3.0265
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Town of Oakland
Simulation Description:	10 year Continuous Simulation Predevelopment Conditions OIA Rainfall Data, 2002 to 2011
Project Number:	
Engineer :	RDC
Supervising Engineer:	Devo Seereeram
Date:	06-14-2012

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	100.00
Water Table Elevation, [WT] (ft datum):	104.80
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	0.00
Fillable Porosity, [n] (%):	25.00

Vertical infiltration was not considered.

Geometry Data

Equivalent Pond Length, [L] (ft):	258.0
Equivalent Pond Width, [W] (ft):	258.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
104.64	871.0
105.89	1307.0
106.89	5663.0
107.89	13504.0
108.89	31799.0
109.89	66211.0
110.89	107593.0

Discharge Structures

Discharge Structure #1 is active as weir

Structure Parameters

Description: Weir Slot

Weir elevation, (ft datum):	108.33
Weir coefficient:	3.13
Weir length, (ft):	2.5
Weir exponent:	1.5

Tailwater - disabled, free discharge

Discharge Structure #2 is active as weir

Structure Parameters

Description: Grate Outfall To OACS

Weir elevation, (ft datum):	109.09
Weir coefficient:	3.13
Weir length, (ft):	14
Weir exponent:	1.5

Tailwater - disabled, free discharge

Discharge Structure #3 is active as orifice

Structure Parameters

Description: Drainwell

Orifice elevation, (ft datum):	104.8
Orifice coefficient:	4.9
Orifice area, (ft^2):	0.087266463
Orifice exponent:	0.5

Tailwater - disabled, free discharge

Scenario Input Data

Scenario 1 :: Continuous Simulation

Hydrograph Type:	Continuous Simulation
Modflow Routing:	Routed with infiltration
Number of Sub-Increments Per Stress Period:	96

Rainfall Data

Data Format:	Date range, daily (monthly summary below)
Starting Date:	Jan 1, 2002
Ending Date:	Dec 31, 2011

Summary of monthly rainfall

Month	Rainfall (inches)	Month	Rainfall (inches)	Month	Rainfall (inches)	Month	Rainfall (inches)
1/2002	1.10	7/2004	4.56	1/2007	1.73	7/2009	6.05
2/2002	3.48	8/2004	14.89	2/2007	0.91	8/2009	4.74
3/2002	0.52	9/2004	14.55	3/2007	0.52	9/2009	4.58
4/2002	1.20	10/2004	1.24	4/2007	2.05	10/2009	2.85
5/2002	2.47	11/2004	2.18	5/2007	0.54	11/2009	1.02
6/2002	13.01	12/2004	1.66	6/2007	5.91	12/2009	5.39
7/2002	10.21	1/2005	3.33	7/2007	6.52	1/2010	3.53
8/2002	10.92	2/2005	1.29	8/2007	4.47	2/2010	4.35
9/2002	4.69	3/2005	6.27	9/2007	8.96	3/2010	8.87
10/2002	4.98	4/2005	1.43	10/2007	5.41	4/2010	4.73
11/2002	2.32	5/2005	4.57	11/2007	0.42	5/2010	3.00
12/2002	11.39	6/2005	17.57	12/2007	1.05	6/2010	3.23
1/2003	0.80	7/2005	3.95	1/2008	4.10	7/2010	4.26
2/2003	1.57	8/2005	7.66	2/2008	1.65	8/2010	5.62
3/2003	5.28	9/2005	1.67	3/2008	5.15	9/2010	5.67
4/2003	4.32	10/2005	10.20	4/2008	3.21	10/2010	0.00
5/2003	2.43	11/2005	0.60	5/2008	3.48	11/2010	1.68
6/2003	6.56	12/2005	2.04	6/2008	9.73	12/2010	0.78
7/2003	8.26	1/2006	0.44	7/2008	7.35	1/2011	5.92
8/2003	11.90	2/2006	2.36	8/2008	10.71	2/2011	0.25
9/2003	5.75	3/2006	0.02	9/2008	4.02	3/2011	5.24
10/2003	1.82	4/2006	1.07	10/2008	2.61	4/2011	0.65
11/2003	2.42	5/2006	3.04	11/2008	1.09	5/2011	2.10
12/2003	1.56	6/2006	6.60	12/2008	0.66	6/2011	7.34
1/2004	3.27	7/2006	7.02	1/2009	2.08	7/2011	10.62
2/2004	4.53	8/2006	4.33	2/2009	0.62	8/2011	9.11
3/2004	0.72	9/2006	4.09	3/2009	0.48	9/2011	5.85
4/2004	2.41	10/2006	1.95	4/2009	1.06	10/2011	8.91
5/2004	1.91	11/2006	1.54	5/2009	14.56	11/2011	0.16
6/2004	8.76	12/2006	3.60	6/2009	8.05	12/2011	0.80

Runoff - Basin Parameters

Lake area (acres): 1.51

Scenario 1 (cont'd.) :: Continuous Simulation

Surface water basin data:

Total area of drainage basin, including lake (acres):	32.9
Directly Connected Impervious Area (acres):	1.51
Impervious area within basin where there are no E.T. losses (acres):	0
Curve Number for non-DCIA Area (AMC I):	39.3
Curve Number for non-DCIA Area (AMC II):	59.3
Curve Number for non-DCIA Area (AMC III):	77.3
Curve Number for DCIA	98

Ground water basin data:

Uses surface water basin data

Season Definitions

Data Format: Calendar year, monthly
Starting Date: Jan
Ending Date: Dec

Date	Season	Date	Season
Jan	dormant	Jul	growing
Feb	dormant	Aug	growing
Mar	dormant	Sep	growing
Apr	dormant	Oct	dormant
May	dormant	Nov	dormant
Jun	growing	Dec	dormant

Evaporation and Evapotranspiration

Evapotranspiration ratio: ET (impervious) / ET (pervious)

ET Ratio (%) 0

Evaporation and Evapotranspiration Rates

Data Format: Calendar year, monthly
Starting Date: Jan
Ending Date: Dec

Date	Monthly Evaporation (inches)	Monthly E.T. (inches)
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0

Diffuse Vertical Leakage

Leakage model: none

Scenario 1 (cont'd.) :: Continuous Simulation

Artificial Recharge

Number of septic tanks within influence of pond	0
Average daily flow per septic tank (gpd)	0
Other baseflows (gpd)	0

Upgradient Flows

Number of contributing upgradient nodes: none

Direct Lake Pumping

Number of contributing pump nodes: none

Summary

Not available

Summary of Results *:: Scenario 1 :: Continuous Simulation*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	104.80		
Maximum	33432.000	108.83		
Inflow				
Rate - Maximum - Positive	13944.000		9.8034	
Rate - Maximum - Negative	13968.000		-9.5425	
Cumulative Volume - Maximum Positive	87552.000			7244114.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			7244114.0
Infiltration				
Rate - Maximum - Positive	33408.000		0.0089	
Rate - Maximum - Negative	33456.000		-0.0094	
Cumulative Volume - Maximum Positive	33432.000			1609.0
Cumulative Volume - Maximum Negative	30072.000			-14.0
Cumulative Volume - End of Simulation	87648.000			1.1
Combined Discharge				
Rate - Maximum - Positive	33432.000		3.5954	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	87648.000			7244113.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			7244113.0
Discharge Structure 1 - simple weir				
Rate - Maximum - Positive	33432.000		2.7374	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	85656.000			581702.8
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			581702.8
Discharge Structure 2 - simple weir				
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	87648.000			0.0
Discharge Structure 3 - simple orifice				
Rate - Maximum - Positive	33432.000		0.8581	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	87648.000			6662410.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			6662410.0
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	N.A.	N.A.		N.A.
72 Hour Stage and Infiltration Volume	N.A.	N.A.		N.A.

PONDS Version 3.3.0265
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Town of Oakland
Simulation Description:	10 Year Continuous Simulation Postdevelopmement, Discharge at 108.5 ft NGVD OIA Rainfall Data, 2002-2011
Project Number:	
Engineer :	RDC
Supervising Engineer:	Devo Seereeram
Date:	06-14-2012

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	100.00
Water Table Elevation, [WT] (ft datum):	104.80
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	0.00
Fillable Porosity, [n] (%):	25.00

Vertical infiltration was not considered.

Geometry Data

Equivalent Pond Length, [L] (ft):	258.0
Equivalent Pond Width, [W] (ft):	258.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
104.64	871.0
105.89	1307.0
106.89	5663.0
107.89	13504.0
108.89	31799.0
109.89	66211.0
110.89	107593.0

Discharge Structures

Discharge Structure #1 is active as weir

Structure Parameters

Description:

Weir elevation, (ft datum):	108.5
Weir coefficient:	3.13
Weir length, (ft):	23.5
Weir exponent:	1.5

Tailwater - disabled, free discharge

Discharge Structure #2 is active as orifice

Structure Parameters

Description: Drainwell

Orifice elevation, (ft datum):	104.8
Orifice coefficient:	4.9
Orifice area, (ft^2):	0.087266463
Orifice exponent:	0.5

Tailwater - disabled, free discharge

Discharge Structure #3 is inactive

Scenario Input Data

Scenario 1 :: Continuous Simulation

Hydrograph Type:	Continuous Simulation
Modflow Routing:	Routed with infiltration
Number of Sub-Increments Per Stress Period:	96

Rainfall Data

Data Format:	Date range, daily (monthly summary below)
Starting Date:	Jan 1, 2002
Ending Date:	Dec 31, 2011

Summary of monthly rainfall

Month	Rainfall (inches)	Month	Rainfall (inches)	Month	Rainfall (inches)	Month	Rainfall (inches)
1/2002	1.10	7/2004	4.56	1/2007	1.73	7/2009	6.05
2/2002	3.48	8/2004	14.89	2/2007	0.91	8/2009	4.74
3/2002	0.52	9/2004	14.55	3/2007	0.52	9/2009	4.58
4/2002	1.20	10/2004	1.24	4/2007	2.05	10/2009	2.85
5/2002	2.47	11/2004	2.18	5/2007	0.54	11/2009	1.02
6/2002	13.01	12/2004	1.66	6/2007	5.91	12/2009	5.39
7/2002	10.21	1/2005	3.33	7/2007	6.52	1/2010	3.53
8/2002	10.92	2/2005	1.29	8/2007	4.47	2/2010	4.35
9/2002	4.69	3/2005	6.27	9/2007	8.96	3/2010	8.87
10/2002	4.98	4/2005	1.43	10/2007	5.41	4/2010	4.73
11/2002	2.32	5/2005	4.57	11/2007	0.42	5/2010	3.00
12/2002	11.39	6/2005	17.57	12/2007	1.05	6/2010	3.23
1/2003	0.80	7/2005	3.95	1/2008	4.10	7/2010	4.26
2/2003	1.57	8/2005	7.66	2/2008	1.65	8/2010	5.62
3/2003	5.28	9/2005	1.67	3/2008	5.15	9/2010	5.67
4/2003	4.32	10/2005	10.20	4/2008	3.21	10/2010	0.00
5/2003	2.43	11/2005	0.60	5/2008	3.48	11/2010	1.68
6/2003	6.56	12/2005	2.04	6/2008	9.73	12/2010	0.78
7/2003	8.26	1/2006	0.44	7/2008	7.35	1/2011	5.92
8/2003	11.90	2/2006	2.36	8/2008	10.71	2/2011	0.25
9/2003	5.75	3/2006	0.02	9/2008	4.02	3/2011	5.24
10/2003	1.82	4/2006	1.07	10/2008	2.61	4/2011	0.65
11/2003	2.42	5/2006	3.04	11/2008	1.09	5/2011	2.10
12/2003	1.56	6/2006	6.60	12/2008	0.66	6/2011	7.34
1/2004	3.27	7/2006	7.02	1/2009	2.08	7/2011	10.62
2/2004	4.53	8/2006	4.33	2/2009	0.62	8/2011	9.11
3/2004	0.72	9/2006	4.09	3/2009	0.48	9/2011	5.85
4/2004	2.41	10/2006	1.95	4/2009	1.06	10/2011	8.91
5/2004	1.91	11/2006	1.54	5/2009	14.56	11/2011	0.16
6/2004	8.76	12/2006	3.60	6/2009	8.05	12/2011	0.80

Runoff - Basin Parameters

Lake area (acres): 1.51

Scenario 1 (cont'd.) :: Continuous Simulation

Surface water basin data:

Total area of drainage basin, including lake (acres):	32.9
Directly Connected Impervious Area (acres):	1.51
Impervious area within basin where there are no E.T. losses (acres):	0
Curve Number for non-DCIA Area (AMC I):	39.3
Curve Number for non-DCIA Area (AMC II):	59.3
Curve Number for non-DCIA Area (AMC III):	77.3
Curve Number for DCIA	98

Ground water basin data:

Uses surface water basin data

Season Definitions

Data Format: Calendar year, monthly
Starting Date: Jan
Ending Date: Dec

Date	Season	Date	Season
Jan	dormant	Jul	growing
Feb	dormant	Aug	growing
Mar	dormant	Sep	growing
Apr	dormant	Oct	dormant
May	dormant	Nov	dormant
Jun	growing	Dec	dormant

Evaporation and Evapotranspiration

Evapotranspiration ratio: ET (impervious) / ET (pervious)

ET Ratio (%) 0

Evaporation and Evapotranspiration Rates

Data Format: Calendar year, monthly
Starting Date: Jan
Ending Date: Dec

Date	Monthly Evaporation (inches)	Monthly E.T. (inches)
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0

Diffuse Vertical Leakage

Leakage model: none

Scenario 1 (cont'd.) :: Continuous Simulation

Artificial Recharge

Number of septic tanks within influence of pond	0
Average daily flow per septic tank (gpd)	0
Other baseflows (gpd)	0

Upgradient Flows

Number of contributing upgradient nodes: none

Direct Lake Pumping

Number of contributing pump nodes: none

Summary

Not available

Summary of Results *:: Scenario 1 :: Continuous Simulation*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	104.80		
Maximum	33432.000	108.61		
Inflow				
Rate - Maximum - Positive	13944.000		9.8034	
Rate - Maximum - Negative	13968.000		-9.5425	
Cumulative Volume - Maximum Positive	87552.000			7244114.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			7244114.0
Infiltration				
Rate - Maximum - Positive	33408.000		0.0089	
Rate - Maximum - Negative	33456.000		-0.0094	
Cumulative Volume - Maximum Positive	33432.000			1715.0
Cumulative Volume - Maximum Negative	120.000			-7.3
Cumulative Volume - End of Simulation	87648.000			219.2
Combined Discharge				
Rate - Maximum - Positive	33432.000		3.5954	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	87648.000			7243895.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			7243895.0
Discharge Structure 1 - simple weir				
Rate - Maximum - Positive	33432.000		2.7606	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	85656.000			566665.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			566665.0
Discharge Structure 2 - simple orifice				
Rate - Maximum - Positive	33432.000		0.8349	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	87648.000			6677230.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	87648.000			6677230.0
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	N.A.	N.A.		N.A.
72 Hour Stage and Infiltration Volume	N.A.	N.A.		N.A.

APPENDIX B:

LOWER BASIN

PEAK STAGE COMPARISONS FOR DESIGN STORM EVENTS

EXISTING & PROPOSED CONDITIONS

Description: **This model adds a high level outfal in the Lower Basin at elevation +108.5 ft NGVD.**
The existing outfall to the Charter School has been removed from the model
The Upper Basin can discharge to the Lower Basin at an elevation of +101.75 ft NGVD.
The discharge from the Storage Tank Basin is routed to the Lower Basin.

Summary Of Dischages To Lake Apopka, Predevelopment vs. Postdevelopment

Storm Event	Discharge To Lake Apopka (ac-ft)			Peak Stage In Lower Basin (ft NGVD)		Peak Stage In Upper Basin (ft NGVD)	
	Predevelopment	Postdevelopment	Change	Predevelopment	Postdevelopment	Predevelopment	Postdevelopment
Calibration Event	2.1	2	-0.1	109.52	109.04	120.65	120.65
1-inch/1-hr	0	0	0	106.32	106.32	119.33	119.33
2-inch/1-hr	0.4	0	-0.4	107.64	107.64	119.69	119.69
3-inch/1-hr	0.5	0.4	-0.1	108.57	108.68	120.07	120.07
4-inch/1-hr	1.7	1.6	-0.1	109.27	108.95	120.52	120.52
Mean Annual	1.3	1.2	-0.1	108.55	108.68	120.65	120.65
10yr/24hr	6.6	6.5	-0.1	109.91	108.92	121.78	121.78
25 yr/24hr	12.3	12.3	0	110.60	109.01	121.89	121.89
100 yr/24hr	22.6	22.9	0.3	112.84	109.15	122.03	122.03
25 yr/96hr	28.2	28.5	0.3	112.81	109.60	122.07	122.07

Notes:

1. Calibration event is storm of August 27, 2010 (4.3 inches of rainfall in 30 minutes)
2. Existing discharge elevation to Charter School pond is 108.33 ft NGVD (elevation of weir slot)
3. Proposed outfall from Lower Basin is 108.5 ft NGVD.
4. Discharge from the upper basin occurs at elevation +121.75 NGVD

Summary of Peak Stage And Discharges For Predevelopment Conditions

		Lower Basin								Upper Basin		
Storm Event	Rainfall Depth (inches)	Runoff Volume (ac-ft)	Peak Stage (ft NGVD)	Total Volume In (ac-ft)	Total Discharge (ac-ft)	Discharge To Charter Pond (ac-ft)	Discharge To Drainwell (ac-ft)	Discharge Down Oakland Ave (ac-ft)	Discharge To Lk Apopka (ac-ft)	Peak Stage (ft NGVD)	Runoff Volume (ac-ft)	Discharge Volume (ac-ft)
Calibration	4.3	2.8	109.52	2.8	2.8	2.1	0.7	0	2.1	120.65	3.4	0
1-inch/1-hr	1	0.1	106.32	0.1	0.1	0	0.1	0	0.0	119.33	0.4	0
2-inch/1-hr	2	0.4	107.64	0.4	0.4	0.4	0	0	0.4	119.69	0.9	0
3-inch/1-hr	3	1.2	108.57	1.2	1.2	0.5	0.7	0	0.5	120.07	1.6	0
4-inch/1-hr	4	2.4	109.27	2.4	2.4	1.7	0.7	0	1.7	120.52	3.0	0
Mean Annual	4.3	2.8	108.55	2.8	2.8	1.3	1.5	0	1.3	120.65	3.5	0
10yr/24hr	7.4	8.3	109.91	8.7	8.7	6.6	2.1	0	6.6	121.78	10.6	0.4
25 yr/24hr	8.6	10.8	110.6	14.6	14.6	12.3	2.3	0	12.3	121.89	14.1	3.9
100 yr/24hr	10.6	15.2	112.84	25.4	25.4	22.4	2.8	0.2	22.6	122.03	20.4	10.2
25 yr/96hr	12	18.4	112.81	33.3	33.3	28.2	5.1	0	28.2	122.07	25.2	14.9

Summary of Peak Stage And Discharges For Postdevelopment Conditions

		Lower Basin								Upper Basin			
Storm Event	Rainfall Depth (inches)	Runoff Volume (ac-ft)	Peak Stage (ft NGVD)	Volume In (ac-ft)	Total Discharge (ac-ft)	Discharge To Drainwell (ac-ft)	Discharge Down Oakland Ave (ac-ft)	LB-2 Discharge N To RR (ac-ft)	Out of Basin Discharge	Peak Stage (ft NGVD)	Runoff Volume (ac-ft)	Discharge Volume (ac-ft)	Canal
Calibration	4.3	2.8	109.04	2.8	2.9	0.8	0	2	2	120.65	3.4	0	1.9
1-inch/1-hr	1	0.1	106.32	0.1	0.1	0.1	0	0	0	119.33	0.4	0	0
2-inch/1-hr	2	0.4	107.64	0.4	0.4	0.4	0	0	0	119.69	0.9	0	0
3-inch/1-hr	3	1.2	108.68	1.2	1.2	0.8	0	0.4	0.4	120.07	1.6	0	0.4
4-inch/1-hr	4	2.4	108.95	2.4	2.4	0.8	0	1.6	1.6	120.52	3	0	1.6
Mean Annual	4.3	2.8	108.68	2.8	2.8	1.6	0	1.2	1.2	120.65	3.5	0	1.2
10yr/24hr	7.4	8.3	108.92	8.7	8.7	2.1	0	6.5	6.5	121.78	10.6	0.4	6.5
25 yr/24hr	8.6	10.8	109.01	14.6	14.6	2.3	0	12.3	12.3	121.89	14.1	3.8	12.3
100 yr/24hr	10.6	15.2	109.15	25.3	25.3	2.4	0	22.9	22.9	122.03	20.4	10.2	22.9
25 yr/96hr	12	18.4	109.6	33.3	33.3	4.8	0	28.5	28.5	122.07	25.2	14.9	28.5

APPENDIX C:

LOWER BASIN

DESIGN STORM EVENT ROUTING USING adICPR

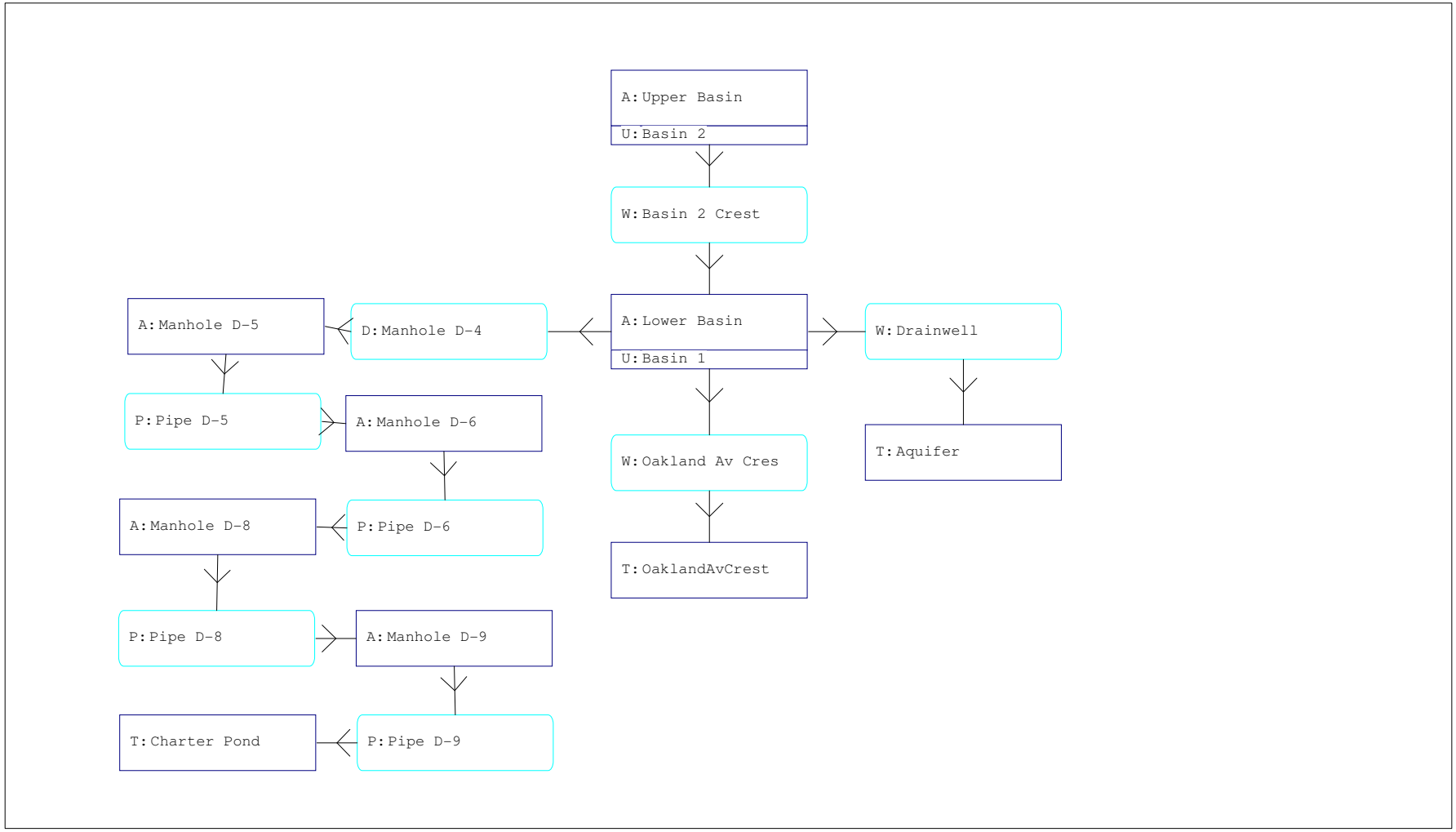
EXISTING CONDITIONS

Town of Oakland
Existing Condtions Model

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



==========
==== Basins ====
==========

Name: Basin 1 Node: Lower Basin Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 35.00
Area(ac): 32.900 Time Shift(hrs): 0.00
Curve Number: 59.30 Max Allowable Q(cfs): 999999.000
DCIA(%): 4.60

Name: Basin 2 Node: Upper Basin Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 30.00
Area(ac): 55.000 Time Shift(hrs): 0.00
Curve Number: 48.60 Max Allowable Q(cfs): 999999.000
DCIA(%): 10.00

==========
==== Nodes ====
==========

Name: Aquifer Base Flow(cfs): 0.000 Init Stage(ft): 77.000
Group: BASE Warn Stage(ft): 77.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	77.000
360.00	77.000

Name: Charter Pond Base Flow(cfs): 0.000 Init Stage(ft): 103.800
Group: BASE Warn Stage(ft): 103.800
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	103.800
360.00	103.800

Name: Lower Basin Base Flow(cfs): 0.000 Init Stage(ft): 104.640
Group: BASE Warn Stage(ft): 109.600
Type: Stage/Area

Elevaions in ft NGVD.
Original Lidar data in NAVD, converted to NGVD

Stage(ft)	Area(ac)
104.640	0.0200
105.889	0.0300
106.889	0.1300
107.889	0.3100
108.889	0.7300
109.889	1.5200
110.889	2.4700

Name: Manhole D-5 Base Flow(cfs): 0.000 Init Stage(ft): 105.010
Group: BASE Warn Stage(ft): 108.720
Type: Stage/Area

Stage(ft)	Area(ac)
105.010	0.0100
108.720	0.0100
109.000	0.5000
110.000	1.0000

Name: Manhole D-6 Base Flow(cfs): 0.000 Init Stage(ft): 105.010
Group: BASE Warn Stage(ft): 110.920
Type: Stage/Area

Stage(ft)	Area(ac)
105.000	0.0100
110.920	0.0100
111.000	0.5000
111.100	1.0000

Name: Manhole D-8 Base Flow(cfs): 0.000 Init Stage(ft): 103.800
Group: BASE Warn Stage(ft): 111.780
Type: Stage/Area

Stage(ft)	Area(ac)
102.000	0.0100
111.780	0.0100
112.000	1.0000

Name: Manhole D-9 Base Flow(cfs): 0.000 Init Stage(ft): 103.800
Group: BASE Warn Stage(ft): 107.900
Type: Stage/Area

Stage(ft)	Area(ac)
99.000	0.0100
107.900	0.0100
108.000	0.5000
108.100	1.0000

Name: OaklandAvCrest Base Flow(cfs): 0.000 Init Stage(ft): 100.000
Group: BASE Warn Stage(ft): 100.000
Type: Time/Stage

At an elevation of 112.8 ft NGVD (111.9 ft NAVD) water can crest over Oakland Ave and flow in a southerly direction towa

Time(hrs)	Stage(ft)
0.00	100.000
999.00	100.000

Name: Upper Basin Base Flow(cfs): 0.000 Init Stage(ft): 117.889
Group: BASE Warn Stage(ft): 121.889
Type: Stage/Area

Elevaions in ft NGVD.
Original Lidar data in NAVD, converted to NGVD

Stage(ft)	Area(ac)

117.889	0.0500
118.889	0.2400
119.889	1.9000
120.889	4.6700
121.750	8.6000
121.889	9.2400

Pipes

Name: Pipe D-5 From Node: Manhole D-5 Length(ft): 63.00
Group: BASE To Node: Manhole D-6 Count: 1
Friction Equation: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Solution Algorithm:	Most Restrictive
Span(in):	24.00	24.00	Flow:	Both
Rise(in):	24.00	24.00	Entrance Loss Coef:	0.20
Invert(ft):	105.260	105.010	Exit Loss Coef:	0.30
Manning's N:	0.012000	0.012000	Bend Loss Coef:	0.00
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular: Beveled ring, 45° bevels

Name: Pipe D-6 From Node: Manhole D-6 Length(ft): 328.00
Group: BASE To Node: Manhole D-8 Count: 1
Friction Equation: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Solution Algorithm:	Most Restrictive
Span(in):	24.00	24.00	Flow:	Both
Rise(in):	24.00	24.00	Entrance Loss Coef:	0.20
Invert(ft):	105.010	103.630	Exit Loss Coef:	0.30
Manning's N:	0.012000	0.012000	Bend Loss Coef:	0.00
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: Pipe D-8 From Node: Manhole D-8 Length(ft): 320.00
Group: BASE To Node: Manhole D-9 Count: 1
Friction Equation: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Solution Algorithm:	Most Restrictive
Span(in):	24.00	24.00	Flow:	Both
Rise(in):	24.00	24.00	Entrance Loss Coef:	0.20
Invert(ft):	102.050	101.220	Exit Loss Coef:	0.30
Manning's N:	0.012000	0.012000	Bend Loss Coef:	0.00
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
---------------------------------------------------------------------------------------------------
         Name: Pipe D-9            From Node: Manhole D-9        Length(ft): 62.00
        Group: BASE                  To Node: Charter Pond           Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                        Flow: Positive
     Span(in): 24.00          24.00                     Entrance Loss Coef: 0.20
     Rise(in): 24.00          24.00                         Exit Loss Coef: 0.30
   Invert(ft): 99.410         99.400                        Bend Loss Coef: 0.00
  Manning's N: 0.012000       0.012000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


===============================================================================================
==== Drop Structures ==========================================================================
===============================================================================================

         Name:                     From Node:                    Length(ft): 0.00
        Group: BASE                  To Node:                         Count: 1

               UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
     Span(in): 0.00           0.00                            Flow: Both
     Rise(in): 0.00           0.00                      Entrance Loss Coef: 0.000
   Invert(ft): 0.000          0.000                         Exit Loss Coef: 1.000
  Manning's N: 0.000000       0.000000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                           Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



---------------------------------------------------------------------------------------------------
         Name: Manhole D-4         From Node: Lower Basin        Length(ft): 58.00
        Group: BASE                  To Node: Manhole D-5            Count: 1

               UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Automatic
     Span(in): 15.00          15.00                           Flow: Both
     Rise(in): 15.00          15.00                     Entrance Loss Coef: 0.200
   Invert(ft): 106.250        106.010                       Exit Loss Coef: 0.300
  Manning's N: 0.012000       0.012000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                           Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Type D Inlet with notch
Rectangular notch 10" below top of inlet

*** Weir 1 of 2 for Drop Structure Manhole D-4 ***
                                                                                    TABLE
                  Count: 1                       Bottom Clip(in): 0.000
```

```
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 49.00                       Invert(ft): 108.330
              Rise(in): 37.00                  Control Elev(ft): 108.330

*** Weir 2 of 2 for Drop Structure Manhole D-4 ***
                                                                      TABLE
                 Count: 1                       Bottom Clip(in): 0.000
                  Type: Vertical: Mavis            Top Clip(in): 0.000
                  Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 46.00                       Invert(ft): 108.330
              Rise(in): 8.00                   Control Elev(ft): 108.330


================================================================================================
==== Weirs =====================================================================================
================================================================================================

         Name: Basin 2 Crest       From Node: Upper Basin
        Group: BASE                  To Node: Lower Basin
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 480.00
                    Rise(in): 999.00
                  Invert(ft): 121.750
       Control Elevation(ft): 121.750
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

Basin crests at about 121.75 ft NGVD based on LIDAR

------------------------------------------------------------------------------------------------
         Name: Drainwell           From Node: Lower Basin
        Group: BASE                  To Node: Aquifer
         Flow: Positive                Count: 1
         Type: Horizontal           Geometry: Circular

                    Span(in): 4.00
                    Rise(in): 4.00
                  Invert(ft): 104.800
       Control Elevation(ft): 104.800
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



------------------------------------------------------------------------------------------------
         Name: Oakland Av Cres     From Node: Lower Basin
        Group: BASE                  To Node: OaklandAvCrest
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 960.00
                    Rise(in): 999.00
                  Invert(ft): 112.800
       Control Elevation(ft): 112.800
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



================================================================================================
```

==== Hydrology Simulations ===
==

Name: 1 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Fdot-1
Rainfall Amount(in): 1.00

Time(hrs)	Print Inc(min)
120.000	5.00

Name: 100yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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

Time(hrs)	Print Inc(min)
120.000	5.00

Name: 10yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Orange
Rainfall Amount(in): 7.40

Time(hrs)	Print Inc(min)
120.000	5.00

Name: 2 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Fdot-1
Rainfall Amount(in): 2.00

Time(hrs)	Print Inc(min)
120.000	5.00

Name: 25yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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

Time(hrs)	Print Inc(min)
120.000	5.00

Name: 25yr-96hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 96.00
Rainfall File: Sjrwmd96
Rainfall Amount(in): 12.00

Time(hrs) Print Inc(min)
--- ---
120.000 5.00

Name: 3 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Fdot-1
Rainfall Amount(in): 3.00

Time(hrs) Print Inc(min)
--- ---
120.000 5.00

Name: 4 inch rainfall
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 0.50
Rainfall File: Fdot-1
Rainfall Amount(in): 4.30

Time(hrs) Print Inc(min)
--- ---
2.000 1.00
120.000 5.00

Name: 4 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Fdot-1
Rainfall Amount(in): 4.00

Time(hrs) Print Inc(min)
--- ---
120.000 5.00

Name: Mean Annual
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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

Time(hrs) Print Inc(min)
--- ---
120.000 5.00

==========
==== Routing Simulations ==========
==========

Name: 1 inch-1 hr Hydrology Sim: 1 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)

999.000	15.000

Group	Run
BASE	Yes

Name: 100yr-24hr Hydrology Sim: 100yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 10yr-24hr Hydrology Sim: 10yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 2 inch-1 hr Hydrology Sim: 2 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run

BASE	Yes

Name: 25yr-24hr Hydrology Sim: 25yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 25yr-96hr Hydrology Sim: 25yr-96hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 3 inch-1 hr Hydrology Sim: 3 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

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): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

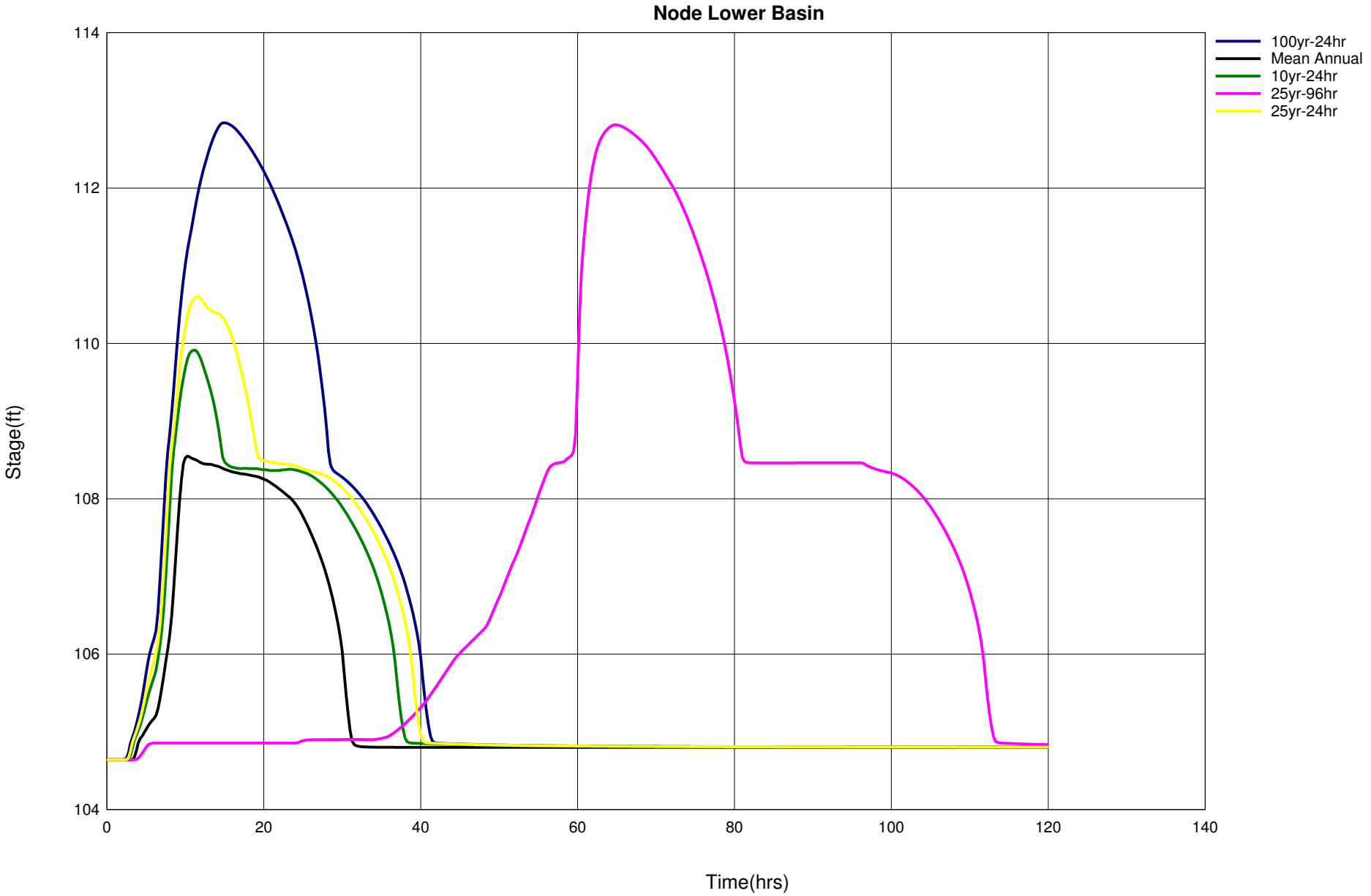
```
-------------------------------------------------------------------------------------------------
         Name: 4 inch rainfall     Hydrology Sim: 4 inch rainfall
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

      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): 120.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           1.000
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 4 inch-1 hr         Hydrology Sim: 4 inch-1 hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

      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): 129.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: Mean Annual         Hydrology Sim: Mean Annual
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\01

      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): 120.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Aquifer	BASE	1 inch-1 hr	0.00	77.00	77.00	0.0000	0	1.54	0.52	0.00	0.00
Charter Pond	BASE	1 inch-1 hr	0.00	103.80	103.80	0.0000	3	0.00	0.00	0.00	0.00
Lower Basin	BASE	1 inch-1 hr	1.54	106.32	109.60	0.0050	3187	0.92	1.41	1.54	0.52
Manhole D-5	BASE	1 inch-1 hr	0.00	105.01	108.72	0.0000	439	0.00	0.00	0.00	0.00
Manhole D-6	BASE	1 inch-1 hr	0.00	105.01	110.92	0.0000	497	0.00	0.00	0.00	0.00
Manhole D-8	BASE	1 inch-1 hr	0.00	103.80	111.78	0.0000	740	0.00	0.00	0.00	0.00
Manhole D-9	BASE	1 inch-1 hr	0.00	103.80	107.90	0.0000	504	0.00	0.00	0.00	0.00
OaklandAvCrest	BASE	1 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	1 inch-1 hr	3.42	119.33	121.89	0.0050	42412	0.83	5.66	0.00	0.00
Aquifer	BASE	100yr-24hr	0.00	77.00	77.00	0.0000	0	14.94	1.19	0.00	0.00
Charter Pond	BASE	100yr-24hr	0.00	103.80	103.80	0.0000	3	15.09	14.13	0.00	0.00
Lower Basin	BASE	100yr-24hr	14.94	112.84	109.60	0.0050	188364	9.25	40.39	14.94	17.43
Manhole D-5	BASE	100yr-24hr	15.06	107.87	108.72	0.0050	439	14.74	14.13	17.88	14.13
Manhole D-6	BASE	100yr-24hr	15.08	107.28	110.92	-0.0042	455	17.88	14.13	15.04	14.13
Manhole D-8	BASE	100yr-24hr	15.09	105.82	111.78	-0.0048	468	15.04	14.13	15.08	14.13
Manhole D-9	BASE	100yr-24hr	15.09	104.38	107.90	0.0049	455	15.08	14.13	15.09	14.13
OaklandAvCrest	BASE	100yr-24hr	0.00	100.00	100.00	0.0000	0	14.94	2.11	0.00	0.00
Upper Basin	BASE	100yr-24hr	12.03	122.03	121.89	0.0050	430268	9.17	53.35	12.03	18.71
Aquifer	BASE	10yr-24hr	0.00	77.00	77.00	0.0000	0	11.14	0.95	0.00	0.00
Charter Pond	BASE	10yr-24hr	0.00	103.80	103.80	0.0000	3	11.25	12.46	0.00	0.00
Lower Basin	BASE	10yr-24hr	11.14	109.91	109.60	0.0050	67255	9.25	21.46	11.12	13.41
Manhole D-5	BASE	10yr-24hr	11.33	107.25	108.72	0.0050	443	11.12	12.46	11.51	12.53
Manhole D-6	BASE	10yr-24hr	11.17	106.98	110.92	-0.0038	590	11.51	12.53	11.08	12.46
Manhole D-8	BASE	10yr-24hr	11.25	105.37	111.78	-0.0050	705	11.08	12.46	11.33	12.46
Manhole D-9	BASE	10yr-24hr	11.25	104.25	107.90	0.0050	455	11.33	12.46	11.25	12.46
OaklandAvCrest	BASE	10yr-24hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	10yr-24hr	23.94	121.78	121.89	0.0050	380628	10.00	25.84	23.94	0.66
Aquifer	BASE	2 inch-1 hr	0.00	77.00	77.00	0.0000	0	2.18	0.71	0.00	0.00
Charter Pond	BASE	2 inch-1 hr	0.00	103.80	103.80	0.0000	3	0.00	0.00	0.00	0.00
Lower Basin	BASE	2 inch-1 hr	2.18	107.64	109.60	0.0050	11516	1.00	4.59	2.18	0.71
Manhole D-5	BASE	2 inch-1 hr	0.00	105.01	108.72	0.0000	439	0.00	0.00	0.00	0.00
Manhole D-6	BASE	2 inch-1 hr	0.00	105.01	110.92	0.0000	497	0.00	0.00	0.00	0.00
Manhole D-8	BASE	2 inch-1 hr	0.00	103.80	111.78	0.0000	740	0.00	0.00	0.00	0.00
Manhole D-9	BASE	2 inch-1 hr	0.00	103.80	107.90	0.0000	504	0.00	0.00	0.00	0.00
OaklandAvCrest	BASE	2 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	2 inch-1 hr	3.43	119.69	121.89	0.0050	68467	0.83	11.74	0.00	0.00
Aquifer	BASE	25yr-24hr	0.00	77.00	77.00	0.0000	0	11.50	1.01	0.00	0.00
Charter Pond	BASE	25yr-24hr	0.00	103.80	103.80	0.0000	3	11.55	12.76	0.00	0.00
Lower Basin	BASE	25yr-24hr	11.50	110.60	109.60	0.0050	95797	9.25	28.32	11.55	13.83
Manhole D-5	BASE	25yr-24hr	11.34	107.31	108.72	0.0050	438	11.55	12.82	10.97	12.93
Manhole D-6	BASE	25yr-24hr	11.55	107.01	110.92	-0.0038	528	10.97	12.93	11.55	12.77
Manhole D-8	BASE	25yr-24hr	11.56	105.45	111.78	-0.0050	683	11.55	12.77	11.56	12.76
Manhole D-9	BASE	25yr-24hr	11.55	104.28	107.90	-0.0050	455	11.56	12.76	11.55	12.76
OaklandAvCrest	BASE	25yr-24hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	25yr-24hr	14.47	121.89	121.89	0.0050	402003	9.25	35.35	14.47	6.46
Aquifer	BASE	25yr-96hr	0.00	77.00	77.00	0.0000	0	64.81	1.19	0.00	0.00
Charter Pond	BASE	25yr-96hr	0.00	103.80	103.80	0.0000	3	64.94	14.11	0.00	0.00
Lower Basin	BASE	25yr-96hr	64.81	112.81	109.60	0.0050	187269	60.25	81.53	64.81	15.74
Manhole D-5	BASE	25yr-96hr	64.92	107.86	108.72	0.0050	439	64.64	14.11	68.09	14.14
Manhole D-6	BASE	25yr-96hr	64.92	107.27	110.92	-0.0046	455	68.09	14.14	64.89	14.11
Manhole D-8	BASE	25yr-96hr	64.94	105.82	111.78	-0.0050	468	64.89	14.11	64.94	14.11
Manhole D-9	BASE	25yr-96hr	64.94	104.38	107.90	0.0050	455	64.94	14.11	64.94	14.11

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
OaklandAvCrest	BASE	25yr-96hr	0.00	100.00	100.00	0.0000	0	64.81	0.44	0.00	0.00
Upper Basin	BASE	25yr-96hr	61.77	122.07	121.89	0.0027	438657	60.17	120.13	61.77	23.09
Aquifer	BASE	3 inch-1 hr	0.00	77.00	77.00	0.0000	0	1.43	0.82	0.00	0.00
Charter Pond	BASE	3 inch-1 hr	0.00	103.80	103.80	0.0000	3	1.52	6.73	0.00	0.00
Lower Basin	BASE	3 inch-1 hr	1.43	108.57	109.60	0.0050	25959	1.00	15.28	1.43	7.64
Manhole D-5	BASE	3 inch-1 hr	1.45	106.58	108.72	0.0050	496	1.43	6.83	1.44	6.82
Manhole D-6	BASE	3 inch-1 hr	1.48	106.33	110.92	-0.0039	812	1.44	6.82	1.48	6.78
Manhole D-8	BASE	3 inch-1 hr	1.51	104.26	111.78	-0.0046	774	1.48	6.78	1.51	6.73
Manhole D-9	BASE	3 inch-1 hr	1.52	103.93	107.90	-0.0049	455	1.51	6.73	1.52	6.73
OaklandAvCrest	BASE	3 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	3 inch-1 hr	3.42	120.07	121.89	0.0050	105009	0.92	20.89	0.00	0.00
Aquifer	BASE4	inch rainfall	0.00	77.00	77.00	0.0000	0	1.33	0.91	0.00	0.00
Charter Pond	BASE4	inch rainfall	0.00	103.80	103.80	0.0000	3	1.43	11.65	0.00	0.00
Lower Basin	BASE4	inch rainfall	1.33	109.52	109.60	0.0050	53461	0.63	41.19	1.33	12.57
Manhole D-5	BASE4	inch rainfall	1.35	107.14	108.72	0.0050	473	1.33	11.65	1.33	11.65
Manhole D-6	BASE4	inch rainfall	1.38	106.88	110.92	-0.0038	686	1.33	11.65	1.38	11.65
Manhole D-8	BASE4	inch rainfall	1.43	105.18	111.78	-0.0049	728	1.38	11.65	1.43	11.65
Manhole D-9	BASE4	inch rainfall	1.43	104.20	107.90	0.0046	455	1.43	11.65	1.43	11.65
OaklandAvCrest	BASE4	inch rainfall	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE4	inch rainfall	2.92	120.65	121.89	0.0049	174074	0.60	57.56	0.00	0.00
Aquifer	BASE	4 inch-1 hr	0.00	77.00	77.00	0.0000	0	1.57	0.89	0.00	0.00
Charter Pond	BASE	4 inch-1 hr	0.00	103.80	103.80	0.0000	3	1.66	11.01	0.00	0.00
Lower Basin	BASE	4 inch-1 hr	1.57	109.27	109.60	0.0050	44955	1.00	31.12	1.57	11.91
Manhole D-5	BASE	4 inch-1 hr	1.58	107.06	108.72	0.0050	479	1.57	11.02	1.58	11.02
Manhole D-6	BASE	4 inch-1 hr	1.60	106.81	110.92	-0.0039	717	1.58	11.02	1.59	11.02
Manhole D-8	BASE	4 inch-1 hr	1.66	105.03	111.78	-0.0050	740	1.59	11.02	1.66	11.01
Manhole D-9	BASE	4 inch-1 hr	1.66	104.15	107.90	-0.0041	455	1.66	11.01	1.66	11.01
OaklandAvCrest	BASE	4 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	4 inch-1 hr	3.42	120.52	121.89	0.0050	158909	0.92	40.29	0.00	0.00
Aquifer	BASE	Mean Annual	0.00	77.00	77.00	0.0000	0	10.29	0.81	0.00	0.00
Charter Pond	BASE	Mean Annual	0.00	103.80	103.80	0.0000	3	10.36	5.90	0.00	0.00
Lower Basin	BASE	Mean Annual	10.29	108.55	109.60	0.0050	25561	10.09	7.04	10.29	6.73
Manhole D-5	BASE	Mean Annual	10.31	106.48	108.72	0.0050	497	10.29	5.92	10.30	5.92
Manhole D-6	BASE	Mean Annual	10.33	106.23	110.92	0.0032	819	10.30	5.92	10.33	5.91
Manhole D-8	BASE	Mean Annual	10.36	104.15	111.78	0.0043	775	10.33	5.91	10.36	5.90
Manhole D-9	BASE	Mean Annual	10.36	103.90	107.90	0.0050	455	10.36	5.90	10.36	5.90
OaklandAvCrest	BASE	Mean Annual	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
Upper Basin	BASE	Mean Annual	26.42	120.65	121.89	0.0050	174812	10.09	7.22	0.00	0.00

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
Basin 2 Crest	BASE	1 inch-1 hr	0.00	0.00	0.000	3.42	119.33	1.54	106.32
Drainwell	BASE	1 inch-1 hr	1.54	0.52	0.008	1.54	106.32	0.00	77.00
Manhole D-4	BASE	1 inch-1 hr	0.00	0.00	0.000	1.54	106.32	0.00	105.01
Oakland Av Cres	BASE	1 inch-1 hr	0.00	0.00	0.000	1.54	106.32	0.00	100.00
Pipe D-5	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	105.01	0.00	105.01
Pipe D-6	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	105.01	0.00	103.80
Pipe D-8	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	103.80	0.00	103.80
Pipe D-9	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	103.80	0.00	103.80
Basin 2 Crest	BASE	100yr-24hr	12.03	18.71	0.101	12.03	122.03	14.94	112.84
Drainwell	BASE	100yr-24hr	14.94	1.19	0.004	14.94	112.84	0.00	77.00
Manhole D-4	BASE	100yr-24hr	14.74	14.13	1.500	14.94	112.84	15.06	107.87
Oakland Av Cres	BASE	100yr-24hr	14.94	2.11	0.094	14.94	112.84	0.00	100.00
Pipe D-5	BASE	100yr-24hr	17.88	14.13	0.215	15.06	107.87	15.08	107.28
Pipe D-6	BASE	100yr-24hr	15.04	14.13	-0.037	15.08	107.28	15.09	105.82
Pipe D-8	BASE	100yr-24hr	15.08	14.13	0.787	15.09	105.82	15.09	104.38
Pipe D-9	BASE	100yr-24hr	15.09	14.13	0.704	15.09	104.38	0.00	103.80
Basin 2 Crest	BASE	10yr-24hr	23.94	0.66	0.000	23.94	121.78	11.14	109.91
Drainwell	BASE	10yr-24hr	11.14	0.95	0.005	11.14	109.91	0.00	77.00
Manhole D-4	BASE	10yr-24hr	11.12	12.46	1.498	11.14	109.91	11.33	107.25
Oakland Av Cres	BASE	10yr-24hr	0.00	0.00	0.000	11.14	109.91	0.00	100.00
Pipe D-5	BASE	10yr-24hr	11.51	12.53	-0.058	11.33	107.25	11.17	106.98
Pipe D-6	BASE	10yr-24hr	11.08	12.46	-0.032	11.17	106.98	11.08	104.96
Pipe D-8	BASE	10yr-24hr	11.33	12.46	1.495	11.25	105.37	11.25	104.25
Pipe D-9	BASE	10yr-24hr	11.25	12.46	1.081	11.25	104.25	0.00	103.80
Basin 2 Crest	BASE	2 inch-1 hr	0.00	0.00	0.000	3.43	119.69	2.18	107.64
Drainwell	BASE	2 inch-1 hr	2.18	0.71	0.008	2.18	107.64	0.00	77.00
Manhole D-4	BASE	2 inch-1 hr	0.00	0.00	0.000	2.18	107.64	0.00	105.01
Oakland Av Cres	BASE	2 inch-1 hr	0.00	0.00	0.000	2.18	107.64	0.00	100.00
Pipe D-5	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	105.01	0.00	105.01
Pipe D-6	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	105.01	0.00	103.80
Pipe D-8	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	103.80	0.00	103.80
Pipe D-9	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	103.80	0.00	103.80
Basin 2 Crest	BASE	25yr-24hr	14.47	6.46	0.052	14.47	121.89	11.50	110.60
Drainwell	BASE	25yr-24hr	11.50	1.01	0.004	11.50	110.60	0.00	77.00
Manhole D-4	BASE	25yr-24hr	11.55	12.82	1.497	11.50	110.60	11.34	107.31
Oakland Av Cres	BASE	25yr-24hr	0.00	0.00	0.000	11.50	110.60	0.00	100.00
Pipe D-5	BASE	25yr-24hr	10.97	12.93	-0.185	11.34	107.31	11.55	107.01
Pipe D-6	BASE	25yr-24hr	11.55	12.77	-0.034	11.55	107.01	11.55	104.99
Pipe D-8	BASE	25yr-24hr	11.56	12.76	1.310	11.56	105.45	11.55	104.28
Pipe D-9	BASE	25yr-24hr	11.55	12.76	0.709	11.55	104.28	0.00	103.80
Basin 2 Crest	BASE	25yr-96hr	61.77	23.09	0.091	61.77	122.07	64.81	112.81
Drainwell	BASE	25yr-96hr	64.81	1.19	0.001	64.81	112.81	0.00	77.00
Manhole D-4	BASE	25yr-96hr	64.64	14.11	1.506	64.81	112.81	64.92	107.86
Oakland Av Cres	BASE	25yr-96hr	64.81	0.44	0.024	64.81	112.81	0.00	100.00
Pipe D-5	BASE	25yr-96hr	68.09	14.14	0.228	64.92	107.86	64.92	107.27
Pipe D-6	BASE	25yr-96hr	64.89	14.11	0.038	64.92	107.27	64.94	105.82
Pipe D-8	BASE	25yr-96hr	64.94	14.11	1.466	64.94	105.82	64.94	104.38
Pipe D-9	BASE	25yr-96hr	64.94	14.11	0.919	64.94	104.38	0.00	103.80
Basin 2 Crest	BASE	3 inch-1 hr	0.00	0.00	0.000	3.42	120.07	1.43	108.57
Drainwell	BASE	3 inch-1 hr	1.43	0.82	0.007	1.43	108.57	0.00	77.00
Manhole D-4	BASE	3 inch-1 hr	1.43	6.83	0.047	1.43	108.57	1.45	106.58
Oakland Av Cres	BASE	3 inch-1 hr	0.00	0.00	0.000	1.43	108.57	0.00	100.00
Pipe D-5	BASE	3 inch-1 hr	1.44	6.82	-0.033	1.45	106.58	1.44	105.94
Pipe D-6	BASE	3 inch-1 hr	1.48	6.78	-0.032	1.48	106.33	1.48	104.54
Pipe D-8	BASE	3 inch-1 hr	1.51	6.73	1.436	1.51	104.26	1.52	103.93
Pipe D-9	BASE	3 inch-1 hr	1.52	6.73	1.027	1.52	103.93	0.00	103.80
Basin 2 Crest	BASE4	inch rainfall	0.00	0.00	0.000	2.92	120.65	1.33	109.52
Drainwell	BASE4	inch rainfall	1.33	0.91	0.008	1.33	109.52	0.00	77.00
Manhole D-4	BASE4	inch rainfall	1.33	11.65	1.653	1.33	109.52	1.35	107.14
Oakland Av Cres	BASE4	inch rainfall	0.00	0.00	0.000	1.33	109.52	0.00	100.00
Pipe D-5	BASE4	inch rainfall	1.33	11.65	-0.060	1.35	107.14	1.33	106.31
Pipe D-6	BASE4	inch rainfall	1.38	11.65	-0.035	1.38	106.88	1.38	104.90
Pipe D-8	BASE4	inch rainfall	1.43	11.65	1.227	1.43	105.18	1.43	104.20
Pipe D-9	BASE4	inch rainfall	1.43	11.65	0.877	1.43	104.20	0.00	103.80
Basin 2 Crest	BASE	4 inch-1 hr	0.00	0.00	0.000	3.42	120.52	1.57	109.27
Drainwell	BASE	4 inch-1 hr	1.57	0.89	0.008	1.57	109.27	0.00	77.00
Manhole D-4	BASE	4 inch-1 hr	1.57	11.02	1.601	1.57	109.27	1.58	107.06
Oakland Av Cres	BASE	4 inch-1 hr	0.00	0.00	0.000	1.57	109.27	0.00	100.00
Pipe D-5	BASE	4 inch-1 hr	1.58	11.02	-0.044	1.58	107.06	1.58	106.26
Pipe D-6	BASE	4 inch-1 hr	1.59	11.02	-0.035	1.60	106.81	1.59	104.86
Pipe D-8	BASE	4 inch-1 hr	1.66	11.01	1.298	1.66	105.03	1.66	104.15
Pipe D-9	BASE	4 inch-1 hr	1.66	11.01	0.913	1.66	104.15	0.00	103.80
Basin 2 Crest	BASE	Mean Annual	0.00	0.00	0.000	26.42	120.65	10.29	108.55

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
Drainwell	BASE	Mean Annual	10.29	0.81	0.004	10.29	108.55	0.00	77.00
Manhole D-4	BASE	Mean Annual	10.29	5.92	0.034	10.29	108.55	10.31	106.48
Oakland Av Cres	BASE	Mean Annual	0.00	0.00	0.000	10.29	108.55	0.00	100.00
Pipe D-5	BASE	Mean Annual	10.30	5.92	-0.024	10.31	106.48	10.30	105.87
Pipe D-6	BASE	Mean Annual	10.33	5.91	-0.025	10.33	106.23	10.33	104.47
Pipe D-8	BASE	Mean Annual	10.36	5.90	1.494	10.36	104.15	10.36	103.90
Pipe D-9	BASE	Mean Annual	10.36	5.90	1.054	10.36	103.90	0.00	103.80


Node Lower Basin
114
112
110
108
106
104
Stage(ft)
0
20
40
60
80
100
120
140
Time(hrs)
100yr-24hr
Mean Annual
10yr-24hr
25yr-96hr
25yr-24hr

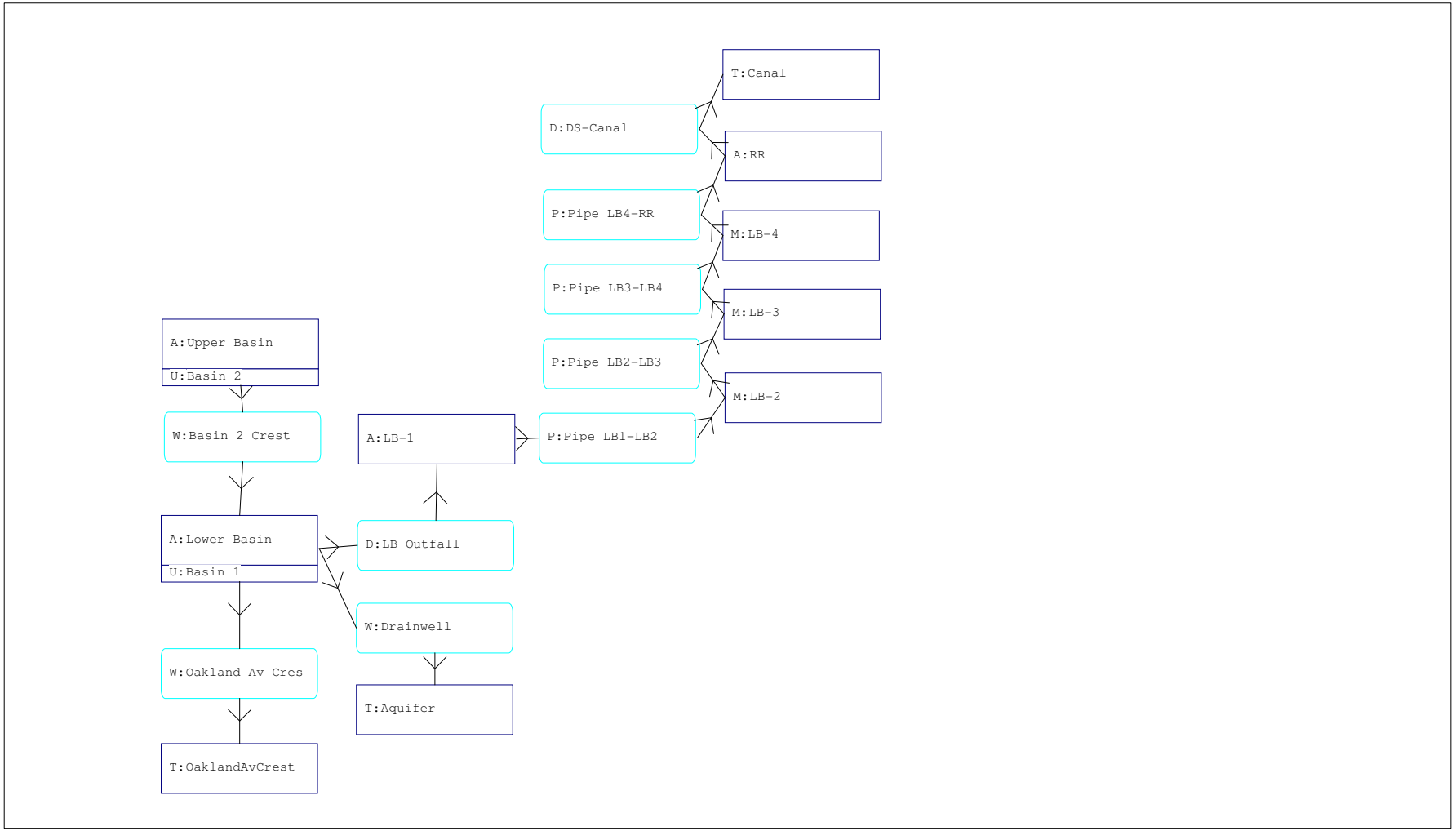
APPENDIX D:
LOWER BASIN
DESIGN STORM EVENT ROUTING
USING adICPR
PROPOSED CONDITIONS

Town Of Oakland
Lower Basin Proposed Conditions

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



Basins

Name: Basin 1 | Node: Lower Basin | Status: Onsite
Group: BASE | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 | Peaking Factor: 323.0
Rainfall File: | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 35.00
Area(ac): 32.900 | Time Shift(hrs): 0.00
Curve Number: 59.30 | Max Allowable Q(cfs): 999999.000
DCIA(%): 4.60

Name: Basin 2 | Node: Upper Basin | Status: Onsite
Group: BASE | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 | Peaking Factor: 323.0
Rainfall File: | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 30.00
Area(ac): 55.000 | Time Shift(hrs): 0.00
Curve Number: 48.60 | Max Allowable Q(cfs): 999999.000
DCIA(%): 10.00

Nodes

Name: Aquifer | Base Flow(cfs): 0.000 | Init Stage(ft): 77.000
Group: BASE | Warn Stage(ft): 77.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	77.000
360.00	77.000

Name: Canal | Base Flow(cfs): 0.000 | Init Stage(ft): 98.000
Group: BASE | Warn Stage(ft): 99.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	98.000
999.00	98.000

Name: LB-1 | Base Flow(cfs): 0.000 | Init Stage(ft): 103.600
Group: BASE | Warn Stage(ft): 112.000
Type: Stage/Area

Stage(ft)	Area(ac)
103.600	0.1000
112.000	0.1000

Name: LB-2 | Base Flow(cfs): 0.000 | Init Stage(ft): 103.350
Group: BASE | Plunge Factor: 1.00 | Warn Stage(ft): 112.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)
103.350	0.1000
112.000	0.1000

Name: LB-3 Base Flow(cfs): 0.000 Init Stage(ft): 103.020
Group: BASE Plunge Factor: 1.00 Warn Stage(ft): 112.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)
103.020	0.1000
112.000	0.1000

Name: LB-4 Base Flow(cfs): 0.000 Init Stage(ft): 102.810
Group: BASE Plunge Factor: 1.00 Warn Stage(ft): 110.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)
102.810	0.1000
110.000	0.1000

Name: Lower Basin Base Flow(cfs): 0.000 Init Stage(ft): 104.640
Group: BASE Warn Stage(ft): 109.600
Type: Stage/Area

Elevaions in ft NGVD.
Original Lidar data in NAVD, converted to NGVD

Stage(ft)	Area(ac)
104.640	0.0200
105.889	0.0300
106.889	0.1300
107.889	0.3100
108.889	0.7300
109.889	1.5200
110.889	2.4700

Name: OaklandAvCrest Base Flow(cfs): 0.000 Init Stage(ft): 100.000
Group: BASE Warn Stage(ft): 100.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	100.000
999.00	100.000

Name: RR Base Flow(cfs): 0.000 Init Stage(ft): 101.000
Group: BASE Warn Stage(ft): 105.000
Type: Stage/Area

Stage(ft)	Area(ac)
101.000	0.0220
102.000	0.0370
103.000	0.1430
104.000	0.2220
105.000	0.3020

Name: Upper Basin Base Flow(cfs): 0.000 Init Stage(ft): 117.889

Group: BASE Warn Stage(ft): 121.889
Type: Stage/Area

Elevaions in ft NGVD.
Original Lidar data in NAVD, converted to NGVD

Stage(ft)	Area(ac)
117.889	0.0500
118.889	0.2400
119.889	1.9000
120.889	4.6700
121.750	8.6000
121.889	9.2400

Pipes

Name: Pipe LB1-LB2 From Node: LB-1 Length(ft): 230.00
Group: BASE To Node: LB-2 Count: 1
Friction Equation: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Horz Ellipse	Horz Ellipse	Solution Algorithm:	Most Restrictive
Span(in):	60.00	60.00	Flow:	Both
Rise(in):	38.00	38.00	Entrance Loss Coef:	0.00
Invert(ft):	103.600	103.350	Exit Loss Coef:	0.20
Manning's N:	0.013000	0.013000	Bend Loss Coef:	0.30
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Name: Pipe LB2-LB3 From Node: LB-2 Length(ft): 295.00
Group: BASE To Node: LB-3 Count: 1
Friction Equation: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Horz Ellipse	Horz Ellipse	Solution Algorithm:	Most Restrictive
Span(in):	60.00	60.00	Flow:	Both
Rise(in):	38.00	38.00	Entrance Loss Coef:	0.20
Invert(ft):	103.350	103.020	Exit Loss Coef:	0.30
Manning's N:	0.013000	0.013000	Bend Loss Coef:	0.00
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Name: Pipe LB3-LB4 From Node: LB-3 Length(ft): 196.00
Group: BASE To Node: LB-4 Count: 1
Friction Equation: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Horz Ellipse	Horz Ellipse	Solution Algorithm:	Most Restrictive
Span(in):	60.00	60.00	Flow:	Both
Rise(in):	38.00	38.00	Entrance Loss Coef:	0.20
Invert(ft):	103.020	102.810	Exit Loss Coef:	0.30
Manning's N:	0.013000	0.013000	Bend Loss Coef:	0.00
Top Clip(in):	0.000	0.000	Outlet Ctrl Spec:	Use dc or tw
Bot Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
			Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Name: Pipe LB4-RR	From Node: LB-4	Length(ft): 60.00	
Group: BASE	To Node: RR	Count: 1	
		Friction Equation: Automatic	
	UPSTREAM	DOWNSTREAM	Solution Algorithm: Most Restrictive
Geometry:	Horz Ellipse	Horz Ellipse	Flow: Both
Span(in):	60.00	60.00	Entrance Loss Coef: 0.20
Rise(in):	38.00	38.00	Exit Loss Coef: 0.30
Invert(ft):	102.810	102.500	Bend Loss Coef: 0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec: Use dc
Bot Clip(in):	0.000	0.000	Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

==========

Drop Structures

==========

Name: DS-Canal	From Node: RR	Length(ft): 65.00	
Group: BASE	To Node: Canal	Count: 2	
		Friction Equation: Automatic	
	UPSTREAM	DOWNSTREAM	Solution Algorithm: Most Restrictive
Geometry:	Circular	Circular	Flow: Both
Span(in):	30.00	30.00	Entrance Loss Coef: 0.000
Rise(in):	30.00	30.00	Exit Loss Coef: 1.000
Invert(ft):	98.020	98.075	Outlet Ctrl Spec: Use dc or tw
Manning's N:	0.013000	0.013000	Inlet Ctrl Spec: Use dc
Top Clip(in):	0.000	0.000	Solution Incs: 10
Bot Clip(in):	0.000	0.000	

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 1 for Drop Structure DS-Canal ***

TABLE

Count:	2	Bottom Clip(in):	0.000
Type:	Horizontal	Top Clip(in):	0.000
Flow:	Both	Weir Disc Coef:	3.200
Geometry:	Rectangular	Orifice Disc Coef:	0.600
Span(in):	49.00	Invert(ft):	101.600
Rise(in):	37.00	Control Elev(ft):	101.600

Name: LB Outfall	From Node: Lower Basin	Length(ft): 212.00	
Group: BASE	To Node: LB-1	Count: 1	
		Friction Equation: Automatic	
	UPSTREAM	DOWNSTREAM	Solution Algorithm: Most Restrictive
Geometry:	Horz Ellipse	Horz Ellipse	Flow: Both
Span(in):	60.00	60.00	

```
     Rise(in): 38.00          38.00                    Entrance Loss Coef: 0.200
   Invert(ft): 103.830        103.600                      Exit Loss Coef: 0.300
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

FDOT Type H Storm Inlet (3' x 8' 9")
38" x 60" elliptical pipe (48" equivalent)

*** Weir 1 of 1 for Drop Structure LB Outfall ***
                                                                                TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal                Top Clip(in): 0.000
                  Flow: Both                    Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 105.00                       Invert(ft): 108.500
              Rise(in): 36.00                  Control Elev(ft): 108.500


================================================================================================
==== Weirs =====================================================================================
================================================================================================

         Name: Basin 2 Crest       From Node: Upper Basin
        Group: BASE                  To Node: Lower Basin
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                     Span(in): 480.00
                     Rise(in): 999.00
                   Invert(ft): 121.750
       Control Elevation(ft): 121.750
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
       Orifice Discharge Coef: 0.600



------------------------------------------------------------------------------------------------
         Name: Drainwell           From Node: Lower Basin
        Group: BASE                  To Node: Aquifer
         Flow: Positive                Count: 1
         Type: Horizontal           Geometry: Circular

                     Span(in): 4.00
                     Rise(in): 4.00
                   Invert(ft): 104.800
       Control Elevation(ft): 104.800
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
       Orifice Discharge Coef: 0.600



------------------------------------------------------------------------------------------------
         Name: Oakland Av Cres     From Node: Lower Basin
        Group: BASE                  To Node: OaklandAvCrest
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                     Span(in): 960.00
                     Rise(in): 999.00
                   Invert(ft): 112.800
       Control Elevation(ft): 112.800
                                          TABLE
```

```
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
       Orifice Discharge Coef: 0.600



================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: 1 inch-1 hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Fdot-1
    Rainfall Amount(in): 1.00

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           1.00
24.000          5.00

--------------------------------------------------------------------------------
         Name: 100yr-24hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          1.00
48.000          5.00

--------------------------------------------------------------------------------
         Name: 10yr-24hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Orange
    Rainfall Amount(in): 7.40

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          1.00
48.000          1.00

--------------------------------------------------------------------------------
         Name: 2 inch-1 hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Fdot-1
    Rainfall Amount(in): 2.00

Time(hrs)       Print Inc(min)
--------------- ---------------
1.000           1.00
24.000          5.00

--------------------------------------------------------------------------------
         Name: 25yr-24hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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

Time(hrs)       Print Inc(min)
```

24.000	1.00
48.000	5.00

Name: 25yr-96hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

Override Defaults: Yes
Storm Duration(hrs): 96.00
Rainfall File: Sjrwmd96
Rainfall Amount(in): 12.00

Time(hrs)	Print Inc(min)
96.000	1.00
120.000	5.00

Name: 3 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Fdot-1
Rainfall Amount(in): 3.00

Time(hrs)	Print Inc(min)
1.000	1.00
24.000	5.00

Name: 4 inch rainfall
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

Override Defaults: Yes
Storm Duration(hrs): 0.50
Rainfall File: Fdot-1
Rainfall Amount(in): 4.30

Time(hrs)	Print Inc(min)
1.000	1.00
24.000	5.00

Name: 4 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Fdot-1
Rainfall Amount(in): 4.00

Time(hrs)	Print Inc(min)
1.000	1.00
24.000	5.00

Name: Mean Annual
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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

Time(hrs)	Print Inc(min)
24.000	1.00
48.000	5.00

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Routing Simulations

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Name: 1 inch-1 hr Hydrology Sim: 1 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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): 0.0100 Max Calc Time(sec): 5.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 100yr-24hr Hydrology Sim: 100yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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): 48.00
Min Calc Time(sec): 0.0100 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 10yr-24hr Hydrology Sim: 10yr-24hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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): 48.00
Min Calc Time(sec): 0.0100 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 2 inch-1 hr Hydrology Sim: 2 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

```
      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): 0.0100              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 25yr-24hr           Hydrology Sim: 25yr-24hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

      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): 48.00
     Min Calc Time(sec): 0.0100              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 25yr-96hr           Hydrology Sim: 25yr-96hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

      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): 120.00
     Min Calc Time(sec): 0.0100              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-------------------------------------------------------------------------------------------------
         Name: 3 inch-1 hr         Hydrology Sim: 3 inch-1 hr
     Filename: C:\Documents and Settings\me\My Documents\_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

      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): 0.0100 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 4 inch rainfall Hydrology Sim: 4 inch rainfall
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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): 0.0100 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 4 inch-1 hr Hydrology Sim: 4 inch-1 hr
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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): 0.0100 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: Mean Annual Hydrology Sim: Mean Annual
Filename: C:\Documents and Settings\me\My Documents_My Work\Oakland 2012\Revised Analyses For Final Report\ICPR\02

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): 48.00
Min Calc Time(sec): 0.0100 Max Calc Time(sec): 60.0000

Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

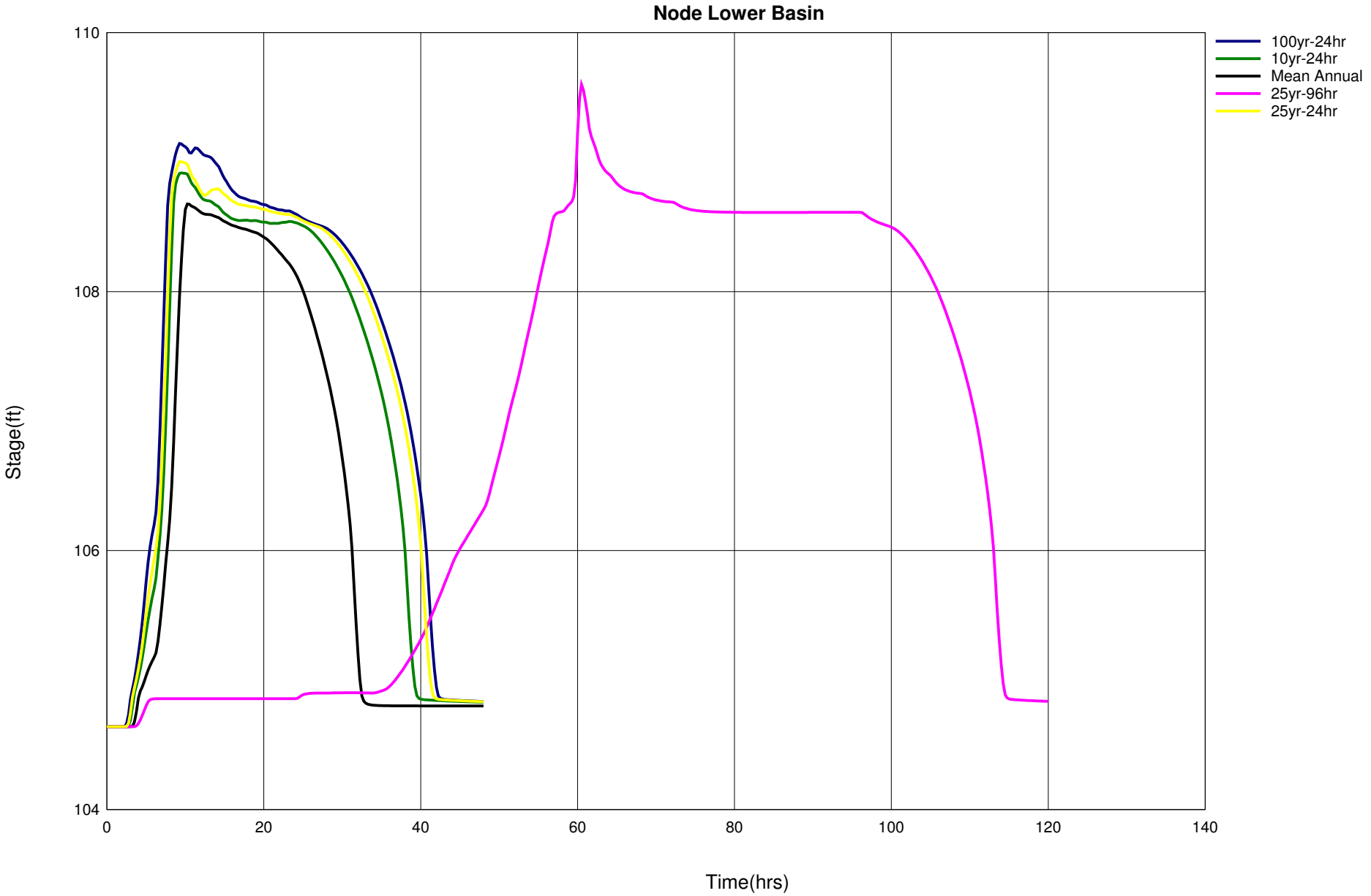
Group	Run
BASE	Yes

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Aquifer	BASE	1 inch-1 hr	0.00	77.00	77.00	0.0000	0	1.54	0.52	0.00	0.00
Canal	BASE	1 inch-1 hr	0.00	98.00	99.00	0.0000	0	0.00	0.00	0.00	0.00
LB-1	BASE	1 inch-1 hr	0.00	103.60	112.00	0.0000	4385	0.00	0.00	0.00	0.00
LB-2	BASE	1 inch-1 hr	0.00	103.35	112.00	0.0000	4422	0.00	0.00	0.00	0.00
LB-3	BASE	1 inch-1 hr	0.00	103.02	112.00	0.0000	4417	0.00	0.00	0.00	0.00
LB-4	BASE	1 inch-1 hr	0.00	102.81	110.00	0.0000	4388	0.00	0.00	0.00	0.00
Lower Basin	BASE	1 inch-1 hr	1.54	106.32	109.60	0.0042	3194	0.87	1.41	1.54	0.52
OaklandAvCrest	BASE	1 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	1 inch-1 hr	0.00	101.00	105.00	0.0000	966	0.00	0.00	0.00	0.00
Upper Basin	BASE	1 inch-1 hr	3.42	119.33	121.89	0.0033	42427	0.80	5.67	0.00	0.00
Aquifer	BASE	100yr-24hr	0.00	77.00	77.00	0.0000	0	9.33	0.88	0.00	0.00
Canal	BASE	100yr-24hr	0.00	98.00	99.00	0.0000	0	9.66	38.19	0.00	0.00
LB-1	BASE	100yr-24hr	9.53	106.13	112.00	-0.0050	4839	9.33	39.05	9.40	38.63
LB-2	BASE	100yr-24hr	9.55	105.94	112.00	-0.0049	5443	9.40	38.63	9.50	38.37
LB-3	BASE	100yr-24hr	9.60	105.51	112.00	0.0048	5411	9.50	38.37	9.58	38.23
LB-4	BASE	100yr-24hr	9.63	105.15	110.00	0.0050	4934	9.58	38.23	9.62	38.19
Lower Basin	BASE	100yr-24hr	9.33	109.15	109.60	0.0050	40645	9.19	40.41	9.33	39.93
OaklandAvCrest	BASE	100yr-24hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	100yr-24hr	9.66	102.16	105.00	0.0050	2485	9.62	38.19	9.66	38.19
Upper Basin	BASE	100yr-24hr	12.03	122.03	121.89	0.0050	430293	9.20	53.46	12.03	18.72
Aquifer	BASE	10yr-24hr	0.00	77.00	77.00	0.0000	0	9.42	0.85	0.00	0.00
Canal	BASE	10yr-24hr	0.00	98.00	99.00	0.0000	0	10.02	20.02	0.00	0.00
LB-1	BASE	10yr-24hr	9.75	105.20	112.00	0.0050	4931	9.42	20.33	9.54	20.15
LB-2	BASE	10yr-24hr	9.82	105.02	112.00	0.0046	5667	9.54	20.15	9.71	20.05
LB-3	BASE	10yr-24hr	9.92	104.67	112.00	0.0046	5583	9.71	20.05	9.88	20.02
LB-4	BASE	10yr-24hr	9.96	104.39	110.00	0.0048	4994	9.88	20.02	9.94	20.02
Lower Basin	BASE	10yr-24hr	9.42	108.92	109.60	0.0050	32800	9.25	21.46	9.42	21.18
OaklandAvCrest	BASE	10yr-24hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	10yr-24hr	10.02	101.96	105.00	0.0050	1730	9.94	20.02	10.02	20.02
Upper Basin	BASE	10yr-24hr	23.94	121.78	121.89	0.0050	380634	10.06	25.86	23.94	0.67
Aquifer	BASE	2 inch-1 hr	0.00	77.00	77.00	0.0000	0	2.18	0.71	0.00	0.00
Canal	BASE	2 inch-1 hr	0.00	98.00	99.00	0.0000	0	0.00	0.00	0.00	0.00
LB-1	BASE	2 inch-1 hr	0.00	103.60	112.00	0.0000	4385	0.00	0.00	0.00	0.00
LB-2	BASE	2 inch-1 hr	0.00	103.35	112.00	0.0000	4422	0.00	0.00	0.00	0.00
LB-3	BASE	2 inch-1 hr	0.00	103.02	112.00	0.0000	4417	0.00	0.00	0.00	0.00
LB-4	BASE	2 inch-1 hr	0.00	102.81	110.00	0.0000	4388	0.00	0.00	0.00	0.00
Lower Basin	BASE	2 inch-1 hr	2.18	107.64	109.60	0.0050	11516	1.00	4.59	2.18	0.71
OaklandAvCrest	BASE	2 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	2 inch-1 hr	0.00	101.00	105.00	0.0000	966	0.00	0.00	0.00	0.00
Upper Basin	BASE	2 inch-1 hr	3.43	119.69	121.89	0.0050	68506	0.80	11.78	0.00	0.00
Aquifer	BASE	25yr-24hr	0.00	77.00	77.00	0.0000	0	9.37	0.86	0.00	0.00
Canal	BASE	25yr-24hr	0.00	98.00	99.00	0.0000	0	9.75	26.57	0.00	0.00
LB-1	BASE	25yr-24hr	9.59	105.53	112.00	0.0050	4919	9.37	27.10	9.46	26.83
LB-2	BASE	25yr-24hr	9.63	105.36	112.00	0.0048	5634	9.46	26.83	9.56	26.67
LB-3	BASE	25yr-24hr	9.70	104.98	112.00	0.0047	5557	9.56	26.67	9.67	26.58
LB-4	BASE	25yr-24hr	9.74	104.68	110.00	0.0050	4986	9.67	26.58	9.74	26.57
Lower Basin	BASE	25yr-24hr	9.37	109.01	109.60	0.0050	35838	9.25	28.32	9.37	27.96
OaklandAvCrest	BASE	25yr-24hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	25yr-24hr	9.75	102.04	105.00	0.0050	1931	9.74	26.57	9.75	26.57
Upper Basin	BASE	25yr-24hr	14.48	121.89	121.89	0.0050	402025	9.20	35.48	14.48	6.47
Aquifer	BASE	25yr-96hr	0.00	77.00	77.00	0.0000	0	60.52	0.92	0.00	0.00
Canal	BASE	25yr-96hr	0.00	98.00	99.00	0.0000	0	60.81	59.39	0.00	0.00

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
LB-1	BASE	25yr-96hr	60.66	108.47	112.00	0.0050	4385	60.22	72.79	60.29	63.49
LB-2	BASE	25yr-96hr	60.71	107.74	112.00	0.0050	4422	60.29	63.49	60.59	59.90
LB-3	BASE	25yr-96hr	60.77	106.60	112.00	0.0050	4418	60.59	59.90	61.03	59.61
LB-4	BASE	25yr-96hr	60.78	105.97	110.00	0.0050	4426	61.03	59.61	60.78	59.39
Lower Basin	BASE	25yr-96hr	60.52	109.60	109.60	0.0050	56301	60.20	82.78	60.22	73.70
OaklandAvCrest	BASE	25yr-96hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	25yr-96hr	60.81	102.35	105.00	0.0050	3335	60.78	59.39	60.81	59.39
Upper Basin	BASE	25yr-96hr	61.77	122.07	121.89	0.0029	438692	60.18	120.29	61.77	23.11
Aquifer	BASE	3 inch-1 hr	0.00	77.00	77.00	0.0000	0	1.52	0.83	0.00	0.00
Canal	BASE	3 inch-1 hr	0.00	98.00	99.00	0.0000	0	2.31	3.57	0.00	0.00
LB-1	BASE	3 inch-1 hr	1.67	104.34	112.00	0.0050	4854	1.52	5.62	1.71	5.20
LB-2	BASE	3 inch-1 hr	1.87	104.08	112.00	0.0036	5490	1.71	5.20	1.92	4.60
LB-3	BASE	3 inch-1 hr	2.08	103.70	112.00	0.0032	5390	1.92	4.60	2.12	4.02
LB-4	BASE	3 inch-1 hr	2.29	103.43	110.00	0.0035	4888	2.12	4.02	2.30	3.57
Lower Basin	BASE	3 inch-1 hr	1.52	108.68	109.60	0.0050	27928	1.00	15.29	1.52	6.45
OaklandAvCrest	BASE	3 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	3 inch-1 hr	2.31	101.71	105.00	0.0050	1539	2.30	3.57	2.31	3.57
Upper Basin	BASE	3 inch-1 hr	3.42	120.07	121.89	0.0050	105066	0.93	20.91	0.00	0.00
Aquifer	BASE4	inch rainfall	0.00	77.00	77.00	0.0000	0	0.87	0.86	0.00	0.00
Canal	BASE4	inch rainfall	0.00	98.00	99.00	0.0000	0	1.22	22.72	0.00	0.00
LB-1	BASE4	inch rainfall	1.00	105.46	112.00	0.0050	4924	0.87	29.73	0.94	28.55
LB-2	BASE4	inch rainfall	1.02	105.26	112.00	0.0038	5651	0.94	28.55	1.03	26.38
LB-3	BASE4	inch rainfall	1.16	104.81	112.00	0.0035	5576	1.03	26.38	1.13	24.59
LB-4	BASE4	inch rainfall	1.21	104.51	110.00	0.0034	4992	1.13	24.59	1.21	22.72
Lower Basin	BASE4	inch rainfall	0.87	109.04	109.60	0.0050	36948	0.63	41.19	0.87	30.59
OaklandAvCrest	BASE4	inch rainfall	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE4	inch rainfall	1.22	101.99	105.00	0.0050	1753	1.21	22.72	1.22	22.72
Upper Basin	BASE4	inch rainfall	2.92	120.65	121.89	0.0050	174129	0.60	57.56	0.00	0.00
Aquifer	BASE	4 inch-1 hr	0.00	77.00	77.00	0.0000	0	1.21	0.86	0.00	0.00
Canal	BASE	4 inch-1 hr	0.00	98.00	99.00	0.0000	0	1.60	17.41	0.00	0.00
LB-1	BASE	4 inch-1 hr	1.29	105.18	112.00	0.0050	4931	1.21	22.86	1.29	21.90
LB-2	BASE	4 inch-1 hr	1.37	104.98	112.00	0.0040	5667	1.29	21.90	1.38	20.24
LB-3	BASE	4 inch-1 hr	1.49	104.55	112.00	0.0035	5582	1.38	20.24	1.49	18.87
LB-4	BASE	4 inch-1 hr	1.59	104.27	110.00	0.0034	4992	1.49	18.87	1.59	17.41
Lower Basin	BASE	4 inch-1 hr	1.21	108.95	109.60	0.0050	33972	1.00	31.11	1.21	23.72
OaklandAvCrest	BASE	4 inch-1 hr	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	4 inch-1 hr	1.60	101.93	105.00	0.0050	1707	1.59	17.41	1.60	17.41
Upper Basin	BASE	4 inch-1 hr	3.42	120.52	121.89	0.0050	158986	0.93	40.57	0.00	0.00
Aquifer	BASE	Mean Annual	0.00	77.00	77.00	0.0000	0	10.34	0.83	0.00	0.00
Canal	BASE	Mean Annual	0.00	98.00	99.00	0.0000	0	11.04	5.00	0.00	0.00
LB-1	BASE	Mean Annual	10.40	104.36	112.00	0.0050	4865	10.34	5.71	10.43	5.69
LB-2	BASE	Mean Annual	10.59	104.14	112.00	0.0042	5529	10.43	5.69	10.60	5.45
LB-3	BASE	Mean Annual	10.80	103.79	112.00	0.0043	5435	10.60	5.45	10.81	5.24
LB-4	BASE	Mean Annual	11.01	103.55	110.00	0.0041	4916	10.81	5.24	11.02	5.00
Lower Basin	BASE	Mean Annual	10.34	108.68	109.60	0.0050	27964	10.12	7.05	10.34	6.54
OaklandAvCrest	BASE	Mean Annual	0.00	100.00	100.00	0.0000	0	0.00	0.00	0.00	0.00
RR	BASE	Mean Annual	11.04	101.74	105.00	0.0050	1564	11.02	5.00	11.04	5.00
Upper Basin	BASE	Mean Annual	26.43	120.65	121.89	0.0050	174821	10.13	7.23	0.00	0.00

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
Basin 2 Crest	BASE	1 inch-1 hr	0.00	0.00	0.000	3.42	119.33	1.54	106.32
Drainwell	BASE	1 inch-1 hr	1.54	0.52	0.005	1.54	106.32	0.00	77.00
DS-Canal	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	101.00	0.00	98.00
LB Outfall	BASE	1 inch-1 hr	0.00	0.00	0.000	1.54	106.32	0.00	103.60
Oakland Av Cres	BASE	1 inch-1 hr	0.00	0.00	0.000	1.54	106.32	0.00	100.00
Pipe LB1-LB2	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	103.60	0.00	103.35
Pipe LB2-LB3	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	103.35	0.00	103.02
Pipe LB3-LB4	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	103.02	0.00	102.81
Pipe LB4-RR	BASE	1 inch-1 hr	0.00	0.00	0.000	0.00	102.81	0.00	101.00
Basin 2 Crest	BASE	100yr-24hr	12.03	18.72	0.221	12.03	122.03	9.33	109.15
Drainwell	BASE	100yr-24hr	9.33	0.88	-0.005	9.33	109.15	0.00	77.00
DS-Canal	BASE	100yr-24hr	9.66	38.19	0.138	9.66	102.16	0.00	98.00
LB Outfall	BASE	100yr-24hr	9.33	39.05	-0.124	9.33	109.15	9.53	106.13
Oakland Av Cres	BASE	100yr-24hr	0.00	0.00	0.000	9.33	109.15	0.00	100.00
Pipe LB1-LB2	BASE	100yr-24hr	9.40	38.63	-0.112	9.53	106.13	9.55	105.94
Pipe LB2-LB3	BASE	100yr-24hr	9.50	38.37	1.242	9.55	105.94	9.60	105.51
Pipe LB3-LB4	BASE	100yr-24hr	9.58	38.23	-0.098	9.60	105.51	9.63	105.15
Pipe LB4-RR	BASE	100yr-24hr	9.62	38.19	0.803	9.63	105.15	9.62	103.84
Basin 2 Crest	BASE	10yr-24hr	23.94	0.67	0.004	23.94	121.78	9.42	108.92
Drainwell	BASE	10yr-24hr	9.42	0.85	-0.005	9.42	108.92	0.00	77.00
DS-Canal	BASE	10yr-24hr	10.02	20.02	0.128	10.02	101.96	0.00	98.00
LB Outfall	BASE	10yr-24hr	9.42	20.33	0.110	9.42	108.92	9.75	105.20
Oakland Av Cres	BASE	10yr-24hr	0.00	0.00	0.000	9.42	108.92	0.00	100.00
Pipe LB1-LB2	BASE	10yr-24hr	9.54	20.15	-0.084	9.75	105.20	9.82	105.02
Pipe LB2-LB3	BASE	10yr-24hr	9.71	20.05	1.121	9.82	105.02	9.92	104.67
Pipe LB3-LB4	BASE	10yr-24hr	9.88	20.02	0.079	9.92	104.67	9.96	104.39
Pipe LB4-RR	BASE	10yr-24hr	9.94	20.02	0.772	9.96	104.39	9.94	103.45
Basin 2 Crest	BASE	2 inch-1 hr	0.00	0.00	0.000	3.43	119.69	2.18	107.64
Drainwell	BASE	2 inch-1 hr	2.18	0.71	0.008	2.18	107.64	0.00	77.00
DS-Canal	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	101.00	0.00	98.00
LB Outfall	BASE	2 inch-1 hr	0.00	0.00	0.000	2.18	107.64	0.00	103.60
Oakland Av Cres	BASE	2 inch-1 hr	0.00	0.00	0.000	2.18	107.64	0.00	100.00
Pipe LB1-LB2	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	103.60	0.00	103.35
Pipe LB2-LB3	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	103.35	0.00	103.02
Pipe LB3-LB4	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	103.02	0.00	102.81
Pipe LB4-RR	BASE	2 inch-1 hr	0.00	0.00	0.000	0.00	102.81	0.00	101.00
Basin 2 Crest	BASE	25yr-24hr	14.48	6.47	0.082	14.48	121.89	9.37	109.01
Drainwell	BASE	25yr-24hr	9.37	0.86	-0.005	9.37	109.01	0.00	77.00
DS-Canal	BASE	25yr-24hr	9.75	26.57	0.137	9.75	102.04	0.00	98.00
LB Outfall	BASE	25yr-24hr	9.37	27.10	0.112	9.37	109.01	9.59	105.53
Oakland Av Cres	BASE	25yr-24hr	0.00	0.00	0.000	9.37	109.01	0.00	100.00
Pipe LB1-LB2	BASE	25yr-24hr	9.46	26.83	-0.088	9.59	105.53	9.63	105.36
Pipe LB2-LB3	BASE	25yr-24hr	9.56	26.67	1.218	9.63	105.36	9.70	104.98
Pipe LB3-LB4	BASE	25yr-24hr	9.67	26.58	-0.080	9.70	104.98	9.74	104.68
Pipe LB4-RR	BASE	25yr-24hr	9.74	26.57	0.814	9.74	104.68	9.74	103.60
Basin 2 Crest	BASE	25yr-96hr	61.77	23.11	0.227	61.77	122.07	60.52	109.60
Drainwell	BASE	25yr-96hr	60.52	0.92	-0.005	60.52	109.60	0.00	77.00
DS-Canal	BASE	25yr-96hr	60.81	59.39	0.107	60.81	102.35	0.00	98.00
LB Outfall	BASE	25yr-96hr	60.22	72.79	0.150	60.52	109.60	60.66	108.47
Oakland Av Cres	BASE	25yr-96hr	0.00	0.00	0.000	60.52	109.60	0.00	100.00
Pipe LB1-LB2	BASE	25yr-96hr	60.29	63.49	0.140	60.66	108.47	60.71	107.74
Pipe LB2-LB3	BASE	25yr-96hr	60.59	59.90	0.434	60.71	107.74	60.77	106.60
Pipe LB3-LB4	BASE	25yr-96hr	61.03	59.61	0.845	60.77	106.60	60.78	105.97
Pipe LB4-RR	BASE	25yr-96hr	60.78	59.39	-0.129	60.78	105.97	60.78	104.22
Basin 2 Crest	BASE	3 inch-1 hr	0.00	0.00	0.000	3.42	120.07	1.52	108.68
Drainwell	BASE	3 inch-1 hr	1.52	0.83	0.007	1.52	108.68	0.00	77.00
DS-Canal	BASE	3 inch-1 hr	2.31	3.57	0.080	2.31	101.71	0.00	98.00
LB Outfall	BASE	3 inch-1 hr	1.52	5.62	0.076	1.52	108.68	1.67	104.34
Oakland Av Cres	BASE	3 inch-1 hr	0.00	0.00	0.000	1.52	108.68	0.00	100.00
Pipe LB1-LB2	BASE	3 inch-1 hr	1.71	5.20	0.033	1.67	104.34	1.87	104.08
Pipe LB2-LB3	BASE	3 inch-1 hr	1.92	4.60	0.036	1.87	104.08	1.94	103.69
Pipe LB3-LB4	BASE	3 inch-1 hr	2.12	4.02	0.064	2.08	103.70	2.29	103.43
Pipe LB4-RR	BASE	3 inch-1 hr	2.30	3.57	-0.027	2.29	103.43	2.30	102.91
Basin 2 Crest	BASE4	inch rainfall	0.00	0.00	0.000	2.92	120.65	0.87	109.04
Drainwell	BASE4	inch rainfall	0.87	0.86	0.008	0.87	109.04	0.00	77.00
DS-Canal	BASE4	inch rainfall	1.22	22.72	0.142	1.22	101.99	0.00	98.00
LB Outfall	BASE4	inch rainfall	0.87	29.73	0.124	0.87	109.04	1.00	105.46
Oakland Av Cres	BASE4	inch rainfall	0.00	0.00	0.000	0.87	109.04	0.00	100.00
Pipe LB1-LB2	BASE4	inch rainfall	0.94	28.55	0.084	1.00	105.46	1.02	105.26
Pipe LB2-LB3	BASE4	inch rainfall	1.03	26.38	0.590	1.02	105.26	1.16	104.81
Pipe LB3-LB4	BASE4	inch rainfall	1.13	24.59	0.106	1.16	104.81	1.21	104.51
Pipe LB4-RR	BASE4	inch rainfall	1.21	22.72	0.328	1.21	104.51	1.21	103.52
Basin 2 Crest	BASE	4 inch-1 hr	0.00	0.00	0.000	3.42	120.52	1.21	108.95

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
Drainwell	BASE	4 inch-1 hr	1.21	0.86	0.007	1.21	108.95	0.00	77.00
DS-Canal	BASE	4 inch-1 hr	1.60	17.41	0.118	1.60	101.93	0.00	98.00
LB Outfall	BASE	4 inch-1 hr	1.21	22.86	0.108	1.21	108.95	1.29	105.18
Oakland Av Cres	BASE	4 inch-1 hr	0.00	0.00	0.000	1.21	108.95	0.00	100.00
Pipe LB1-LB2	BASE	4 inch-1 hr	1.29	21.90	0.069	1.29	105.18	1.37	104.98
Pipe LB2-LB3	BASE	4 inch-1 hr	1.38	20.24	0.938	1.37	104.98	1.49	104.55
Pipe LB3-LB4	BASE	4 inch-1 hr	1.49	18.87	0.113	1.49	104.55	1.59	104.27
Pipe LB4-RR	BASE	4 inch-1 hr	1.59	17.41	0.486	1.59	104.27	1.59	103.39
Basin 2 Crest	BASE	Mean Annual	0.00	0.00	0.000	26.43	120.65	10.34	108.68
Drainwell	BASE	Mean Annual	10.34	0.83	0.004	10.34	108.68	0.00	77.00
DS-Canal	BASE	Mean Annual	11.04	5.00	0.097	11.04	101.74	0.00	98.00
LB Outfall	BASE	Mean Annual	10.34	5.71	0.067	10.34	108.68	10.40	104.36
Oakland Av Cres	BASE	Mean Annual	0.00	0.00	0.000	10.34	108.68	0.00	100.00
Pipe LB1-LB2	BASE	Mean Annual	10.43	5.69	-0.034	10.40	104.36	10.59	104.14
Pipe LB2-LB3	BASE	Mean Annual	10.60	5.45	0.044	10.59	104.14	10.60	103.75
Pipe LB3-LB4	BASE	Mean Annual	10.81	5.24	0.123	10.80	103.79	11.01	103.55
Pipe LB4-RR	BASE	Mean Annual	11.02	5.00	-0.031	11.01	103.55	11.02	102.99


Node Lower Basin
110
108
106
104
Stage(ft)
0
20
40
60
80
100
120
140
Time(hrs)
100yr-24hr
10yr-24hr
Mean Annual
25yr-96hr
25yr-24hr