## WATER QUALITY CALCULATIONS

**Water Management District**
**Pollution Abatement Volume Requirement**

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 135.00 |
| Post Development Impervious Area Added (ac) = | 12.72 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing an on-line dry retention facility for the Project's treatment, attenuation, and flood comp. volumes and an on-line wet detention facility to replace the existing wet detention facility at SR-27 and remaining flood comp. volumes.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 5.62 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 1.33 | |
| Governing Condition + 0.5" x Total Area = | 11.25 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **11.25** | |

## ESTIMATE FLOODPLAIN IMPACTS

**With Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 107.5 | 107.0 | 105.5 (Pond D) | 0.5 | 7.24 | 3.62 |
| 107.5 | 105.5 | | 2 | 19.62 | 39.24 |
| | | | | **Total Impact Volume:** | **42.86** |

**Without Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 107.5 | 107.0 | 105.5 (Pond D) | 0.5 | 7.24 | 3.62 |
| 107.5 | 105.5 | | 2 | 19.62 | 39.24 |
| 106.4 | 105.5 | | 0.9 | 7.40 | 6.66 |
| | | | | **Total Impact Volume:** | **49.52** |

(3) The floodplain elevations were drawn from the permitted plans for ERP No. 90260-2 and published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the control elevations of the ponds constructed under ERP No. 90260-2 and the observed water level of the adjacent wetlands.

## ESTIMATE EXISTING DRAINAGE POND IMPACTS

**Existing Wet Pond D (Permit 90260-2)**

| Stage | Description | Area (ac) | Avg. Area (ac) | Incremental Depth (ft) | Incremental Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Control Elevation | 3.63 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 3.71 | 3.67 | 0.50 | 1.84 | 1.84 |
| 107.00 | | 3.74 | 3.72 | 1.00 | 3.72 | 5.56 |
| 107.68 | Design High Water Elev | 3.85 | 3.79 | 0.68 | 2.58 | 8.14 |

| Pond Impacted | Floodplain Comp. Impacts (ac-ft) | Treatment Volume (ac-ft) | Attenuation Volume (ac-ft) | Total Impacts (ac-ft) |
|---|---|---|---|---|
| Pond D w/Flood Comp (Permit 90260-2) | 1.68 | 2.75 | 5.39 | **9.82** |

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.7' below ground due to the soil types' average SHWT's in the dry pond area is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.7 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.7 | ft |

3) Use greater of required treatment volume or attenuation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 21.53 | ac-ft |
| Required Treatment Volume = | 11.25 | ac-ft |
| Required Flood Compensation Volume = | 42.86 | ac-ft |
| Required Existing Pond Flood Plain Impact Compensation Volume = | 1.68 | ac-ft |
| Required Existing Pond Treatment Compensation Volume = | 2.75 | ac-ft |
| Total Required Existing Pond Impact Compensation Volume = | 9.82 | ac-ft |
| **Total Flood Compensation Volume =** | **44.54** | **ac-ft** |
| **Total Treatment Volume =** | **14.00** | **ac-ft** |
| **Total Attenuation and Treatment Volume =** | **40.91** | **ac-ft** |
| **Total Peak Volume =** | **85.45** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond and only include the attenuation and treatment volumes.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | |
|---|---|---|
| Volume = | 40.91 | ac-ft |
| H = | 3.7 | ft |

$$40.91 = L^2 \times 3.7$$

| | | |
|---|---|---|
| Solving for L = | 694.0 | ft |
| Therefore W = | 694.0 | ft |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.7 | ft |
| x = | 29.6 | ft |
| Length @ top of slope = | 724 | ft |
| Width @ top of slope = | 724 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 754 | ft |
| Width w/maint. Berm = | 754 | ft |
| Total Area = | 13.0 | acre |
| Add 10% Contingency | 14.3 | acre |

PRELIMINARY POND AREA REQUIRED FOR BASIN = 14.3 ACRE

| | |
|---|---|
| **Proposed Pond 1B1 Area (Exist. Pond Impacts & Floodplain Comp.):** | **6.8 acre** |
| **Proposed Pond 1B2 Area (Exist. Pond Impacts & Floodplain Comp.):** | **3.1 acre** |
| **Proposed Pond 1B3 Area (Treatment & Attenuation):** | **12.2 acre** |
| **Proposed Pond 1B4 Area (Floodplain Comp.):** | **25.3 acre** |
| **Total Area of Proposed Ponds[(6)]:** | **47.5 acre** |

| Facility Type | Total Area (ac) |
|---|---|
| Wet Facility | 10.0 |
| Dry Facility | 12.2 |
| Flood Comp. | 25.3 |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 1B3 (Sized to retain the project's treatment and attenuation):**

Ave. Existing Ground Elevation = 115 ft
Normal Water Elevation = 103 ft (Per the adjacent lake/wetland's observed water elevation, Sawgrass Lake)
Lowest Profile Elevation = 118.00 ft
Total Pond Area = 12.24 acre
Depth of Pond = 7.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 106.00 | Bottom of Pond | 9.28 | | 0.00 | 0.00 | 0.00 |
| 107.00 | | 9.54 | 9.41 | 1.00 | 9.41 | 9.41 |
| 108.00 | | 9.81 | 9.68 | 1.00 | 9.68 | 19.09 |
| 109.00 | | 10.08 | 9.94 | 1.00 | 9.94 | 29.03 |
| 110.00 | | 10.35 | 10.21 | 1.00 | 10.21 | 39.25 |
| 111.00 | | 10.62 | 10.49 | 1.00 | 10.49 | 49.73 |
| 112.00 | Free Board Elevation | 10.90 | 10.76 | 1.00 | 10.76 | 60.49 |
| 113.00 | Front Maint. Berm | 11.18 | 11.04 | 1.00 | 11.04 | 71.53 |
| 114.88 | Back Maint. Berm | 12.24 | 11.71 | 1.88 | 21.95 | 93.48 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment (Project Only) | 11.25 | 107.21 | 1.21 |
| Treatment and Attenuation (Project Only) | 32.78 | 109.37 | 3.37 |

**Proposed Ponds 1B1 & 1B2 (Sized to replace the existing FDOT Pond and a portion of the flood compensation):**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 105.5 ft (Per the existing Pond D in Permit 90260-2)
Lowest Profile Elevation = 118.00 ft
Total Pond Area = 9.97 acre
Depth of Pond = 3.50 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Control Elevation | 8.14 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 8.39 | 8.26 | 0.50 | 4.13 | 4.13 |
| 107.00 | | 8.89 | 8.64 | 1.00 | 8.64 | 12.77 |
| 107.50 | Top of Floodplain Comp. | 9.14 | 9.01 | 0.50 | 4.51 | 17.28 |
| 108.00 | Free Board Elevation | 9.39 | 9.27 | 0.50 | 4.63 | 21.91 |
| 109.00 | Front Maint. Berm | 9.90 | 9.65 | 1.00 | 9.65 | 31.56 |
| 110.88 | Back Maint. Berm | 11.86 | 10.88 | 1.88 | 20.40 | 51.96 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment (Existing FDOT Pond Only) | 2.75 | 105.83 | 0.33 |
| Treatment, Attenuation, & Flood Comp. (Exist. FDOT Pond) | 9.82 | 106.66 | 1.16 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided[7] (ac-ft) |
|---|---|---|---|
| Total 107.5' Floodplain Compensation Required | 44.54 | 107.50 | 7.46 |
| **Remaining 107.5' Floodplain Comp. Volume Required:** | | | **37.07** |

(7) Compensation provided does not include attenuation volumes.

**Proposed Pond 1B4 (Sized for a portion of the flood compensation):**

Ave. Existing Ground Elevation = 118 ft

Normal Water Elevation = 105.5 ft (Per the existing Pond D in Permit 90260-2 and observed water elevation of the adjacent existing lake/wetland.)

Lowest Profile Elevation = 118.00 ft

Total Pond Area = 25.30 acre

Depth of Pond = 12.50 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Bottom of Pond | 19.83 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 20.04 | 19.94 | 0.50 | 9.97 | 9.97 |
| 107.00 | | 20.47 | 20.26 | 1.00 | 20.26 | 30.22 |
| 107.50 | Top of Floodplain Comp. | 20.68 | 20.57 | 0.50 | 10.29 | 40.51 |
| 108.00 | | 20.90 | 20.79 | 0.50 | 10.39 | 50.91 |
| 109.00 | | 21.33 | 21.11 | 1.00 | 21.11 | 72.02 |
| 110.00 | | 21.76 | 21.54 | 1.00 | 21.54 | 93.56 |
| 111.00 | | 22.19 | 21.98 | 1.00 | 21.98 | 115.53 |
| 112.00 | | 22.63 | 22.41 | 1.00 | 22.41 | 137.95 |
| 113.00 | | 23.07 | 22.85 | 1.00 | 22.85 | 160.80 |
| 114.00 | | 23.51 | 23.29 | 1.00 | 23.29 | 184.09 |
| 115.00 | | 23.96 | 23.74 | 1.00 | 23.74 | 207.82 |
| 116.00 | | 24.40 | 24.18 | 1.00 | 24.18 | 232.00 |
| 117.00 | | 24.85 | 24.63 | 1.00 | 24.63 | 256.63 |
| 118.00 | Top of Pond | 25.30 | 25.08 | 1.00 | 25.08 | 281.71 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 107.5' Floodplain Compensation Required | 37.07 | 107.50 | 40.51 |
| **Remaining 107.5' Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond C | 113.01 | 112.05 | 110.85 | 1800 | 0.05% | 111.75 |
| Ponds 1B1 & 1B2 | 114.87 | 113.91 | 106.66 | 100 | 0.05% | 106.71 |
| Pond 1B3 | 118.00 | 116.74 | 109.37 | 2600 | 0.05% | 110.67 |

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 1C1, 1C2, 1C3, & 1C4**
**Basin 1**

Computed By: MS
Checked By: MH
Date: 6/21/2019

| | |
|---|---|
| Beginning Station | 10000.00 |
| End Station | 13573.05 |
| Length (ft) | 3573.05 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| A portion of SR-27, unimproved land (water bodies & woods), pasture/range, and orchards | 133.36 |
| **TOTAL BASIN AREA** | **133.36** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. at the US 27 Intersection/realignment | 26.42 |
| **TOTAL IMPERVIOUS AREA** | **26.42** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | A/D | 98 | 26.42 | 2,588.88 |
| Grassed Area/Open (Good) | A | 39 | 11.97 | 466.67 |
| Grassed Area/Open (Good) | D | 80 | 5.20 | 415.86 |
| Woods/Orchard (Poor) | A | 57 | 27.50 | 1,567.43 |
| Woods/Orchard (Fair) | A | 43 | 4.23 | 182.02 |
| Woods (Fair) | A | 36 | 1.52 | 54.80 |
| Woods (Fair) | D | 79 | 19.15 | 1,512.80 |
| Woods (Poor) | D | 83 | 3.87 | 320.88 |
| Pasture/Range (Poor) | A | 68 | 15.57 | 1,058.66 |
| Water Bodies | D | 100 | 17.94 | 1,793.77 |
| | | TOTAL | 133.36 | 9,961.77 |
| | | **COMPOSITE CN** | | **74.7** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.39 | 5.92 | 65.74 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.39 | 12.55 | 139.46 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.39 | 4.33 | 48.10 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| | | |
|---|---|---|
| **Soil Storage (in)** | S | 3.39 |

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| | | |
|---|---|---|
| **Runoff (in)** | R | 5.92 |

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| | | |
|---|---|---|
| **Runoff (ac-ft)** | Vr | 65.74 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, unimproved lands adjacent to bridges, and ponds | 133.36 |
| **TOTAL AREA (AC)** | **133.36** |

| Proposed Impervious Area | | |
|---|---|---|
| **Description** | **Area[2]** | |
| Proposed Pavement[1] | 39.14 | |
| **Total Impervious Area** | **39.14** | **Acre** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | A/D | 98 | 39.14 | 3,835.50 |
| Grassed Area/Open Area (Good) | A | 39 | 14.13 | 550.99 |
| Grassed Area/Open Area (Good) | D | 80 | 25.46 | 2,036.62 |
| Woods/Orchard (Poor) | A | 57 | 3.13 | 178.32 |
| Woods (Poor) | D | 83 | 2.86 | 237.16 |
| Water Bodies | D | 100 | 2.78 | 277.62 |
| Proposed Pond Area | A | 100 | 45.87 | 4,587.14 |
| | | TOTAL | 133.36 | 11,703.36 |
| | | **COMPOSITE CN** | | **87.8** |

### ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 1.39 | 7.52 | 83.55 |
| 100 yr, 240 hr | FDOT | 16.00 | 1.39 | 14.44 | 160.47 |
| 100 yr, 8 hr | FDOT | 7.24 | 1.39 | 5.80 | 64.45 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** $S = (1000/CN) - 10$

| **Soil Storage (in)** | S | 1.39 |
|---|---|---|

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| **Runoff (in)** | R | 7.52 |
|---|---|---|

**3) Runoff Volume (Vr)** $Vr = R/12 * Area$

| **Runoff (ac-ft)** | Vr | 83.55 |
|---|---|---|

### SUMMARY OF ATTENUATION ESTIMATES

**PRE-DEVELOPED CONDITION**

| AREA (AC): | 133.36 |
|---|---|
| CN: | 74.7 |

**POST DEVELOPED CONDITION**

| AREA (AC): | 133.36 |
|---|---|
| CN: | 87.8 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 65.74 | 83.55 | 17.82 |
| FDOT | 100 yr, 240 hr | 139.46 | 160.47 | 21.02 |
| FDOT | 100 yr, 8 hr | 48.10 | 64.45 | 16.34 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 21.02 |
|---|---|

## WATER QUALITY CALCULATIONS

**Water Management District**
**Pollution Abatement Volume Requirement**

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 133.36 |
| Post Development Impervious Area Added (ac) = | 12.72 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing an on-line dry retention facility for the Project's treatment, attenuation, and flood comp. volumes and an on-line wet detention facility to replace the existing wet detention facility at SR-27 and remaining flood comp. volumes.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 5.56 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 1.33 | |
| Governing Condition + 0.5" x Total Area = | 11.11 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **11.11** | |

## ESTIMATE FLOODPLAIN IMPACTS

**With Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 107.5 | 107.0 | 105.5 (Pond D) | 0.5 | 7.24 | 3.62 |
| 107.5 | 105.5 | | 2 | 19.62 | 39.24 |
| | | | | **Total Impact Volume:** | **42.86** |

**Without Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 107.5 | 107.0 | 105.5 (Pond D) | 0.5 | 7.24 | 3.62 |
| 107.5 | 105.5 | | 2 | 19.62 | 39.24 |
| 106.4 | 105.5 | | 0.9 | 7.40 | 6.66 |
| | | | | **Total Impact Volume:** | **49.52** |

(3) The floodplain elevations were drawn from the permitted plans for ERP No. 90260-2 and published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the control elevations of the ponds constructed under ERP No. 90260-2 and the observed water level of the adjacent wetlands.

## ESTIMATE EXISTING DRAINAGE POND IMPACTS

**Existing Wet Pond D (Permit 90260-2)**

| Stage | Description | Area (ac) | Avg. Area (ac) | Incremental Depth (ft) | Incremental Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Control Elevation | 3.63 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 3.71 | 3.67 | 0.50 | 1.84 | 1.84 |
| 107.00 | | 3.74 | 3.72 | 1.00 | 3.72 | 5.56 |
| 107.68 | Design High Water Elev | 3.85 | 3.79 | 0.68 | 2.58 | 8.14 |

| Pond Impacted | Floodplain Comp. Impacts (ac-ft) | Treatment Volume (ac-ft) | Attenuation Volume (ac-ft) | Total Impacts (ac-ft) |
|---|---|---|---|---|
| Pond D w/Flood Comp (Permit 90260-2) | 1.68 | 2.75 | 5.39 | **9.82** |

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.7' below ground due to the soil types' average SHWT's in the dry pond area is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.7 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.7 | ft |

3) Use greater of required treatment volume or attenuation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 21.02 | ac-ft |
| Required Treatment Volume = | 11.11 | ac-ft |
| Required Flood Compensation Volume = | 42.86 | ac-ft |
| Required Existing Pond Flood Plain Impact Compensation Volume = | 1.68 | ac-ft |
| Required Existing Pond Treatment Compensation Volume = | 2.75 | ac-ft |
| Total Required Existing Pond Impact Compensation Volume = | 9.82 | ac-ft |
| **Total Flood Compensation Volume =** | **44.54** | **ac-ft** |
| **Total Treatment Volume =** | **13.86** | **ac-ft** |
| **Total Attenuation and Treatment Volume =** | **40.27** | **ac-ft** |
| **Total Peak Volume =** | **84.80** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond and only include the attenuation and treatment volumes.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | |
|---|---|---|
| Volume = | 41.95 | ac-ft |
| H = | 3.7 | ft |

41.95 = $L^2$ x 3.7

| | | |
|---|---|---|
| Solving for L = | 702.7 | ft |
| Therefore W = | 702.7 | ft |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.7 | ft |
| x = | 29.6 | ft |
| Length @ top of slope = | 732 | ft |
| Width @ top of slope = | 732 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 762 | ft |
| Width w/maint. Berm = | 762 | ft |
| Total Area = | 13.3 | acre |
| Add 10% Contingency | 14.7 | acre |

PRELIMINARY POND AREA REQUIRED FOR BASIN = 14.7 ACRE

| | |
|---|---|
| **Proposed Pond 1C1 Area (Exist. Pond Impacts & Floodplain Comp.):** | **6.8 acre** |
| **Proposed Pond 1C2 Area (Exist. Pond Impacts & Floodplain Comp.):** | **3.1 acre** |
| **Proposed Pond 1C3 Area (Treatment & Attenuation):** | **10.6 acre** |
| **Proposed Pond 1C4 Area (Floodplain Comp.):** | **25.3 acre** |
| **Total Area of Proposed Ponds[(6)]:** | **45.9 acre** |

| Facility Type | Total Area (ac) |
|---|---|
| Wet Facility | 10.0 |
| Dry Facility | 10.6 |
| Flood Comp. | 25.3 |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 1C3 (Sized to retain the project's treatment and attenuation):**

Ave. Existing Ground Elevation = 115 ft
Normal Water Elevation = 103 ft (Per the adjacent lake/wetland's observed water elevation, Sawgrass Lake)
Lowest Profile Elevation = 118.00 ft
Total Pond Area = 10.60 acre
Depth of Pond = 7.50 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Bottom of Pond | 7.72 | 0.00 | 0.00 | 0.00 | 0.00 |
| 106.00 | | 7.84 | 7.78 | 0.50 | 3.89 | 3.89 |
| 107.00 | | 8.08 | 7.96 | 1.00 | 7.96 | 11.85 |
| 108.00 | | 8.32 | 8.20 | 1.00 | 8.20 | 20.05 |
| 109.00 | | 8.58 | 8.45 | 1.00 | 8.45 | 28.50 |
| 110.00 | | 8.83 | 8.71 | 1.00 | 8.71 | 37.21 |
| 111.00 | | 9.09 | 8.96 | 1.00 | 8.96 | 46.17 |
| 112.00 | Free Board Elevation | 9.35 | 9.22 | 1.00 | 9.22 | 55.39 |
| 113.00 | Front Maint. Berm | 9.61 | 9.48 | 1.00 | 9.48 | 64.87 |
| 114.88 | Back Maint. Berm | 10.60 | 10.10 | 1.88 | 18.94 | 83.81 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment (Project Only) | 11.11 | 106.91 | 1.41 |
| Treatment and Attenuation (Project Only) | 32.13 | 109.43 | 3.93 |

**Proposed Ponds 1C1 & 1C2 (Sized to replace the existing FDOT Pond and a portion of the flood compensation):**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 105.5 ft (Per the existing Pond D in Permit 90260-2)
Lowest Profile Elevation = 118.00 ft
Total Pond Area = 9.97 acre
Depth of Pond = 3.50 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Control Elevation | 8.14 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 8.39 | 8.26 | 0.50 | 4.13 | 4.13 |
| 107.00 | | 8.89 | 8.64 | 1.00 | 8.64 | 12.77 |
| 107.50 | Top of Floodplain Comp. | 9.14 | 9.01 | 0.50 | 4.51 | 17.28 |
| 108.00 | Free Board Elevation | 9.39 | 9.27 | 0.50 | 4.63 | 21.91 |
| 109.00 | Front Maint. Berm | 9.90 | 9.65 | 1.00 | 9.65 | 31.56 |
| 110.88 | Back Maint. Berm | 11.86 | 10.88 | 1.88 | 20.40 | 51.96 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment (Existing FDOT Pond Only) | 2.75 | 105.83 | 0.33 |
| Treatment, Attenuation, & Flood Comp. (Exist. FDOT Pond) | 9.82 | 106.66 | 1.16 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided[7] (ac-ft) |
|---|---|---|---|
| Total 107.5' Floodplain Compensation Required | 44.54 | 107.50 | 7.46 |
| **Remaining 107.5' Floodplain Comp. Volume Required:** | | | **37.07** |

(7) Compensation provided does not include attenuation volumes.

**Proposed Pond 1C4 (Sized for a portion of the flood compensation):**

Ave. Existing Ground Elevation = 118 ft

Normal Water Elevation = 105.5 ft (Per the existing Pond D in Permit 90260-2 and observed water elevation of the adjacent existing lake/wetland.)

Lowest Profile Elevation = 118.00 ft

Total Pond Area = 25.30 acre

Depth of Pond = 12.50 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.50 | Bottom of Pond | 19.83 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 20.04 | 19.94 | 0.50 | 9.97 | 9.97 |
| 107.00 | | 20.47 | 20.26 | 1.00 | 20.26 | 30.22 |
| 107.50 | Top of Floodplain Comp. | 20.68 | 20.57 | 0.50 | 10.29 | 40.51 |
| 108.00 | | 20.90 | 20.79 | 0.50 | 10.39 | 50.91 |
| 109.00 | | 21.33 | 21.11 | 1.00 | 21.11 | 72.02 |
| 110.00 | | 21.76 | 21.54 | 1.00 | 21.54 | 93.56 |
| 111.00 | | 22.19 | 21.98 | 1.00 | 21.98 | 115.53 |
| 112.00 | | 22.63 | 22.41 | 1.00 | 22.41 | 137.95 |
| 113.00 | | 23.07 | 22.85 | 1.00 | 22.85 | 160.80 |
| 114.00 | | 23.51 | 23.29 | 1.00 | 23.29 | 184.09 |
| 115.00 | | 23.96 | 23.74 | 1.00 | 23.74 | 207.82 |
| 116.00 | | 24.40 | 24.18 | 1.00 | 24.18 | 232.00 |
| 117.00 | | 24.85 | 24.63 | 1.00 | 24.63 | 256.63 |
| 118.00 | Top of Pond | 25.30 | 25.08 | 1.00 | 25.08 | 281.71 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 107.5' Floodplain Compensation Required | 37.07 | 107.50 | 40.51 |
| **Remaining 107.5' Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond C | 113.01 | 112.05 | 110.85 | 1800 | 0.05% | 111.75 |
| Ponds 1C1 & 1C2 | 114.87 | 113.91 | 106.66 | 100 | 0.05% | 106.71 |
| Pond 1B3 | 118.00 | 116.74 | 109.43 | 2600 | 0.05% | 110.73 |

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 2A**
**Basin 2**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date | 6/19/2019 |

| | |
|---|---|
| Beginning Station | 13573.05 |
| End Station | 18846.66 |
| Length (ft) | 5273.61 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods) and orchards | 51.84 |
| **TOTAL BASIN AREA** | **51.84** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Woods/Orchard (Poor) | A | 57 | 39.18 | 2,233.10 |
| Woods/Orchard (Poor) - Offsite | A | 57 | 2.73 | 155.64 |
| Woods (Poor) | D | 83 | 8.50 | 705.85 |
| Water Bodies | D | 100 | 1.43 | 142.57 |
| | | TOTAL | 51.84 | 3,237.16 |
| | | **COMPOSITE CN** | | **62.4** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 6.01 | 4.40 | 19.02 |
| 100 yr, 240 hr | FDOT | 16.00 | 6.01 | 10.52 | 45.45 |
| 100 yr, 8 hr | FDOT | 7.24 | 6.01 | 3.02 | 13.07 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| | | |
|---|---|---|
| **Soil Storage (in)** | S | 6.01 |

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| | | |
|---|---|---|
| **Runoff (in)** | R | 4.40 |

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| | | |
|---|---|---|
| **Runoff (ac-ft)** | Vr | 19.02 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, unimproved lands adjacent to bridges, and ponds | 51.84 |
| **TOTAL AREA (AC)** | **51.84** |

| Proposed Impervious Area | | |
|---|---|---|
| **Description** | **Area[2]** | |
| Proposed Pavement[1] | 21.64 | |
| **Total Impervious Area** | **21.64** | **Acre** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A/D | 98 | 21.64 | 2,121.02 |
| Grassed/Open Area (Good) | A | 60 | 13.55 | 813.11 |
| Grassed/Open Area (Good) | D | 61 | 0.44 | 26.96 |
| Woods/Orchard (Poor) - Offsite | A | 57 | 2.73 | 155.64 |
| Woods (Poor) | D | 83 | 3.81 | 316.38 |
| Water Bodies | D | 100 | 0.50 | 50.35 |
| Proposed Pond Area | A | 100 | 9.16 | 915.50 |
| | | TOTAL | 51.84 | 4,398.95 |
| | | **COMPOSITE CN** | | **84.9** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 1.78 | 7.16 | 30.95 |
| 100 yr, 240 hr | FDOT | 16.00 | 1.78 | 14.04 | 60.66 |
| 100 yr, 8 hr | FDOT | 7.24 | 1.78 | 5.47 | 23.61 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| **Soil Storage (in)** | S | 1.78 |
|---|---|---|

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| **Runoff (in)** | R | 7.16 |
|---|---|---|

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| **Runoff (ac-ft)** | Vr | 30.95 |
|---|---|---|

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| AREA (AC): | 51.84 |
|---|---|
| CN: | 62.4 |

**POST DEVELOPED CONDITION**

| AREA (AC): | 51.84 |
|---|---|
| CN: | 84.9 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 19.02 | 30.95 | 11.93 |
| FDOT | 100 yr, 240 hr | 45.45 | 60.66 | 15.21 |
| FDOT | 100 yr, 8 hr | 13.07 | 23.61 | 10.55 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 15.21 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 51.84 |
| Post Development Impervious Area Added (ac) = | 21.64 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line dry retention facility.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 2.16 | |
| 2) 1.25" of Runoff Over Added Impervious Area = | 2.25 | Governs |
| Governing Condition + 0.5" x Total Area = | 4.41 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **4.41** | |

## ESTIMATE FLOODPLAIN IMPACTS

**With Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 101.0 | 101.0 | 5.4 | 0.83 | 4.51 |
| | | | | **Total Impact Volume:** | **4.51** |

**Without Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 9.42 | 32.03 |
| 106.4 | 101.0 | 101.0 | 5.4 | 0.83 | 4.51 |
| | | | | **Total Impact Volume:** | **36.54** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 6.5' below ground due to the average soil types' in the areas of the pond alternatives SHWT is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 15.21 | ac-ft |
| Required Treatment Volume = | 4.41 | ac-ft |
| Required Flood Compensation Volume = | 4.51 | ac-ft |
| **Total Attenuation and Treatment Volume =** | **19.62** | **ac-ft** |
| **Total Peak Volume =** | **24.13** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | | | |
|---|---|---|---|---|---|
| Volume = | 19.62 | ac-ft | | | |
| H = | 3.5 | ft | | | |
| | 19.62 | = | $L^2$ x | 3.5 | |
| Solving for L = | 494.2 | ft | | | |
| Therefore W = | 494.2 | ft | | | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 522 | ft |
| Width @ top of slope = | 522 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 552 | ft |
| Width w/maint. Berm = | 552 | ft |
| Total Area = | 7.0 | acre |
| Add 10% Contingency | 7.7 | acre |

| PRELIMINARY POND AREA REQUIRED FOR BASIN = | 7.7 | ACRE |
|---|---|---|

**Proposed Pond 2A[(6)] (Treat., Atten., & Floodplain Comp.):** **9.2 acre**

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 2A (Sized to retain the project's treatment, attenuation, and flood comp. volumes):**

Ave. Existing Ground Elevation = 120 ft
Normal Water Elevation = 103 ft (Per the adjacent wetland's observed water elevation)
Lowest Profile Elevation = 125.84 ft
Total Pond Area = 9.16 acre
Depth of Pond = 13.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.00 | Bottom of Pond | 5.38 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 5.58 | 5.48 | 1.00 | 5.48 | 5.48 |
| 106.40 | Top of Floodplain Comp. | 5.66 | 5.62 | 0.40 | 2.25 | 7.73 |
| 107.00 | | 5.79 | 5.73 | 0.60 | 3.44 | 11.17 |
| 108.00 | | 5.99 | 5.89 | 1.00 | 5.89 | 17.06 |
| 109.00 | | 6.21 | 6.10 | 1.00 | 6.10 | 23.16 |
| 110.00 | | 6.42 | 6.31 | 1.00 | 6.31 | 29.47 |
| 111.00 | | 6.64 | 6.53 | 1.00 | 6.53 | 36.00 |
| 112.00 | | 6.86 | 6.75 | 1.00 | 6.75 | 42.74 |
| 113.00 | | 7.08 | 6.97 | 1.00 | 6.97 | 49.71 |
| 114.00 | | 7.31 | 7.20 | 1.00 | 7.20 | 56.91 |
| 115.00 | | 7.54 | 7.42 | 1.00 | 7.42 | 64.33 |
| 116.00 | | 7.77 | 7.66 | 1.00 | 7.66 | 71.99 |
| 117.00 | Free Board Elevation | 8.01 | 7.89 | 1.00 | 7.89 | 79.88 |
| 118.00 | Front Maint. Berm | 8.24 | 8.13 | 1.00 | 8.13 | 88.01 |
| 119.88 | Back Maint. Berm | 9.16 | 8.70 | 1.88 | 16.31 | 104.32 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 4.41 | 105.81 | 0.81 |
| Treatment and Attenuation | 19.62 | 108.44 | 3.44 |
| Treatment, Attenuation, & Flood Comp. | 24.13 | 109.15 | 4.15 |

| Description | Volume Required (ac-ft) | Floodplain Elevation | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 4.51 | 106.40 | 7.73 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[(7)] (%) | Approximate HGL Elev.[(8)] (ft) |
|---|---|---|---|---|---|---|
| Pond 2A | 125.84 | 124.58 | 108.44 | 500 | 0.05% | 108.69 |

(7) A slope of 0.05% was assumed for the preliminary HGL check.

(8) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 2B**
**Basin 2**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date | 6/19/2019 |

| | |
|---|---|
| Beginning Station | 13573.05 |
| End Station | 18846.66 |
| Length (ft) | 5273.61 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods) and orchards | 51.87 |
| **TOTAL BASIN AREA** | **51.87** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Woods/Orchard (Poor) | A | 57 | 39.21 | 2,234.87 |
| Woods/Orchard (Poor) - Offsite | A | 57 | 2.73 | 155.64 |
| Woods (Poor) | D | 83 | 8.50 | 705.85 |
| Water Bodies | D | 100 | 1.43 | 142.57 |
| | | TOTAL | 51.87 | 3,238.93 |
| | | **COMPOSITE CN** | | **62.4** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 6.01 | 4.40 | 19.03 |
| 100 yr, 240 hr | FDOT | 16.00 | 6.01 | 10.52 | 45.48 |
| 100 yr, 8 hr | FDOT | 7.24 | 6.01 | 3.02 | 13.07 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| | | |
|---|---|---|
| **Soil Storage (in)** | S | 6.01 |

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| | | |
|---|---|---|
| **Runoff (in)** | R | 4.40 |

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| | | |
|---|---|---|
| **Runoff (ac-ft)** | Vr | 19.03 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, unimproved lands adjacent to bridges, and ponds | 51.87 |
| **TOTAL AREA (AC)** | **51.87** |

| Proposed Impervious Area | | |
|---|---|---|
| **Description** | **Area[2]** | |
| Proposed Pavement[1] | 21.64 | |
| **Total Impervious Area** | **21.64** | **Acre** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A/D | 98 | 21.64 | 2,121.02 |
| Grassed/Open Area (Good) | A | 60 | 13.55 | 813.11 |
| Grassed/Open Area (Good) | D | 61 | 0.44 | 26.96 |
| Woods/Orchard (Poor) - Offsite | A | 57 | 2.73 | 155.64 |
| Woods (Poor) | D | 83 | 3.81 | 316.38 |
| Water Bodies | D | 100 | 0.50 | 50.35 |
| Proposed Pond Area | A | 100 | 9.19 | 918.61 |
| | | TOTAL | 51.87 | 4,402.06 |
| | | **COMPOSITE CN** | | **84.9** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 1.78 | 7.17 | 30.97 |
| 100 yr, 240 hr | FDOT | 16.00 | 1.78 | 14.04 | 60.70 |
| 100 yr, 8 hr | FDOT | 7.24 | 1.78 | 5.47 | 23.63 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| **Soil Storage (in)** | S | 1.78 |
|---|---|---|

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| **Runoff (in)** | R | 7.17 |
|---|---|---|

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| **Runoff (ac-ft)** | Vr | 30.97 |
|---|---|---|

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| AREA (AC): | 51.87 |
|---|---|
| CN: | 62.4 |

**POST DEVELOPED CONDITION**

| AREA (AC): | 51.87 |
|---|---|
| CN: | 84.9 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 19.03 | 30.97 | 11.95 |
| FDOT | 100 yr, 240 hr | 45.48 | 60.70 | 15.22 |
| FDOT | 100 yr, 8 hr | 13.07 | 23.63 | 10.56 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 15.22 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 51.87 |
| Post Development Impervious Area Added (ac) = | 21.64 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line dry retention facility.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 2.16 | |
| 2) 1.25" of Runoff Over Added Impervious Area = | 2.25 | Governs |
| Governing Condition + 0.5" x Total Area = | 4.42 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **4.42** | |

## ESTIMATE FLOODPLAIN IMPACTS

**With Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 101.0 | 101.0 | 5.4 | 0.83 | 4.51 |
| | | | | **Total Impact Volume:** | **4.51** |

**Without Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 9.42 | 32.03 |
| 106.4 | 101.0 | 101.0 | 5.4 | 0.83 | 4.51 |
| | | | | **Total Impact Volume:** | **36.54** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 6.5' below ground due to the average soil types' in the areas of the pond alternatives SHWT is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Use greater of required treatment volume or attenuation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 15.22 | ac-ft |
| Required Treatment Volume = | 4.42 | ac-ft |
| Required Flood Compensation Volume = | 4.51 | ac-ft |
| **Total Attenuation and Treatment Volume =** | **19.64** | **ac-ft** |
| **Total Peak Volume =** | **24.15** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | | |
|---|---|---|---|---|
| Volume = | 19.64 | ac-ft | | |
| H = | 3.5 | ft | | |
| | 19.64 | = | $L^2$ x | 3.5 |
| Solving for L = | 494.4 | ft | | |
| Therefore W = | 494.4 | ft | | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 522 | ft |
| Width @ top of slope = | 522 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 552 | ft |
| Width w/maint. Berm = | 552 | ft |
| Total Area = | 7.0 | acre |
| Add 10% Contingency | 7.7 | acre |

| | | |
|---|---|---|
| PRELIMINARY POND AREA REQUIRED FOR BASIN = | 7.7 | ACRE |

**Proposed Pond 2B[(6)] (Treat., Atten., & Floodplain Comp.): 9.2 acre**

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 2B (Sized to retain the project's treatment, attenuation, and flood comp. volumes):**

Ave. Existing Ground Elevation = 123 ft
Normal Water Elevation = 101 ft (Per the adjacent wetland's observed water elevation)
Lowest Profile Elevation = 125.84 ft
Total Pond Area = 9.19 acre
Depth of Pond = 15.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 105.00 | Bottom of Pond | 4.89 | | 0.00 | 0.00 | 0.00 |
| 106.00 | | 5.09 | 4.99 | 1.00 | 4.99 | 4.99 |
| 106.40 | Top of Floodplain Comp. | 5.17 | 5.13 | 0.40 | 2.05 | 7.04 |
| 107.00 | | 5.29 | 5.23 | 0.60 | 3.14 | 10.18 |
| 108.00 | | 5.50 | 5.40 | 1.00 | 5.40 | 15.58 |
| 109.00 | | 5.71 | 5.61 | 1.00 | 5.61 | 21.19 |
| 110.00 | | 5.93 | 5.82 | 1.00 | 5.82 | 27.01 |
| 111.00 | | 6.15 | 6.04 | 1.00 | 6.04 | 33.05 |
| 112.00 | | 6.37 | 6.26 | 1.00 | 6.26 | 39.30 |
| 113.00 | | 6.59 | 6.48 | 1.00 | 6.48 | 45.79 |
| 114.00 | | 6.82 | 6.71 | 1.00 | 6.71 | 52.49 |
| 115.00 | | 7.05 | 6.94 | 1.00 | 6.94 | 59.43 |
| 116.00 | | 7.29 | 7.17 | 1.00 | 7.17 | 66.60 |
| 117.00 | | 7.52 | 7.40 | 1.00 | 7.40 | 74.00 |
| 118.00 | | 7.76 | 7.64 | 1.00 | 7.64 | 81.64 |
| 119.00 | Free Board Elevation | 8.01 | 7.88 | 1.00 | 7.88 | 89.53 |
| 120.00 | Front Maint. Berm | 8.25 | 8.13 | 1.00 | 8.13 | 97.66 |
| 121.88 | Back Maint. Berm | 9.19 | 8.72 | 1.88 | 16.35 | 114.00 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 4.42 | 105.89 | 0.89 |
| Treatment and Attenuation | 19.64 | 108.72 | 3.72 |
| Treatment, Attenuation, & Flood Comp. | 24.15 | 109.53 | 4.53 |
| **Remaining Volume (Total Volume - Volume at Berm Front):** | | | **0.00** |

| Description | Volume Required (ac-ft) | Floodplain Elevation | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 4.51 | 106.40 | 7.04 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |

## PRELIMINARY HGL CHECK

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[(7)] (%) | Approximate HGL Elev.[(8)] (ft) |
|---|---|---|---|---|---|---|
| Pond 2B | 125.84 | 124.58 | 108.72 | 400 | 0.05% | 108.92 |

(7) A slope of 0.05% was assumed for the preliminary HGL check.

(8) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 2C**
**Basin 2**

Computed By: MS
Checked By: MH
Date: 6/19/2019

| | |
|---|---|
| Beginning Station | 13573.05 |
| End Station | 18846.66 |
| Length (ft) | 5273.61 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods) and orchards | 54.59 |
| **TOTAL BASIN AREA** | **54.59** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Woods/Orchard (Poor) | A | 57 | 39.31 | 2,240.85 |
| Woods/Orchard (Poor) - Offsite | A | 57 | 5.35 | 304.95 |
| Woods (Poor) | D | 83 | 8.50 | 705.85 |
| Water Bodies | D | 100 | 1.43 | 142.57 |
| | | TOTAL | 54.59 | 3,394.22 |
| | | **COMPOSITE CN** | | **62.2** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 6.08 | 4.37 | 19.87 |
| 100 yr, 240 hr | FDOT | 16.00 | 6.08 | 10.47 | 47.65 |
| 100 yr, 8 hr | FDOT | 7.24 | 6.08 | 3.00 | 13.63 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| | | |
|---|---|---|
| **Soil Storage (in)** | S | 6.08 |

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| | | |
|---|---|---|
| **Runoff (in)** | R | 4.37 |

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| | | |
|---|---|---|
| **Runoff (ac-ft)** | Vr | 19.87 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, unimproved lands adjacent to bridges, and ponds | 54.59 |
| **TOTAL AREA (AC)** | **54.59** |

| Proposed Impervious Area | | |
|---|---|---|
| **Description** | **Area[2]** | |
| Proposed Pavement[1] | 21.64 | |
| **Total Impervious Area** | **21.64** | **Acre** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A/D | 98 | 21.64 | 2,121.02 |
| Grassed/Open Area (Good) | A | 60 | 13.55 | 813.11 |
| Grassed/Open Area (Good) | D | 61 | 0.44 | 26.96 |
| Woods/Orchard (Poor) - Offsite | A | 57 | 5.35 | 304.95 |
| Woods (Poor) | D | 83 | 3.81 | 316.38 |
| Water Bodies | D | 100 | 0.50 | 50.35 |
| Proposed Pond Area | A | 100 | 9.29 | 929.10 |
| | | TOTAL | 54.59 | 4,561.86 |
| | | **COMPOSITE CN** | | **83.6** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 1.97 | 7.01 | 31.87 |
| 100 yr, 240 hr | FDOT | 16.00 | 1.97 | 13.86 | 63.05 |
| 100 yr, 8 hr | FDOT | 7.24 | 1.97 | 5.32 | 24.20 |

**Runoff Volume Example Calculations:**

**1) Soil Storage (S)** S = (1000/CN) - 10

| **Soil Storage (in)** | S | 1.97 |
|---|---|---|

**2) Runoff (R)** $R = (P-0.2S)^2/(P+0.8S)$

| **Runoff (in)** | R | 7.01 |
|---|---|---|

**3) Runoff Volume (Vr)** Vr = R/12 * Area

| **Runoff (ac-ft)** | Vr | 31.87 |
|---|---|---|

**SUMMARY OF ATTENUATION ESTIMATES**

| **PRE-DEVELOPED CONDITION** | |
|---|---|
| AREA (AC): | 54.59 |
| CN: | 62.2 |

| **POST DEVELOPED CONDITION** | |
|---|---|
| AREA (AC): | 54.59 |
| CN: | 83.6 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 19.87 | 31.87 | 12.00 |
| FDOT | 100 yr, 240 hr | 47.65 | 63.05 | 15.41 |
| FDOT | 100 yr, 8 hr | 13.63 | 24.20 | 10.56 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 15.41 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 54.59 |
| Post Development Impervious Area Added (ac) = | 21.64 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line dry retention facility.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 2.27 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 2.25 | |
| Governing Condition + 0.5" x Total Area = | 4.55 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **4.55** | |

## ESTIMATE FLOODPLAIN IMPACTS

**With Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 101.0 | 101.0 | 5.4 | 2.39 | 12.93 |
| | | | | **Total Impact Volume:** | **12.93** |

**Without Bridge between Lakes**

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 9.42 | 32.03 |
| 106.4 | 101.0 | 101.0 | 5.4 | 2.39 | 12.93 |
| | | | | **Total Impact Volume:** | **44.96** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 6.5' below ground due to the average soil types' in the areas of the pond alternatives SHWT is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume. Note that a negative attenuation volume reduces the required floodplain compensation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 15.41 | ac-ft |
| Required Treatment Volume = | 4.55 | ac-ft |
| Required Flood Compensation Volume = | 12.93 | ac-ft |
| **Total Attenuation and Treatment Volume =** | **19.96** | **ac-ft** |
| **Total Peak Volume =** | **32.88** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | | |
|---|---|---|---|---|
| Volume = | 19.96 | ac-ft | | |
| H = | 3.5 | ft | | |
| | 19.96 | = | $L^2$ x | 3.5 |
| Solving for L = | 498.4 | ft | | |
| Therefore W = | 498.4 | ft | | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 526 | ft |
| Width @ top of slope = | 526 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 556 | ft |
| Width w/maint. Berm = | 556 | ft |
| Total Area = | 7.1 | acre |
| Add 10% Contingency | 7.8 | acre |

| PRELIMINARY POND AREA REQUIRED FOR BASIN = | 7.8 | ACRE |
|---|---|---|

**Proposed Pond 2C[(6)] (Treat., Atten., & Floodplain Comp.):** **9.3 acre**

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 2C (Sized to retain the project's treatment, attenuation, and flood comp. volumes):**

Ave. Existing Ground Elevation = 116 ft
Normal Water Elevation = 101 ft (Per the adjacent wetland's observed water elevation)
Lowest Profile Elevation = 125.84 ft
Total Pond Area = 9.29 acre
Depth of Pond = 10.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 104.00 | Bottom of Pond | 5.52 | | 0.00 | 0.00 | 0.00 |
| 105.00 | | 5.77 | 5.64 | 1.00 | 5.64 | 5.64 |
| 106.00 | | 6.02 | 5.89 | 1.00 | 5.89 | 11.54 |
| 106.40 | Top of Floodplain Comp. | 6.12 | 6.07 | 0.40 | 2.43 | 13.96 |
| 107.00 | | 6.28 | 6.20 | 0.60 | 3.72 | 17.68 |
| 108.00 | | 6.54 | 6.41 | 1.00 | 6.41 | 24.09 |
| 109.00 | | 6.81 | 6.67 | 1.00 | 6.67 | 30.76 |
| 110.00 | | 7.08 | 6.94 | 1.00 | 6.94 | 37.71 |
| 111.00 | | 7.36 | 7.22 | 1.00 | 7.22 | 44.93 |
| 112.00 | | 7.64 | 7.50 | 1.00 | 7.50 | 52.42 |
| 113.00 | Free Board Elevation | 7.92 | 7.78 | 1.00 | 7.78 | 60.20 |
| 114.00 | Front Maint. Berm | 8.20 | 8.06 | 1.00 | 8.06 | 68.26 |
| 115.88 | Back Maint. Berm | 9.29 | 8.75 | 1.88 | 16.40 | 84.66 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment (Project Only) | 4.55 | 104.74 | 0.74 |
| Treatment and Attenuation (Project Only) | 19.96 | 107.54 | 3.54 |
| Treatment, Attenuation, & Flood Comp. (Project Only) | 32.88 | 109.49 | 5.49 |
| **Remaining Volume (Total Volume - Volume at Berm Front):** | | | **0.00** |

| Description | Volume Required (ac-ft) | Floodplain Elevation | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 12.93 | 106.40 | 13.96 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |

### PRELIMINARY HGL CHECK

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[7] (%) | Approximate HGL Elev.[8] (ft) |
|---|---|---|---|---|---|---|
| Pond 2C | 125.84 | 124.58 | 107.54 | 650 | 0.05% | 107.87 |

(7) A slope of 0.05% was assumed for the preliminary HGL check.

(8) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 3A1, 3A2, & 3A3**
**Basin 3**

Computed By: MS
Checked By: MH
Date: 6/19/2019

| | |
|---|---|
| Beginning Station | 18846.66 |
| End Station | 24420.95 |
| Length (ft) | 5574.29 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods), pasture/range, and orchards | 76.38 |
| **TOTAL BASIN AREA** | **76.38** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Pasture/Range (Poor) | A | 68 | 41.49 | 2,821.03 |
| Pasture/Range (Poor) | D | 89 | 14.29 | 1,272.00 |
| Pasture/Range (Poor) - Offsite | A | 68 | 0.79 | 53.71 |
| Pasture/Range (Poor) - Offsite | D | 89 | 0.38 | 33.50 |
| Woods/Orchard (Poor) | A | 57 | 7.16 | 408.06 |
| Woods (Good) | D | 77 | 0.24 | 18.59 |
| Water Bodies | D | 100 | 12.03 | 1,203.40 |
| | | TOTAL | 76.38 | 5,810.28 |
| | | **COMPOSITE CN** | | **76.1** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

Summary Table:

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.15 | 6.08 | 38.73 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.15 | 12.76 | 81.21 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.15 | 4.48 | 28.51 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 3.15 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 6.08 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 38.73 |

## Post Development

| Total Basin Area | | |
|---|---|---|
| **Description** | | **Area (ac)** |
| Roadway, off-site areas, unimproved lands adjacent to bridges, and ponds | | 76.38 |
| | **TOTAL AREA (AC)** | **76.38** |

| Proposed Impervious Area | | | |
|---|---|---|---|
| **Description** | **Area[2]** | | |
| Proposed Pavement[1] | 28.71 | | |
| **Total Impervious Area** | **28.71** | **Acre** | |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A/D | 98 | 28.71 | 2,813.38 |
| Grassed/Open Area (Good) | A | 39 | 18.79 | 732.70 |
| Grassed/Open Area (Good) | D | 80 | 16.27 | 1,301.49 |
| Pasture/Range (Poor) - Offsite | A | 68 | 0.79 | 53.71 |
| Pasture/Range (Poor) - Offsite | D | 89 | 0.38 | 33.50 |
| Proposed Pond Area | D | 100 | 11.45 | 1,144.84 |
| | | TOTAL | 76.38 | 6,079.62 |
| | | **COMPOSITE CN** | | **79.6** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 2.56 | 6.52 | 41.49 |
| 100 yr, 240 hr | FDOT | 16.00 | 2.56 | 13.29 | 84.58 |
| 100 yr, 8 hr | FDOT | 7.24 | 2.56 | 4.87 | 31.01 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 2.56

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 6.52

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 41.49

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 76.38 |
| CN: | 76.1 |

**POST DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 76.38 |
| CN: | 79.6 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 38.73 | 41.49 | 2.76 |
| FDOT | 100 yr, 240 hr | 81.21 | 84.58 | 3.36 |
| FDOT | 100 yr, 8 hr | 28.51 | 31.01 | 2.49 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 3.36 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 76.38 |
| Post Development Impervious Area Added (ac) = | 28.71 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line wet detention facility.

**Wet Detention (On-Line System) Criteria -** 2.50" over added impervious area or 1.0" over total area, whichever is greater. (Based on the SJRWMD's and SFWMD's treatment volume requirements found in the 2018 Permit Information Manual and 2016 ERP Applicant's Handbook Volume II, respectively.) The SFWMD and SJRWMD requirements for wet detention facilities are the same.

| **Water Quality Volume Required** | **Ac-Ft** | |
|---|---|---|
| 1) 1" of Runoff Over Total Area = | 6.36 | Governs |
| 2) 2.5" of Runoff Over Added Impervious Area = | 5.98 | |
| POLLUTION ABATEMENT VOLUME REQUIRED = | 6.36 | |

## ESTIMATE FLOODPLAIN IMPACTS

| **Floodplain Elevation[3]** | **Average Existing Ground[4]/ESHWT Elevation[5]** | **Exist. Pond Control** | **Depth of Impact (ft)** | **Area of Impact (ac)** | **Impact Volume (ac-ft)** |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 17.54 | 59.65 |
| 106.4 | 104.7 | | 1.7 | 5.18 | 8.80 |
| | | | | **Total Impact Volume:** | **68.45** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 5' below ground due to the average soil types in the areas of the pond alternatives SHWT is 42" (3.5') to 72" (6') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 5 | ft |
| F = Freeboard = | 1 | ft |
| H = D - F = | 4 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 3.36 | ac-ft |
| Required Treatment Volume = | 6.36 | ac-ft |
| Required Flood Compensation Volume = | 68.45 | ac-ft |
| **Total Attenuation and Treatment Volume =** | **9.73** | **ac-ft** |
| **Total Peak Volume =** | **78.18** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | |
|---|---|---|
| Volume = | 9.73 | ac-ft |
| H = | 4 | ft |

$9.73 = L^2 \times 4$

| | | |
|---|---|---|
| Solving for L = | 325.5 | ft |
| Therefore W = | 325.5 | ft |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 4 | ft |
| x = | 32 | ft |
| Length @ top of slope = | 357 | ft |
| Width @ top of slope = | 357 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 387 | ft |
| Width w/maint. Berm = | 387 | ft |
| Total Area = | 3.45 | acre |
| Add 10% Contingency | 3.79 | acre |

| PRELIMINARY POND AREA REQUIRED FOR BASIN = | 3.8 | ACRE |
|---|---|---|

| | | Facility Type | Total Area (ac) |
|---|---|---|---|
| **Proposed Pond 3A1 (Treat., Atten., & Floodplain Comp.):** | **7.5 acre** | Wet Facility | 7.5 |
| **Proposed Pond 3A2 (Floodplain Comp.):** | **3.9 acre** | Floodplain Comp. | 18.6 |
| **Proposed Pond 3A3 (Floodplain Comp.):** | **14.6 acre** | | |
| **Total Area of Proposed Ponds[(6)]:** | **26.1 acre** | | |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 3A1 (Sized to retain the project's treatment, attenuation, and partial flood comp.)**:

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 7.51 acre
Depth of Pond = 5.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Control Elevation | 5.03 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 5.29 | 5.16 | 1.00 | 5.16 | 5.16 |
| 105.00 | | 5.57 | 5.43 | 1.00 | 5.43 | 10.59 |
| 106.00 | | 5.84 | 5.71 | 1.00 | 5.71 | 16.30 |
| 106.40 | Top of Floodplain Comp. | 5.96 | 5.90 | 0.40 | 2.36 | 18.66 |
| 107.00 | Freeboard Elevation | 6.13 | 6.04 | 0.60 | 3.63 | 22.28 |
| 108.00 | Front Maint. Berm | 6.41 | 6.27 | 1.00 | 6.27 | 28.55 |
| 109.88 | Back Maint. Berm | 7.51 | 6.96 | 1.88 | 13.05 | 41.61 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 6.36 | 104.22 | 1.22 |
| Treatment and Attenuation | 9.73 | 104.90 | 1.90 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided[7] (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 68.45 | 106.40 | 18.66 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **49.79** |

(7) Compensation provided does not include attenuation volumes.

**Proposed Pond 3A2 (Sized to retain a portion of the project's flood comp. volume)**:

Ave. Existing Ground Elevation = 108 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 3.94 acre
Depth of Pond = 5.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 2.94 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 3.14 | 3.04 | 1.00 | 3.04 | 3.04 |
| 105.00 | | 3.33 | 3.23 | 1.00 | 3.23 | 6.27 |
| 106.00 | | 3.53 | 3.43 | 1.00 | 3.43 | 9.71 |
| 106.40 | Top of Floodplain Comp. | 3.61 | 3.57 | 0.40 | 1.43 | 11.13 |
| 107.00 | | 3.73 | 3.67 | 0.60 | 2.20 | 13.34 |
| 108.00 | Top of Pond | 3.94 | 3.84 | 1.00 | 3.84 | 17.17 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.4' Floodplain Compensation Required | 49.79 | 106.40 | 11.13 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **38.66** |

**Proposed Flood Comp. Area 3A3 (Sized to retain a portion of the project's flood comp. volume)**:

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 14.65 acre
Depth of Pond = 7.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 12.38 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 12.70 | 12.54 | 1.00 | 12.54 | 12.54 |
| 105.00 | | 13.02 | 12.86 | 1.00 | 12.86 | 25.39 |
| 106.00 | | 13.34 | 13.18 | 1.00 | 13.18 | 38.57 |
| 106.40 | Top of Floodplain Comp. | 13.47 | 13.40 | 0.40 | 5.36 | 43.93 |
| 107.00 | | 13.66 | 13.56 | 0.60 | 8.14 | 52.07 |
| 108.00 | | 13.99 | 13.82 | 1.00 | 13.82 | 65.89 |
| 109.00 | | 14.32 | 14.15 | 1.00 | 14.15 | 80.04 |
| 110.00 | Top of Pond | 14.65 | 14.48 | 1.00 | 14.48 | 94.53 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.4' Floodplain Compensation Required | 38.66 | 106.40 | 43.93 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond 3A1 | 110.04 | 109.48 | 104.90 | 1750 | 0.05% | 105.78 |

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 3B1, 3B2, 3B3, & 3B4**
**Basin 3**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date: | 6/19/2019 |

| | |
|---|---|
| Beginning Station | 18846.66 |
| End Station | 24420.95 |
| Length (ft) | 5574.29 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods), pasture/range, and orchards | 83.34 |
| **TOTAL BASIN AREA** | **83.34** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Pasture/Range (Poor) | A | 68 | 48.45 | 3,294.33 |
| Pasture/Range (Poor) | D | 89 | 14.29 | 1,272.00 |
| Pasture/Range (Poor) - Offsite | A | 68 | 0.79 | 53.71 |
| Pasture/Range (Poor) - Offsite | D | 89 | 0.38 | 33.50 |
| Woods/Orchard (Poor) | A | 57 | 7.16 | 408.06 |
| Woods (Good) | D | 77 | 0.24 | 18.59 |
| Water Bodies | D | 100 | 12.03 | 1,203.40 |
| | | TOTAL | 83.34 | 6,283.58 |
| | | **COMPOSITE CN** | | **75.4** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.26 | 6.00 | 41.68 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.26 | 12.66 | 87.90 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.26 | 4.41 | 30.59 |

1) Soil Storage (S) — $S = (1000/CN) - 10$

| Soil Storage (in) | S | 3.26 |
|---|---|---|

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$

| Runoff (in) | R | 6.00 |
|---|---|---|

3) Runoff Volume (Vr) — $Vr = R/12 * Area$

| Runoff (ac-ft) | Vr | 41.68 |
|---|---|---|

## Post Development

| Total Basin Area | | |
|---|---|---|
| **Description** | | **Area (ac)** |
| Roadway, off-site areas, unimproved lands adjacent to bridges, and ponds | | 83.34 |
| | **TOTAL AREA (AC)** | **83.34** |

| Proposed Impervious Area | | | |
|---|---|---|---|
| **Description** | **Area[2]** | | |
| Proposed Pavement[1] | 28.71 | | |
| **Total Impervious Area** | **28.71** | **Acre** | |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A/D | 98 | 28.71 | 2,813.38 |
| Grassed/Open Area (Good) | A | 39 | 27.19 | 1,060.60 |
| Grassed/Open Area (Good) | D | 80 | 19.31 | 1,544.76 |
| Pasture/Range (Poor) - Offsite | A | 68 | 0.79 | 53.71 |
| Pasture/Range (Poor) - Offsite | D | 89 | 0.38 | 33.50 |
| Proposed Pond Area | D | 100 | 6.96 | 696.03 |
| | | TOTAL | 83.34 | 6,201.97 |
| | | **COMPOSITE CN** | | **74.4** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.44 | 5.88 | 40.84 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.44 | 12.51 | 86.85 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.44 | 4.30 | 29.85 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 3.44

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 5.88

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 40.84

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 83.34 |
| CN: | 75.4 |

**POST DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 83.34 |
| CN: | 74.4 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 41.68 | 40.84 | -0.84 |
| FDOT | 100 yr, 240 hr | 87.90 | 86.85 | -1.05 |
| FDOT | 100 yr, 8 hr | 30.59 | 29.85 | -0.75 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | -0.75 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 83.34 |
| Post Development Impervious Area Added (ac) = | 28.71 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing an on-line off-site dry retention facility paired with infield flood planes.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 3.47 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 2.99 | |
| Governing Condition + 0.5" x Total Area = | 6.94 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **6.94** | |

## ESTIMATE FLOODPLAIN IMPACTS

| **Floodplain Elevation[3]** | **Average Existing Ground[4]/ESHWT Elevation[5]** | **Exist. Pond Control** | **Depth of Impact (ft)** | **Area of Impact (ac)** | **Impact Volume (ac-ft)** |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 17.54 | 59.65 |
| 106.4 | 104.7 | | 1.7 | 5.18 | 8.80 |
| | | | | **Total Impact Volume:** | **68.45** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.5' below ground due to the soil types' average SHWT's in the dry pond area (12 ac) is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume. Note that a negative attenuation volume reduces the required floodplain compensation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | -0.75 | ac-ft |
| Required Treatment Volume = | 6.94 | ac-ft |
| Required Flood Compensation Volume = | 68.45 | ac-ft |
| Total Floodplain Impacts = | 68.45 | ac-ft |
| Total Attenuation Credits = | -0.75 | ac-ft |
| **Total Required Floodplain Compensation =** | **67.70** | **ac-ft** |
| **Total Peak Volume =** | **74.65** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

where H = height (ft)
L = length of vertical sided pond (ft)
W = width of vertical sided pond (ft)

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

Volume = 6.94 ac-ft
H = 3.5 ft

$6.94 = L^2 \times 3.5$

Solving for L = 294.0 ft
Therefore W = 294.0 ft

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 322 | ft |
| Width @ top of slope = | 322 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 352 | ft |
| Width w/maint. Berm = | 352 | ft |
| Total Area = | 2.8 | acre |
| Add 10% Contingency | 3.1 | acre |

PRELIMINARY POND AREA REQUIRED FOR BASIN = 3.1 ACRE

| | | Facility Type | Total Area (ac) |
|---|---|---|---|
| **Proposed Pond 3B1 (Floodplain Comp. and Attenuation Credit):** | **7.5 acre** | Floodplain Comp. | 25.1 |
| **Proposed Pond 3B2 (Floodplain Comp. and Attenuation Credit):** | **3.9 acre** | | |
| **Proposed Pond 3B3 (Floodplain Comp. and Attenuation Credit):** | **13.7 acre** | | |
| **Proposed Pond 3B4 (Treatment):** | **7.0 acre** | Dry Facility | 7.0 |
| **Total Area of Proposed Ponds[(6)]:** | **32.1 acre** | | |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 3B4 (Sized to retain the project's treatment):**

Ave. Existing Ground Elevation = 120 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 6.96 acre
Depth of Pond = 8.50 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 109.50 | Bottom of Pond | 4.51 | | 0.00 | 0.00 | 0.00 |
| 110.00 | | 4.60 | 4.55 | 0.50 | 2.28 | 2.28 |
| 111.00 | Freeboard Elevation | 4.78 | 4.69 | 1.00 | 4.69 | 6.97 |
| 112.00 | | 4.97 | 4.88 | 1.00 | 4.88 | 11.85 |
| 113.00 | | 5.17 | 5.07 | 1.00 | 5.07 | 16.92 |
| 114.00 | | 5.36 | 5.26 | 1.00 | 5.26 | 22.18 |
| 115.00 | | 5.56 | 5.46 | 1.00 | 5.46 | 27.64 |
| 116.00 | | 5.76 | 5.66 | 1.00 | 5.66 | 33.30 |
| 117.00 | | 5.96 | 5.86 | 1.00 | 5.86 | 39.16 |
| 118.00 | Front Maint. Berm | 6.17 | 6.07 | 1.00 | 6.07 | 45.23 |
| 119.88 | Back Maint. Berm | 6.96 | 6.56 | 1.88 | 12.31 | 57.54 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 6.94 | 111.00 | 1.50 |

**Proposed Flood Comp. Area 3B1 (Sized to retain a portion of the project's flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 7.51 acre
Depth of Pond = 7.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 5.50 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 5.77 | 5.64 | 1.00 | 5.64 | 5.64 |
| 105.00 | | 6.06 | 5.92 | 1.00 | 5.92 | 11.55 |
| 106.00 | | 6.34 | 6.20 | 1.00 | 6.20 | 17.75 |
| 106.40 | Top of Floodplain Comp. | 6.46 | 6.40 | 0.40 | 2.56 | 20.31 |
| 107.00 | | 6.63 | 6.54 | 0.60 | 3.93 | 24.24 |
| 108.00 | | 6.92 | 6.78 | 1.00 | 6.78 | 31.01 |
| 109.00 | | 7.21 | 7.07 | 1.00 | 7.07 | 38.08 |
| 110.00 | Top of Pond | 7.51 | 7.36 | 1.00 | 7.36 | 45.45 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 67.70 | 106.40 | 20.31 |
| **Remaining Floodplain Comp. Volume Required:** | | | **47.39** |

**Proposed Flood Comp. Area 3B2 (Sized to retain a portion of the project's flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 108 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 3.94 acre
Depth of Pond = 5.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 2.94 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 3.14 | 3.04 | 1.00 | 3.04 | 3.04 |
| 105.00 | | 3.33 | 3.23 | 1.00 | 3.23 | 6.27 |
| 106.00 | | 3.53 | 3.43 | 1.00 | 3.43 | 9.71 |
| 106.40 | Top of Floodplain Comp. | 3.61 | 3.57 | 0.40 | 1.43 | 11.13 |
| 107.00 | | 3.73 | 3.67 | 0.60 | 2.20 | 13.34 |
| 108.00 | Top of Pond | 7.51 | 5.62 | 1.00 | 5.62 | 18.96 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.4' Floodplain Compensation Required | 47.39 | 106.40 | 11.16 |
| **Remaining Floodplain Comp. Volume Required:** | | | **36.23** |

**Proposed Flood Comp. Area 3B3 (Sized to retain a portion of the project's flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 13.67 acre
Depth of Pond = 7.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 11.51 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 11.81 | 11.66 | 1.00 | 11.66 | 11.66 |
| 105.00 | | 12.11 | 11.96 | 1.00 | 11.96 | 23.62 |
| 106.00 | | 12.42 | 12.27 | 1.00 | 12.27 | 35.89 |
| 106.40 | Top of Floodplain Comp. | 12.54 | 12.48 | 0.40 | 4.99 | 40.88 |
| 107.00 | | 12.73 | 12.64 | 0.60 | 7.58 | 48.46 |
| 108.00 | | 13.04 | 12.88 | 1.00 | 12.88 | 61.35 |
| 109.00 | | 13.35 | 13.20 | 1.00 | 13.20 | 74.55 |
| 110.00 | Top of Pond | 13.67 | 13.51 | 1.00 | 13.51 | 88.06 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.4' Floodplain Compensation Required | 36.23 | 106.40 | 40.92 |
| **Remaining Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK[7]**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond 3B4 w/CR-455 Runoff | 110.04 | 109.48 | 111.00 | 2900 | 0.05% | 112.45 |

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond 3B4 w/out CR-455 Runoff | 112.81 | 111.55 | 111.00 | 1050 | 0.05% | 111.52 |

(7) For this profile to work hydraulically the runoff from the west side of CR-455 would need to be directed to Basin 4.

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 3C1, 3C2, 3C3, & 3C4**
**Basin 3**

Computed By: MS
Checked By: MH
Date: 6/19/2019

| | |
|---|---|
| Beginning Station | 18846.66 |
| End Station | 24420.95 |
| Length (ft) | 5574.29 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods), pasture/range, and orchards | 83.63 |
| **TOTAL BASIN AREA** | **83.63** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Pasture/Range (Poor) | A | 68 | 48.74 | 3,314.37 |
| Pasture/Range (Poor) | D | 89 | 14.29 | 1,272.00 |
| Pasture/Range (Poor) - Offsite | A | 68 | 0.79 | 53.71 |
| Pasture/Range (Poor) - Offsite | D | 89 | 0.38 | 33.50 |
| Woods/Orchard (Poor) | A | 57 | 7.16 | 408.06 |
| Woods (Good) | D | 77 | 0.24 | 18.59 |
| Water Bodies | D | 100 | 12.03 | 1,203.40 |
| | | TOTAL | 83.63 | 6,303.63 |
| | | **COMPOSITE CN** | | **75.4** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.27 | 6.00 | 41.80 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.27 | 12.65 | 88.18 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.27 | 4.40 | 30.68 |

1) Soil Storage (S) — $S = (1000/CN) - 10$

| Soil Storage (in) | S | 3.27 |
|---|---|---|

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$

| Runoff (in) | R | 6.00 |
|---|---|---|

3) Runoff Volume (Vr) — $Vr = R/12 * Area$

| Runoff (ac-ft) | Vr | 41.80 |
|---|---|---|

## Post Development

| Total Basin Area | | |
|---|---|---|
| **Description** | | **Area (ac)** |
| Roadway, off-site areas, unimproved lands under bridges, and ponds | | 83.63 |
| | **TOTAL AREA (AC)** | **83.63** |

| Proposed Impervious Area | | | |
|---|---|---|---|
| **Description** | **Area[2]** | | |
| Proposed Pavement[1] | 28.71 | | |
| **Total Impervious Area** | **28.71** | **Acre** | |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A/D | 98 | 28.71 | 2,813.38 |
| Grassed/Open Area (Good) | A | 39 | 27.19 | 1,060.60 |
| Grassed/Open Area (Good) | D | 80 | 19.31 | 1,544.76 |
| Pasture/Range (Poor) - Offsite | A | 68 | 0.79 | 53.71 |
| Pasture/Range (Poor) - Offsite | D | 89 | 0.38 | 33.50 |
| Proposed Pond Area | D | 100 | 7.26 | 725.51 |
| | | TOTAL | 83.63 | 6,231.45 |
| | | **COMPOSITE CN** | | **74.5** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.42 | 5.89 | 41.06 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.42 | 12.52 | 87.25 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.42 | 4.31 | 30.02 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 3.42 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 5.89 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 41.06 |

**SUMMARY OF ATTENUATION ESTIMATES**

| PRE-DEVELOPED CONDITION | | POST DEVELOPED CONDITION | |
|---|---|---|---|
| AREA (AC): | 83.63 | AREA (AC): | 83.63 |
| CN: | 75.4 | CN: | 74.5 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 41.80 | 41.06 | -0.74 |
| FDOT | 100 yr, 240 hr | 88.18 | 87.25 | -0.93 |
| FDOT | 100 yr, 8 hr | 30.68 | 30.02 | -0.66 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | -0.66 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SJRWMD |
| Post Development Total Area (ac) = | 83.63 |
| Post Development Impervious Area Added (ac) = | 28.71 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing an on-line off-site dry retention facility paired with infield flood planes.

**Dry Retention (On-Line System) Criteria -** 1.25" over impervious area or 0.5" over total area, whichever is greater. Plus add 0.5" over the total area. (Based on the SJRWMD treatment volume requirements found in the 2018 Permit Information Manual.)

| **Dry Retention** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 3.48 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 2.99 | |
| Governing Condition + 0.5" x Total Area = | 6.97 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **6.97** | |

## ESTIMATE FLOODPLAIN IMPACTS

| **Floodplain Elevation[3]** | **Average Existing Ground[4]/ESHWT Elevation[5]** | **Exist. Pond Control** | **Depth of Impact (ft)** | **Area of Impact (ac)** | **Impact Volume (ac-ft)** |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 17.54 | 59.65 |
| 106.4 | 104.7 | | 1.7 | 5.18 | 8.80 |
| | | | | **Total Impact Volume:** | **68.45** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.5' below ground due to the soil types' average SHWT's in the dry pond area (12 ac) is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume. Note that a negative attenuation volume reduces the required floodplain compensation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | -0.66 | ac-ft |
| Required Treatment Volume = | 6.97 | ac-ft |
| Required Flood Compensation Volume = | 68.45 | ac-ft |
| Total Floodplain Impacts = | 68.45 | ac-ft |
| Total Attenuation Credits = | -0.66 | ac-ft |
| **Total Required Floodplain Compensation =** | **67.79** | **ac-ft** |
| **Total Peak Volume =** | **74.76** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

where H = height (ft)
L = length of vertical sided pond (ft)
W = width of vertical sided pond (ft)

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

Volume = 6.97 ac-ft
H = 3.5 ft

$6.97 = L^2 \times 3.5$

Solving for L = 294.5 ft
Therefore W = 294.5 ft

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 323 | ft |
| Width @ top of slope = | 323 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 353 | ft |
| Width w/maint. Berm = | 353 | ft |
| Total Area = | 2.9 | acre |
| Add 10% Contingency | 3.1 | acre |

PRELIMINARY POND AREA REQUIRED FOR BASIN = 3.1 ACRE

| | | Facility Type | Total Area (ac) |
|---|---|---|---|
| **Proposed Pond 3C1 (Floodplain Comp. and Attenuation Credit):** | **6.8 acre** | Floodplain Comp. | 24.4 |
| **Proposed Pond 3C2 (Floodplain Comp. and Attenuation Credit):** | **3.9 acre** | | |
| **Proposed Pond 3C3 (Floodplain Comp. and Attenuation Credit):** | **13.7 acre** | | |
| **Proposed Pond 3C4 (Treatment):** | **7.3 acre** | Dry Facility | 7.3 |
| **Total Area of Proposed Ponds[(6)]:** | **31.6 acre** | | |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 3C4 (Sized to retain the project's treatment):**

Ave. Existing Ground Elevation = 122 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 7.26 acre
Depth of Pond = 10.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 110.00 | Bottom of Pond | 4.68 | | 0.00 | 0.00 | 0.00 |
| 111.00 | Freeboard Elev. 111.50' | 4.85 | 4.76 | 1.00 | 4.76 | 4.76 |
| 112.00 | | 5.02 | 4.93 | 1.00 | 4.93 | 9.69 |
| 113.00 | | 5.19 | 5.11 | 1.00 | 5.11 | 14.80 |
| 114.00 | | 5.37 | 5.28 | 1.00 | 5.28 | 20.08 |
| 115.00 | | 5.56 | 5.46 | 1.00 | 5.46 | 25.55 |
| 116.00 | | 5.74 | 5.65 | 1.00 | 5.65 | 31.20 |
| 117.00 | | 5.93 | 5.83 | 1.00 | 5.83 | 37.03 |
| 118.00 | | 6.12 | 6.02 | 1.00 | 6.02 | 43.05 |
| 119.00 | | 6.31 | 6.21 | 1.00 | 6.21 | 49.27 |
| 120.00 | Front Maint. Berm | 6.50 | 6.41 | 1.00 | 6.41 | 55.67 |
| 121.88 | Back Maint. Berm | 7.26 | 6.88 | 1.88 | 12.90 | 68.57 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 6.97 | 111.47 | 1.47 |

**Proposed Flood Comp. Area 3C1 (Sized to retain a portion of the project's flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 6.78 acre
Depth of Pond = 7.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 5.50 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 5.77 | 5.64 | 1.00 | 5.64 | 5.64 |
| 105.00 | | 6.06 | 5.92 | 1.00 | 5.92 | 11.55 |
| 106.00 | | 6.34 | 6.20 | 1.00 | 6.20 | 17.75 |
| 106.40 | Top of Floodplain Comp. | 6.46 | 6.40 | 0.40 | 2.56 | 20.31 |
| 107.00 | | 6.63 | 6.54 | 0.60 | 3.93 | 24.24 |
| 108.00 | | 6.92 | 6.78 | 1.00 | 6.78 | 31.01 |
| 109.00 | | 7.21 | 7.07 | 1.00 | 7.07 | 38.08 |
| 110.00 | Top of Pond | 6.78 | 7.00 | 1.00 | 7.00 | 45.08 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 67.79 | 106.40 | 20.35 |
| **Remaining Floodplain Comp. Volume Required:** | | | **47.44** |

**Proposed Flood Comp. Area 3C2 (Sized to retain a portion of the project's flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 108 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 3.94 acre
Depth of Pond = 5.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Bottom of Pond | 2.94 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 3.14 | 3.04 | 1.00 | 3.04 | 3.04 |
| 105.00 | | 3.33 | 3.23 | 1.00 | 3.23 | 6.27 |
| 106.00 | | 3.53 | 3.43 | 1.00 | 3.43 | 9.71 |
| 106.40 | Top of Floodplain Comp. | 3.61 | 3.57 | 0.40 | 1.43 | 11.13 |
| 107.00 | | 3.73 | 3.67 | 0.60 | 2.20 | 13.34 |
| 108.00 | Top of Pond | 3.94 | 3.84 | 1.00 | 3.84 | 17.17 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.4' Floodplain Compensation Required | 47.44 | 106.40 | 11.16 |
| **Remaining Floodplain Comp. Volume Required:** | | | **36.28** |

**Proposed Flood Comp. Area 3C3 (Sized to retain a portion of the project's flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 103 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 110.04 ft
Total Pond Area = 13.67 acre
Depth of Pond = 7.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 103.00 | Control Elevation | 11.51 | | 0.00 | 0.00 | 0.00 |
| 104.00 | | 11.81 | 11.66 | 1.00 | 11.66 | 11.66 |
| 105.00 | | 12.11 | 11.96 | 1.00 | 11.96 | 23.62 |
| 106.00 | | 12.42 | 12.27 | 1.00 | 12.27 | 35.89 |
| 106.40 | Top of Floodplain Comp. | 12.54 | 12.48 | 0.40 | 4.99 | 40.88 |
| 107.00 | | 12.73 | 12.64 | 0.60 | 7.58 | 48.46 |
| 108.00 | | 13.04 | 12.88 | 1.00 | 12.88 | 61.35 |
| 109.00 | | 13.35 | 13.20 | 1.00 | 13.20 | 74.55 |
| 110.00 | | 13.67 | 13.51 | 1.00 | 13.51 | 88.06 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.4' Floodplain Compensation Required | 36.28 | 106.40 | 40.92 |
| **Remaining Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK[7]**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond 3C4 w/CR-455 Runoff | 110.04 | 109.48 | 111.47 | 3920 | 0.05% | 113.43 |

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Pond 3C4 w/out CR-455 Runoff | 112.81 | 112.25 | 111.47 | 100 | 0.05% | 111.52 |

(7) For this profile to work hydraulically the runoff from the west side of CR-455 would need to be directed to Basin 4.

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 4A1, 4A2, & 4A3**
**Basin 4**

Computed By: MS
Checked By: MH
Date: 6/14/2019

| | |
|---|---|
| Beginning Station | 24420.95 |
| End Station | 31505.52 |
| Length (ft) | 7084.57 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods), pasture/range, and orchards | 113.45 |
| **TOTAL AREA** | **113.45** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | D | 98 | 0.00 | 0.00 |
| Pasture/Range (Poor) | A | 68 | 48.47 | 3,295.90 |
| Pasture/Range (Poor) | D | 89 | 11.82 | 1,051.66 |
| Pasture/Range (Poor) - Offsite | A | 68 | 4.92 | 334.65 |
| Woods/Orchard (Poor) | A | 57 | 4.24 | 241.40 |
| Woods (Good) | A | 30 | 1.03 | 31.01 |
| Water Bodies | D | 100 | 42.98 | 4,297.53 |
| | | TOTAL | 113.45 | 9,252.16 |
| | | **COMPOSITE CN** | | **81.6** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 2.26 | 6.76 | 63.90 |
| 25 yr, 72 hr | SFWMD | 9.65 | 2.26 | 7.38 | 69.79 |
| 100 yr, 240 hr | FDOT | 16.00 | 2.26 | 13.57 | 128.32 |
| 100 yr, 8 hr | FDOT | 7.24 | 2.26 | 5.09 | 48.13 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 2.26

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 6.76

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 63.90

## Post-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, and ponds | 113.45 |
| **TOTAL AREA** | **113.45** |

| Proposed Impervious Area | |
|---|---|
| **Description** | **Area[(2)] (ac)** |
| Proposed Pavement[(1)] | 38.56 |
| **TOTAL IMPERVIOUS AREA** | **38.56** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| On-site Roadway | A/D | 98 | 38.56 | 3,778.41 |
| Grassed/Open Area (Good) | A | 39 | 37.53 | 1,463.60 |
| Grassed/Open Area (Good) | D | 80 | 18.72 | 1,497.67 |
| Pasture/Range (Poor) - Offsite | A | 68 | 4.92 | 334.65 |
| Proposed Pond Area | A/D | 100 | 13.73 | 1,372.54 |
| | | TOTAL | 113.45 | 8,446.88 |
| | | **COMPOSITE CN** | | **74.5** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.43 | 5.89 | 55.64 |
| 25 yr, 72 hr | SFWMD | 9.65 | 3.43 | 6.48 | 61.29 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.43 | 12.51 | 118.28 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.43 | 4.30 | 40.67 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 3.43

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 5.89

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 55.64

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 113.45 |
| CN: | 81.6 |

**POST DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 113.45 |
| CN: | 74.5 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 63.90 | 55.64 | -8.26 |
| SFWMD | 25 yr, 72 hr | 69.79 | 61.29 | -8.50 |
| FDOT | 100 yr, 240 hr | 128.32 | 118.28 | -10.04 |
| FDOT | 100 yr, 8 hr | 48.13 | 40.67 | -7.46 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | -7.46 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | | | |
|---|---|---|---|
| Agency: | SFWMD & | SJRWMD | (Utilize most stringent regulations) |
| Post Development Total Area (ac) = | | 113.45 | |
| Post Development Impervious Area Added (ac) = | | 38.56 | |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line wet detention facility.

The SFWMD and SJRWMD requirements for wet detention facilities are the same.
**Wet Detention (On-Line System) Criteria -** 2.50" over added impervious area or 1.0" over total area, whichever is greater. (Based on the SJRWMD's and SFWMD's treatment volume requirements found in the 2018 Permit Information Manual and 2016 ERP Applicant's Handbook Volume II, respectively.)

| **Water Quality Volume Required:** | **Ac-Ft** | |
|---|---|---|
| 1) 1" of Runoff Over Total Area = | 9.45 | Governs |
| 2) 2.5" of Runoff Over Added Impervious Area = | 8.03 | |
| POLLUTION ABATEMENT VOLUME REQUIRED = | 9.45 | |

## ESTIMATE FLOODPLAIN IMPACTS

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 0.57 | 1.95 |
| 106.4 | 104.7 | | 1.7 | 0.44 | 0.75 |
| | | | | **Total Impact Volume:** | **2.70** |

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.0 | 102.0 | 102.0 | 4.0 | 4.41 | 17.64 |
| 106.0 | 104.0 | | 2.0 | 1.31 | 2.62 |
| 106.0 | 104.0 | 104.0 | 2.0 | 25.84 | 51.68 |
| 106.0 | 105.0 | | 1.0 | 5.63 | 5.63 |
| | | | | **Total Impact Volume:** | **77.57** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 5' below ground due to the average soil types' in the areas of the pond alternatives SHWT is 42" (3.5') to 72" (6') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from top of Maint Berm to SHWT = | 5 | ft |
| M = Maintenance Berm (Maint Berm) = | 1 | ft |
| H = D - M = | 4 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume.
Note that a negative attenuation volume reduces the required floodplain compensation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | -7.46 | ac-ft |
| Required Treatment Volume = | 9.45 | ac-ft |
| Required 106.0' Floodplain Compensation Volume = | 77.57 | ac-ft |
| Required 106.4' Floodplain Compensation Volume = | 2.70 | ac-ft |
| Total Floodplain Impacts = | 80.27 | ac-ft |
| Total Attenuation Credits = | -7.46 | ac-ft |
| **Total Required Floodplain Compensation =** | **72.80** | **ac-ft** |
| **Total Peak Volume =** | **82.26** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

where H = height (ft)
L = length of vertical sided pond (ft)
W = width of vertical sided pond (ft)

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | | |
|---|---|---|---|---|
| Volume = | 9.45 | ac-ft | | |
| H = | 4 | ft | | |
| | 9.45 | = | $L^2$ x | 4 |
| Solving for L = | 320.9 | ft | | |
| Therefore W = | 320.9 | ft | | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 4 | ft |
| x = | 32 | ft |
| Length @ top of slope = | 353 | ft |
| Width @ top of slope = | 353 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 383 | ft |
| Width w/maint. Berm = | 383 | ft |
| Total Area = | 3.37 | acre |
| Add 10% Contingency | 3.70 | acre |

PRELIMINARY POND AREA REQUIRED FOR BASIN = 3.7 ACRE

| | | Facility Type | Total Area (ac) |
|---|---|---|---|
| **Proposed Pond 4A1 (Floodplain Comp. and Attenuation Credit):** | **7.9 acre** | Flood Plain Comp | 11.1 |
| **Proposed Pond 4A2 (Floodplain Comp. and Attenuation Credit):** | **3.2 acre** | | |
| **Proposed Pond 4A3 (Treatment, FP Comp., and Atten. Credit):** | **13.7 acre** | Wet Facility | 13.7 |
| **Total Area of Proposed Ponds[(6)]:** | **24.9 acre** | | |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Flood Comp. Area 4A1 (Sized to retain a portion of the 106.0' flood comp. volume and attenuation credit)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 7.93 acre
Depth of Pond = 8.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Bottom of Pond | 5.67 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 5.94 | 5.81 | 1.00 | 5.81 | 5.81 |
| 104.00 | | 6.22 | 6.08 | 1.00 | 6.08 | 11.89 |
| 105.00 | | 6.50 | 6.36 | 1.00 | 6.36 | 18.25 |
| 106.00 | Top of 106.0' FP Comp. | 6.78 | 6.64 | 1.00 | 6.64 | 24.89 |
| 107.00 | | 7.07 | 6.92 | 1.00 | 6.92 | 31.81 |
| 108.00 | | 7.35 | 7.21 | 1.00 | 7.21 | 39.02 |
| 109.00 | | 7.64 | 7.50 | 1.00 | 7.50 | 46.51 |
| 110.00 | Top of Pond | 7.93 | 7.79 | 1.00 | 7.79 | 54.30 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.0' Floodplain Compensation Required | 70.11 | 106.00 | 24.89 |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **45.22** |

**Proposed Flood Comp. Area 4A2 (Sized to retain a portion of the 106.0'/106.4' flood comp. volumes & attenuation credit)**

Ave. Existing Ground Elevation = 115 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 3.22 acre
Depth of Pond = 13.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Bottom of Pond | 1.14 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 1.27 | 1.20 | 1.00 | 1.20 | 1.20 |
| 104.00 | | 1.41 | 1.34 | 1.00 | 1.34 | 2.54 |
| 105.00 | | 1.55 | 1.48 | 1.00 | 1.48 | 4.02 |
| 106.00 | Top of 106.0' FP Comp. | 1.70 | 1.62 | 1.00 | 1.62 | 5.64 |
| 106.40 | Top of 106.4' FP Comp. | 1.76 | 1.73 | 0.40 | 0.69 | 6.33 |
| 107.00 | | 1.85 | 1.81 | 0.60 | 1.08 | 7.42 |
| 108.00 | | 2.01 | 1.93 | 1.00 | 1.93 | 9.35 |
| 109.00 | | 2.18 | 2.10 | 1.00 | 2.10 | 11.45 |
| 110.00 | | 2.35 | 2.26 | 1.00 | 2.26 | 13.71 |
| 111.00 | | 2.52 | 2.43 | 1.00 | 2.43 | 16.14 |
| 112.00 | | 2.69 | 2.60 | 1.00 | 2.60 | 18.74 |
| 113.00 | | 2.86 | 2.77 | 1.00 | 2.77 | 21.52 |
| 114.00 | | 3.04 | 2.95 | 1.00 | 2.95 | 24.46 |
| 115.00 | Top of Pond | 3.22 | 3.13 | 1.00 | 3.13 | 27.59 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided[7] (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 2.70 | 106.40 | 6.33 |
| Remaining 106.0' Floodplain Compensation Required | 45.22 | 106.00 | 3.63 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **41.58** |

(7) The 106.0' floodplain comp. provided does not include the portion of the 106.4' floodplain comp. utilized under the 106.0' floodplain elevation

**Proposed Pond 4A3 (Sized to retain the treatment and the remainder of the 106.0' flood comp):**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 13.73 acre
Depth of Pond = 6.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Control Elevation | 10.85 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 11.14 | 10.99 | 1.00 | 10.99 | 10.99 |
| 104.00 | | 11.42 | 11.28 | 1.00 | 11.28 | 22.27 |
| 105.00 | | 11.71 | 11.57 | 1.00 | 11.57 | 33.84 |
| 106.00 | Top of 106.0' FP Comp. | 12.00 | 11.86 | 1.00 | 11.86 | 45.70 |
| 107.00 | Freeboard Elevation | 12.30 | 12.15 | 1.00 | 12.15 | 57.85 |
| 108.00 | Front Maint. Berm | 12.59 | 12.45 | 1.00 | 12.45 | 70.29 |
| 109.88 | Back Maint. Berm | 13.73 | 13.16 | 1.88 | 24.67 | 94.97 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 9.45 | 102.86 | 0.86 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.0' Floodplain Compensation Required | 41.58 | 106.00 | 45.70 |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Ponds 4A3 (ML Low Point) | 108.00 | 106.74 | 102.86 | 300 | 0.05% | 103.01 |
| Ponds 4A3 (CR-455 Low Point) | 110.04 | 109.48 | 102.86 | 4420 | 0.05% | 105.07 |

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 4B1, 4B2, & 4B3**
**Basin 4**

Computed By: MS
Checked By: MH
Date: 6/14/2019

| | |
|---|---|
| Beginning Station | 24420.95 |
| End Station | 31505.52 |
| Length (ft) | 7084.57 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Unimproved land (water bodies & woods), pasture/range, and orchards | 99.73 |
| **TOTAL AREA** | **99.73** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 0.00 |
| **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | D | 98 | 0.00 | 0.00 |
| Pasture/Range (Poor) | A | 68 | 48.47 | 3,295.90 |
| Pasture/Range (Poor) | D | 89 | 11.82 | 1,051.66 |
| Pasture/Range (Poor) - Offsite | A | 68 | 4.92 | 334.65 |
| Woods/Orchard (Poor) | A | 57 | 4.24 | 241.40 |
| Woods (Good) | A | 30 | 1.03 | 31.01 |
| Water Bodies | D | 100 | 29.25 | 2,924.99 |
| | | TOTAL | 99.73 | 7,879.62 |
| | | **COMPOSITE CN** | | **79.0** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 2.66 | 6.45 | 53.58 |
| 25 yr, 72 hr | SFWMD | 9.65 | 2.66 | 7.06 | 58.69 |
| 100 yr, 240 hr | FDOT | 16.00 | 2.66 | 13.20 | 109.71 |
| 100 yr, 8 hr | FDOT | 7.24 | 2.66 | 4.81 | 39.94 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 2.66

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 6.45

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 53.58

## Post-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, and ponds | 99.73 |
| **TOTAL AREA** | **99.73** |

| Proposed Impervious Area | |
|---|---|
| **Description** | **Area[(2)] (ac)** |
| Proposed Pavement[(1)] | 38.56 |
| **TOTAL IMPERVIOUS AREA** | **38.56** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| On-site Roadway | A/D | 98 | 38.56 | 3,778.41 |
| Grassed/Open Area (Good) | A | 39 | 29.60 | 1,154.29 |
| Grassed/Open Area (Good) | D | 80 | 18.72 | 1,497.67 |
| Pasture/Range (Poor) - Offsite | A | 68 | 4.92 | 334.65 |
| Proposed Pond Area | A/D | 100 | 7.93 | 793.11 |
| | | TOTAL | 99.73 | 7,558.13 |
| | | **COMPOSITE CN** | | **75.8** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.19 | 6.05 | 50.28 |
| 25 yr, 72 hr | SFWMD | 9.65 | 3.19 | 6.65 | 55.29 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.19 | 12.72 | 105.68 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.19 | 4.45 | 36.97 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 3.19

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 6.05

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 50.28

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 99.73 |
| CN: | 79.0 |

**POST DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 99.73 |
| CN: | 75.8 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 53.58 | 50.28 | -3.30 |
| SFWMD | 25 yr, 72 hr | 58.69 | 55.29 | -3.40 |
| FDOT | 100 yr, 240 hr | 109.71 | 105.68 | -4.03 |
| FDOT | 100 yr, 8 hr | 39.94 | 36.97 | -2.97 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | -2.97 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | | | |
|---|---|---|---|
| Agency: | SFWMD & | SJRWMD | (Utilize most stringent regulations) |
| Post Development Total Area (ac) = | | 99.73 | |
| Post Development Impervious Area Added (ac) = | | 38.56 | |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line wet detention facility.

The SFWMD and SJRWMD requirements for wet detention facilities are the same.
**Wet Detention (On-Line System) Criteria -** 2.50" over added impervious area or 1.0" over total area, whichever is greater. (Based on the SJRWMD's and SFWMD's treatment volume requirements found in the 2018 Permit Information Manual and 2016 ERP Applicant's Handbook Volume II, respectively.)

| **Water Quality Volume Required:** | **Ac-Ft** | |
|---|---|---|
| 1) 1" of Runoff Over Total Area = | 8.31 | Governs |
| 2) 2.5" of Runoff Over Added Impervious Area = | 8.03 | |
| POLLUTION ABATEMENT VOLUME REQUIRED = | 8.31 | |

## ESTIMATE FLOODPLAIN IMPACTS

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 0.57 | 1.95 |
| 106.4 | 104.7 | | 1.7 | 0.44 | 0.75 |
| | | | | **Total Impact Volume:** | **2.70** |

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.0 | 102.0 | 102.0 | 4.0 | 4.41 | 17.64 |
| 106.0 | 104.0 | | 2.0 | 1.31 | 2.62 |
| 106.0 | 104.0 | 104.0 | 2.0 | 25.84 | 51.68 |
| 106.0 | 105.0 | | 1.0 | 5.63 | 5.63 |
| | | | | **Total Impact Volume:** | **77.57** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 5' below ground due to the average soil types' in the areas of the pond alternatives SHWT is 42" (3.5') to 72" (6') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from top of Maint Berm to SHWT = | 5 | ft |
| M = Maintenance Berm (Maint Berm) = | 1 | ft |
| H = D - M = | 4 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume. Note that a negative attenuation volume reduces the required floodplain compensation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | -2.97 | ac-ft |
| Required Treatment Volume = | 8.31 | ac-ft |
| Required 106.0' Flood Compensation Volume = | 77.57 | ac-ft |
| Required 106.4' Flood Compensation Volume = | 2.70 | ac-ft |
| Total Floodplain Impacts = | 80.27 | ac-ft |
| Total Attenuation Credits = | -2.97 | ac-ft |
| **Total Required Floodplain Compensation =** | **77.29** | **ac-ft** |
| **Total Peak Volume =** | **85.60** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | |
|---|---|---|
| Volume = | 8.31 | ac-ft |
| H = | 4 | ft |

$$8.31 = L^2 \times 4$$

| | | |
|---|---|---|
| Solving for L = | 300.8 | ft |
| Therefore W = | 300.8 | ft |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 4 | ft |
| x = | 32 | ft |
| Length @ top of slope = | 333 | ft |
| Width @ top of slope = | 333 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 363 | ft |
| Width w/maint. Berm = | 363 | ft |
| Total Area = | 3.02 | acre |
| Add 10% Contingency | 3.32 | acre |

| PRELIMINARY POND AREA REQUIRED FOR BASIN = | 3.3 | ACRE |
|---|---|---|

| | | Facility Type | Total Area (ac) |
|---|---|---|---|
| **Proposed Pond 4B1 (Treatment, FP Comp., and Atten. Credit):** | **7.9 acre** | Wet Facility | 11.1 |
| **Proposed Pond 4B2 (Treatment, FP Comp., and Atten. Credit):** | **3.2 acre** | | |
| **Proposed Pond 4B3 (FP Comp. and Atten. Credit):** | **15.2 acre** | FP Comp. | 15.2 |
| **Total Area of Proposed Ponds[(6)]:** | **26.4 acre** | | |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 4B1 (Sized to retain a portion of the treatment, attenuation credit, and 106.0' flood comp.)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 7.93 acre
Depth of Pond = 6.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Control Elevation | 5.20 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 5.47 | 5.33 | 1.00 | 5.33 | 5.33 |
| 104.00 | | 5.74 | 5.60 | 1.00 | 5.60 | 10.94 |
| 105.00 | | 6.01 | 5.87 | 1.00 | 5.87 | 16.81 |
| 106.00 | Top of 106.0' FP Comp. | 6.29 | 6.15 | 1.00 | 6.15 | 22.96 |
| 107.00 | Free Board Elevation | 6.57 | 6.43 | 1.00 | 6.43 | 29.39 |
| 108.00 | Front Maint. Berm | 6.85 | 6.71 | 1.00 | 6.71 | 36.10 |
| 109.88 | Back Maint. Berm | 7.93 | 7.39 | 1.88 | 13.86 | 49.96 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 8.31 | 103.53 | 1.53 |

| Description | Volume Required (ac-ft) | Elevation | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total Treatment Volume Required | 8.31 | 103.50 | 8.13 |
| Total 106.0' Floodplain Compensation Required | 74.60 | 106.00 | 22.96 |
| **Remaining Treatment Volume Required:** | | | **0.18** |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **51.63** |

**Proposed Pond 4B2 (Sized to retain a portion of the treatment, attenuation credit, and 106.0'/106.4' flood comp.)**

Ave. Existing Ground Elevation = 115 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 3.22 acre
Depth of Pond = 11.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Control Elevation | 0.93 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 1.05 | 0.99 | 1.00 | 0.99 | 0.99 |
| 104.00 | | 1.17 | 1.11 | 1.00 | 1.11 | 2.10 |
| 105.00 | | 1.30 | 1.24 | 1.00 | 1.24 | 3.34 |
| 106.00 | Top of 106.0' FP Comp. | 1.44 | 1.37 | 1.00 | 1.37 | 4.71 |
| 106.40 | Top of 106.4' FP Comp. | 1.50 | 1.47 | 0.40 | 0.59 | 5.30 |
| 107.00 | Free Board Elevation | 1.58 | 1.54 | 0.60 | 0.92 | 6.22 |
| 108.00 | | 1.74 | 1.66 | 1.00 | 1.66 | 7.88 |
| 109.00 | | 1.89 | 1.81 | 1.00 | 1.81 | 9.69 |
| 110.00 | | 2.06 | 1.97 | 1.00 | 1.97 | 11.67 |
| 111.00 | | 2.22 | 2.14 | 1.00 | 2.14 | 13.81 |
| 112.00 | | 2.39 | 2.30 | 1.00 | 2.30 | 16.11 |
| 113.00 | Front Maint. Berm | 2.56 | 2.47 | 1.00 | 2.47 | 18.58 |
| 114.88 | Back Maint. Berm | 3.22 | 2.89 | 1.88 | 5.41 | 24.00 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Remaining Treatment Volume Required | 0.18 | 102.27 | 0.27 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided[7] (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 2.70 | 106.40 | 5.30 |
| Remaining 106.0' Floodplain Compensation Required | 51.63 | 106.00 | 2.60 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **49.04** |

(7) The 106.0' floodplain comp. provided does not include the portion of the 106.4' floodplain comp. utilized under the 106.0' floodplain elevation

**Proposed Flood Comp. Area 4B3 (Sized to retain a portion of the 106.0' flood comp. volume)**:

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 15.22 acre
Depth of Pond = 8.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Bottom of Pond | 12.77 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 13.07 | 12.92 | 1.00 | 12.92 | 12.92 |
| 104.00 | | 13.37 | 13.22 | 1.00 | 13.22 | 26.15 |
| 105.00 | | 13.68 | 13.52 | 1.00 | 13.52 | 39.67 |
| 106.00 | Top of 106.0' FP Comp. | 13.98 | 13.83 | 1.00 | 13.83 | 53.50 |
| 107.00 | | 14.29 | 14.13 | 1.00 | 14.13 | 67.63 |
| 108.00 | | 14.60 | 14.44 | 1.00 | 14.44 | 82.08 |
| 109.00 | | 14.91 | 14.75 | 1.00 | 14.75 | 96.83 |
| 110.00 | Top of Pond | 15.22 | 15.07 | 1.00 | 15.07 | 111.90 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Remaining 106.0' Floodplain Compensation Required | 49.04 | 106.00 | 53.50 |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **0.00** |

## PRELIMINARY HGL CHECK

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[8] (%) | Approximate HGL Elev.[9] (ft) |
|---|---|---|---|---|---|---|
| Ponds 4B1 & 4B2 (ML Low Point) | 108.00 | 106.74 | 103.50 | 1700 | 0.05% | 104.35 |
| Ponds 4B1 & 4B2 (CR-455 Low Point) | 110.04 | 109.48 | 103.50 | 1770 | 0.05% | 104.39 |

(8) A slope of 0.05% was assumed for the preliminary HGL check.

(9) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 4C1, 4C2, & 4C3**
**Basin 4**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date: | 6/14/2019 |

| | |
|---|---|
| Beginning Station | 24420.95 |
| End Station | 31505.52 |
| Length (ft) | 7084.57 |

## Pre-Development

| Total Basin Area | | |
|---|---|---|
| **Description** | | **Area (ac)** |
| Unimproved land (water bodies & woods), pasture/range, and orchards | | 99.73 |
| | **TOTAL AREA** | **99.73** |

| Existing Impervious Area | | |
|---|---|---|
| **Description** | | **Area (ac)** |
| Roadway, sidewalk, etc. | | 0.00 |
| | **TOTAL IMPERVIOUS AREA** | **0.00** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | D | 98 | 0.00 | 0.00 |
| Pasture/Range (Poor) | A | 68 | 48.47 | 3,295.90 |
| Pasture/Range (Poor) | D | 89 | 11.82 | 1,051.66 |
| Pasture/Range (Poor) - Offsite | A | 68 | 4.92 | 334.65 |
| Woods/Orchard (Poor) | A | 57 | 4.24 | 241.40 |
| Woods (Good) | A | 30 | 1.03 | 31.01 |
| Water Bodies | D | 100 | 29.25 | 2,924.99 |
| | | TOTAL | 99.73 | 7,879.62 |
| | | **COMPOSITE CN** | | **79.0** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 2.66 | 6.45 | 53.58 |
| 25 yr, 72 hr | SFWMD | 9.65 | 2.66 | 7.06 | 58.69 |
| 100 yr, 240 hr | FDOT | 16.00 | 2.66 | 13.20 | 109.71 |
| 100 yr, 8 hr | FDOT | 7.24 | 2.66 | 4.81 | 39.94 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 2.66 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 6.45 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 53.58 |

## Post-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, off-site areas, and ponds | 99.73 |
| **TOTAL AREA** | **99.73** |

| Proposed Impervious Area | |
|---|---|
| **Description** | **Area[2] (ac)** |
| Proposed Pavement[1] | 38.56 |
| **TOTAL IMPERVIOUS AREA** | **38.56** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| On-site Roadway | A/D | 98 | 38.56 | 3,778.41 |
| Grassed/Open Area (Good) | A | 39 | 29.60 | 1,154.29 |
| Grassed/Open Area (Good) | D | 80 | 18.72 | 1,497.67 |
| Pasture/Range (Poor) - Offsite | A | 68 | 4.92 | 334.65 |
| Proposed Pond Area | A/D | 100 | 7.93 | 793.11 |
| | | TOTAL | 99.73 | 7,558.13 |
| | | **COMPOSITE CN** | | **75.8** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 24 hr | SJRWMD | 9.00 | 3.19 | 6.05 | 50.28 |
| 25 yr, 72 hr | SFWMD | 9.65 | 3.19 | 6.65 | 55.29 |
| 100 yr, 240 hr | FDOT | 16.00 | 3.19 | 12.72 | 105.68 |
| 100 yr, 8 hr | FDOT | 7.24 | 3.19 | 4.45 | 36.97 |

1) Soil Storage (S) — $S = (1000/CN) - 10$ — Soil Storage (in) S = 3.19

2) Runoff (R) — $R = (P-0.2S)^2/(P+0.8S)$ — Runoff (in) R = 6.05

3) Runoff Volume (Vr) — $Vr = R/12 * Area$ — Runoff (ac-ft) Vr = 50.28

**SUMMARY OF ATTENUATION ESTIMATES**

**PRE-DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 99.73 |
| CN: | 79.0 |

**POST DEVELOPED CONDITION**

| | |
|---|---|
| AREA (AC): | 99.73 |
| CN: | 75.8 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SJRWMD | 25 yr, 24 hr | 53.58 | 50.28 | -3.30 |
| SFWMD | 25 yr, 72 hr | 58.69 | 55.29 | -3.40 |
| FDOT | 100 yr, 240 hr | 109.71 | 105.68 | -4.03 |
| FDOT | 100 yr, 8 hr | 39.94 | 36.97 | -2.97 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | -2.97 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | | | |
|---|---|---|---|
| Agency: | SFWMD & | SJRWMD | (Utilize most stringent regulations) |
| Post Development Total Area (ac) = | | 99.73 | |
| Post Development Impervious Area Added (ac) = | | 38.56 | |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line wet detention facility.

The SFWMD and SJRWMD requirements for wet detention facilities are the same.
**Wet Detention (On-Line System) Criteria -** 2.50" over added impervious area or 1.0" over total area, whichever is greater. (Based on the SJRWMD's and SFWMD's treatment volume requirements found in the 2018 Permit Information Manual and 2016 ERP Applicant's Handbook Volume II, respectively.)

| **Water Quality Volume Required:** | **Ac-Ft** | |
|---|---|---|
| 1) 1" of Runoff Over Total Area = | 8.31 | Governs |
| 2) 2.5" of Runoff Over Added Impervious Area = | 8.03 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **8.31** | |

## ESTIMATE FLOODPLAIN IMPACTS

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.4 | 103.0 | 103.0 | 3.4 | 0.57 | 1.95 |
| 106.4 | 104.7 | | 1.7 | 0.44 | 0.75 |
| | | | | **Total Impact Volume:** | **2.70** |

| Floodplain Elevation[3] | Average Existing Ground[4]/ESHWT Elevation[5] | Exist. Pond Control | Depth of Impact (ft) | Area of Impact (ac) | Impact Volume (ac-ft) |
|---|---|---|---|---|---|
| 106.0 | 102.0 | 102.0 | 4.0 | 4.41 | 17.64 |
| 106.0 | 104.0 | | 2.0 | 1.31 | 2.62 |
| 106.0 | 104.0 | 104.0 | 2.0 | 25.84 | 51.68 |
| 106.0 | 105.0 | | 1.0 | 5.63 | 5.63 |
| | | | | **Total Impact Volume:** | **77.57** |

(3) The floodplain elevations were drawn from published FEMA data.

(4) The average existing ground elevations were estimated from the published county lidar data.

(5) The ESHWT was drawn from the observed water level of the adjacent wetlands.

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The depth available for the treatment and attenuation volumes is constrained to the front of berm elevation above the SHWT minus the freeboard.

2) We will assume the SHWT elevations for the purpose of preliminary pond sizing to be at 5' below ground due to the average soil types' in the areas of the pond alternatives SHWT is 42" (3.5') to 72" (6') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from top of Maint Berm to SHWT = | 5 | ft |
| M = Maintenance Berm (Maint Berm) = | 1 | ft |
| H = D - M = | 4 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume. Note that a negative attenuation volume reduces the required floodplain compensation volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | -2.97 | ac-ft |
| Required Treatment Volume = | 8.31 | ac-ft |
| Required 106.0' Flood Compensation Volume = | 77.57 | ac-ft |
| Required 106.4' Flood Compensation Volume = | 2.70 | ac-ft |
| Total Floodplain Impacts = | 80.27 | ac-ft |
| Total Attenuation Credits = | -2.97 | ac-ft |
| **Total Required Floodplain Compensation =** | **77.29** | **ac-ft** |
| **Total Peak Volume =** | **85.60** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

where H = height (ft)
L = length of vertical sided pond (ft)
W = width of vertical sided pond (ft)

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | | |
|---|---|---|---|---|
| Volume = | 8.31 | ac-ft | | |
| H = | 4 | ft | | |
| | 8.31 | = | $L^2$ x | 4 |
| Solving for L = | 300.8 | ft | | |
| Therefore W = | 300.8 | ft | | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 4 | ft |
| x = | 32 | ft |
| Length @ top of slope = | 333 | ft |
| Width @ top of slope = | 333 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 363 | ft |
| Width w/maint. Berm = | 363 | ft |
| Total Area = | 3.02 | acre |
| Add 10% Contingency | 3.32 | acre |

PRELIMINARY POND AREA REQUIRED FOR BASIN = 3.3 ACRE

| | | Facility Type | Total Area (ac) |
|---|---|---|---|
| **Proposed Pond 4C1 (Treatment):** | **7.9 acre** | Wet Facility | 7.9 |
| **Proposed Pond 4C2 (Floodplain Comp.):** | **3.2 acre** | Flood Plain Comp. | 24.4 |
| **Proposed Pond 4C3 (Floodplain Comp. and Attenuation Credits):** | **21.2 acre** | | |
| **Total Area of Proposed Ponds[(6)]:** | **32.4 acre** | | |

(6) Sized to include floodplain compensation as well as to compensate for hilly terrain. Floodplain compensation is only accounted for up to the 100-year floodplain elevation or the front of berm, whichever is lower.

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 4C1 (Sized to retain the project's treatment volume):**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 7.93 acre
Depth of Pond = 6.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Control Elevation | 5.20 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 5.47 | 5.33 | 1.00 | 5.33 | 5.33 |
| 104.00 | | 5.74 | 5.60 | 1.00 | 5.60 | 10.94 |
| 105.00 | | 6.01 | 5.87 | 1.00 | 5.87 | 16.81 |
| 106.00 | | 6.29 | 6.15 | 1.00 | 6.15 | 22.96 |
| 107.00 | Free Board Elevation | 6.57 | 6.43 | 1.00 | 6.43 | 29.39 |
| 108.00 | Front Maint. Berm | 6.85 | 6.71 | 1.00 | 6.71 | 36.10 |
| 109.88 | Back Maint. Berm | 7.93 | 7.39 | 1.88 | 13.86 | 49.96 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 8.31 | 103.53 | 1.53 |

**Proposed Flood Comp. Area 4C2 (Sized to retain the project's 106.4' flood comp. volume)**

Ave. Existing Ground Elevation = 115 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 3.22 acre
Depth of Pond = 11.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 104.00 | Bottom of Pond | 1.41 | | 0.00 | 0.00 | 0.00 |
| 105.00 | | 1.55 | 1.48 | 1.00 | 1.48 | 1.48 |
| 106.00 | | 1.70 | 1.62 | 1.00 | 1.62 | 3.10 |
| 106.40 | Top of 106.4' FP Comp. | 1.76 | 1.73 | 0.40 | 0.69 | 3.79 |
| 107.00 | | 1.85 | 1.81 | 0.60 | 1.08 | 4.87 |
| 108.00 | | 2.01 | 1.93 | 1.00 | 1.93 | 6.81 |
| 109.00 | | 2.18 | 2.10 | 1.00 | 2.10 | 8.90 |
| 110.00 | | 2.35 | 2.26 | 1.00 | 2.26 | 11.17 |
| 111.00 | | 2.52 | 2.43 | 1.00 | 2.43 | 13.60 |
| 112.00 | | 2.69 | 2.60 | 1.00 | 2.60 | 16.20 |
| 113.00 | | 2.86 | 2.77 | 1.00 | 2.77 | 18.97 |
| 114.00 | | 3.04 | 2.95 | 1.00 | 2.95 | 21.92 |
| 115.00 | Top of Pond | 3.22 | 3.13 | 1.00 | 3.13 | 25.05 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.4' Floodplain Compensation Required | 2.70 | 106.40 | 3.79 |
| **Remaining 106.4' Floodplain Comp. Volume Required:** | | | **0.00** |

**Proposed Flood Comp. Area 4C3 (Sized to retain the project's 106.0' floodplain comp. volume and attenuation credits)**

Ave. Existing Ground Elevation = 110 ft
Normal Water Elevation = 102 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 108.00 ft
Total Pond Area = 21.21 acre
Depth of Pond = 8.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 102.00 | Bottom of Pond | 18.47 | | 0.00 | 0.00 | 0.00 |
| 103.00 | | 18.81 | 18.64 | 1.00 | 18.64 | 18.64 |
| 104.00 | | 19.14 | 18.98 | 1.00 | 18.98 | 37.62 |
| 105.00 | | 19.48 | 19.31 | 1.00 | 19.31 | 56.93 |
| 106.00 | Top of 106.0' FP Comp. | 19.82 | 19.65 | 1.00 | 19.65 | 76.58 |
| 107.00 | | 20.17 | 20.00 | 1.00 | 20.00 | 96.58 |
| 108.00 | | 20.52 | 20.34 | 1.00 | 20.34 | 116.92 |
| 109.00 | | 20.86 | 20.69 | 1.00 | 20.69 | 137.61 |
| 110.00 | Top of Pond | 21.21 | 21.04 | 1.00 | 21.04 | 158.65 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Total 106.0' Floodplain Compensation Required | 74.60 | 106.00 | 76.58 |
| **Remaining 106.0' Floodplain Comp. Volume Required:** | | | **0.00** |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[7] (%) | Approximate HGL Elev.[8] (ft) |
|---|---|---|---|---|---|---|
| Pond 4C1 (Mainline Low Point) | 108.00 | 106.74 | 103.53 | 1700 | 0.05% | 104.38 |
| Ponds 4C1 (CR-455 Low Point) | 110.04 | 109.48 | 103.53 | 1770 | 0.05% | 104.42 |

(7) A slope of 0.05% was assumed for the preliminary HGL check.

(8) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 5A1 & 5A2**
**Basin 5**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date: | 6/14/2019 |

| | |
|---|---|
| Beginning Station | 31505.52 |
| End Station | 33466.44 |
| Length (ft) | 1960.92 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Portions of SR-429 and Schofield Road, unimproved land (water bodies & woods), pasture/range, and orchards/tree farms | 92.80 |
| **TOTAL BASIN AREA** | **92.80** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 16.64 |
| **TOTAL IMPERVIOUS AREA** | **16.64** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | A | 98 | 16.64 | 1,630.67 |
| Pasture/Range (Poor) | A | 68 | 2.30 | 156.24 |
| Woods/Orchard (Poor) | A | 57 | 1.04 | 59.30 |
| Woods/Orchard (Fair) | A | 43 | 35.14 | 1,511.03 |
| Woods (Good) | A | 30 | 9.12 | 273.53 |
| Grassed Area | A | 39 | 28.57 | 1,114.09 |
| | | TOTAL | 92.80 | 4,744.86 |
| | | **COMPOSITE CN** | | **51.1** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 72 hr | SFWMD | 9.65 | 9.56 | 3.46 | 26.77 |
| 100 yr, 240 hr | FDOT | 16.00 | 9.56 | 8.39 | 64.91 |
| 100 yr, 8 hr | FDOT | 7.24 | 9.56 | 1.91 | 14.75 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 9.56 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 3.46 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 26.77 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway and existing and proposed ponds | 92.80 |
| **TOTAL AREA** | **92.80** |

| Proposed Impervious Area | |
|---|---|
| **Description** | **Area[2] (ac)** |
| Proposed Pavement[1] | 27.52 |
| **TOTAL IMPERVIOUS AREA** | **27.52** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A | 98 | 27.52 | 2,697.11 |
| Grassed/Open Area (Good) | A | 39 | 49.26 | 1,921.16 |
| Proposed Pond Area | A/D | 100 | 16.02 | 1,601.95 |
| | | TOTAL | 92.80 | 6,220.23 |
| | | **COMPOSITE CN** | | **67.0** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 72 hr | SFWMD | 9.65 | 4.92 | 5.53 | 42.75 |
| 100 yr, 240 hr | FDOT | 16.00 | 4.92 | 11.31 | 87.47 |
| 100 yr, 8 hr | FDOT | 7.24 | 4.92 | 3.50 | 27.08 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 4.92 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 5.53 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 42.75 |

**SUMMARY OF ATTENUATION ESTIMATES**

| PRE-DEVELOPED CONDITION | | POST DEVELOPED CONDITION | |
|---|---|---|---|
| AREA (AC): | 92.80 | AREA (AC): | 92.80 |
| CN: | 51.1 | CN: | 67.0 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SFWMD | 25 yr, 72 hr | 26.77 | 42.75 | 15.98 |
| FDOT | 100 yr, 240 hr | 64.91 | 87.47 | 22.56 |
| FDOT | 100 yr, 8 hr | 14.75 | 27.08 | 12.34 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 22.56 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SFWMD |
| Post Development Total Area (ac) = | 92.80 |
| Post Development Impervious Area Added (ac) = | 10.88 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line dry retention facility.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. (Based on the SFWMD treatment volume requirements found in the 2016 ERP Applicant's Handbook Volume II.)

| **Water Quality Volume Required** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 3.87 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 1.13 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **3.87** | |

## ESTIMATE EXISTING DRAINAGE POND IMPACTS

| Description | Area (ac) | Estimated Depth (ft) | Storage (ac-ft) |
|---|---|---|---|
| Existing Pond between the Existing North bound SR 429 Lane and the Existing Schofield Road North bound Entrance Ramp to SR 429 | 0.04 | 1.00 | 0.04 |
| Existing Pond between the Existing Schofield Road North bound Entrance Ramp to SR 429 and East SR 429 ROW | 0.24 | 1.00 | 0.24 |
| **TOTAL STORAGE IMPACTED (ac-ft):** | | | **0.28** |

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The top of the treatment and attenuation volume are constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.5' below ground due to the soil types' average SHWT's in the dry pond area (12 ac) is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 22.56 | ac-ft |
| Required Treatment Volume = | 3.87 | ac-ft |
| Required Existing Pond Impact Compensation Volume = | 0.28 | ac-ft |
| **Peak Volume =** | **26.71** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | |
|---|---|---|---|
| Volume = | 26.71 | ac-ft | |
| H = | 3.5 | ft | |
| | 26.71 = | | $L^2$ x 3.5 |
| Solving for L = | 576.6 | ft | |
| Therefore W = | 576.6 | ft | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 605 | ft |
| Width @ top of slope = | 605 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 635 | ft |
| Width w/maint. Berm = | 635 | ft |
| Total Area = | 9.2 | acre |
| Add 10% Contingency = | 10.2 | acre |

**PRELIMINARY POND AREA REQUIRED FOR BASIN = 10.2 ACRES**

| | | Facility Type | Total Area |
|---|---|---|---|
| Proposed Pond 5A1: | 5.1 acre | Dry Retention | 16.0 acre |
| Proposed Pond 5A2: | 11.0 acre | | |
| **Total of Ponds:** | **16.0 acre** | | |

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 5A1 (Sized to retain the project's treatment, attenuation, and existing pond impacts):**

Ave. Existing Ground Elevation = 147 ft
Normal Water Elevation = 104 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 148.53 ft (From Mainline profile)
Total Pond Area = 5.05 acre
Depth of Pond = 6.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 139.00 | Bottom of Dry Pond | 3.31 | 1.65 | 0.00 | 0.00 | 0.00 |
| 140.00 | | 3.48 | 3.39 | 1.00 | 3.39 | 3.39 |
| 141.00 | | 3.65 | 3.56 | 1.00 | 3.56 | 6.95 |
| 142.00 | | 3.82 | 3.73 | 1.00 | 3.73 | 10.69 |
| 143.00 | Free Board Elevation | 4.00 | 3.91 | 1.00 | 3.91 | 14.60 |
| 144.00 | | 4.17 | 4.09 | 1.00 | 4.09 | 18.68 |
| 145.00 | Front Maint. Berm | 4.36 | 4.26 | 1.00 | 4.26 | 22.95 |
| 146.88 | Back Maint. Berm | 5.05 | 4.70 | 1.88 | 8.82 | 31.77 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 3.87 | 140.13 | 1.13 |
| Treatment and Attenuation | 26.71 | 145.80 | 6.80 |

| Description | Volume Required (ac-ft) | Elevation (ft) | Compensation Provided (ac-ft) |
|---|---|---|---|
| Treatment and Attenuation | 26.71 | 143.00 | 14.60 |
| **Remaining Treatment + Attenuation Volume Required:** | | | **12.12** |

**Proposed Pond 5A2 (Sized to retain the project's treatment, attenuation, and existing pond impacts):**

Ave. Existing Ground Elevation = 130 ft
Normal Water Elevation = 104 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 116.73 ft (Schofield Road access road profile)
Total Pond Area = 10.97 acre
Depth of Pond = 16.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 112.00 | Bottom of Dry Pond | 3.76 | | 0.00 | 0.00 | 0.00 |
| 113.00 | | 4.06 | 3.91 | 1.00 | 3.91 | 3.91 |
| 114.00 | | 4.38 | 4.22 | 1.00 | 4.22 | 8.13 |
| 115.00 | Free Board Elevation | 4.70 | 4.54 | 1.00 | 4.54 | 12.67 |
| 116.00 | | 5.04 | 4.87 | 1.00 | 4.87 | 17.53 |
| 117.00 | | 5.38 | 5.21 | 1.00 | 5.21 | 22.74 |
| 118.00 | | 5.74 | 5.56 | 1.00 | 5.56 | 28.31 |
| 119.00 | | 6.10 | 5.92 | 1.00 | 5.92 | 34.23 |
| 120.00 | | 6.47 | 6.29 | 1.00 | 6.29 | 40.52 |
| 121.00 | | 6.84 | 6.66 | 1.00 | 6.66 | 47.17 |
| 122.00 | | 7.21 | 7.03 | 1.00 | 7.03 | 54.20 |
| 123.00 | | 7.59 | 7.40 | 1.00 | 7.40 | 61.60 |
| 124.00 | | 7.97 | 7.78 | 1.00 | 7.78 | 69.38 |
| 125.00 | | 8.35 | 8.16 | 1.00 | 8.16 | 77.54 |
| 126.00 | | 8.73 | 8.54 | 1.00 | 8.54 | 86.07 |
| 127.00 | | 9.11 | 8.92 | 1.00 | 8.92 | 94.99 |
| 128.00 | Front Maint. Berm | 9.50 | 9.30 | 1.00 | 9.30 | 104.30 |
| 129.88 | Back Maint. Berm | 10.97 | 10.23 | 1.88 | 19.19 | 123.48 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 3.87 | 112.99 | 0.99 |
| Remaining Treatment and Attenuation | 12.12 | 114.95 | 2.95 |

**PRELIMINARY HGL CHECK**

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[(3)] (%) | Approximate HGL Elev.[(4)] (ft) |
|---|---|---|---|---|---|---|
| Pond 5A1 | 148.53 | 147.27 | 143.00 | 950 | 0.05% | 143.48 |
| Pond 5A2 | 116.73 | 116.25 | 114.95 | 1000 | 0.05% | 115.45 |

(3) A slope of 0.05% was assumed for the preliminary HGL check.

(4) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 5B**
**Basin 5**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date: | 6/14/2019 |

| | |
|---|---|
| Beginning Station | 31505.52 |
| End Station | 33466.44 |
| Length (ft) | 1960.92 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Portions of SR-429 and Schofield Road, unimproved land (water bodies & woods), pasture/range, and orchards/tree farms | 102.90 |
| **TOTAL BASIN AREA** | **102.90** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 16.64 |
| **TOTAL IMPERVIOUS AREA** | **16.64** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | A | 98 | 16.64 | 1,630.67 |
| Pasture/Range (Poor) | A | 68 | 2.30 | 156.24 |
| Woods/Orchard (Poor) | A | 57 | 1.04 | 59.30 |
| Woods/Orchard (Fair) | A | 43 | 45.24 | 1,945.39 |
| Woods (Good) | A | 30 | 9.12 | 273.53 |
| Grassed Area | A | 39 | 28.57 | 1,114.09 |
| | | TOTAL | 102.90 | 5,179.22 |
| | | **COMPOSITE CN** | | **50.3** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 72 hr | SFWMD | 9.65 | 9.87 | 3.36 | 28.80 |
| 100 yr, 240 hr | FDOT | 16.00 | 9.87 | 8.23 | 70.60 |
| 100 yr, 8 hr | FDOT | 7.24 | 9.87 | 1.83 | 15.71 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 9.87 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 3.36 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 28.80 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway and existing and proposed ponds | 102.90 |
| **TOTAL AREA** | **102.90** |

| Proposed Impervious Area | |
|---|---|
| **Description** | **Area[2] (ac)** |
| Proposed Pavement[1] | 27.52 |
| **TOTAL IMPERVIOUS AREA** | **27.52** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A | 98 | 27.52 | 2,697.11 |
| Grassed/Open Area (Good) | A | 39 | 65.28 | 2,545.92 |
| Proposed Pond Area | A/D | 100 | 10.10 | 1,010.15 |
| | | TOTAL | 102.90 | 6,253.18 |
| | | **COMPOSITE CN** | | **60.8** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 72 hr | SFWMD | 9.65 | 6.46 | 4.72 | 40.44 |
| 100 yr, 240 hr | FDOT | 16.00 | 6.46 | 10.22 | 87.66 |
| 100 yr, 8 hr | FDOT | 7.24 | 6.46 | 2.85 | 24.46 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 6.46 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 4.72 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 40.44 |

**SUMMARY OF ATTENUATION ESTIMATES**

| PRE-DEVELOPED CONDITION | | POST DEVELOPED CONDITION | |
|---|---|---|---|
| AREA (AC): | 102.90 | AREA (AC): | 102.90 |
| CN: | 50.3 | CN: | 60.8 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SFWMD | 25 yr, 72 hr | 28.80 | 40.44 | 11.64 |
| FDOT | 100 yr, 240 hr | 70.60 | 87.66 | 17.05 |
| FDOT | 100 yr, 8 hr | 15.71 | 24.46 | 8.75 |

| | |
|---|---|
| MAXIMUM ATTENUATION VOLUME (AC-FT) | 17.05 |

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SFWMD |
| Post Development Total Area (ac) = | 102.90 |
| Post Development Impervious Area Added (ac) = | 10.88 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line dry retention facility.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. (Based on the SFWMD treatment volume requirements found in the 2016 ERP Applicant's Handbook Volume II.)

| **Water Quality Volume Required** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 4.29 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 1.13 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **4.29** | |

## ESTIMATE EXISTING DRAINAGE POND IMPACTS

| Description | Area (ac) | Estimated Depth (ft) | Storage (ac-ft) |
|---|---|---|---|
| Existing Pond between the Existing North bound SR 429 Lane and the Existing Schofield Road North bound Entrance Ramp to SR 429 | 0.04 | 2.00 | 0.08 |
| Existing Pond between the Existing Schofield Road North bound Entrance Ramp to SR 429 and East SR 429 ROW | 0.24 | 3.00 | 0.73 |
| **TOTAL STORAGE IMPACTED (ac-ft):** | | | **0.81** |

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The top of the treatment and attenuation volume are constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.5' below ground due to the soil types' average SHWT's in the dry pond area (12 ac) is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 17.05 | ac-ft |
| Required Treatment Volume = | 4.29 | ac-ft |
| Required Existing Pond Impact Compensation Volume = | 0.81 | ac-ft |
| **Peak Volume =** | **21.34** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

| | | |
|---|---|---|
| where | H = | height (ft) |
| | L = | length of vertical sided pond (ft) |
| | W = | width of vertical sided pond (ft) |

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | |
|---|---|---|---|
| Volume = | 21.34 | ac-ft | |
| H = | 3.5 | ft | |
| | 21.34 = | | $L^2$ x 3.5 |
| Solving for L = | 515.4 | ft | |
| Therefore W = | 515.4 | ft | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 543 | ft |
| Width @ top of slope = | 543 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 573 | ft |
| Width w/maint. Berm = | 573 | ft |
| Total Area = | 7.5 | acre |
| Add 10% Contingency = | 8.3 | acre |

**PRELIMINARY POND AREA REQUIRED FOR BASIN = 8.3 ACRES**

**Total of Ponds:** **10.1 acre**

| Facility Type | Total Area |
|---|---|
| Dry Retention | 10.1 acre |

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 5B (Sized to retain the project's treatment, attenuation, and existing pond impacts):**

Ave. Existing Ground Elevation = 120 ft
Normal Water Elevation = 104 ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.)
Lowest Profile Elevation = 116.73 ft (From Mainline profile)
Total Pond Area = 10.10 acre
Depth of Pond = 6.00 ft

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 112.00 | Bottom of Dry Pond | 7.53 | | 0.00 | 0.00 | 0.00 |
| 113.00 | | 7.78 | 7.66 | 1.00 | 7.66 | 7.66 |
| 114.00 | | 8.04 | 7.91 | 1.00 | 7.91 | 15.56 |
| 115.00 | Free Board Elevation | 8.30 | 8.17 | 1.00 | 8.17 | 23.73 |
| 116.00 | 115.5 | 8.56 | 8.43 | 1.00 | 8.43 | 32.16 |
| 117.00 | | 8.82 | 8.69 | 1.00 | 8.69 | 40.84 |
| 118.00 | Front Maint. Berm | 9.08 | 8.95 | 1.00 | 8.95 | 49.80 |
| 119.88 | Back Maint. Berm | 10.10 | 9.59 | 1.88 | 17.99 | 67.78 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 4.29 | 112.56 | 0.56 |
| Treatment and Attenuation | 21.34 | 114.71 | 2.71 |

## PRELIMINARY HGL CHECK

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[(3)] (%) | Approximate HGL Elev.[(4)] (ft) |
|---|---|---|---|---|---|---|
| Pond 5B | 116.73 | 116.25 | 114.71 | 870 | 0.05% | 115.14 |

(3) A slope of 0.05% was assumed for the preliminary HGL check.

(4) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

**Project: Lake/Orange Connector PD&E**
**Client: CFX**
**Pond(s): 5C**
**Basin 5**

| | |
|---|---|
| Computed By: | MS |
| Checked By: | MH |
| Date: | 6/14/2019 |

| | |
|---|---|
| Beginning Station | 31505.52 |
| End Station | 33466.44 |
| Length (ft) | 1960.92 |

## Pre-Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Portions of SR-429 and Schofield Road, unimproved land (water bodies & woods), pasture/range, and orchards/tree farms | 100.81 |
| **TOTAL BASIN AREA** | **100.81** |

| Existing Impervious Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway, sidewalk, etc. | 16.64 |
| **TOTAL IMPERVIOUS AREA** | **16.64** |

**ATTENUATION VOLUME ESTIMATE**

| Land Use Description | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway and Sidewalks | A | 98 | 16.64 | 1,630.67 |
| Pasture/Range (Poor) | A | 68 | 10.30 | 700.51 |
| Woods/Orchard (Poor) | A | 57 | 1.04 | 59.30 |
| Woods/Orchard (Fair) | A | 43 | 35.14 | 1,511.03 |
| Woods (Good) | A | 30 | 9.12 | 273.53 |
| Grassed Area | A | 39 | 28.57 | 1,114.09 |
| | | TOTAL | 100.81 | 5,289.12 |
| | | **COMPOSITE CN** | | **52.5** |

**ESTIMATE OF PRE-DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 72 hr | SFWMD | 9.65 | 9.06 | 3.64 | 30.54 |
| 100 yr, 240 hr | FDOT | 16.00 | 9.06 | 8.66 | 72.74 |
| 100 yr, 8 hr | FDOT | 7.24 | 9.06 | 2.03 | 17.09 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 9.06 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 3.64 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 30.54 |

## Post Development

| Total Basin Area | |
|---|---|
| **Description** | **Area (ac)** |
| Roadway and existing and proposed ponds | 100.81 |
| **TOTAL AREA** | **100.81** |

| Proposed Impervious Area | |
|---|---|
| **Description** | **Area[2] (ac)** |
| Proposed Pavement[1] | 27.52 |
| **TOTAL IMPERVIOUS AREA** | **27.52** |

(1) This includes the assumption that the median area (82' typical median width) is impervious to account for future widening projects.

(2) The impervious area was found using CAD software and proposed footprint in plan view.

| Land Use Description/ Soil Name | Soil Group | CN | Area (ac) | Product |
|---|---|---|---|---|
| Roadway | A | 98 | 27.52 | 2,697.11 |
| Grassed/Open Area (Good) | A | 39 | 65.28 | 2,545.92 |
| Proposed Pond Area | A/D | 100 | 8.00 | 800.39 |
| | | TOTAL | 100.81 | 6,043.43 |
| | | **COMPOSITE CN** | | **60.0** |

**ESTIMATE OF POST DEVELOPMENT RUNOFF VOLUME**

**Summary Table:**

| Design Storm | Agency | P (in) | S (in) | R (in) | Vr (ac-ft) |
|---|---|---|---|---|---|
| 25 yr, 72 hr | SFWMD | 9.65 | 6.68 | 4.61 | 38.73 |
| 100 yr, 240 hr | FDOT | 16.00 | 6.68 | 10.07 | 84.63 |
| 100 yr, 8 hr | FDOT | 7.24 | 6.68 | 2.77 | 23.27 |

| | | | | |
|---|---|---|---|---|
| 1) Soil Storage (S) | $S = (1000/CN) - 10$ | Soil Storage (in) | S | 6.68 |
| 2) Runoff (R) | $R = (P-0.2S)^2/(P+0.8S)$ | Runoff (in) | R | 4.61 |
| 3) Runoff Volume (Vr) | $Vr = R/12 * Area$ | Runoff (ac-ft) | Vr | 38.73 |

**SUMMARY OF ATTENUATION ESTIMATES**

| PRE-DEVELOPED CONDITION | | POST DEVELOPED CONDITION | |
|---|---|---|---|
| AREA (AC): | 100.81 | AREA (AC): | 100.81 |
| CN: | 52.5 | CN: | 60.0 |

| AGENCY | DESIGN STORM | RUNOFF VOLUME (Vr) | | |
|---|---|---|---|---|
| | | PRE (AC-FT) | POST (AC-FT) | INCREASE (AC-FT) |
| SFWMD | 25 yr, 72 hr | 30.54 | 38.73 | 8.18 |
| FDOT | 100 yr, 240 hr | 72.74 | 84.63 | 11.89 |
| FDOT | 100 yr, 8 hr | 17.09 | 23.27 | 6.18 |

| MAXIMUM ATTENUATION VOLUME (AC-FT) | 11.89 |
|---|---|

## WATER QUALITY CALCULATIONS

### Water Management District
### Pollution Abatement Volume Requirement

| | |
|---|---|
| Agency: | SFWMD |
| Post Development Total Area (ac) = | 100.81 |
| Post Development Impervious Area Added (ac) = | 10.88 |

Based on the existing soil types and their depth to SHWT (USGS), Metric is proposing a on-line dry retention facility.

**Dry Retention (On-Line System) Criteria -** 1.25" over added impervious area or 0.5" over total area, whichever is greater. (Based on the SFWMD treatment volume requirements found in the 2016 ERP Applicant's Handbook Volume II.)

| **Water Quality Volume Required** | **Ac-Ft** | |
|---|---|---|
| 1) 0.5" of Runoff Over Total Area = | 4.20 | Governs |
| 2) 1.25" of Runoff Over Added Impervious Area = | 1.13 | |
| **DRY RETENTION POLLUTION ABATEMENT VOLUME REQUIRED =** | **4.20** | |

## ESTIMATE EXISTING DRAINAGE POND IMPACTS

| Description | Area (ac) | Estimated Depth (ft) | Storage (ac-ft) |
|---|---|---|---|
| Existing Pond between the Existing North bound SR 429 Lane and the Existing Schofield Road North bound Entrance Ramp to SR 429 | 0.04 | 2.00 | 0.08 |
| Existing Pond between the Existing Schofield Road North bound Entrance Ramp to SR 429 and East SR 429 ROW | 0.24 | 3.00 | 0.73 |
| **TOTAL STORAGE IMPACTED (ac-ft):** | | | **0.81** |

## ESTIMATE POND RIGHT OF WAY REQUIREMENTS

1) The top of the treatment and attenuation volume are constrained to the front of berm elevation above the SHWT minus the freeboard minus the Dry Retention Height above SHWT.

2) We will assume the ponds' average SHWT elevations for the purpose of this preliminary pond sizing calculation to be at 6.5' below ground due to the soil types' average SHWT's in the dry pond area (12 ac) is > 80" (6.67') [USGS].

| | | |
|---|---|---|
| D = Pond Depth from front of Maint. Berm to SHWT = | 6.5 | ft |
| F = Freeboard = | 1 | ft |
| R = Dry Retention Height Above SHWT = | 2 | ft |
| H = D - F - R = | 3.5 | ft |

3) Sum the required treatment, flood compensation, and/or attenuation volumes to attain the Peak Pond Volume.

| | | |
|---|---|---|
| Required Attenuation Volume = | 11.89 | ac-ft |
| Required Treatment Volume = | 4.20 | ac-ft |
| Required Existing Pond Impact Compensation Volume = | 0.81 | ac-ft |
| **Peak Volume =** | **16.09** | **ac-ft** |

4) For purposes of pond area calculations, assume a square pond.

Volume = LWH

where H = height (ft)
L = length of vertical sided pond (ft)
W = width of vertical sided pond (ft)

Since a square pond is being assumed, L = W. Therefore, Volume = $L^2H$

| | | | |
|---|---|---|---|
| Volume = | 16.09 | ac-ft | |
| H = | 3.5 | ft | |
| | 16.09 = | | $L^2$ x 3.5 |
| Solving for L = | 447.5 | ft | |
| Therefore W = | 447.5 | ft | |

5) Increase dimensions to account for side slopes.

Add: x = [(Side Slopes x H) x 2] to each dimension

| | | |
|---|---|---|
| Side slopes: | 4 | ft/ft |
| H: | 3.5 | ft |
| x = | 28 | ft |
| Length @ top of slope = | 475 | ft |
| Width @ top of slope = | 475 | ft |

6) Add maintenance berms.

Assume 15' maintenance berm (add to each side)

| | | |
|---|---|---|
| Length w/maint Berm = | 505 | ft |
| Width w/maint. Berm = | 505 | ft |
| Total Area = | 5.9 | acre |
| Add 10% Contingency = | 6.5 | acre |

**PRELIMINARY POND AREA REQUIRED FOR BASIN = 6.5 ACRES**

| | | Facility Type | Total Area |
|---|---|---|---|
| **Total of Ponds:** | **8.0 acre** | Dry Retention | 8.0 acre |

## POND STAGE/STORAGE CALCULATIONS

**Proposed Pond 5C (Sized to retain the project's treatment, attenuation, and existing pond impacts):**

| | | |
|---|---|---|
| Ave. Existing Ground Elevation = | 116 | ft |
| Normal Water Elevation = | 104 | ft (Per the observed water elevation of the adjacent existing waterbodies/wetlands.) |
| Lowest Profile Elevation = | 116.73 | ft (From Mainline profile) |
| Total Pond Area = | 8.00 | acre |
| Depth of Pond = | 4.00 | ft |

| Stage | Description | Area (ac) | Ave Area (ac) | Localized Depth (ft) | Storage (ac-ft) | Total Storage (ac-ft) |
|---|---|---|---|---|---|---|
| 109.00 | Bottom of Dry Pond | 6.80 | | 0.00 | 0.00 | 0.00 |
| 110.00 | | 6.80 | 6.80 | 1.00 | 6.80 | 6.80 |
| 111.00 | | 6.90 | 6.85 | 1.00 | 6.85 | 13.65 |
| 112.00 | Free Board Elevation | 7.00 | 6.95 | 1.00 | 6.95 | 20.60 |
| 113.00 | Front Maint. Berm | 7.21 | 7.11 | 1.00 | 7.11 | 27.71 |
| 114.88 | Back Maint. Berm | 8.00 | 7.61 | 1.88 | 14.26 | 41.97 |

| Description | Volume Required (ac-ft) | Stage | Above Bottom of Pond (ft) |
|---|---|---|---|
| Treatment | 4.20 | 109.62 | 0.62 |
| Treatment and Attenuation | 16.09 | 111.35 | 2.35 |

## PRELIMINARY HGL CHECK

| Pond ID | Lowest Profile Elevation (ft) | Estimated EOP Elevation (ft) | DHW (ft) | Distance to Low (ft) | Estimated HGL Slope[(3)] (%) | Approximate HGL Elev.[(4)] (ft) |
|---|---|---|---|---|---|---|
| Pond 5C | 116.73 | 116.25 | 111.35 | 315 | 0.05% | 111.51 |

(3) A slope of 0.05% was assumed for the preliminary HGL check.

(4) The DHW elevation utilized as the tailwater for the preliminary HGL check is for the 100-year, 240-hour design storm instead of the 10-year, 24-hour storm, therefore the 1' clearance criteria was not utlized.

# Appendix C – Pond Evaluation Matrices

| Basin 1 | | | |
|---|---|---|---|
| Pond ID | Ponds 1A1 to 1A4 | Ponds 1B1 to 1B4 | Ponds 1C1 to 1C3 |
| Location | Ponds 1A1, 1A2, & 1A4 are located in infields, Pond 1A3 is located outside of ROW | Ponds 1B1, 1B2, & 1B4 are located in infields, Pond 1B3 is located outside of ROW | Ponds 1C1 to 1C2 are located in infields, Pond 1C3 is located outside of ROW |
| Total Size of Ponds (acre) | 31.2 | 47.5 | 45.9 |
| Size of Additional ROW Needed (acre) | 4.1 | 12.2 | 10.6 |
| No. Parcels Required for Acquisition | 1 | 1 | 3 |
| ELA Opportunities | Pond 1A4 used for Impacted FDOT Pond & Project | Ponds 1B1 & 1B2 used for Impacted FDOT Pond & Flood Comp | Ponds 1C1 & 1C2 used for Impacted FDOT Pond & Flood Comp |
| FEMA Floodplain Impacts (ac-ft) | 29.7 | 44.5 | 44.5 |
| Listed Species Impact | None | None | None |
| Contaminated Sites | None | None | None |
| Archeological & Historical Impacts | None | None | None |
| Social Impacts | None | None | None |
| Other Environmental Impacts | None | None | None |
| Major Utility Conflict Potential (Yes/No) | No | No | No |
| Construction/Maintenance Concerns | None | Drainage Ponds farther from Low Point in Profile | Drainage Ponds farther from Low Point in Profile |
| Public Opinion | None | None | None |
| Aesthetics | Good | Good | Good |
| Current Land Use Zoning | Agricultural & PUD | Agricultural & PUD | Agricultural & PUD |
| Future Land Use Zoning | Agricultural & PUD | Agricultural & PUD | Agricultural & PUD |
| Total Cost | $4,312,387 | $7,171,009 | $6,866,379 |
| Associated Risks | None | None | None |
| Pond Alternative 1A: Ponds 1A1 through 1A4 are the recommended options, since the majority are located within existing CFX ROW and require the least amount of ROW acquisition and the other two alternatives have constructability concerns. | | | |

| Basin 2 | | | |
|---|---|---|---|
| Pond ID | Pond 2A | Pond 2B | Pond 2C |
| Location | Outside ROW | Outside ROW | Outside ROW |
| Total Size of Ponds (acre) | 9.2 | 9.2 | 9.3 |
| Size of Additional ROW Needed (acre) | 9.2 | 9.2 | 9.3 |
| No. Parcels Required for Acquisition | 1 | 2 | 2 |
| ELA Opportunities | None | None | None |
| FEMA Floodplain Impacts (ac-ft) | 4.5 | 4.5 | 12.9 |
| Listed Species Impact | None | None | None |
| Contaminated Sites | None | None | None |
| Archeological & Historical Impacts | None | None | None |
| Social Impacts | None | None | None |
| Other Environmental Impacts | None | None | None |
| Major Utility Conflict Potential (Yes/No) | No | No | No |
| Construction/Maintenance Concerns | None | None | None |
| Public Opinion | None | None | None |
| Aesthetics | Good | Good | Good |
| Current Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Future Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Total Cost | $2,100,620 | $2,763,946 | $2,287,441 |
| Associated Risks | None | None | None |
| Pond Alternative 2A: Pond 2A is the recommended option, since it requires the least amount of ROW acquisition and is the most hydraulically connected to the FEMA Floodplain. | | | |

| Basin 3 | | | |
|---|---|---|---|
| Pond ID | Ponds 3A1 to 3A3 | Ponds 3**B**1 to 3B4 | Ponds 3C1 to 3C4 |
| Location | Ponds 3A1 & 3A2 are located in infields, Pond 3A3 is located outside of ROW | Ponds 3B1 & 3B2 are located in infields, Ponds 3B3 &3B4 are located outside of ROW | Ponds 3C1 & 3C2 are located in infields, Ponds 3C3 &3C4 are located outside of ROW |
| Total Size of Ponds (acre) | 26.1 | 32.1 | 31.1 |
| Size of Additional ROW Needed (acre) | 14.6 | 20.7 | 21.0 |
| No. Parcels Required for Acquisition | 1 | 2 | 2 |
| ELA Opportunities | None | None | None |
| FEMA Floodplain Impacts (ac-ft) | 68.5 | 68.5 | 68.5 |
| Listed Species Impact | None | None | None |
| Contaminated Sites | None | None | None |
| Archeological & Historical Impacts | None | None | None |
| Social Impacts | None | None | Pond on Cemex Property |
| Other Environmental Impacts | None | None | None |
| Major Utility Conflict Potential (Yes/No) | No | No | No |
| Construction/Maintenance Concerns | Drainage Ponds farther from Low Point in Profile | Drainage Ponds farther from Low Point in Profile | None |
| Public Opinion | None | None | None |
| Aesthetics | Good | Good | Good |
| Current Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Future Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Total Cost | $4,926,209 | $6,356,460 | $7,067,289 |
| Associated Risks | None | None | None |
| Pond Alternative 3A: Ponds 3A1 through 3A3 is the recommended option, since it requires the least amount of ROW acquisition and none of the ponds are located on Cemex property which would most likely be more expensive. | | | |

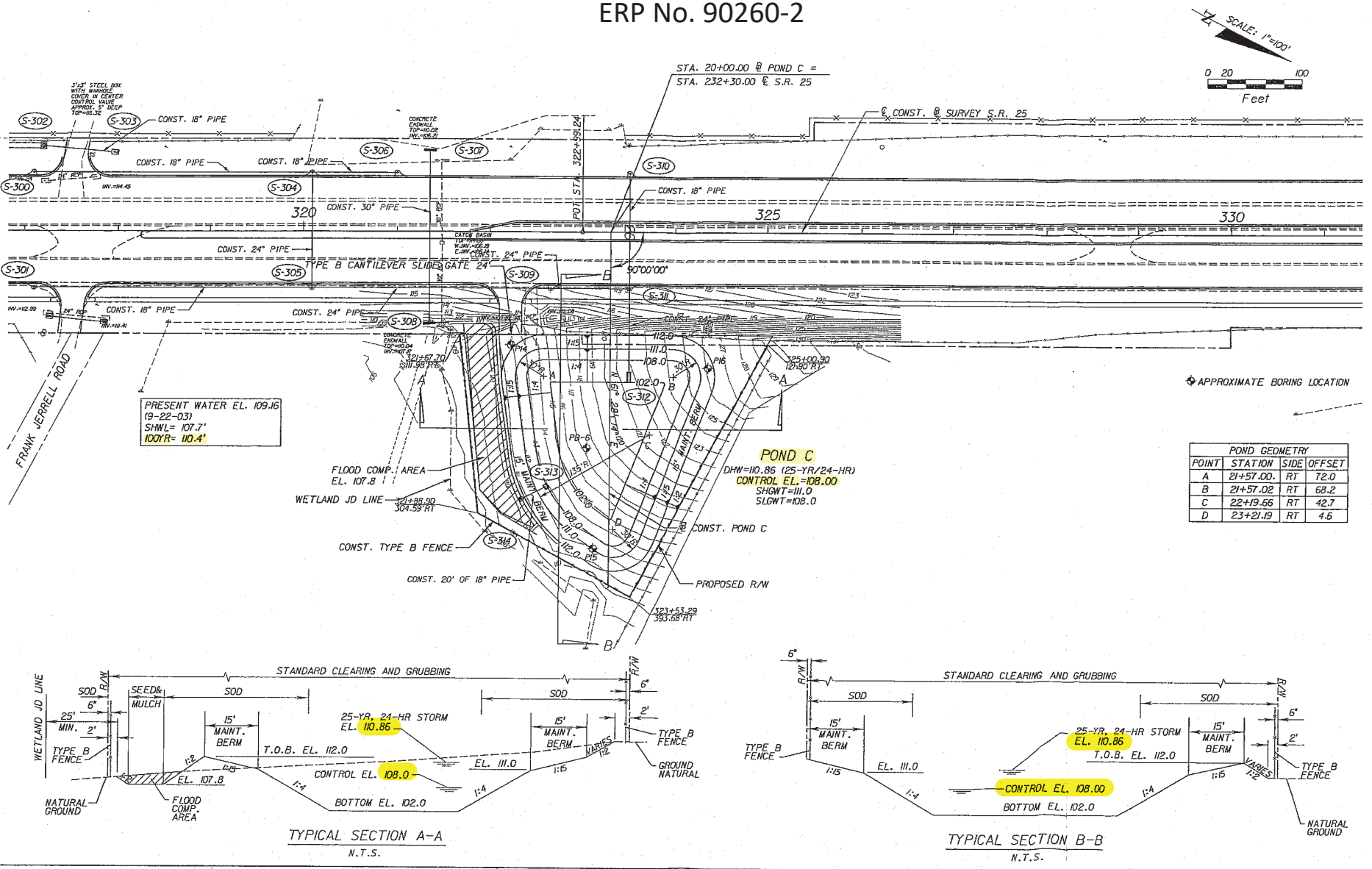
| Basin 4 | | | |
|---|---|---|---|
| Pond ID | Ponds 4A1 to 4A3 | Ponds 4**B**1 to 4B3 | Ponds 4C1 to 4C3 |
| Location | Ponds 4A1 & 4A2 are located in infields, Pond 4A3 is located outside of ROW | Ponds 4B1 & 4B2 are located in infields, Pond 4B3 is located outside of ROW | Ponds 3C1 & 3C2 are located in infields, Pond 4B3 is located outside of ROW |
| Total Size of Ponds (acre) | 24.9 | 26.4 | 32.4 |
| Size of Additional ROW Needed (acre) | 13.7 | 15.2 | 21.2 |
| No. Parcels Required for Acquisition | 1 | 1 | 1 |
| ELA Opportunities | None | None | None |
| FEMA Floodplain Impacts (ac-ft) | 80.3 | 80.3 | 80.3 |
| Listed Species Impact | None | None | None |
| Contaminated Sites | None | None | None |
| Archeological & Historical Impacts | None | None | None |
| Social Impacts | None | None | None |
| Other Environmental Impacts | None | None | None |
| Major Utility Conflict Potential (Yes/No) | No | No | No |
| Construction/Maintenance Concerns | Hydro-connectivity of Flood Plains | Drainage Ponds farther from Low Point in Profile & Hydro-connectivity of Flood Plains | Drainage Ponds farther from Low Point in Profile |
| Public Opinion | None | None | None |
| Aesthetics | Good | Good | Good |
| Current Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Future Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Total Cost | $4,668,639 | $5,026,710 | $6,458,964 |
| Associated Risks | None | None | None |
| Pond Alternative 4C: Ponds 4C1 through 4C3 is the recommended option, since it is the most hydraulically connected to the FEMA floodplains | | | |

| Basin 5 | | | |
|---|---|---|---|
| Pond ID | Ponds 5A1 & 5A2 | Pond 5B1 | Pond 5C1 |
| Location | All ponds located within infields/ROW. | Located outside of ROW | Located outside of ROW |
| Total Size of Ponds (acre) | 16.0 | 10.1 | 8.0 |
| Size of Additional ROW Needed (acre) | 0 | 10.1 | 8.0 |
| No. Parcels Required for Acquisition | 0 | 2 | 1 |
| ELA Opportunities | Interagency agreement between SJRWMD & SFWMD (Ponds Sized for either WMD) | Interagency agreement between SJRWMD & SFWMD (Ponds Sized for either WMD) | Interagency agreement between SJRWMD & SFWMD (Ponds Sized for either WMD) |
| FEMA Floodplain Impacts (ac-ft) | 0 | 0 | 0 |
| Listed Species Impact | None | None | None |
| Contaminated Sites | None | None | None |
| Archeological & Historical Impacts | None | None | None |
| Social Impacts | None | None | None |
| Other Environmental Impacts | None | None | None |
| Major Utility Conflict Potential (Yes/No) | No | No | No |
| Construction/Maintenance Concerns | Drainage Ponds farther from Low Point in Profile | Drainage Ponds farther from Low Point in Profile | None |
| Public Opinion | None | None | None |
| Aesthetics | Excellent | Good | Good |
| Current Land Use Zoning | Agricultural | Agricultural | Agricultural |
| Future Land Use Zoning | Village | Village | Village |
| Total Cost | $1,993,934 | $2,266,283 | $2,027,668 |
| Associated Risks | None | None | None |
| Pond Alternative 5A: Ponds 5A1 and 5A2 is the recommended option, since it requires no additional ROW acquisition. | | | |

# Appendix D – Existing ERP Excerpts

# ERP No. 90260-2

# ERP No. 90260-2







TYPICAL SECTION A-A
N.T.S.




TYPICAL SECTION B-B
N.T.S.

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
| | | | | | |

ENGINEER OF RECORD: GLEN T. PARTLOW
P.E. NO: 58725

HDR Employee-owned
FBPR Certificate of Authorization No. 4213

HDR Engineering, Inc.
315 E. Robinson Street, Suite 400
Orlando, FL 32801-1949
(407) 423-4200
www.hdrinc.com

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| S.R. 25 | LAKE | 238422-1-52-01 |

DETENTION AREA C

SHEET NO. 325

6-17

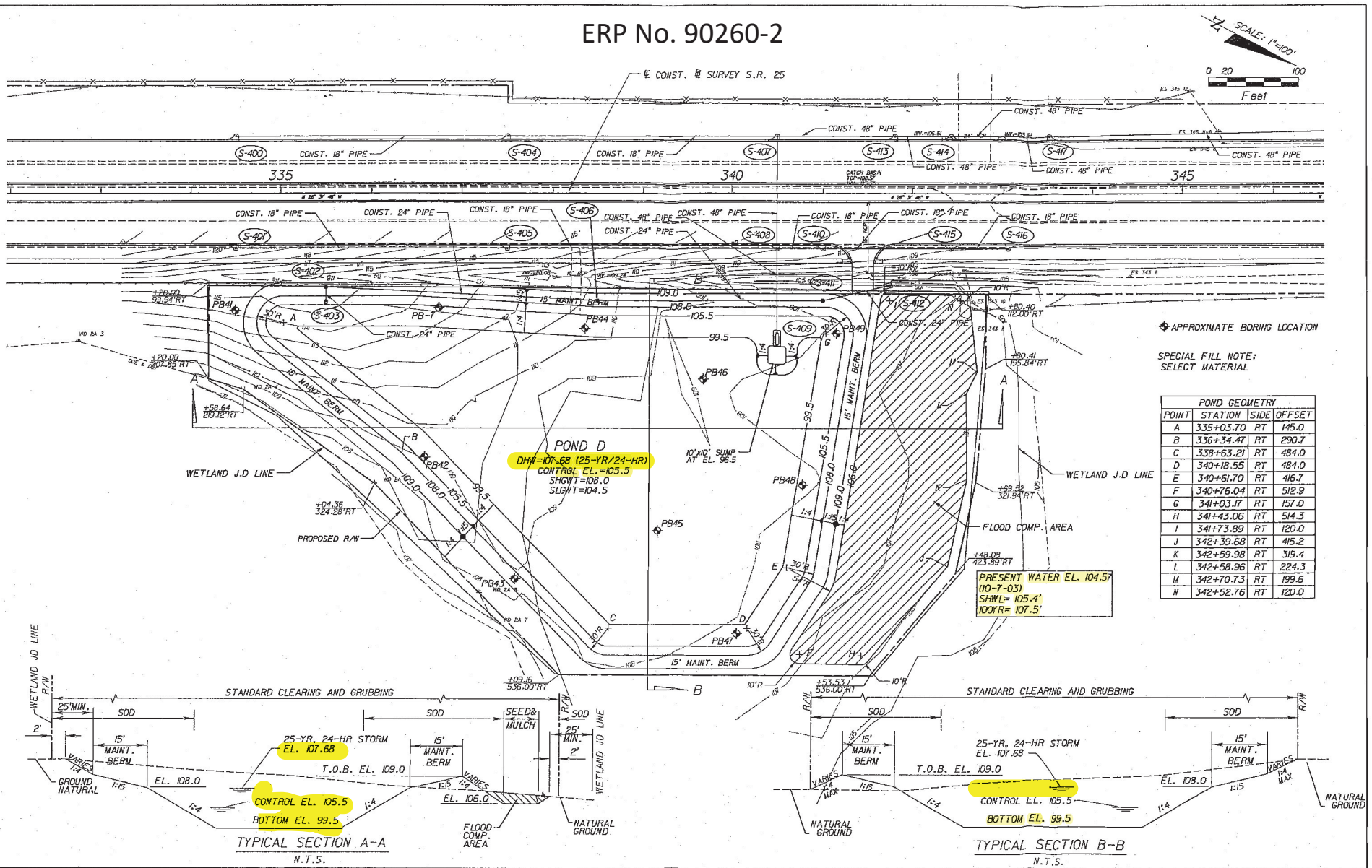
the SCS Type II rainfall distribution. To meet open basin requirements, a control structure was designed with a weir set at the water quality volume elevation and sized such that the post-development flows would not exceed pre-development flows.

The system was modeled using ICPR 3 for Windows. Results from the routed model are provided on the table below. Post-Development flow rates do not exceed pre-development for the design storms evaluated.

The soils encountered at this site are Candler Sands (Type A Soils) and Placid and Myakka Sand (Type D), based on the SCS Soil Survey. There are no known potential contamination sites, or cultural sites previously identified within the proposed pond site. The pond is bound by wetlands on its north and east sides. The pond berm will remain 25 feet from the wetland lines as this is the buffer recommended by the SJRWMD.

| **Basin D** | | |
|---|---|---|
| | **Required** | **Provided** |
| Water Quality Volume (ac-ft) | 2.75 | 2.97 |
| | **Pre** | **Post** |
| Peak Flows Q (25yr / 24 hr) (cfs) | 46.69 | 6.20 |
| Peak Stage (25yr / 24 hr) (ft) | N/A | 107.68 |
| Peak Flows Q (Mean Annual) (cfs) | 6.59 | 0.82 |
| Peak Stage (Mean Annual) (ft) | N/A | 106.39 |

# ERP No. 90260-2




| POND GEOMETRY | | | |
|---|---|---|---|
| POINT | STATION | SIDE | OFFSET |
| A | 335+03.70 | RT | 145.0 |
| B | 336+34.47 | RT | 290.7 |
| C | 338+63.21 | RT | 484.0 |
| D | 340+18.55 | RT | 484.0 |
| E | 340+61.70 | RT | 416.7 |
| F | 340+76.04 | RT | 512.9 |
| G | 341+03.17 | RT | 157.0 |
| H | 341+43.06 | RT | 514.3 |
| I | 341+73.89 | RT | 120.0 |
| J | 342+39.68 | RT | 415.2 |
| K | 342+59.98 | RT | 319.4 |
| L | 342+58.96 | RT | 224.3 |
| M | 342+70.73 | RT | 199.6 |
| N | 342+52.76 | RT | 120.0 |

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
| | | | | | |

ENGINEER OF RECORD: GLEN T. PARTLOW P.E. NO: 58725

HDR Employee-owned

FBPR Certificate of Authorization No. 4213

HDR Engineering, Inc. 315 E. Robinson Street, Suite 400 Orlando, FL 32801-1949 (407) 420-4200 www.hdrinc.com

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

| ROAD NO. | COUNTY | FINANCIAL PROJECT ID |
|---|---|---|
| S.R. 25 | LAKE | 238422-1-52-01 |

DETENTION AREA D

SHEET NO. 326

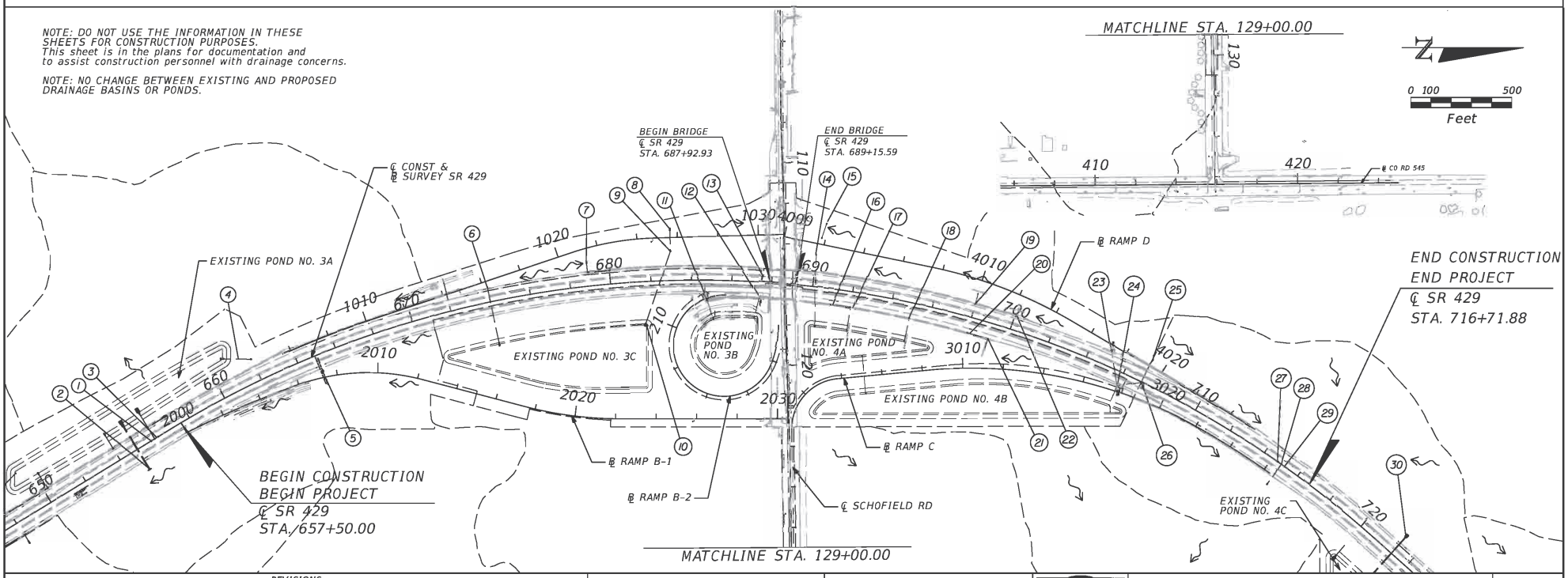
#USER# 5/23/2005 8:38:40 AM z:\238422\5201\drainage\pdpird04.dgn

| STR ID | DESCRIPTION |
|---|---|
| 1 | DBI TYPE B<br>GRATE EL. 124.39, INV. 120.39 |
| 2 | STRAIGHT CONCRETE ENDWALL<br>INV. 110.00 |
| 3 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 124.17, INV. 125.55, 18" CAP, INV. 104.50 |
| 4 | MITERED END SECTION, PIPE, INLET<br>INV. 104.00, 18" RCP, GRATE EL. 129.00, INV. 124.03 |
| 5 | INFORMATION NOT KNOWN |
| 6 | MITERED END SECTION, PIPE, INLET<br>INV. 152.11, 18" PIPE, GRATE 171.57, INV. 162.20 |
| 7 | INLET, PIPE, INLET<br>GRATE 186.19 INV. 182.86, 18" RCP, GRATE 184.63, INV. 180.83 |
| 8 | MITERED END SECTION<br>INV. 157.55 |
| 9 | INLET<br>GRATE 162.58, INV 156.48 (Lt), INV 156.42 (Rt) |
| 10 | MITERED END SECTION<br>INV. 151.89 |
| 11 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 187.82, INV. 184.00, 18" CAP, INV. 157.50 |
| 12 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 190.52, INV. 187.44, 18" CAP, INV. 157.50 |
| 13 | FLUME FLOWLINE<br>@ WALL 193.59, @ MEDIAN 192.55 |
| 14 | MITERED END SECTION, PIPE, MITERED END SECTION<br>INV. 150.50, 24" RCP, INV. 150.50 |
| 15 | MITERED END SECTION, PIPE, MITERED END SECTION<br>INV. 157.21, 18" RCP, INV. 157.00 |
| 16 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 190.39, INV. 187.30, 18" CAP, INV. 150.50 |
| 17 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 189.89, INV. 186.81, 18" CAP, INV. 150.50 |
| 18 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 187.23, INV. 184.15, 18" CAP, INV. 150.50 |
| 19 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 186.57, INV. 183.24, 18" CAP, INV. 169.73 |
| 20 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 182.79, INV. 179.71, 18" CAP, INV. 160.48 |
| 21 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 180.77, INV. 177.69, 18" CAP, INV. 164.13 |
| 22 | GUTTER INLET TYPE S, PIPE, U-TYPE CONCRETE ENDWALL<br>GRATE EL. 182.21, INV. 179.13, 18" CAP, INV. 173.04 |
| 23 | GUTTER INLET TYPE S, PIPE, DBI TYPE A (J BOTTOM)<br>GRATE EL. 170.22, INV. 165.00, 18" RCP, INV. 156.22 |
| 24 | DBI TYPE A (J BOTTOM)<br>GRATE EL. 163.57, INV. 153.72 (Rt) (30" RCP), 156.22 (Lt) (18" RCP), 154.22 (Ah) (24" RCP) |
| 25 | MITERED END SECTION, PIPE, DBI TYPE B (J BOTTOM)<br>INV. 161.63, 18" RCP, INV. 154.57 |
| 26 | DBI TYPE B (J BOTTOM)<br>GRATE EL. 160.12, INV. 154.57 (Bk) (24" RCP), 154.57 (Lt) (18" RCP) |
| 27 | DBI TYPE B, PIPE, DBI TYPE B<br>GRATE EL. 147.93, INV. 144.97, 18" RCP, INV. 144.16 |
| 28 | DBI TYPE B<br>GRATE EL. 147.66, INV. 144.16 (Bk) (18" RCP), 144.16 (Ah) (18" RCP), 138.00 (Rt) 24" CAP |
| 29 | DBI TYPE B, PIPE, DBI TYPE B<br>GRATE EL. 147.76, INV. 144.80, 18" RCP, INV. 144.16 |
| 30 | MITERED END SECTION, PIPE, MITERED END SECTION<br>INV. 141.00, 24" CAP, INV. 130.00 |

ERP 48-205102

NOTE: DO NOT USE THE INFORMATION IN THESE SHEETS FOR CONSTRUCTION PURPOSES. This sheet is in the plans for documentation and to assist construction personnel with drainage concerns.

NOTE: NO CHANGE BETWEEN EXISTING AND PROPOSED DRAINAGE BASINS OR PONDS.




| REVISIONS | | | |
|---|---|---|---|
| DATE | DESCRIPTION | DATE | DESCRIPTION |
| | | | |

TROY W. VARGAS, P.E. LICENSE NO. 57621
WBQ Design & Engineering Inc.
201 N. Magnolia Ave. Suite 200 Orlando Fl. 32801
Phone 407.839.4300 Fax 407.839.1621
CERTIFICATE OF AUTHORIZATION NO. 6796

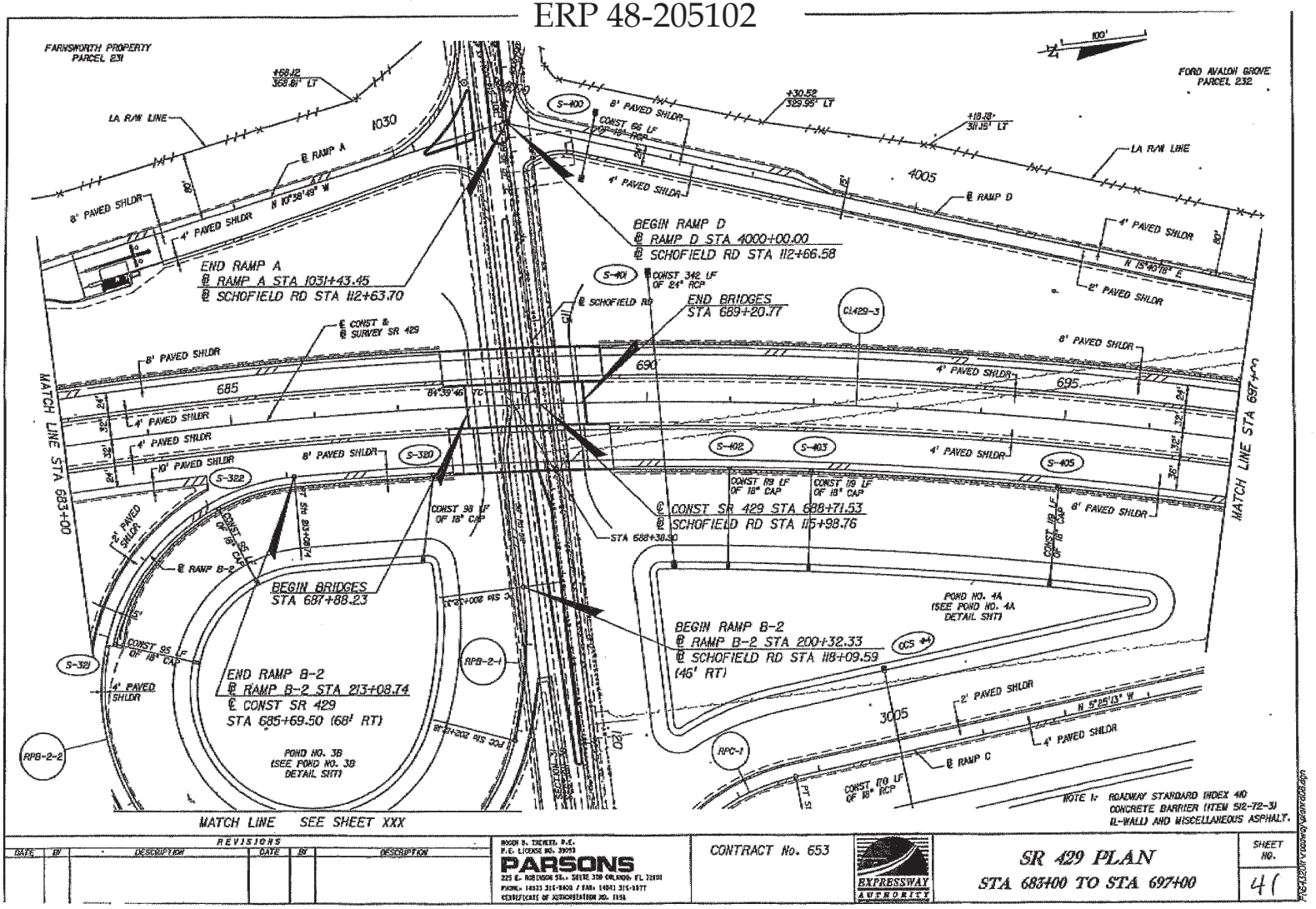
OOCEA PROJ. NO.
429-305

EXPRESSWAY AUTHORITY

**EXISTING DRAINAGE MAP**

SHEET NO. 3

msuarez 5/14/2012 7:29:23 PM P:\1100CEA\MISC-SCH\429-305\drainage\drmprd01.dgn




| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |

HOOD B. TICKETT, P.E.
P.E. LICENSE NO. 39093
PARSONS
225 E. ROBINSON St., SUITE 300 ORLANDO, FL 32801
PHONE: 14033 316-0600 / FAX: 14041 316-0677
CERTIFICATE OF AUTHORIZATION NO. 1156

CONTRACT No. 653

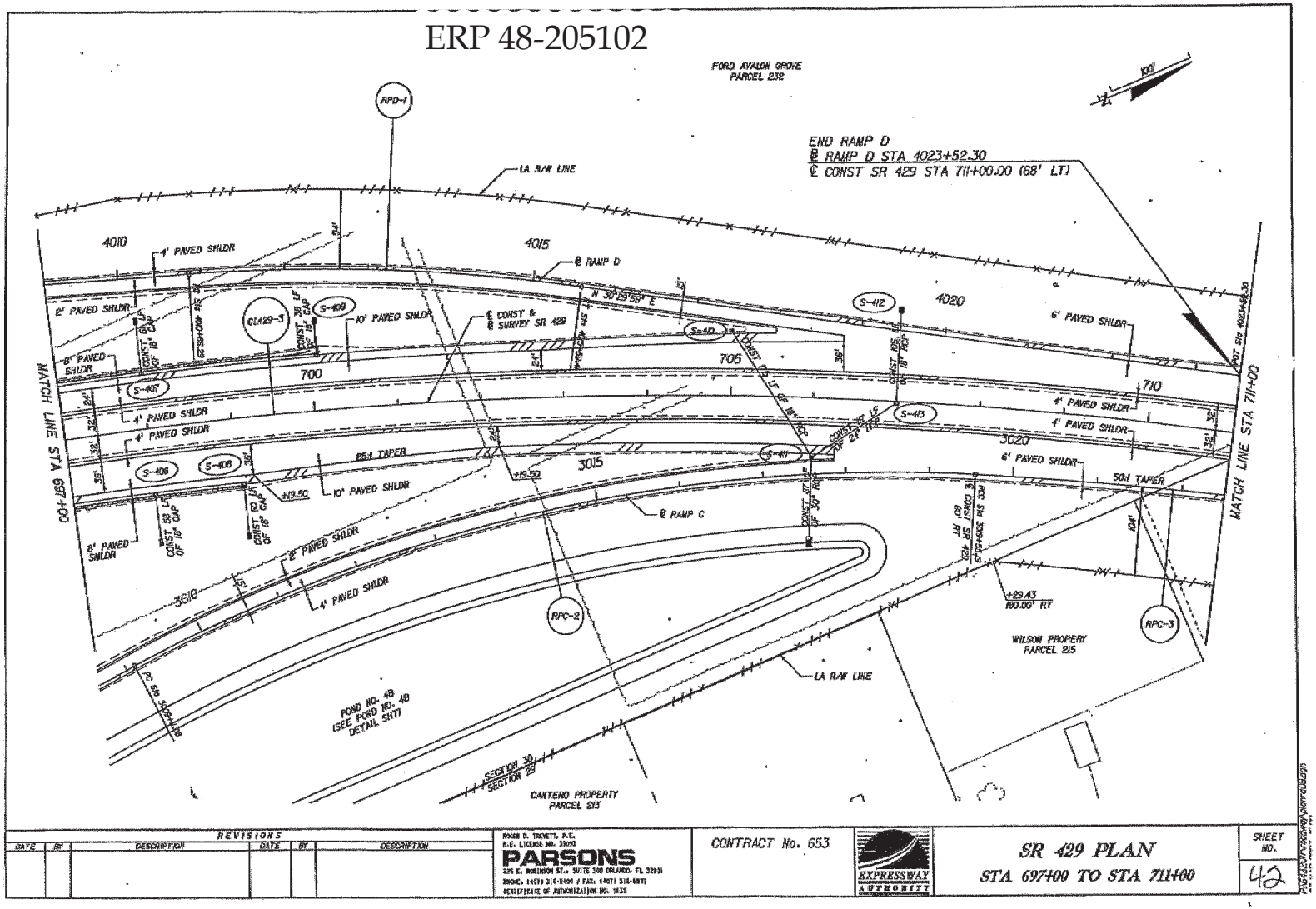
EXPRESSWAY AUTHORITY

SR 429 PLAN
STA 683+00 TO STA 697+00

SHEET NO. 41

Figure 15 of 73

ERP 48-205102




| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
| | | | | | |

ROGER D. TREVETT, P.E.
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225 E. ROBINSON ST., SUITE 500 ORLANDO, FL 32801
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CERTIFICATE OF AUTHORIZATION NO. 1638

CONTRACT No. 653

EXPRESSWAY AUTHORITY

SR 429 PLAN
STA 697+00 TO STA 711+00

SHEET NO. 42

Figure 16 of 73

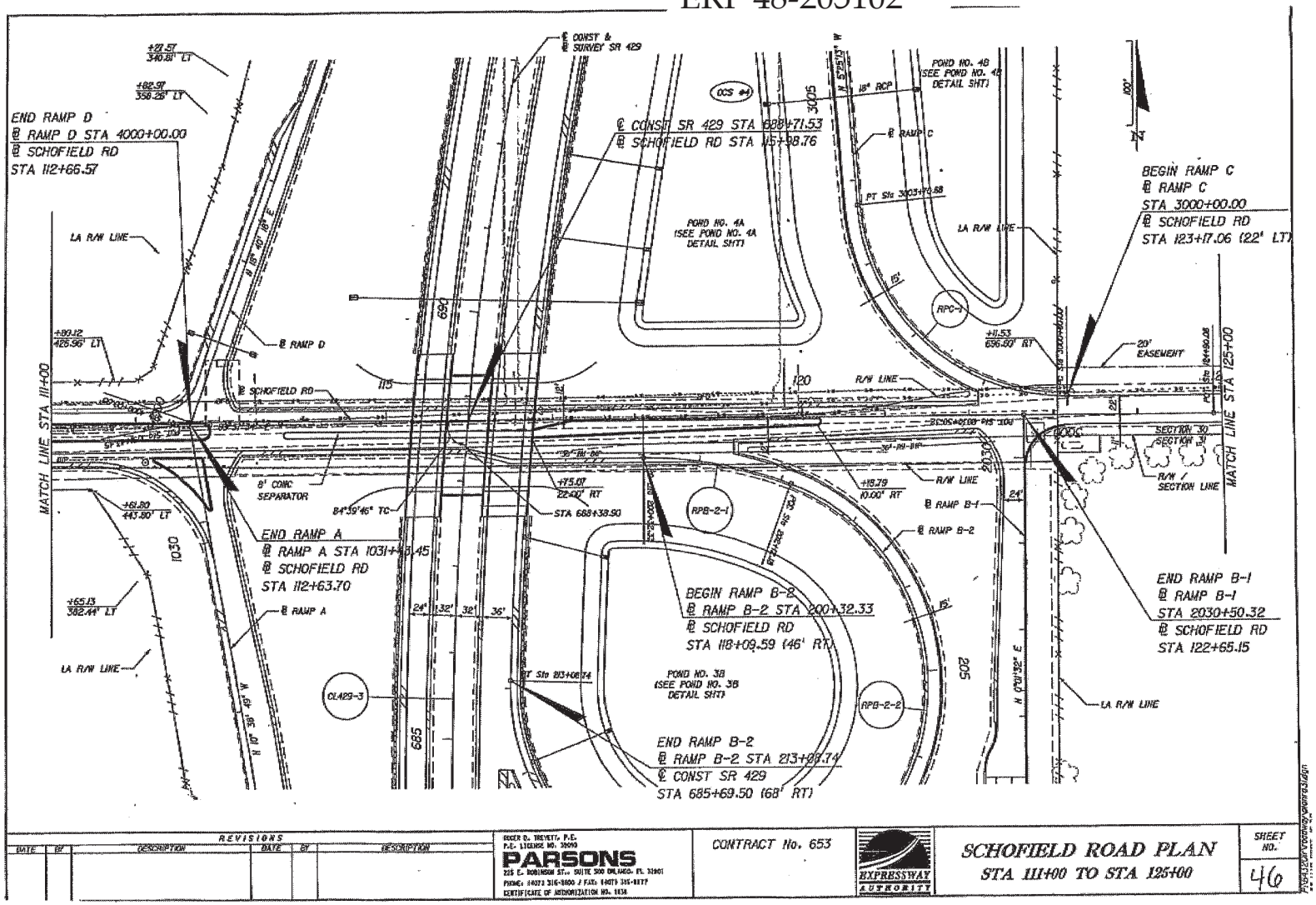
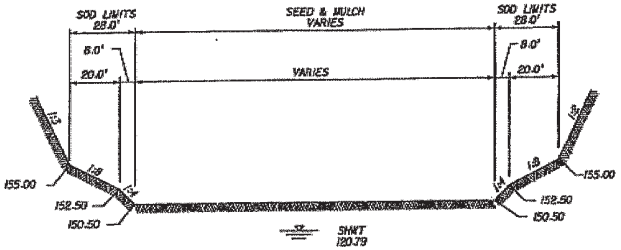
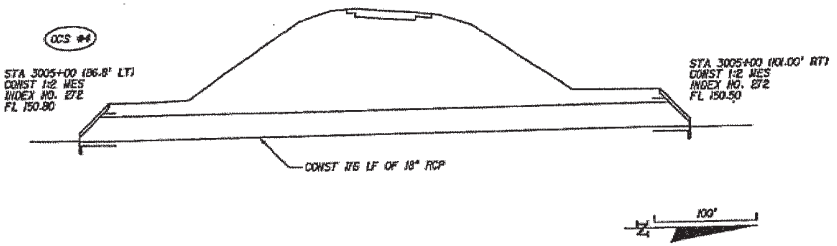



Figure 20 of 73




TYPICAL SECTION A-A
(N.T.S.)







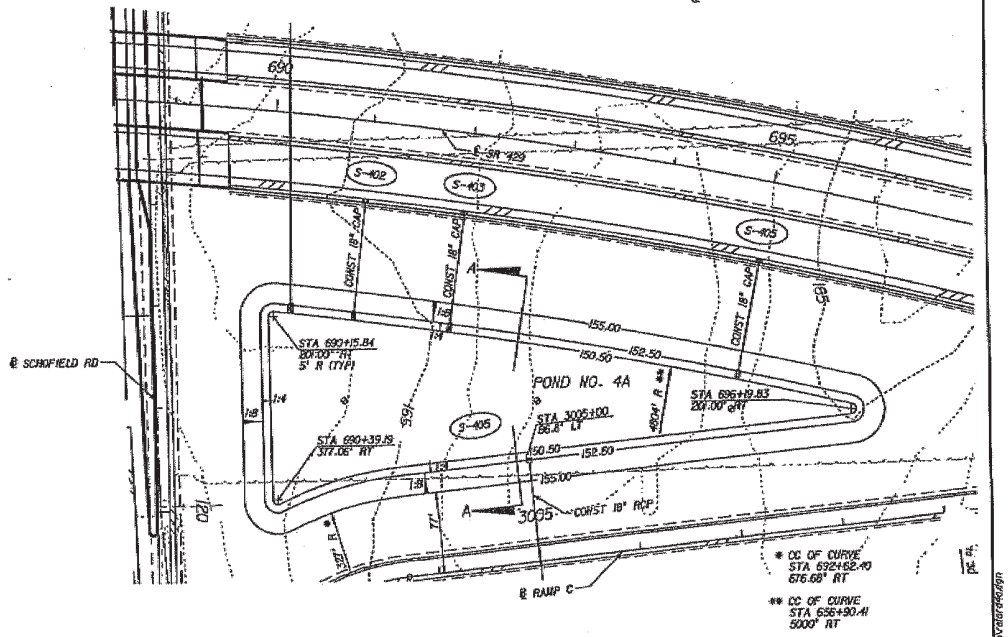
| STORM FREQUENCY | PEAK STAGE |
|---|---|
| 10 YR/24 HR (STORMSEWER TAILWATER) | 151.29 (STAGE @ PEAK INFLOW) |
| 100 YR/24 HR (ORANGE COUNTY) | 153.03 |

LEGEND

⊕ POND NO. 4A AUGER BORING LOCATIONS

POND CONSTRUCTION NOTES:

1. INITIAL POND BOTTOM ELEVATION TO BE EXCAVATED TO WITHIN 1.0' OF FINAL ELEVATION. FINAL GRADING DEFERRED UNTIL ALL CONTRIBUTING AREAS HAVE BEEN STABILIZED.
2. LIGHT EQUIPMENT SHALL BE USED TO REMOVE ACCUMULATED SEDIMENTS TO ACHIEVE FINAL GRADE WITHOUT COMPACTING POND BOTTOM.
3. AFTER FINAL GRADINGS, POND FLOOR TO BE SCARIFIED WITH ROTARY TILLER OR DISC HARROW TO PROMOTE INFILTRATION AND GROWTH ESTABLISHMENT.




| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |

ROGER B. KROVITZ, P.E.
P.E. LICENSE NO. 31999
PARSONS
225 E. ROBINSON ST., SUITE 300 ORLANDO, FL 32801
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CERTIFICATE OF AUTHORIZATION NO. 1231

CONTRACT No. 653

EXPRESSWAY AUTHORITY

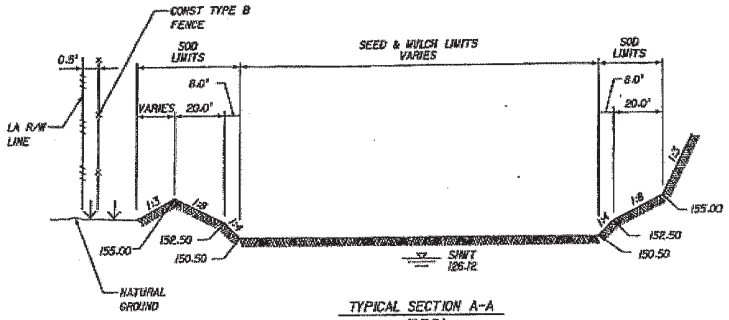
SR 429 POND DETAILS
POND NO. 4A

SHEET NO. 119

P:\SR429\Plans\Drainage\Details\4A.dgn

Figure 30 of 73

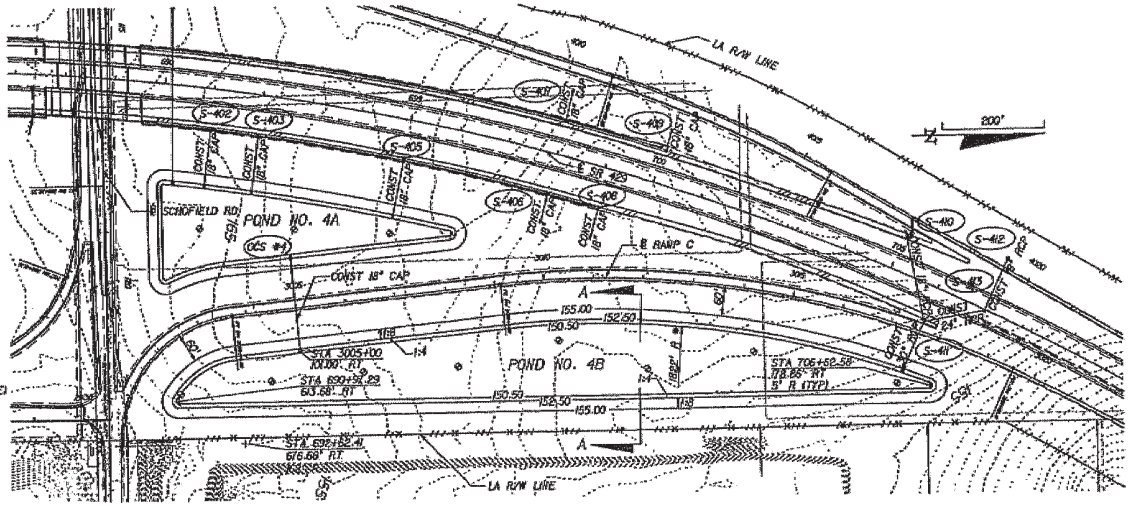
ERP 48-205102




TYPICAL SECTION A-A
(N.T.S.)

POND CONSTRUCTION NOTES:

1. INITIAL POND BOTTOM ELEVATION TO BE EXCAVATED TO WITHIN 1.0' OF FINAL ELEVATION, FINAL GRADING DEFERRED UNTIL ALL CONTRIBUTING AREAS HAVE BEEN STABILIZED.
2. LIGHT EQUIPMENT SHALL BE USED TO REMOVE ACCUMULATED SEDIMENTS TO ACHIEVE FINAL GRADE WITHOUT COMPACTING POND BOTTOM.
3. AFTER FINAL GRADING, POND FLOOR TO BE SCARIFIED WITH ROTARY TILLER OR DISC HARROW TO PROMOTE INFILTRATION AND GROWTH ESTABLISHMENT.




* CC OF CURVE
STA 700+64.14
1989' RT

| STORM FREQUENCY | PEAK STAGE |
|---|---|
| 10 YR/24 HR (STORMSEWER TAILWATER) | 151.33 (STAGE @ PEAK INFLOW RATE) |
| 100 YR/24 HR (ORANGE COUNTY) | 153.03 |

LEGEND

⊕ POND NO. 4B AUGER BORING LOCATIONS

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| DATE | BY | DESCRIPTION | DATE | BY | DESCRIPTION |
| | | | | | |

ROGER D. TREMBLE P.E.
P.E. LICENSE NO. 39073
PARSONS
225 E. ROBINSON ST., SUITE 300 ORLANDO, FL 32801
PHONE: (407) 316-4900 / FAX: (407) 316-4999
CERTIFICATE OF AUTHORIZATION NO. 1851

CONTRACT No. 653

EXPRESSWAY AUTHORITY

SR 429 POND DETAILS
POND NO. 4B

SHEET NO. 120

Figure 31 of 73

# Appendix E – ELA Meeting Minutes

**Feasibility / PD&E Study for the**
**Lake / Orange County Connector (US 27 to SR 429)**
**CFX Project No. 599-225**

**MINUTES:** Environmental Look Around (ELA) Meeting

**DATE:** January 10, 2018 **TIME:** 1:30 P.M.

**LOCATION:** Lake County Public Works, 350 N. Sinclair Avenue, Tavares FL 32778

---

**ATTENDEES:**

George Gadiel, Lake County
Seth Lynch, Lake County
Nicholas Mcray, Lake County
Clayton Lee, Dewberry (by teleconference)
Mark Scott, Metric
Jazlyn Heywood, Metric (by teleconference)
Bill White, Lake County
Jeff Johnson, Lake County
Nicole Gough, Dewberry
Chandra Raman, Metric
Will Sloup, Metric

The purpose of the meeting was to discuss potential regional watershed opportunities. Also, to identify any historic maintenance problems involving drainage or flooding which could affect the viability of the project alternatives and influence the evaluation results. The following items were discussed:

**Study Overview**

- Exhibits were used to provide an overview of the potential five-mile, new alignment, CFX system expansion project.
- The study is in the alternatives analysis phase; four project alternatives have been developed. Alternatives 1 and 2 are the northern routes while Alternatives 3 and 4 are the southern routes. All alternatives end at a common location at SR 429, whereas there are four potential tie-in locations at US 27.
- New interchanges are proposed at US 27, the future extension of CR 455 (diamond interchange), the future Valencia Parkway (partial interchange) and SR 429 (systems interchange).
- The conceptual designs show US 27 shifted to the east; this is to accommodate the interchange with US 27 while avoiding impacts to Lake Louisa State Park lands.
- The Cook Road overpass accommodates a 120-foot wide typical section; same as at the future CR 455 extension.
- The study team is preparing for a second round of stakeholder and public engagement meetings. The second Environmental Advisory Group (EAG) and Project Advisory Group (PAG) meetings are scheduled for February 12th. The second public informational meeting is scheduled for March 7th.
- Drainage analysis during the alternatives analysis phase entails developing the primary pond(s) per basin. Once a recommended preferred alternative is identified, three alternative pond sites per basin will be identified.
- The study team will also conduct ELA meetings with the appropriate staff at Orange County, SFWMD and SJRWMD.

**Flood Zones & Drainage Criteria**

- Potential impacts to flood zones A and A/E are the County's primary concern; floodplain impacts should be minimized. The County's floodplain compensation requirements are stricter than SJRWMD criteria, so the County's criteria (cup-for-cup within the affected flood zone) should be used.
- The study team is working to minimize floodplain impacts. If floodplain impacts are unavoidable, cup-for-cup compensation will be provided in floodplain compensation ponds.
- Stormwater management facilities will be designed based on Lake County's Land Development Regulations (LDR) and SJRWMD criteria.
- The proposed project is located in a closed basin. Therefore, pre- and post-discharge requirements will be based on the 25-year, 96-hour storm per SJRWMD criteria.
- County staff questioned whether the study team obtained LiDAR data as there are some low areas along some of the alternatives that will be good pond sites. The team has the most current LiDAR data for Lake County.

**Historic Drainage Issues**

- Historic drainage issues are very minimal given the rural nature of the area.
- In the Summer of 2018 there was fish kill at Sawgrass Lake; there had been heavy rains in July. Lake County performed nutrient analysis which revealed elevated nutrients at the time of the fish kill and determined there was a verified microcystic bloom in the lake. The County can provide related information from FDEP.
- No water body within the study area has been identified as nutrient impaired.

**Stormwater Master Plan**

- The County is not aware of any old stormwater master plan that covers the study area.

**Regional Pond**

- The County is not aware of any future plans for a regional pond.

**Joint-Use Pond**

- There is no reason the County would not be open to a joint-use pond. However, their preference is not to maintain any such pond. There are current joint-use ponds between FDOT and developers.
- The CR 455 extension PD&E study is not far enough along to define the potential interchange location with the proposed expressway and, therefore, it is not possible at this time to know if there is potential for a joint use pond between both proposed projects.

**Stormwater Harvesting**

- The County is not currently participating in SJRWMD's stormwater harvesting initiatives since they do not operate a water utility.

**Access Management**

- The County is concerned with changes to the existing access management along US 27, specifically as it relates to the existing full median opening at the Lake Louisa State Park Entrance and at South Bradshaw Road.
- The County is in the process of vacating South Bradshaw Road.
- The study team continues to coordinate with FDOT as it relates to potential impacts to US 27.

**ACTION ITEMS:**

1. Lake County (Nicholas) will provide the FDEP information related to the Sawgrass Lake fish kill.

METRIC ENGINEERING

# Feasibility / PD&E Study for the
# Lake / Orange County Connector (US 27 to SR 429)
# CFX Project No. 599-225

---

## South Florida Water Management District Environmental Look Around (ELA)
## Meeting Agenda
## January 24, 2019

- **PD&E Study Overview**
  - Will describes project. New alignment expansion project.
  - Gone through a corridor analysis. 800' wide on both sides. Evaluated and paired it down to a single corridor with four project alternatives within it. Explains the four project alternatives and interchanges – CR 455 extension, future Valencia Parkway (partial) and SR 429 (System).
  - Legislative agreement, mainline existing is a DEP permit. Improvement or capacity is district and this project falls within that category. DEP doesn't want to take on any new alignment. Come early enough to get the methodology done.
  - Talking to the Districts. Any opportunities or fatal flaws you can think of.
- Recharge is part of the Central Florida Water initiative. Very active areas.
- Good possibility that there could be an interagency agreement. If it came down to it. Half mile and a major interchange.
- Reduce impacts, eliminate impacts to the greatest extent possible
- Pretty standard stuff
- This area is pretty well-drained.
- RIB's
- Closed basins that draw straight down to the aquifer.
- Chris Esterson talk to him about the recharge.

- **Discussion Points**
  - Most of the project is in the jurisdiction of the SJRWMD. Is the SFWMD open to an interagency agreement?
  - Can we merge wetlands into stormwater management facilities?
  - Does the District give water quality credits for any special water quality treatments?
  - Any drainage studies performed by the District in the area? No new. Talk to orange county. They may have.
  - Any potential large permitting that we need to be aware of?
  - Are there any water demands from the District in the area?

- **Open Discussion**

**Feasibility / PD&E Study for the**
**Lake / Orange County Connector (US 27 to SR 429)**
**CFX Project No. 599-225**

**MINUTES:** Coordination Meeting

**DATE:** February 26, 2019 **TIME:** 1:30 P.M.

**LOCATION:** FDOT District Five – Indian River Conference Room

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**ATTENDEES:**

Mario Bizzio, FDOT
Heather Grubert, FDOT
Jean Parlow, FDOT
Jonathan Williamson, Dewberry
Jamison Edwards, Metric
James Crew, Metric
Jim Stroz, FDOT
Karen Snyder, FDOT
Mike Sanders, FDOT
Will Sloup, Metric
Jazlyn Heywood, Metric
Mark Scott, Metric

The purpose of the meeting was to continue coordination efforts as it relates to the proposed Lake/Orange County Connector and US 27. The meeting started with introductions and a study update. The following items were discussed:

**Project Alternatives**

- The study has a two phased approach: (1) Alternative Corridor Evaluation (ACE), and (2) Alternatives Analysis. The ACE process is complete and a recommended corridor area has been identified.
- Four project alternatives were developed within the recommended corridor area.
- The four project alternatives can be categorized into two northern routes and two southern routes, with four potential tie-in locations on US 27 and one common tie-in location at SR 429.
- Conceptual interchange configurations show a direct connection at US 27, a traditional diamond at the future extension of CR 455, a partial interchange at the future Valencia Parkway, and a new Systems interchange at SR 429.

**Schedule**

- The project alternatives will be presented for public input at a March 7th public meeting, to be held at the Bridgewater Middle School in Winter Garden. A recommended preferred alternative will then be selected by CFX and refined by the study team.
- The public hearing is anticipated to be held in June of 2019.

**Traffic:**

- There isn't a significant difference in traffic (2045 Average AADTs) between the alternatives.
- An operational analysis will be performed on the recommended preferred alternative.

**Submittals**

- Plan sheets for the recommended preferred alternative (specifically along US 27) will be submitted for FDOT review in May 2019. Per notes from the first coordination meeting, the review of a conceptual plan set could take one month due to the number of disciplines involved.

- Metric will arrange a meeting, during the review period, with the assigned reviewers to further explain the project and answer questions.

**Access Management**

- Access management standards on US 27 will be maintained.
- Olympus – a planned sports, wellness, fitness and entertainment development – is in contact with FDOT regarding access onto US 27. Mike Sanders will provide conceptual access plans that were submitted to the Department in February of 2018. Jean Parlow has had more recent discussions with the Developer.

**Drainage**

- FDOT is open to joint-use drainage facility opportunities. Ferrell Hickson (District Drainage Design Engineer) and Casey Lyon (District Permit Coordinator) should be contacted regarding potential joint-use opportunities and invited to future coordination meetings.
- Alternative 3 will impact an existing FDOT pond along US 27. There is also a FDOT pond located on the northeast side of Alternative 1, but no impacts are anticipated.

**ACTION ITEMS:**

- Metric will provide Karen Snyder with the evaluation matrix.
- Michael Sanders will provide the conceptual access plans for the proposed Olympus Development.

**Feasibility / PD&E Study for the**
**Lake / Orange County Connector (US 27 to SR 429)**
**CFX Project No. 599-225**

**MINUTES:** ELA with Orange County

**DATE:** April 25, 2019 **TIME:** 1:30 P.M.

**LOCATION:** Orange County Public Works - Roads & Drainage Conference Room

4200 S. John Young Parkway, Orlando 32839

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**ATTENDEES:**

Brian Sanders, Orange County
Daniel Negron Vega, Orange County
Pedro Medina, Orange County
Brian Nead, Orange County
Jonathan Williamson, Dewberry (phone)
Mark Scott, Metric Engineering (phone)
Michael Holt, Metric Engineering
Will Sloup, Metric Engineering

The purpose of the meeting was to coordinate with Orange County as part of the Environmental Look Around. The meeting started with introductions and a study overview. The following items were discussed:

**Meeting Overview**

- Mr. Sloup and Mr. Holt gave an overview of the project and explained the intent of the Environmental Look Around (ELA) regarding localized stormwater management collaboration.
- Orange County staff reported that there is one active project in the study area, the widening of Avalon Road. The design has been completed for the segment between Schofield Road and Flamingo Crossing Boulevard but there is no funding for construction.
- Mr. Sanders will send the construction plans of Avalon Road to the team.
- There is a new study for the widening of Avalon Road from Schofield Road to New Independence Parkway, but it is still in the beginning stages.
- All discussed to continue coordination if the Lake / Orange County Connector moves forward to final design for possible partnering for stormwater management between CFX and Orange County.
- Mr. Negron, with the Stormwater Management Division, will provide the team a copy of the Reedy Creek and Cypress Creek Stormwater Master Plans for reference.
- Mr. Sloup discussed the upcoming EAG and PAG meetings. Orange County staff confirmed they will have representatives attending the meetings.
- Mr. Sloup gave a summary of the project schedule and upcoming milestones.

**ACTION ITEMS:**

- Mr. Sanders will send the construction plans of Avalon Road to the team. (Received 4/29/19)
- Mr. Negron, with the Stormwater Management Division, will provide the team a copy of the Reedy Creek and Cypress Creek Stormwater Master Plans (Received 4/29/19)

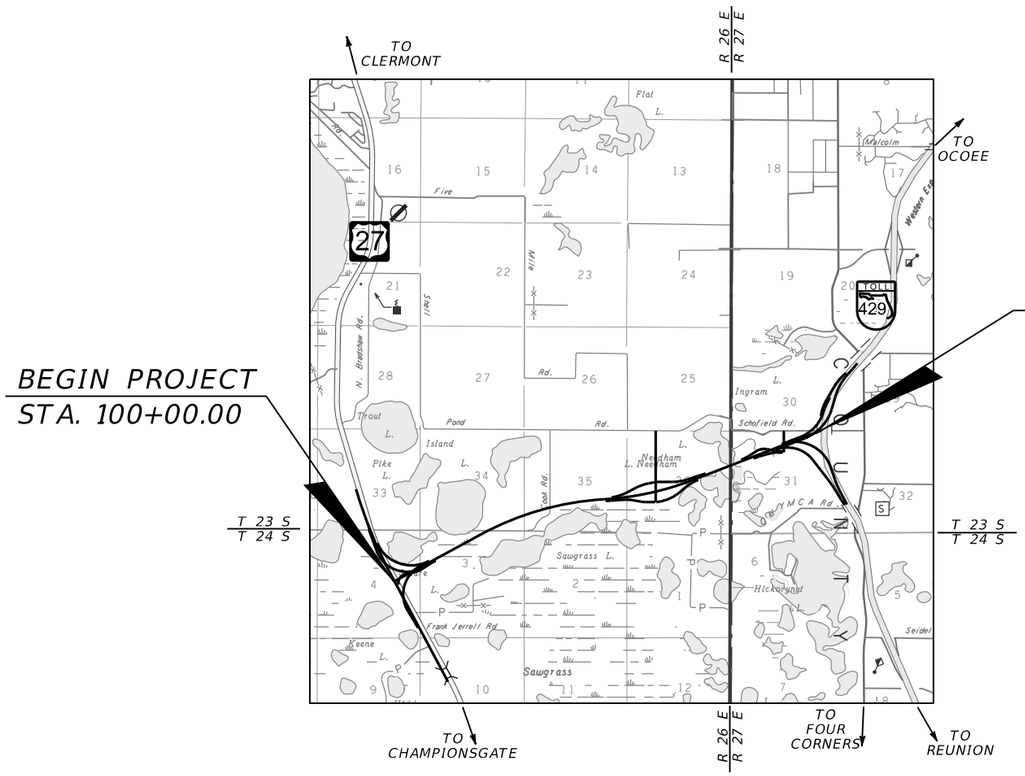
# Appendix F – Proposed Typical Section Package

# CENTRAL FLORIDA EXPRESSWAY AUTHORITY (CFX)

# TYPICAL SECTION PACKAGE

LAKE/ORANGE COUNTY CONNECTOR FEASIBILITY/PD&E STUDY
FROM US 27 TO SR 429
CFX PROJECT NUMBER 599-225

LAKE COUNTY & ORANGE COUNTY




JAMISON R. EDWARDS
LICENSE
No 76095
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED BY:

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METRIC ENGINEERING, INC.
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CERTIFICATE OF AUTHORIZATION 2294
VENDOR NO. F-59-1685550
JAMISON R. EDWARDS, P.E. NO. 76095


THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004 F.A.C.

## TYPICAL SECTION PACKAGE


| SHEET NO. | SHEET DESCRIPTION |
|---|---|
| 1 | COVER SHEET |
| 2 | TYPICAL SECTION NO. 1 |
| 3 | TYPICAL SECTION NO. 2 |
| 4 | TYPICAL SECTION NO. 3 |
| 5 | TYPICAL SECTION NO. 4 |
| 6 | TYPICAL SECTION NO. 5 |
| 7 | TYPICAL SECTION NO. 6 |
| 8 | TYPICAL SECTION NO. 7 |
| 9 | TYPICAL SECTION NO. 8 |
| 10 | TYPICAL SECTION NO. 9 |
| 11 | TYPICAL SECTION NO. 10 |
| 12 | TYPICAL SECTION NO. 11 |
| 13 | TYPICAL SECTION NO. 12 |
| 14 | TYPICAL SECTION NO. 13 |
| 15 | TYPICAL SECTION NO. 14 |
| 16 | TYPICAL SECTION NO. 15 |
| 17 | TYPICAL SECTION NO. 16 |
| 18 | TYPICAL SECTION NO. 17 |
| 19 | TYPICAL SECTION NO. 18 |
| 20 | TYPICAL SECTION NO. 19 |




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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

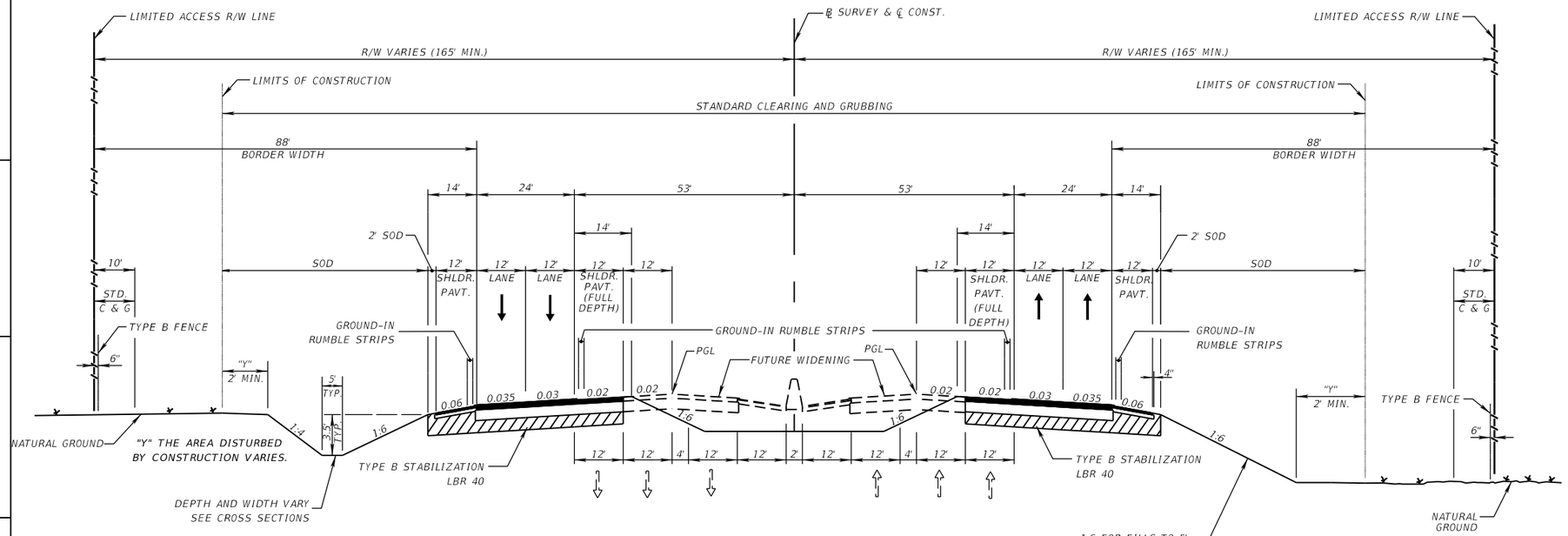
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

BORDER WIDTH

# TYPICAL SECTION No. 1

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ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
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DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

## TYPICAL SECTION
## LAKE/ORANGE COUNTY CONNECTOR

STA. 124+06.28 TO STA. 124+70.04
STA. 149+37.04 TO STA. 187+42.31
STA. 188+98.37 TO STA. 242+96.46
STA. 244+86.16 TO STA. 304+82.71
STA. 308+86.36 TO STA. 312+51.19
STA. 314+97.38 TO STA. 317+81.95
STA. 321+08.54 TO STA. 334+66.44

NOT TO SCALE

SHEET NO. 2

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

5/20/2019 2:39:57 PM

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

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|---|---|---|---|
| ( ) | C1 : NATURAL | ( ) | C3C : SUBURBAN COMM. |
| ( ) | C2 : RURAL | ( ) | C4 : URBAN GENERAL |
| ( ) | C2T : RURAL TOWN | ( ) | C5 : URBAN CENTER |
| ( ) | C3R : SUBURBAN RES. | ( ) | C6 : URBAN CORE |
| (X) | N/A : L.A. FACILITY | | |

## FUNCTIONAL CLASSIFICATION

| | | | |
|---|---|---|---|
| ( ) | INTERSTATE | ( ) | MAJOR COLLECTOR |
| (X) | FREEWAY/EXPWY. | ( ) | MINOR COLLECTOR |
| ( ) | PRINCIPAL ARTERIAL | ( ) | LOCAL |
| ( ) | MINOR ARTERIAL | | |

## HIGHWAY SYSTEM

- ( ) NATIONAL HIGHWAY SYSTEM
- ( ) STRATEGIC INTERMODAL SYSTEM
- (X) STATE HIGHWAY SYSTEM
- ( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

- (X) 1 - FREEWAY
- ( ) 2 - RESTRICTIVE w/Service Roads
- ( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
- ( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
- ( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
- ( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
- ( ) 7 - BOTH MEDIAN TYPES

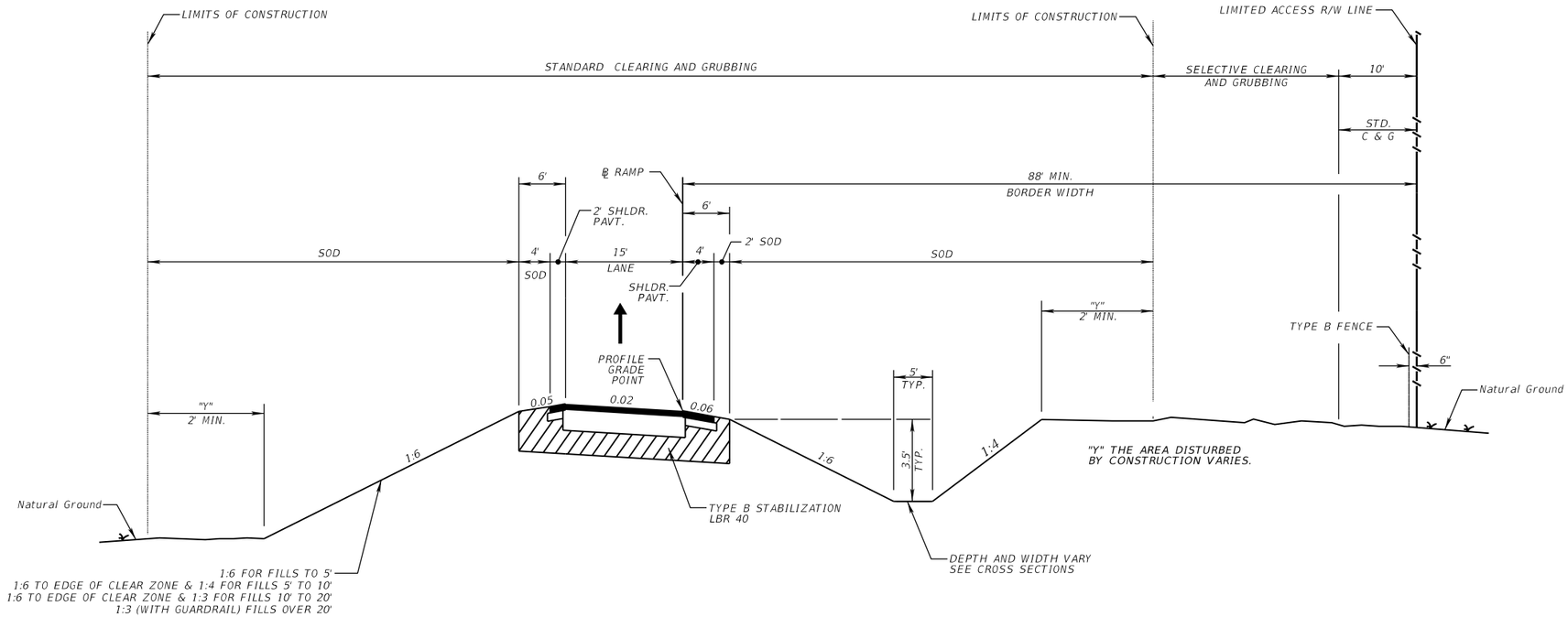
## CRITERIA

- (X) NEW CONSTRUCTION / RECONSTRUCTION
- ( ) RESURFACING (LA FACILITIES)
- ( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

BORDER WIDTH

# TYPICAL SECTION No. 2




## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

## TYPICAL SECTION SINGLE LANE RAMP

RAMP 01
RAMP 02
RAMP 03
RAMP 04
RAMP 05
RAMP 06
RAMP 07
RAMP 08
RAMP 09
RAMP 10
RAMP 11
RAMP 12
RAMP 13
RAMP 14
RAMP 15

NOT TO SCALE

SHEET NO. 3

5/17/2019 1:24:47 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

| | | | |
|---|---|---|---|
| ( ) | C1 : NATURAL | ( ) | C3C : SUBURBAN COMM. |
| ( ) | C2 : RURAL | ( ) | C4 : URBAN GENERAL |
| ( ) | C2T : RURAL TOWN | ( ) | C5 : URBAN CENTER |
| ( ) | C3R : SUBURBAN RES. | ( ) | C6 : URBAN CORE |
| (X) | N/A : L.A. FACILITY | | |

## FUNCTIONAL CLASSIFICATION

| | | | |
|---|---|---|---|
| ( ) | INTERSTATE | ( ) | MAJOR COLLECTOR |
| (X) | FREEWAY/EXPWY. | ( ) | MINOR COLLECTOR |
| ( ) | PRINCIPAL ARTERIAL | ( ) | LOCAL |
| ( ) | MINOR ARTERIAL | | |

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

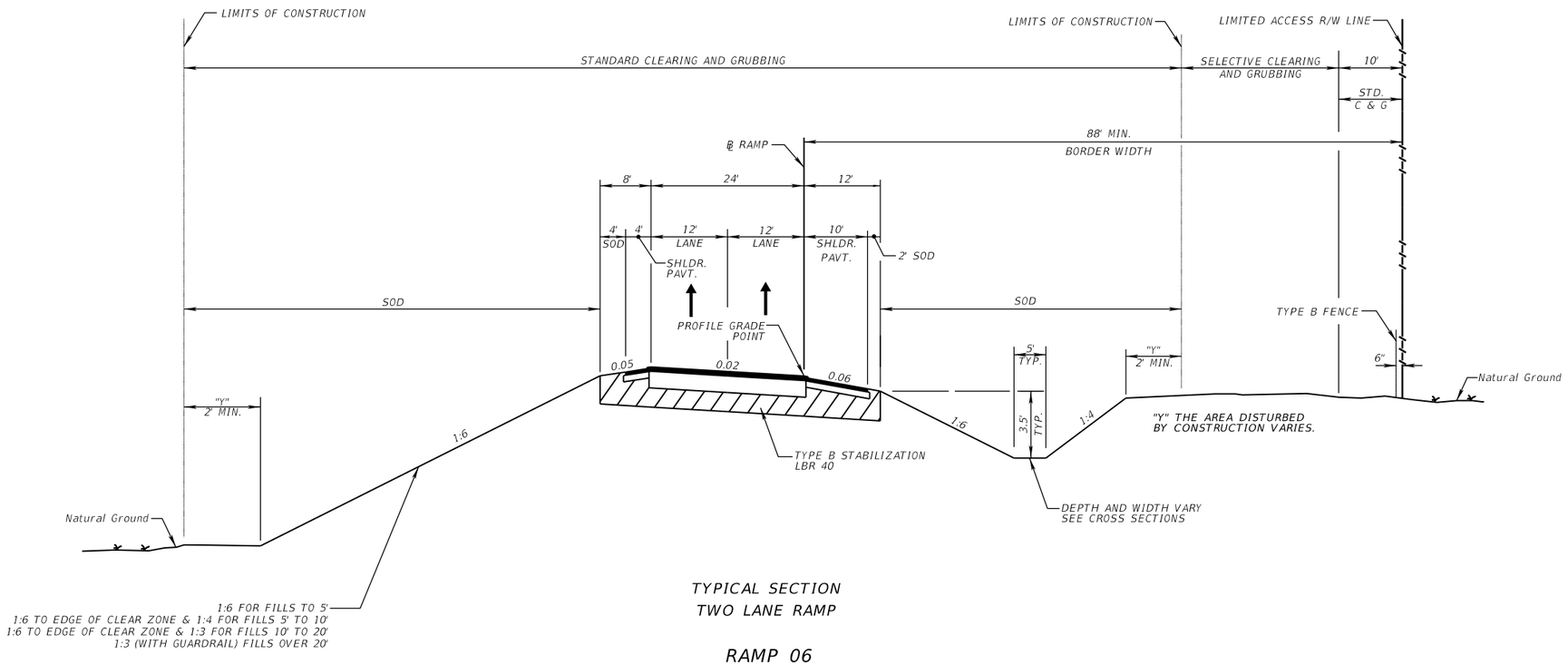
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

BORDER WIDTH

# TYPICAL SECTION No. 3




TYPICAL SECTION
TWO LANE RAMP

RAMP 06
RAMP 08
RAMP 09

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 4

5/17/2019 1:24:48 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

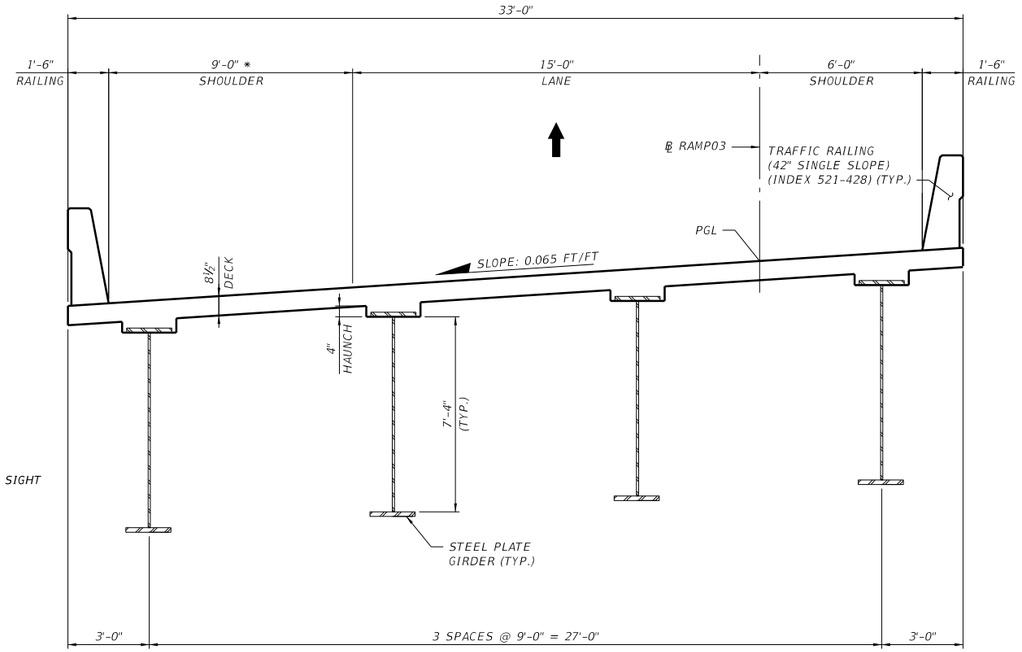
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 4




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 01
RAMP 3 OVER US 27
STA. 915+50.45 TO STA. 922+01.56

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 5

5/17/2019 1:24:48 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

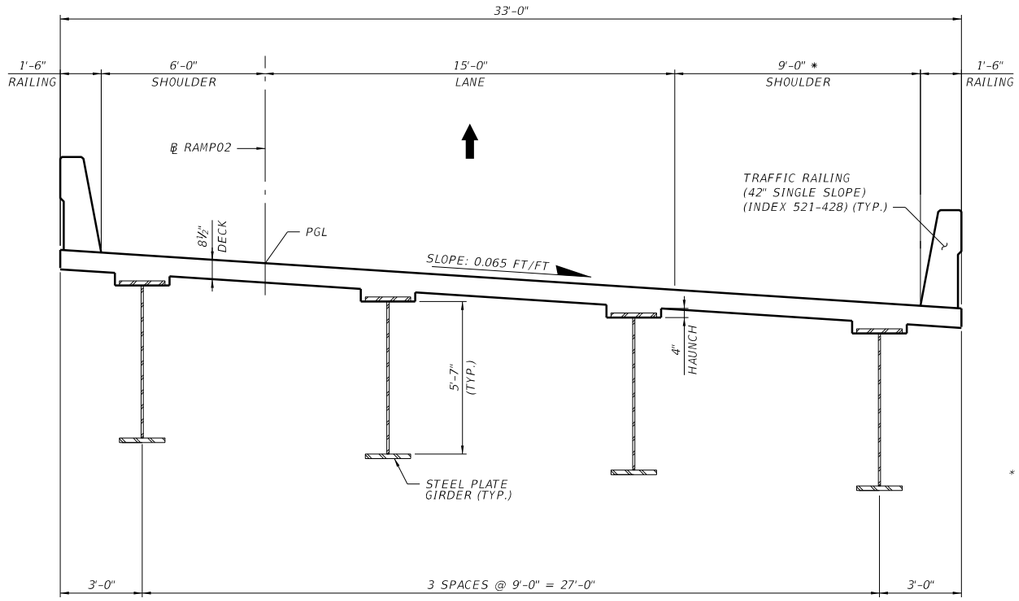
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 5




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 02
RAMP 2 OVER US 27 AND RAMP 3
STA. 808+16.21 TO STA. 830+20.65

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 6

5/17/2019 1:24:49 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

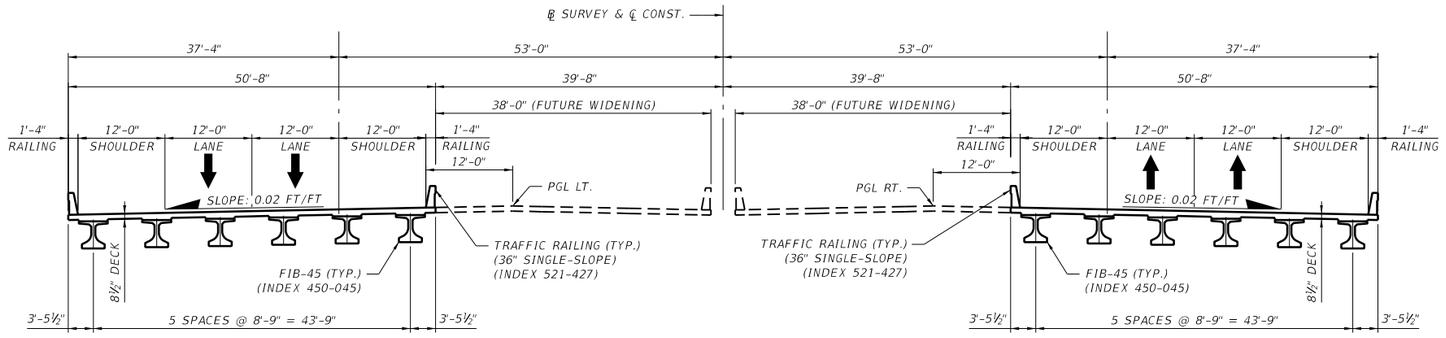
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 6




WESTBOUND
BRIDGE 3A

EASTBOUND
BRIDGE 3B

TYPICAL SECTION
BRIDGE 3A AND 3B
MAINLINE OVER EXISTING WETLANDS
STA. 124+70.08 TO STA. 149+37.08

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. 7

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

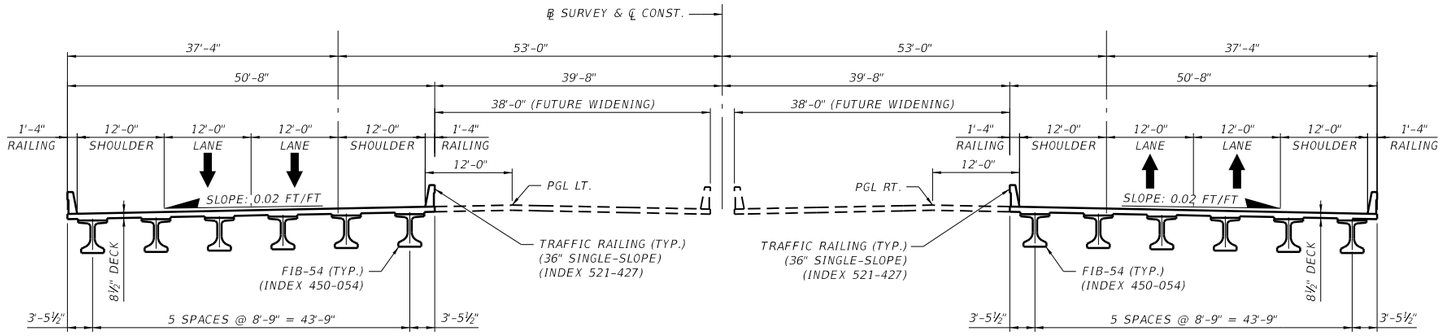
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 7




WESTBOUND
BRIDGE 4A

EASTBOUND
BRIDGE 4B

TYPICAL SECTION
BRIDGE 4A AND 4B
MAINLINE OVER COOK RD.
EB BRIDGE STA. 187+43.97 TO STA. 188+70.33
WB BRIDGE STA. 187+71.40 TO STA. 188+96.81

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. 8

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

5/17/2019 1:24:49 PM

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

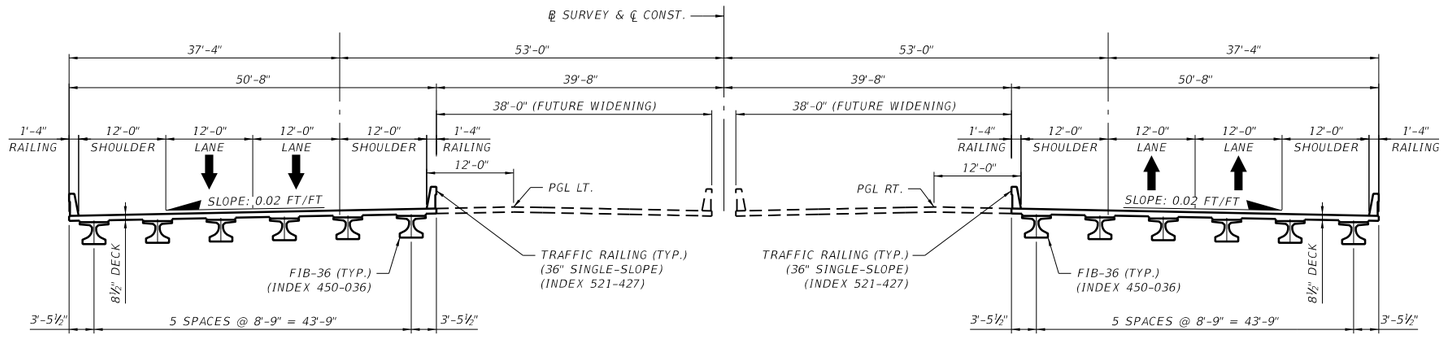
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 8




WESTBOUND
BRIDGE 5A

EASTBOUND
BRIDGE 5B

TYPICAL SECTION
BRIDGE 5A AND 5B
MAINLINE OVER CR 455
EB BRIDGE STA. 242+99.26 TO STA. 244+57.07
WB BRIDGE STA. 243+24.18 TO STA. 244+83.18

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. 9

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5/17/2019 1:24:50 PM

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

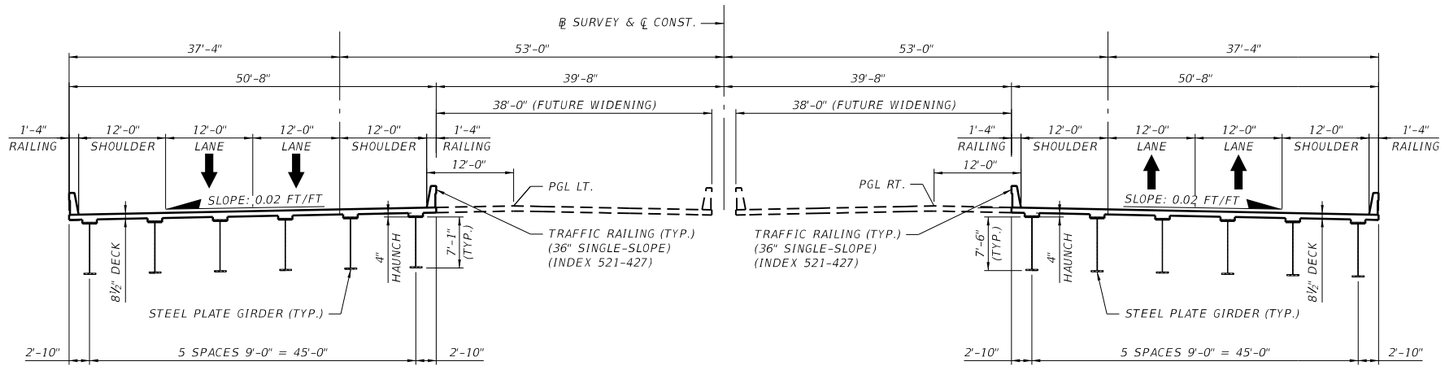
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 9




WESTBOUND
BRIDGE 6A

EASTBOUND
BRIDGE 6B

TYPICAL SECTION
BRIDGE 6A AND 6B
MAINLINE OVER RAMP 9
EB BRIDGE STA. 306+74.88 TO STA. 308+86.36
WB BRIDGE STA. 304+82.71 TO STA. 306+85.08

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. 10

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5/17/2019 1:24:50 PM

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

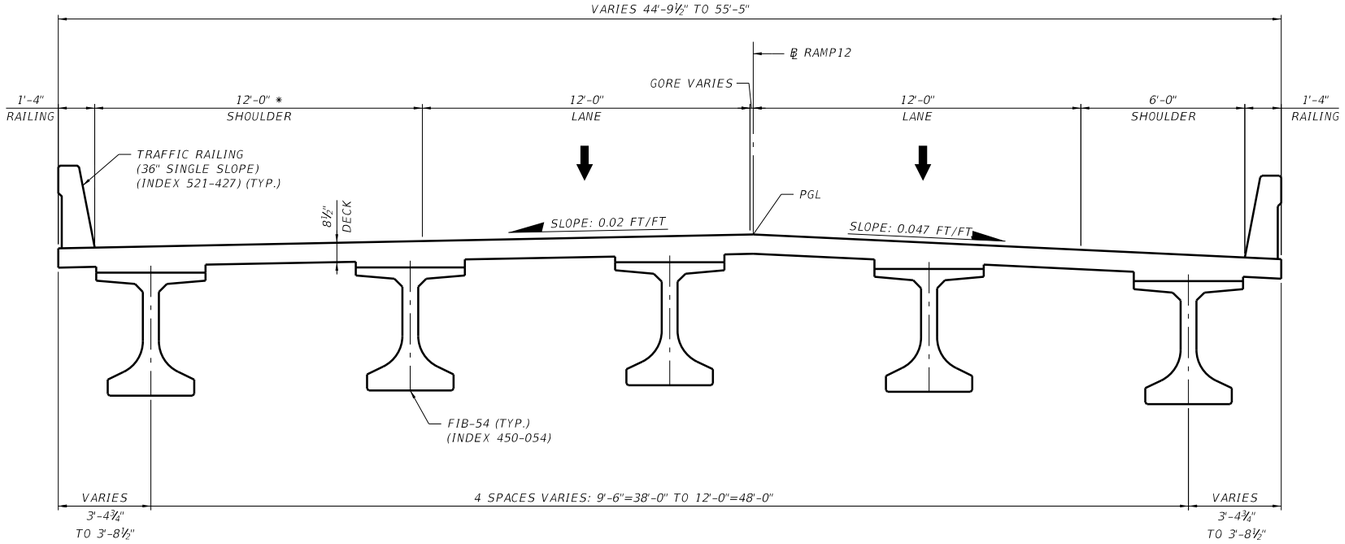
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 10




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 7A
MAINLINE OVER VALENCIA PARKWAY
STA. 313+22.95 TO STA. 314+84.80

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 11

5/17/2019 1:24:50 PM

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

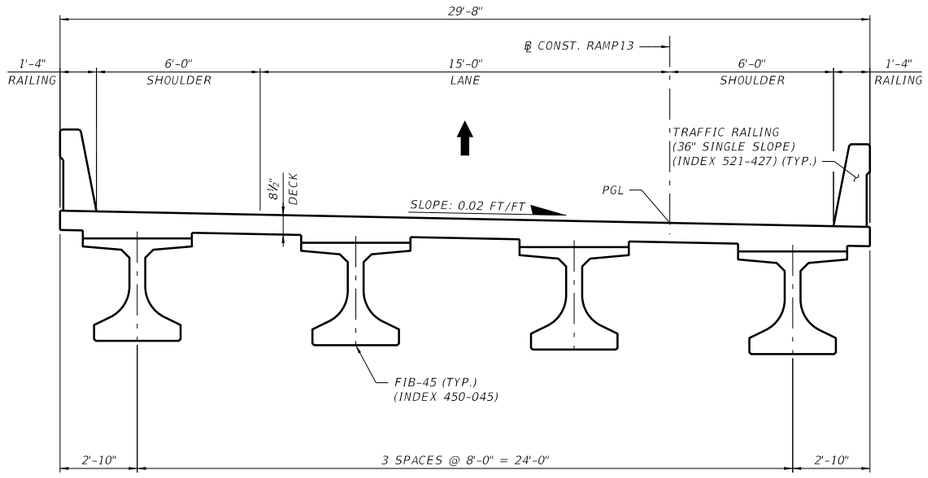
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 11




TYPICAL SECTION
BRIDGE 7B
MAINLINE OVER VALENCIA PARKWAY
STA. 1903+42.02 TO STA. 1905+07.10

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 12

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

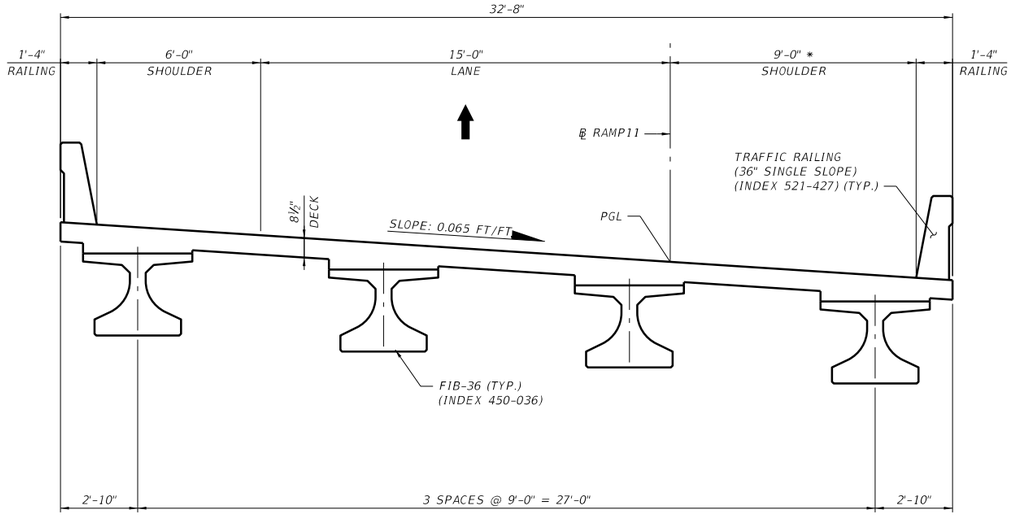
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 12




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 7C
MAINLINE OVER VALENCIA PARKWAY
STA. 1703+27.25 TO STA. 1704+82.45

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 13

5/17/2019 1:24:51 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

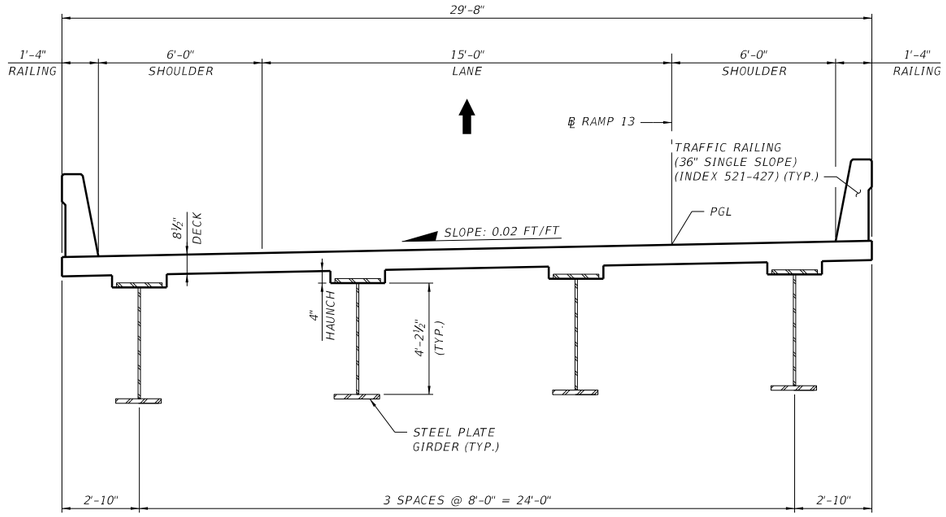
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 13




TYPICAL SECTION
BRIDGE 08
RAMP 13 OVER RAMP 12
STA. 1908+52.29 TO STA. 1911+78.88

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 14

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5/17/2019 1:24:51 PM

# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

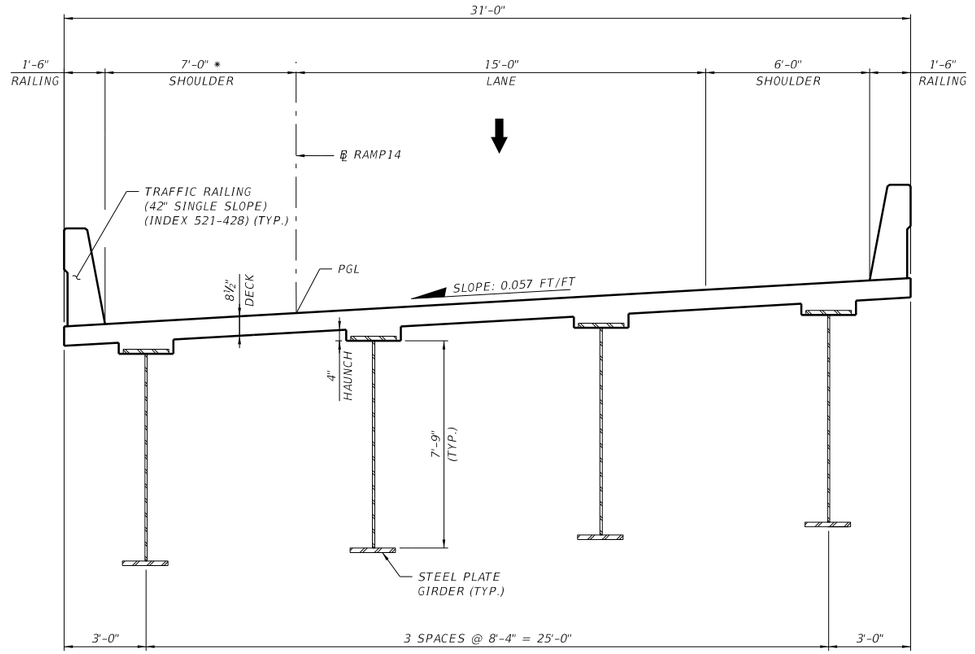
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 14




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

TYPICAL SECTION
BRIDGE 09
RAMP 14 OVER SCHOFIELD RD.
STA. 2015+92.20 STA. 2018+09.96

NOT TO SCALE

SHEET NO. 15

5/17/2019 1:24:51 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

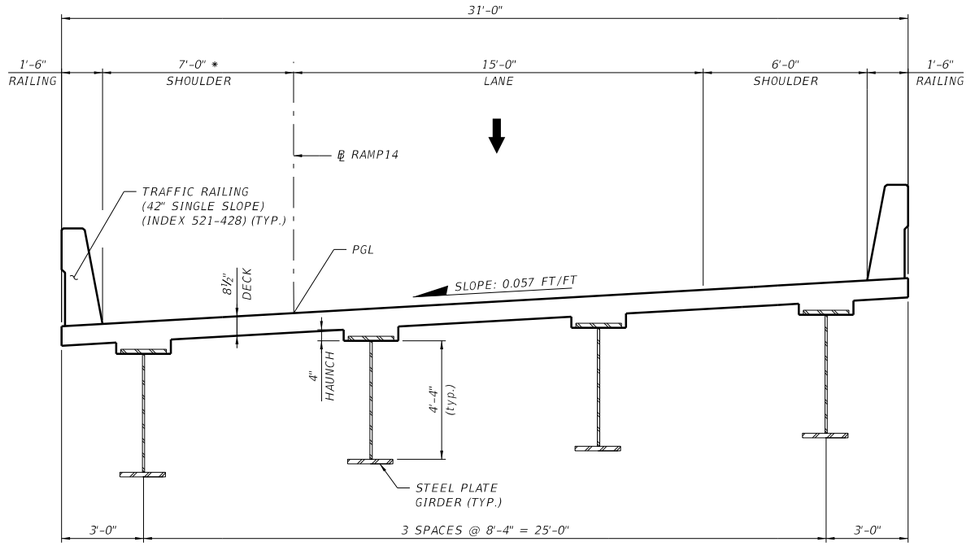
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 15




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 10
RAMP 14 OVER RAMP 15
STA. 2022+60.99 TO STA. 2025+93.37

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 16

5/17/2019 1:24:52 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

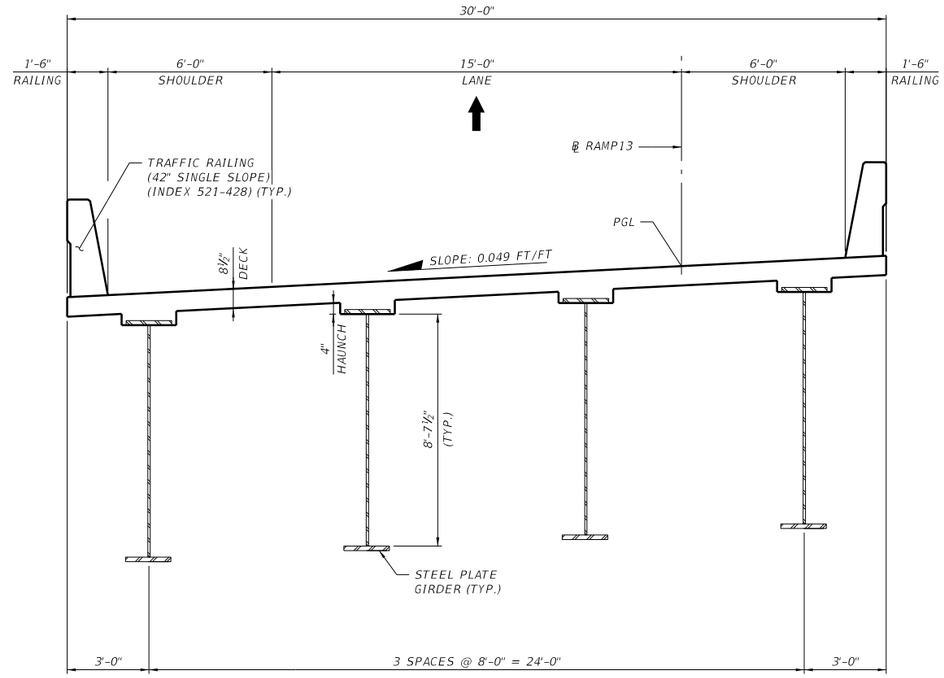
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 16




TYPICAL SECTION
BRIDGE 11
RAMP 13 OVER SR 429
STA. 1920+01.36 TO STA. 1930+07.89

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 17

5/17/2019 1:24:52 PM

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

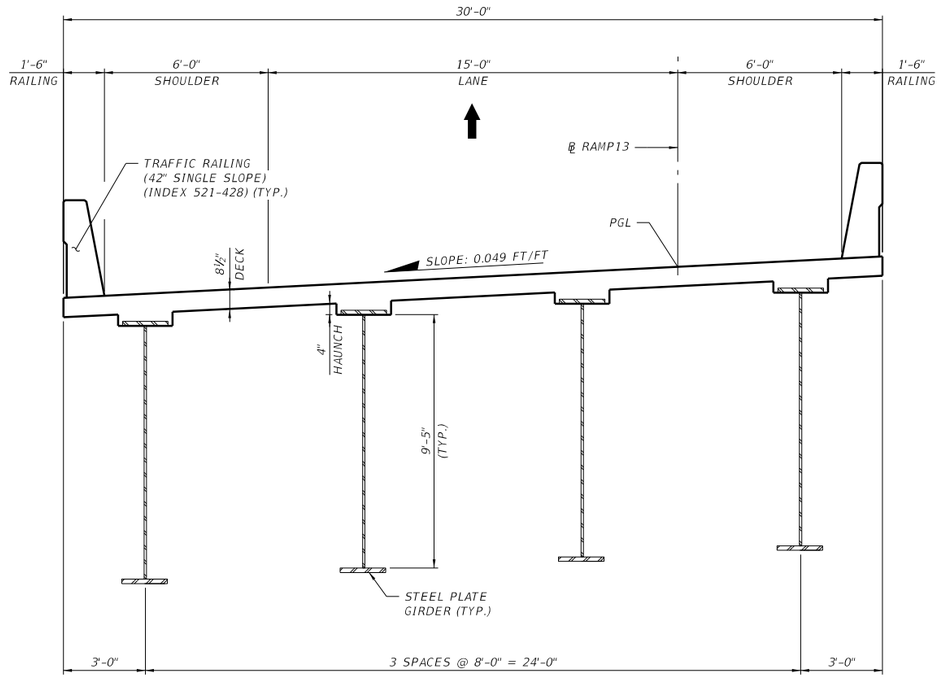
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 17




TYPICAL SECTION
BRIDGE 12
RAMP 13 OVER EXISTING SR 429 NB ON-RAMP
STA. 1933+86.94 TO STA. 1936+48.73

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 18

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

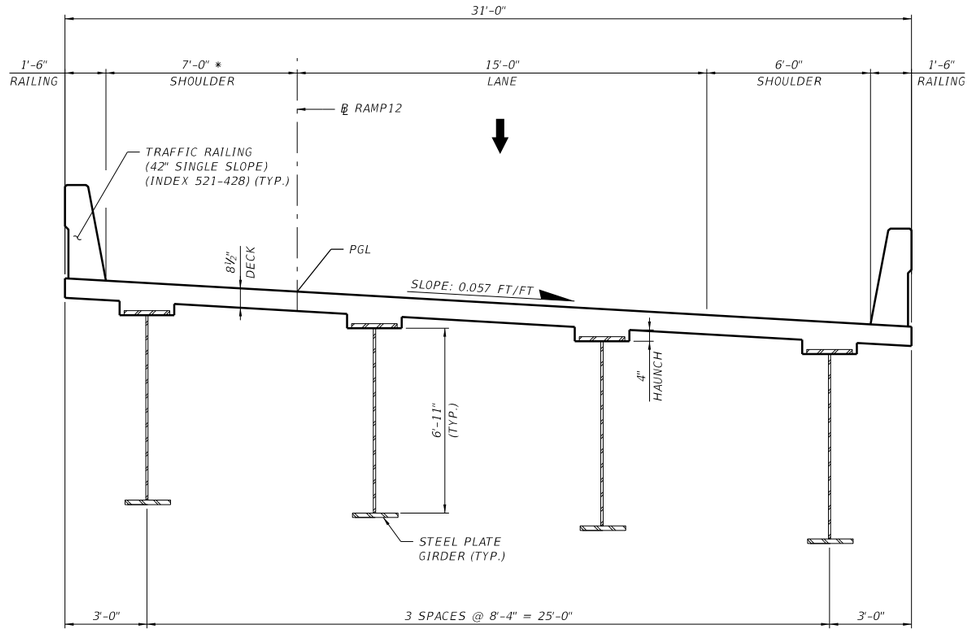
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 18




* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 13
RAMP 12 OVER SR 429
STA. 1819+81.74 TO STA. 1826+01.97

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 19

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# PROJECT CONTROLS

## CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

## FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

## HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

## ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

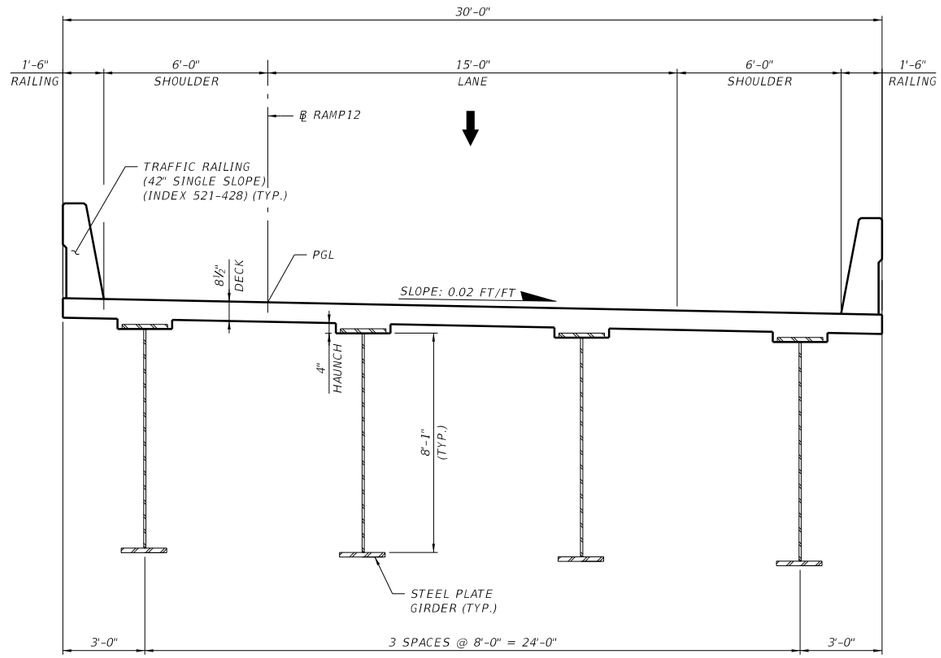
## CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

## POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

# TYPICAL SECTION No. 19




*TYPICAL SECTION*
*BRIDGE 14*
*RAMP 12 OVER EXISTING SR 429 NB OFF-RAMP*
*STA. 1830+51.23 TO STA. 1832+77.86*

## TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. 20

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