Utility Conflict Identification and Constructability Concerns

PRESENTERS

MELONIE SCHWARTZ

INWOOD CONSULTING ENGINEERS

JOSHUA KELLY

OZ-MATIC

OCTOBER 5, 2023

FLORIDA LOCAL USERS GROUP

Agenda

- → Meet the presenters
- → Breakout questions
- → What is a Utility Conflict?
  Direct vs In-Direct Conflicts
- → Design Element Impacts to Utilities
- → Utility Relocation Constraints
- → Constructability, Best Practices, & Lessons Learned in Construction
- → Key Takeaways
- → Thank You

Meet the presenter

Melonie Schwartz

Melonie is a Senior Utility Coordination Manager for Inwood Consulting Engineers, a business that does Transportation Engineering, Utility Design, PD&E, Ecological, Traffic, Drainage, Public Involvement and Structures Design. Melonie has over 16 years experience coordinating projects throughout the State of Florida.

Meet the presenter

Joshua Kelly

Josh is a Senior Utility Construction Coordinator for Ozmatic Inc, a business that provides construction oversite for road, bridge and highway infrastructure. Josh has over 20+ years of experience providing Utility Construction oversight and works directly with FDOT on construction projects.

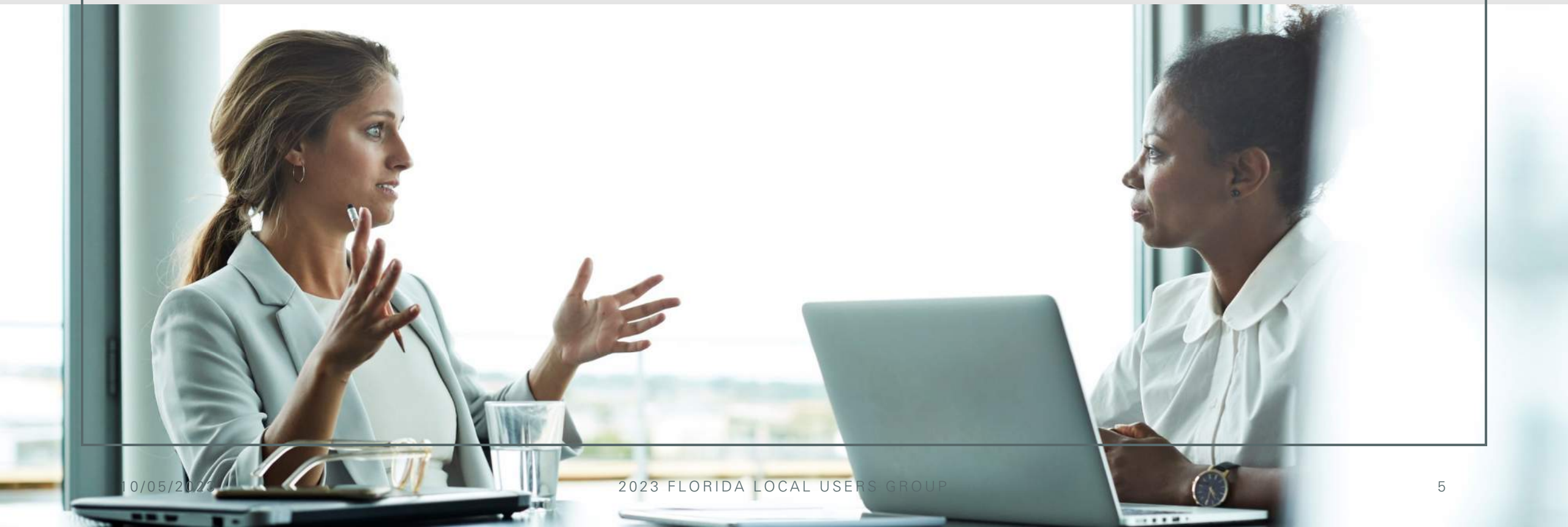
Breakout Questions

Who knows that the utility level symbology means?

Who knows what a utility conflict is?

Who knows the difference between a direct and an indirect conflict?

Give me an example of a critical utility



Coming together is a beginning, staying together is progress, and working together is success.

Henry Ford

What is a Utility Conflict?

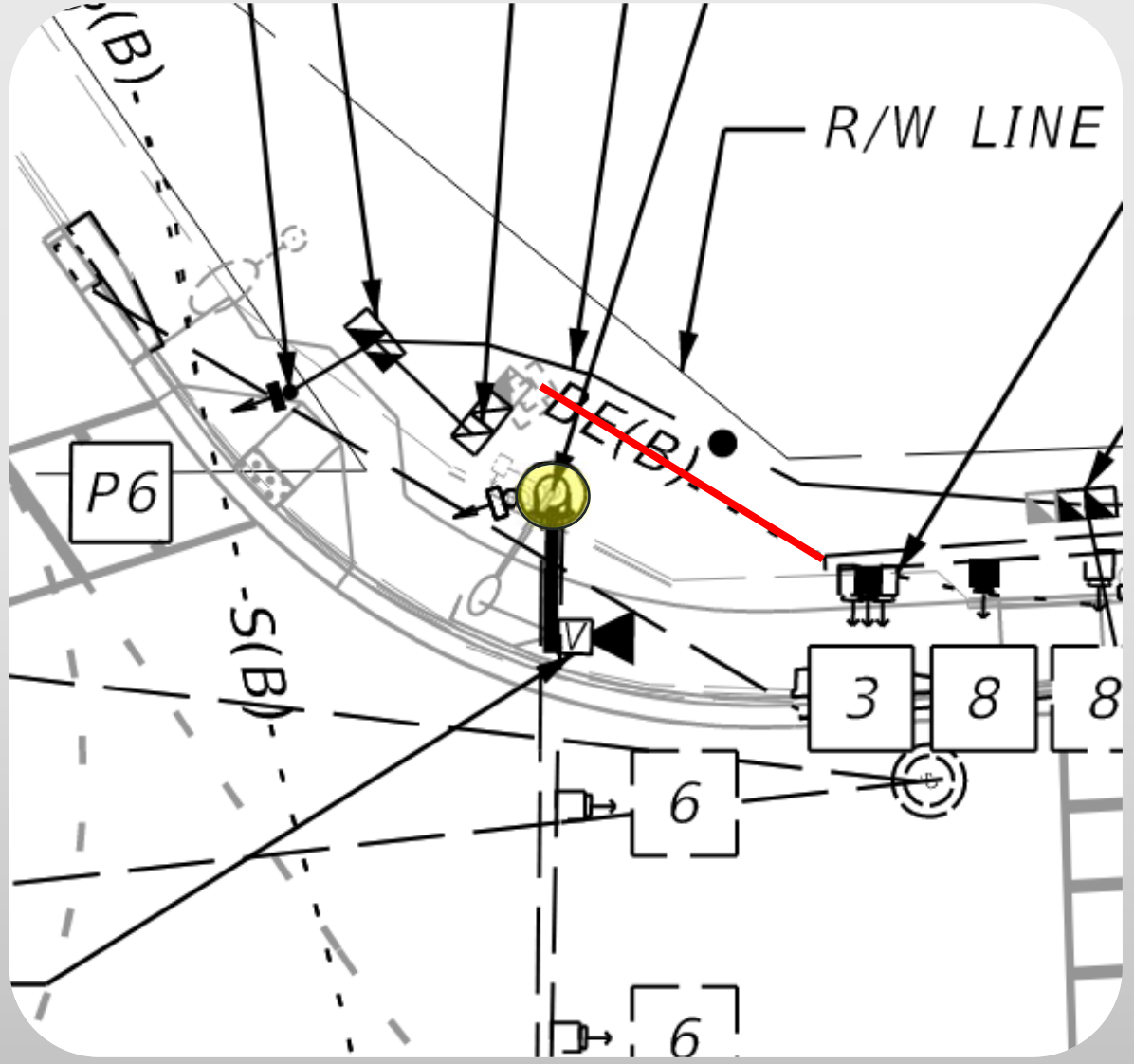
Direct vs In-Direct Conflicts

Is this a conflict?

Is the Buried Electric (BE) shown in the picture below in conflict?

No, it is not a conflict. The buried electric is over 4 feet from the outside edge of the mast arm foundation diameter and 3 feet from the auger drilling hole.

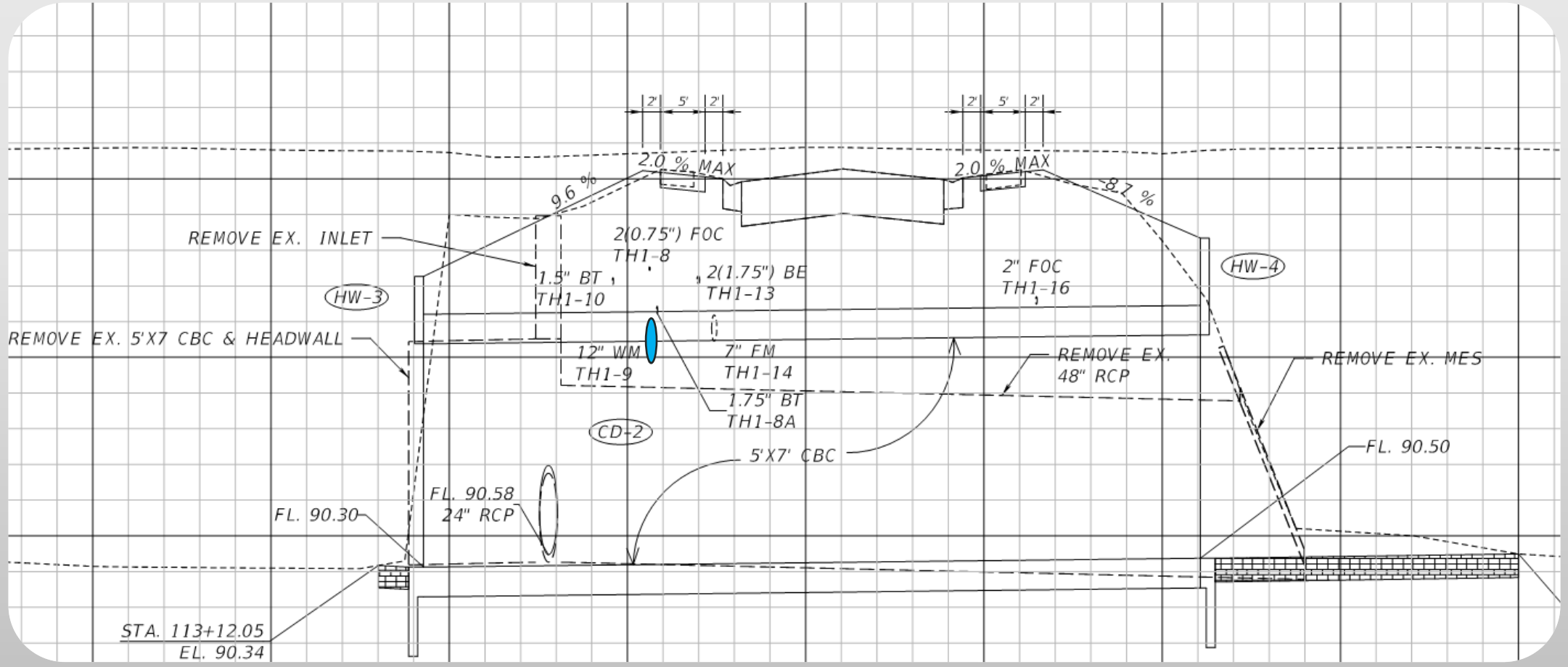
It is noted that the Utility Agency Owner may elect to have time within a Utility Work Schedule to locate and protect during the mast arm installation.



Is this a conflict?

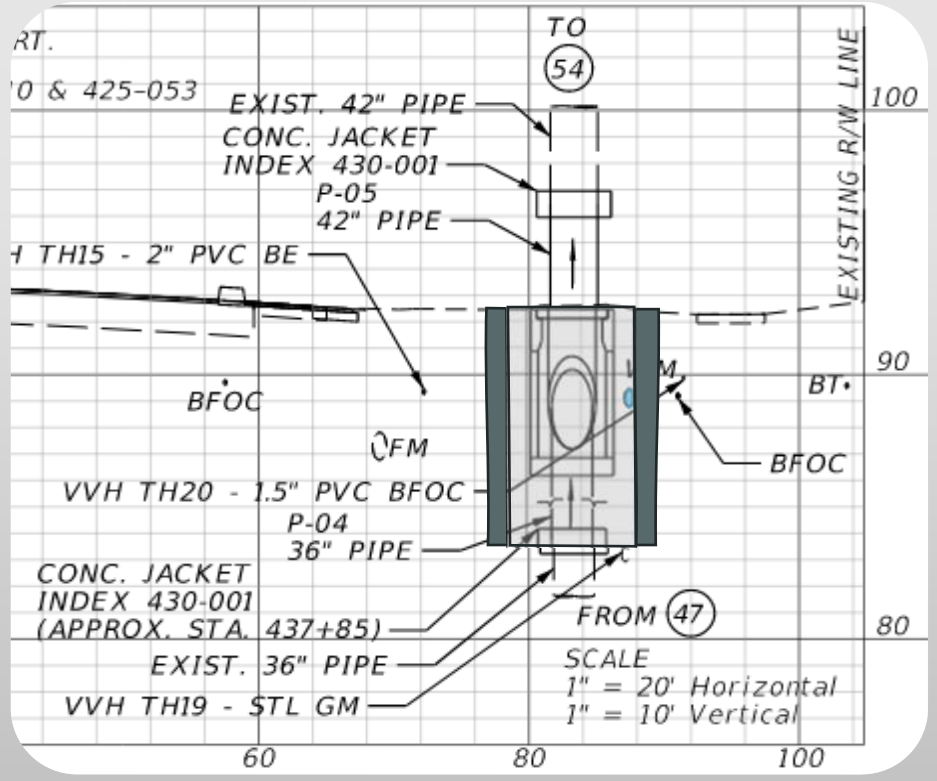
Is the water main in conflict with the box culvert?

Yes, it is a conflict.

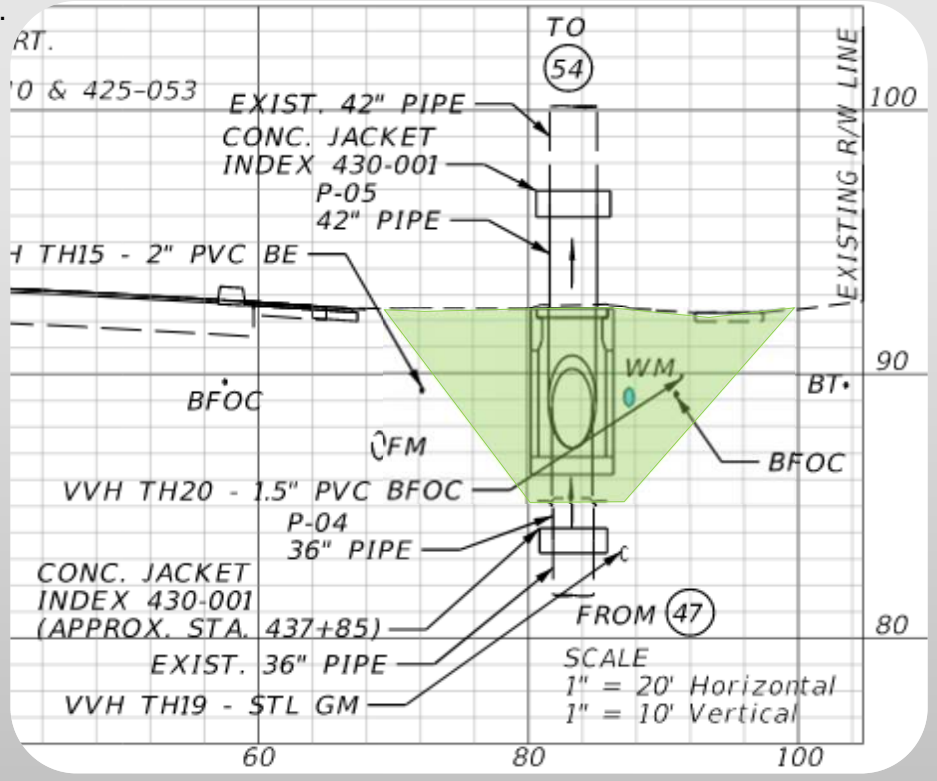


Is this a conflict?

Is the drainage structure in conflict with the water main?



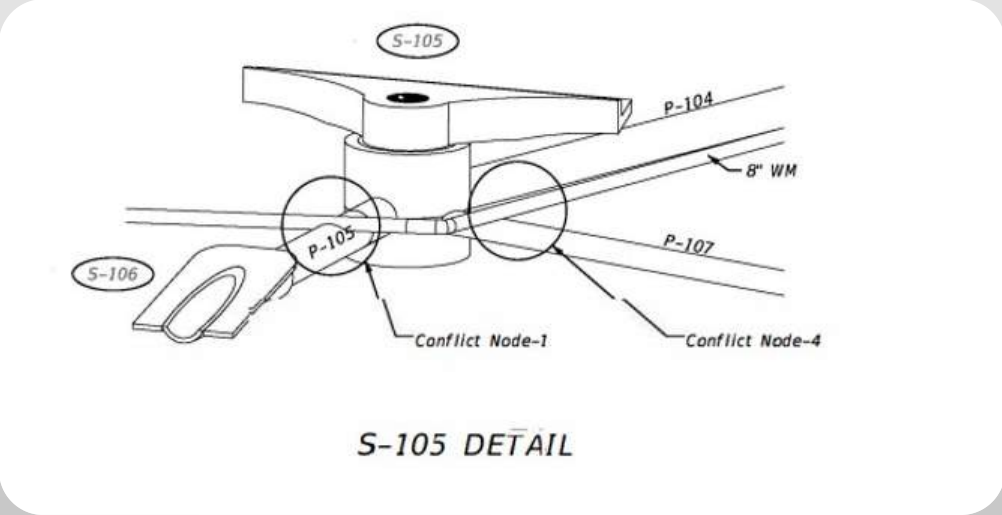
Yes, it is in conflict due to constructability. If the contractor uses a trench box, the water main will be impacted by the trench box. If the contractor uses an open cut then the water main will be exposed and would need to be supported and possibly restrained.



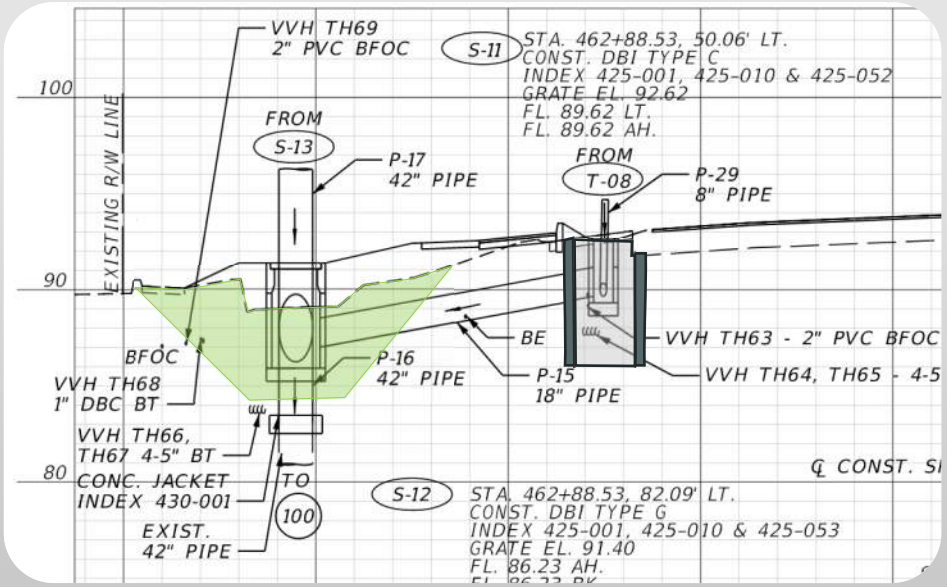
Direct verses In-Direct Utility Conflicts

A direct utility conflict is where two (or more) elements are crossing each other.

Example: Storm pipe between drainage structures is at is going through a utility.



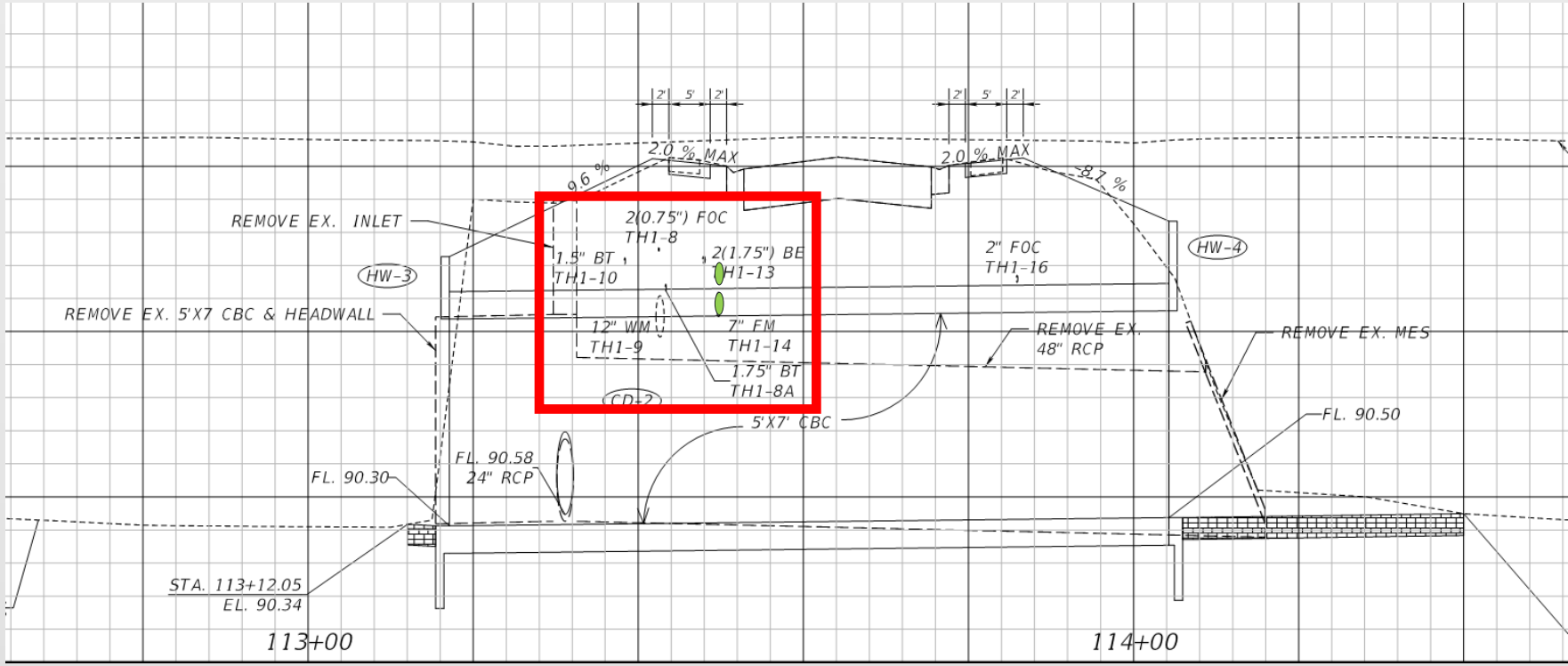
An in-direct utility conflict (or a proximity / constructability utility conflict) is where the design element does not have a direct clash with the utility; however, the construction of that facility is such that the utility is impacted.



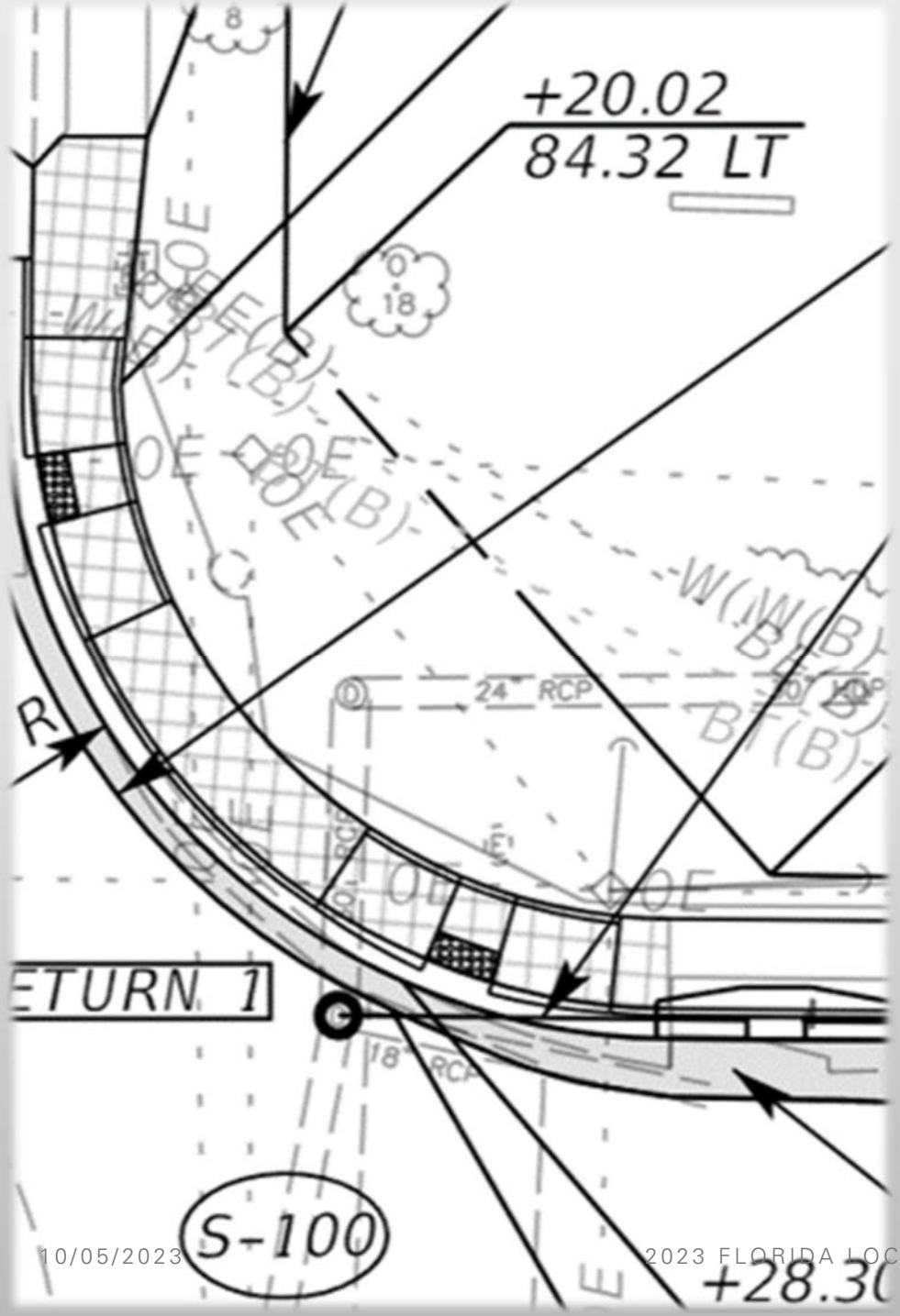
SUE

SUE verifies the vertical and horizontal location of subsurface utilities

Allows the design team, utility coordinators, and Utility Agency/Owners to identify or clear conflicts



V_{vh} #	UTILITY DESCRIPTION (Owner, Type)	SIZE	MATERIALS	℄ and/or ℄ STATION	OFFSET	LT/RT	EXISTING GROUND ELEVATION	TOP ELEVATION
1-1	AT&T	1.75"	DBC	102+49.24	9.31'	LT	99.16	96.61
1-2	UNKNOWN	(3)1.75"	PE	102+56.03	13.03'	LT	99.29	96.54
1-3	ORANGE COUNTY UTILITIES	9.00"	DIP	102+63.55	3.47'	LT	99.15	95.55
1-4	AT&T	1.75"	DBC	103+22.42	10.80'	LT	99.22	96.57
1-5	UNKNOWN	(3)1.75"	PE	103+26.75	12.54'	LT	99.17	95.42
1-6	UNKNOWN	UNK	UNK	113+17.09	13.66'	LT	99.23	N/A
1-7	DUKE	2.25"	DBC	113+37.81	22.08'	LT	98.90	95.40
1-8	UNKNOWN	(2)0.75"	DBC	113+42.49	30.53'	LT	99.07	97.02
1-8A	AT&T	1.75"	DBC	113+43.29	30.46'	LT	99.09	96.14
1-9	OUC	12.00"	STL	113+42.61	28.09'	LT	99.07	95.87
1-10	AT&T	1.75"	DBC	113+38.07	35.77'	LT	98.58	96.78
1-11	TECO	2.25"	STL	113+29.18	54.08'	LT	100.13	98.08
1-12	DUKE	2.00"	HDPE	113+34.59	52.76'	LT	99.82	96.97
1-13	DUKE	(2)1.75"	DBC	113+47.95	29.59'	LT	99.13	96.81
1-14	ORANGE COUNTY UTILITIES	7.00"	STL	113+49.74	33.21'	LT	99.00	95.95



Survey Designates

Quality Level “D”

- Existing Records, Marked Plans, GIS Maps, etc.

Quality Level “C”

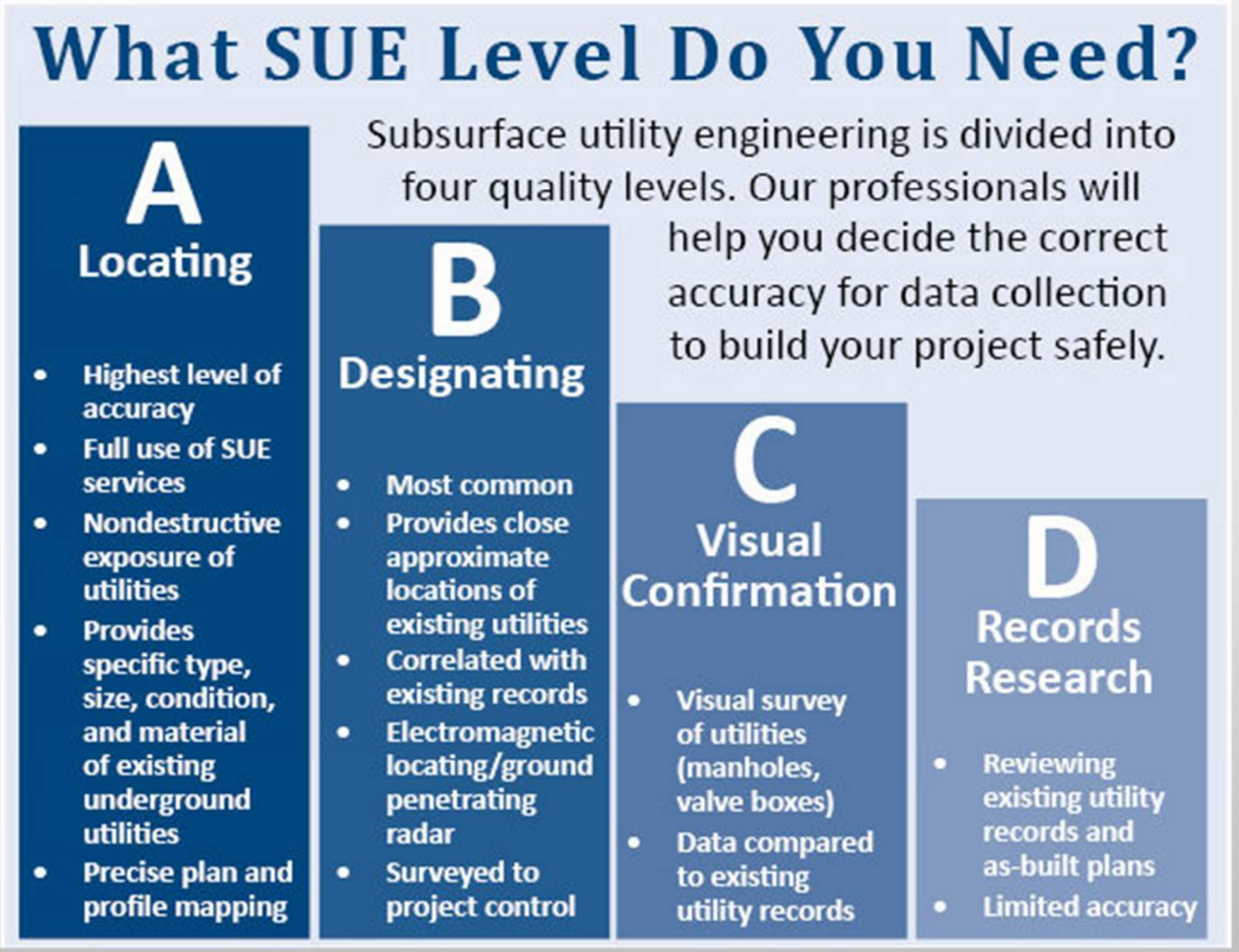
- Surface Visible Feature Survey
- Delineator, Valve Boxes, Hydrants

Quality Level “B”

- Designating technologies (scanning, toning, etc.)
- Locator locates the lines and surveyor picks them up

Quality Level “A”

- Locating – Physically expose facility at a location for measurement and data



Need to know…

Quality Level = Reliability Level

When inputting RGBs / Marked Plans from UAOs you are entering them as LEVEL D, as they are based on the UAO's record information

Importance of a Detailed Utility Conflict Matrix

It is very important to have a detailed Utility Conflict Matrix that captures all your conflicts for all design elements: Roadway, Structures (bridges, walls), ITS, Lighting, Signals, Signs, Landscape, Demucking, etc.)

It needs to be maintained through the project lifecycle

Update associated Test Hole Numbers when available and finalize the disposition, when work to be performed, dependent utility (as applicable) and comments based on the outcome of the utility coordination efforts

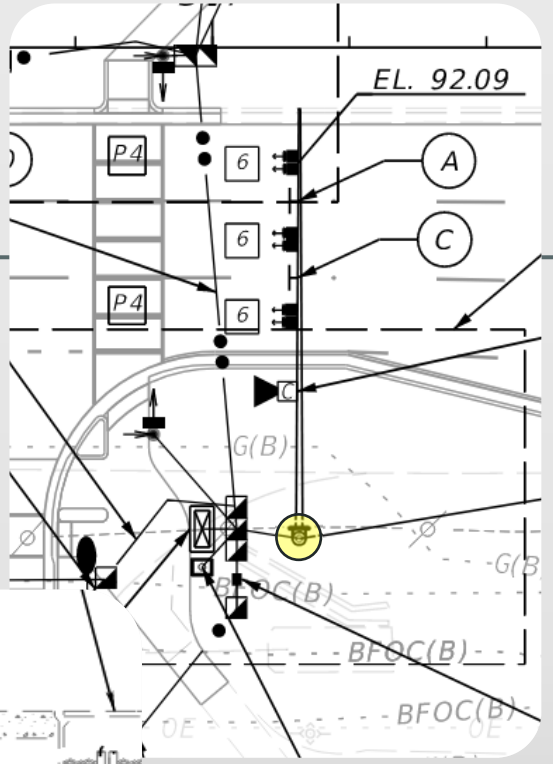
UTILITY CONFLICT MATRIX

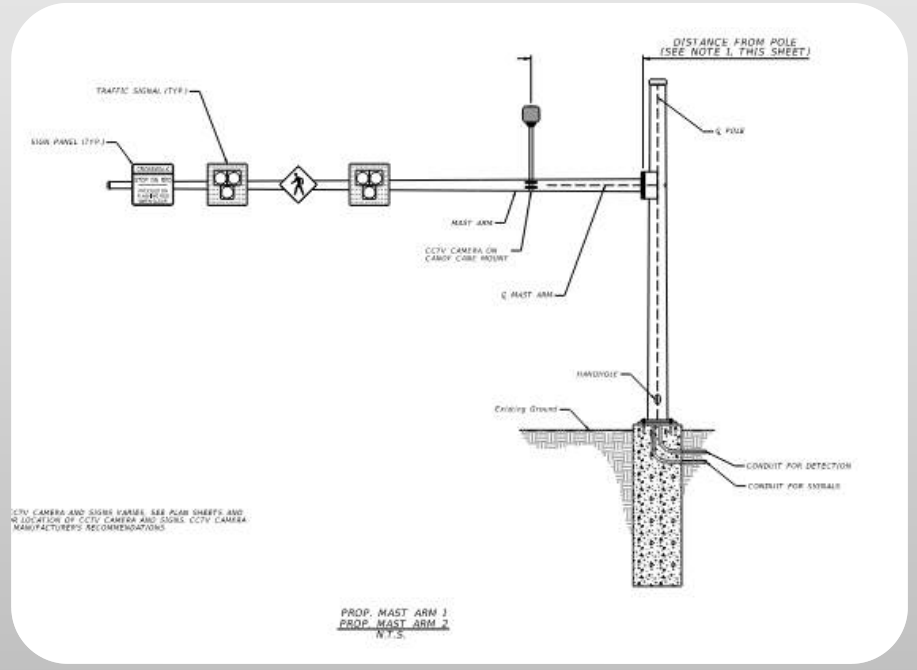
FPID		445303-1-52-01						Phase	UTILITY CERTIFICATION				*Revised Utility Conflict Matrix must be submitted at the following intervals:*			
Description		SR 436 from N. of Old Cheney Highway to N. of University Park Drive						Proj Mgr.	Beata Stys-Palasz, PE FDOT				- Plans in Hand Review - Initial Plans Review - Final Plans Review with all conflicts addressed - Utility Certification			
Date of Report		1/20/2023						Utility Coord	Melonie Schwartz Inwood							
Conflict #	**Owner**	**Utility Facility (type, size, material)**	**From Sta**	**To Sta**	**Offset**	**Side**	**Alignment Chain**	**Point (P) or Long. (L)**	**Design Element in Conflict With**	**Plan Sheet #**	**VVH Req'd**	**VVH Test Hole Location**	**Disposition**	**When Will Work Be Performed**	**Dependent Utility**	**Comments**
1	Duke Energy SL	Light Pole and Pull Boxes	502+95.47	503+05.69	73.69	RT	CL Const. SR 436	P	Light pole and pull boxes in center of new sidewalk	43 (pvs 33)	NO		To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement
2	Duke Energy SL	Pull Box for BE to signal	503+95.52		92.71	RT	CL Const. SR 436	P	Pull box in proposed sidewalk	43 (pvs 33)	NO		To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement
3	Duke Energy SL	Light Pole	502+01.85		61.27	LT	CL Const. SR 436	P	In proposed bike lane	42 (pvs 32)	NO		To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement
4	Duke Energy SL	Pull Box for light pole	502+34.46		60.27	LT	CL Const. SR 436	P	In proposed bike lane	42 (pvs 32)	NO		To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement
5	Duke Energy SL	2" PVC BE (SL)	507+64.39		76.47	RT	CL Const. SR 436	P	Proximity to drainage structure S-17 (pvs S-14) & S-16 (pvs S-13), on exist. 36" pipe	43 (pvs 33)	NO		To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement
6	Duke Energy SL	Pull Box for light pole	515+83.04		74.99	RT	CL Const. SR 436	P	Pull box in asphalt pavement to be removed	45 (pvs 35)	NO		To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement
7	Duke Energy SL	2" PVC BE (SL)	517+13.78		68.84	RT	CL Const. SR 436	P	Proximity to Mast Arm MA-2.	T-12	YES	TH-108	To Be Relocated	During Construction by Utility		Lighting relocations will be performed via RISA Agreement

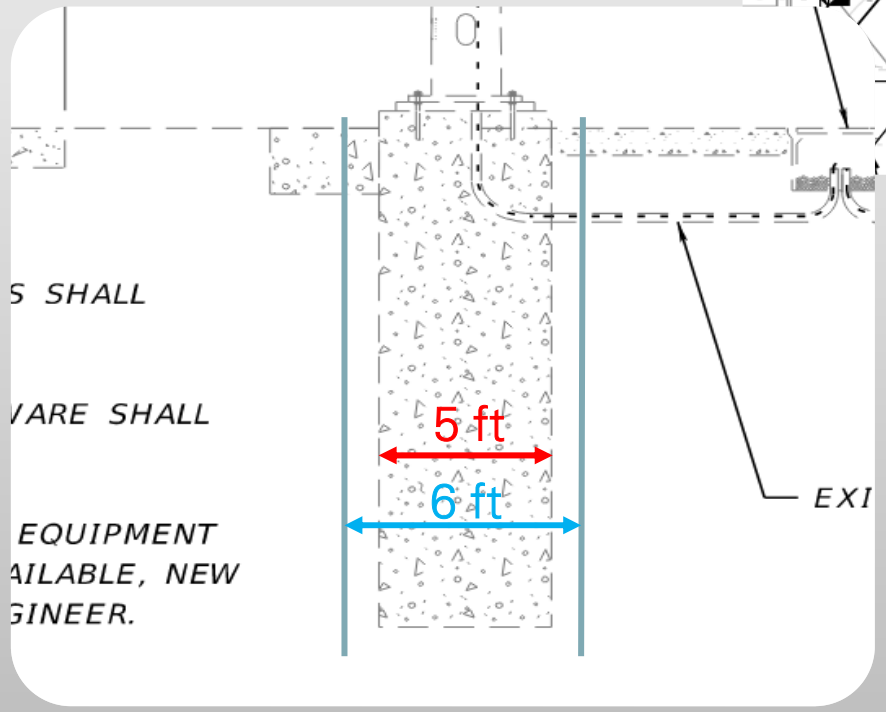
Design Element Impacts to Utilities

Mast Arms, Signs and Strain Poles

- ❑ Mast Arms, Sign Foundations, and Strain Poles
- ❑ Auger diameter is larger than the foundation diameter
- ❑ Some utilities may be sensitive to vibration and could be affected by installation

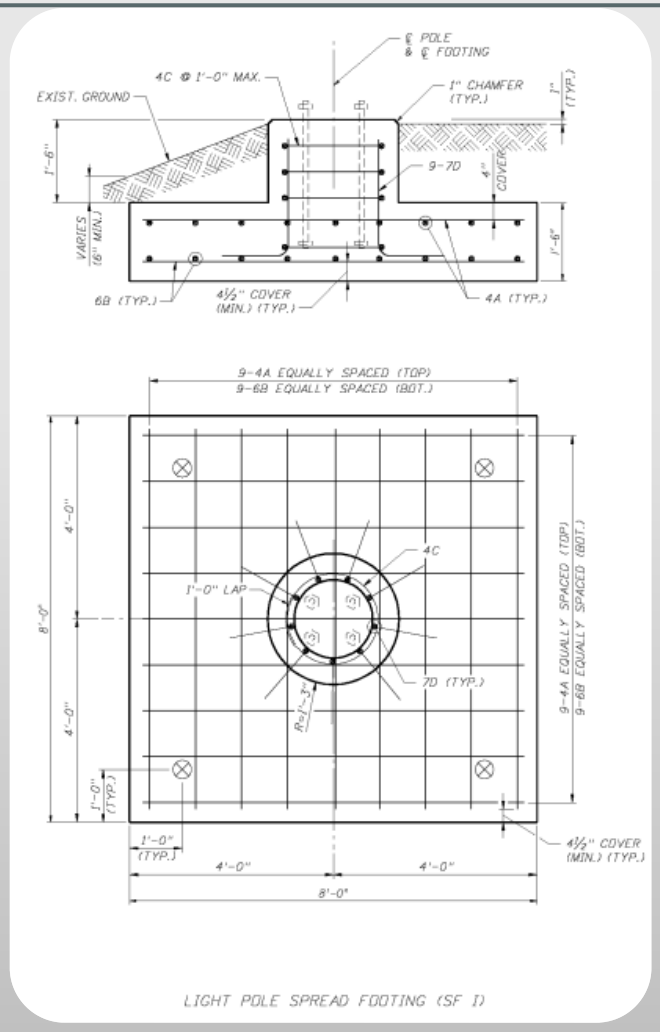




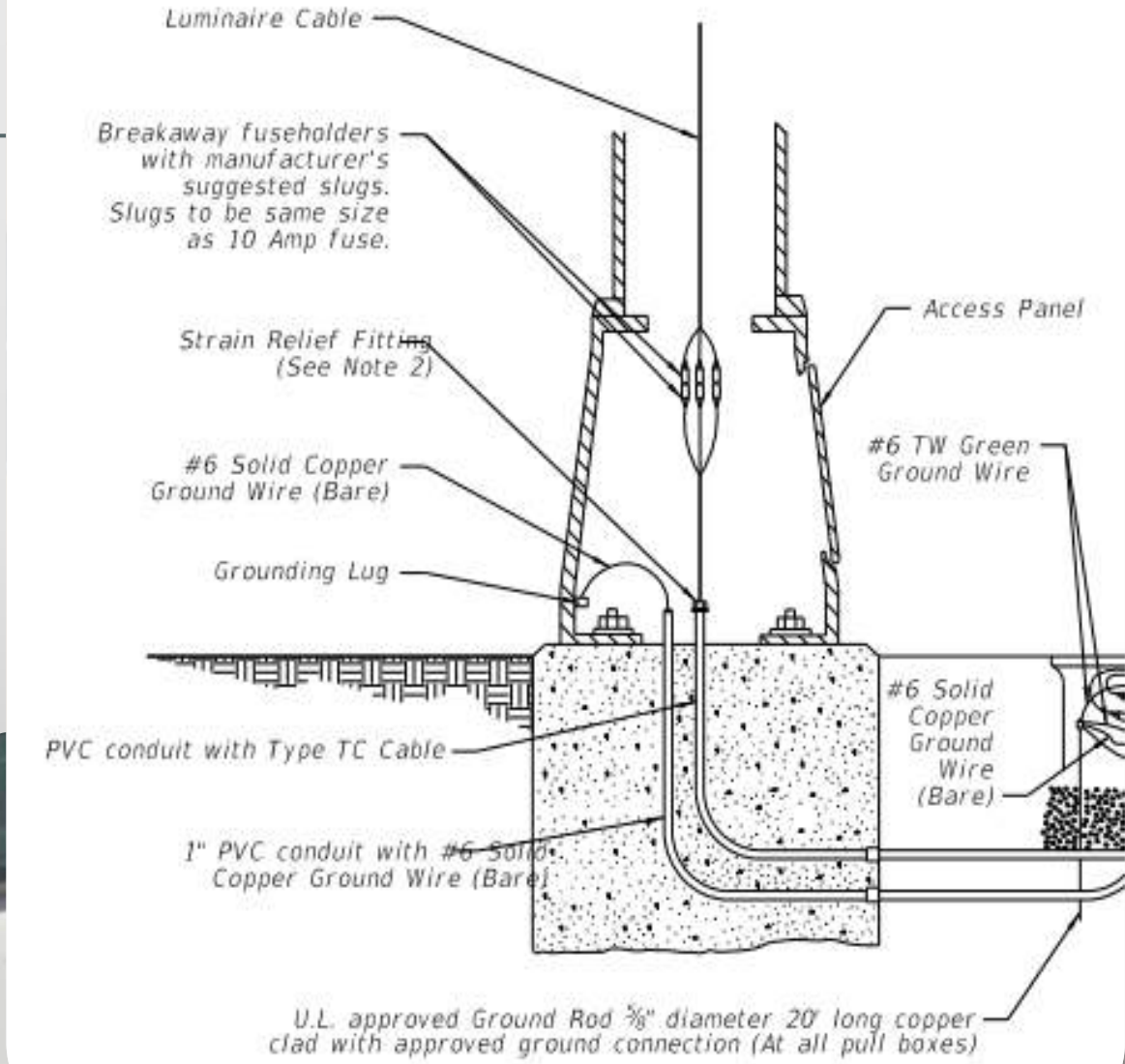


Lighting and ITS

- Lighting foundations and ITS Camera poles and foundations
- Can spread footers be used to avoid utility conflicts?

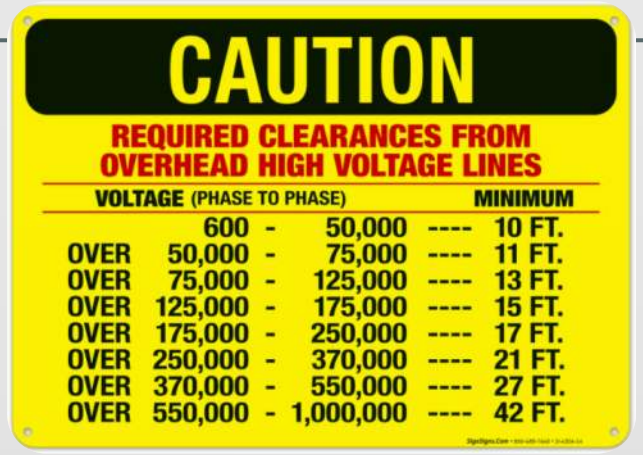


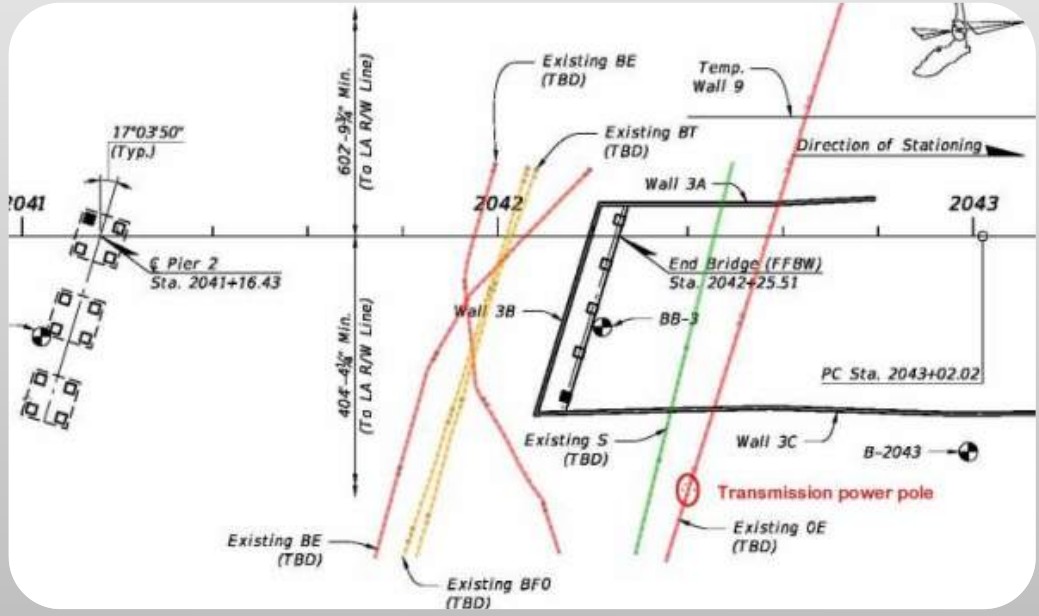
LIGHT POLE SPREAD FOOTING (SF I)



Bridges and Temporary Critical Walls

- ❑ Bridge Foundations and Construction Restraints
- ❑ Piles
- ❑ Beware of Utilities sensitive to Vibration
- ❑ Overhead Clearance
- ❑ Check OE Voltage and verify OSHA Clearances
- ❑ Joint Pole Users





Wall Zone Pipe and Gravity Walls

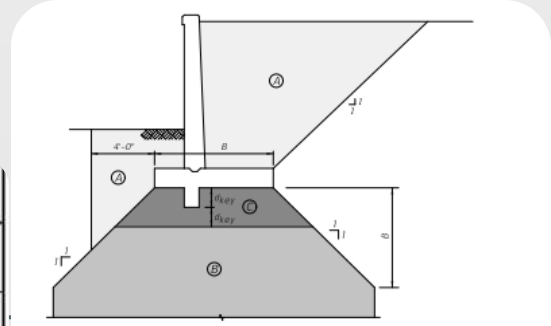
Wall Zones are not just related to MSE Walls, but apply to gravity / retaining walls as well

Utilities located next to the gravity wall may not be able to adjust or tie into their ducts

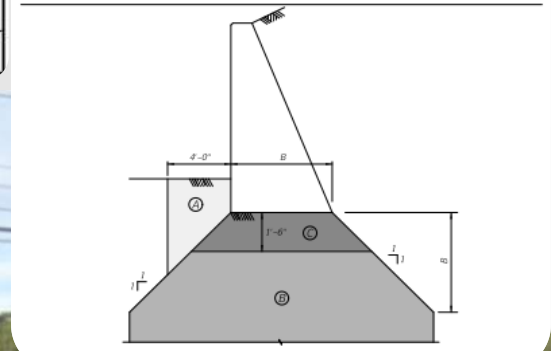
With the power poles to the right, the power company (and their joint users) will have to back up their trucks to the handrail to access and maintain the poles

Just a note: For all gravity walls, the contractor will need to perform densities 2 feet below bottom of the wall and, if not compliant, they will need to compact and re-test. This can be difficult

Wall Zone	Requirements	Comments
A	Wall Zone Pipe (see ***Drainage Manual***, Table 6-1)	Not likely to leak and used when probable first indicator of leak is topside settlement or soil loss
B	Wall Zone Pipe. No longitudinal conveyances[2] allowed. Transverse conveyances must meet AASHTO LRFD criteria[3]	First indicator of leak is wall damage: pipe must endure unique loading with no chance of leakage
C	No pipes allowed	First indicator of leak is bridge/wall damage



SECTION THRU CAST IN PLACE CANTILEVER RETAINING WALL (INDEX 400-010)



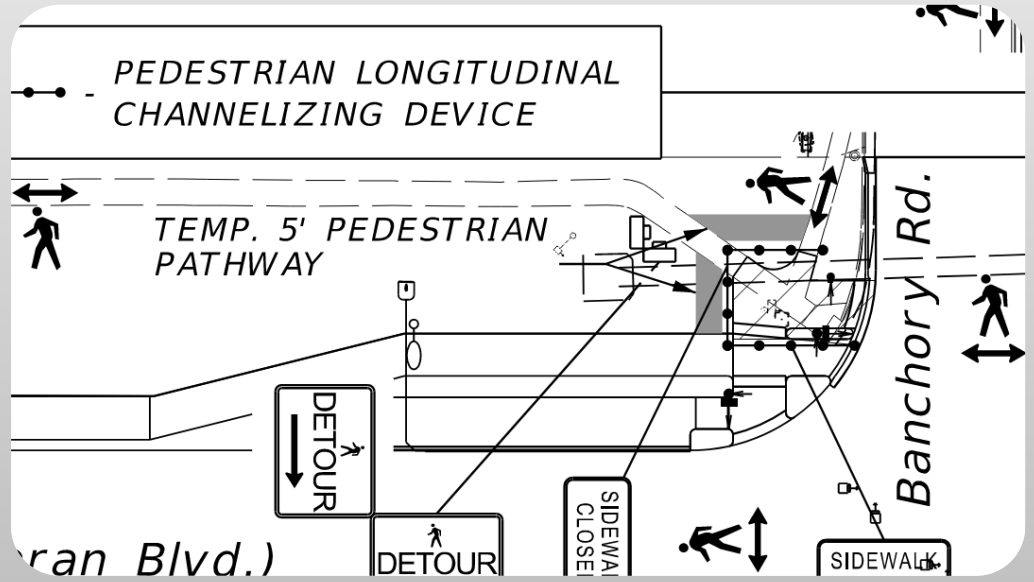
SECTION THRU CAST IN PLACE GRAVITY WALL (INDEX 400-011)

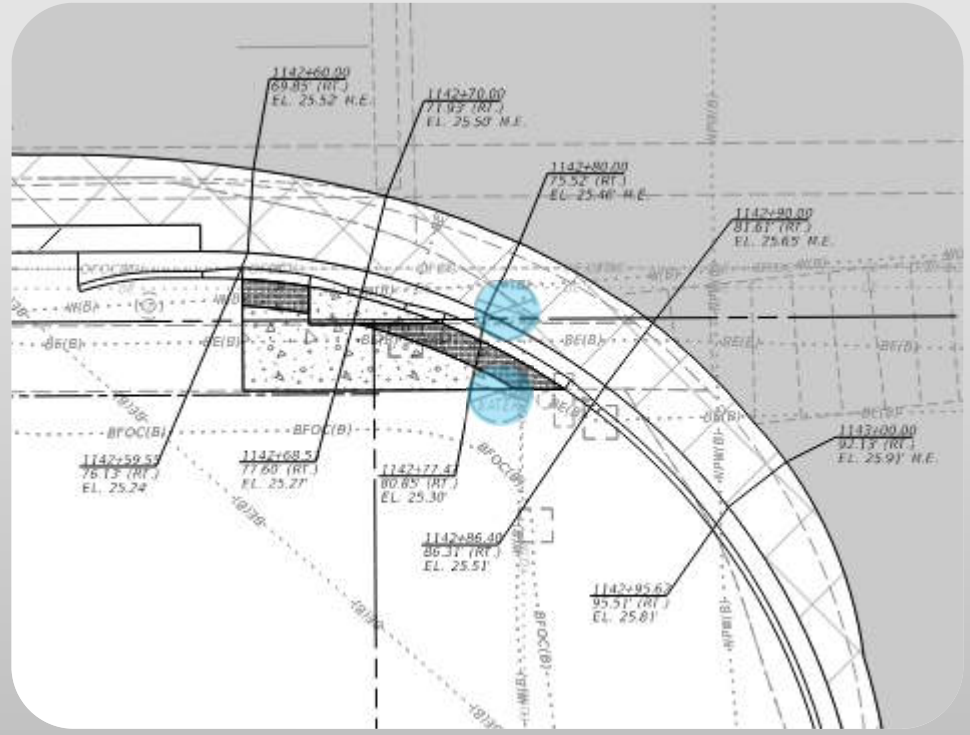
Curb Ramps, Sidewalks and Temporary Pedestrian MOT

Curb ramps need to be reviewed for above ground appurtenances like valves , manholes, pull boxes, vaults, pedestals, meters, hydrants, guy wires

Ensure these items are not in the curb and that they are adjusted to be flush for final grade

Temporary Pedestrian MOT can present additional conflict with pedestals, guy wires, pull boxes and must meet ADA as well



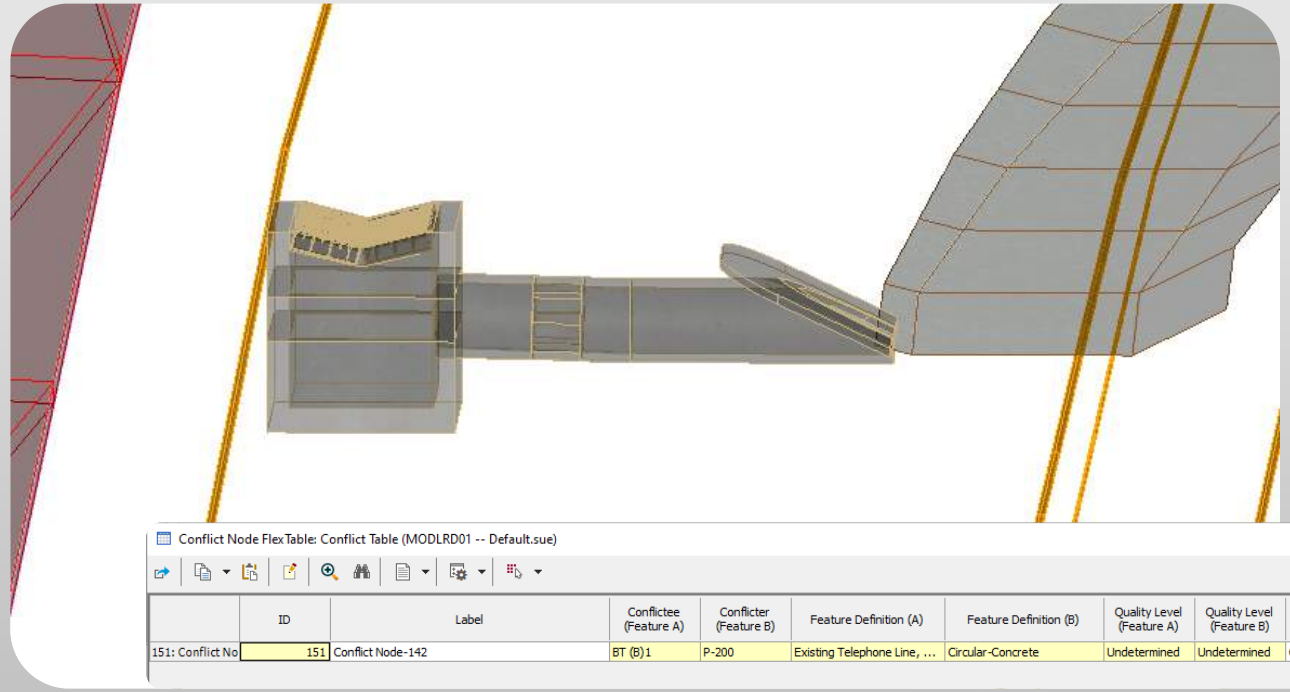


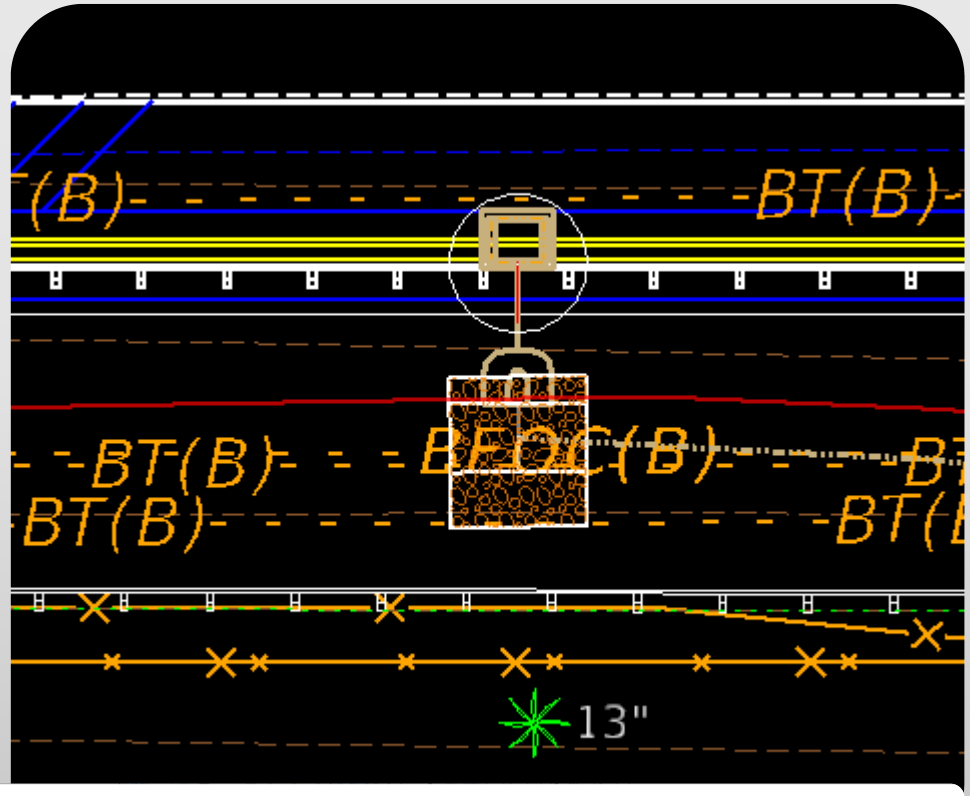
Drainage Structures and Pipes

Drainage Structures should be VVH for utility conflicts

Constructability needs to be reviewed

NexGen Clash Detection / Utility Conflicts





Conflict Node FlexTable: Conflict Table (MODLRD01 -- Default.sue)

	ID	Label	Conflictee (Feature A)	Conflicter (Feature B)	Feature Definition (A)	Feature Definition (B)	Quality Level (Feature A)	Quality Level (Feature B)	Current Status	X (ft)	Y (ft)	Station (Start) (ft)	Station (Stop) (ft)	Recommended Resolution	Other Resolution Description	Requires Test Hole?	Responsible Party	Notes
151: Conflict No	151	Conflict Node-142	BT (B)1	P-200	Existing Telephone Line, ...	Circular-Concrete	Undetermined	Undetermined	Created	544,108.03	701,683.08	0+00	0+00	Relocation Before Construction		☐		

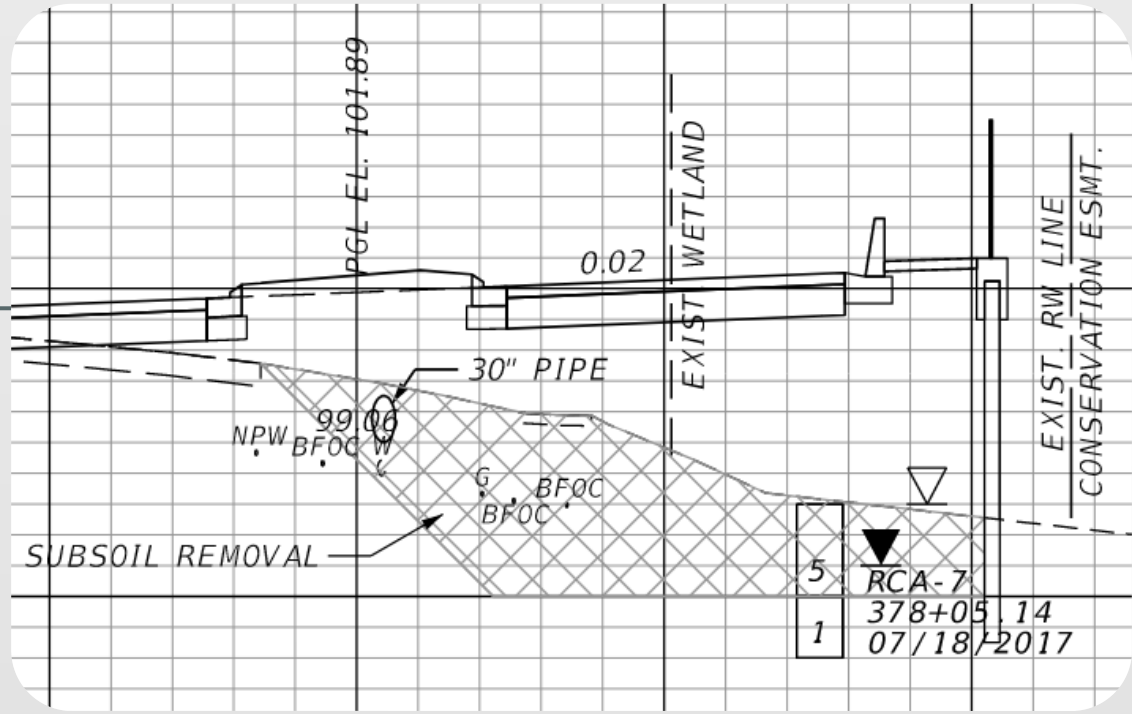
Subsoil Removal

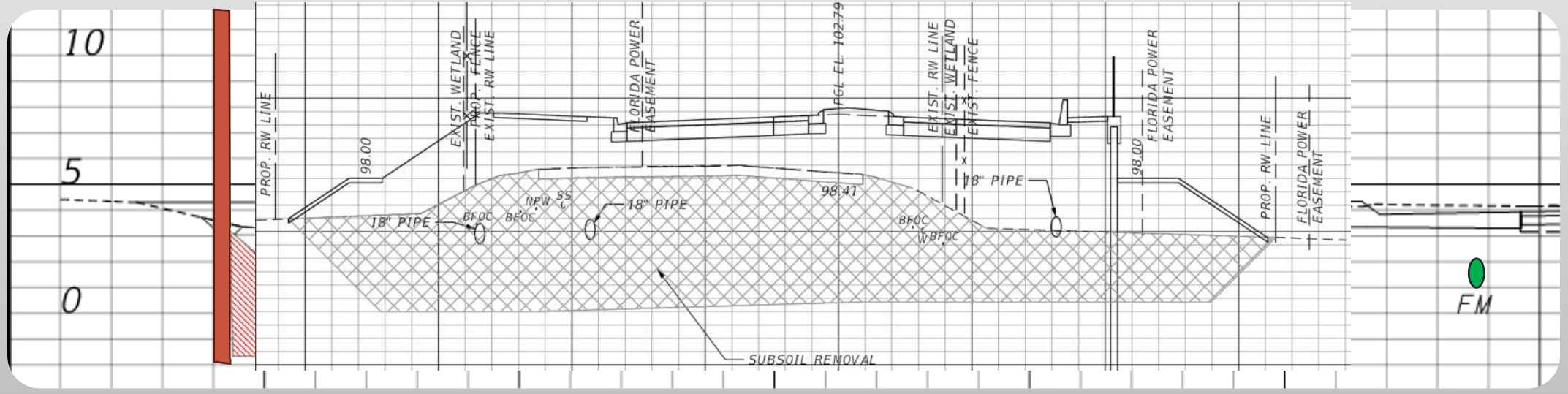
Need to evaluate areas of subsoil for utility impacts

Will the removal expose utilities or poles?

Need to evaluate if you are removing muck (typically deeper) verses a clay envelope (typically shallower) and how much excavation may be needed to get under neath of the muck – might need over excavation

Need to leave room for the UAOs within the r/w





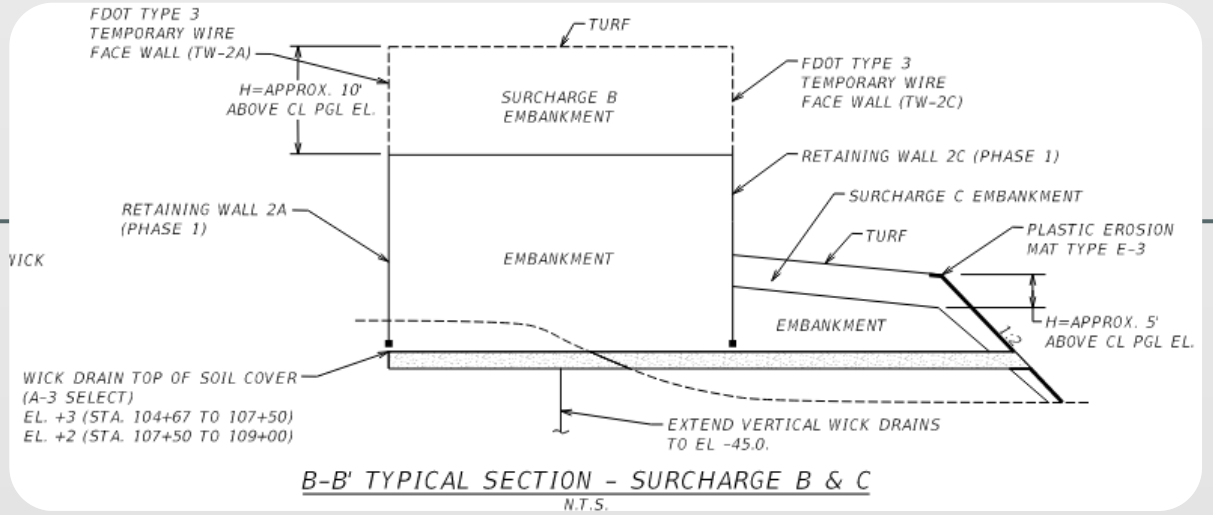
Surcharge

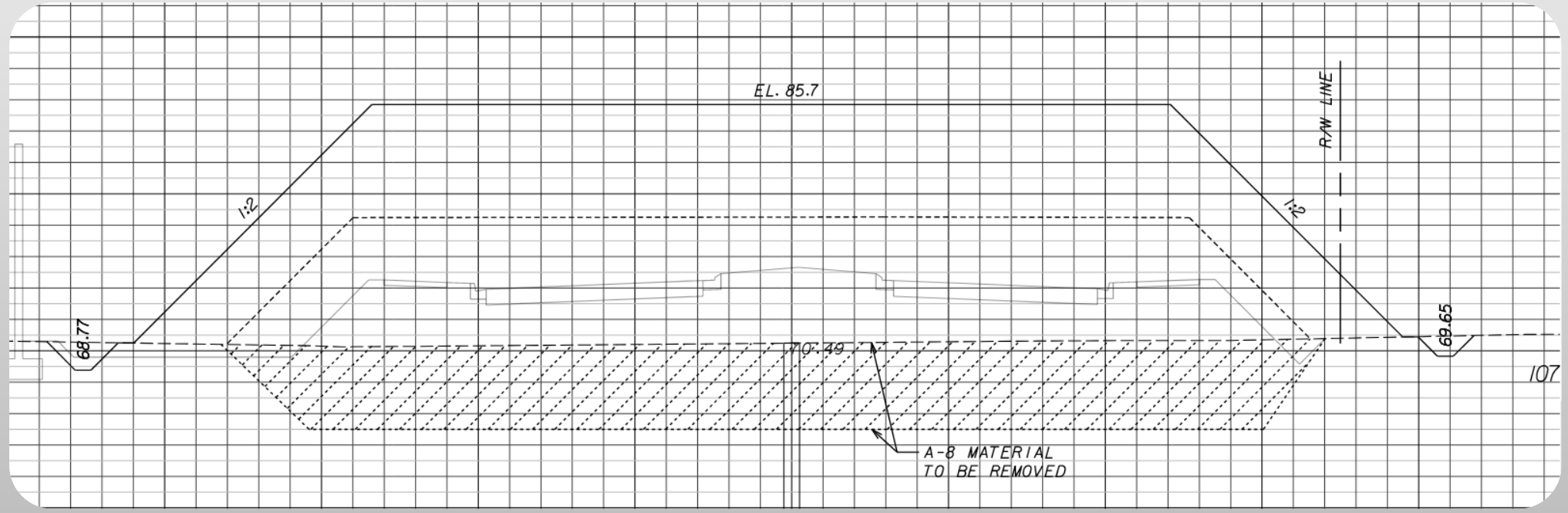
Need to review surcharge limits for utility conflicts

Pressurized mains need to be reviewed for impacts from differential settlement

You can have both subsoil removal and surcharge

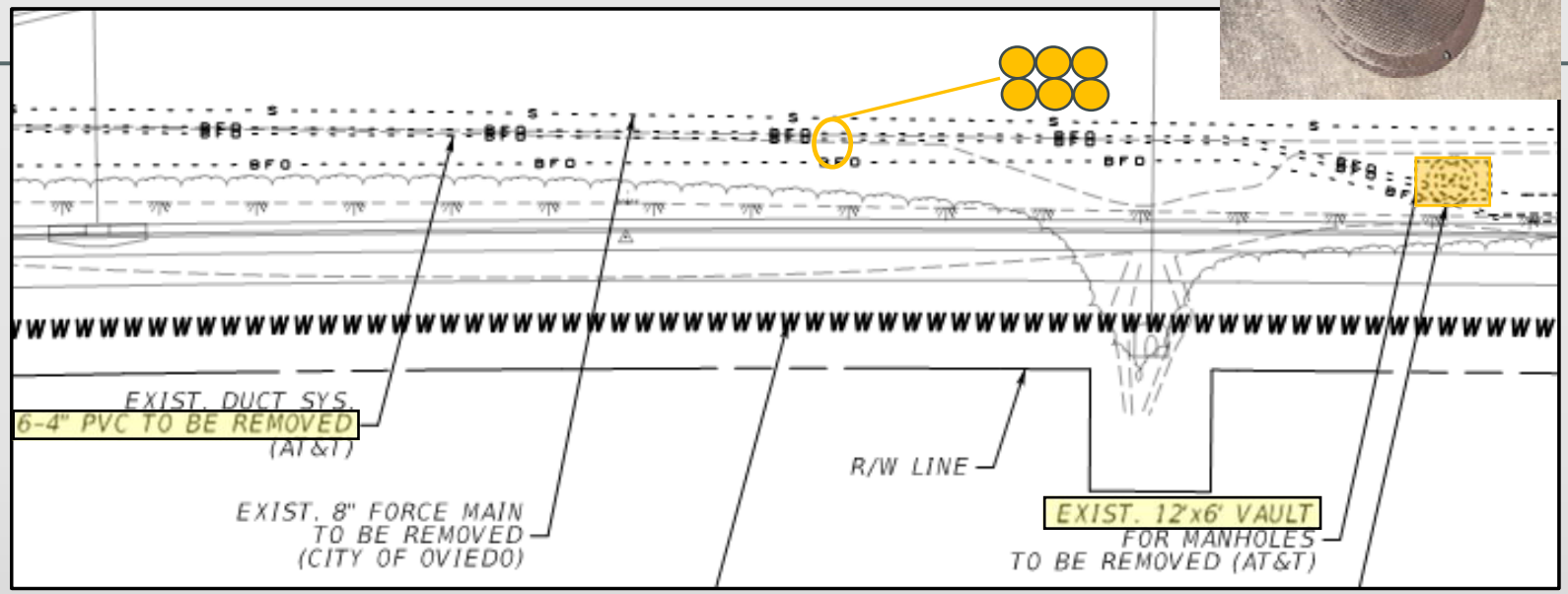
Goal is to eliminate the organics and stabilize the earth.





Manhole and Duct Systems

- What you see on survey and above ground is not indicative of what is below ground
- Manhole / Vault Sizes
- Large conduit runs (i.e. 9-way duct bank)
- Concrete Encasement



Concrete encased duct bank supported for pipe installation

Critical Utilities

Major utilities

- Natural Gas Lines
  - FGT: 90 days with 90% Plans
  - FGT: 25 ft working space
- Transmission Electric Lines
  - Typically requires 25-50 ft of offset from poles and guy wires
- Duct Banks
- Gravity Sewers (Vitrified Clay Pipe – VCP)
- Asbestos Cement
  - Water Main, Gravity Sewer, Duct Bank Encasement, Etc.

Standard Depths of Cover

- 3 feet for Water, Reclaimed Water, Sewer Force Main, and Gas

Utility Relocation Constraints

Right of Way Constraints

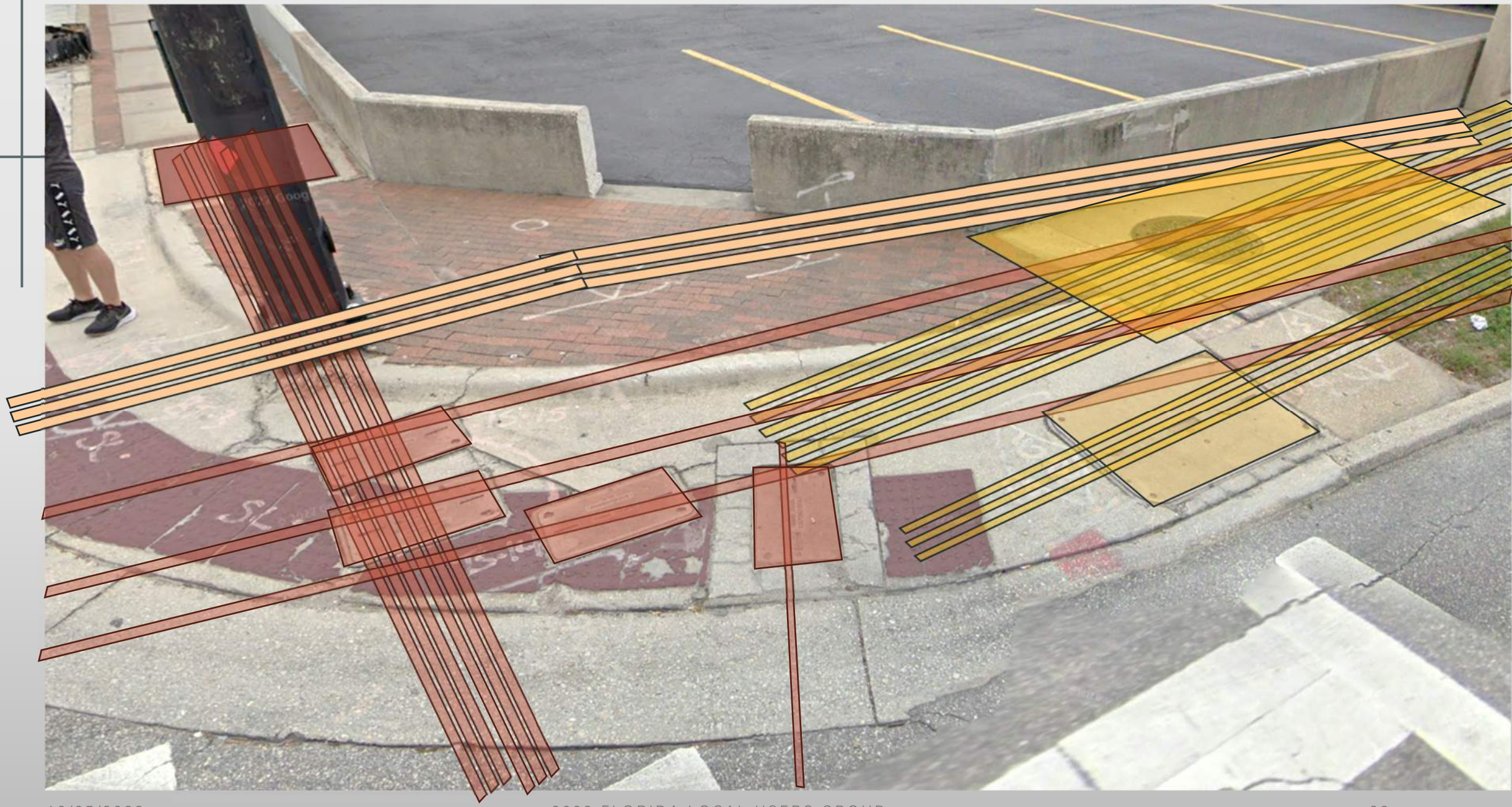
There are locations where the UAOs have limited areas where they can relocate their facilities.

Urban Corridors present challenges for relocations due to limited space outside roadway, as well as limited space in the road as well.

New Mast Arms present challenges for the UAOs to find a clear path to relocate

New curb ramps and temporary pedestrian TCP will impact the pull boxes, pull boxes and valve covers – need to look at curb lines, transitions and landings

Shared Use Paths within tight right-of-way corridors need to leave room for utilities to remain



Right of Way Constraints

There are locations where the UAOs have limited areas where they can relocate their facilities.

Tight right of way for overhead pole conflicts with clear zone

3R criteria vs New Construction Criteria – crash history effects when poles have to relocate when not meeting clear zone vs projects where new construction criteria

Keyhole additions at turn lanes present problems if poles at back of right-of-way already

ADA Criteria

The FDOT has criteria on how sidewalks, crosswalks, pedestrian button locations, curb ramps and detectable warning surfaces must be constructed.

To the right is an excerpt from the 2022 ADA Pocket Field Guide

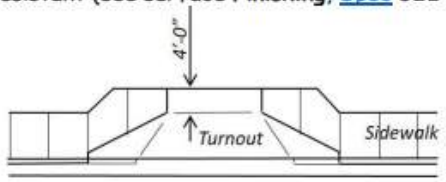
The US Access Board released new criteria on 9/7/2023.

Look for constraints to a utility like manholes and valves that can not break over

Sidewalks

Standard sidewalk width varies, with the minimum width for new construction of **5'-0"** in C1 & C2 context classification. For RRR projects, unaltered sidewalk width ≥ **4'-0"** may be retained within any context classification. (See FDM Table 222.2.1)

Walkarounds at driveways must be ≥ **4'-0"** wide (Index 522-003). In all cases, walking surface cross slope cannot exceed **2.0%**. Sidewalk surfaces must be firm, stable, & slip-resistant (see surface **Finishing**, Spec 522-7).

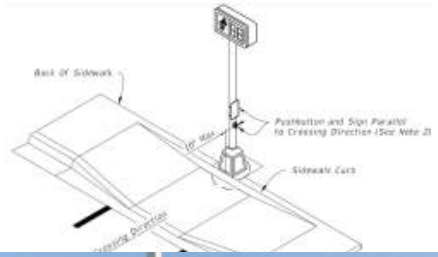


Street Crossings

Curb ramps must be wholly contained within crosswalk markings. Crossings must meet the same grade and cross slope criteria as sidewalks (FDM 222.2.2). Consider providing a **2'**-long level space at the counterslope if change in slope from a curb ramp to the street surface exceeds **11.3%** (see below)

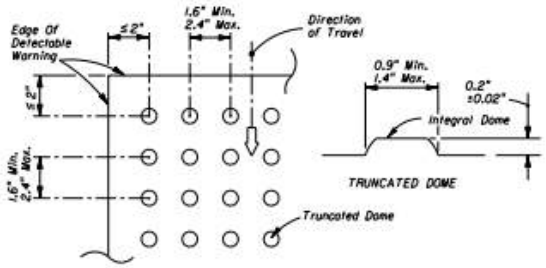
Pedestrian Pushbuttons

Accessibility of ped buttons is determined by (1) button height and horizontal side reach; (2) level maneuvering clear space; and, (3) button & sign orientation. The ped button must be no more than **42"** above the walking surface with a horizontal reach distance ≤ **10"** from the edge of the clear area (Index 665-001). A level, clear area (with long dimension centered on the ped button) must have footprint dimensions ≥ **30"x48"** with surface slopes ≤ **2.0%** in all directions (FDM 222.2.2). Button orientation shall be as shown in the Figure below and as described in Note 2. For Note 3, pushbutton and sign placement must not reduce the clear space of the landing.



Curb Ramps & Detectable Warnings

Curb ramp running slope must not exceed **1:12 (8.3%)** and cross slope must not exceed **2.0%** (Index 522-002). A level landing must be located at the top that is at least **4'** deep and at least as wide as the curb ramp. Curb ramps are to be the same width as the sidewalk, where practicable (FDM 222.2.2). All sidewalk curb ramps must have detectable warnings, of contrasting color (e.g., red, black, or yellow per Spec 527), that are placed within **5'** of back of curb and extend the full width of the walking surface (Index 522-002). "Truncated domes" are the only acceptable detectable warning pattern, as shown below (see FDOT's APL).



DETECTABLE WARNINGS

LUNCH BREAK
12:00 - 1:30 pm

SEE YOU BACK HERE AFTER LUNCH
FOR CONSTRUCTABILITY CONCERNS

Constructability, Best Practices, & Lessons Learned in Construction

Things to think about

Constructability

- Is what on the Plans Constructable
- Is what on the RGB's Constructable
- Is what on the UWS's Constructable
- Is what on the TCP's Constructable

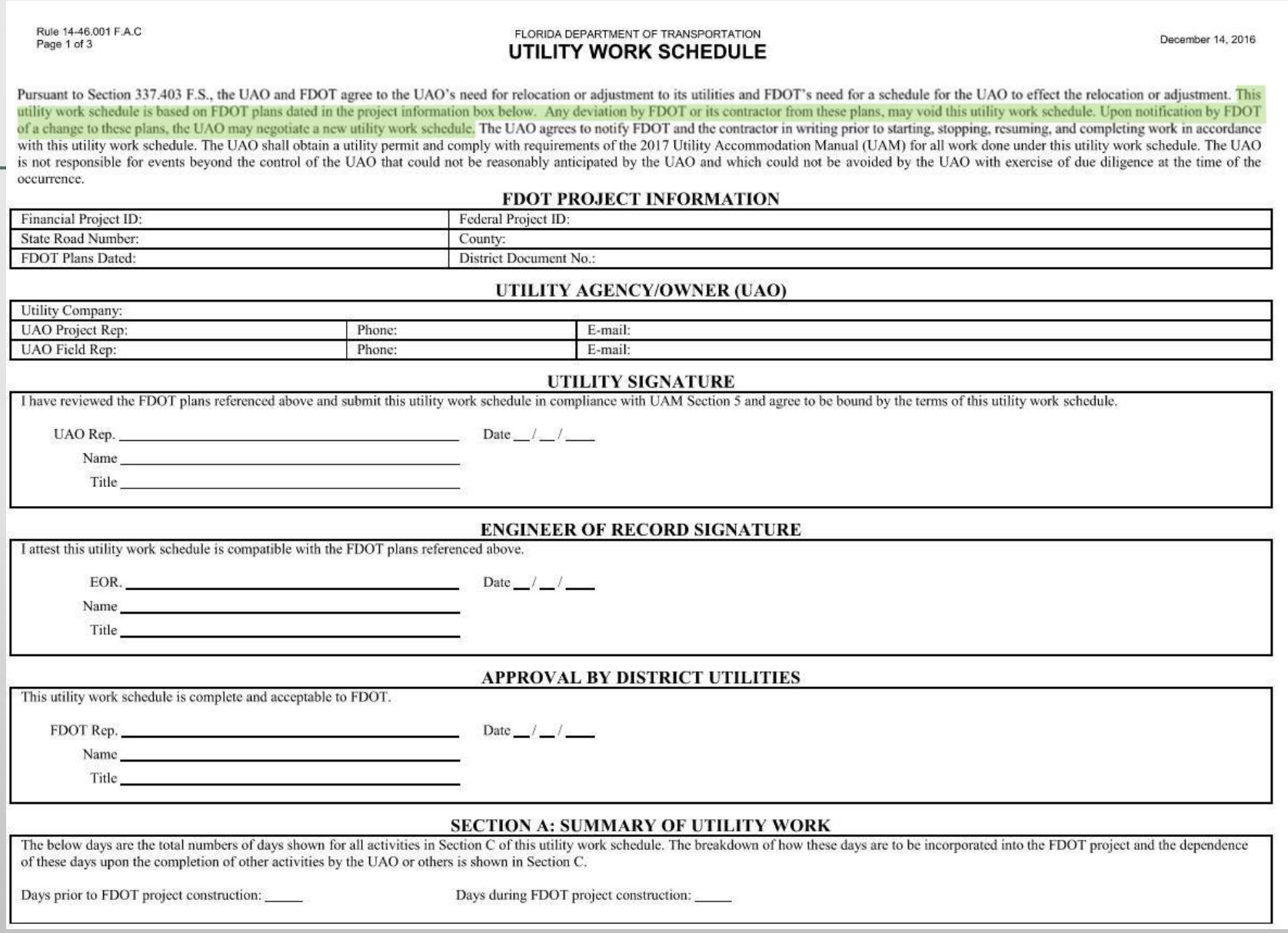
UWS Language

Green Excerpt from the right:

This utility work schedule is based on FDOT plans dated in the project information box below.

Any deviation by FDOT or its contractor from these plans, may void this utility work schedule.

Upon notification by FDOT of a change to these plans, the UAO may negotiate a new utility work schedule.



Rule 14-46.001 F.A.C
Page 1 of 3

FLORIDA DEPARTMENT OF TRANSPORTATION

UTILITY WORK SCHEDULE

December 14, 2016

Pursuant to Section 337.403 F.S., the UAO and FDOT agree to the UAO's need for relocation or adjustment to its utilities and FDOT's need for a schedule for the UAO to effect the relocation or adjustment. This utility work schedule is based on FDOT plans dated in the project information box below. Any deviation by FDOT or its contractor from these plans, may void this utility work schedule. Upon notification by FDOT of a change to these plans, the UAO may negotiate a new utility work schedule. The UAO agrees to notify FDOT and the contractor in writing prior to starting, stopping, resuming, and completing work in accordance with this utility work schedule. The UAO shall obtain a utility permit and comply with requirements of the 2017 Utility Accommodation Manual (UAM) for all work done under this utility work schedule. The UAO is not responsible for events beyond the control of the UAO that could not be reasonably anticipated by the UAO and which could not be avoided by the UAO with exercise of due diligence at the time of the occurrence.

FDOT PROJECT INFORMATION

Financial Project ID:	Federal Project ID:
State Road Number:	County:
FDOT Plans Dated:	District Document No.:

UTILITY AGENCY/OWNER (UAO)

Utility Company:		
UAO Project Rep:	Phone:	E-mail:
UAO Field Rep:	Phone:	E-mail:

UTILITY SIGNATURE

I have reviewed the FDOT plans referenced above and submit this utility work schedule in compliance with UAM Section 5 and agree to be bound by the terms of this utility work schedule.

UAO Rep. _____ Date __/__/____
Name _____
Title _____

ENGINEER OF RECORD SIGNATURE

I attest this utility work schedule is compatible with the FDOT plans referenced above.

EOR. _____ Date __/__/____
Name _____
Title _____

APPROVAL BY DISTRICT UTILITIES

This utility work schedule is complete and acceptable to FDOT.

FDOT Rep. _____ Date __/__/____
Name _____
Title _____

SECTION A: SUMMARY OF UTILITY WORK

The below days are the total numbers of days shown for all activities in Section C of this utility work schedule. The breakdown of how these days are to be incorporated into the FDOT project and the dependence of these days upon the completion of other activities by the UAO or others is shown in Section C.

Days prior to FDOT project construction: _____ Days during FDOT project construction: _____

How MOT Phasing Effects Constructability

- Can you perform the work in the proper TCP Phasing
- The majority of work on most projects falls under Phase 1
- Can the work actually be pinpointed to separate phasing
- Does it matter what phasing your work is in

Things to Ponder on

- ❑ Make sure the Plans make sense
- ❑ Do the RGB's address the issues
- ❑ The UWS should address all the issues
- ❑ Is work proposed constructible with the TCP's
- ❑ Can the work be completed in different phases
- ❑ The benefits of using multiple TCP Phasing

Constructability Topics of Discussion

- Mast Arm Foundations
- Steel Strain Pole Foundations
- Drainage Structure Installations
- Drainage Pipe Installations

Types of Installation that Misc. Drilled Shaft Foundations are used

Mast Arm Installations

Steel Strain Pole Installations

2. Proposed Equipment List:

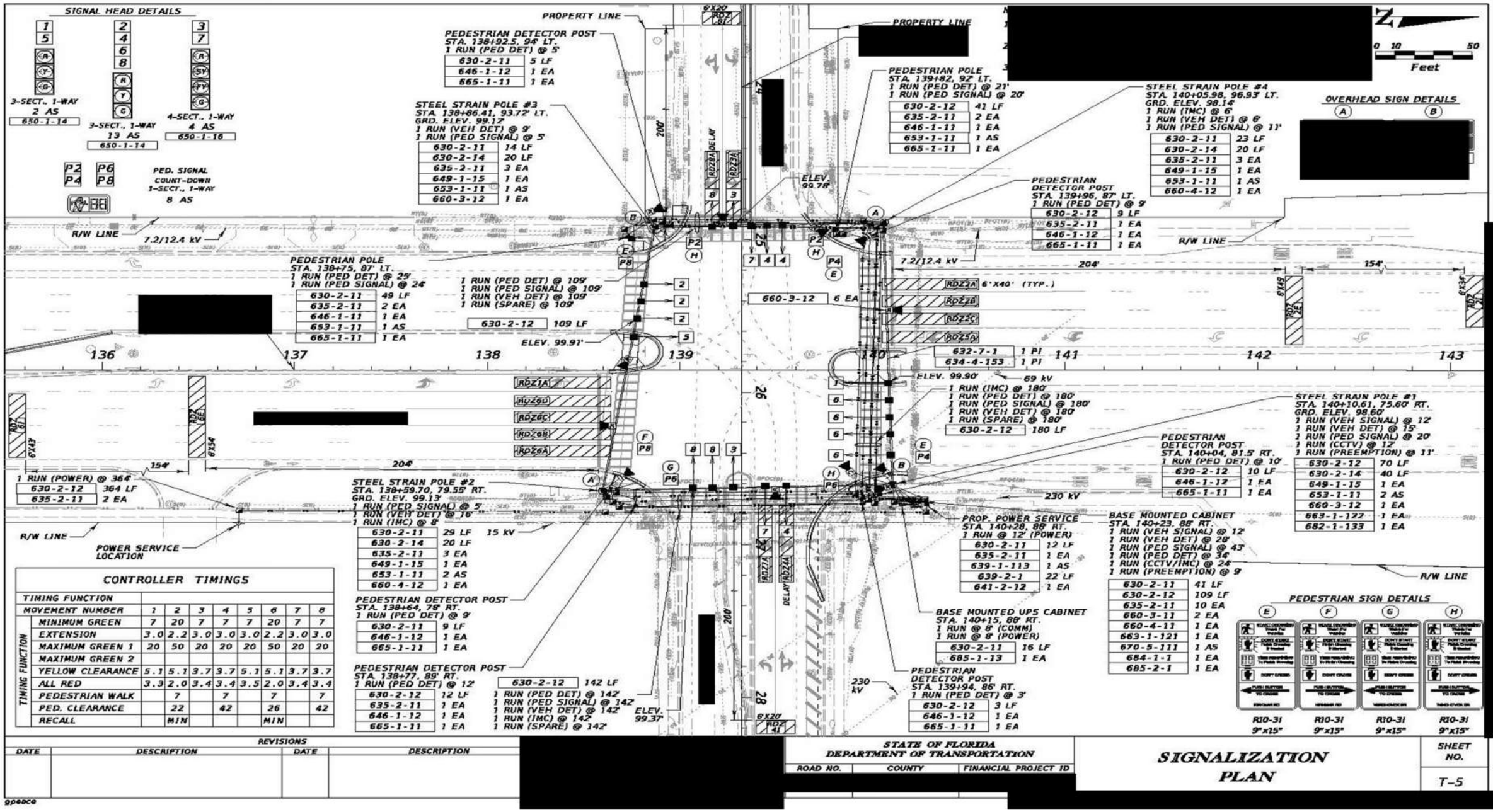
Watson 1000 Drill Rig: Torque – Excess 40,000 ft-lbs. / Maximum Depth – 35 feet
Watson 1100 Drill Rig: Torque – Excess 40,600 ft-lbs. / Maximum Depth – 50 feet – working height 29'10"
Watson 2000 Drill Rig: Torque – Excess 54,000 ft-lbs. / Maximum Depth – 60 feet
Watson 3000 Drill Rig: Torque – Excess 105,000 ft-lbs. / Maximum Depth – 48 feet – working height 35'
Watson 3000 Drill Rig: Torque – Excess 105,000 ft-lbs. / Maximum Depth – 100 feet – working height 50'
Bayshore Lodrill DH18-36: Torque – Excess 18,000 ft-lbs. / Maximum Depth – 36 feet – working height 13'
Boom Truck: 20 ton or larger with 3500-gal water storage tank
CAT Backhoe 416/420 and/or a John Deer 310G
F-450 and/or F-350 crew truck with 24,000 lbs. GVW support trailer
Tremie Pipe, 12-inch diameter, sectioned
Slurry mixing system to include mud gun, mixing tank, circulation pumps, and a de-sander
A 4,900-gal water truck will be used if required
Jack-mounted Surface Form: ***60" & 66" diameter***
Split Steel Form: ***60" & 66" diameter***
Auger Bit: ***60" & 66" diameter***
Bailing Bucket: ***48" - 60" diameter***
Temporary surface casing **Per Specification 455-15.1.3:** ***66" or 72" x 6' minimum for 60" and 72" or 78" x 6' minimum for 66"*** shaft, 3/8-inch wall thickness.

3. Shaft Construction Operations:

A qualified survey crew will mark the location of the purposed shaft foundation and determine the top elevation of the shaft. All underground and overhead utilities will be located to ensure they are not in conflict with drilling operations. The first 4 feet of the shaft will be hand dug to verify no underground utility conflict with the shaft location. A temporary surface casing will be placed a minimum of 5 foot below ground surface and 1 foot above ground surface **Per Specifications 455-15.1.3,** with alignment and elevation verified. An auger bit will be used to drill down to the shaft tip per the Plans. A polymer or mineral slurry will be used to stabilize the shaft during and after the drilling operation. A bailing bucket and a de-sander (if required) will be used to remove all sediment to provide a clean bottom. A steel rebar cage will be placed, and concrete poured to the top of the shaft elevation. *Please see sections 4, 5, 6, 7, & 8 for additional drilled shaft construction sequence of operation not mentioned in this section.*

4. Shaft Excavation Methods:

Once the foundation location is established, the initial 4' feet will be hand dug 4 feet, as required, to clear any utilities in the area. A temporary surface casing will be placed per FDOT specifications with alignment and elevation verified. After checking for overhead utilities or obstructions, the drill rig will be aligned and level adjacent to the hole. The drill rig mast with an auger attached will be positioned over the excavation point and checked for plumb and alignment. The auger will then be advanced into the shaft. Once the auger is loaded with soil, it will be raised, and the rig rotated to clear the temporary casing. The auger will then be spun backwards to unload the soil. The soils will be deposited approx. 5 ft. away from the excavation to minimize excess overburden pressure at the top of the hole. A weighted tape measure will be used routinely to check the depth of the shaft as drilling progresses. This operation will be repeated until the excavation is at Plan depth. An official drilled shaft log will be kept by the qualified inspector provided by the Prime Contractor unless otherwise specified in contract documents. The Prime Contractor will be notified within 48 hours prior to the start of drilling operations.


SIGNAL HEAD DETAILS
3-SECT., 1-WAY
2 AS
650-1-14
3-SECT., 1-WAY
13 AS
650-1-14
4-SECT., 1-WAY
4 AS
650-1-16
PED. SIGNAL COUNT-DOWN
1-SECT., 1-WAY
8 AS
PROPERTY LINE
PEDESTRIAN DETECTOR POST
STA. 138+92.5, 94' LT.
1 RUN (PED DET) @ 5'
630-2-11 5 LF
646-1-12 1 EA
665-1-11 1 EA
STEEL STRAIN POLE #3
STA. 138+86.41, 93.72' LT.
GRD. ELEV. 99.12'
1 RUN (VEH DET) @ 9'
1 RUN (PED SIGNAL) @ 5'
630-2-11 14 LF
630-2-14 20 LF
635-2-11 3 EA
649-1-15 1 EA
653-1-11 1 AS
660-3-12 1 EA
PEDESTRIAN POLE
STA. 139+82, 92' LT.
1 RUN (PED DET) @ 21'
1 RUN (PED SIGNAL) @ 20'
630-2-12 41 LF
635-2-11 2 EA
646-1-11 1 EA
653-1-11 1 AS
665-1-11 1 EA
STEEL STRAIN POLE #4
STA. 140+05.98, 96.93' LT.
GRD. ELEV. 98.14'
1 RUN (IMC) @ 6'
1 RUN (VEH DET) @ 6'
1 RUN (PED SIGNAL) @ 11'
630-2-11 23 LF
630-2-14 20 LF
635-2-11 3 EA
649-1-15 1 EA
653-1-11 1 AS
660-4-12 1 EA
OVERHEAD SIGN DETAILS
PEDESTRIAN DETECTOR POST
STA. 139+96, 87' LT.
1 RUN (PED DET) @ 9'
630-2-12 9 LF
635-2-11 1 EA
646-1-12 1 EA
665-1-11 1 EA
ELEV. 99.78'
R/W LINE
7.2/12.4 kV
PEDESTRIAN POLE
STA. 138+75, 87' LT.
1 RUN (PED DET) @ 25'
1 RUN (PED SIGNAL) @ 24'
630-2-11 49 LF
635-2-11 2 EA
646-1-11 1 EA
653-1-11 1 AS
665-1-11 1 EA
1 RUN (PED DET) @ 109'
1 RUN (PED SIGNAL) @ 109'
1 RUN (VEH DET) @ 109'
1 RUN (SPARE) @ 109'
630-2-12 109 LF
660-3-12 6 EA
ELEV. 99.91'
RDZ2A 6'X40' (TYP.)
RDZ2B
RDZ2C
RDZ5A
632-7-1 1 PI
634-4-153 1 PI
136
137
138
139
140
141
142
143
RDZ1A
RDZ5D
RDZ2C
RDZ6B
RDZ6A
1 RUN (POWER) @ 364'
630-2-12 364 LF
635-2-11 2 EA
154'
204'
ELEV. 99.90'
69 kV
1 RUN (IMC) @ 180'
1 RUN (PED DET) @ 180'
1 RUN (PED SIGNAL) @ 180'
1 RUN (VEH DET) @ 180'
1 RUN (SPARE) @ 180'
630-2-12 180 LF
STEEL STRAIN POLE #1
STA. 140+10.61, 75.60' RT.
GRD. ELEV. 98.60'
1 RUN (VEH SIGNAL) @ 12'
1 RUN (VEH DET) @ 15'
1 RUN (PED SIGNAL) @ 20'
1 RUN (CCTV) @ 12'
1 RUN (PREEMPTION) @ 11'
630-2-12 70 LF
630-2-14 40 LF
649-1-15 1 EA
653-1-11 2 AS
660-3-12 1 EA
663-1-122 1 EA
682-1-133 1 EA
PEDESTRIAN DETECTOR POST
STA. 140+04, 81.5' RT.
1 RUN (PED DET) @ 10'
630-2-12 10 LF
646-1-12 1 EA
665-1-11 1 EA
230 kV
STEEL STRAIN POLE #2
STA. 139+59.70, 79.55' RT.
GRD. ELEV. 99.13'
1 RUN (PED SIGNAL) @ 5'
1 RUN (VEH DET) @ 16'
1 RUN (IMC) @ 8'
630-2-11 29 LF
630-2-14 20 LF
635-2-11 3 EA
649-1-15 1 EA
653-1-11 2 AS
660-4-12 1 EA
15 kV
PROP. POWER SERVICE
STA. 140+28, 88' RT.
1 RUN @ 12' (POWER)
630-2-11 12 LF
635-2-11 1 EA
639-1-113 1 AS
639-2-1 22 LF
641-2-12 1 EA
BASE MOUNTED CABINET
STA. 140+23, 88' RT.
1 RUN (VEH SIGNAL) @ 12'
1 RUN (VEH DET) @ 28'
1 RUN (PED SIGNAL) @ 43'
1 RUN (PED DET) @ 34'
1 RUN (CCTV/IMC) @ 24'
1 RUN (PREEMPTION) @ 9'
630-2-11 41 LF
630-2-12 109 LF
635-2-11 10 EA
660-3-11 2 EA
660-4-11 1 EA
663-1-121 1 EA
670-5-111 1 AS
684-1-1 1 EA
685-2-1 1 EA
R/W LINE
POWER SERVICE LOCATION
PEDESTRIAN DETECTOR POST
STA. 138+64, 78' RT.
1 RUN (PED DET) @ 9'
630-2-11 9 LF
646-1-12 1 EA
665-1-11 1 EA
BASE MOUNTED UPS CABINET
STA. 140+15, 88' RT.
1 RUN @ 8' (COMM)
1 RUN @ 8' (POWER)
630-2-11 16 LF
685-1-13 1 EA
PEDESTRIAN DETECTOR POST
STA. 138+77, 89' RT.
1 RUN (PED DET) @ 12'
630-2-12 12 LF
635-2-11 1 EA
646-1-12 1 EA
665-1-11 1 EA
630-2-12 142 LF
1 RUN (PED DET) @ 142'
1 RUN (PED SIGNAL) @ 142'
1 RUN (VEH DET) @ 142'
1 RUN (IMC) @ 142'
1 RUN (SPARE) @ 142'
ELEV. 99.37'
230 kV
PEDESTRIAN DETECTOR POST
STA. 139+94, 86' RT.
1 RUN (PED DET) @ 3'
630-2-12 3 LF
646-1-12 1 EA
665-1-11 1 EA
CONTROLLER TIMINGS
TIMING FUNCTION
MOVEMENT NUMBER 1 2 3 4 5 6 7 8
MINIMUM GREEN 7 20 7 7 7 20 7 7
EXTENSION 3.0 2.2 3.0 3.0 3.0 2.2 3.0 3.0
MAXIMUM GREEN 1 20 50 20 20 20 50 20 20
MAXIMUM GREEN 2
YELLOW CLEARANCE 5.1 5.1 3.7 3.7 5.1 5.1 3.7 3.7
ALL RED 3.3 2.0 3.4 3.4 3.5 2.0 3.4 3.4
PEDESTRIAN WALK 7 7
PED. CLEARANCE 22 42 26 42
RECALL MIN MIN
PEDESTRIAN SIGN DETAILS
R10-3I 9"x15"
R10-3I 9"x15"
R10-3I 9"x15"
R10-3I 9"x15"
REVISIONS
DATE
DESCRIPTION
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ROAD NO.
COUNTY
FINANCIAL PROJECT ID
SIGNALIZATION PLAN
SHEET NO.
T-5

NOTES:

1. Work with Index 634-001 for grounding and span wire details. See the Plans for clamp spacing, cable sizes and forces, signals and sign mounting locations and details.

2. Shop Drawings:

   This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

3. Materials:

   A. Strain Pole and Backing Rings:
      a. Less than 3/16": ASTM A1011 Grade 50, 55, 60 or 65
      b. Greater than or equal to 3/16": ASTM A572 Grade 50, 55, 60 or 65
      c. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   B. Steel Plates: ASTM A36
   C. Weld Metal: E70XX
   D. Bolts, Nuts and Washers:
      a. High Strength Bolts: ASTM F3125, Grade A325, Type 1
      b. Nuts: ASTM A563 Grade DH Heavy-Hex
      c. Washers: ASTM F436 Type 1, one under turned element
   E. Anchor Bolts, Nuts and Washers:
      a. Anchor Bolts: ASTM F1554 Grade 55
      b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
      c. Plate Washers: ASTM A36 (2 per bolt). Split-lock washers and self-locking nuts are not permitted
   F. Handhole Frame: ASTM A709 or ASTM A36, Grade 36
   G. Handhole Cover: ASTM A1011 Grade 50, 55, 60 or 65
   H. Aluminum Pole Caps and Nut Covers: ASTM B26 (319-F)
   I. Stainless Steel Screws: AISI Type 316
   J. Threaded Bars/Studs: ASTM A36 or ASTM A307
   K. Concrete: Class IV (Drilled Shaft) for all environmental classifications.
   L. Reinforcing Steel: Specification 415

4. Fabrication:

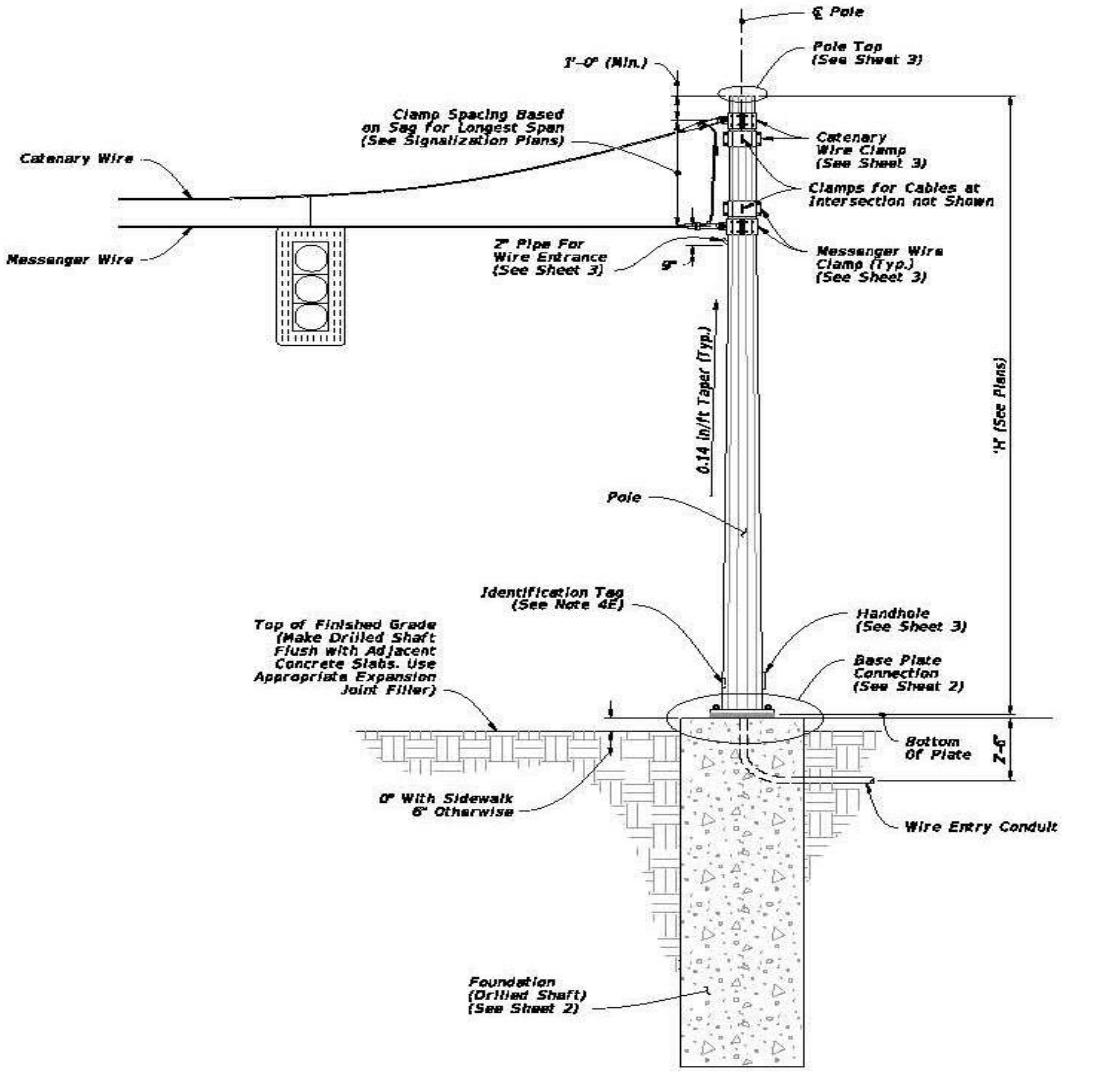
   A. Pole Taper: Change diameter at a rate of 0.14 inches per foot, round or 12-sided (Min.)
   B. Upright splices are not permitted. Transverse welds are only permitted at the base.
   C. Provide bolt hole diameters as follows:
      a. Bolts (except Anchor Bolts): Bolt diameter plus 1/16", prior to galvanizing.
      b. Anchor Bolts: Bolt diameter plus 1/2", maximum.
   D. Locate handhole 180° from 2" wire entrance pipe.
   E. Identification Tag: (Submit details for approval.)
      a. 2"x 4" (Max.) aluminum identification tag.
      b. Locate on the inside of the pole and visible from the handhole.
      c. Secure to pole with 1/8" diameter stainless steel rivets or screws.
      d. Include the following information on the ID Tag:
         1. Financial Project ID
         2. Pole Type
         3. Pole height
         4. Manufacturers' Name
         5. Fy of Steel
         6. Base Wall Thickness
   F. Provide a 'J' or 'C' hook at the top of the pole for signal wiring support (See Sheet 3).
   G. Perform all welding in accordance with Specification 460-6.4.
   H. Fabricate longitudinal seam welds in pole with 60 percent minimum penetration or fusion welds except, within 6" of the base plate connection use full-penetration groove welds.
   I. Hot Dip Galvanize after fabrication.

5. Coatings:

   A. All Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329
   B. All other steel items including plate washers: ASTM A123

6. Construction:

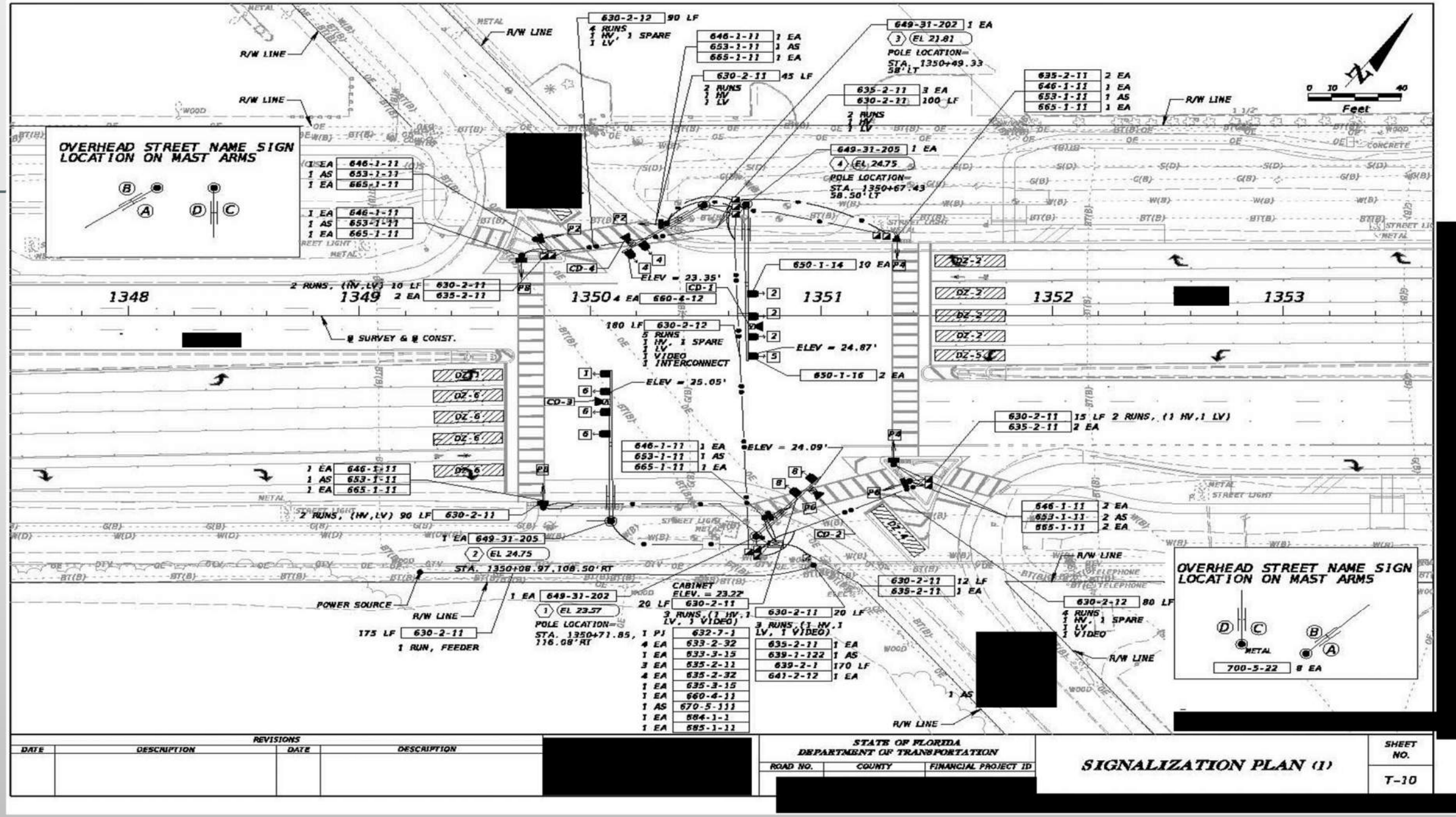
   A. Foundation: Specification 455, except that payment is included in the cost of the strain pole.
   B. After installation, place wire screen between top of foundation and bottom of base plate in accordance with Specification 649-6.



STRAIN POLE ASSEMBLY

ELEVATION AND NOTES

LAST REVISION	REVISION	DESCRIPTION:	FDOT FY 2022-23 STANDARD PLANS	STEEL STRAIN POLE	INDEX	SHEET
11/01/19					649-010	1 of 3


OVERHEAD STREET NAME SIGN LOCATION ON MAST ARMS
OVERHEAD STREET NAME SIGN LOCATION ON MAST ARMS
630-2-12 90 LF
4 RUNS 1 HV, 1 SPARE 1 LV
646-1-11 1 EA
653-1-11 1 AS
665-1-11 1 EA
630-2-11 45 LF
2 RUNS 1 HV 1 LV
649-31-202 1 EA
3 EL 21.81
POLE LOCATION= STA. 1350+49.33 58' LT
635-2-11 3 EA
630-2-11 100 LF
2 RUNS 1 HV 1 LV
649-31-205 1 EA
4 EL 24.75
POLE LOCATION= STA. 1350+67.43 58.50' LT
650-1-14 10 EA
650-1-16 2 EA
ELEV = 23.35'
ELEV = 24.87'
ELEV = 25.05'
ELEV = 24.09'
180 LF 630-2-12
5 RUNS 1 HV, 1 SPARE 1 LV 1 VIDEO 1 INTERCONNECT
2 RUNS, (HV,LV) 10 LF 630-2-11
635-2-11 2 EA
2 RUNS, (HV,LV) 90 LF 630-2-11
649-31-205 1 EA
2 EL 24.75
STA. 1350+08.97, 108.50' RT
649-31-202 1 EA
1 EL 23.57
POLE LOCATION= STA. 1350+71.85, 116.08' RT
175 LF 630-2-11
1 RUN, FEEDER
POWER SOURCE
CABINET ELEV. = 23.27'
20 LF 630-2-11
3 RUNS (1 HV, 1 LV, 1 VIDEO)
630-2-11 20 LF
3 RUNS (1 HV, 1 LV, 1 VIDEO)
635-2-11 1 EA
639-1-122 1 AS
639-2-1 170 LF
641-2-12 1 EA
632-7-1 1 PJ
633-2-32 4 EA
633-3-15 1 EA
635-2-11 3 EA
635-2-32 4 EA
635-3-15 1 EA
660-4-11 1 EA
670-5-111 1 AS
684-1-1 1 EA
685-1-12 1 EA
630-2-11 15 LF 2 RUNS, (1 HV,1 LV)
635-2-11 2 EA
630-2-11 12 LF
635-2-11 1 EA
630-2-12 80 LF
4 RUNS 1 HV, 1 SPARE 1 LV 1 VIDEO
700-5-22 8 EA
1348
1349
1350
1351
1352
1353
R/W LINE
@ SURVEY & @ CONST.
CD-1
CD-2
CD-3
CD-4
DZ-2
DZ-4
DZ-5
DZ-6
P2
P4
P6
P8
0 10 40
Feet
REVISIONS
DATE
DESCRIPTION
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ROAD NO.
COUNTY
FINANCIAL PROJECT ID
SIGNALIZATION PLAN (1)
SHEET NO.
T-10

GENERAL NOTES:

1. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

2. Prior to Fabrication: Verify the installed Foundation elevation will result in the required signal elevation and adjust the Pole height as needed.

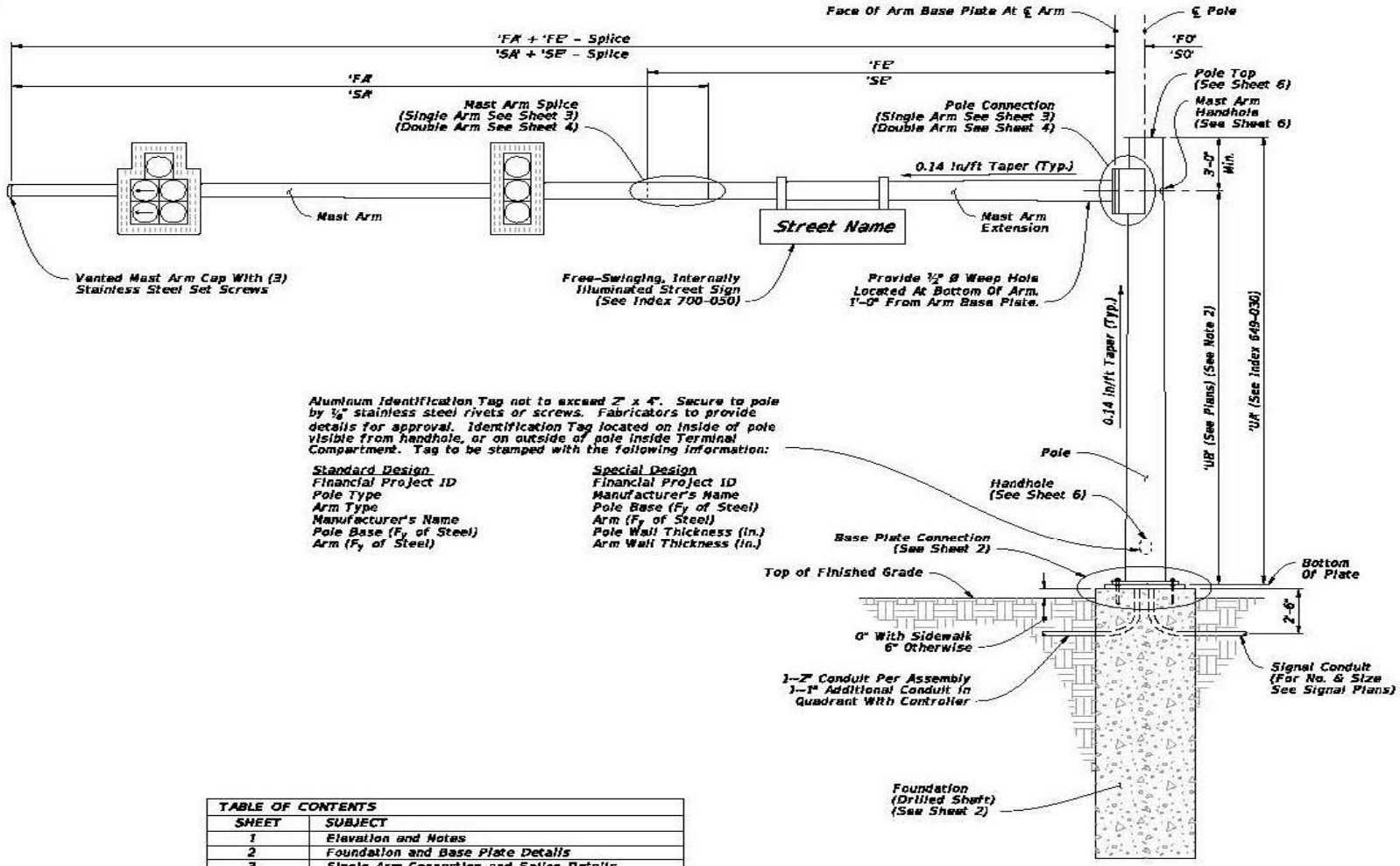
3. Details for Signal and Sign locations, Signal Head attachment, Sign attachment, Pedestrian Head attachment, and Foundation Conduit are not shown for simplicity.

4. Materials:
   - A. Poles, Mast Arms and Backing Rings:
     - a. Less than 3/16": ASTM A1011 Grade 50, 55, 60 or 65
     - b. Greater than or equal to 3/16": ASTM A572 Grade 50, 55, 60 or 65
     - c. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   - B. Steel Plates: ASTM A36
   - C. Weld Metal: E70XX
   - D. Bolts, Nuts and Washers:
     - a. High Strength Hex Head Bolts: ASTM F3125, Grade A325, Type 1
     - b. Nuts: ASTM A563 DH Heavy-Hex
     - c. Washers: ASTM F436 Type 1, one under turned element
   - E. Anchor Bolts, Nuts and Washers:
     - a. Anchor Bolts: ASTM F1554 Grade 55
     - b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
     - c. Plate Washers: ASTM A36 (2 per bolt)
   - F. Threaded Bars/Studs: ASTM A36 or ASTM A307
   - G. Handhole Frame: ASTM A709 or ASTM A36, Grade 36
   - H. Handhole Cover: ASTM A1011 Grade 50, 55, 60 or 65
   - I. Pole Caps and Nut Covers: Fabricate from cast aluminum or galvanized carbon steel.
   - J. Stainless Steel Screws: AISI Type 316
   - K. Concrete: Class IV (Drilled Shaft) for all environmental classifications.
   - L. Reinforcing Steel: Specification 415

5. Fabrication:
   - A. Welding:
     - a. Specification 460-6.4 and
     - b. AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 14.4.4
   - B. Poles and Mast Arms:
     - a. Round or 12-sided (Min.)
     - b. Taper pole diameter at 0.14 inches per foot
     - c. Upright poles must be a single section. For arms and upright poles, circumferential welds and laminated sections are not permitted.
     - d. Arms may be either one or two sections. See Sheet 4 for telescopic splice detail
     - e. Fabricate longitudinal seam welds with 60 percent minimum penetration or fusion welds except:
       1. Use a full-penetration groove weld within 6 inches of the circumferential tube-to-plate connection.
       2. Use full-penetration groove welds on the female end section of telescopic (i.e., slip type) field splices for a minimum length of one and one-half times the inside diameter of the female section plus 6 inches.
     - f. Locate longitudinal seams weld along the:
       1. Lower quadrant of the arms.
       2. Same side of the pole as the arm connections
     - g. Face handhole perpendicular from arm on single arm poles, perpendicular from the first arm of double arms poles facing away from traffic or see special instructions on the Mast Arm Tabulation Sheet.
     - h. Provide a 'J' or 'C' hook at the top of the pole for signal wiring support (See Sheet 6)
     - i. First and Second arm camber angle = 2"
     - j. Bolt holes diameters as follows:
       1. Bolts (except Anchor bolts): Bolt diameter plus 1/16" prior to galvanizing.
       2. Anchor Bolts: Bolt diameter plus 1/2" (Max.).

6. Coatings:
   - A. All Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329
   - B. All other steel items including plate washers ASTM A123

7. Construction:
   - A. Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
   - B. Install Pole vertically.
   - C. Place structural grout pad with drain between top of foundation and bottom of baseplate in accordance with Specification 649-7.
   - D. Attach Sign Panels and Signals centered on the elevation of the Mast Arm.
   - E. Wire Access holes are 1½" or less in diameter.



Aluminum Identification Tag not to exceed 2" x 4". Secure to pole by ⅛" stainless steel rivets or screws. Fabricators to provide details for approval. Identification Tag located on inside of pole visible from handhole, or on outside of pole inside Terminal Compartment. Tag to be stamped with the following information:

Standard Design	Special Design
Financial Project ID	Financial Project ID
Pole Type	Manufacturer's Name
Arm Type	Pole Base (F_y of Steel)
Manufacturer's Name	Arm (F_y of Steel)
Pole Base (F_y of Steel)	Pole Wall Thickness (in.)
Arm (F_y of Steel)	Arm Wall Thickness (in.)

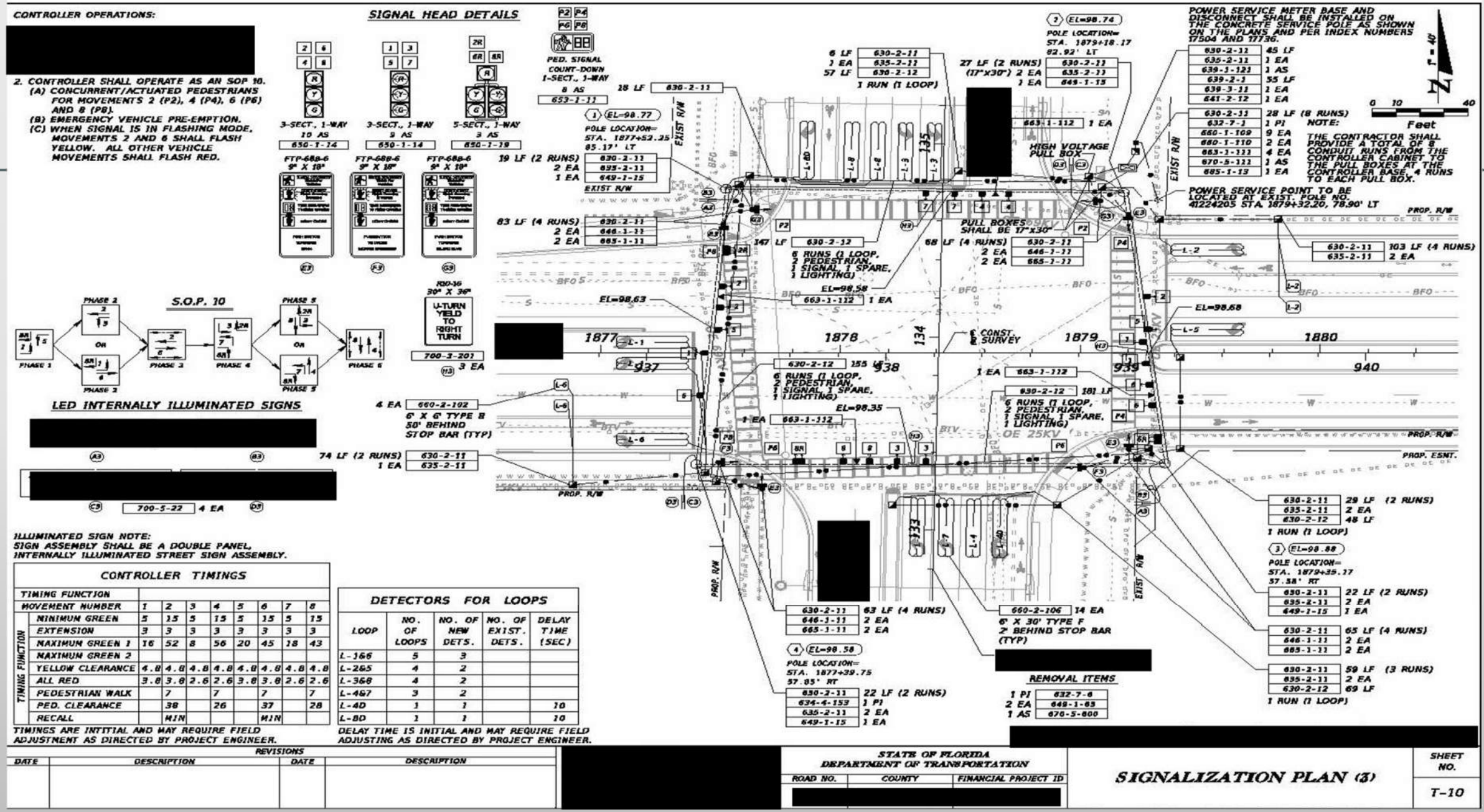
TABLE OF CONTENTS

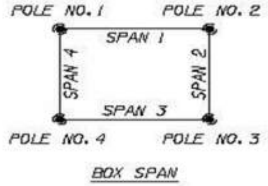
Single Arm Shown, Double Arm Similar (Luminaire Arm Not Shown)

MAST ARM ASSEMBLY

ELEVATION AND NOTES

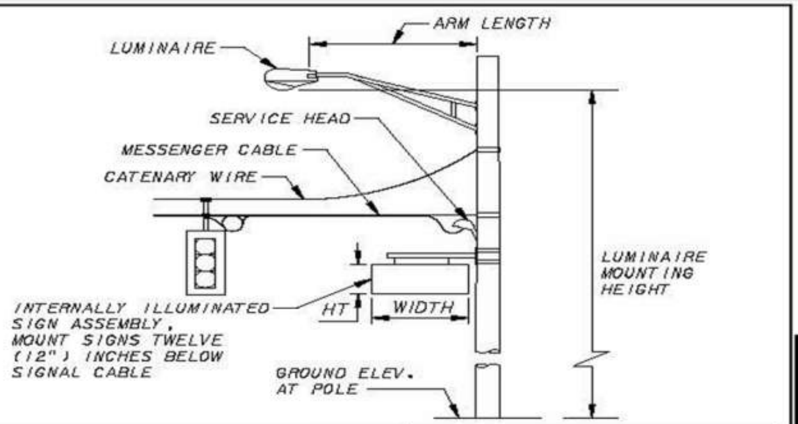
LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2022-23 STANDARD PLANS	MAST ARM ASSEMBLIES	INDEX	SHEET
11/01/21						649-031	1 of 6


CONTROLLER OPERATIONS:
[redacted]
2. CONTROLLER SHALL OPERATE AS AN SOP 10.
(A) CONCURRENT/ACTUATED PEDESTRIANS FOR MOVEMENTS 2 (P2), 4 (P4), 6 (P6) AND 8 (P8).
(B) EMERGENCY VEHICLE PRE-EMPTION.
(C) WHEN SIGNAL IS IN FLASHING MODE, MOVEMENTS 2 AND 6 SHALL FLASH YELLOW. ALL OTHER VEHICLE MOVEMENTS SHALL FLASH RED.
SIGNAL HEAD DETAILS
3-SECT., 1-WAY
10 AS
650-1-14
3-SECT., 1-WAY
9 AS
650-1-14
5-SECT., 1-WAY
3 AS
650-1-19
FTP-688-6
9" X 18"
PED. SIGNAL COUNT-DOWN 1-SECT., 1-WAY
8 AS
653-1-11
S.O.P. 10
PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
PHASE 6
LED INTERNALLY ILLUMINATED SIGNS
[redacted]
700-5-22 4 EA
R10-36
30" X 36"
U-TURN YIELD TO RIGHT TURN
700-3-207 3 EA
4 EA 660-2-102
6' X 6' TYPE B
50' BEHIND STOP BAR (TYP)
74 LF (2 RUNS) 630-2-11
1 EA 635-2-11
18 LF 630-2-11
1 EL=98.77
POLE LOCATION=
STA. 1877+52.25
85.17' LT
19 LF (2 RUNS) 630-2-11
2 EA 635-2-11
1 EA 649-1-15
EXIST R/W
83 LF (4 RUNS) 630-2-11
2 EA 646-1-11
2 EA 665-1-11
EL=98.63
6 LF 630-2-11
1 EA 635-2-11
57 LF 630-2-12
1 RUN (1 LOOP)
2 EL=98.74
POLE LOCATION=
STA. 1879+18.17
82.92' LT
27 LF (2 RUNS) (17"X30") 630-2-11
2 EA 635-2-11
1 EA 649-1-15
663-1-112 1 EA
HIGH VOLTAGE PULL BOX
PULL BOXES SHALL BE 17"X30"
68 LF (4 RUNS) 630-2-11
2 EA 646-1-11
2 EA 665-1-11
147 LF 630-2-12
6 RUNS (1 LOOP, 2 PEDESTRIAN, 1 SIGNAL, 1 SPARE, 1 LIGHTING)
EL=98.58
663-1-112 1 EA
EL=98.63
1877
1878
1879
1880
937
938
939
940
134
135
CONST. & SURVEY
630-2-12 155 LF
6 RUNS (1 LOOP, 2 PEDESTRIAN, 1 SIGNAL, 1 SPARE, 1 LIGHTING)
EL=98.35
1 EA 663-1-112
630-2-12 181 LF
6 RUNS (1 LOOP, 2 PEDESTRIAN, 1 SIGNAL, 1 SPARE, 1 LIGHTING)
OE 25KV
PROP. R/W
EXIST R/W
630-2-11 63 LF (4 RUNS)
646-1-11 2 EA
665-1-11 2 EA
4 EL=98.58
POLE LOCATION=
STA. 1877+39.75
57.05' RT
630-2-11 22 LF (2 RUNS)
634-4-153 1 PI
635-2-11 2 EA
649-1-15 1 EA
660-2-106 14 EA
6' X 30' TYPE F
2' BEHIND STOP BAR (TYP)
REMOVAL ITEMS
1 PI 632-7-6
2 EA 649-1-85
1 AS 670-5-800
POWER SERVICE METER BASE AND DISCONNECT SHALL BE INSTALLED ON THE CONCRETE SERVICE POLE AS SHOWN ON THE PLANS AND PER INDEX NUMBERS 17504 AND 17736.
630-2-11 45 LF
635-2-11 1 EA
639-1-121 1 AS
639-2-1 55 LF
639-3-11 1 EA
641-2-12 1 EA
630-2-11 28 LF (8 RUNS)
632-7-1 1 PI
660-1-109 9 EA
680-1-110 2 EA
683-1-111 4 EA
670-5-111 1 AS
685-1-13 1 EA
NOTE:
THE CONTRACTOR SHALL PROVIDE A TOTAL OF 8 CONDUIT RUNS FROM THE CONTROLLER CABINET TO THE PULL BOXES AT THE CONTROLLER BASE. 4 RUNS TO EACH PULL BOX.
POWER SERVICE POINT TO BE LOCATED AT EXIST. POLE NO. 41224205 STA. 1879+32.20, 78.90' LT
630-2-11 103 LF (4 RUNS)
635-2-11 2 EA
630-2-11 29 LF (2 RUNS)
635-2-11 2 EA
630-2-12 48 LF
1 RUN (1 LOOP)
3 EL=98.88
POLE LOCATION=
STA. 1879+35.17
57.58' RT
630-2-11 22 LF (2 RUNS)
635-2-11 2 EA
649-1-15 1 EA
630-2-11 65 LF (4 RUNS)
646-1-11 2 EA
665-1-11 2 EA
630-2-11 59 LF (3 RUNS)
635-2-11 2 EA
630-2-12 69 LF
1 RUN (1 LOOP)
1" = 40'
0 10 40
Feet
ILLUMINATED SIGN NOTE:
SIGN ASSEMBLY SHALL BE A DOUBLE PANEL, INTERNALLY ILLUMINATED STREET SIGN ASSEMBLY.
CONTROLLER TIMINGS
TIMING FUNCTION
MOVEMENT NUMBER 1 2 3 4 5 6 7 8
MINIMUM GREEN 5 15 5 15 5 15 5 15
EXTENSION 3 3 3 3 3 3 3 3
MAXIMUM GREEN 1 16 52 8 56 20 45 18 43
MAXIMUM GREEN 2
YELLOW CLEARANCE 4.8 4.8 4.8 4.8 4.8 4.8 4.8 4.8
ALL RED 3.8 3.8 2.6 2.6 3.8 3.8 2.6 2.6
PEDESTRIAN WALK 7 7 7
PED. CLEARANCE 38 26 37 28
RECALL MIN MIN
TIMINGS ARE INTITIAL AND MAY REQUIRE FIELD ADJUSTMENT AS DIRECTED BY PROJECT ENGINEER.
DETECTORS FOR LOOPS
LOOP | NO. OF LOOPS | NO. OF NEW DETS. | NO. OF EXIST. DETS. | DELAY TIME (SEC)
L-1&6 5 3
L-2&5 4 2
L-3&8 4 2
L-4&7 3 2
L-4D 1 1 10
L-8D 1 1 10
DELAY TIME IS INITIAL AND MAY REQUIRE FIELD ADJUSTING AS DIRECTED BY PROJECT ENGINEER.
REVISIONS
DATE | DESCRIPTION | DATE | DESCRIPTION
[redacted]
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ROAD NO. | COUNTY | FINANCIAL PROJECT ID
[redacted]
SIGNALIZATION PLAN (3)
SHEET NO.
T-10



NOTES:

1. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY ALL ELEVATIONS LISTED HEREIN.
2. INFORMATION BELOW IS FOR DESIGN PURPOSES ONLY. FIELD ADJUSTMENTS MAY BE REQUIRED.
3. SEE APPROPRIATE PLAN SHEET FOR PROPOSED SIGNAL HEAD ALIGNMENTS AND SIGN CONFIGURATION/LOCATION.
4. BACKPLATES REQUIRED FOR ALL SIGNAL HEADS.
5. NEW SIGNAL HEADS ARE BEING INSTALLED ON NEW SPAN. (SEE STEEL POLE SCHEDULE FOR WIRE SIZES.)



☆ ONLY FOR FUTURE SPAN LOADING

● ONLY FOR FUTURE LOAD SHIFT (RELOCATED SIGNAL HEAD)

STEEL STRAIN POLES

	LOC. NO.	SHEET NO.	POLE	LOCATION BY STATION	CRIT. ROAD ELEV.	GROUND ELEV. AT POLE	SPAN	SPAN LENGTH	SIGNAL DATA DISTANCE ALONG SPAN/NUMBER OF SECTIONS							
									DIST.	SEC.	DIST.	SEC.	DIST.	SEC.	DIST.	SEC.
☆	1	T-8	1	1703+29.28	98.71'	95.40	1	200.8'	106.6'	3	117.6'	3	128.3'	3	139.5'	3
			2	1705+30.06		95.94			155.8'	5						
☆	1	T-8	2	1705+30.06	99.41'	95.94	2	166.1'	58.3'	3	86.5'	3	89.1'	3	100.4'	3
			3	1705+66.78		98.45			111.1'	3	122.4'	3	133.7	3	153.2'	5
☆	1	T-8	3	1705+66.78	97.94'	98.45	3	212.0'	97.0'	3	109.1'	3	121.2'	3	133.3'	3
			4	1703+54.79		98.83			145.4'	3	162.0'	5				
☆	1	T-8	4	1703+54.79	99.55'	98.83	4	161.7'	44.8'	3	74.7'	3	77.7	3	85.3'	3
			1	1703+29.28		95.40			97.0'	3	108.1'	3	119.2'	3	138.5'	5
●	1	T-8	4	1703+54.79	99.55'	98.83	4	161.7'	44.8'	3	71.7'	3	74.7'	3	85.3'	3
			1	1703+29.28		95.40			97.0'	3	108.1'	3	119.2'	3	138.5'	5
☆	2	T-9	3	1771+27.88	91.57'	91.58	3	134.8'	21.7'	3	32.2'	3	42.6'	3	105.8'	3
			4	1769+92.88		91.52			115.8'	5						

	LOC. NO.	SIGN DATA DISTANCE FROM POLE(*)/HEIGHT & WIDTH (* Enter Pole No. as indicated above if attached to pole)												LIGHTING DATA			
		DIST.	HT.	WIDTH	DIST.	HT.	WIDTH	DIST.	HT.	WIDTH	DIST.	HT.	WIDTH	WATTAGE	ARM LENGTH	LUMINAIRE MOUNTING HEIGHT	
☆	1		2'-0"	7'-0"										376	8'	40'	
☆	1		2'-0"	9'-0"	93.2'	3'-0"	2'-6"							376	8'	40'	
☆	1		2'-0"	7'-0"										376	8'	40'	
☆	1		2'-0"	9'-0"	80.3'	3'-0"	2'-6"							376	8'	40'	
●	1		2'-0"	9'-0"	80.3'	3'-0"	2'-6"							376	8'	40'	
☆	2		2'-0"	7'-0"										376	4'	40'	

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

[redacted]

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
[redacted]		

FUTURE STRAIN POLE TABULATION

SHEET NO. T-29

[redacted]

Drainage Structure Installations

Scenario:

The Structure is a 6′ x 6′ and is installed at 10′ under grade.

How far in a Rural area would be the area of influence?

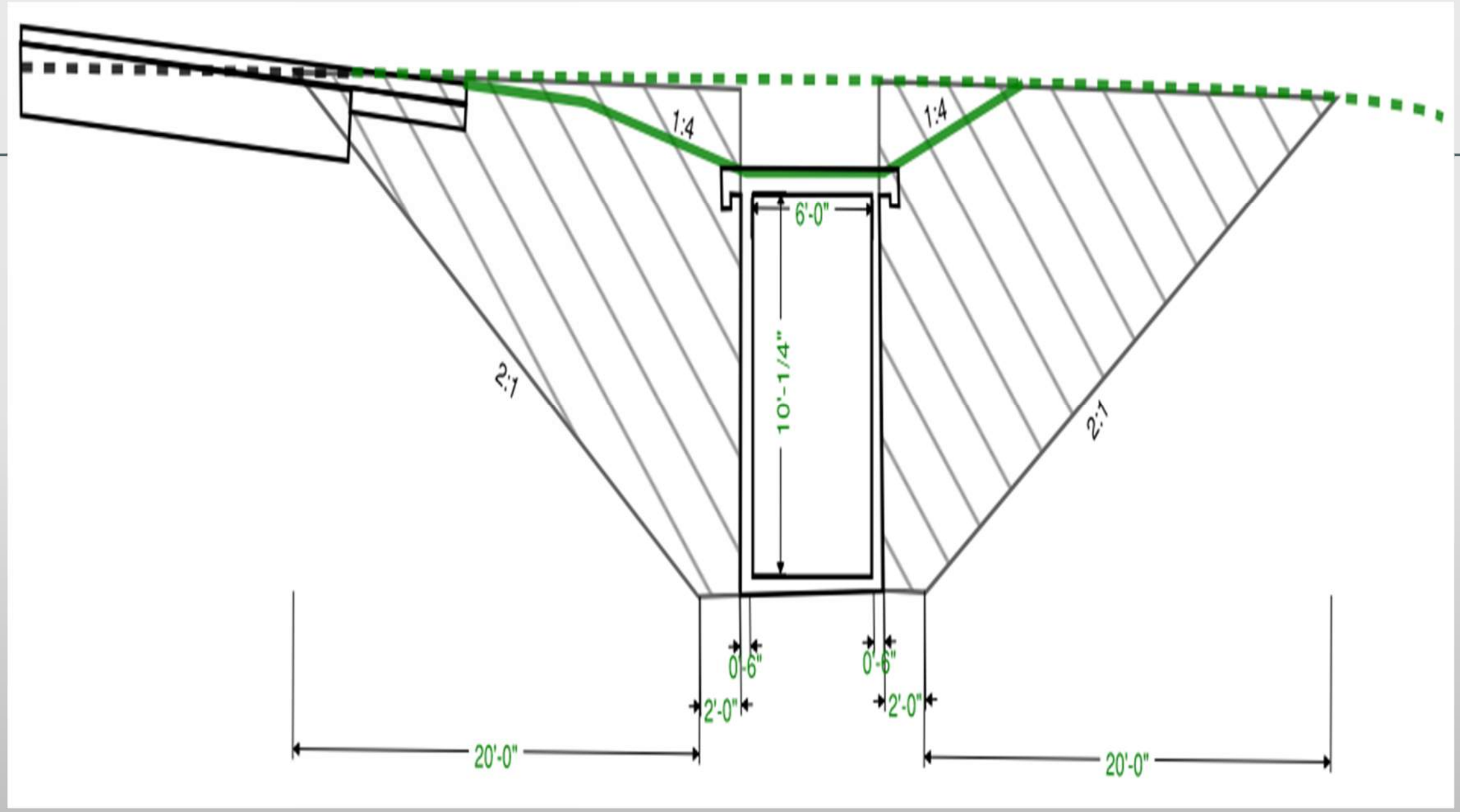
6′ + 1′ + 2′ + 2′ + 20′ + 20′ = 51′ total

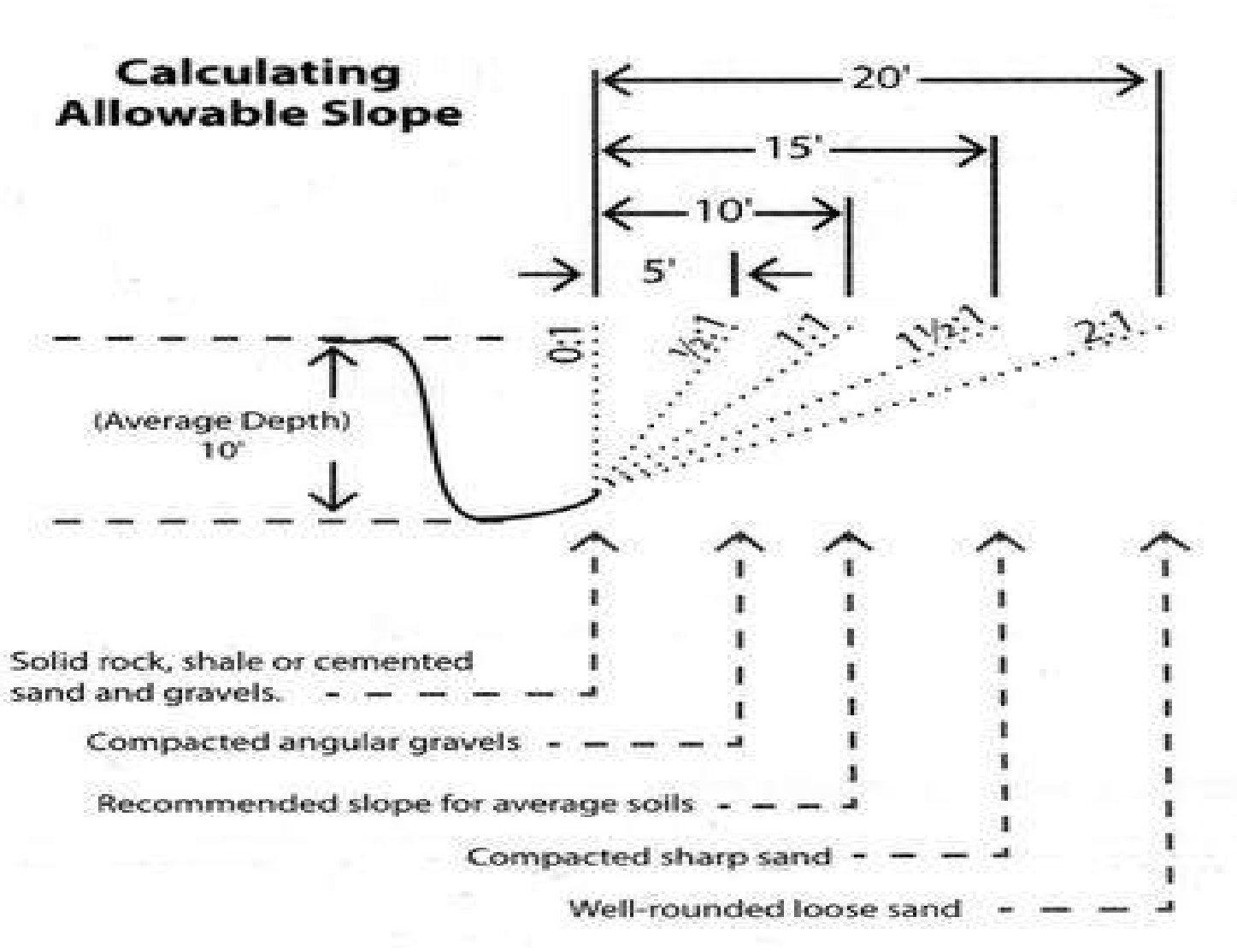
S B T T D D

How far in an Urban area would be the area of influence?

6′ + 1′ + (1′+1′) 2′ + 2′ + 2′ = 13′ total

S B WT T T


1:4
1:4
6'-0"
10'-1/4"
2:1
2:1
0'-6"
0'-6"
2'-0"
2'-0"
20'-0"
20'-0"



Determining Soil Type

Type	Description	Examples
A	Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot or greater.	Clay, silty clay, sandy clay, clay loam and in some cases: silty clay loam and sandy clay loam.
B	Cohesive soils with unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf.	Angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases silty clay loam and sandy clay loam.
C	Cohesive soils with unconfined compressive strength greater than 0.5 tsf or less.	Granular soils such as gravel, sand and loamy sand; submerged soil or soil from which water is freely seeping; submerged rock that is not stable.

Allowable Slopes

Soil or Rock Type	Maximum Allowable Slope
Stable Rock:	Vertical
Type A	75%
Type B	100%
Type C	150%

Applies to excavations that are less than 20' in depth. Those that are greater in depth should be designed by a registered professional.

Drainage Pipe Installations

Scenario:

The Pipe is a 48" RCP and is installed at 10' under grade.

How far in a Rural area would be the area of influence?

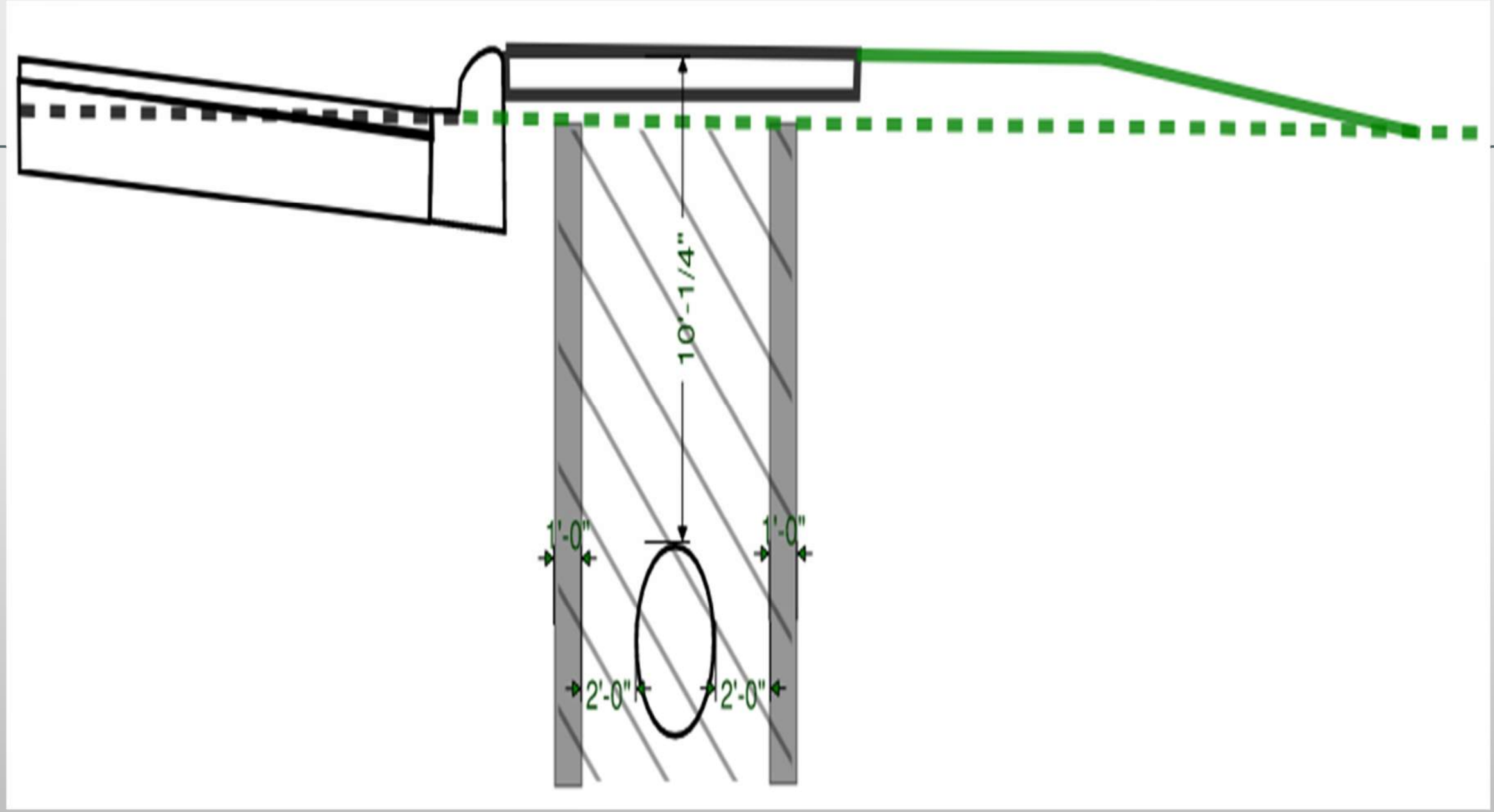
4' + 2' + 2' + 20' + 20' = 48' total

P T T D D

How far in an Urban area would be the area of influence?

4' + (1'+1') 2' + 2' + 2' = 10' total

P WT T T


10'-1 1/4"
1'-0"
1'-0"
2'-0"
2'-0"

Differences between Rural and Urban

Rural Area

You can have a Rural Area that an Urban logic would apply.

If you’re in a Rural area and you have 30’ of ROW between the EOP and the Edge of the ROW an Urban Logic would apply.

Urban Area

You can have an Urban Area that a Rural logic would apply.

If you're in an Urban area and you have an 80’ of ROW between the EOP and the Edge of the ROW a Rural Logic would apply.

Conclusion between Rural and Urban

Just because you're in a Rural Area doesn’t mean you have a lot of room to work.

Just because you’re in an Urban area doesn’t mean you have limited room to work.

Whether you’re in a Rural or an Urban area doesn’t really matter, its all about the width of the ROW and how many Utilities you have located within the ROW.

Best Practices Prior to Construction

First Steps:

Reviewing the UWS's

Reviewing the RGB's

Reviewing the Conflict Matrix

Reviewing the No Conflict Letters

Reviewing the Certification Letter

Reviewing the final plans Date

Best Practices Prior to Construction

Second Steps:

Is there any work in the UWS's that we can get started, before Construction time starts with Construction Survey

- Drilled Shafts
- Structures
- Multipath

Best Practices Prior to Construction

Third Steps:

Can we take advantage of time we grant for issues that are known, before we start

- Can we get the Utility work done early
- Can we be more proactive by locating areas of concern
- Are we engaging Utilities for the Project

Best Practices During Construction

First Steps:

Are we making contact not just by email

Are we contacting everyone listed on the UWS

Are we getting responses

Best Practices During Construction

Second Steps:

Are we talking about the issues

Are we talking about the resolution to issues

Are we doing research before we point the finger

Best Practices During Construction

Third Steps:

What is best for the project and FDOT

Constant communication when issues arise

Working together to resolve the issues

Best Practices Throughout the Duration of the Project from Beginning to End

Realize that the Utilities have supply issues like the FDOT has

Partnering with the Utilities.

Acting swiftly to NOI's

Tracking NOI's sufficiently

Mitigating issues to keep the job within Performance Measures

Mitigating to keep NOI's out of Compensable Time

Coordination, Coordination, Coordination

Key Takeaways

Not everything is a conflict - need to do your due diligence with SUE

Review your project for proximity, temporary and constructability conflicts

Update your conflict matrix through the project lifecycle

Practice Design Avoidance - Be a good Design Partner

When in the field LOOK Up as well as down

Be responsive and act swiftly to questions/RFIs during construction

Follow the 4 c's: Communication, Coordination, Cooperation and Commitment

Thank you

Melonie Schwartz | 407-242-4981 | mschwartz@inwoodinc.com

Joshua Kelly | 352-584-2660 | joshua.kelly@oz-matic.com