
IFB NO. Y19-734-RM

ISSUED: January 18, 2019

INVITATION FOR BIDS

FOR

PORTER ROAD RETAINING WALL REPAIR

**PART H
TECHNICAL SPECIFICATIONS**

**PART H
Volume II**

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TECHNICAL PROVISIONS
FOR
PORTER ROAD RETAINING
WALL REPLACEMENT
ORANGE COUNTY, FLORIDA



PREPARED FOR:

ORANGE COUNTY PUBLIC WORKS DEPARTMENT
STORMWATER MANAGEMENT DIVISION
4200 JOHN YOUNG PARKWAY
ORLANDO, FLORIDA 32839-9205

PREPARED BY:



3000 Dovera Drive, Suite 200
Oviedo, Florida 32765
p 407.971.8850 f 407.971.8955

November 2018

PART H
TECHNICAL PROVISIONS

for:

**PORTER ROAD RETAINING
WALL REPLACEMENT
ORANGE COUNTY, FLORIDA**

ACKNOWLEDGMENTS

As always, Inwood has enjoyed the opportunity to serve Orange County on this assignment, and would like to express our appreciation for the continued support of the County Commissioners.

Orange County Board of County Commissioners

Teresa Jacobs, County Mayor

Betsy Vanderley, District 1

Rod A. Love, District 2

Pete Clarke, District 3

Jennifer Thompson, District 4

Emily Bonilla, District 5

Victoria P. Siplin, District 6



CERTIFICATION

The engineering material and data contained within the following **Technical Provisions** was prepared by Inwood Consulting Engineers for the sole use by the Orange County Roads and Drainage Division.

_____, P.E.
Joshua M. Spence, P.E.
Florida Registration No. 70707
Date:

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for:

PORTER ROAD RETAINING WALL REPLACEMENT ORANGE COUNTY, FLORIDA

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ORANGE COUNTY TECHNICAL PROVISIONS

✦ Orange County **Technical Provisions (TP's)** pertinent to this contract are listed below ✦

TP No.		Technical Provision Description
101		Mobilization
102		Maintenance of Traffic
104		Prevention, Control and Abatement of Erosion and Water Pollution
110		Clearing and Grubbing
120		Excavation, Embankment and Grading
400		Concrete Structures
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PART H TECHNICAL PROVISIONS

for

PORTER ROAD RETAINING WALL REPLACEMENT ORANGE COUNTY, FLORIDA

SCOPE OF WORK

The Porter Road Retaining Wall Replacement is located along Porter Road in west Orange County between Key West Dove Street and Tropical Kingbird Street in the Summerlake Subdivision. The project extent is within Section 34, Township 23S, and Range 27E. The project is within the Reedy Creek Drainage Basin and falls under the jurisdiction of the South Florida Water Management District (SFWMD). The project is located within County Commissioner District 1 and is maintained by the West Orange Maintenance Facility. This contract includes the work necessary to construct approximately 255 linear feet of sheet pile wall with associated components and remove the existing gravity wall located on the north side of Porter Road between Key West Dove Street and Tropical King Bird Street in the Summerlake Subdivision. The proposed work will occur within existing rights-of-way and easements. The work required to complete the project includes, but is not limited to removing and disposing the existing concrete retaining wall and installing a new, sheet pile wall with pressed-in installation. The Contractor shall furnish all labor, materials, equipment, supervision, quality control, tools, transportation, supplies, and manpower as well as pay for any applicable fees to complete the work specified in this contract.

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**PORTER ROAD RETAINING
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INDEX OF DRAWINGS

(Prepared by Inwood Consulting Engineers)

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	Porter Road Retaining Wall Replacement
1	KEY SHEET
2	SUMMARY OF PAY ITEMS AND QUANTITIES
3	GENERAL NOTES
4	TYPICAL SECTION
5	PROJECT LAYOUT
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SCHEDULE OF PRICES (a.k.a. BID FORM)

SCHEDULE OF PRICES
PORTER ROAD
RETAINING WALL REPLACEMENT

Item No.	Pay Item No.	Description	Units	Quantity	Unit Cost	Total
1	101-1	MOBILIZATION (10% OF ALL OTHER ITEMS)	LS	1		
2	102-1	MAINTENANCE OF TRAFFIC (5% OF ITEMS 3-11)	LS	1		
3	104-14	PREVENTION, CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION	LS	1		
4	110-1-1	CLEARING AND GRUBBING	LS	1		
5	120-1	EXCAVATION, EMBANKMENT AND GRADING	LS	1		
6	400-2	CLASS II CONCRETE (W/ REINFORCING STEEL)	CY	53		
7	455-1	STEEL SHEET PILING, F&I PERMANENT	SF	6,375		
8	515-2-311	PEDESTRIAN/BICYCLE RAILING, ALUMINUM ONLY, 42" TYPE 1	LF	255		
9	570-1	PERFORMANCE TURF, SOD	SY	480		
10	900-1	AS-BUILT PLANS	LS	1		
11	900-2	IDEMNIFICATION	LS	1	\$100.00	\$100.00
ESTIMATED TOTAL PROJECT COST:						\$100.00

**PART H
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ENGINEER'S ESTIMATE

ENGINEER'S ESTIMATE OF PROBABLE COST
PORTER ROAD
RETAINING WALL REPLACEMENT

*Please be advised that this estimate is based on Final Design Plans
(as of November 2018) and was prepared for informational purposes only.*

Item No.	Pay Item No.	Description	Units	Quantity	Unit Cost	Total
1	101-1	MOBILIZATION (10% OF ALL OTHER ITEMS)	LS	1	\$60,900.00	\$60,900.00
2	102-1	MAINTENANCE OF TRAFFIC (5% OF ITEMS 3-11)	LS	1	\$29,000.00	\$29,000.00
3	104-14	PREVENTION, CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION	LS	1	\$5,000.00	\$5,000.00
4	110-1-1	CLEARING AND GRUBBING	LS	1	\$40,000.00	\$40,000.00
5	120-1	EXCAVATION, EMBANKMENT AND GRADING	LS	1	\$1,200.00	\$1,200.00
6	400-2	CLASS II CONCRETE (W/ REINFORCING STEEL)	CY	53	\$800.00	\$42,400.00
7	455-1	STEEL SHEET PILING, F&I PERMANENT	SF	6,375	\$75.00	\$478,130.00
8	515-2-311	PEDESTRIAN/BICYCLE RAILING, ALUMINUM ONLY, 42" TYPE 1	LF	255	\$40.00	\$10,200.00
9	570-1	PERFORMANCE TURF, SOD	SY	480	\$3.50	\$1,680.00
10	900-1	AS-BUILT PLANS	LS	1	\$1,000.00	\$1,000.00
11	900-2	IDEMNIFICATION	LS	1	\$100.00	\$100.00
ESTIMATED TOTAL PROJECT COST:						\$669,610.00

NOTE:

- 1) The above cost estimate does not reflect any utility protection, or relocations.
- 2) The unit costs listed above were obtained from a combination of FDOT's 12-month moving averages for Area 8 and Statewide, similar Orange County Term Contractor rates and other similar projects.

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TECHNICAL PROVISIONS

PART H

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for

PORTER ROAD RETAINING WALL REPLACEMENT ORANGE COUNTY, FLORIDA

“**Standard Specifications**” shall mean the July 2018 edition of the **Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction**, and supplements thereto, and **Orange County Road Construction Specifications**, latest edition. The project shall be constructed in accordance with these specifications. “**Additional Specifications**” (if any) may also be provided herein by the Engineer in an effort to more clearly define the Work under this Contract.

When reference is made to a Division, Section, or Article, it shall mean a Division, Section, or Article of said “**Standard Specification**”. Wherever the Standard Specifications indicate a mailing address for a State office or Agency, the office or agency and the address shown area hereby deleted and replaced by the following:

Orange County Stormwater Management	4200 South John Young Parkway
Division – Public Works Department	Orlando, Florida 32839

Where duplication of specifications occur, the Florida Department of Transportation (FDOT) “Standard Specifications for Road and Bridge Construction (July 2018)” shall apply unless reference is made to a material or equipment specification as required by Orange County. Where discrepancies occur between the “Standard Specifications”, “Supplemental Specifications”, “Orange County Specifications” and the Engineer’s “Additional Specifications”, provisions of Section 5-2 of the Standard Specifications for Road and Bridge Construction (January 2017) shall apply.

Each reference to Basis of Payment in said “Standard Specifications” is superseded by the conditions contained in the Technical Provisions and all other conditions related to Basis of Payment contained in these specifications.



The work specified in this contract represents the type of services to be accomplished. Work under this contract is limited to specified areas as listed in the scope of work. Areas have been inventoried and calculated as to quantities. Any discrepancies or disagreements concerning quantities and limits of work shall be immediately reported in writing (shall reflect the new measurements taken by the Contractor and the contract measurements) to the County representative. Discrepancies or disagreements will be mutually resolved prior to beginning work in any area in question. The County will make the final determination on any unresolved matters.



TECHNICAL PROVISIONS

TP 101 – Mobilization

MOBILIZATION

Mobilization shall include all items detailed in Article 101 of the Standard Specifications, the Special Provisions and on the plans, except as directed by the Engineer.

Preservation of Property Corners including all items detailed in Section 7-11 of the Standard Specifications shall be included in the contract price for mobilization.

Basis of Payment

The work and incidental costs covered under Mobilization will be paid for at the contract lump sum price and will be paid in partial payments in accordance with the following:

Percent of Original Contract Amount Earned	Allowable Percent of the Lump Sum Price for the Items*
5	25
10	50
25	75
50	100

*Partial payments as detailed above will be limited to 10% of the original Contract amount for the roadway pay items. Any amount of mobilization in excess of 10% of the roadway pay items will be paid upon completion of all work.

Payment shall be made under:

Pay Item:

101-1	Mobilization	Lump Sum
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Pay Item Footnote No. 101-1

Includes all applicable survey costs and costs necessary for a video survey. Includes all efforts necessary to construct and dismantle a temporary staging area as needed to accommodate typical wet season rainfall events occurring during construction. Includes all monitoring and investigation efforts by a geotechnical engineer as necessary during and after construction due to signs of ground settling / shifting. See General Notes for additional items included under this pay item.



TECHNICAL PROVISIONS

TP 102 – Maintenance of Traffic

MAINTENANCE OF TRAFFIC

All Maintenance of Traffic work shall conform to the requirements of Section 102 of the Standard Specifications, Index 600 of the FDOT Design Standards, the plans, and/or as herein modified, except as directed by the Engineer.

The road shall be kept open to two-way traffic on a paved surface during construction except when full closures are allowed by the plans or by the Engineer. The Contractor shall not be permitted to isolate residences or places of business. Access shall be provided to all residences and all places of business whenever construction interferes with the existing means of access.

The Contractor shall furnish, erect and maintain all necessary traffic control devices, including flagmen and pilot cars, in accordance with the *Manual of Uniform Traffic Control Devices for Streets and Highways*, published by the U.S. Department of Transportation, Federal Highway Administration. The Contractor shall provide and maintain in a safe condition the entire project limits included, but not limited to pre-existing conditions, driving lanes, temporary approaches, crossings, and intersections with trails, roads, streets, business parking lots, residences, garages and completed work. The Contractor shall take all necessary precautions for the protection of the work and the safety of the public in accordance with Section 102.

The Contractor shall present his signed and sealed Maintenance of Traffic Plan that is approved by Orange County Traffic Engineering to the Engineer at the preconstruction conference, and shall be fully and solely responsible for the adequacy of the Maintenance of Traffic plan regardless of the source. The plan shall be signed and sealed by a Professional Engineer licensed in the State of Florida.

The Contractor shall be responsible for installation of signs for all business along the project corridor. Signs should be manufactured and installed in accordance with FDOT design standards. No special compensation will be made to the contractor to defray costs of any of the work or delays for complying with the requirements of installing business signs, but such costs shall be considered as having been included in the price stipulated for the Maintenance of Traffic pay item.

Basis of Payment

All materials, work and incidental costs related to Maintenance of Traffic will be paid for at the contract lump sum price. All material, labor and equipment necessary for the construction and maintenance of the entire project limits included, but not limited to pre-existing conditions, driving lanes, temporary approaches, crossings, intersections with trails, roads, streets, business parking lots, residences, garages, temporary driving lanes, side streets, driveway connections, and completed work, as may be directed by the Engineer shall be included in the contract price.

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TECHNICAL PROVISIONS

TP 102 – Maintenance of Traffic

Payment shall be made under:

Pay Item:

102-1	Maintenance of Traffic	Lump Sum
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Pay Item Footnote No. 102-1

Includes all necessary traffic control devices including flagmen, pilot cars and variable message boards, in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways (latest edition). Contractor shall secure construction site (i.e. temporary pedestrian safety fencing, barricades, signs, etc.) in order to prevent pedestrians from accessing work areas. See General Notes for additional items included.



TECHNICAL PROVISIONS

TP 104 – Prevention, Control and Abatement of Erosion and Water Pollution

PREVENTION, CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION

LAND CLEARING

Prevention, control and abatement of erosion and water pollution shall conform to the requirements of Section 104 of the Standard Specifications, National Pollution Discharge Elimination System (NPDES) requirements, except as modified by these Technical Provisions or as directed by the Engineer.

The Contractor shall present at the Preconstruction Conference its Storm Water Pollution Prevention Plan (SWPPP) and a separate schedule to manage erosion and water pollution. This schedule shall include a complete outline of the proposed construction of all erosion and pollution control and abatement items required.

The Contractor shall be responsible for the preparation and submittal of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Florida Department of Environmental Protection (FDEP) and shall obtain the FDEP Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

DEWATERING

The term treatment as used in this technical provision means the application of all FDEP approved techniques and/or methods available to remove the exceedances out of dewatering effluent except impounding. Impounding is not considered a treatment method for purposes of compensation under this technical provision.

The CONTRACTOR shall include in his/her bid all applicable costs, including monitoring, resulting from treatment and disposal of contaminated groundwater with concentration levels that exceed the allowable limits of the FDEP generic permit, and shall not be entitled to any adjustment in the Contract Price as a result of any change in the permit fees or unanticipated treatment and disposal costs.

Prior to any work commencing, and for the duration of the work, the CONTRACTOR is responsible for meeting all the conditions of the applicable permits and submitting any required reports to the appropriate agencies.

The CONTRACTOR shall dewater only in relation to the location and relocation of facilities owned by the COUNTY. No compensation shall be provided for dewatering performed for facilities that are not owned by the COUNTY.

TECHNICAL PROVISIONS

TP 104 – Prevention, Control and Abatement of Erosion and Water Pollution

Permitting

If exceedances are found in the dewatering effluent, the CONTRACTOR will be required to:

1. Immediately notify the COUNTY and report the exceedances that are encountered.
2. Meet with the FDEP to determine any and all alternatives that are acceptable.
3. Obtain prior COUNTY approval of treatment and disposal alternatives.
4. Obtain prior written COUNTY authorization to use pay item TP 104-14
5. Apply and obtain any and all permits and/or treatment approvals that FDEP requires including, but not limited to:
 - a. Generic Permit for Discharges from Petroleum Contaminated Sites (62-621.300(1), F.A.C.). Allows discharges from sites with automotive gasoline, aviation gasoline, jet fuel, or diesel fuel contamination.
 - b. Permit for all Other Contaminated Sites (62-04; 62-302; 62-620 & 62-660, F.A.C.). The coverage is available only through the individual NPDES permit issued by FDEP. Allows discharges from sites with general contaminant issues, i.e. ground water and/or soil contamination other than petroleum fuel contamination.
 - c. Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity (62-621.300(2), F.A.C.).
 - d. Generic Permit for Stormwater Discharge from Large or Small Construction Activities (62-621.300(4) (a), F.A.C.).
6. Apply and obtain any and all permits and/or treatment approvals that the Water Management District requires including, but not limited to:
 - a. No-Notice Short-Term Dewatering Permit (40E-20.302(3), F.A.C.) If the CONTRACTOR'S proposed work is expected to exceed 90 days in duration, or does not meet any of the other requirements listed with the requirements of Rule 40E-20.302(3), the CONTRACTOR must apply for and obtain a Dewatering General Water Use Permit (40E-20.302(2) F.A.C.)



TECHNICAL PROVISIONS

TP 104 – Prevention, Control and Abatement of Erosion and Water Pollution

The CONTRACTOR shall not be entitled to file, or recover under, any delay claim based on preparation of permit applications and the time required for obtaining the applicable permits. If, prior to or during the dewatering, it is determined that the disposal or discharge of the dewatering effluent is not authorized by the FDEP's Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity, the CONTRACTOR shall diligently pursue further required permit(s) from FDEP or other agencies without resort to delay claims or recompense from the COUNTY for either permit application activities or the time required to obtain such permits.

The CONTRACTOR shall consider and anticipate the potential need to obtain the herein discussed permits in developing his schedule, and shall make every effort to avoid or minimize potential impacts to his critical path that might result from delays in dewatering activities due to the time necessary for the CONTRACTOR to obtain the necessary permits. The CONTRACTOR shall make every effort to schedule activities requiring dewatering as late as possible during his schedule, and shall schedule activities not impacted by dewatering as early as possible. For each day, up to a maximum of one hundred eighty (180) days that the CONTRACTOR diligently pursues such permit(s) and is unable to avoid adversely impacting his critical path, a day will be added to the time allotted to the CONTRACTOR to complete performance of the Project.

Treatment

The CONTRACTOR shall implement the appropriate treatment that is acceptable to FDEP, COUNTY, and, if necessary, the Water Management District to attain compliance for all exceedances encountered during dewatering activities. Treatments may include, but are not limited to: chemical treatment, ion exchange treatment, filtration, and disposal of discharged groundwater in a properly permitted facility.

The CONTRACTOR shall:

1. Make every effort to minimize the spread of contamination into uncontaminated areas;
2. Provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions;
3. Ensure such provisions adhere to all applicable laws, rules or regulations covering hazardous conditions in a manner commensurate with the level of severity of the conditions;
4. If necessary, provide contamination assessment and remediation personnel to handle site assessment, determine the course of action necessary for site security, and perform the necessary steps under applicable laws, rules, and regulations for additional assessment and/or remediation work to resolve the contamination issue;

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TECHNICAL PROVISIONS

TP 104 – Prevention, Control and Abatement of Erosion and Water Pollution

5. Delineate the contamination area(s), any staging or holding area required, and develop a work plan that will provide the schedule of projected completion dates for the final resolution of the contamination issue;
6. Maintain jurisdiction over activities inside any delineated contamination areas and any associated staging or holding areas;
7. Be responsible for the health and safety of workers within the delineated areas; and
8. Provide continuous access to representatives of regulatory or enforcement agencies having jurisdiction.

Basis of Payment

All work and incidental costs required to comply with the articles of this specification will be paid at the contract lump sum price for Prevention, Control and Abatement of Erosion and Water Pollution.

Payment will be made under:

Pay Item:

104-14	Prevention, Control and Abatement of Erosion and Water Pollution	Lump Sum
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Pay Item Footnote No. 104-14

Includes the cost of all items required for erosion control including, but not limited to, synthetic bales, turbidity barriers, inlet protection, silt fence, and temporary grassing, as shown in the plans or as directed by the County.



TECHNICAL PROVISIONS

TP 110 – Clearing and Grubbing

CLEARING AND GRUBBING

All clearing and grubbing shall be performed in accordance with the requirements of Section 110 of the Standard Specifications, except as directed by the Engineer.

Scope of work to include but not be limited to, the removal of all rigid, asphalt pavement, Portland cement concrete pavement, curb, curb and gutter, ditch pavement, sidewalk, driveway aprons, concrete slabs, concrete structures, brick, fences, gravity walls, retaining walls, pipes, etc.

Clearing and Grubbing shall also include the removal of existing pavement and base course and backfilling with suitable material, as shown in the construction plans. Removal of the existing roadway shall also include the proper disposal of the removed materials as specified above.

Basis of Payment

All work and incidental costs required to perform clearing and grubbing as herein specified will be paid for at the contract lump sum price.

Payment shall be made under:

Pay Item:

110-1-1	Clearing and Grubbing	Lump Sum
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Pay Item Footnote No. 110-1-1

Includes, but is not limited to, the sawcut, removal and disposal of existing pavement, driveway asphalt/concrete, curb and base required to construct the project. Includes the removal of existing concrete gravity wall, hand rail, etc. as called out in the plans. Includes the transport and disposal of all removed materials to an approved Orange County disposal site yard or as directed by the County. Includes the cost of location and verification of existing utilities, and all coordination with utility companies for adjustments and/or relocation as necessary for construction. It is the Contractor’s responsibility to provide temporary slope stabilization / shoring and protection of utilities. Contractor to provide a Temporary Slope Stabilization / Shoring Plan that shall be signed and sealed by a Professional Engineer in the state of Florida. It is the Contractor’s responsibility to replace in-kind or better any damaged fencing identified to remain, damaged mailboxes or any other private property disturbed during construction. Includes the cost of property owner and tenant notification prior to the commencement of work. The Contractor shall notify all residents within the work area as to when the work will take place and explain the level of inconvenience that will be involved. This notification shall take place five (5) days prior to commencement of any work in that area. The notification will be by an approved door hanger to be placed on each house/business and any vehicles within 25’ of the limits of construction.



TECHNICAL PROVISIONS

TP 120 – Excavation, Embankment and Grading

EXCAVATION, EMBANKMENT AND GRADING

All excavation and embankment work shall conform to the requirements of Section 120 of the Standard Specifications, and the provisions of this section, except as directed by the Engineer.

Placement and compaction of backfill shall conform to Section 548 of the Standard Specifications, and the provisions of this section, except as directed by the Engineer.

Basis of Payment

Subsoil Excavation will be paid for at the contract price per cubic yard.

Payment shall constitute full compensation for all work described herein and in the Special Provisions and shall include the excavation and disposal of muck, clay, rock, or any other material that is unsuitable in its original position and that is excavated below the finished grading template. Work under this pay item shall also include the excavation of all suitable material within the specified limits as necessary to excavate the unsuitable material. The bottom of the finished grading template shall be considered to be the top of the finished base, shoulders, and slopes for stabilized bases and the finished shoulder and slope lines and bottom of base or rigid pavement for rigid pavement or all other bases. Payment shall also include the provision, placement, shaping, and compaction of suitable backfill material to replace the removed unsuitable material up to the original grade line or to the bottom of the proposed roadway base material, whichever is lower.

The limits of Subsoil Excavation indicated in the construction plans are considered to be particularly variable, in accordance with field conditions actually encountered.

Excavation, Embankment and Grading will be paid for at the contract lump sum price.

Payment shall constitute full compensation for all work described herein and in the Special Provisions and shall include grading of shoulders, graded road connections, slopes, compaction, final dressing, subsoil excavation, replacement material and all work required for completing the project that is not paid for under the other pay items. Also included are removals and off-site disposal or on-site utilization of all materials, structures, abandoned utilities and obstructions as directed by the Engineer.

Payment shall be made under:

Pay Item:

120-1	Excavation, Embankment and Grading	Lump Sum
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TECHNICAL PROVISIONS

TP 120 – Excavation, Embankment and Grading



Pay Item Footnote No. 120-1

Includes the cost of all work required for excavation, embankment fill (backfill after removal of existing gravity wall and sheet pile installation), and associated grading. Backfill material shall consist of A-3 or A-2-4 (less than 15% passing sieve 200).



TECHNICAL PROVISIONS

TP 400 – Concrete Structures

CONCRETE STRUCTURES

The work specified in this Section consists of the construction of concrete structures and other concrete members at the locations and to the dimensions shown on the plans in accordance with Section 400 of the FDOT Standard Specifications for Road and Bridge Construction. All concrete construction not covered under a separate specific technical provision or pay item should be constructed in accordance with this technical provision.

Exposed concrete surfaces shall receive a Class V Surface Finish as required by Article 400-15.2.6 of the Standard Specifications, unless otherwise noted in the construction plans.

Method of Measurement

The quantity to be paid for under this Section shall be the volume, in cubic yards, of the classes of concrete shown in the plans, completed, in place, and accepted, except as noted herein.

Basis of Payment

Price and payment will be full compensation for the classes of concrete shown in the plans and shall include all labor, excavation, backfilling, compaction, forms, bracing, reinforcing steel, concrete, dewatering, and all items and incidentals necessary to complete this item of work. No separate payment will be made for obtaining the required concrete finish.

Approach slabs will be paid at the contract unit price each for concrete approach slab.

Payment shall constitute full compensation for all work and materials specified herein, and in Sections 400 and 415 of the FDOT Standard Specifications for Road and Bridge Construction.

Payment shall be made under:

Pay Item:

400- 2	Class II Concrete (w/ Reinforcing Steel)	Per Cubic Yard
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Pay Item Footnote No. 400-2

Includes the cost of all materials and labor for installation of the sheet pile wall concrete cap including reinforcing steel.

TECHNICAL PROVISIONS

TP 455 – Sheet Pile Wall

SHEET PILE WALL

Construction of Sheet Pile shall conform to the requirements of Section 455 of the Standard Specifications, except as modified herein or as directed by the Engineer.

Materials

Materials for Sheet Piling shall adhere to the requirements found in Section 455 of Standard Specifications, except as modified in the plans or as directed by the Engineer. Drive sheet piling and cut off true to line and grade. Install sheet piling with a suitable equipment. Remove and replace any section damaged during handling and installation at no additional expense to the County.

Installation

Furnish and install sheet piling including driving, jetting, preformed pile holes, cutting off, splicing, dynamic load testing, and static load testing of piling in accordance with Section 455 of the Standard Specifications. Drive sheet piling and cut off true to line and grade. Install sheet piling with a suitable equipment. Remove and replace any section damaged during handling and installation at no additional expense to the County.

Where rock or strong material is encountered such that the sheet piles cannot be set to grade by driving, inform the County's Representative prior to removing the strong material by other acceptable means, such as excavation and backfilling or by punching. Installation shall adhere to the requirements found in Section 455 of the Standard Specifications, except as modified in the plans or as directed by the Engineer.

Method of Measurement

Quantities measured for payment under this Section shall be the area in square feet of sheet pile wall installed in place, completed and accepted. Measurements shall be from top of pile elevation to the bottom of pile elevation and from beginning to end wall limits as shown in the Plans.

Basis of Payment

Price and payment will be full compensation for all labor, equipment, and materials required for furnishing and installing sheet piling including preformed holes and coating, but will not include furnishing and placing anchors when an anchored wall system is designed and detailed in the Plans. In such cases, furnishing and installing anchors will be paid for separately. Any sheet piling not shown in the plans, but deemed to be critical, shall be brought to the attention of the County's Representative prior to installation. Includes the cost of replacing in-kind any sidewalk damaged during construction of the sheet pile wall.

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TECHNICAL PROVISIONS

TP 455 – Sheet Pile Wall

Payment shall be made under:

Pay Item:

455-1	Steel Sheet Piling, F&I Permanent	Per Square Foot
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Pay Item Footnote No. 455-1

Includes the cost of all labor and materials to properly construct sheet piling as shown in the plans utilizing non-vibratory methods. Also includes the cost of cutting the sheeting below grade. Sheet pile design shall be signed and sealed by a Professional Engineer registered in the state of Florida.



TECHNICAL PROVISIONS

**TP 515 – Metal Pedestrian/Bicycle Railings,
Guiderails, and Handrails**

METAL PEDESTRIAN/BICYCLE RAILINGS, GUIDERAILS, AND HANDRAILS

Construction of metal pedestrian/bicycle railings, guiderails, and handrails shall conform to the requirements of Section 515 of the Standard Specifications, as well as the requirements of FDOT Index 862, and this Technical Provision, except as directed by the Engineer.

Method of Measurement

Quantities measured for payment under this Section shall be the plan quantity, in linear feet, installed and accepted. The quantity will be measured along the centerline of the top rail.

Basis of Payment

Price and payment will be full compensation for all work specified in this Section, including all materials, hardware, labor, and incidentals required to complete the installation.

Payment shall be made under:

Pay Item:

515-2-311 Pedestrian/Bicycle Railing, Aluminum Only, 42” Type 1 Per Linear Foot

Pay Item Footnote No. 515-2-311

Includes the cost of all materials, labor and equipment required to anchor the posts to the sheet pile wall concrete cap.



TECHNICAL PROVISIONS

TP 570 – Performance Turf

PERFORMANCE TURF

The Contractor shall establish a stand of grass in all areas designated on the plans and disturbed by construction in accordance with Chapter 15, Environmental Control, Article XVII, Fertilizer Management Ordinance of the Orange County Code; Sections 162 and 570 of the Standard Specifications, except as directed by the Engineer.

Work under this Section shall include all seeding, mulching, sodding, fertilizing and watering necessary to provide routine maintenance of the grassed area until the work is accepted by the Engineer.

There must be at least 90% coverage of healthy grass prior to acceptance by the Engineer. The Engineer, at any time, may require replanting of any areas in which the establishment of the grass stand does not appear to be developing satisfactorily.

The Contractor shall mow grassed areas twice monthly, or as required by the Engineer, until final acceptance of the work.

Seeding and Mulching

Grass seed shall be common Bermuda and Bahia. In addition, brown top-millet will be included during summer months and annual rye in the winter months. All seed shall meet the requirements of the State Department of Agriculture.

Sodding

Sodding shall be Bahia. It may be placed in rolls or as individual pieces. In established areas, replacement sod shall be of the same type as the existing sod, unless otherwise approved by the Engineer.

Fertilizers

Fertilize as necessary based on soil testing performed in accordance with Section 162. For fertilizer rates and application times follow Chapter 15 Environmental Control, Article XVII Fertilizer Management Ordinance of the Orange County Code.

Method of Measurement

Payment shall be calculated based on the quantity in square yards as specified in the completed and accepted plans. The cost of establishing grass in other areas disturbed by construction activities shall be borne by the Contractor.

PART H



TECHNICAL PROVISIONS

TP 570 – Performance Turf

Basis of Payment

Payment shall be paid for at the contract unit price per square yard. Payment shall constitute full compensation for furnishing all materials and completing all the work specified herein, including ground preparation, fertilizing, seeding, mulching, sodding, watering, mowing and complete maintenance of the grassed area until final completion and acceptance by the Engineer.

Payment shall be made under:

Pay Item:

570-1	Performance Turf, Sod	Per Square Yard
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Pay Item Footnote No. 570-1

Includes the cost of pegging, fertilizer and water as required for establishment of permanent sodding. Sod placed on all slopes 1:3 or steeper shall be pegged. Also includes the cost of topsoil treatment on all permanent grass areas and mowing until the final project acceptance by the County.



TECHNICAL PROVISIONS

TP 900-1 – As-Built Plans

AS-BUILT PLANS

The As-Built Plans shall incorporate all the changes made to the red line As-Built plans. They shall show locations and elevations of paving, swales, ditches, pipe inverts and structures constructed and all relocated or reset property corners, section corners and 1/4 section corners.

Upon the completion of the project, the Contractor shall submit to the County one (1) set of 24"x36" paper Full Size Drawings with Statement of Certifications, certifying that the project was constructed according to the Construction Plans and Specifications, and that the AS BUILT PLANS are correct representation of what was constructed. The plans shall delineate all red line information contained on the As-Built Plans.

The Contractor shall include the Statement of Certification on either the cover sheet certifying all of the sheets or certify each individual sheet. The Statement of Certifications shall be signed and sealed by a Professional Engineer and/or a Professional Surveyor and Mapper, both registered in the State of Florida.

Basis of Payment

As-Built Plans will be paid for at the contract lump sum price, completed and accepted.

Payment shall be made under:

Pay Item:

900-1	As-Built Plans	Lump Sum
-------	----------------	----------

Pay Item Footnote No. 900-1

Includes all efforts necessary for preparation of as-built (red-line) drawings showing approved deviations from plans and confirmed quantities to be used by engineer in the certification of as-built drawings.

PART H



TECHNICAL PROVISIONS

TP 900-2 – Indemnification

INDEMNIFICATION

The Contractor shall indemnify, defend, and hold harmless the COUNTY and all its officers, agents, and employees, from all claims, losses, damages, costs, charges, or expenses arising out of any acts, action, neglect, or omission by the Contractor during the performance of the Contract, whether direct or indirect, and whether to any person or property to which the COUNTY or said parties may be subject, except that neither the Contractor nor any of its subcontractors are liable under this Section for damages arising out of the injury or damage to persons or property directly caused or resulting from the sole negligence of the COUNTY or any of its officers, agents, or employees.

Payment shall be made under:

Pay Item:

900-2	Indemnification	Lump Sum
-------	-----------------	----------

**PART H
TECHNICAL PROVISIONS**

for

**PORTER ROAD RETAINING
WALL REPLACEMENT
ORANGE COUNTY, FLORIDA**

GEOTECHNICAL ENGINEERING REPORT

(Prepared by Devo Engineering)

GEOTECHNICAL ENGINEERING REPORT

INVESTIGATION OF SLOPE FAILURE & CONCEPTUAL REMEDIATION PLAN PORTER ROAD RETAINING WALL ADJACENT TO LAKE STAILING

HORIZONS WEST, ORANGE COUNTY, FLORIDA



JULY 2018

05/11/2018 09:43

Prepared by

For



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



3000 Dovera Drive
Suite 200
Oviedo, FL 32765

DEVO SEEREERAM, PH.D., P.E., LLC
CONSULTING GEOTECHNICAL ENGINEER
FLORIDA REGISTRATION No. 48303



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

5500 Alhambra Drive * Orlando, Florida 32808 * Phone: 407-290-2371

e-mail: devo@devoeng.com

www.devoeng.com

Date: July 26, 2018

Devo's Project No: 18-610.74

To:

INWOOD CONSULTING ENGINEERS, INC.

3000 Dovera Drive, Suite 200

Oviedo, FL 32765

phone: 407-971-8502; fax: 407-971-8955; ssommerfeldt@inwoodinc.com

attention: **STEVE SOMMERFELDT, P.E.**

Ref:

GEOTECHNICAL ENGINEERING REPORT

INVESTIGATION OF SLOPE FAILURE & CONCEPTUAL REMEDIATION PLAN

PORTER ROAD RETAINING WALL ADJACENT TO LAKE STAILING

HORIZONS WEST, ORANGE COUNTY, FLORIDA

Dear Mr. Sommerfeldt:

Attached is our report on the above-captioned project which includes a root cause analysis of the failure and an evaluation of two potential retrofits: ❶ a sheetpile wall with reconstruction of the retaining wall (option 1), and ❷ a sheetpile wall with a coping beam and guard rail (option 2) to replace the existing retaining wall. Our recommendation is option 2 since the sheetpile will be more strategically located within the body of the failure mass. A cost estimate for the sheetpile wall is also included and we are recommending the pressed-in method for sheetpile installation due to the close proximity of sensitive buried utilities.

Report Certification

We trust that the geotechnical data, root cause assessment, and wall repair recommendations are clearly communicated and responsive to the needs of Inwood and Orange County Roads & Drainage staff. Feel free to contact us if there are any questions regarding this report.

Sincerely,

Devo Seereeram, Ph.D., P.E.

Florida Registration No. 48303

Date: July 26, 2018

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I.0 BACKGROUND

General

A 254± lineal feet gravity retaining wall (3 ft high with hand rail) was constructed in 2008 on the north side of Porter Road adjacent to Lake Stailing, the latter being an excavated ski lake (circa 1996) within the footprint of a former circular sinkhole feature which is at the toe of this slope failure. Structural details of the retaining wall are not available but it is apparent that a standard FDOT gravity retaining wall detail was used. According to the roadway plans (MSCW, May 2007), the wall design was delegated to the contractor, not the roadway design engineer. Exhibit 1 shows the circular sinkhole feature at this location prior to road widening/wall construction and also prior to excavation of the ski lake. Lake Stailing discharges into Lake Hancock through a permitted control structure. The ground contours prior to development are shown later in this report in Exhibit 10.

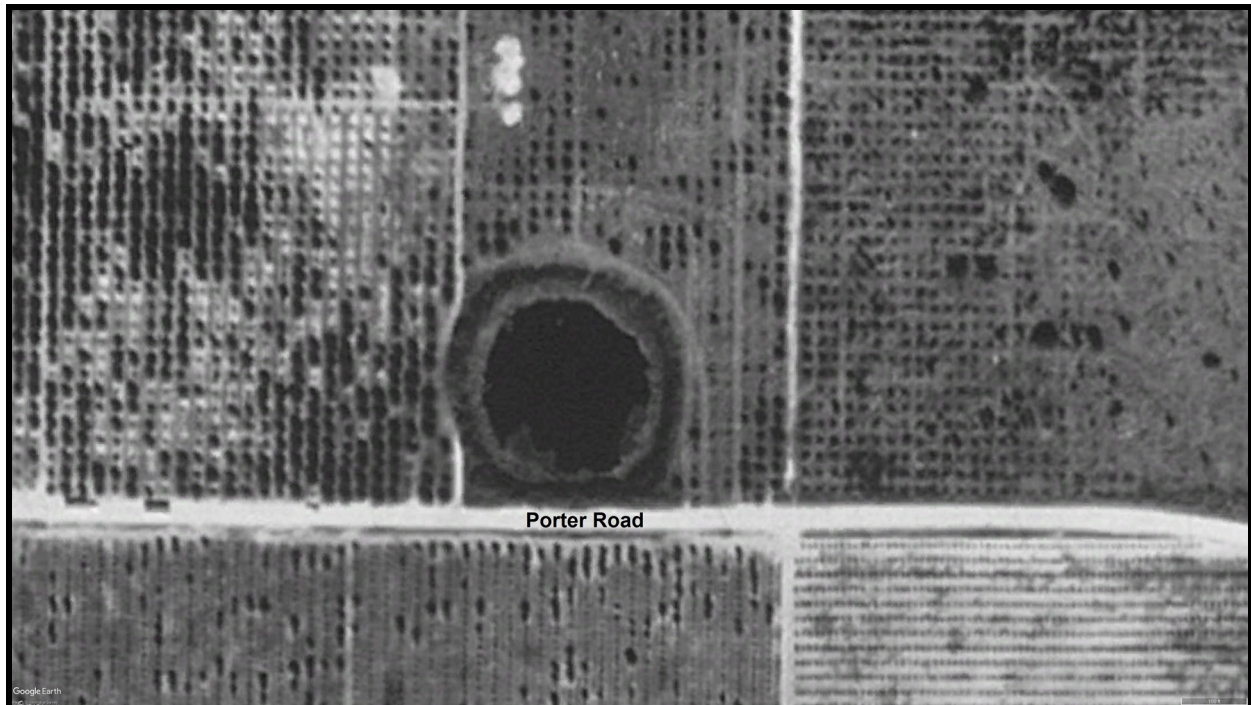


Exhibit 1. Site Location on 1995 Aerial (showing original circular wetland feature)

Property Appraiser Aerials from 2004 to 2017

This wall and hand rail was apparently constructed to accommodate a new sidewalk and utility bank on the north side of Porter Road. Select aerial photos (2004, 2006, 2007, 2008, 2009, 2017) of this wall location are shown in Exhibits 2 to 7. Key observations are as follows:

- ❶ the wall appears for the first time in the 2009 aerial photo, and
- ❷ there are no signs of apparent slope movement for the most recent aerial photo prior to Hurricane Irma (Jan 2017, see Exhibit 7).

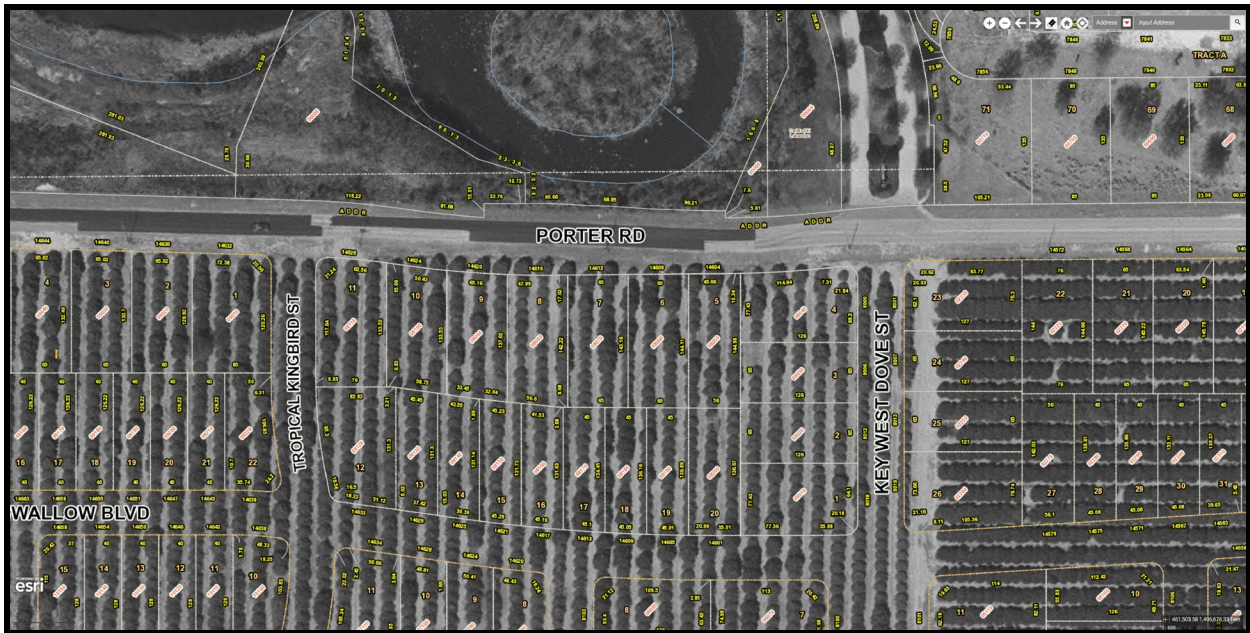


Exhibit 2. 2004 Aerial Image (Orange County Property Appraiser)



Exhibit 3. 2006 Aerial Image (Orange County Property Appraiser)



Exhibit 4. 2007 Aerial Image (Orange County Property Appraiser)

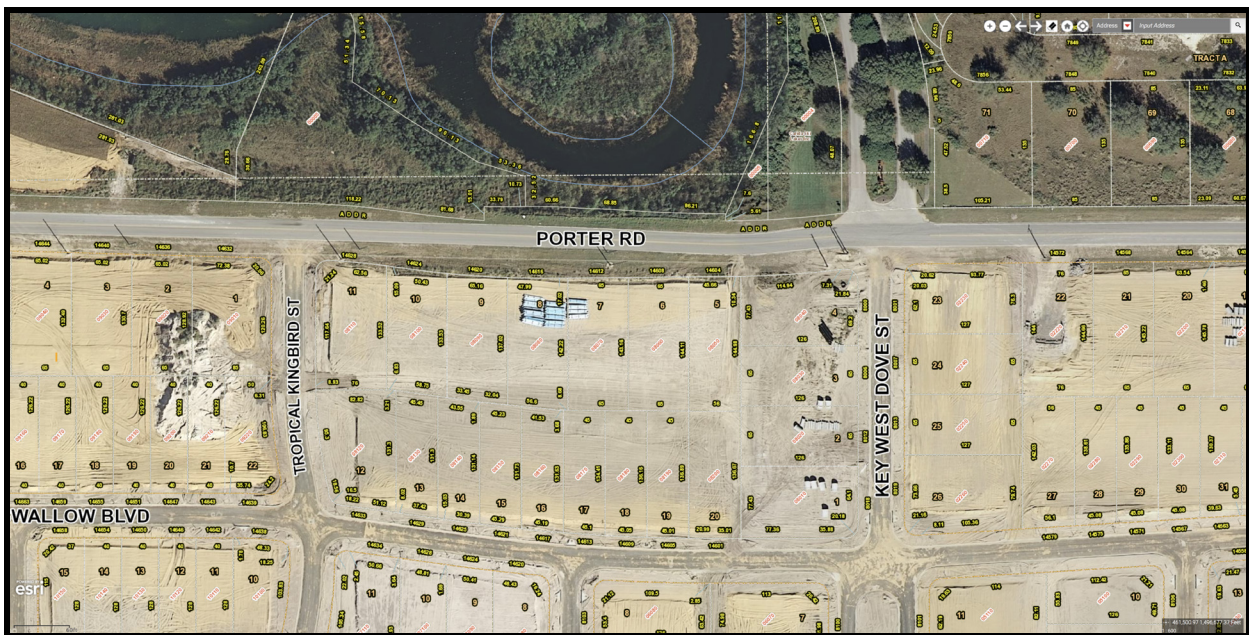


Exhibit 5. 2008 Aerial Image (Orange County Property Appraiser)

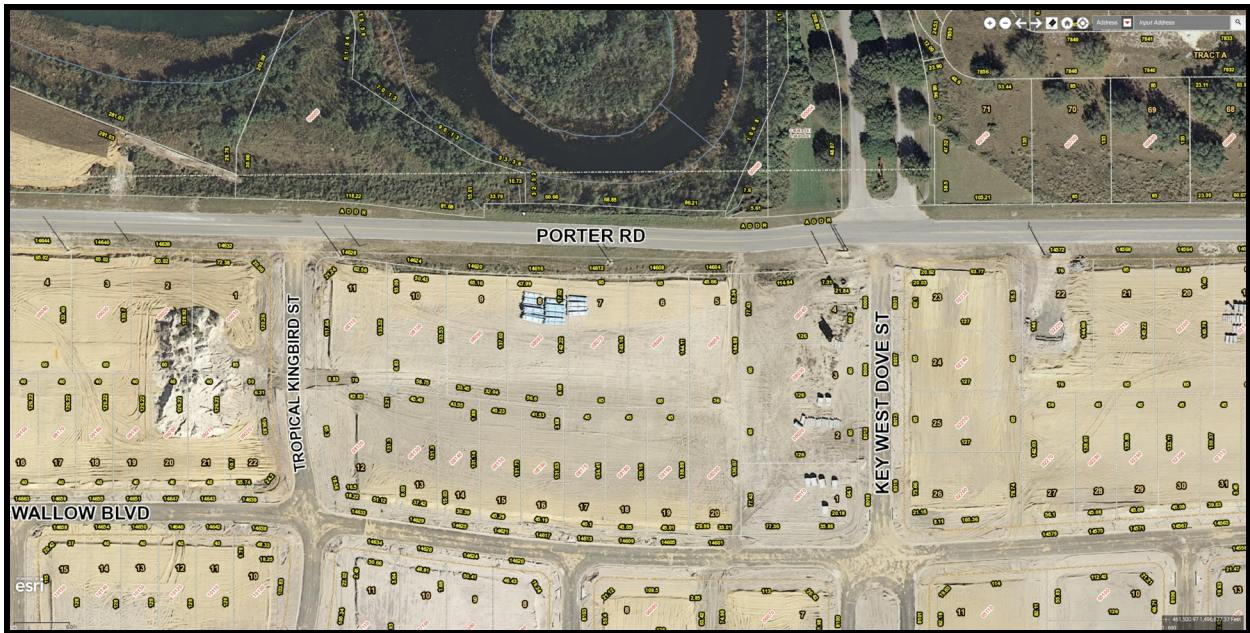


Exhibit 6. 2009 Aerial Image (Orange County Property Appraiser)

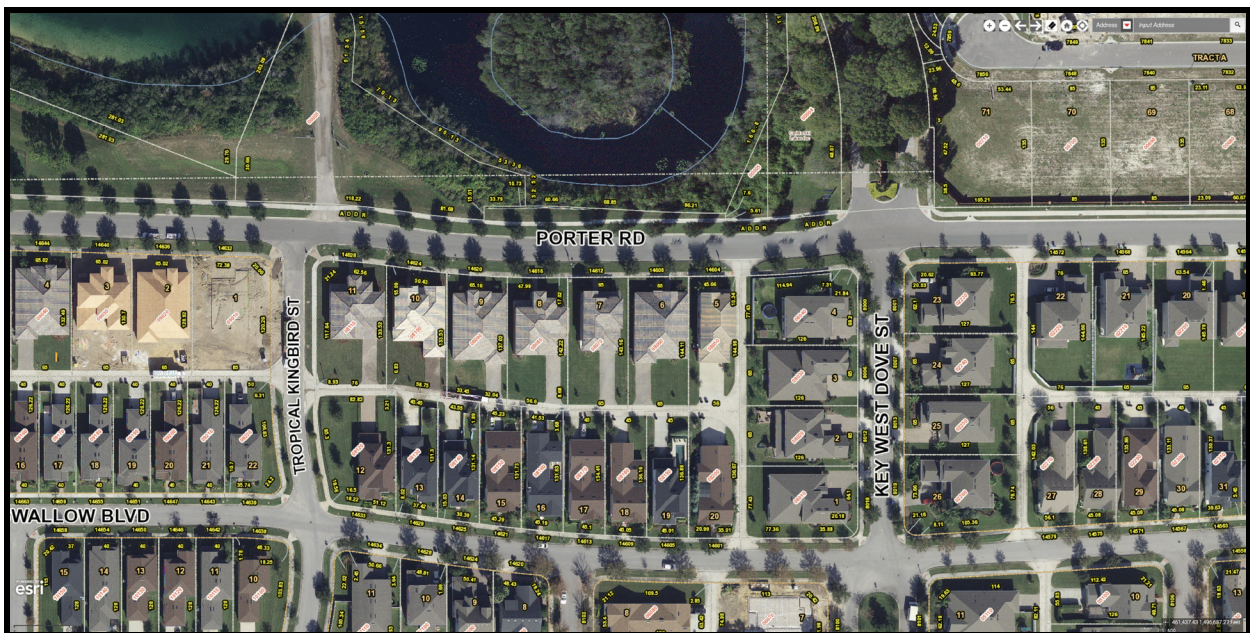


Exhibit 7. 2017 Aerial Image (Orange County Property Appraiser)

Street View Photos of 2011 and 2016

Exhibits 8 and 9 below are Google Streetview images of the wall from April 2011 (within a few years of the wall construction) to as recently as December 2016. These Streetview images do not show any obvious signs of wall movement on these dates.



Exhibit 8. Google Streetview Image From April 2011



Exhibit 9. Google Streetview Image From December 2016

Exhibit 10 shows the contours of the sinkhole depression prior to its infilling and grading to create Lake Staling. The base of the sinkhole was +75 ft NGVD (i.e., 25 ft below the sinkhole rim at elevation +100 ft NGVD).

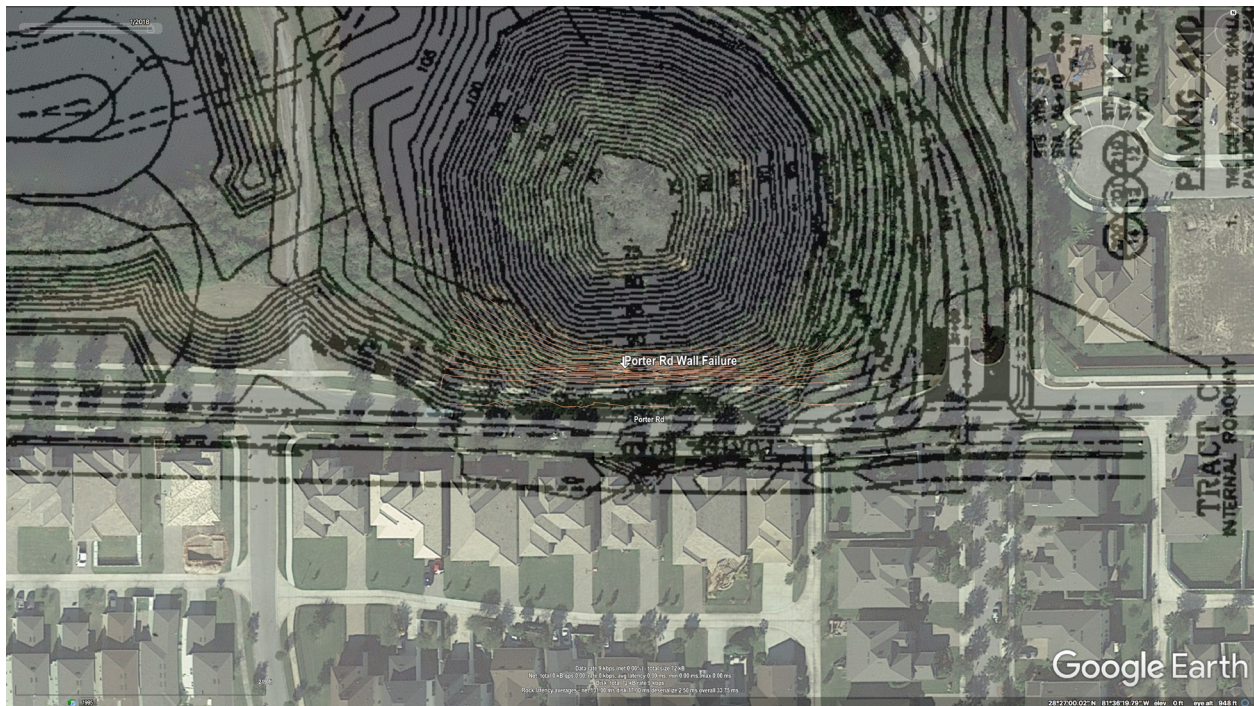


Exhibit 10. Sinkhole Contours Prior to Ski Lake grading

January 2018 Photos & General Observations

We understand that subsidence of the retaining wall was first reported sometime after Hurricane Irma passed through the area on September 10-11, 2017, although the actual date of the wall movement/slope failure is not precisely known. Devo Engineering personnel visited the site on January 22, 2018 and took photos, some of which are in Exhibits 11 through 14. From this initial site visit, it was apparent that this was not a retaining wall failure, but a deeper seated global slope stability failure of the roadway embankment. This slope angle is about 1.6H:1.0V at the retaining wall which is steeper than the maximum of 2H:1V that is normally specified for roadway embankments. The slope failure appears to correspond with the rain and record Irma-related high lake stages (combined with wave action) playing a part in triggering the movement.

Several annotated photos are also included in Appendix A showing the proximity of the slope failure to the buried utilities. These are also depicted in cross-section view in Figure 1.2 as a visual aid to see the relative position of the slope failure to the utilities of concern. Note that the edge of the slope failure is relatively far from the edge of the sidewalk (15± ft) and the edge of the roadway pavement (30± ft), compared to the closest fiber optics cable (3± ft).



Exhibit 11. View of Retaining Wall Fence From Porter Road Looking NW (1/22/18)



Exhibit 12. View of Subsidence Along Retaining Wall Fence Looking East (1/22/18)



Exhibit 13. Close up of Shear Failure Scarp Looking West (1/22/2018)



Exhibit 14. Soil Pulling Away From Downslope Side of Wall (1/22/2018)

Hurricane Irma

Hurricane Irma passed through the area on September 10-11, 2017 bringing approximately 9 to 10 inches of rainfall to the project site vicinity as shown in Exhibit 15. Extraordinary wetness was also observed within the adjacent Summerlake subdivision where new roadway underdrains are planned.

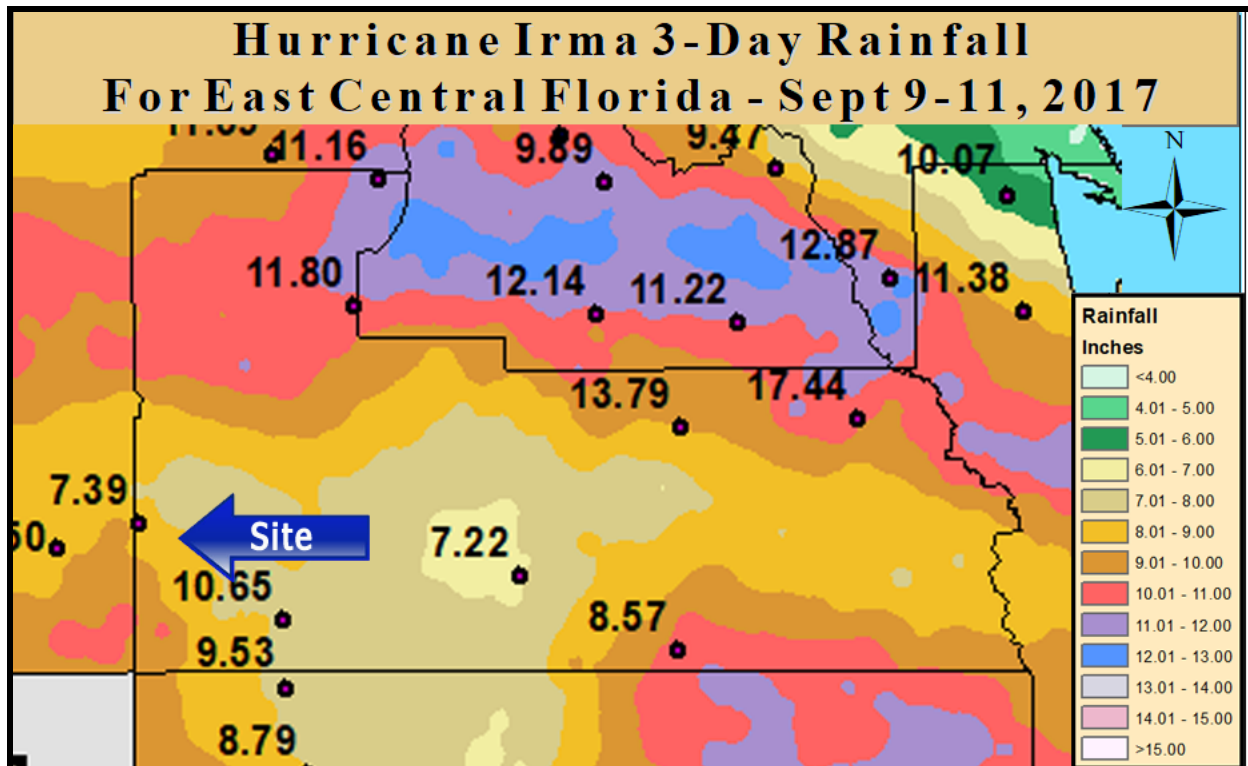


Exhibit 15. Hurricane Irma Rainfall Map For East Central Florida

Lake Hancock & Lake Stailing

In the aftermath of Hurricane Irma, Lake Hancock, which is directly north of the project site, rose to an elevation of +98.7 ft NAVD which is close to its 100 yr flood elevation of +98.9 ft NAVD, reflecting a peak in subregional groundwater levels. This subregional hydrologic peak is reflected in the lake level chart for Lake Hancock in Exhibit 16 which shows the record high lake level measured after Hurricane Irma.

Lake Stailing discharges at an elevation of +100 ft NAVD (+101 ft NGVD) into Lake Hancock and we understand that Lake Stailing stages remained at +100 ft NAVD for an extended period after Hurricane Irma causing boat docks on this lake to be inundated for several weeks. Lake Stailing is a ski lake which brings the ski boats and skiers very close to the shoreline downslope from the retaining wall. From our visual observations, waves 1.5 to 2 ft high are created by the ski activity. The toe of the slope would therefore be saturated to an elevation of +102 ft NAVD (+103 ft NGVD) during this high water event when combined with the ski-induced wave action. Note that the top of slope is about 8 ft higher at elevation +110 ft NAVD.