

# TECHNICAL MEMORANDUM

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**To:** City of Clearwater Personnel

**From:** Justin V. Keller, PE, CFM, ENV SP, Advanced Engineering & Design, Inc. (AED)

**CC:** File

**Date:** October 20, 2025

**Re:** City of Clearwater  
Disaster #4834DR  
Damage #1514623, Alligator Creek  
Sites 1, 2 & 3A (Repair & Mitigation)

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The City of Clearwater experienced damages as outlined within the Damage Description and Dimensions (DDD) document associated with the above-referenced site. The City is intending to pursue repair of the damaged facilities at Sites 1 & 3A in lieu of mitigation. By definition, facility repair is intended to restore basic function and safety of the facility in a manner that replicates the pre-damage condition. Mitigation may be pursued at Site 2.

## Sites 1 and 3A

The damaged embankment was a vegetated creek bank for a critical open conveyance facility. While the slope was stable in the pre-damage condition, it was relatively steep. This slope was stabilized solely through the presence of established vegetation whose root system penetrated deep into the ground. High velocities experienced during Disaster #4834DR resulted in a loss of this vegetation which in turn de-stabilized the slope and damaged the embankment.

Considering that this is an active open conveyance facility, reconstructing a stabilized vegetated slope is not practical. Repairing the bank through the placement of native soil and vegetation would not restore basic function and safety. Without a deep root system (which takes years to grow), this soil would be un-stabilized and thereby subject to future failures during non-severe storm events. As such, the City will be pursuing the installation of a sheet piling system as the means of slope stabilization repair.

This concern is exacerbated at Site 3A where the creek changes direction resulting in excessive forces on the outer banks.

Slope stabilization using sheet piling will require that the sheet piles be offset from the existing embankment toe of slope. Native soils would be placed landward of the slope stabilization to re-establish pre-damage runoff patterns.

The extents of slope stabilization cannot match the limits of the washout; they must extend beyond in either direction. Terminating at the point of connection can result in undermining and further washout. Therefore, slope stabilization is proposed to extend upstream and downstream of the limits identified in the DDD.

A transition will be needed between the method of slope stabilization (sheet pile wall system) and the connection to the existing embankment. This is because the typical sections differ. Since vegetated slopes cannot be repaired due to the time required for vegetation establishment, rip rap material will be needed to stabilize the new embankment.

## Site 2

A weir associated with a stormwater management facility is located at the site. High stages in the facility resulted in overtopping of the weir. This overtopping resulted in excessive velocities over the weir resulting in vegetation loss and eventual washout of the surrounding bank. The concrete weir structure was undermined and structural damage is apparent.

The weir structure will be repaired dimensionally in-kind to ensure that critical elevations are replicated. In lieu of constructing a concrete weir, the use of a staggered sheet pile system is proposed. Modification of the sheets will be needed to ensure dimensional replication of the existing facility.

### *Mitigation Opportunities*

The stormwater management facility's only discharge is through this control weir. Water cascading over this weir causes erosion on the downstream side of the structure. The City continuously maintains this location to ensure that the erosion doesn't result in structure undermining. However, during severe and /or long-duration storm events, maintenance of this area is not possible and continued flow over the weir does compromise structure stability.

To mitigate this concern, the City is proposing constructing a new control structure with a fiberglass skimmer. Discharged flows would be routed to downstream areas via a new culvert resulting in less velocity and removing the cascading feature in its entirety. This structure would be located internal to the pond (versus near the bank) so it would be immune from washout concerns associated with high flows.

**City of Clearwater****Disaster #4834DR****Damage #1514623, Alligator Creek****Opinion of Probable Cost****Site 1**

<i>Pay Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total</i>
Site Mobilization & General Conditions	LS	1	\$ 20,000.00	\$ 20,000.00
Maintenance of Traffic (Vehicular & Pedestrian)	LS	1	\$ 10,000.00	\$ 10,000.00
Erosion & Sediment Control	LS	1	\$ 15,000.00	\$ 15,000.00
Clearing & Grubbing / Site Preparation	LS	1	\$ 15,000.00	\$ 15,000.00
Slope Stabilization (Sheet Pile Wall System)	LF	106	\$ 2,750.00	\$ 291,500.00
Native Soil Backfill	CY	202.89	\$ 125.00	\$ 25,361.25
Transition Grading (Top of Bank)	SY	111.11	\$ 15.00	\$ 1,666.65
Rip Rap Armoring (Ditch Bank Lining)	CY	2.22	\$ 625.00	\$ 1,387.50
Sod Restoration	SY	111.11	\$ 12.25	\$ 1,361.10
TOTAL (SITE 1)				\$ 381,276.50

**Site 2**

<i>Pay Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total</i>
Site Mobilization & General Conditions	LS	1	\$ 30,000.00	\$ 30,000.00
Maintenance of Traffic (Vehicular & Pedestrian)	LS	1	\$ 10,000.00	\$ 10,000.00
Erosion & Sediment Control	LS	1	\$ 15,000.00	\$ 15,000.00
Clearing & Grubbing / Site Preparation	LS	1	\$ 25,000.00	\$ 25,000.00
Slope Stabilization (Sodded Embankment)	LF	42.26	\$ 250.00	\$ 10,565.00
Sheet Pile Weir Wall	LF	25	\$ 2,500.00	\$ 62,500.00
Native Soil Backfill	CY	50.52	\$ 125.00	\$ 6,315.00
Sod Restoration	SY	281.11	\$ 12.25	\$ 3,443.60
TOTAL (SITE 2)				\$ 162,823.60

**Site 3A**

<i>Pay Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total</i>
Site Mobilization & General Conditions	LS	1	\$ 100,000.00	\$ 100,000.00
Maintenance of Traffic (Vehicular & Pedestrian)	LS	1	\$ 15,000.00	\$ 15,000.00
Erosion & Sediment Control	LS	1	\$ 20,000.00	\$ 20,000.00
Clearing & Grubbing / Site Preparation	LS	1	\$ 50,000.00	\$ 50,000.00
Slope Stabilization (Sheet Pile Wall System)	LF	283.4	\$ 3,000.00	\$ 850,200.00
Native Soil Backfill	CY	126.2	\$ 125.00	\$ 15,775.00
Transition Grading (Top of Bank)	SY	314.88	\$ 15.00	\$ 4,723.20
Rip Rap Armoring (Ditch Bank Lining)	CY	2.22	\$ 625.00	\$ 1,387.50
Sod Restoration	SY	314.88	\$ 12.25	\$ 3,857.28
TOTAL (SITE 3)				\$ 1,060,942.98

**City of Clearwater**

**Disaster #4834DR**

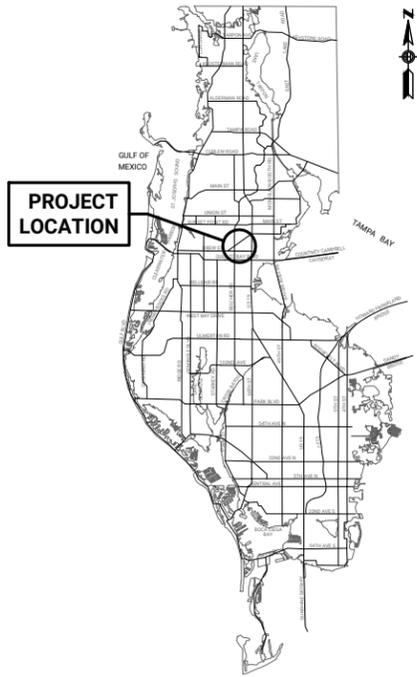
**Damage #1514623, Alligator Creek**

**Opinion of Probable Cost**

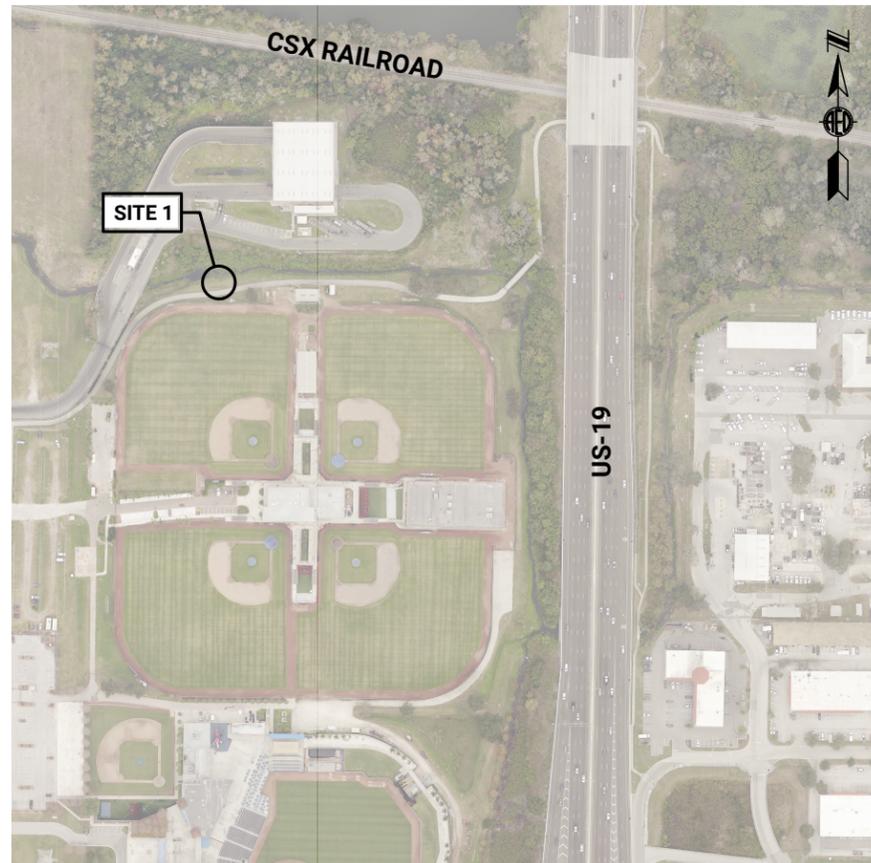
**Site 2 (Mitigation)**

<i>Pay Item Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total</i>
Site Mobilization & General Conditions	LS	1	\$ 50,000.00	\$ 50,000.00
Maintenance of Traffic (Vehicular & Pedestrian)	LS	1	\$ 10,000.00	\$ 10,000.00
Erosion & Sediment Control	LS	1	\$ 20,000.00	\$ 20,000.00
Clearing & Grubbing / Site Preparation	LS	1	\$ 25,000.00	\$ 25,000.00
Slope Stabilization (Sodded Embankment)	LF	17.7	\$ 250.00	\$ 4,425.00
Control Structure	EA	1	\$ 17,500.00	\$ 17,500.00
Mitered End Section	EA	1	\$ 10,000.00	\$ 10,000.00
Concrete Culvert	LF	25	\$ 200.00	\$ 5,000.00
Native Soil Backfill	CY	67.9	\$ 125.00	\$ 8,487.50
Sod Restoration	SY	281.11	\$ 12.25	\$ 3,443.60
TOTAL (SITE 2)				\$ 153,856.10

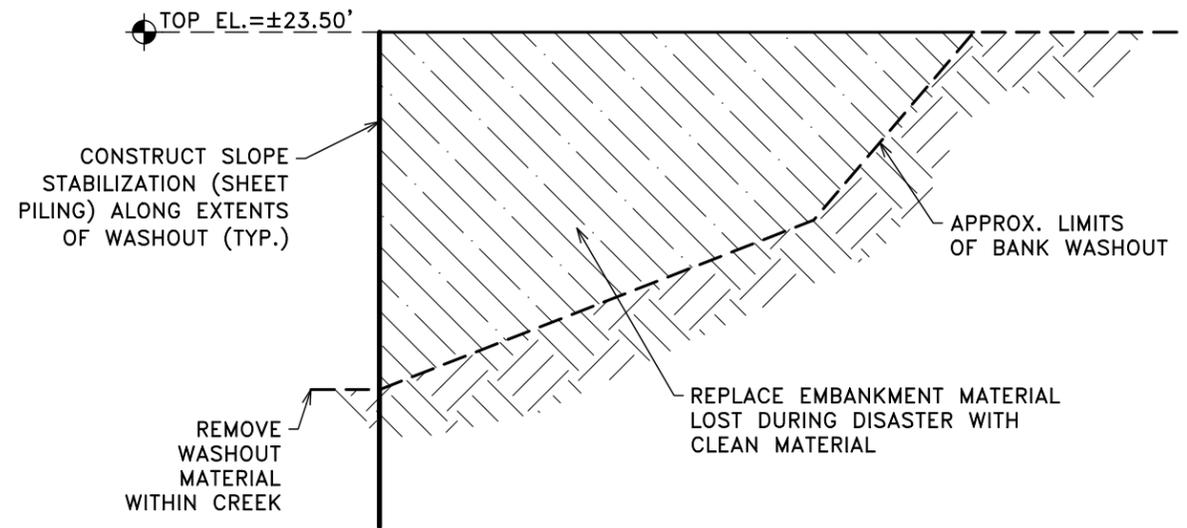
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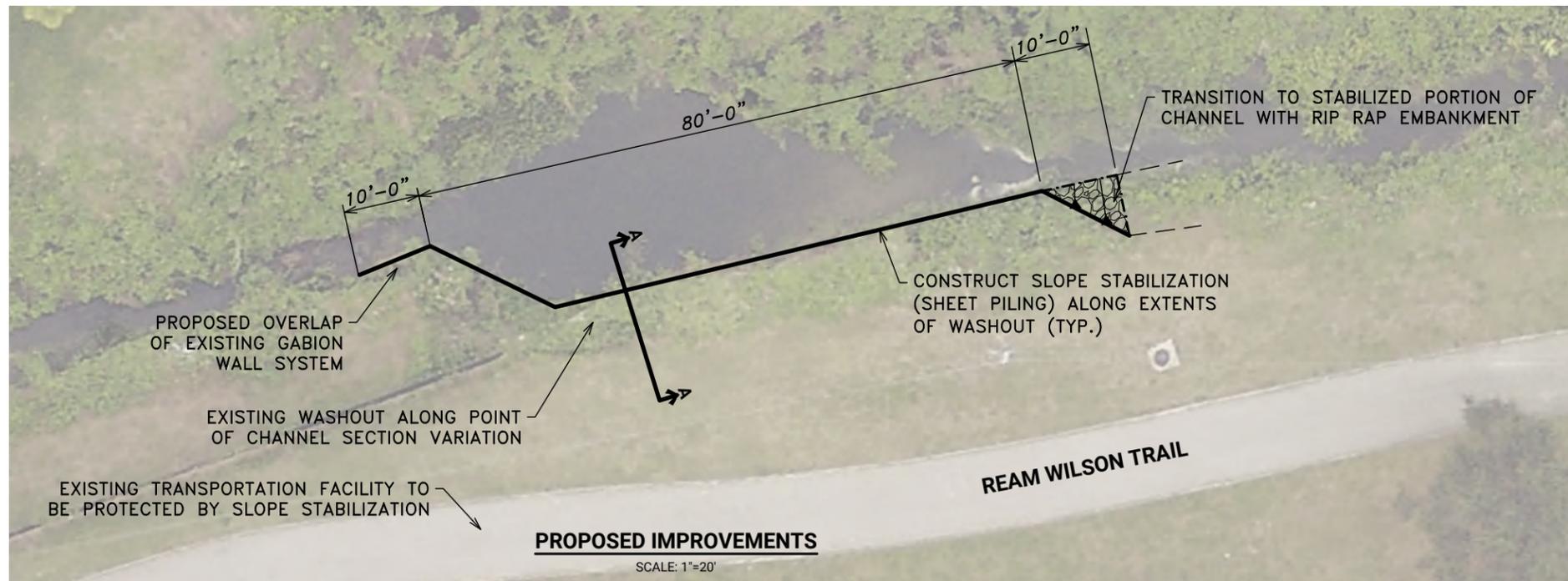
**LOCATION MAP**  
NOT TO SCALE



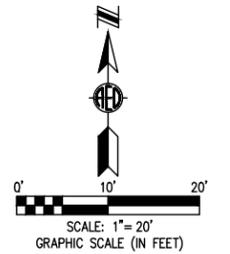
**FACILITY MAP**  
SCALE: 1"=400'



**TYPICAL SECTION "A-A"**  
SCALE: 1"=4'



**PROPOSED IMPROVEMENTS**  
SCALE: 1"=20'



- LEGEND:**
- SLOPE STABILIZATION
  - SLOPED EMBANKMENT
  - RIP RAP

NO.	REVISIONS	BY	DATE

SCALE: AS SHOWN  
 DRAWN: S.A.T.  
 DESIGNED: A.E.D.  
 APPROVED: J.V.K.

**ADVANCED**  
 ENGINEERING & DESIGN, INC.  
 3931 68th Avenue North, Pinellas Park, FL 33781 • (727) 526-9158 • www.aed-fl.com

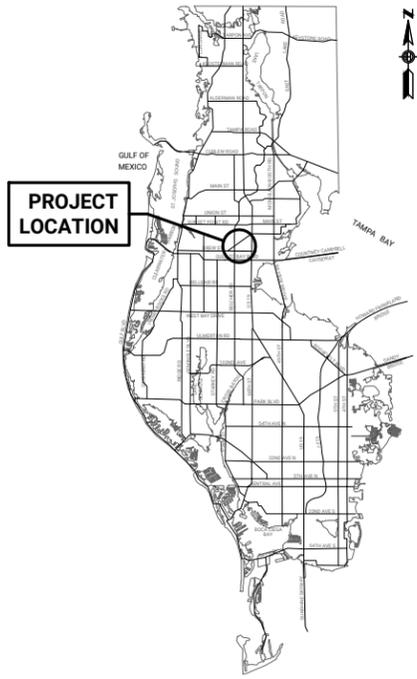


**CITY OF CLEARWATER**  
 DISASTER #4834DR  
 SUMMARY OF REPAIR & MITIGATION

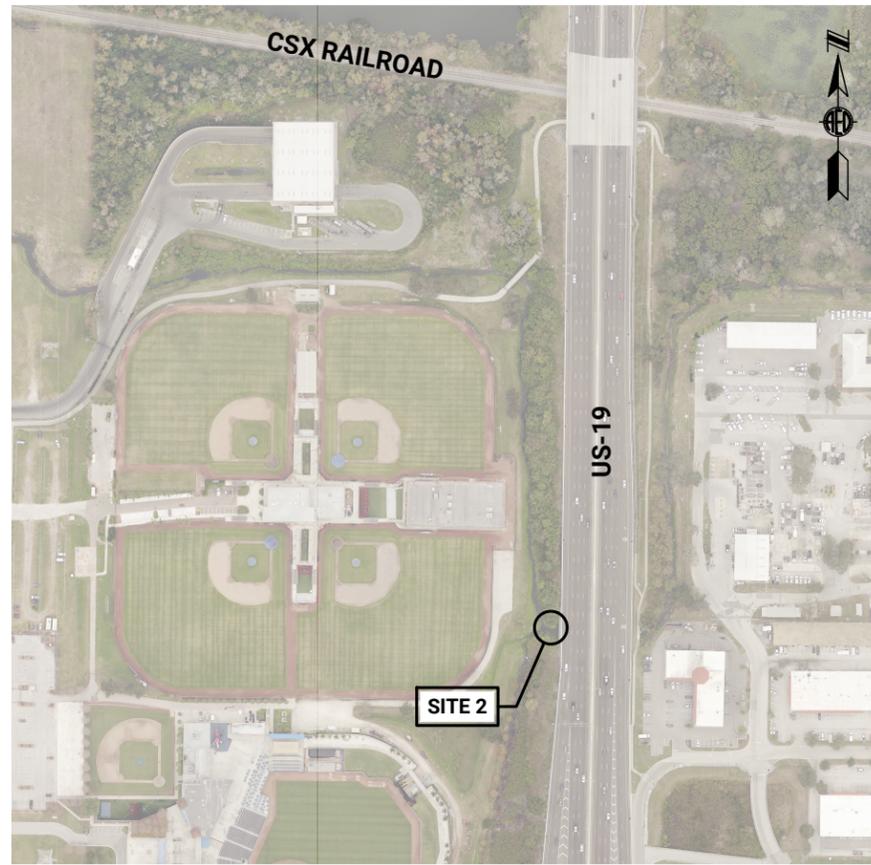
**DAMAGE #1514623,  
 ALLIGATOR CREEK  
 SITE 1 (REPAIR)**

DATE:	10/17/25
PROJECT NO.:	24.CL-41
SHEET NO.:	<b>1</b>

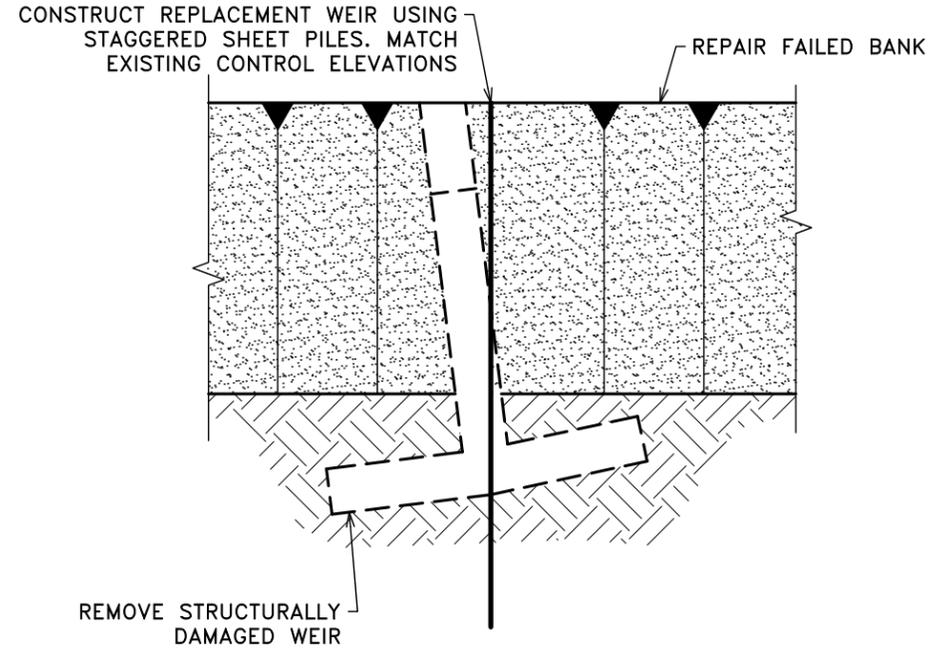
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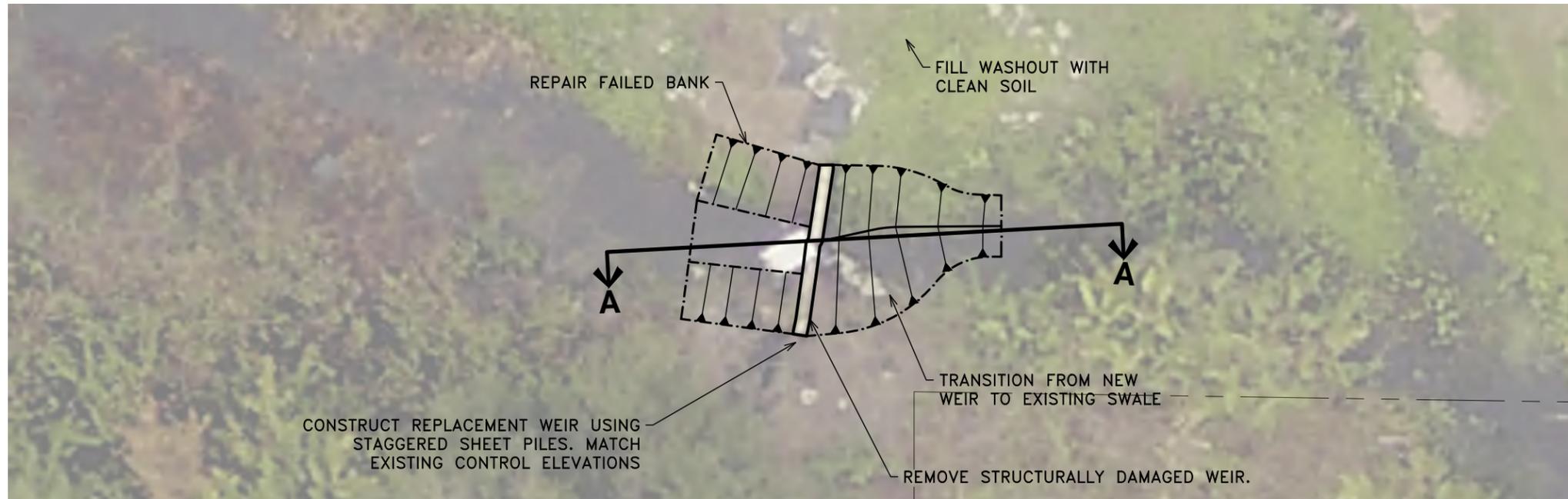
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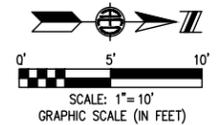
**FACILITY MAP**  
SCALE: 1"=400'



**TYPICAL SECTION "A-A"**  
SCALE: 1"=4'



**PROPOSED IMPROVEMENTS**  
SCALE: 1"=10'



- LEGEND:**
- SLOPE STABILIZATION
  - SLOPED EMBANKMENT
  - RIP RAP

NO.	REVISIONS	BY	DATE

SCALE: AS SHOWN  
DRAWN: S.A.T.  
DESIGNED: A.E.D.  
APPROVED: J.V.K.

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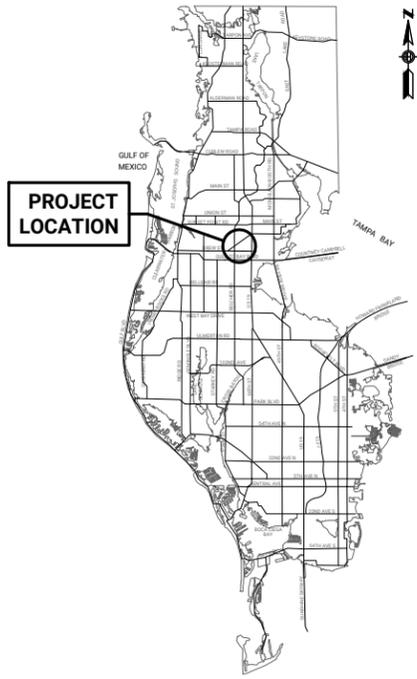


**CITY OF CLEARWATER**  
DISASTER #4834DR  
SUMMARY OF REPAIR & MITIGATION

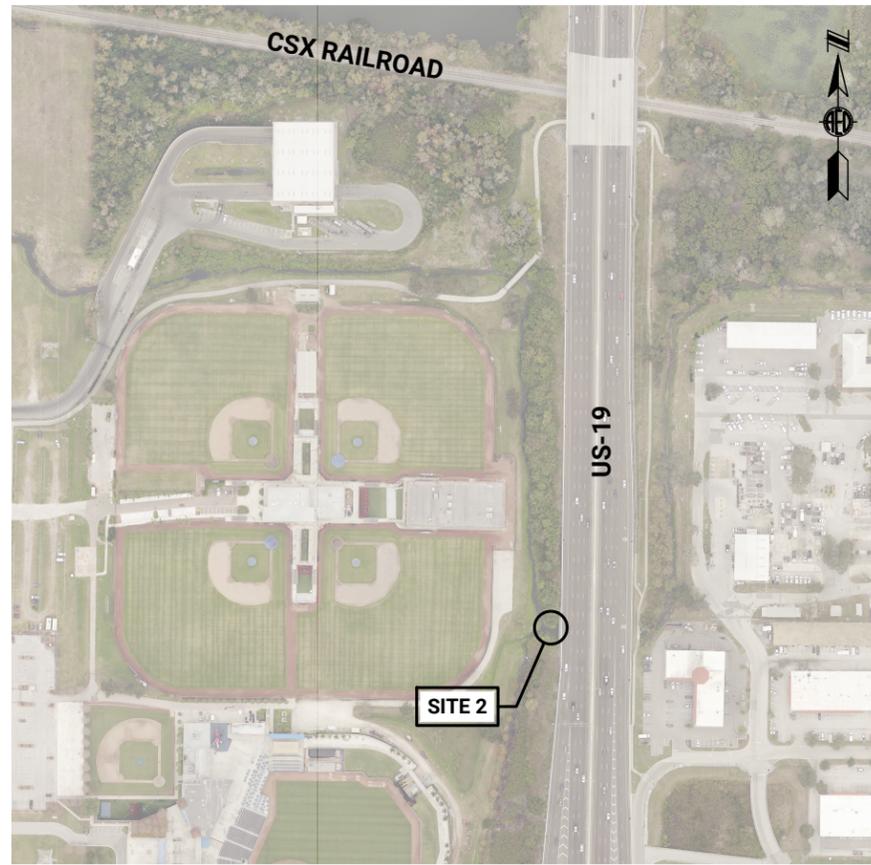
**DAMAGE #1514623,  
ALLIGATOR CREEK  
SITE 2 (REPAIR)**

DATE:	10/17/25
PROJECT NO.:	24.CL-41
SHEET NO.:	<b>2</b>

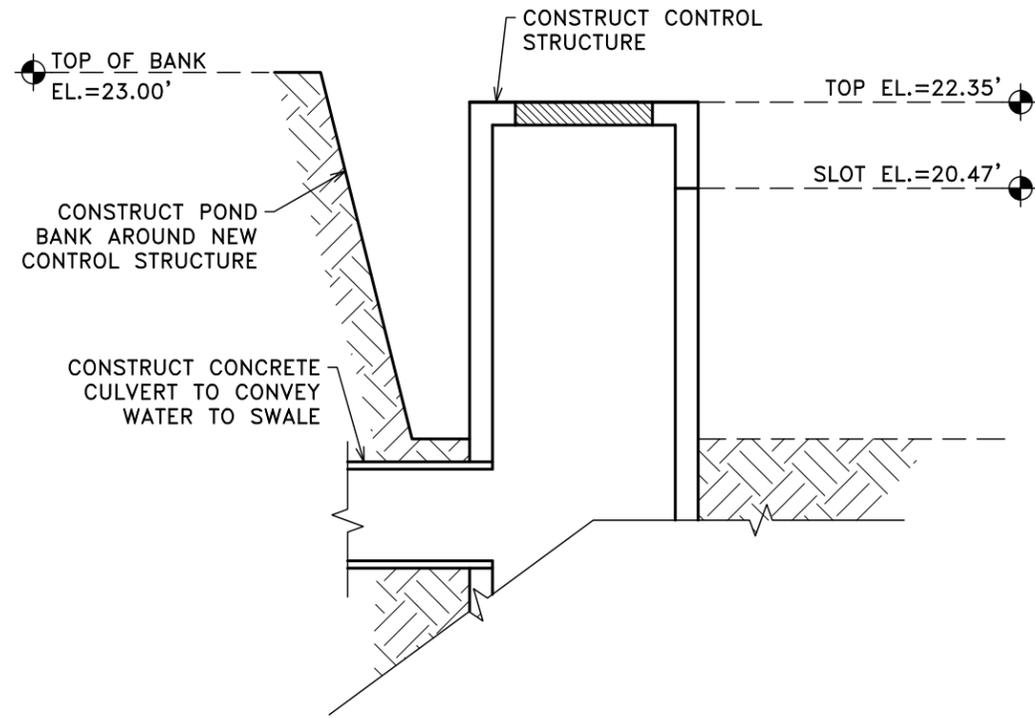
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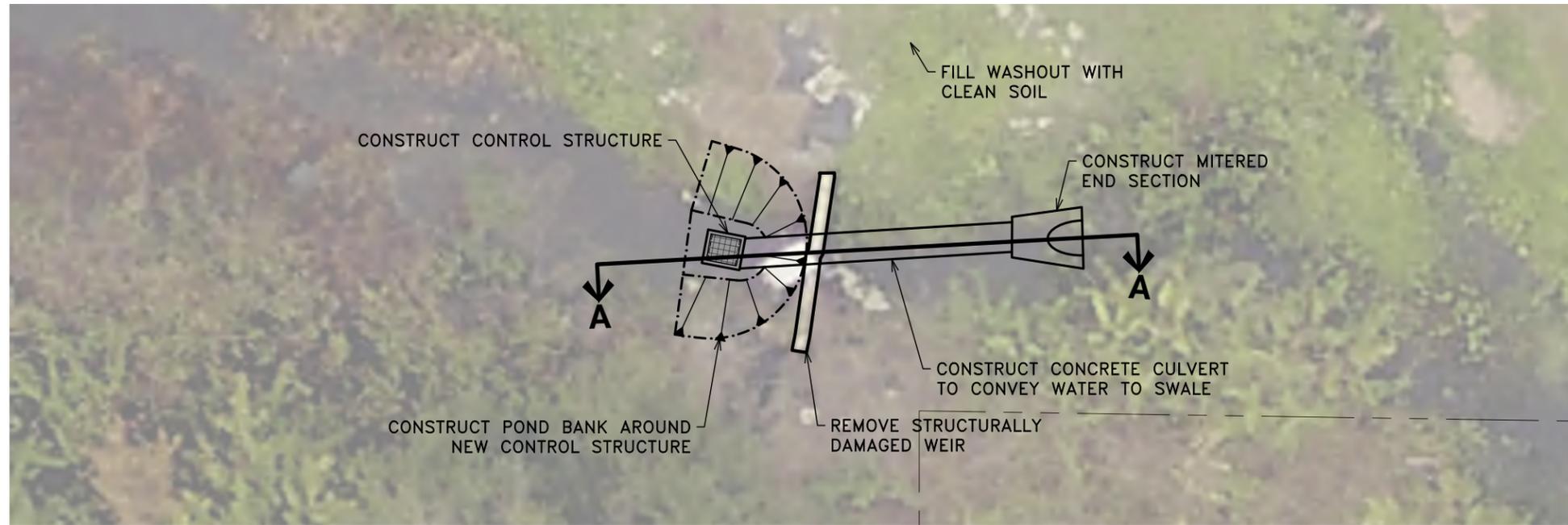
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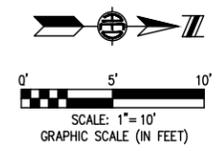
**FACILITY MAP**  
SCALE: 1"=400'



**TYPICAL SECTION "A-A"**  
SCALE: 1"=4'



**PROPOSED IMPROVEMENTS**  
SCALE: 1"=10'



- LEGEND:**
- SLOPE STABILIZATION
  - SLOPED EMBANKMENT
  - RIP RAP

NO.	REVISIONS	BY	DATE

SCALE: AS SHOWN  
 DRAWN: S.A.T.  
 DESIGNED: A.E.D.  
 APPROVED: J.V.K.

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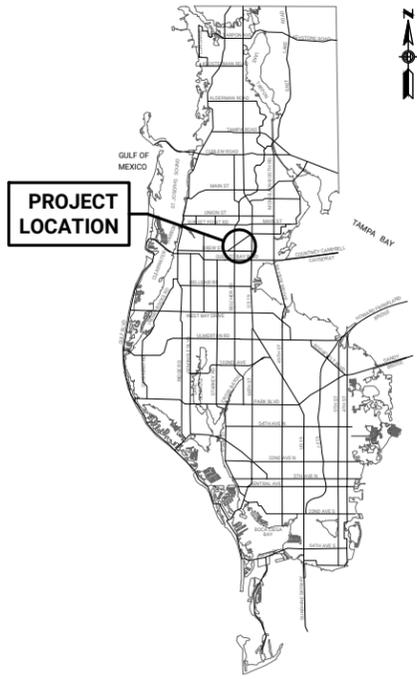


**CITY OF CLEARWATER**  
 DISASTER #4834DR  
 SUMMARY OF REPAIR & MITIGATION

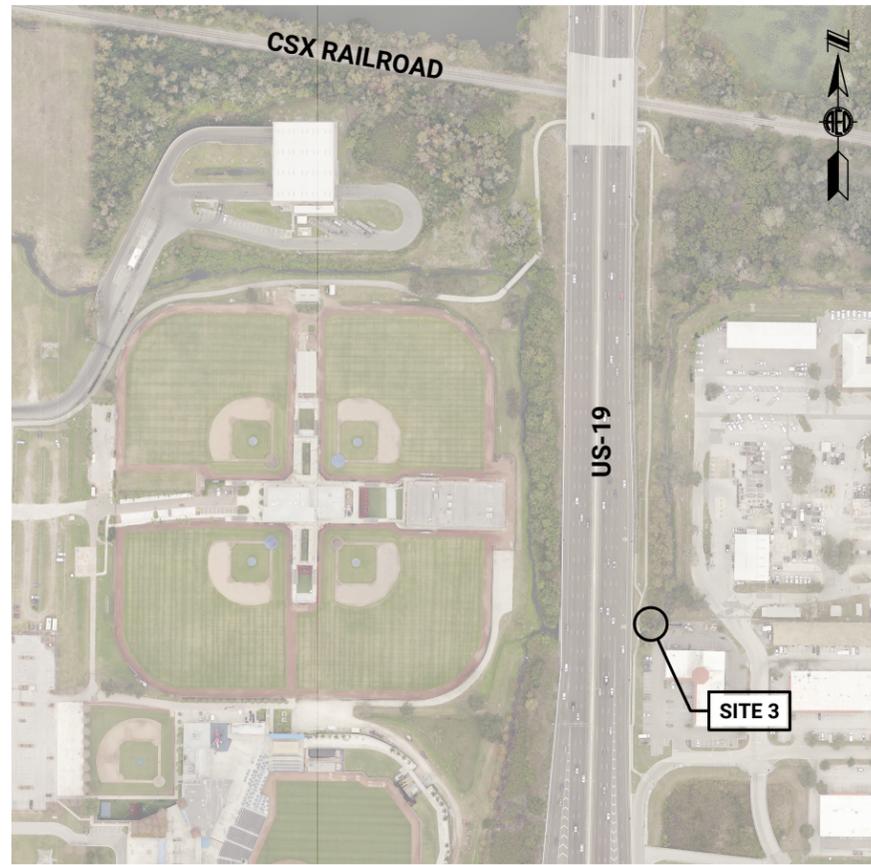
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 ALLIGATOR CREEK  
 SITE 2 (MITIGATION)**

DATE: 10/17/25  
 PROJECT NO.: 24.CL-41  
 SHEET NO.: **2M**

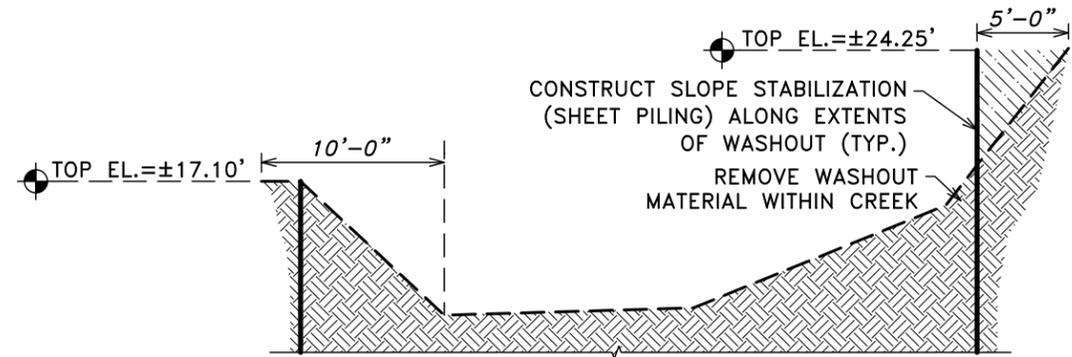
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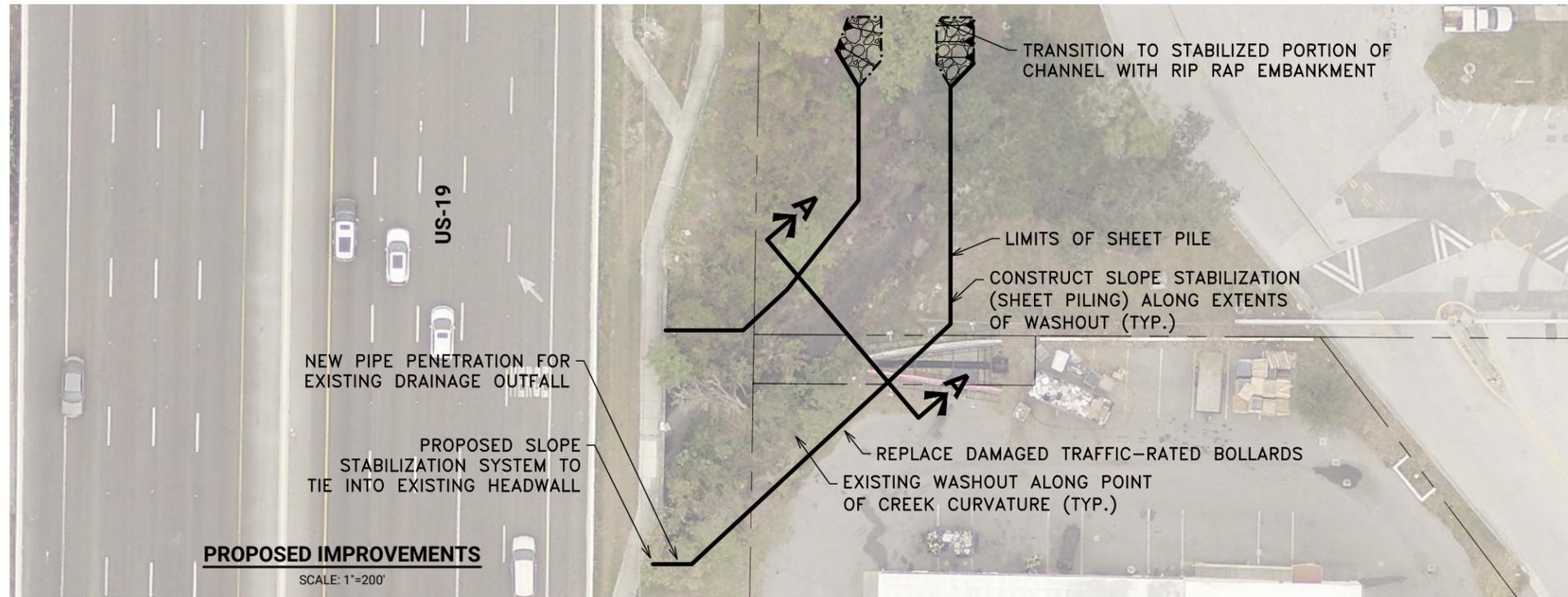
**LOCATION MAP**  
NOT TO SCALE



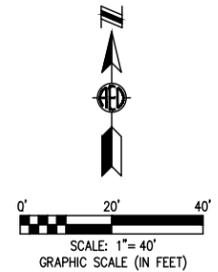
**FACILITY MAP**  
SCALE: 1"=400'



**TYPICAL SECTION "A-A"**  
SCALE: 1"=10'



**PROPOSED IMPROVEMENTS**  
SCALE: 1"=200'



- LEGEND:**
- SLOPE STABILIZATION
  - SLOPED EMBANKMENT
  - RIP RAP

NO.	REVISIONS	BY	DATE

SCALE: AS SHOWN  
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**CITY OF CLEARWATER**  
 DISASTER #4834DR  
 SUMMARY OF REPAIR & MITIGATION

**DAMAGE #1514623,  
 ALLIGATOR CREEK  
 SITE 3 (REPAIR)**

DATE:	10/17/25
PROJECT NO.:	24.CL-41
SHEET NO.:	<b>3</b>