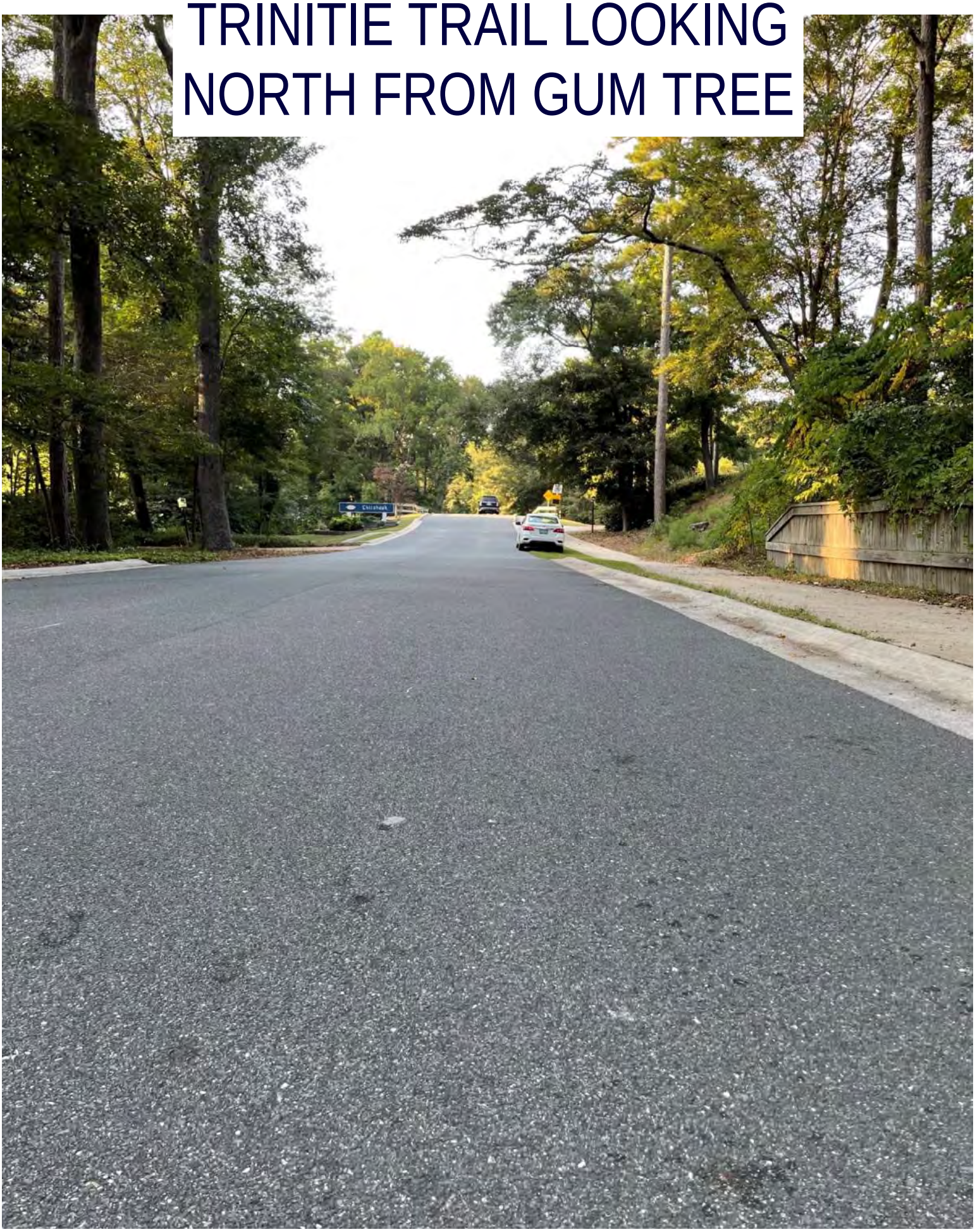
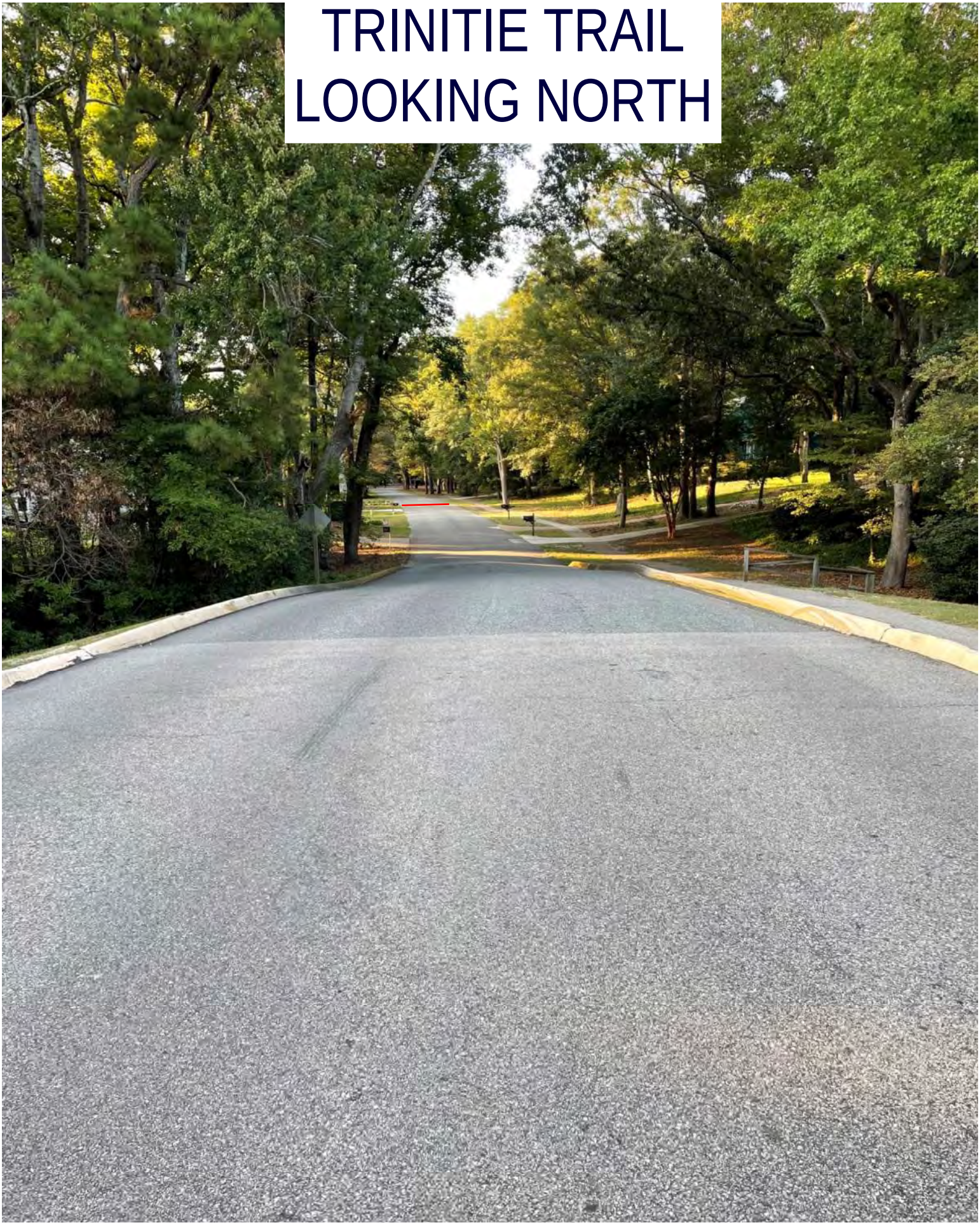
TRINITIE TRAIL PIPE ARCH REPLACEMENT

TRINITIE TRAIL LOOKING NORTH FROM GUM TREE



TRINITIE TRAIL
LOOKING SOUTH

TRINITIE TRAIL
LOOKING NORTH



TRINITIE TRAIL
LOOKING SOUTH


ALONG EXISTING PIPE
ARCH LOOKING WEST

ALONG EXISTING PIPE
ARCH LOOKING EAST

RDWY-1

FEASIBILITY

KHA PROJECT 011541001

DATE: 09-15-2022

PROJECT:
TTRINITIE TRAIL
CULVERT REPLACEMENT
FEASIBILITY STUDY

TITLE:
ALTERNATIVES 1 & 2 - BRIDGE

PLANS PREPARED FOR:
TOWN OF SOUTHERN SHORES

NO.	DATE	REVISIONS

SEAL

INCOMPLETE PLANS
do not use for P.S. & E. submittal
PRELIMINARY PLANS
do not use for construction

SEAL

INCOMPLETE PLANS
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PRELIMINARY PLANS
do not use for construction

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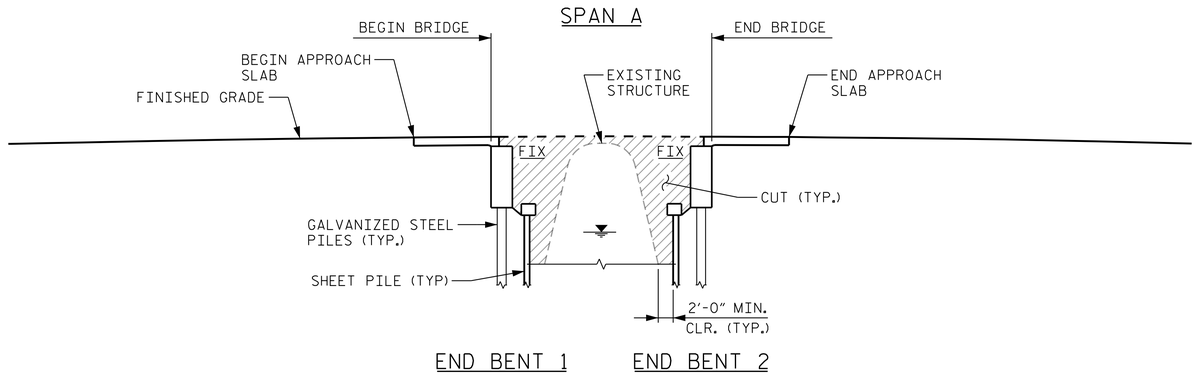
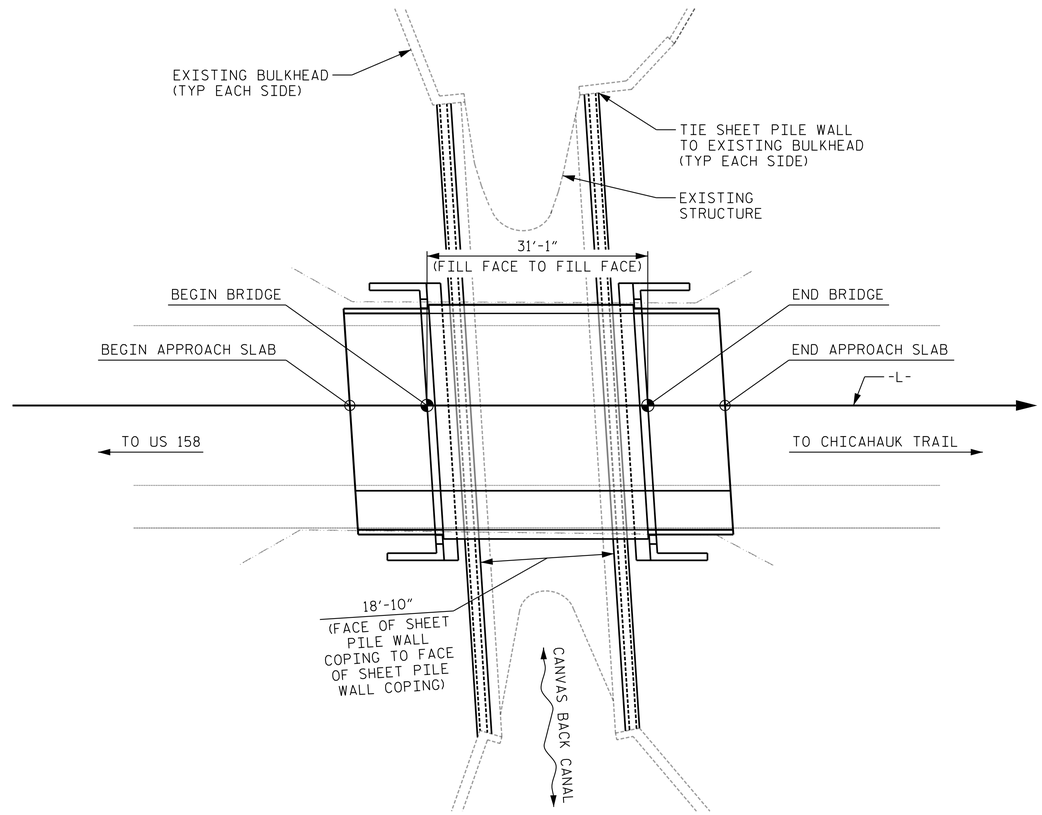
NC LICENSE #: C-0102



SECTION ALONG -L-

SECTIONS AT END BENTS ARE AT RIGHT ANGLES.



PLAN

PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.

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9/15/2022

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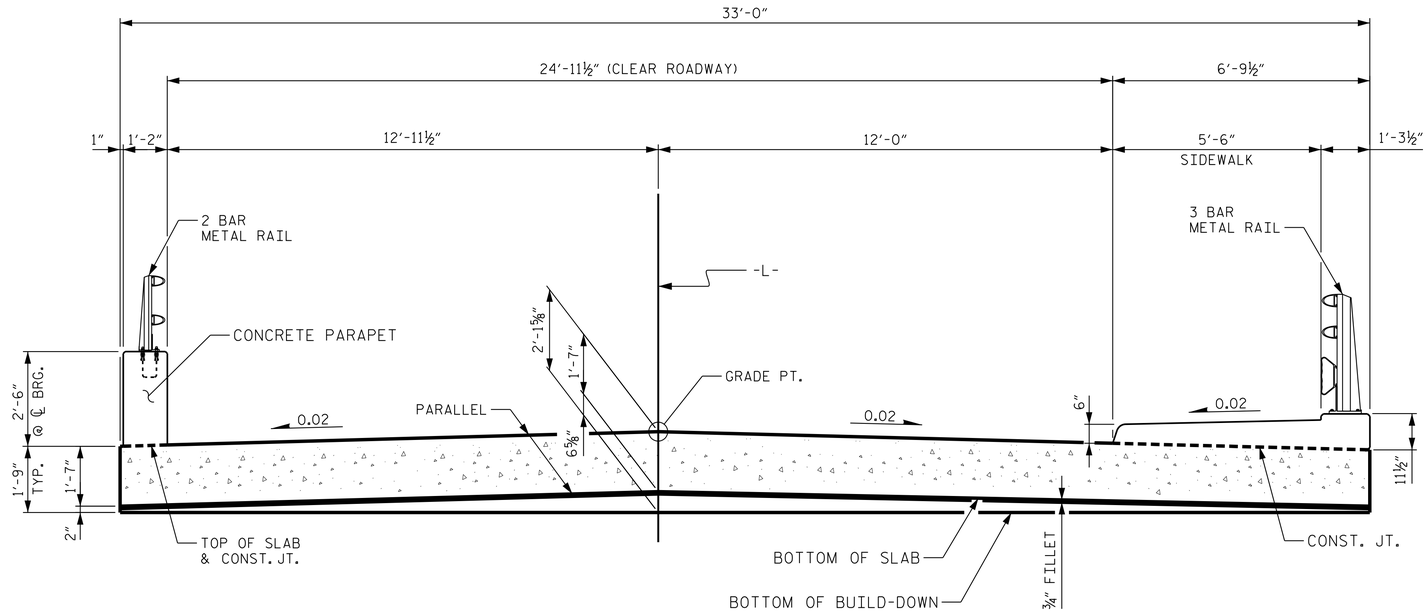
ALTERNATIVES #1 & #2
FLAT SLAB & CORED SLAB
PLAN & ELEVATION

NOT TO SCALE

PROJECT:
TOWN OF SOUTHERN SHORES, NC
TRINITIE TRAIL BRIDGE REPLACEMENT

JOB NUMBER:	SHEET NUMBER:
011541001	S-1



FLAT SLAB - TYPICAL SECTION

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9/15/2022

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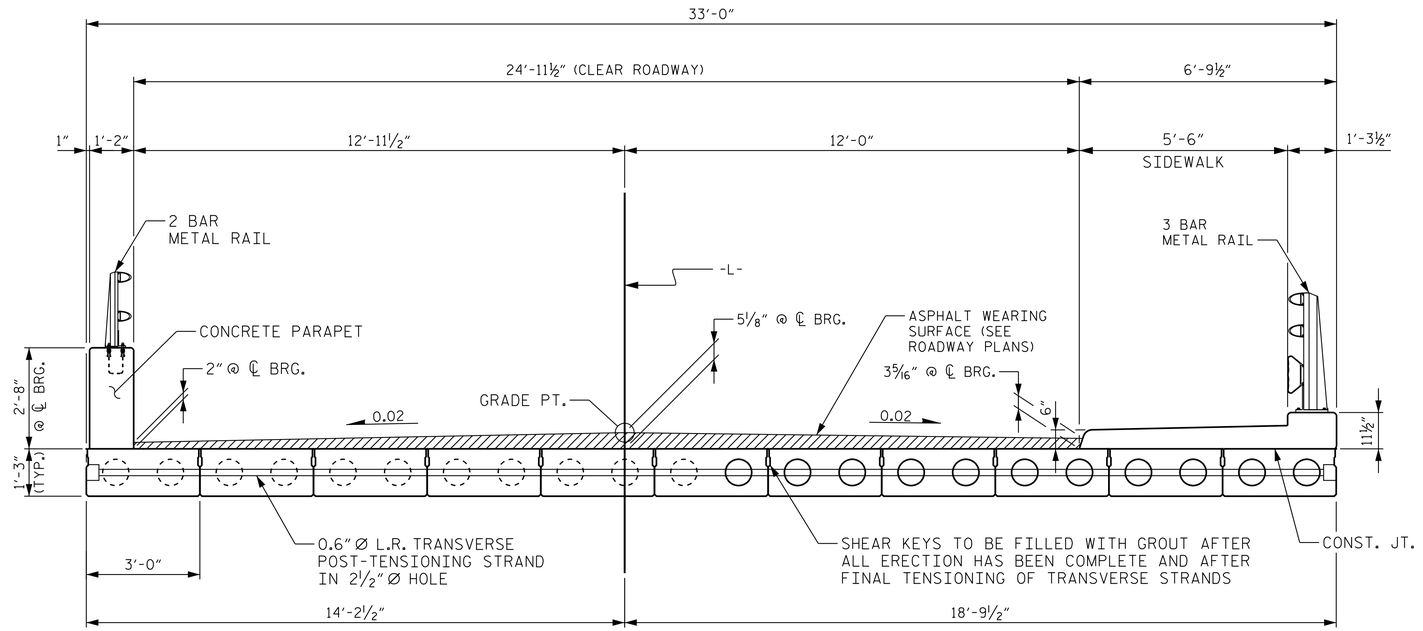
ALTERNATIVE #1
FLAT SLAB BRIDGE
TYPICAL SECTION

NOT TO SCALE

PROJECT:
TOWN OF SOUTHERN SHORES, NC
TRINITIE TRAIL BRIDGE REPLACEMENT

JOB NUMBER: 011541001

SHEET NUMBER: S-2



CORED SLAB - TYPICAL SECTION

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9/15/2022

REV. No.:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

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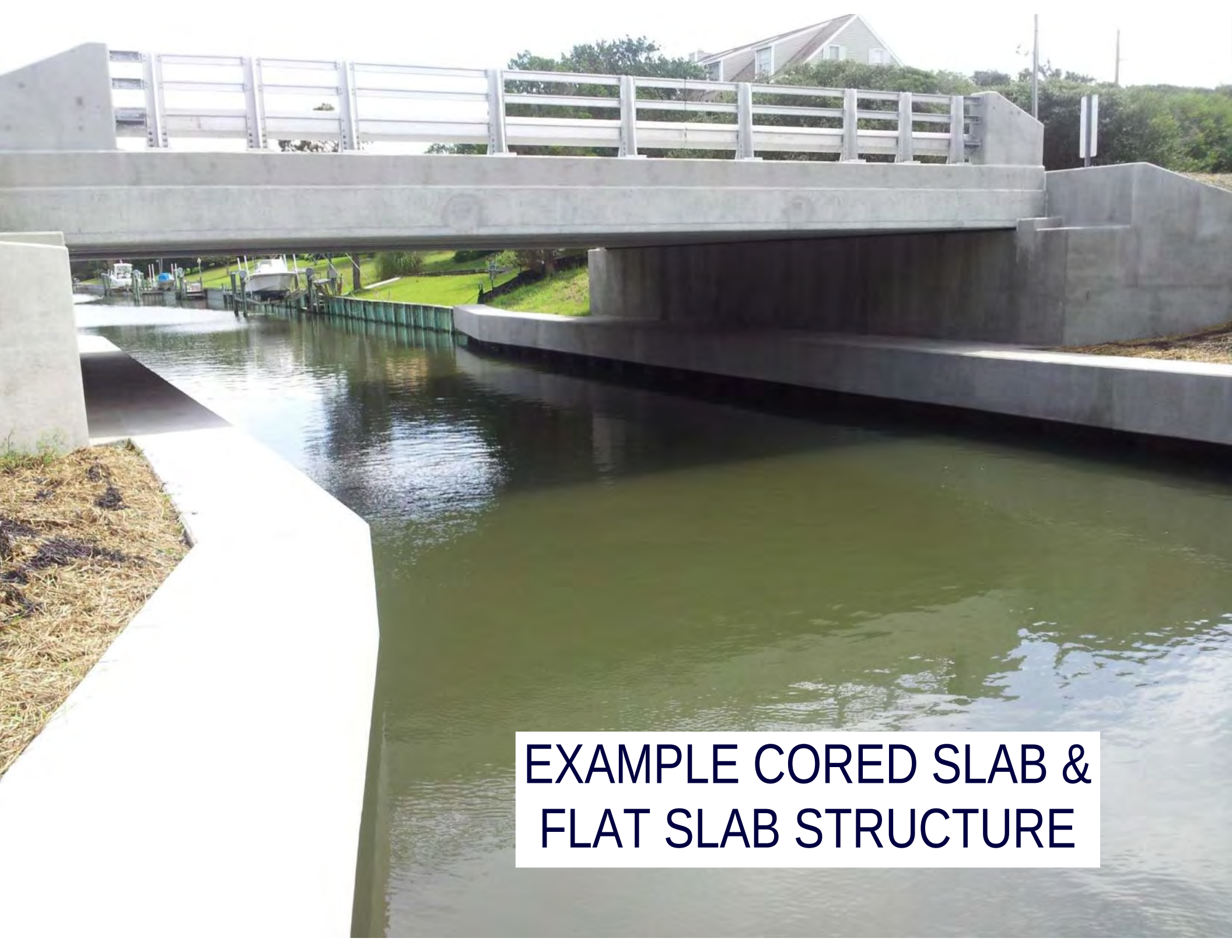
ALTERNATIVE #2
CORED SLAB BRIDGE
TYPICAL SECTION

NOT TO SCALE

PROJECT:
TOWN OF SOUTHERN SHORES, NC
TRINITIE TRAIL BRIDGE REPLACEMENT

JOB NUMBER: 0115410001

SHEET NUMBER: S-3


EXAMPLE CORED SLAB &
FLAT SLAB STRUCTURE

Alternative #1: Flat Slab Bridge

The flat slab bridge alternative will require permanent sheet pile wall with reinforced concrete coping on top to be driven directly outside the limits of the existing structure. These walls will extend the full length of the existing structure and tie to existing bulkheads both to the east and west of Trinitie Trail. Cast-in-place concrete end bent caps and turned back wingwalls will be used to support the surrounding soil at the begin and end bridge. Due to the nature of this type of construction, it is anticipated that the canal will be closed for a longer duration since the above water work will be more substantial than any of the other alternatives.

The bridge length for this option is set based on the assumed limits of the existing structure. We assumed a 2' offset from the limits of the existing pipe arch to the proposed sheet pile bulkhead; from there the bridge is founded on a 6.5' tall end bent caps to reduce the overall structure length. By minimizing the length of bridge, we are able to limit the overall roadway impacts by reducing the amount of overall roadway length needing grading. The bridge height, and likewise the vertical canal opening was set to maintain the existing vertical clearance at the existing pipe arch. Based on previous experience within navigable waterways with the Coast Guard and without having any existing boating data for the crossing, we do not believe that lowering the opening is a viable option at this time.

Alternative #2: Cored Slab Bridge

The cored slab bridge alternative will also require permanent sheet pile wall with reinforced concrete coping on top to be driven directly outside the limits of the existing structure. Similarly, these walls will extend the full length of the existing structure and tie to existing bulkheads both to the east and west of Trinitie Trail. Cast-in-place end bent caps and earth retaining wingwalls will be formed, poured, and stripped at begin and end bridge. It is anticipated that the end bent caps will need to be supported on deep foundations based on past performance of the existing structure. Construction of the precast cored slab superstructure will require crane operation and rigging coordination to pick and set each of the precast units. Note, it is anticipated that a shorter term shut down of the canal will be necessary to construct the cored slab bridge than would be necessary for the other alternatives.

The bridge length for this option is set based on the assumed limits of the existing structure. We assumed a 2’ offset from the limits of the existing pipe arch to the proposed sheet pile bulkhead; from there the bridge is founded on a 6.5’ tall end bent caps to reduce the overall structure length. By minimizing the length of bridge, we are able to limit the overall roadway impacts by reducing the amount of overall roadway length needing grading. The bridge height, and likewise the vertical canal opening was set to maintain the existing vertical clearance at the existing pipe arch. Based on previous experience within navigable waterways with the Coast Guard and without having any existing boating data for the crossing, we do not believe that lowering the opening is a viable option at this time.

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RDWY-2

FEASIBILITY

KHA PROJECT 011541001

DATE: 09-15-2022

PROJECT:
TTRINITIE TRAIL
CULVERT REPLACEMENT
FEASIBILITY STUDY

TITLE:
ALTERNATIVE 3 - CULVERT

PLANS PREPARED FOR:
TOWN OF SOUTHERN SHORES

NO.	DATE	REVISIONS

SEAL

INCOMPLETE PLANS
do not use for P.S. & E. documents
PRELIMINARY PLANS
do not use for construction

SEAL

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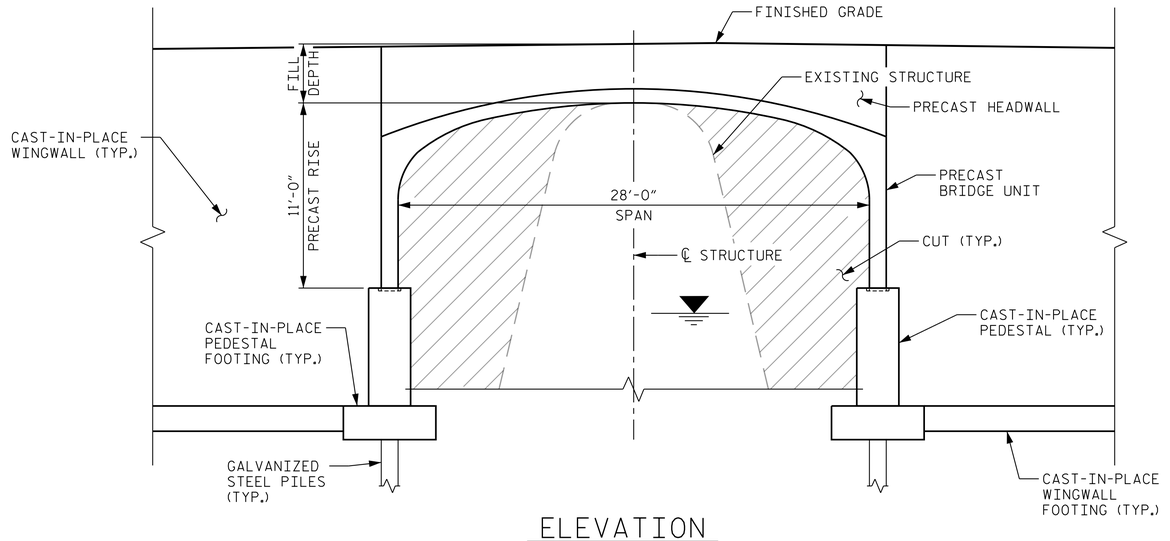
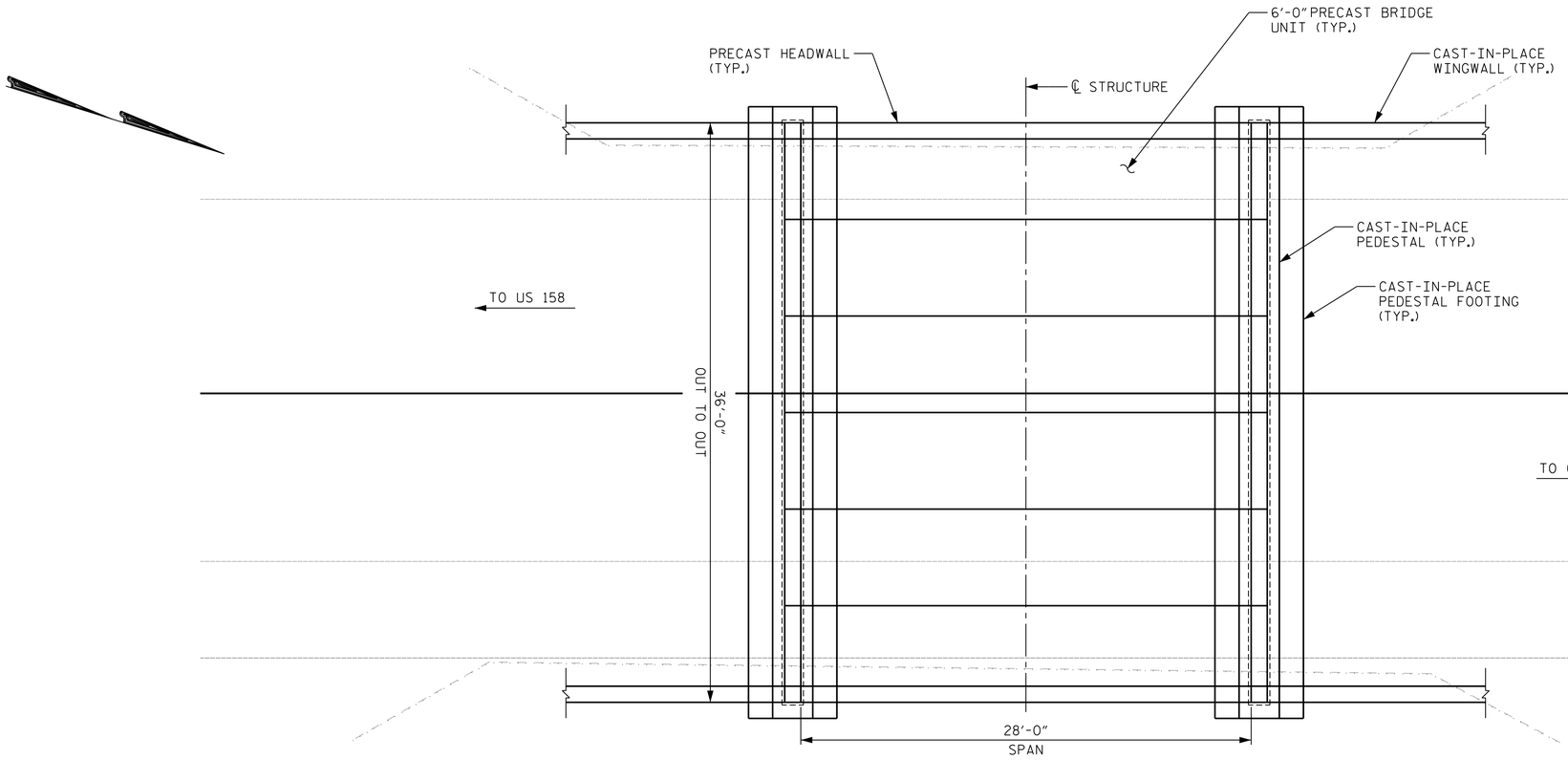


ELEVATION

GUARDRAIL NOT SHOWN FOR CLARITY.



PLAN

PROPOSED PILES AND EXISTING STRUCTURE & BULKHEAD NOT SHOWN FOR CLARITY.

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9/15/2022

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ALTERNATIVE #3
PRECAST ARCH
PLAN & ELEVATION

NOT TO SCALE

PROJECT:
TOWN OF SOUTHERN SHORES, NC
TRINITIE TRAIL BRIDGE REPLACEMENT

JOB NUMBER: 011541001

SHEET NUMBER: S-4

Alternative #3: Precast Arch

The precast arch alternative will also require permanent sheet pile wall to be driven directly outside the limits of the existing structure. These walls will extend from the precast arch to the existing bulkheads both to the east and west of Trinitie Trail. Cast-in-place pedestal footings, pedestals, and earth retaining wingwalls and headwalls will be formed, poured, and stripped at begin and end bridge. It is anticipated that the pedestal and wingwall footings will need to be supported on deep foundations based on past performance of the existing structure. Construction of the precast arch will require crane operation and rigging coordination to pick and set each of the precast units. Note, it is anticipated that a shorter term shut down of the canal will be necessary to construct the precast arch than would be necessary for the flat slab bridge alternative.

The precast arch span was set based on the assumed limits of the existing structure. We assumed a 2' offset from the limits of the existing pipe arch to the proposed temporary shoring needed to construct the cast-in-place concrete pedestal and footing. The precast arch height, and likewise the vertical canal opening was set to maintain the existing vertical clearance at the existing pipe arch. Based on previous experience within navigable waterways with the Coast Guard and without having any existing boating data for the crossing, we do not believe that lowering the opening is a viable option at this time. One of the major difference with this alternative is the cast-in-place concrete wingwalls that are used to retain the roadway fill above and behind the arch. These walls will be full depth (pedestal footing to roadway grade) and therefore will require additional shoring during construction.

EXAMPLE PRECAST ARCH STRUCTURE