

**Newburyport Central Waterfront Bulkhead  
Existing Conditions – Center Embayment**



***Failing Tie Back Anchor Bolts – Structural Concern***



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Existing Conditions – Center Embayment**



**Splash zone steel section loss - loss of fill behind bulkhead**



**Newburyport Central Waterfront Bulkhead  
Existing Conditions – Center Embayment**



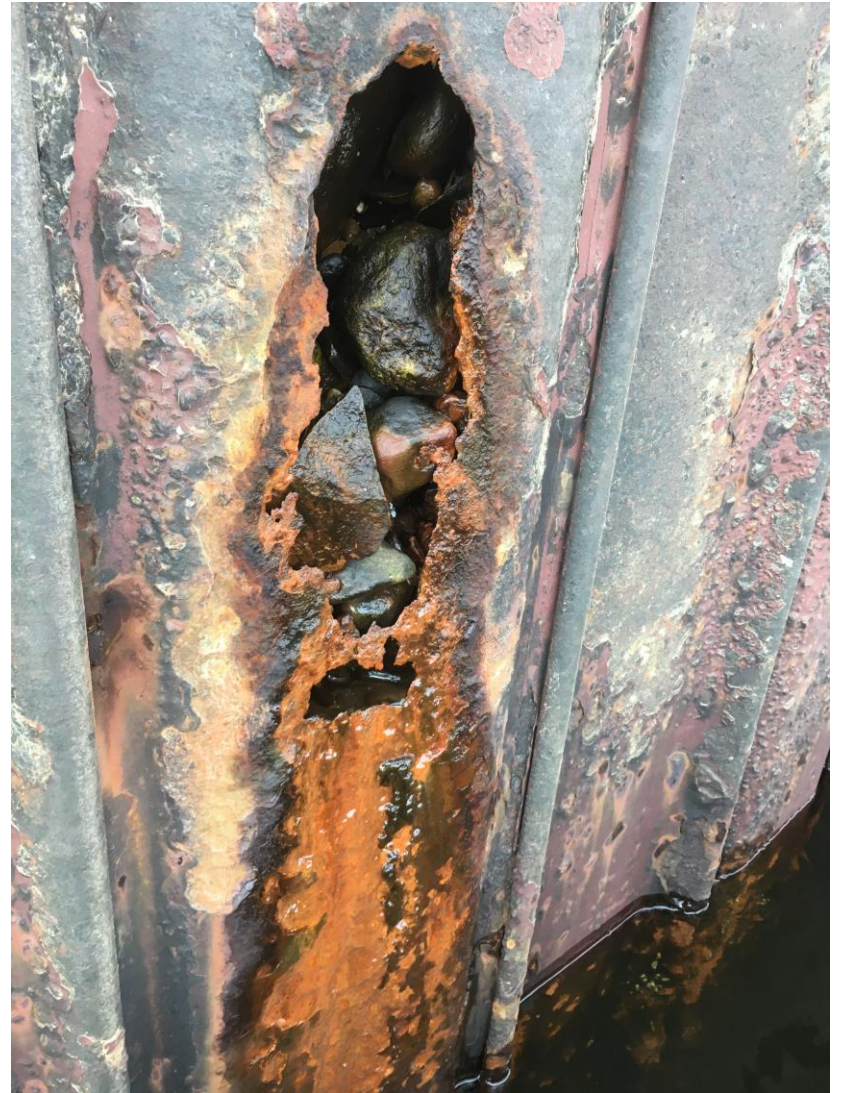
**Splash zone steel section loss - loss of fill behind bulkhead**



**Newburyport Central Waterfront Bulkhead  
Existing Conditions – Steel Cells - East Bulkhead**



**2013 typical conditions: corroding weep hole**



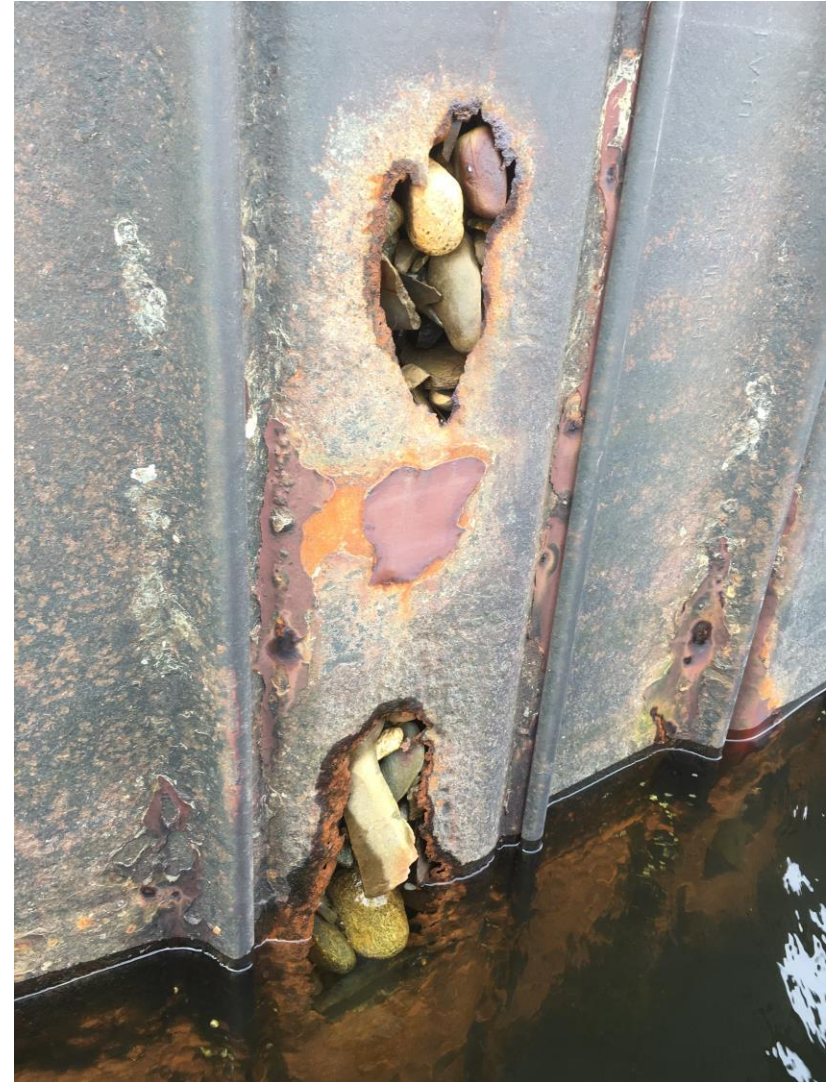
**2021 typical conditions: enlarged weep hole**



**Newburyport Central Waterfront Bulkhead  
Existing Conditions – Steel Cells - East Bulkhead**



**Spring 2021**



**Spring 2021**



**Newburyport Central Waterfront Bulkhead  
Existing Conditions – Mooring Pilings**



**Mooring piling underwater – loss of steel and exposed concrete**

**Newburyport Central Waterfront Bulkhead  
Existing Conditions – Mooring Pilings**



**Mooring piling underwater – no steel remaining and loss of concrete fill**



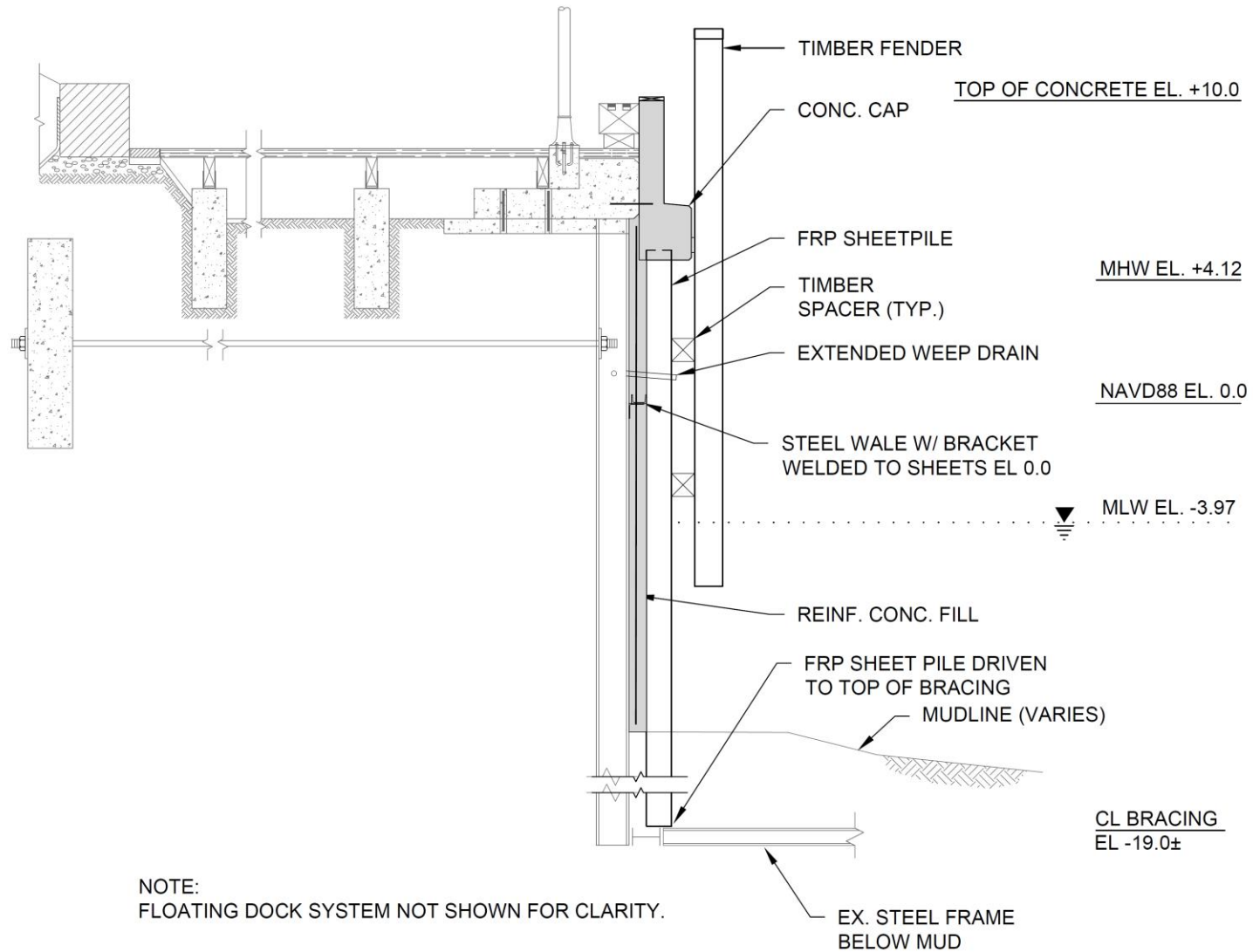
**Newburyport Central Waterfront Bulkhead  
Existing Conditions 2021 – Repaired Transportation Dock Section of Bulkhead**



**FRP sheet piles with concrete  
infill, and new mooring pilings**



# Newburyport Central Waterfront Bulkhead Repair Typical Section



C

EMBAYMENT BULKHEAD REPAIR (TYP.) - SECTION

CP-103 SCALE: 1/4" = 1'-0"