To: Mayor and City Council

From: Craig Middleton, City Manager
Robert Zadnik, Public Works Manager
Adrian Cormier, CLE Engineering

Subject: Continued review of the Beach Road Seawall Stabilization Project

Recommended Motion/Item Description

1. Consider the proposed design for Phase 1 stabilization of Beach Road and Seawall.

2. Approve a resolution authorizing a budget amendment for the Beach Road Seawall Stabilization Project.

Background

Over the last year, Public Works has observed measurable outward movement on a portion of the Beach Road Seawall, directly adjacent to Peninsula Road. This movement was discovered when the cap of the concrete wall began to develop cracks and spalling. The root cause of this migration is wave action that is undermining the wall foundation. In 2015, the City addressed a similar defect to a section of the Beach Road Seawall near Main Street.

Stetson Engineering, Miller Pacific Engineering Group (MPEG), and CLE Engineering (CLE) are currently considering a wide range of reasonable coastal flood protection measures as part of the global repair for Beach Road and San Rafael Avenue.

At the February 28, 2018 Citizens' Flood Zone Committee (CFZC) meeting, a number of criteria were discussed and a list of preliminary flood protection options was presented to the group. Given the high cost of construction, along with known regulatory restrictions for offshore structures, the Committee unanimously agreed that sheet piles and an incremental raise of the Beach Road seawall was the preferred, and most feasible, flood protection measure for Beach Road.

Stetson Engineering and staff will continue to work with the CFZC to select the final evaluation criteria, and will seek feedback from the Committee throughout the remaining alternatives evaluation process.

Staff has been advised that stabilizing the seawall at Beach Road is time sensitive and should be carried out as soon as possible. Coastal structural and geotechnical engineers initially provided staff with repair options and preliminary project budget ranges. This information was presented during the regular City Council meeting on March 12, 2018. Council authorized staff to further investigate a sheet pile design proposal.

Findings

As part of the work funded by the Department of Water Resources' (DWR) Local Levee Assistance Program (LLAP) grant, CLE performed a structural inspection of the seawalls comprising portions of the Beach Road levee in 2017.

The concrete seawalls were found to be in typical condition for their age, showing cracking of the concrete caps and spalling around penetrations. In addition to these typical conditions, CLE identified a global issue of insufficient footing depth. This has resulted in localized failures of the wall in the past due to rotation and/or sliding – likely caused by scouring of the beach profile over time. As sand and mud have been removed by wave action, the seawall has been undermined and has begun to shift. It is likely that the shallow footing condition exists along the entire length of the seawall.

It is important to note that the condition of the seawall is such that it can be augmented rather than replaced. Once the foundation is stabilized and strengthened, the seawall will be able to support upward extensions if warranted.

The most effective way to stabilize and strengthen the seawall foundation is through the use of sheet piles that would be driven into the bay mud and attached to the wall. While more expensive than a temporary fix, the use of sheet piles would provide a permanent repair that would allow for a variety of options for improving the effectiveness of the seawall in the future.

Refined Proposal

After performing its geotechnical investigation in March, MPEG has concluded that the tieback design, identified as Option 1 in the March 12, 2018 Council staff report, is not advisable given the depth of liquefiable soil and the absence of a toe structure on the existing seawall.

The long-term stabilization proposal, described as Option B in the March staff report, consists of sheet piles installed along the bayward toe of the seawall foundation (see attachment, Phase 1 Design). CLE is proposing that sheet piles be driven into the soil to an approximate depth of 35 feet and secured to the base of the existing wall. In addition, after consideration of the geotechnical findings, CLE's engineer is recommending that the total length of the project be increased. The original project was envisioned to be 60-80 linear feet; the current recommended project would be 100 linear feet of seawall. While fixed costs (mobilization, permitting, and design) remain consistent, the change in the overall length of the project has resulted in increases to the project's total cost.

Staff is currently working with the DWR to determine which portions of the design and permitting costs would be eligible for funding through the LLAP grant. The targeted window for construction would be fall of 2018.

Fiscal Impact

The Council has authorized $80,000 to be applied toward the repair of the Beach Road seawall. The resolution before you today would transfer $220,000 in Road Impact Fees that are included in the FY17/18 Capital Improvement Project budget to be applied toward the project. Any unused funds from FY17/18 will be carried over to the following budget year. The remaining funding need will be included, for Council consideration, in the proposed FY18/19 Capital Improvement Budget.

Engineer's Estimate of Probable Costs
(NOT TO BE USED FOR BIDDING PURPOSES)

CITY OF BELVEDERE
2018 Beach Road Seawall Stabilization

Item	Description	Amount
Design		
	Survey & Design	$ 40,000.00
	Structural and Geotechnical Engineering	$ 7,500.00
	Project Management & Inspections	$ 10,000.00
Permitting and Environmental		$ 16,000.00
Materials, Labor and Equipment		
	100' assuming per-foot price of $3,000	$ 300,000.00
	Mobilization (special equipment)	$ 50,000.00
	Construction Contingency 15% (typical)	$ 45,000.00
	Total	**$ 468,500.00**

Recommendation

1. Consider the proposed design for Phase 1 stabilization of Beach Road and Seawall.

2. Approve a resolution authorizing a budget amendment for the Beach Road Seawall Stabilization Project.

Attachments

- Draft resolution
- Beach Road Seawall Phase 1 Design
- Beach Road Seawall Phase 2 Proposed Concrete Cap

CITY OF BELVEDERE

RESOLUTION NO. 2018-

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BELVEDERE AUTHORIZING A BUDGET AMENDMENT FOR THE BEACH ROAD SEAWALL STABILIZATION PROJECT

WHEREAS, the City Council of the City of Belvedere adopted a resolution approving the Annual Operating Budget for Fiscal Year 2017/18 on June 12, 2017; and

WHEREAS, at this time the City wishes to transfer Road Impact Funds in the amount of $220,000 within the Capital Improvement Fund budget from the Street Paving project to the Beach Road Seawall Stabilization Project;

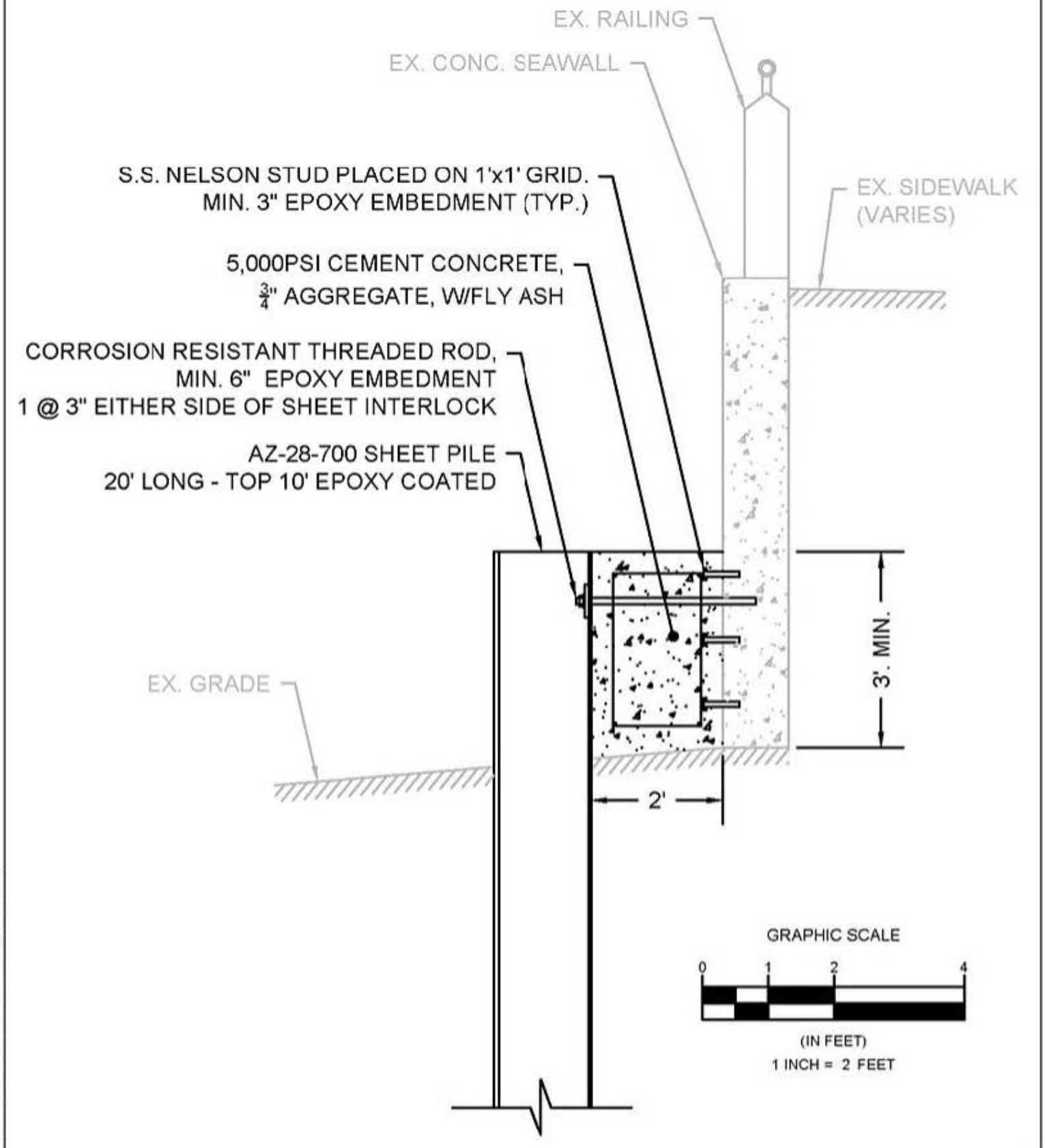
NOW, THEREFORE BE IT RESOLVED, by the City Council of the City of Belvedere that the Fiscal Year 2017/18 Annual Operating Budget shall be amended to reflect the transfer of $220,000 from the Street Paving project to the Beach Road Seawall Stabilization Project within the Capital Improvement Fund.

PASSED AND ADOPTED at a regular meeting of the City Council of the City of Belvedere on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

APPROVED:_____
Marty Winter, Mayor

ATTEST:_____
Alison Foulis, City Clerk

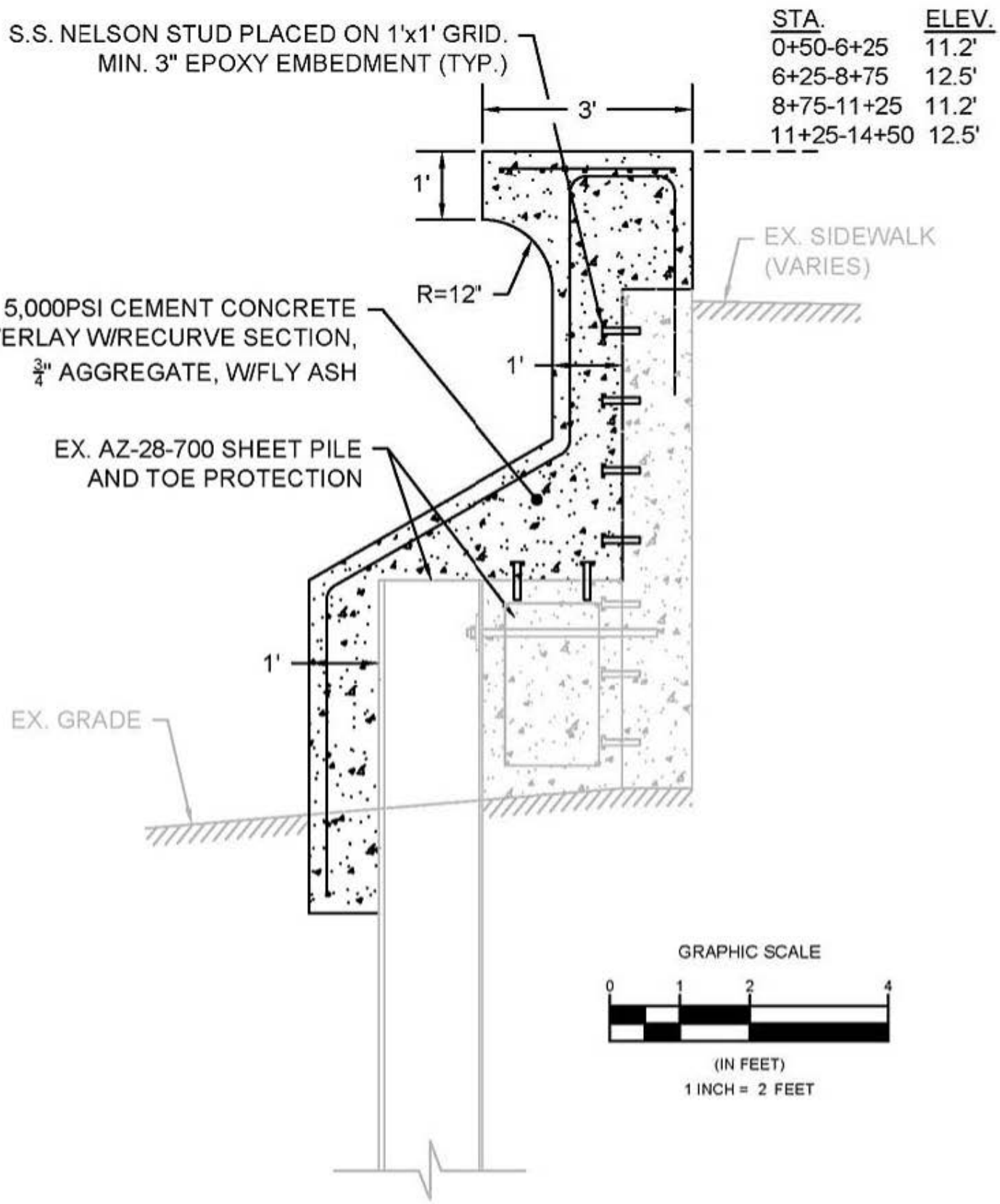


PROPOSED SHEET PILE TOE PROTECTION
BEACH ROAD

LOCATION
BELVEDERE, CA

CLIENT
CITY OF BELVEDERE

cleengineering
10 Commercial Blvd | Ste 100 | Novato, CA 94949
t: 415.884.8011 | www.cleengineering.com



PROPOSED SEAWALL OVERLAY
BEACH ROAD

LOCATION
BELVEDERE, CA

CLIENT
CITY OF BELVEDERE

cleengineering
10 Commercial Blvd | Ste 100 | Novato, CA 94949
t: 415.884.8011 | www.cleengineering.com