

TECHNICAL MEMORANDUM

TO: Mr. Robert Shea, Sound Mattress & Felt Company

FROM: Mr. William Carroll, L.G., L.H.G.

DATE: June 14, 2016

RE: Cleanup Action Alternative Evaluation and Cost Estimate
Former Sound Mattress and Felt Property
1940 E. 11th Street
Tacoma, Washington

PN: 110-001

Pacific Crest Environmental, LLC (Pacific Crest) has prepared this Technical Memorandum (Memorandum) to present a preferred cleanup alternative approach for the former Sound Mattress and Felt Company (Sound Mattress) Site (the Site). The Site includes soil and groundwater impacted by releases of chlorinated volatile organic compounds (CVOCs) and metals (cadmium and nickel) at the former Sound Mattress property located at 1940 East 11th Street in Tacoma, Washington (Subject Property). The Port of Tacoma is the current owner of the Subject Property. The Washington State Department of Ecology (Ecology) assigned Facility/Site No. 1232087 and Voluntary Cleanup Program (VCP) Project No. SW0857 to the Site in 2007.

This Memorandum includes:

- A summary of the remedial action objectives (RAOs);
- A description of the preferred cleanup action alternative;
- A summary of primary work scope elements of the preferred cleanup action alternative, and a cost estimate for implementation.

REMEDIAL ACTION OBJECTIVES

Cleanup of the Site is required because concentrations of CVOCs and metals in soil and groundwater have been confirmed to exceed preliminary cleanup levels selected in accordance with the Model Toxics Control Act (MTCA) Cleanup Regulation as presented in the *Draft Feasibility Study Investigation Report – Former Sound Mattress and Felt Company* prepared by Pacific Crest dated January 28, 2015 (FS Report). The ultimate objective of the cleanup is to

obtain a No Further Action (NFA) determination for the Site from Ecology. The RAOs for the Site cleanup are as follows:

- **Short Term:** Mitigate, to the extent practicable, unacceptable risk to receptors due to exposure to concentrations of the contaminants of concern (COCs) in the media of potential concern through the use of institutional controls or engineered barriers.
- **Long Term:** Reduce concentrations of the COCs in the media of concern to below their respective Site-specific MTCA cleanup levels at the applicable point of compliance.

PREFERRED CLEANUP ACTION ALTERNATIVES EVALUATION

The selection of a preferred cleanup action alternative is based upon comparison of the components of the alternative to the threshold and evaluation criteria established under WAC 173-340-360. The cleanup action alternative described below and in Table 1 is most likely to meet the regulatory and performance requirements of MTCA and achieve the RAOs at a reasonable cost:

- **Preferred Alternative –Excavation, ISCR, ERD and MNA**
 - **Remediation Elements:** The Preferred Alternative incorporates a phased approach to the cleanup, in which the first phase includes excavation and in-situ chemical reduction (ISCR) as interim measures, and the second phase includes enhanced reductive dechlorination (ERD) and monitored natural attenuation (MNA) as the final cleanup approach.
 - **Excavation:** The first element of the Preferred Alternative consists of excavation of approximately 5,500 tons of CVOC-affected soil and returning the northern portion of the Subject Property to the surrounding surface grade (SSG)¹. Returning this portion of the Subject Property to the SSG would allow partial use of the Subject Property by the Port and reduce the volume of contamination to be addressed in the second phase of the cleanup. The concentrations of CVOCs in the area that is targeted for excavation are within acceptable limits for disposal at a Subtitle D landfill, which is the most cost-effective disposal option.
 - **ISCR:** The second element of the first phase of the Preferred Alternative consists of treating soil in areas around the suspected “plating area” of the Former Building using soil mixing with ISCR amendments Daramend® and MetaFix® reagents manufactured by PeroxyChem. Soil mixing would be conducted by a specialized remediation contractor using specialized equipment to inject the amendment and mix the slurry. This technology appears to be well suited for the Site conditions. Following completion of the soil mixing, performance soil and groundwater sampling would be conducted to assess the effectiveness of the ISCR treatment.
 - **ERD:** The final phase of the cleanup would include focused applications of ERD into groundwater. Groundwater analytical data indicate that reductive

¹Surface grade on the Subject Property is elevated by between 2 and 3 feet in the area of the former Building.

dechlorination is naturally occurring in groundwater, and that ERD is an appropriate technology to enhance this process. ERD would be accomplished by injection of an aqueous solution into vertical borings during one or more events. Performance groundwater sampling would be conducted periodically during this phase to monitor the cleanup progress, and evaluate the need for additional injection events.

- **MNA:** Following ERD, MNA would be conducted until the long-term RAO for groundwater is confirmed.
- **Implementability:** The ease of implementation of the Preferred Alternative ERD has been facilitated by the demolition of the former Building.
- **Remediation Timeframe:** The estimated remediation timeframe for this alternative to achieve the long-term RAO is between 5 and 10 years.

CLEANUP ACTION IMPLEMENTATION

The Preferred Alternative would be implemented in two phases: an interim cleanup measure (Interim Measure) to expedite cleanup of contaminated soil and groundwater in the source area, followed by a second cleanup phase (Final Cleanup Measure) to address residual groundwater contamination and recalcitrant areas ("hot spots"). The components of the proposed Interim Measure are illustrated on Figure 1. The scope of work to implement the Preferred Alternative is summarized below:

Interim Measure

- Preparing an Interim Measure Work Plan;
- Obtaining required permits and authorizations, including developing a Stormwater Pollution Prevention Plan (SWPPP) and implementing erosion and sediment control measures;
- Removing the existing 4-inch to 8-inch coarse gravel surface from approximately 1.5 acres of the Subject Property and temporarily stockpiling onsite.
- Removing approximately 9,000 square feet of concrete foundation remaining from the Former Building and disposing off-site.
- Excavating approximately 5,500 tons of contaminated soils overlying the SSG and disposing off-site at a Subtitle D landfill.
- Treating approximately 6,000 cubic yards of subsurface material in the source area by ISCR and metals immobilization to approximately 15 feet below ground surface (bgs).
- Advancing seven soil borings in the source area vicinity and collecting soil samples for laboratory analysis.
- Installing seven groundwater monitoring wells on the Subject Property.
- Conducting two groundwater sampling events using existing and proposed monitoring wells.

Final Cleanup Action

- Revising the FS Report and preparing a Cleanup Action Plan (CAP) for Ecology review and approval. It is noted that, as Ecology has yet to approve final CAP for the Site, actual implementation of the Final Cleanup Action presented herein are considered preliminary and subject to change.
- Obtaining a UIC permit, and injecting a solution of ERD substrate during up to four events.
- Conducting up to six semi-annual groundwater sampling events during to monitor the progress of the groundwater cleanup during and following ERD.
- Preparing annual progress reports for submittal to Ecology.
- Conducting confirmation soil sampling to confirm soil cleanup objectives have been attained in accordance with an Ecology-approved plan.
- Conducting four consecutive quarters of confirmation groundwater monitoring.
- Preparing a Closure Report and requesting a NFA determination for the Site from Ecology.
- Abandoning the existing monitoring well network at the Site.

CLOSING

Please contact me at (425) 888-4990 if you have questions regarding the information presented herein.

Sincerely,

PACIFIC CREST ENVIRONMENTAL, LLC



William Carroll, L.G., L.H.G.
Principal Hydrogeologist

Attachments: Table 1 – Cleanup Action Alternative Summary
Figure 1 – Site Plan with Proposed Cleanup Action Elements

REFERENCES

Pacific Crest Environmental, LLC. 2013. *Draft Feasibility Study Report – Former Sound Mattress and Felt Company*. Prepared for Sound Mattress and Felt Company. April 12.

_____. 2015. *Draft for Review Feasibility Study Investigation Report – Former Sound Mattress and Felt Company*. Prepared for Sound Mattress and Felt Company. January 28.

TABLES

CLEANUP ACTION ALTERNATIVE EVALUATION AND COST ESTIMATE TECHNICAL MEMORANDUM

**FORMER SOUND MATTRESS AND FELT PROPERTY
1940 E. 11TH STREET
TACOMA, WASHINGTON**

PACIFIC CREST PN: 110-001

Table 1
Cleanup Action Alternative Summary
Sound Mattress and Felt Company
1940 E. 11th Street
Tacoma, Washington
Pacific Crest No: 110-001

Cleanup Action Alternative	Description	General Performance Record	Site Specific Issues
Excavation, ISCR, ERD and MNA	Preferred Alternative consists of limited excavation; ISCR using soil mixing; ERD to address residual affected groundwater and implementation of MNA.	Excavation as an interim measure would return a portion of the property to productive use; soil mixing using ISCR is expected to substantially reduce the source area concentrations and stabilize metals in soil to prevent leaching; monitoring results indicate groundwater conditions are conducive to reductive dechlorination.	Demolition of the Building facilitates the interim measure excavation and soil mixing. The Port has agreed to Method C Cleanup Levels for use on the Property.

FIGURE

**CLEANUP ACTION ALTERNATIVE EVALUATION AND COST ESTIMATE
TECHNICAL MEMORANDUM**

**FORMER SOUND MATTRESS AND FELT PROPERTY
1940 E. 11TH STREET
TACOMA, WASHINGTON**

PACIFIC CREST PN: 110-001

6/14/2016 110-001-052.dwg FIG.1 TMemor

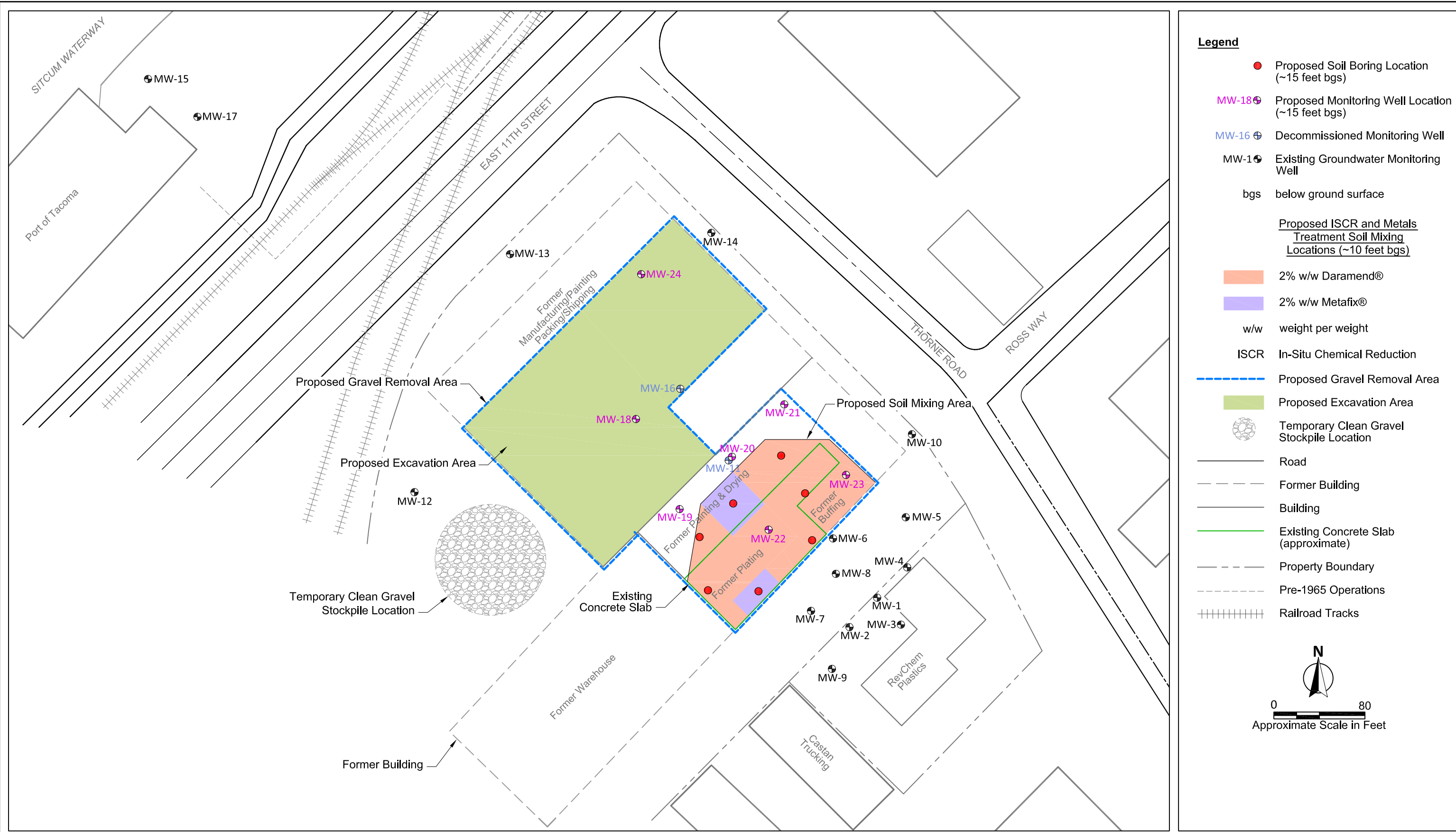


Figure 1

Site Plan with Proposed Interim Action Cleanup Elements