EXCAVATION SUPPORT PLAN

POLYCHROME WEST & EAST REMEDIATION PROJECT YONKERS, NY

April 2018

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this Excavation Support Plan is to describe the techniques and procedures for excavation and backfill activities on the Polychrome West & East Remediation Project. All excavation activities will be performed in a manner which complies with OSHA Regulations and the Community Air Monitoring Plan (CAMP) prepared for the Site.

2.0 EXCAVATION

2.1 Excavation Mark-Out/One-Call/GPR

Prior to any intrusive activities, all excavation units will be surveyed & marked out in the field by Avalon Bay's surveyor. Excavation units will be reviewed by Posillico, AKRF, & Avalon Bay representatives to confirm the extents and depths of each unit and discuss the anticipated scope of each unit (excavation above or below the water table, support of excavation methodology, direct load and/or stockpiling of material, etc).

Utility mark outs will be been performed by both the New York One Call System and a third party Ground Penetrating Radar (GPR) utility locating subcontractor. Posillico will perform test pits to verify the location of any subsurface utilities or anomalies that have been found in the excavation foot prints. All test pits will be performed via hand dig/soft dig methods prior to full-scale excavation activities commence. If necessary, subsurface utilities encountered will be surveyed by others to record horizontal and vertical data.

2.2 Open-Cut Excavation

Once test pitting is complete, Posillico will commence excavation activities per the contract drawings & specifications. Posillico anticipates performing the majority, if not all of the excavation on the Polychrome West & East parcels via open-cut. Utilizing safe sloping/benching will allow Posillico to reach specified depths without the need for support of excavation equipment. West parcel excavation units that are anticipated to be performed via open-cut are areas A, B, C, D, E, F, G, H, I, and J as delineated in contract drawing PW RA-01. Posillico anticipates performing all excavation activities in the East parcel via open-cut, these areas include 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, A, B, C, D, and E as delineated in contract drawing PE RA-01. If support of excavation is necessary to achieve excavation to greater depths or due to unanticipated soil conditions, a slide-rail or trench box system will be utilized.

For ISS units on the Polychrome East parcel, a 9' cut is anticipated. However, along the property lines Posillico will perform a 5' cut for an area approximately 10' wide to ensure no damage to adjacent structures or sidewalks. ISS will begin from a higher working platform in this 10' wide area.

On the Polychrome West parcel, Posillico will first prioritize excavation units A & F to allow for the set-up of the construction tracking pad & on-site facilities for the ISS grout plant operations. Excavation activities will be performed by a hydraulic excavator capable to reach the specified depths of each unit.

Prior to intrusive activities in a delineated excavation unit, the first cut will be outside of the excavation unit footprint to create the safe slope/bench in clean material. This clean material will be put aside & stockpiled for potential re-use on-site. The clean cut will be to a depth of 5' to allow excavation in the delineated contaminated areas to progress deeper than specified depths if necessary. A detailed of the open-cut excavation process can be found in **Attachment A – Open-Cut Excavation Detail.**

Posillico anticipates a combination of stockpiling of materials & direct loading of material into trucks for facility disposal. Construction debris encountered may need to be segregated depending on facility requirements.

Pre-Trench excavation will be performed with sloping/benching where OSHA regulations allow. In deeper areas where not possible, a trench box or slide rail may be utilized if needed to ensure proper shoring of the excavation.

2.3 Slide Rail Excavation

If necessary, Posillico can perform excavation on the Polychrome West & East parcels with the use of a slide-rail and/or trench box system to safely perform the work. The need for a slide-rail or trench box system may be possible to complete Excavation Units E, F, H, & I and will be determined based upon the inspection of soil conditions when excavation begins. The slide rail system will be mobilized prior to work commencing in any of the aforementioned areas to be prepared to utilize the equipment if necessary. Each slide rail system cell is anticipated to have a 12.5' x 12.5' footprint to allow for excavation & backfill to be performed in smaller units.

The slide rail system is engineered to allow multiple cells to be interconnected simultaneously, or by relocating the system by removing panels from an existing cell and expanding onto an adjacent cell. For example, the delineated area for

Excavation Unit E would require a total of (16) cells. The example slide rail system cell layout can be found in **Attachment B – Slide Rail Layout Plan.**

Further detailing on the slide rail system equipment can be found in **Attachment C – Slide Rail System Cut Sheets.**

3.0 DEWATERING

Posillico does not intend on installing a dewatering system to lower the groundwater table in excavation units on either of the Polychrome West & East parcels. Excavation will be performed below the water table in a wet condition if work conditions allow. Dewatering, if necessary, is anticipated to be completed by the on-site dewatering contractor.

Posillico will be prepared with the appropriate equipment & materials necessary to dewater excavation units if directed by AKRF and/or Avalon Bay. Further dewatering information can be found in Posillico's **1.10.3 Dewatering of Excavated Soil, Stabilization, & Handling Plan.**

4.0 BACKFILL

Excavation in each unit on the West and East parcels will be deemed complete once inspected and confirmed by AKRF and/or Avalon Bay. Bottom of Excavation survey shots will be collected by others prior to the installation of backfill.

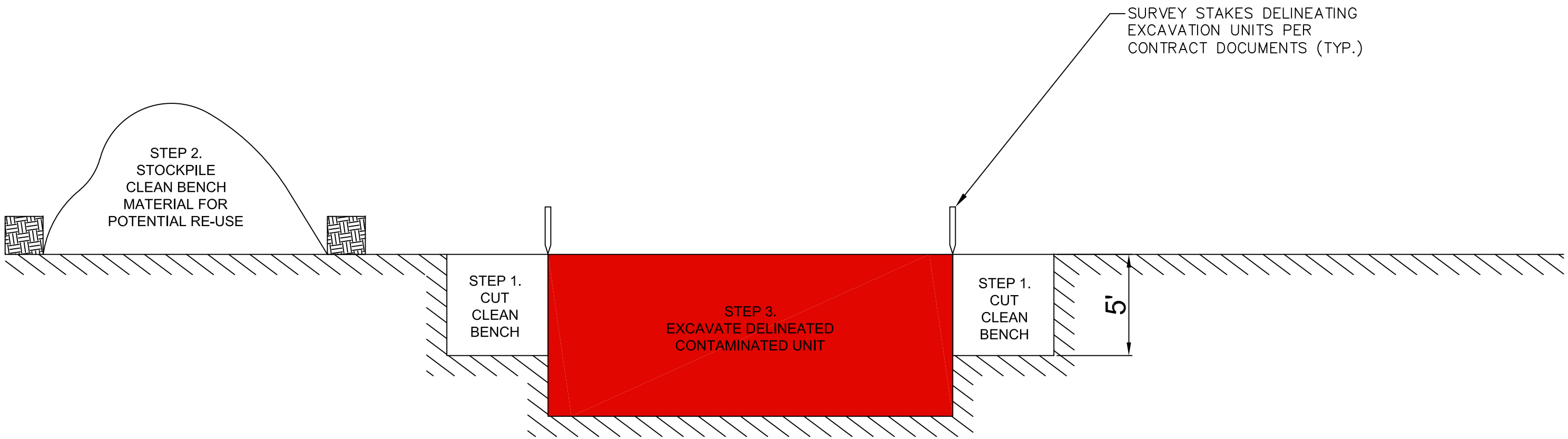
Excavations that are below the groundwater table will be backfilled with clean and approved ¾ inch gravel and up to 1 foot above the water table. For additional information on ¾" gravel, please see Posillico's **1.10.8 Gravel Submittal**.

As directed by AKRF and/or Avalon Bay, Posillico will place Oxygen release compound (ORC and/or Regenox, or approved alternate) in the excavation areas where NAPL is encountered. Currently, ORC is anticipated in Excavation Units H, I, and within the ATI peninsula on the Polychrome West parcel. Bulk ORC and/or Regenox will be procured by the Owner or Engineer.

Posillico will place demarcation layer abovet the water table and along sidewalls of the remedial excavations prior to continuing with backfill. The remaining depths will be backfilled with crushed concrete provided by the Owner or swell material generated from ISS operations.

Posillico will place all backfill material in loose lifts no thicker than 12 inches. Material will be compacted with hydraulic excavator buckets and/or plate compactors.

Attachment A



REVISIONS/ISSUES			
NO.	DATE	BY	DESCRIPTION

POLYCHROME WEST & EAST
OPEN-CUT EXCAVATION DETAIL

DRAWN BY: AEG	SCALE: 1 = 5'	DATE: 4/17/18

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Posillico
1750 New Highway
Farmingdale, New York 11735
(631) 249-1872

Attachment B

EXCAVATION/ISS UNIT "A"

NW-12 NW-13 NW-14 NW-15

-0' 4"

-0' 4"

EXCAVATION/ISS UNIT "B"

EXCAVATION/ISS UNIT "E"

PROPOSED 12.5'x12.5' SLIDERAIL SYSTEM CELLS TO PERFORM EXCAVATION "E"

PROPOSED BUILDING 2 PARKING

S[illegible]

[illegible]OSED BUILDING 2 COURTYARD (VMS)

-0' 2"

EXCAVATION/ISS UNIT "G"

GENERATOR

GROUNDWATER TREATMENT TRAILER

INFLUENT STORAGE FRAC TANK (WATER)

INFLUENT STORAGE FRAC TANK (WATER)

GWTT SUPPLIES / GENERATOR

POSILLICO TRAILER

POSILLICO TOOLBOX

EFFLUENT STORAGE FRAC TANK (WATER)

EFFLUENT STORAGE FRAC TANK (WATER)

EFFLUENT STORAGE FRAC TANK (WATER)

BLANKET

PNEUMATIC STORAGE TANKER ("PIG")

VERTICAL SILO (BFS)

CONTROLS

HOLDING TANK

MIX TANK

VERTICAL SILO (PC)

MOYNO PUMP

TRANSFER PUMP

AIR COMPRESSOR

CONEX BOX

GENERATOR

OFFICE TRAILER

EXCAVATION/ISS UNIT

EXCAVATION/ISS UNIT "

-0' 4"

BOTTOM OF PILE ELEVATION (TYP.)

EXCAVATION/ISS UNIT "F"

1' 2"

3' 2"

EXCAVATION UNIT "H"

REVISIONS/ISSUES			
NO.	DATE	BY	DESCRIPTION

POLYCHROME WEST & EAST
SLIDERAIL LAYOUT PLAN

DRAWN BY: AEG | SCALE: 1 = 30' | DATE: 4/17/18

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Farmingdale, New York 11735
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Attachment C

AMERICAN SHORING INC.

Manufacturers' Tabulated Data

SLIDE RAIL

American Shoring, Inc.
207 Lake Street
Newburgh, NY 12550
800-407-4674
Fax: 800-361-1973

TABULATED DATA
FOR
SLIDE RAIL

1.0 SCOPE

This Data includes both pit (square & rectangular) and linear (pipeline) Slide Rail applications for excavation depths of 24 feet. For depths greater than 24 feet contact the engineering department at American Shoring, Inc. (ASI).

This Data complies with all United States Federal and individual state O.S.H.A. Regulations.

This Data applies only to ASI and SBH manufactured Slide Rail System.

2.0 TRAINING AND SAFETY

All personnel, competent persons, foremen, equipment operators and superintendents must be trained and/or knowledgeable in the use of Slide Rail systems. ASI can provide on-site instruction at customer request.

All excavation work and installation of the Slide Rail System shall be done following all applicable safety regulations and procedures.

All Slide Rail Panel, Rails and Struts shall be in good working condition.

3.0 APPLICATION

All cables, slings, chains, safety hooks and shackles shall be inspected for damage and shall be sufficient strength to support the loads applied.

Tag lines shall be used to place the individual pieces of the system.

Workers shall not be under Slide Rail Panels, Rails or Struts when they are being moved or placed in the excavation.

No Slide Rail Panel, Rail or Strut shall be allowed to stand unsupported in a position that may allow it to fall on a worker.

The Slide Rail System must be in a stable condition before any worker enters the excavation.

Workers must be protected from falling dirt and rocks at all times.

The bottom of the panels and rails shall be no higher than two feet above the bottom of the excavation while workers are in the excavation.

The excavation should be dug down four feet before the first Panels or Rails are placed in the excavation.

The Panels and Rail Pairs shall be pushed into the excavation after first digging under them with the excavator bucket. The Panels and Rails shall not be pounded on to drive them down into the excavation. Rather a "dig and push" method in small steps will provide the best results.

Workers shall clean out around and under the Panels and Rails with shovels if necessary and only when the Panels and Rails are stable and can not fall on the workers or injure them.

All Panels and Rails shall be installed vertical, plum and square to the other members of the system. It is important that the first rail pair and panels placed in the excavation shall be placed

3.0 (CONTINUED)

properly (vertical, plum and square) to insure that the remaining panels and rails will go in correctly and easily.

It is necessary to backfill behind the panels and rails to fill any voids that form during placement of the system. This procedure is to maintain stability of the system and to maintain a tight excavation.

Extracting the panels from the slide rails is often the most difficult part of the process. Longer panel lengths contribute to the extraction difficulty and as a general rule shorter length panels should be used in less stable soil.

4.0 INSPECTION

The excavation and Slide Rail System shall be inspected daily by the competent person, who is the superintendent or foreman, to determine that the excavation, work site and Slide Rail System are safe and the work is proceeding properly and safely.

5.0 DEPTH AND CAPACITY TABLES

The tables show the lateral earth capacity of each length of Panel in pounds per square foot. An engineer may calculate the allowable working depth of the System from that lateral earth capacity.

The tables also show a maximum working depth for several types of soil. After determining the type of soil or the Equivalent Weight Effect (sometimes called Equivalent Fluid Pressure), the maximum working depth can be found listed under the column for that type of soil.

The tables do not include a surface surcharge.

The tables are limited to 24 feet deep.

For depths that are not shown in the tables contact the engineering department at American Shoring, Inc.

6.0 SPREADER AND SPREADER FRAMES

Pipe clearances and spreader lengths shown in the table are the maximum for typical conditions. For special conditions contact the engineering department at American Shoring, Inc.

7.0 SOIL TYPES

The soil classifications in the tables of A25, B45, C-1, C-2 and C-3 are described in the OSHA Excavation Regulations as Type A, B and C soils. They have Equivalent Weight Effects of 25 and 45 pounds per cubic feet per foot of depth (sometimes called Equivalent Fluid Pressure and it is in units of pounds per square feet).

Type C60 soil is a soft cohesive or moist granular soil that is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install the Slide Rail System. The Equivalent Weight Effect for this soil type is 60 pounds per cubic feet per foot of depth.

MAXIMUM ALLOWABLE DEPTH TABLE

Panel Length	Capacity	Maximum Allowable Depth* Soil Type					
Feet	With 33% Overstress P.S.F.	A25 feet	B45 feet	C1 (50) feet	C (60) feet	C2 (65) feet	C3 (80) feet
6.600	6826	----	----	24'	24'	24'	24'
8.202	5595	----	----	24'	24'	24'	24'
9.842	3886	----	----	24'	24'	24'	24'
11.560	2854	----	----	24'	24'	24'	24'
13.123	2185	----	----	24'	24'	24'	24'
14.764	1887	74'	41'	38'	34'	29'	24'
16.404	1528	60'	33'	31'	28'	24'	19'
18.044	1448	57'	32'	29'	25'	22'	18'
19.685	1217	48'	27'	24'	24'	19'	15'
20.500	1198	48'	27'	24'	24'	19'	15'
21.325	1037	41'	23'	21'	19'	16'	13'
22.966	894	35'	20'	18'	16'	14'	12'
23.800	824	33'	22'	17'	15'	13'	12'
24.606	779	31'	17'	16'	14'	12'	10'
26.246	1133	45'	25'	23'	21'	18'	14'
27.887	1003	40'	22'	20'	18'	16'	13'
30.833	1002	40'	22'	20'	17'	15'	13'
31.401	791	31'	17'	16'	14'	12'	10'
36.000	720	20'	15'	14'	12'	10'	8'

For greater depth requirements than those shown here contact the engineering department at American Shoring, Inc.

Remediation Systems

- *American Shoring's Slide Rail Systems allows the environmental contractor to tackle the toughest remediation jobs.*
- *Our unique four-sided rail is designed to let the contractor proceed in any direction from the starting point.*
- *It is a true four-sided rail fabricated with a convenient, retractable, lifting ring for easy handling and installation.*
- *Eliminates the need to remove the entire Slide Rail pit and reset it.*
- *Allows continuation of remediation work while leaving the starting pit in place simply by adding panels in whichever direction you wish to proceed.*
- *Our four-sided rails are available in several lengths and can be used on the deepest remediation sites.*
- *Built to take on the toughest job site conditions*
- *Field proven by environmental contractors throughout the country.*

AMERICAN SHORING INC.

1.800.407.4674

www.americanshoring.com