PRCTI20250120

01/21/25

VAK Construction Engineering Services, LLC

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mcooper@vakengineering.com

City of Puyallup
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MARTIN R. COOPER
STATE OF WASHINGTON
42708
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

M E M O

TO:	David Walker, Anderson Environmental Contracting, LLC	**Job #**	25-009A
FROM:	Marty Cooper P.E., S.E. VAK Engineering		
PROJECT:	Northwest Motorsports, Puyallup	**DATE:**	1/21/2025
RE:	Temporary Shoring Design		

Per your request, we have provided recommendations for shoring excavations beneath an existing interior building slab on grade. The approximate excavation locations are shown in the Draft Remedial Action Work Plan by Hart Hickman, dated October 10, 2924. It is our understanding that the maximum depth of excavation shall be 8'-0". The shoring box considered for this analysis was the Speed Shore Model APS-0812 with a maximum spreader width of 6'-0".

Shoring was analyzed for active earth pressures as well as surcharge loading from any nearby building foundations. Active earth pressures were estimated based upon a conservatively assumed soil unit weight of 125 pcf and 25 degree angle of internal friction. Surcharge loading from building foundations was based upon field measurements provided by the contractor.

The results of our analysis found that the excavations shall be located a minimum distance of 3'-0" from any building foundations. The ends of each shoring box shall be contained by using 1" thick steel plate or 4x timber lagging. Steel plate lagging shall be ASTM A36 or better. Timber lagging shall be DF-L #2 or better.

No loading shall be allowed on the building roof during the excavation procedure. A maximum construction loading of 25 psf shall be allowed on the building floor slab near the excavation. It shall be the responsibility of the contractor to ensure this loading is not exceeded during the excavation procedure.

It shall be the responsibility of the contractor to ensure that the shoring boxes are installed tight against the existing undisturbed soil, so as to minimize voids in soil outside the box. Any voids that form between the soil and box walls shall be immediately filled with pea gravel. During the installation of the shoring boxes, the height of un-shored excavation shall never exceed 6". Therefore, the shoring box shall be continuously advanced downward into the excavation as the depth increases.

Please feel free to contact us if you have questions regarding the above information.

City of Puyallup
Building
REVIEWED
FOR
COMPLIANCE
SKinnear
01/31/2025
2:53:56 PM

CITY OF PUYALLUP
STATE OF WASHINGTON

Calculations required to be provided by the Permittee on site for all Inspections

LEGEND

- PARCEL LINE
- EXCAVATION EXTENT
- SOIL BORING LOCATION
- AREA OF CONCRETE REMOVAL

NOTES:

1. AERIAL IMAGERY OBTAINED FROM GOOGLE IMAGE SERVICES.
2. BASE DATA OBTAINED FROM PIERCE COUNTY GIS, 2024.

N

APPROXIMATE
0 20 40
SCALE IN FEET

TITLE

PROPOSED EXCAVATION MAP

PROJECT

NORTHWEST MOTORSPORTS
400 RIVER ROAD
PUYALLUP, WASHINGTON

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007 main

DATE: 11-13-24	REVISION NO. 0
JOB NO. SAI-413	FIGURE NO. 4

S:\AAA-Master Projects\Sonic Automotive - SA\SAI-413 NWMS Puyallup\Remedial Work Plan\Figures\SAI413_20241008.dwg, FIG 4, 11/13/2024 11:25:46 AM, mbise

Aluminum Shields

Speed Shores Aluminum Trench Shields provide exceptional strength at minimal weight — as little as half the weight of comparable steel trench shields. These aluminum trench shields are specifically designed for municipalities, utility companies, plumbers and contractors who generally use a rubber-tired backhoe or light excavator. The comprehensive product line includes the popular Aluminum Panel Shield (APS) series as well as a wide variety of heavy-duty welded-construction models.

Available in a full range of sizes and configurations, Speed Shores aluminum trench shields offer the most complete array of standard features and options in the industry. Rugged steel lifting and pulling eyes, heavy-duty stacking sockets and foam-filled walls are just a few of the many features offered. A variety of spreader options are available, to include adjustable telescoping steel spreaders, hydraulic cylinders, and fixed-length static spreaders. The shields smooth exterior walls minimize pulling friction while preventing the accumulation of dirt and debris.

Ideal for utility maintenance and repair, pipeline bellholes, cable splice pits and light utility installations, Speed Shore aluminum trench shields offer the ultimate in lightweight, high-capacity trench shielding.

Aluminum Panel Shields Offer Superior Strength With Less Weight.

- **Aluminum Alloy Construction** for exceptional high strength-to-weight ratios and superior corrosion resistance.
- **Narrow Double-Wall Panels** minimize excavation width while maximizing interior work space.
- **Exclusive APS Extruded Panel** offers unique 12-inch high extrusion for greater strength and wall height increments of 1 foot.
- **Foam-Filled Smooth Walls** prevent accumulation of water, dirt and debris.
- **Adjustable Spreaders** allow for rapid adjustment of shield width.
- **Heavy-Duty Lifting Lugs** provide for rapid 4-point lifting of units.
- **Stacking Pockets** provide solid interlock of stacked units for deeper applications.

SPEED SHORE®
PIONEERING TRENCH SAFETY

Aluminum Shield Specifications

Aluminum Panel Shields

MODEL	DIMENSIONS H (Ft.)	L	PIPE CLEARANCE (In.)	WEIGHT (Lbs.)	SHIELD CAPACITY (Psf)	ALLOWABLE DEPTH (Ft.) by soil type ** A	B	C(60)	C
APS-0406	4	6	18	488	4190	50	50	50	50
APS-0408	4	8	18	586	2050	50	45	35	26
APS-0410	4	10	18	686	1210	46	27	21	16
APS-0412	4	12	18	786	800	30	18	14	11
APS-0414	4	14	18	884	570	21	13	10	8
APS-0416	4	16	18	984	420	15	10	8	6
APS-0606	6	6	30	698	2330	50	50	39	30
APS-0608	6	8	30	848	1750	50	39	30	25
APS-0610	6	10	30	996	1210	46	27	21	16
APS-0612	6	12	30	1142	800	30	18	14	11
APS-0614	6	14	30	1292	570	21	13	10	8
APS-0616	6	16	30	1434	420	15	10	8	6
APS-0806	8	6	36	920	1650	50	36	28	21
APS-0808	8	8	36	1114	1240	48	27	20	16
APS-0810	8	10	36	1306	990	38	21	16	13
APS-0812	8	12	36	1498	800	30	18	14	11
APS-0814	8	14	36	1692	570	21	13	10	8
APS-0816	8	16	36	1884	420	15	10	8	6

Note: Stacking Kits (Model No. APS-SB-04) are available, and include the 4 brackets and pins required for stacking two shields.

** Prior to use, refer to OSHA's 29 CFR, Part 1926 (subpart P) and Speed Shore's Tabulated Data for detailed explanation of soil types and product application. Type A soil not to exceed 25 Psf per foot of depth; Type B soil not to exceed 45 Psf per foot of depth; Type C(60) soil not to exceed 60 Psf per foot of depth; Type C soil not to exceed 80 Psf per foot of depth.

Note: Allowable depths are limited to 50 feet for practical purposes. Contact Speed Shore for applications exceeding posted allowable depths.

Adjustable Spreaders*

HEAVY-DUTY (For End Loading)

MODEL	OPERATING RANGE (Ins.)	WEIGHT (Lbs.)
SPRH-APS-036	26 - 36	214
SPRH-APS-048	32 - 48	260
SPRH-APS-060	40 - 60	318
SPRH-APS-072	48 - 72	600
SPRH-APS-096	60 - 96	758

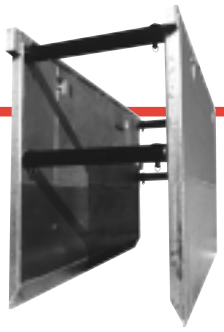
STANDARD

MODEL	OPERATING RANGE (Ins.)	WEIGHT (Lbs.)
SPR-APS-036	26 - 36	164
SPR-APS-048	32 - 48	200
SPR-APS-060	40 - 60	246
SPR-APS-072	48 - 72	294
SPR-APS-096	60 - 96	364

*Includes 4 spreaders per set.

Aluminum Trench Shields (Welded Construction)

Available in a full range of sizes to accommodate your more challenging excavations, our welded-construction aluminum shields are P. E.–Certified. They have exceptional strength, and weigh half as much as comparable steel trench shields. Call for specifications.



Pioneer of the World's Most Advanced Trench Safety Systems

Shoring Shields® | *Vertical Shores* | *Waler Systems* | *Excavation Braces* | *Modular Alum. Panel Systems* | *Aluminum Trench Shields* | *Steel Trench Shields* | *Manhole Shields* | *Manguard® Shields* | *Slide-Rail Systems* | *Mega-Shore® Systems* | *Bedding Boxes*

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(713) 943-0750 ▪ FAX (713) 943-8483 ▪ USA TOLL FREE: 1-800-231-6662
www.speedshore.com

Authorized Distributor

North Shop

Beam Trib = 18'
Roof width = 40'
Roof weight = 40 psf

$$R_1 = (40\,psf)(18')\left(\frac{40'}{2}\right) = 14.4\,K$$

Wall Ht = 20'
Wall wt. = 150 pcf
Wall thickness = 8"

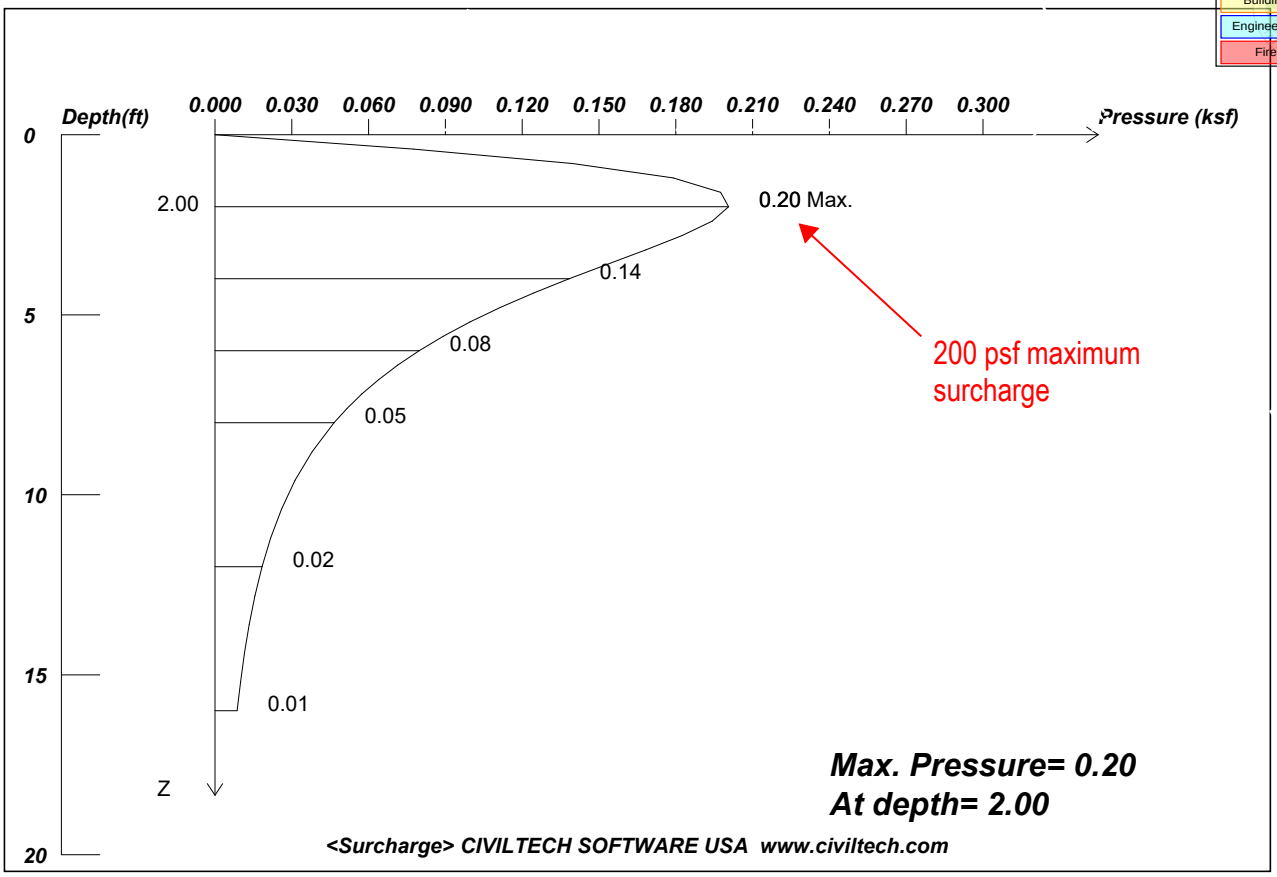
$$R_2 = (150\,pcf)(0.67')(20')(8') = 16.1\,K$$

$$R_T = 30.5\,K$$

Assume 4x4 Footing

$$q = \frac{30.5\,K}{(4')(4')} = 1.875\,ksf$$

North Shop



Licensed to 4324324234 3424343
Date: 1/21/2025 File: V:\2025\25009 HART & HICKMAN - NW MOTORSPORTS PUYALLUP\PHASE A STRUCTURE S

Wall Height, H= 8 Load Depth, D= 0
Load Factor of Surcharge Loading = 1
Rigid Wall Condition -- No movement or deflection of the wall are allowed.
Max. Pressure = 0.201 at depth = 2.00

X	Width	Length	Area Load
2.0	4.0	4.0	1.90

UNITS: LENGTH/DEPTH: ft, Qpoint: kip, Qline: kip/ft, Qstrip/Qarea/PRESSURE: ksf

South Shop

Roof width = 50'

$w_1 = (40 psf)(\frac{50'}{2}) = 1.0 klf$

Wall Ht = 20'

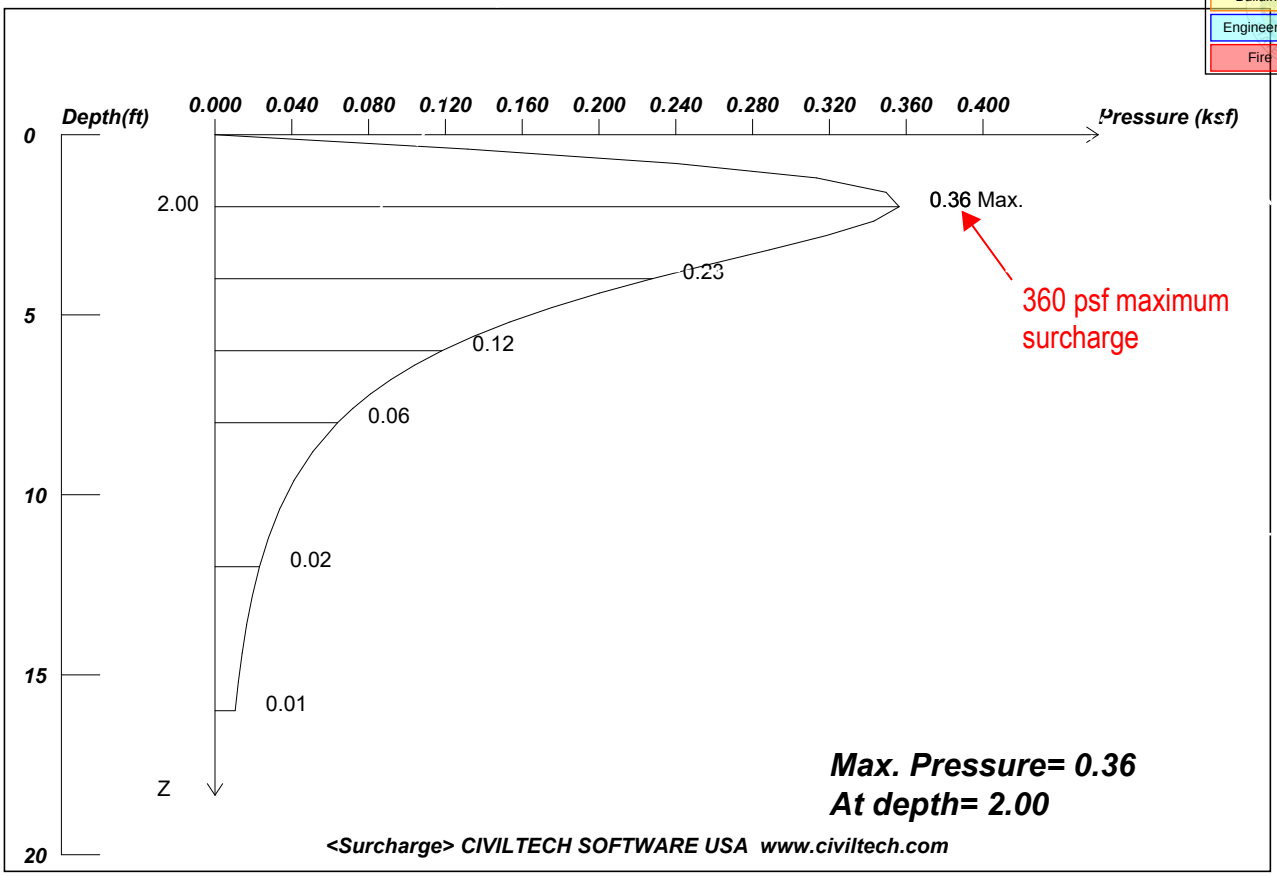
$w_2 = (150 pcf)(0.67)(20') = 2.0 klf$

$w_T = 3.0 klf$

Assume 2' wide Footing

$q = \frac{3.0 klf}{2'} = 1.5 ksf$

South Shop



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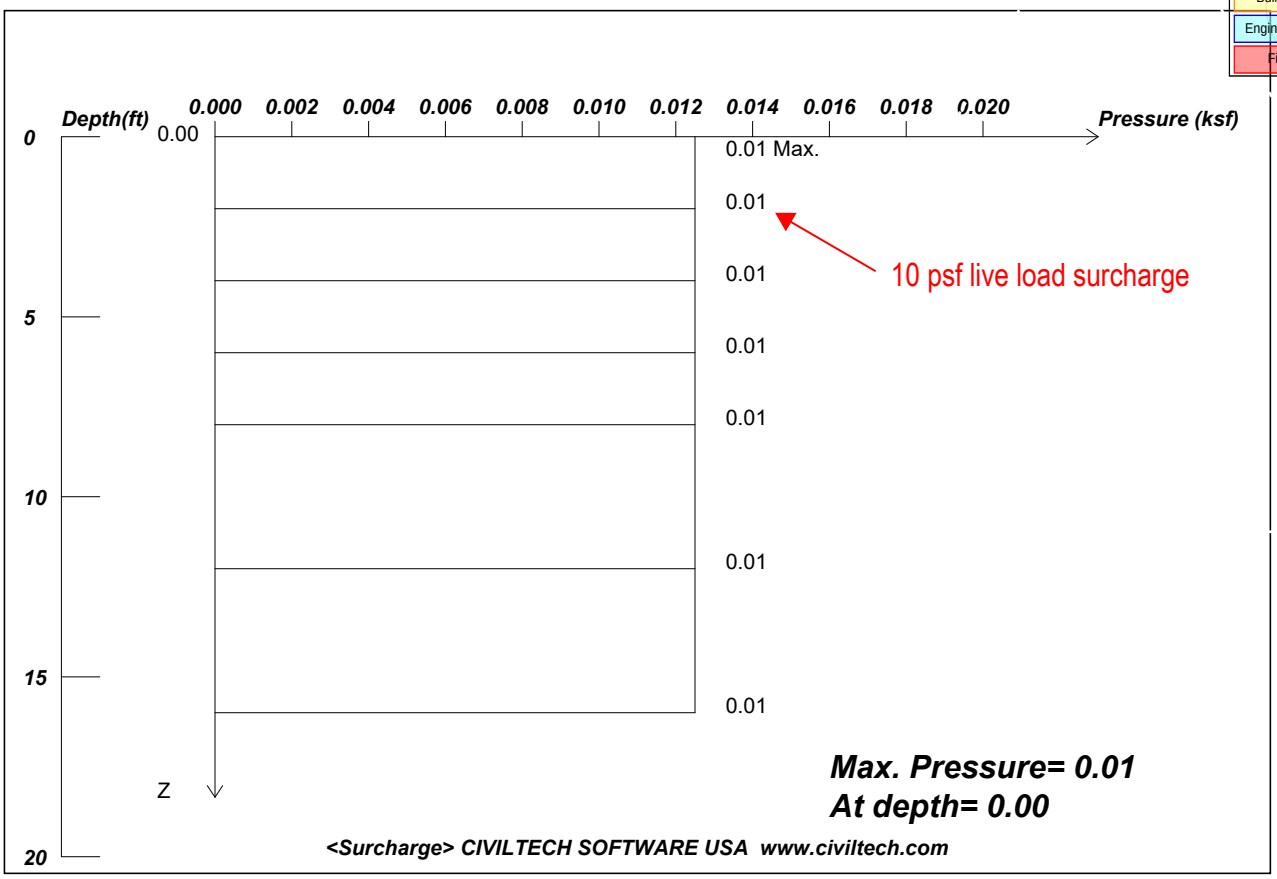
Wall Height, H= 8 Load Depth, D= 0
Load Factor of Surcharge Loading = 1
Rigid Wall Condition -- No movement or deflection of the wall are allowed.
Max. Pressure = 0.356 at depth = 2.00

X	Width	Strip Load
2.5	2.0	1.50

2.5' offset, use 3.0' minimum all locations

UNITS: LENGTH/DEPTH: ft, Qpoint: kip, Qline: kip/ft, Qstrip/Qarea/PRESSURE: ksf



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Date: 1/21/2025 File: V:\2025\25009 HART & HICKMAN - NW MOTORSPORTS PUYALLUP\PHASE A STRUCTURE S

Wall Height, H= 8 Load Depth, D= 0
Load Factor of Surcharge Loading = 1
Rigid Wall Condition -- No movement or deflection of the wall are allowed.
Max. Pressure = 0.013 at depth = 0.00

Infinite Surcharge, Q=.025 Active Wedge Approach * (recommend)

UNITS: LENGTH/DEPTH: ft, Qpoint: kip, Qline: kip/ft, Qstrip/Qarea/PRESSURE: ksf

VAK
Construction Engineering Services

Soil Pressure

Assume $\phi = 25°$, $\gamma = 125$ pcf

$$K_a = \frac{1 - \sin 25°}{1 + \sin 25°} = 0.41$$

$$P_a = (0.41)(125\text{pcf})(8') = 410\text{ psf}$$

Max Footing Surcharge = 360 psf

Max. LL Surcharge = 10 psf

Total Pressure = 780 psf < 800 psf
ok

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LAGGING DESIGN

WALL CONFIGURATION:

PILE Bf:	2	IN
PILE SPACING=	6	FT. (C. to C. PILE)
WALL H=	8	FT

SOIL PARAMETERS:

Ka:		
SOIL WT:		PCF
ARCH'G FACTOR:	0.6	

PRESSURES

SOIL=	410	PSF
SURCHARGE=	370	PSF
TOTAL DESIGN=	780	PSF

ALLOWABLE STRESSES:

STEEL=	21000	PSI	(A36)
WOOD=	1500	PSI	(D.F. NO 2)

MINIMUM REQ'D THICKNESS:

DESIGN L=	5.83	FT
M=	1990.63	FT-Lb
STEEL T=	0.75	IN MIN
WOOD T=	2.82	IN MIN