From: Howe, Tyler
To: Spellman, John (DEC)
Cc: Beam, Steve A; Brien, Jason; Brian Wert
Subject: NG Rensselaer Contractor"s Project Operations Plan
Date: Wednesday, April 20, 2022 3:25:42 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
01 15 00-001-C Project Operations Plan.pdf

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

John,

Attached is EWMI's Project Operations Plan for the National Grid Rensselaer Site.

Thanks,
Tyler

Tyler Howe
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COMMENTS ON CONTRACTOR SUBMITTAL NO. 01 15 00-001-C

NATIONAL GRID
RENNSELAER NON-OWNED FORMER MGP SITE
EWMI, Inc.

Arcadis Project No. 30004017.00014

ENGINEER'S COMMENTS ON – Project Operations Plan

DISPOSITION ASSIGNED BY ENGINEER FOR INFORMATIONAL SUBMITTALS, CLOSEOUT SUBMITTALS, AND MAINTENANCE MATERIAL SUBMITTALS:

☒ ACCEPTED

☐ NOT ACCEPTED

Engineer's action on this submittal is subject to this note. Engineer's review is only for general compatibility with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, and for general compliance with the information given in the Contract Documents. Contractor shall be solely responsible for complying with the Contract Documents, as well as with Supplier instructions consistent with the Contract Documents, Owner's directions, and Laws and Regulations. Contractor is solely responsible for obtaining, correlating, confirming, and correcting dimensions at the Site; quantities; information and choices pertaining to fabrication processes; means, methods, sequences, procedures, and techniques of construction; safety precautions and programs incident thereto; and for coordinating the work of all trades. Engineer is not responsible for resubmittals or tracking progress of resubmittals.

Arcadis U.S., Inc.

Date: 4/8/2022 By: _____

ENGINEER'S COMMENTS:

1. Per project team call on April 7, 2022, EWMI must have odor control foaming equipment, materials, and labor to apply foam odor control prepared and available prior to conducting any intrusive activities.

Brian Wert
14 Brick Kiln Court
Northampton, PA 18067-9784
(484) 788-3844 –*Cell*
(484) 275-6900 –*Fax*
E-mail address: bwert@ewmi.com

SUBMITTAL No. 01 15 00-006-D

To:	Arcadis of New York, Inc. **Att. Tyler Howe** One Lincoln Center 110 West Fayette Street Suite 300 Syracuse, NY 13202	**From:**	Environmental Waste Minimization, Inc. (EWMI) **Brian Wert** 14 Brick Kiln Court Northampton, PA 18067
Phone:	(315) 446-9120	**Pages:**	Two Hundred and Four (204, including Cover Sheet)
e-mail:	Tyler.Howe@arcadis.com	**Date:**	Friday April 8, 2022
Re:		**CC:**	Jason Brien, – Arcadis Steve Beam, – National Grid Phil Reinsmith, Doug Inman, Tim David, Alec Zeoli, - EWMI
Page 1	**Submittal Cover Sheet**	**PO#**	
2-204	**Comprehensive Work Plan**	**Project**	Rensselaer Non-Owned Former MGP Site
		Location	Rensselaer, NY 12144
		Client Contract No.	

☐ Urgent **X** For Review ☐ Please Comment ☐ Please Reply ☐ Hand Delivered

☐ E-Mailed ☐ Check Attached ☐ FedEx/Overnight ☐ Drawings Attached ☐ USPS/Standard ● Comments:

Attach Label Below *(if applicable)*

EWMI hereby submits the following **Comprehensive Work Plan** in accordance with § 01 15 00 - 006 of the Technical Specifications.

_____ - Brian Wert. – Project Mananger

Comprehensive Work Plan

EWMI CONT No. 116717
RENSSELAER NON-OWNED FORMER MGP SITE (SITE NO. 4-42-057)
RENSSELAER, NY

Prepared for:

National Grid
300 Erie Blvd West
Syracuse, NY 13202

Prepared by:

Environmental Waste Minimization, Inc.
14 Brick Kiln Court
Northampton, PA 18067
Phone: 484-275-6900

Date: April 8, 2022

Work Plan Contents:

4.0 Demobilization/Project Closeout

Submittals Incorporated into Work Plan

A. 01 15 00-003 List of Major Construction Equipment **(Section 3.1)**
B. 01 52 13-001 Field Offices **(Section 3.2)**
C. 01 55 26-001 Traffic Maintenance and Protection Plan **(Section 3.7)**
D. 01 71 26-001 Survey Plan **(Section 3.8)**
E. 01 35 43.13-001 Hazardous Materials Communication Plan **(Section 3.13)**
F. 01 35 43.13-002 Emergency Spill Response Plan **(Section 3.14)**
G. 01 35 43.13-003 Hazardous Materials Proposed for use at Site **(Section 3.15)**
H. 31 23 00-001 Excavation and Backfilling Plan **(Section 3.17)**
I. 31 50 00-002 Slide Rail Installation and Removal Plan **(Section 3.17)**
J. 31 51 41-001 Temporary Pumping System Plan **(Section 3.17)**
K. 02 41 00-001 Demolition and Removal Plan **(Section 3.18)**
L. 01 15 00-004 List of Major Sub-Contractors and Suppliers **(Attachment B)**
M. 01 15 00-001 Contractors Organizational Structure **(Attachment C)**
N. 01 15 00-005 Site Use Plan **(Attachment L)**

Attachments

A. Standard Daily Forms
B. Proposed Sub-Contractors
C. Project Organizational Chart
D. Submittal Log
E. Preliminary Construction Schedule
F. Field Offices Plan Drawing
G. Traffic Control Plan Drawing and Directions
H. Survey Plan Phases
I. Sample Chemical Inventory Tracking Spread Sheet
J. Proposed Hazardous Materials Safety Data Sheets
K. Temporary Dewatering System Layout Plan
L. Slide Rail Shoring System Detail
M. Site Use Plan

1.0 INTRODUCTION

1.1 PURPOSE OF THE COMPREHENSIVE WORK PLAN

Environmental Waste Minimization, Inc. (EWMI) has prepared this Comprehensive Work Plan (CWP) for the purpose of providing a detailed description of the materials, equipment, tools, procedures, and controls that will be utilized to perform the remedial activities at the Former MGP site located in Rensselaer, NY. This proposed Work Plan is based on the RFPs dated December 2020. EWMI is a certified small business entity.

1.2 GENERAL WORK ACTIVITY OVERVIEW

The proposed remedial action will be conducted in a sequential manner. A summary of the general sequence of work is outlined as follows:

- Preparation of Health and Safety Plan, Work Plan, and Other Required Submittals.
- Site Permitting.
- Waste Characterization and Approvals.
- Site Mobilization.
- Installation of SESC and Other Site Preparation Measures.
- Installation of the Gravity Wall.
- Excavation, Loading and Offsite Disposal of Impacted Soil of Tar Well, Northern Gas Holder, Southern Gas Holder.
- Backfilling.
- Restoration of Site.
- Project Closeout and Demobilization.
- Completion and Submittal of Closeout Documentation.

Concurrent with the above listed remedial tasks, EWMI will submit on an as-needed basis, progress reports, equipment and material procurement logs, waste shipment logs and specific task submittals.

COMMUNITY & SITE RELATIONS

EWMI understands that it is imperative to conduct all site work in a professional and appropriate manner conducive to maintaining good community relations. EWMI will be sensitive to this issue

and work in conjunction with client and engineer to minimize any impact to the surrounding community and ongoing businesses. EWMI will conduct all work Monday through Friday as directed by client and engineer personnel (assumed 8-10-hour days during daylight hours). Throughout the project and all phases, EWMI will conduct site and perimeter inspections to ensure EWMI is compliant with all project specifications.

QUALITY CONTROL

EWMI will document daily site conditions and work activities using our Daily Record. At a minimum, the Daily Record will include field notes, conversation records, observations, testing sheets, and construction problem identification and corrective measures implemented.

EWMI will document all project meetings and health and safety meetings to verify compliance with the contract requirements. EWMI will attend progress meetings as required. Upon completion of field activities, EWMI will prepare a summary report which will include all meeting notes, daily records, site photographs, testing data, backfill tickets, disposal manifests, etc. for submittal to client and engineer. See attachment A with standard daily forms.

STAFFING

Our field crew will consist of EWMI field personnel experienced in remediation of large hazardous waste sites. Our field crew is 40-hour OSHA HAZWOPER trained, including the required annual 8-hour HAZWOPER refresher updates. OSHA certificates will be provided prior to field activities. EWMI will have a dedicated project manager, who will conduct on-site activities during the entire project. Additionally, EWMI will provide a dedicated site safety officer, who will ensure the safety and compliance of all field personnel and activities. The on-site field crew also consists of two (2) equipment operators and three (3) field technicians to perform the work. EWMI will also provide project and health and safety oversight for EWMI subcontractors and vendors. EWMI also provides a senior oversight manager and inside Project Manager Assistant that will be responsible for all project related submittals, and commercial matters.

During the project, EWMI will utilize several sub-contractors who specialize in the scope of work they have been tasked to perform. See attachment B for a list of the proposed sub-contractors for the project at the current time. EWMI will immediately notify the client and engineer in advance if there are changes in the proposed subcontractor and their respective duties. See Attachment C for the project organizational chart.

1.3 PERSONNEL HEALTH & SAFETY

EWMI is concerned about the safety of everyone at and around our worksite whether it is our workers, client's personnel, subcontractors, or the surrounding community. As a result, EWMI has developed a Health and Safety Program that is un-matched in our industry sector. Safety is our core value here at EWMI, and without question is the responsibility of each and every employee.

Our highly trained professional staff is required to complete continual courses and training throughout each year as mandated by EWMI and OSHA. Some of the courses and training include the following: initial 40-hour OSHA HAZWOPER, annual 8-hour OSHA HAZWOPER refresher training, OSHA 8-hour Supervisor, OSHA 30-hour construction, OSHA 10-hour construction, OSHA Excavation and Trenching Safety, heavy equipment operations, DOT Hazardous Materials, RCRA and CPR/AED/First Aid Training.

Our Safety Program meets or exceeds all OSHA requirements covering protection of employees from chemical hazards, including OSHA Regulations 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response), 29 CFR 1910.134 (Respiratory Protection) and 29 CFR 1910.1200 (GHS Hazard Communication).

The major objectives of the Program are to:

- Indoctrinate safety as the number one priority for every person, every day, every job.
- Nullify the risk of employee and occupational injuries and illness.
- Satisfy regulatory requirements regarding health and safety.
- Minimize liability of both EWMI and our clients; and,
- Ensure our *client's* that health and safety is not just a requirement but our culture.

Successfully meeting these objectives requires 100% commitment 100% of the time from every employee at all levels of our company. Our Health and Safety Staff along with Ownership work diligently to make this a reality leading by example. All EWMI employees are required to comply with all Safety Policies and Procedures; management is responsible for providing the commitment and resources necessary for implementation and preservation of the Program.

We employ a behavioral based safety program. This program encourages and requires all employees to look out for one another and think before they act. We engage in a "Blue Card" Safety Observation system which empowers all workers to write and react to an observation whether negative or positive and include the corrective or encouraging action taken. All cards are reviewed by the immediate supervisor as well as the Health and Safety Director.

As part of our behavior-based safety culture we exercise STOP WORK AUTHORITY. It is both the duty and right of each and every employee regardless of position to exercise our STOP WORK Policy whenever an employee, member of the public or local environment may be at risk; no blame or fault is put on any employee using STOP WORK even if upon investigation the STOP WORK was used unnecessarily. Management fully supports the decisions of its employees in the execution of this policy. This policy is applied in any situation where an unsafe action or behavior, omission or non-action of any party involved has the potential to lead to an incident. Work that has been halted is not resumed until all safety aspects are cleared and the site is deemed safe to begin work again by the onsite safety officer.

Safety is the top responsibility of every employee; as our philosophy on safety is "Every Job, Every Day." We have the expectation that every employee goes home the way they came in. With this in mind, EWMI came up with a set of Cardinal Safety Rules. These rules are concise and highly visible so that every employee can review them, understand them, and make them Core Values displayed in our daily work routine. These rules apply to all contractors and visitors as well.

1. No Employee shall enter a Confined Space without proper training, equipment, support, entry permit, presence of an authorized attendant and authorization granted from the Project Manager acting as the Entry Supervisor.
2. No Employee shall enter an open excavation without a proper protective system and egress in place, monitoring and authorization from the Project Competent Person.
3. No Employee shall remove, dismantle, or work on energized equipment without utilizing our Lockout/Tagout policies and procedures in place. An employee only has the authority to remove his/her lock only; all employees shall be responsible for removing their own locks.
4. Do not make any technical or procedural changes without authorization from management.
5. No Employee shall begin work without fully understanding the HASP including all appropriate Personal Protective Equipment (PPE) for each required task and without a properly completed work permit in place.
6. No Employee shall work from a height of six feet or greater without the use of fall protection.
7. All authorized employees shall drive or operate company vehicles in a safe manner and in accordance with applicable laws and regulations.
8. No Employee shall operate ANY equipment which they are not trained and qualified on.
9. All Employees shall report near misses, injuries, and accidents to Management immediately.

10. All employees have the right, responsibility, and authority to STOP WORK immediately for any reasonable suspicion of unsafe conditions or unsafe behavior without fear of repercussion.

It is our commitment to conduct all work under every project safely adhering to all federal and state standards as well as industry best safety practices including but not limited to OSHA, EWMI Safety Procedures, client and engineer requirements, and any site-specific safety policies.
A detailed site-specific health and safety plan has been prepared and submitted to client and engineer for review.

2.0 PRE-MOBILIZATION ACTIVITIES

2.1 PREPARE WORK PLANS, SUBMITTALS, SCHEDULES, AND WASTE APPROVALS

COMPREHENSIVE WORK PLAN

Included herein is the comprehensive and integrated strategy to implement all project components including the sequence, means and methods, site plans, locations of temporary facilities, traffic routing, decontamination facilities, excavation and backfilling, transportation, and disposal, etc.

SUBMITTALS

EWMI will continue to provide the required pre-construction technical submittals as outlined in Table 1 specification section 01 33 00A (submittal log) for review and approval by client and engineer prior to mobilization to the project site. The submittals will be provided in accordance with technical specification section 01 33 00 (submittal procedures). See attachment D for submittal log.

SCHEDULE

A detailed project schedule will be submitted under separate cover after determining a firm start date for the project. A draft version of the Construction Schedule is included in attachment E.

WASTE CHARACTERIZATION/WASTE APPROVALS

EWMI has interpreted, compiled, and organized relevant site analytical data and has prepared a detailed sampling plan provided under separate cover to perform a geo-probe sampling event. This includes the Cover Soil Pre-Cut Area, Tar Well, Southern Gas Holder and Northern Gas Holder for waste characterization. Geoprobe sampling will be performed under a separate mobilization prior the project start date. This DATA will be provided to the proposed disposal facilities to acquire disposal acceptance. EWMI will prepare the waste profile sheets for the proposed waste streams and submitted to the owner for signature.

2.2 PERMITS/UTILITY MARK-OUT

EWMI has contacted the City of Rensselaer, NY regarding required permits for the project. EWMI has determined that a hydrant permit and construction permit will be required for the project. EWMI will submit copies of all applications and permits to the client and engineer as required.

EWMI will provide coordination with the client and engineer to ensure utility clearance prior to intrusive work and will conduct all work to assure compliance with the project schedule, conditions, and requirements. EWMI will make the appropriate public utility mark-out call at least 72 hours prior to mobilization to the site. The One-Call utility clearance will be updated as needed throughout the project and all One-Call tickets and information will be forwarded to the client and engineer on a continual basis.

EWMI has also included a Ground Penetrating Radar (GPR) survey for the location and verification of the anticipated utilities or anomalies. EWMI will be subcontracting GPRS for those services. GPRS will identify and mark subsurface targets identified with GPR with paint or flagging as appropriate depending on surface conditions. A letter report summarizing methods and findings will be provided upon request.

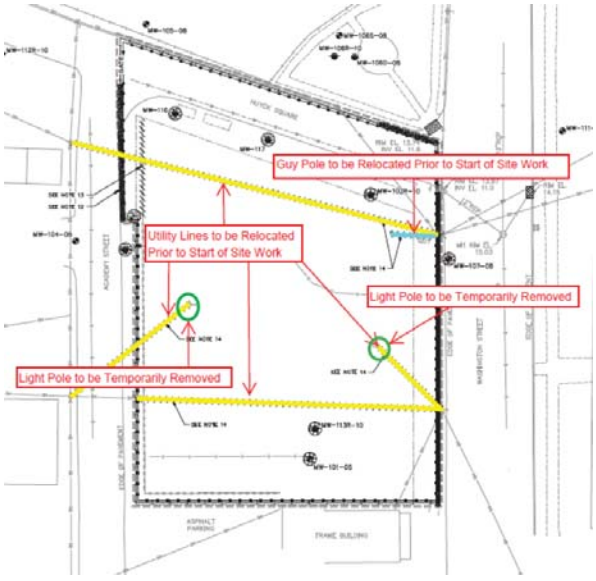
2.3 PREPARE SITE-SPECIFIC HEALTH AND SAFETY PLAN

EWMI has submitted a comprehensive site-specific Health and Safety Plan (HASP) in accordance with the contract requirement, all applicable Occupational Safety and Health Administration (OSHA) requirements and 29 CFR 1910.120. The HASP defines personnel monitoring and personal protective equipment (PPE) requirements as well as contingency plans for site emergencies such as site flooding, fire, and spills. Upon review by Owner/Owner's Representative, EWMI will revise and resubmit, if necessary, to the satisfaction of the project team. The document will also be revised as necessary as the project progresses and site conditions warrant a change to the plan.

2.4 UTILITY RELOCATION

Prior to mobilization to the site EWMI will coordinate with the appropriate utility service providers for the relocation of overhead utility lines, poles, guys, and yard lights. At this time Verizon and Spectrum have been identified as owners of the transmission lines. The guy pole, two light poles with yard lights and associated electrical lines leading to the light poles are believed to be owned by National Grid. EWMI will update client and engineer with the utility companies' relocation plans and schedules before any relocations are performed. See figure 1 for locations of anticipated utilities to be relocated.

Figure 1:



3.0 SITE WORK

3.1 MOBILIZATION AND SITE SETUP

Note: Submittal *01 15 00-003 List of Major Construction Equipment* has been incorporated into this portion of the work plan

EWMI will mobilize all labor, equipment, and materials necessary to complete the scope of work under this contract for each phase. During the course of the project various pieces of equipment and sub-contractors will be on site to perform required job tasks. Client and engineer will be notified of equipment mobilizations/demobilizations, material deliveries and sub-contractor schedules to allow for efficient coordination of job tasks.

LIST OF MAJOR CONSTRUCTION EQUIPMENT

EWMI EQUIPMENT

1. John Deere 245 Excavator
2. John Deere 544 Wheel Loader
3. Walk-behind, self-propelled water-cooled Road Saw
4. Vibratory Trench Roller

GEO SOLUTIONS EQUIPMENT (ISS WALL CONSTRUCTION)

1. CAT 336 Excavator
2. Batch Plant for On Site Grout Manufacturing

PETER LUIZZI BROS. (ASPHALT & CONCRETE RESTORATION)

1. Asphalt Miller
2. Smooth Drum Roller
3. Asphalt Paver Screed

3.2 TEMPORARY FACILITIES/PARKING

Note: Submittal *01 52 13-001 Field Offices* has been incorporated into this portion of the work plan

EWMI will provide one (1) 50’ x 10’ furnished mobile office trailer electricity, climate control and

internet for use by the Engineer and NYSDEC. EWMI will utilize our 8' x 20' project trailer equipped with electric, and internet for EWMI's on site Project Manager to perform necessary administrative tasks. EWMI will provide a generator adequate to meet the electric needs of both office trailers. EWMI will provide portable restroom(s) with wash stations to meet the needs of site personnel. Designated parking areas will also be established for site personnel and visitors. Parking for site personal during the course of the project will be restricted to areas near the office and job trailers to the extent possible. However, due to the limited space of the site parking areas will most likely need to be adjusted based on work activities. Parking locations will be discussed during construction meeting and locations will be agreed upon by contractor, client, and engineer. This information will be relayed to field personnel during daily tailgate meetings as needed. See Attachment F for Product data sheets and site plan indicating proposed location of field offices, office support equipment.

3.3 SITE SECURITY

EWMI will be installing temporary chain link fence around the perimeter of the site for the protection and security of workers and the public. Two gated access points will be installed along the eastern and western ends of Huyck Street. Gate access areas will be kept closed when not in use during working hours. The access gates will be chained and secured with a padlock during non-working hours. Keys to the padlocks will be distributed to necessary site personnel. Submittals depicting the location of temporary fencing and gates along with pertinent product data sheets will be provided under a separate submittal.

All tools, materials, equipment that can be readily moved will be stored in our secure storage trailer and locked during non-working hours. Heavy equipment will be locked and immobilized so that the equipment cannot be started and/or otherwise moved. Job and office trailers will be locked during non-working hours. EWMI also utilizes portable, battery-powered security "trail" cameras to monitor site activities during non-working hours. Images will be record when motion is detected and stored on an internal memory card for later viewing.

3.4 TEMPORARY PROJECT SIGNS

EWMI will furnish, install, and maintain temporary signage as specified in section 01 58 13 of the bid specifications
EWMI will furnish and supply temporary signage to include project identification signs, project hotline signs, danger signs and security signs. Shop drawings showing layout, text, font, character size, colors, graphics, or logos (if any), materials of construction and dimensions will be provided under a separate submittal.

3.5 PROTECTION OF FACILITIES

EWMI will protect all existing stormwater inlets and manholes, site fences and gates, curbing, pavement, utility poles and overhead wires, and all other facilities to remain in place to prevent damage from remediation and earthwork operations. Any damage to the property during the construction work will be repaired by EWMI prior to the completion of the field work. EWMI will utilize reflective orange traffic cones, high visibility fencing, caution tape, etc. as a visual control and traffic routing measures when field activities are near any sensitive areas on site.

3.6 EROSION AND SEDIMENT CONTROLS

Erosion control measures will be installed in accordance with the New York State standards and Specifications for Erosion and Sediment Control. Erosion and sediment controls for this project include the installation of eight" fiber roll along the perimeter of the site and around storm water inlets as depicted on the site preparation plan drawing G-104 and erosion and sediment controls details drawing G-501. Inlet protection bags will be installed if determined necessary during construction. Product data submittals for erosion and sediment controls will be provided under a separate cover.

A Decontamination Pad will be constructed on site as depicted in the miscellaneous drawing sheet G-502. The decon pad will be used for decontaminating truck tires, equipment, and tools for the duration of the remedial portion of the project. A high-pressure, cold-water washer will be set up with a clean 225-gallon tote of water. "Contact" rinse water accumulated in the sump will be transferred to a separate tote with a submersible pump. The contents of the tote will then be transferred to the wastewater storage tank for disposal.

3.7 TRAFFIC CONTROL

Note: Submittal *01 55 26 Traffic Maintenance and Protection Plan* has been incorporated into this portion of the work plan as

EWMI has prepared a traffic control plan that details traffic flow into and out of the site, throughout the work. This plan also details working hours and control measures to minimize disruption to the surrounding community. A copy of this traffic plan with traffic routes and turn by turn directions will be submitted to import and export transportation companies for adherence during project implementation.

All traffic will enter the site through the construction entrance gate located at the intersection

of Huyck Square and Washington Street. All traffic will leave the site through the construction gate located at the intersection of Huyck Square and Academy Street. Work Area Ahead signs will be placed along Washington Street to provide advanced warning of work activity. Additional signage will be placed to mark the location of the entrance and exit gates with flow arrows. EWMI field personnel will assist delivery trucks entering, exiting, and traveling through the site. EWMI utilizes a two-spotter system for larger delivery vehicles. One spotter will be located at the rear of the vehicle and the other will be located at the front of the vehicle within direct visual and verbal communication range. Spotters will be equipped with two-way radios for communication.

Do not Enter signs will be installed on both entrance and exit gates. During non-working hours, a Type 3 "Road Closed" barricade equipped with lighted barrels will be used to block off the gates as an additional traffic safety control measure. See attachment G for design layout.

3.8 SURVEYING

Note: Submittal *01 71 26 Survey Plan* has been incorporated into this portion of the work plan

A New York State licensed surveyor, Colliers Engineering & Design, will be performing survey tasks for the project. The scope of tasks has been broken into four phases to include the following. See attachment H for a detailed explanation of the survey phases.

Phase 1.0 Pre-Construction Site Control Establishment and Survey Control Plan
Phase 2.0 Pre-Construction Topographical Survey
Phase 3.0 Interim Survey & Monitoring/Post Removal Surveys
Phase 4.0 Post-Restoration Topographic Survey

EWMI will perform photo documentation of pre-construction and post-restoration site conditions. Photos will be of digital quality and numbered. A key plan will be provided showing the location and general direction of each photograph.

3.9 VIBRATION MONITORING

EWMI will develop a construction instrumentation monitoring plan and will be provided as a separate submittal. The plan will include documentation describing the collection of readings and will be presented to the Engineer of Record for approval. Vibration monitoring will be performed at six (6) locations and deformation monitoring will be performed at three points. We will provide wireless solar-powered systems to avoid the need for local power and related challenges. Prior to excavation we will install the systems, setup wireless connections, and establish communication with the remote telemetry using an internet-based program capable of

continuous access. The data collected by the system will be transmitted remotely through a wireless-based system using a built-in modem. The system will transmit the data to a secure hosting website to enable continuous viewing of the collected data. We will provide the client and engineer access to the hosting website and issue a Username and Password. Access can be provided to other project personnel at your request. We will continue to prepare Data Reports summarizing the data collected by the systems. We will prepare daily reports in accordance with the project requirements. We can prepare additional reports at other intervals at your request. The reports will be prepared by a Professional Engineer registered in the State of New York.

3.10 WORK ZONES

EWMI will establish work zones, to include an exclusion zone (EZ), contamination reduction zone (CRZ) with equipment and personal decontamination points, support zone (SZ), and access control points at each excavation area. EWMI will provide labor, materials, and equipment to install safety measures as described in the site-specific HASP to delineate each work zone on the property. EWMI personnel using 2-way radio communication will monitor the work site and ensure the access is controlled to allow only authorized, trained personnel. EWMI uses its own "Meet and Greet" policy for any unexpected entrants to the work site to ensure they are aware of the hazards on site and observe all EWMI site policies and procedures. Open excavations will be fenced off with orange construction fence during non-working hours.

3.11 WORKDAYS/HOURS

EWMI anticipates working five (5) days per week, eight (8) to ten (10) hours per day (Monday through Friday, during normal daylight hours) until the project is completed. Changes to the working days and hours, including holidays, will be coordinated with the client and engineer site managers.

3.12 AIR MONITORING

Air Monitoring **-** EWMI will provide all labor, materials, equipment, services, and incidentals as specified and required to comply with the Community Air Monitoring Plan (CAMP). Community Air Monitoring will be performed during all ground intrusive work or dust generating work. Community Air Monitoring Includes real-time air monitoring for total volatile organic compounds

(TVOC's) and particulate matter less than 10 micrometers in diameter (PM_{10}) along with periodic monitoring for manufactured gas plant (MGP)-related odors.

The perimeter air monitoring system will consist of three Air Monitoring Stations capable of measuring real-time ambient air concentrations of TVOCs and PM_{10}, logging air monitoring data, and altering site personnel if alert levels or action levels are exceeded. Each Air Monitoring Station will be equipped with a photoionization detector and aerosol photometer with direct read and data logging capabilities.

Periodic monitoring for MGP-related odors will be performed hourly or more frequently if necessary, during work hours along the perimeter of the work area. If odors are noticed procedures will be followed as described in Specification Section 01 35 49 Part 3.02.A.3 and in the event of odor complaints procedures will be followed as described in Specification Section 01 35 49 Part 3.02.B.

Dust – Best Management Practices or BMPs, will be implemented during the work to prevent any fugitive dust emissions from the site. Standard engineering and management controls will limit the amount of dust generating activities performed on site. If required, dust suppression will be performed by applying a light water mist to the problem areas using a high-pressure cold-water washer. The pressure washer wand equipped with a nozzle will create a fine spray mist that will atomize airborne dust and prevent it from migrating off site and in the work zone.

Data RAM dust monitors will be utilized for the duration if the project and will be installed along the perimeter of the job site. Locations and usage of the monitors will be adjusted based on changes in site conditions such as weather, and work locations. Personal Data RAMS will be utilized be field crew while performing job task where exposure to dust is at a higher risk level. DATA collected from dust monitors will be recorded and documented and provided to the client and engineer as required in specification section 01 35 49.

Vapors – Best management practices or BMPs, will be implemented during the work to prevent any fugitive vapor emissions from the site. Standard engineering and management controls will limit the amount of dust generating activities performed on site. A non-PFAS Rusmar® Foam generator, model OC (AC-645) long duration foam will be available at the site for the duration of the excavation work at the site. BioSolve's® Pink Water™ and/or (AC-645) long duration foam will be used continuously during excavation and impacted material handling activities. Foam will also be applied to open excavations at the end of each workday for overnight and weekend odor control. The foam produces a thick, long-lasting, viscous barrier within the excavations and stockpiled soils for immediate control of dust, odors, and volatile organic compounds (VOCs). In

addition to odor / vector control, EWMI will use BioSolve's® Pink Water™ as a lipophilic surfactant formula to attack hydrocarbon mitigation problems.

A photo-ionization detector (PID) meter will be utilized during excavation work to ensure the safety of workers. If readings begin to reach actions levels stop work will be performed at the site and necessary controls will be implemented to ensure the safety of workers and the public.

Meteorological Monitoring – EWMI will provide one portable meteorological monitoring system capable of measuring wind speed, wind direction, relative humidity, dry bulb temperature, and barometric pressure with display and data-logging features.

Equipment – The following air monitoring equipment is proposed for the project.

1. PID-MiniRAE3000 10.6 120V D
2. Dust Trak2 Desktop Monitor 8530
3. Enclosure (NEMA) Pine Telemetry
4. Pine IG21 Wireless Modem
5. Wireless Vantage Pro2 by Davis Instruments

3.13 HAZARDOUS MATERIALS COMMUNICATION

Note: Submittal *01 35 43.13 – 001 Hazardous Materials Communication Plan* has been incorporated into this portion of the work plan

EWMI will implement the following procedures for the management, handling and storage for hazardous materials brought onto the site or generated at the site. These procedures are intended to provide awareness to field personnel of the presence of hazardous materials and make information of the hazardous materials readily available to ensure appropriate actions can be taken for medical treatment or spill response.

EWMI currently implements a chemical inventory tracking spreadsheet for any chemicals stored in job trailers or brought to the site. The spreadsheet contains the name, usage, manufacture, container size, quantity and an SDS link for the hazardous materials. The spreadsheets are updated as hazardous materials are consumed, restocked or new materials are brought in. See attachment I for a sample spreadsheet.

EWMI will modify the job trailer spreadsheet as needed to include specific chemicals required to complete this project. EWMI will maintain a copy in their job/office trailer. A second copy will

be distributed to the owner and engineer. Hard copies of SDS's for all chemicals on site will be maintained inconspicuously in EWMI's job/office trailer and will be available to all site personnel for the duration of the project. SDSs for the major hazardous materials being used at the site have been included as attachment J and includes diesel fuel, gasoline, hydraulic fluid, Biosolve Pinkwater, AC-645 foam, Calciment.

Additional hazardous materials and wastes specific to the job will be generated during the project. All materials and wastes will be stored in approved storage containers and will be properly marked and labeled. Materials and waste will also be stored and secured in secondary containment and protected from adverse weather.

3.14 SPILL CONTROL & PREVENTION

Note: Submittal *01 35 43.13 - 002 Emergency Spill Response Plan* has been incorporated into this section of the work plan

The major sources for a potential spill or release during site work may include but not limit; diesel fuel, gasoline, engine oil, hydraulic fluids for heavy equipment, bulk storage agents for the gravity wall, and non-hazardous impacted soils loaded into outbound trucks. Diesel fuel storage on site will be limited to approved fuel cells integrated to designated EWMI fleet trucks. Gasoline will be stored in OSHA approved, 5-gallon fuel cans. When not in use and at the end of the workday all fuel cans will be stored in the EWMI job trailer. Refueling of equipment will be conducted at a minimum of one hundred' from any water way. Fuel transfer pumps will always be attended while in use. Absorbent spill pads and materials will be stored in all trucks equipped with an approved fuel cell and readily available in the event of a spill release Fueling with cans will be done with funnels and spill pads with absorbent material kept at hand and readily available in the event of a spill. The same precautions will be taken when routinely topping off engine oils and hydraulic oils. Additional steps to minimize the risk of a fluids release from heavy equipment include the inspections of the equipment which is performed before work begins each day at a minimum and records will be provided to client and engineer with the submission of the daily reports on the following business day. As part of the daily inspection, it includes verifying that all connections are tight, and no leaking fluids are observed. Conveyance piping or transfer hoses will be inspected for cuts, frays, and cracking. Any loose connections or damaged hoses will be repaired prior to operation of the equipment. In the event of a spill or release, the designated field supervisor will be responsible for immediately notifying the EWMI site project manager, who will then notify the client and engineer site contact of the incident. A spill kit will be maintained at the site within the work zone and will contain at a minimum, spill pads, granular

absorbent material, and containment booms for immediate containment of a spill or release. Waste generated during a spill or release will be cleaned up immediately and placed into drums or other secure containment and removed by EWMI. All waste will be properly labeled while in storage. In the event of a spill or release that would require outside resources to manage EWMI will use its 24-hour emergency response company Rapid Response Inc. (RRI) to assist with cleanup. Within 48 hours of spill cleanup an incident report will be filled out to include a description of the event, individuals involved, site conditions at time of event, actions taken during the event, determination of the root cause of the event and any steps to be taken in the future to prevent or reduce the risk of the event occurring again. All reports and documentation of the incident will be provided to the client and engineer. The appropriate local, state, and federal agencies will be notified of any releases as required by law. Contact information for authorities having jurisdiction, emergency responders, site contractors, owner, and engineer are provided below.

Authorities Having Jurisdiction

1. Local
    a. Fire Department – (518) 357-2045
    b. Police Department – (518)-462-7451
2. Region 4 Spill Office – (518) -357-2045
3. State NYSDEC Spill Hotline – 1-800-457-7362

Emergency Responders

1. EWMI to self-perform – 1-877-460-1038
2. Fire Department – (518) 357-2045

EWMI Contacts

Phil Reinsmith (Project Manager) – (484)-788-5733
Brian Wert (Site Superintendent) – (484)-788-3844
Jon Gialouris (Foreman) – (484)-788-3007
Nick Aquilino (Site Safety Technician) – (484)-655-0465

Owner and Engineer

Steve Beam (National Grid) – (315)-663-5304
Kyle Warren (Arcadis) – (518)-986-6120

3.15 ANTICIPATED HAZARDOUS MATERIALS AND WASTE

Note: Submittal *01 35 43.13 – 003 Hazardous Materials Proposed for use at the Site* has been incorporated into this portion of the work plan

The following is a list of hazardous and non-hazardous materials anticipated to be on site during the project. Some items on the list are generic, however the job specific hazardous materials inventory tracking spreadsheet will contain a detailed list. Material Safety Data Sheets (SDS's), will be brought to the site during mobilization and will be kept conspicuously located in EWMI's field trailer.

Hazardous Materials

1. Gasoline
    a. Manufacturer – Various
    b. Supplier – Various
    c. Container Size and Type – 5-Gallon Metal Gas Can
    d. Number of Contains – 1-3
2. Diesel Fuel
    a. Manufacturer – Various
    b. Supplier – Various
    c. Container Size and Type – 5-Gallon Metal Fuel Can up to 75 Gallons Steel Truck Mounted Fuel Cell
    d. Number of Containers – 1-2 Fuel Cans and 1-2 Truck Mounted Fuel Cells
3. Hydraulic Fluid
    a. Manufacturer – Various
    b. Supplier – Various
    c. Container Size and Type – 5 Gallon Plastic Pail
    d. Number of Containers – 1-2 Pails
4. Biosolve Pinkwater
    a. Manufacturer – The Biosolve Company
    b. Supplier – Same
    c. Container Size and Type – 55-Gallon Drums
    d. Number of Containers – 1-16 Drums
5. AC-645 Foam
    a. Manufacture – Rusmar Inc.
    b. Supplier – Same
    c. Container Size and Type – 55-Gallon Drums
    d. Number of Containers – 1-16 Drums
6. Calciment
    a. Manufacturer – Mintek Resources
    b. Supplier – Same

c. Container Size and Type – Cubic Yard Sacks
d. Number of Containers – 1-50

Hazardous & Non-Hazardous Wastes

1. Investigative Derived Wastes (IDW) Waste from Waste Class Sampling Event
2. Excavated Impacted Soil
3. Impacted Wastewater from Excavation Dewatering and Equipment Decontamination
4. PPE

3.16 GRAVITY WALL CONSTRUCTION

Preparation

Prior to construction of the gravity wall EWMI will coordinate with GES for collecting verification soil solidification samples and testing for permeability and compressive strength (ASTM D5084 and ASTM D1633). Each set of samples will consist of four 3-inch by 6-inch sample specimens (cylinders) of homogenized solidified soils obtained from the soil solidification monolith surface, mid-point, and other depths to be determined by the Engineer.

EWMI will remove the asphalt over the proposed In-situ Stabilization (ISS) areas. The material will be direct loaded when possible for transportation to the landfill facility. Once the asphaltic pavement is removed, EWMI will initiate a three-foot (3') deep pilot cut for the ISS work. The sides of the excavation will be sloped 2:1. As with the asphalt, soil will be direct loaded.

The ISS gravity wall installation will be performed by our subcontractor Geo-Solutions Inc. (GSI). Their scope of work consists of in-situ soil solidification (ISS) of potentially impacted soils by the excavator bucket soil mixing method within the site. This process includes monolithic stabilization of approximately 1,650 cubic yards (CY) of soil. The designated limits and depths of the ISS are shown on Drawing S-101 and S-301. The ISS will commence at the top of till. GSI is proposing to stabilize the soil using an excavator bucket and in-situ soil mixing method using a grout mixture of ten percent (10%) cement. A detailed work plan for the ISS installation will be provided under a separate cover.

Excavator Soil Mixing

The maximum anticipated depth of ISS is fifteen feet (15') below the work platform. The ISS area will be laid-out into a series of rectangular cells. Each ISS cell will be designated with a unique identifier based on its location within the grid. Adjacent cells will be slightly overlapped to ensure a continuous, uniform, and homogenous mixture of the target soil. Grout is added to the excavation while the cut gradually widens by taking small slices of soil from its sides. As the soil is removed, it is mixed with the grout in the cell. The entire cell is then mixed until homogeneous and the operation repeated in the next available cell.

ISS Layout and Depth

Once the overburden removal and work platform grading are complete, the treatment area will be surveyed and staked in the field. Stakes and benchmarks will be set at pre-determined spacing along all sides of the treatment area to provide a basis for a grid to locate and position soil mixing cells. Each cell will be identified with a unique designation based on the location within the grid established. During mixing of the cell, depth will be verified through the application of graduations marked on the excavator's boom and stick assembly. The bottom elevation of each completed cell will be measured by placing the mixing bucket at the corners of the cell and surveying a fixed target on the excavator stick by Total-Station. Cell depth will be verified by a GSI field technician.

Grout Batching Procedures

Grout will be prepared on a batch or continuous basis in GSI's high-shear mixers. The appropriate weights of reagents will be added to the water that has been metered into the plant. A predetermined amount of grout will be metered and pumped from the mix plant for each cell based on the volume of the cell. Parameters for each batch mix will be recorded and can be related to the particular cell in which it is to be injected.

ISS Spoils

The spoils created by ISS operations are expected to cure in place up to the work platform elevation or higher if practicable. GSI will maintain the spoils during ISS operations within the ISS areas.

Quality Control

Quality Control is critical to the successful completion of the project. GSI will enact a quality control program specifically designed to meet the requirements of the project in addition to GSI's extensive Standard Operating Procedures for Shallow Soil Mixing. Field tests of the soil-mix materials will be performed according to specifications and documented on our respective soil-mix "Quality Control Form." A detailed work plan for this portion of the project will be provided under a separate cover.

Post ISS in-situ samples will be obtained for various depths immediately upon completion of the ISS cell with the excavator bucket. GSI will retrieve sample material and prepare molded specimens in accordance with ASTM D4832 for laboratory following the specified curing periods. GSI will make additional ISS samples available to the client and engineer for quality assurance testing and observation, if necessary.

3.17 SOIL EXCAVATION & BACKFILLING

Note: Submittal *31 23 00-001 Excavation and Backfilling Plan, 31 50 00-002 Slide Rail Installation and Removal Plan* and *01 51 41 – 001 Temporary Pumping System Plan* has been incorporated into this section of the work plan

Remedial excavation will be performed in three separate locations at the site. EWMI will begin with the Tar Well Excavation, which will utilize a slide rail shoring system. The second excavation will be performed in the Northern Gas Holder and the third excavation will be performed in the Southern Gas Holder.

Groundwater encountered during in the excavations will be removed with a three-inch (3") centrifugal pump and containerized in one of the two (2) 21,000-gallon frac tanks to be staged on the site. If there is a significant amount of tar residue encountered in the pumped water, then EWMI may switch one of the frac tanks out for an 18,000-gallon weir tank. Water will be pumped initially into the weir tank and then to the frac tank to decant and separate the tar from water. See attachment K for the temporary dewatering system layout plan.

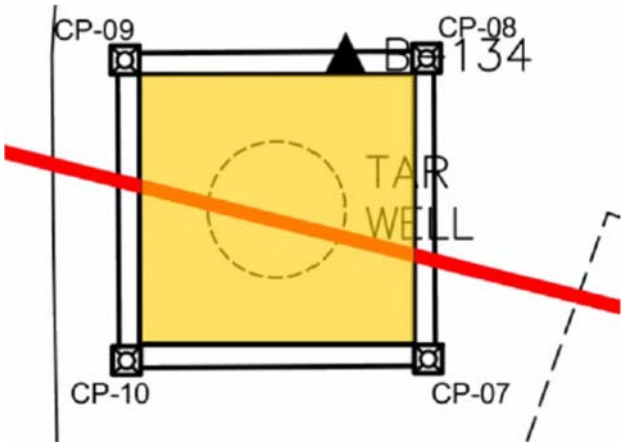
EWMI will utilize Calciment™ as a drying agent. The Calciment™ will be supplied in two-thousand pound (2,000 lb.) super sacks. Calciment™ is a proprietary material manufactured by Mintek®. It is a hybrid of Portland Cement and quicklime. This material requires less yield than other stabilizing or drying agents on the market, thus minimizing time to import, manage and dry wet soil on site and decreasing off-site disposal costs. As storage is limited onsite this is a major consideration. The Excavated soils that will not pass a paint filter test will be amended with Calciment™. The excavator will hoist the super sacks of Calciment™ and spread the agent over the soil. The excavator will mechanically mix the Calciment™ with the soil using the excavator bucket. Once material is sufficiently dry, it will be directly loaded onto dump trucks for removal from the site.

It is anticipated that historic piping may be encountered during the excavation work. EWMI will

be prepared to perform abandonment of these pipes by use of plugs, blocks, or mortar. Abandonment will be performed in accordance with Miscellaneous Details Drawing G-502 Detail 3. The client and engineer will be immediately informed when unknown pipes are encountered. Air monitoring will also be performed before performing any work on unknown pipes. Below is the excavation and backfill plan for the excavation areas.

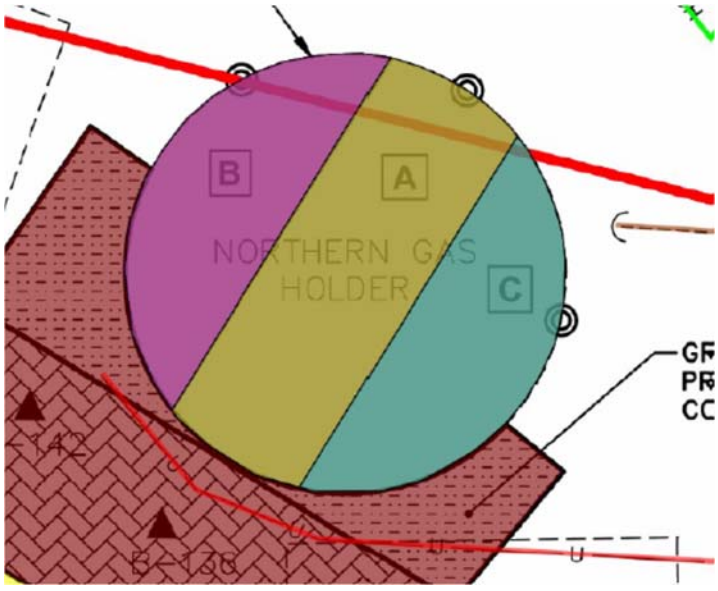
Tar Well Excavation & Backfilling

EWMI will excavate the tar well area first. A 16.4' X 16.4' square, slide rail system with two rows of eight-foot (8') high panels and one row of four-foot (4') high panels will be utilized for shoring this area. A four-foot (4') pilot cut will be performed over the footprint of the proposed area and the slide rail frame. The first set of panels will be assembled in the pilot cut area. As excavation progresses the posts and panels will be installed to create a four-sided box. The shoring system will be advanced downward into the excavation as we progress. Once the excavation is advanced past and eight-foot (8') vertical depth, the second tier of eight-foot (8') vertical panels will be placed between the posts followed by the final four-foot (4') set. After excavation is complete, backfill will commence and panels will advance upward in reverse by pulling each panel upward as fill progresses. Backfill will be performed in twelve-inch (12") loose lifts for fill less than five-foot (5') below grade and eighteen (18") lifts for fill more than five-feet (5') below grade. Fill will be compacted with a remote-control trench roller. EWMI will provide nuclear density testing of the compacted fill to ensure the compaction density requirements. EWMI will utilize a John Deere 245 or equivalent excavator and a John Deere 544 or equivalent wheel loader for the excavation and installation/removal of the slide rail system. See attachment L for slide rail system engineered design and installation details..



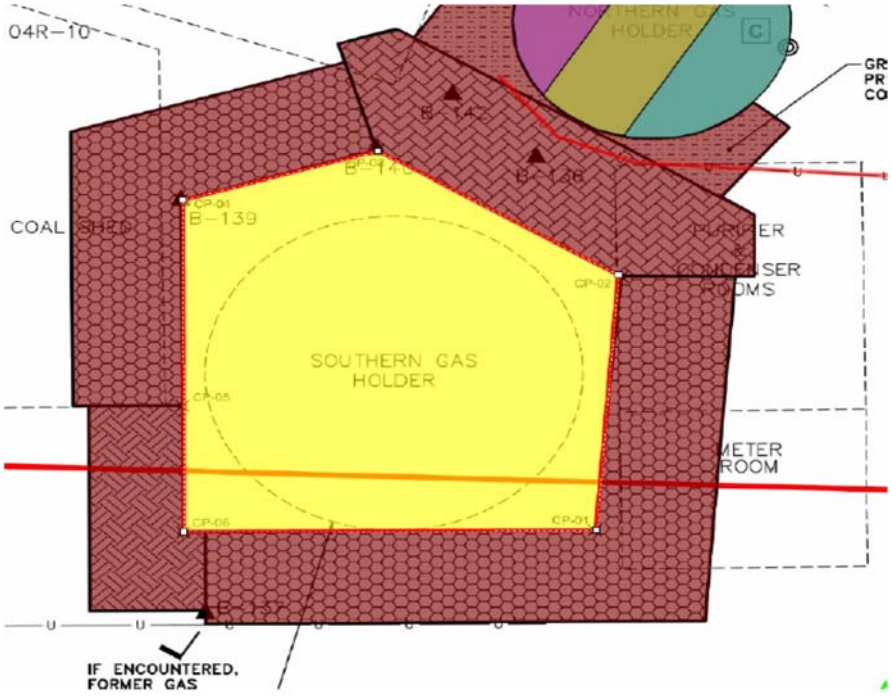
Northern Gas Holder Excavation & Backfilling

Excavation will continue within the northern gas holder in the sequence depicted in the RFP showing A, B and C cells. It is assumed that the wall structure is sufficiently sound to serve as excavation support. EWMI will utilize the John Deere 245 or equivalent excavator and a John Deere 544 or equivalent wheel loader for the remedial work associated with this excavation area. As cell A is excavated, the slope of the excavation will project into excavation B to allow for the proper OSHA sloping and entry of personnel into the excavation. It is anticipated that the final three feet (3') of the excavation will be straight cut to minimize the amount of sloping. Once the cell is excavated, any visible "gross" tar will be removed from the walls of the holder using mechanical scraping methods. If the excavation proves unsafe for entry due to instability in the existing structure or unfavorable soil/groundwater conditions that cannot be addressed with the sloping, then cleaning of the walls and compaction testing will not be performed until the backfill progresses to an elevation where safe entry into the excavation is possible. EWMI has allowed for a moderate scraping effort to clean the walls. Abrasive cleaning methods or removal of staining or impregnated material has not been factored into the work plan. Backfill work will commence as soon as the walls in cell A have been scraped. Backfill of cell A will allow for sufficient sloping or benching alongside Cell B for OSHA compliance. Flowable fill will be used for backfilling, the material will be conveyed into the excavation via a concrete mixing truck. Plywood, with soil and lumber bracing will be used to form a backstop for the pour between excavation cells. Excavation work will continue using this sequence through the B and C cells.



Southern Gas Holder Excavation & Backfilling

The final area of excavation will be the southern gas holder. The southern gas holder will be excavated within the confines of the gravity wall. As the backfill progresses the sections of the gravity designated for removal will be excavated and backfilled in coordination with the other work. EWMI plans to begin excavation along the northeastern corner of the excavation and advance the excavation westward. EWMI will utilize a John Deere 245 or equivalent excavator and a John Deere 544 or equivalent wheel loader for the excavation of the southern gas holder. It is anticipated that the northeast corner will be one of the deeper portions of the excavation. This will be a preferred location for a sump pit if water is encountered and pumping needs to be performed. If necessary EWMI will utilize Calciment™ for a drying agent. Due space constraints EWMI will live load excavated material for disposal. EWMI will also remove portions of the gravity wall as depicted on the Gravity Wall Removal Plan drawing (S-102). The Gravity wall will be removed to the top of till or a minimum of two' deeper than groundwater table. Excavated material will be live loaded and transported off site for disposal. After completion of excavation work EWMI will commence with placing backfill in the southern gas holder. Backfill will be performed in twelve-inch (12") loose lifts for fill less than five-feet (5') below grade and eighteen-inch (18") lifts for fill more than five-feet (5') below grade. Fill will be compacted with a remote-control trench roller. EWMI will provide nuclear density testing of the compacted fill to ensure the compaction density requirements.



3.18 DEMOLITION

Note: Submittal *02 41 00 Demolition* has been incorporated into this portion of the work plan

The demolition portions of this project will include the temporary relocation of communication lines, electrical lines, guy pole and two light poles located in the parking lot. See section 2.6 for the utility relocation plan. Other demolition work will include removal of asphalt, concrete, and temporary removal of a portion of the guard rail along Academy Street to allow excavation of the Tar Well

Asphalt and Concrete

A road saw and demo saw will be utilized as necessary to cut the asphalt and concrete as needed before removal. A fine water mist will be applied for dust control during asphalt and concrete cutting work. Asphalt and concrete will then be removed with the excavator and live loaded when possible, for disposal.

Guard Rail

Prior to excavation of the Tar Well a portion approximately thirty linear feet of the guard will be removed. EWMI will unbolt and remove rails which will be saved for reuse. Posts will be removed as necessary and saved for reuse. Posts and rails will be reinstalled in accordance with state and local requirements during the site restoration portion of the project.

3.19 SITE RESTORATION

EWMI will place and compact eight inches (8”) of type 2 aggregate over portions of the parking lot that were excavated or where existing subbase was otherwise removed for remediation purposes. Existing subbase will be utilized over the remaining area of the parking lot if the client elects to repave the entire parking lot area as priced in the base bid. The new subbase will be fine graded to match the current topography. The remaining asphalt paving will be removed with an excavator and the material will be direct loaded for removal from the site and surface recompacted, as necessary. Temporary fencing and barrier walls will be removed immediately prior to placement of the subbase.

EWMI will utilize a subcontractor for curb, sidewalk, and asphalt paving. Prior to placement of the asphalt, the curb and sidewalk will be formed and poured. After concrete is cured and forms are stripped, the base and wearing courses of asphalt will be placed using full size paver with

integrated electronic grade controls. A steel drum vibratory roller will be used for compaction. Compaction testing will be performed as required. The parking lot striping will be placed withing 48 hours of completion of the paving.

3.20 WASTE MANAGEMENT, TRANSPORTATION AND DISPOSAL

EWMI will manage the transportation and disposal from the remedial activities in a manner that ensures the protection of health, safety, public welfare, and the environment.

EWMI will schedule and coordinate trucks to transport materials from the site to the selected treatment/disposal facilities. Trucks will not queue or park on any public or private streets in the neighboring area and will conform to Site working hours. Transporters will be given a copy of the traffic routing plan prior to start of work to familiarize themselves with the proposed routes for vehicle movement throughout the site.

All trucks leaving the site with contaminated soil will be covered and have the appropriate manifests or bills of lading and shall be inspected for proper cover prior to exiting the site. Weigh scales at the disposal facility will be used to document the quantity shipped. Completed shipping manifests shall be provided to client and engineer on a daily basis.

3.21 EQUIPMENT DECONTAMINATION

All tools, equipment, and machinery from the Exclusion Zone (EZ) or Contaminated Reduction Zone (CRZ) are decontaminated in the CRZ prior to removal to the Support Zone (SZ). All contaminated tools and equipment will be decontaminated on site using the following methods: a dry decontamination procedure will consist of thoroughly scraping, brushing, or wiping down tools and equipment. Any solids generated will be placed on the outbound bulk soil disposal trucks. Typically, a thorough dry decontamination is sufficient to remove the impacted material being handled on site. Visual inspection will be completed and further decontamination utilizing “wet” methods will be conducted if needed. EWMI has included pricing for a decontamination pad/collection area to be installed for equipment washing/cleaning. Any decontamination water will be transferred to on site storage tanks for disposal.

4.0 DEMOBILIZATION/PROJECT CLOSE-OUT

Following the substantial completion of all field activities a site walk will be conducted with client and engineer representatives prior to demobilization from the project site. This site walk will be used to receive closeout of construction activities or identify "punch list items" to be addressed. Following the completion of field activities and satisfaction of punch-list items EWMI will demobilize fully from the project site. The site will be cleared of construction signs/barricades, excess materials, waste, trash, and all other items. All facilities and equipment brought to the jobsite throughout the project will also be removed upon approval of the final work product by the client. Upon complete demobilization EWMI will submit to client and engineer any documentation that had not been forwarded on a weekly basis including a final summary of all soils shipped off-site.

END OF DOCUMENT

ATTACHMENT A

Standard Daily Forms

ATTACHMENT A

Standard Daily Forms

Environmental Waste Minimization, Inc.
EWMI
Tel. (484) 275-6900 (484) 275-6970 -Fax
www.ewmi-info.com

RAPID RESPONSE, INC.
An Affiliate of EWMI
24/7/365 877-460-1038
www.rri-hazmat.com

DAILY RECORD

Project #: _____ Date: _____ Day: _____

Customer: _____ Customer Contact: _____

Job Location: _____ Customer Phone: _____

_____ Customer Fax: _____

NAMES	CODE	START	O.S. START	O.S. FINISH	FINISH	TOTAL HOURS

SUBCONTRACTOR	CODE	START	O.S. START	O.S. FINISH	FINISH	TOTAL HOURS

QTY	MATERIALS / CONSUMABLES
	PPE Level- (Circle One) Mod -D D C B
	PPE Level- (Circle One) Mod -D D C B

EQUIPMENT	QTY.	DAYS

CONTAINER & VOLUME	I.D. #	DAYS	Spot / Pickup

Customer Initials: _____

JOB DESCRIPTION / REMARKS

BACKFILL	TICKET #	UNIT	VOLUME
		Total	

☐ See Attached Spreadsheet

DISPOSAL	MANIFEST #	ESTIMATED VOLUME	UNIT
	Estimated Total		

☐ See Attached Spreadsheet

Weather: ____________________ Temperature: ______ ºF

Signature: Customer ____________________ EWMI / RRI : ____________________

Date: ____________________ Date: ____________________

Original - Customer Copy

EH&S Work Permit

GENERAL INFORMATION SECTION (Complete for all Permits)

Job Number | Division | Facility Name(s)/Generator | Consulting Contractor (if applicable)

Date | Emergency Phone Numbers: Fire/Police I EMS | Other

Description of Work

Special Instructions

Is initial Atmospheric Testing required? (Check all that apply) Attach Results.

☐ Work Zone ☐ Perimeter ☐ Personal ☐ Other (CSE, Hot Work) ☐ N/A

SAFE WORK SECTION-Includes all EWMI/RRI Personnel, Contractors, Subcontractors, Clients and Visitors

	Complete	N/A
Site orientation / overview complete & Emergency Action Plan reviewed	☐	☐
Informed crew of the scope of work & STOP WORK AUTHORITY	☐	☐
Reviewed safety shower and eyewash location(s)	☐	☐
Reviewed all chemical hazards including SDS's and Fact Sheets	☐	☐
Reviewed environmental and housekeeping requirements (Clean-up/Disposal/Containment)	☐	☐
Reviewed personal and equipment decontamination procedures and requirements	☐	☐
Understand all safety and environmental potential exposures associated with the job	☐	☐
Reviewed job procedures to mitigate hazardous exposures	☐	☐
Reviewed SSHASP, JSA's & PPE requirements	☐	☐
Proper notifications have been made (Operations, One Call, Customer, Site Contact, etc.)	☐	☐
Daily site inspection complete	☐	☐
Excavation inspected according to policy	☐	☐
All equipment inspected for defects, including ladders, CSE, fall protection equipment	☐	☐

Job Specific Potential Exposures (Check all that apply) (Complete for all Permits)

- ☐ Asbestos
- ☐ Cave In
- ☐ Corrosives
- ☐ Dust/Combustibles
- ☐ Electrical/High Voltage
- ☐ Excavations
- ☐ Chemicals (Name) _____
- ☐ Extreme Weather Conditions
- ☐ High Pressure
- ☐ Falling Objects
- ☐ Fire/Flammables
- ☐ Falls
- ☐ Welding
- ☐ Flying Debris
- ☐ Freeze Burns
- ☐ Hazardous Atmosphere
- ☐ Hazardous Energy
- ☐ Heat Stress
- ☐ Heavy Lifting
- ☐ High Winds
- ☐ Hot Water/Steam
- ☐ Biological Hazards
- ☐ Heavy Metals
- ☐ Noise
- ☐ Hot Work*
- ☐ Other _____
- ☐ Confined Space*
- ☐ Radiation
- ☐ Reactive
- ☐ Slips, Trips & Falls
- ☐ Thermal Burn
- ☐ Toxic

• If work is outside established SOP's for asbestos, notify and obtain approval from the Health and Safety Manager. *Attach additional permit(s)

PPE/EQUIPMENT SECTION (Check all that apply) (Complete for all Permits)

- ☐ Hard Hat
- ☐ Safety Glasses
- ☐ Work Boot (Safety Toe, Chemical)
- ☐ Hearing Protection (Plugs/ Muffs)
- ☐ Gloves (Leather/Chemical/ Electrical)
- ☐ Fire Retardant Clothing (Nomex)
- ☐ APR - Full/Half Mask
- ☐ SCBA
- ☐ Airline w/ Escape Bottle
- ☐ Chemical Goggles Face Shield
- ☐ Welder Hood/Cutting Goggles
- ☐ Cool Vest/Suit
- ☐ Chemical Splash Suit
- ☐ Flash Suit/Electrical Mats
- ☐ Full Body Harness/Lanyard
- ☐ Personal Flotation Device
- ☐ Non-Sparking Tools
- ☐ GFCI
- ☐ Forced Air Ventilation
- ☐ Communication Equipment
- ☐ Perimeter Control
- ☐ Personal/ Area Monitoring Equipment
- ☐ Other_____

ENERGY CONTROL SECTION

☐ See attached isolation procedure form. ☐ N/A

ENERGY CONTROL LOG

Isolation Device(s)	Location of Device(s)	Device(s) Position	Isolation Lock/Tag ID#	Attachment/ Verification Date	Init.	Removal Date	Init.
1.							
2.							
3.							
4.							
5.							

Energy Control Closure

Have all Safety Devices been reinstalled if removed?	☐ Yes	☐ N/A
Have all Locks, Blinds, and Tags been removed and energy restored in proper sequence?	☐ Yes	☐ N/A
Has all work been completed?	☐ Yes	☐ No

Energy Source(s) Isolated	☐ Yes	☐ N/A	Equipment Depressurized	☐ Yes	☐ N/A
Blinds(s) Installed	☐ Yes	☐ N/A	Stored Energy is Relieved	☐ Yes	☐ N/A
Energy Source(s) Tried	☐ Yes	☐ N/A	Appropriate Valves Closed	☐ Yes	☐ NIA
Line or Equipment properly evacuated?	☐ Yes	☐ N/A	Has Thermal Relief been addressed?	☐ Yes	☐ N/A
Jumper/Grounding/Bonding Installed?	☐ Yes	☐ N/A	Have all affected employees been notified that Energy Control is in place?	☐ Yes	☐ N/A
Line or Equipment positively identified?	☐ Yes	☐ N/A			
Has equipment status been verified and returned to service?	☐ Yes	☐ No			

Pre-Job Meeting Section

Has the Safety Lead reviewed the information on the EH&S Work Permit with all workers signatures appear on the EH&S Work Permit? ☐ Yes ☐ No

Have applicable questions concerning the work to be performed been answered prior to commencing work? ☐ Yes ☐ No

Personnel Accountability Section

Print Name	Signature	Company

Project Manager and/or Authorized Employee (print) | Project Manager and/or Authorized Employee Signature | Date Issued | Expires | Time Issued | Expires

☐ AM ☐ PM

PM/AE Phone # | Reason for voiding Permit | Date | Time

Corrective action taken

☐ AM ☐ PM

Authorized Employee Signature for re-validation | Date | Time

☐ AM ☐ PM

Permit Closed (PM/AE or Delegate's Signature) | Date | Time

63984

Daily Safety Tailgate Meeting Record

Project Name:
Contract #
Meeting Date & Time:
Meeting Leader:

- ❑ What activities occurring today could result in hand injuries? Is everyone aware that the use of fixed open blade knives is prohibited without cut resistant gloves?
- ❑ What activities today will require good communications between ground personnel and equipment operators? Is everyone aware of the radio communications channel and proper procedures for both radio and visual communications?

Additional Safety and Health Topics Covered (List, Heat/Cold Stress, Hand tools, Driving, etc. and time spent on topic.)

Who attended the Safety Tailgate Meeting today (employees, subcontractors, visitors)?

NAME	COMPANY	SIGNATURE	Employee (E) or Visitor (V)

Construction Equipment Inspection

Environmental Waste Minimization, Inc. EWMI

EVERY JOB SAFETY EVERY DAY

RAPID RESPONSE, INC. An Affiliate of EWMI

NO SMOKING

Project Name:			Contract	
Inspected By:			Date	
Equipment Name:			Hours:	

CHECK :	OK	BAD	N/A	REMARKS
Engine Oil				
Hydraulic Oil				
Grease Fittings / Lubricate				
Air Filters				
Radiator / Coolant				
Motor / Wiring				
CHECK :	**OK**	**BAD**	**N/A**	**REMARKS**
Belts				
Hoses				
Fuel Lines				
Gauges				
Bucket / Teeth				
Emergency Brake				
Tracks / Tires / Wheels				
Wiper Blades				
Grab Bars				
Hooks / Grapples				
Exhaust System				
Seat Belts				
R.O.P.S.				
Dump Mechanism				
Boom / Hoist				
CHECK :	**OK**	**BAD**	**N/A**	**REMARKS**
Wipers / Fluid				
Lights				
Horn				
Warning Lights				
Signal System				
Attachments				Type:
CHECK :	**OK**	**BAD**	**N/A**	**REMARKS**
Cleaning				
Whisk Broom				
Fire Extinguisher				
CHECK :	**OK**	**BAD**	**N/A**	**REMARKS**
Cab				
Windows				
Tracks				
Decontaminate				

Notes:

Daily Site COVID-19 Inspections

Date: _____ **Work location evaluated:** _____

COVID Monitor: _____

Project Manager: _____

Exposure Controls	Status	Corrective Action	Date Corrected
Has crew confirmed they are symptom free			
Has crew's temperatures been screened and confirmed fever free (below 100.4°F/38°C)			
Is hand washing and sanitation station been set up and are being maintained			
Is there plenty of sanitizer			
Have all common areas been disinfected			
Have all vehicles been disinfected			
Have tools and equipment been disinfected			
Crew wearing appropriate face coverings correctly covering their nose and mouth			
Crew is maintaining 6 feet of distancing at all times except when a job task dictates			
Crew has been reminded and is wearing appropriate face covering over nose and mouth when in vehicles together (maintaining 3 feet apart in all directions)			
Crew is not loitering in areas close together including job trailers or where 6 feet of distancing can't be maintained			
Extra disposable facemasks are available			
Extra disposable N95 respirators without an exhalation valve are available			
Crew is practicing good personal hygiene			

ATTACHMENT B

Proposed Sub-Contractors

National Grid
Non-Owned Former MPG Site
Huyck Square & Washington Street
Rensselaer, NY 12144

EWMI PROPOSED SUBCONTRACTOR LIST

SUBCONTRACTOR	*SERVICE PROVIDED*	*ADDRESS & CONTACT NUMBER*
Aztec Environmental	Geo-Prob	5 McCrea Hill Road Ballston Spa, NY 12020
Geo-Solutions	ISS Gravity Wall	1250 Fifth Avenue New Kensington, PA 15068 724-335-7273
Peter Luizzi Bros., Inc.	Asphalt & Concrete Installation	49 Railroad Ave. Albany, NY 12205 518-482-8954
Colliers Engineering & Design	Survey, Vibration Monitoring & Optical Monitoring	400 Valley Rd., Suite 304 Mt. Arlington, NJ 07856 973-810-0034
Atlantic Testing Laboratories	Compaction Testing	22 Corporate Drive Clifton Park, NY 12065 518-383-9144
GPRS	GPR Survey	5217 Monroe St., Suite A Toledo, OH 43623 518-390-3725

Third Party Health & Safety	Diversified Safety Services	4696 Millennium Dr #110 Belcamp, MD 21017 (443) 402-1315
Imported Fill Geotechnical Testing	Certified Testing Laboratories, Inc.	754 E. Fairview St. Bethlehem, PA 18018 (610) 865-2674
Imported Fill Chemical Testing	Alpha Analytical Lab	8 Walkup Dr. Westborough, MA 01581 (800) 624-9220

EWMI PROPOSED SUBCONTRACTORS OF IMPORTED FILL, AGGRAGATES, AND ASPHALT

SUBCONTRACTOR	*SERVICE PROVIDED*	*ADDRESS & CONTACT NUMBER*
Troy Sand &Gravel	Type D Sand	34 Grange RD. West Sand Lake, NY 12196 (518) 674-2854
R.J. Valente	Imported Aggregates and General Fill	3349 NY Route 2 Cropseyville, NY 12052 (518) 279-1001
Clemente Latham	Controlled Low Strength Materials	850 South Pearl St. Albany, NY 12202 (888) 473-9649
Callanan Industries, Inc.	Flexible Fill	110 Dunham Dr. Albany, NY 12202 (518) 436-8916
Callanan Industries, Inc.	Concrete	110 Dunham Dr. Albany, NY 12202 (518) 436-8916

EWMI PROPOSED DISPOSAL FACILITIES

SUBCONTRACTOR	*SERVICE PROVIDED*	*ADDRESS & CONTACT NUMBER*
Colonie Landfill	Soil for Cover	Memorial Town Hall Newtonville, NY 12128 (518) 783-2845
EMSI – NY (Clean Earth)	Soil for LTTD Treatment	304 Towpath Road Fort Edward, NY 12828 (877) 445-3478
Ontario County Sanitary Landfill	Direct Burial	3555 Post Farm Road Stanley, NY 14561 (585) 526-4420
Covanta Environmental Solutions - Oriskany	Groundwater	120 Dry Road Orskany, NY 13424 (315) 736-6080
Veolia ES Technical Solutions Flanders	NAPL	1 Eden Lane Flanders, NJ 07836 (973) 347-7111
Wayne Disposal Site #2 Landfill	Sampling Excess and Debris	49350 N. I-94 Service Dr. Belleville, MI 48111 (800) 592-5489

ATTACHMENT C

Project Organization Chart

nationalgrid

Non-Owned Former MPG Site
Huyck Square & Washington Street
Rensselaer, NY 12144

ARCADIS

Kyle Warren
Field Engineer
(484) 357-4139
Kyle.Warren@arcadis.com

EWMI Corporate Staff

Timothy A. David
Management
Oversight
(484) 275-6900
tdavid@ewmi.com

Tom Sidloski
Director of Remediation Sales
& Estimating
(484) 357-4139
tsidloski@ewmi.com

Joel Baier
T&D/Approvals Coordinator
(484) 275 -6906
jbaier@ewmi.com

Phil Reinsmith
Director of Operations
(484) 788-5733
preinsmith@ewmi.com

Alec Zeoli
Account Manager
(484) 538-7085
azeoli@ewmi.com

Doug Inman
Project Manager Assistant
(484) 357-3961
dinman@ewmi.com

Joe Fittos
Health & Safety Director
(484) 375-6954
jfittos@ewmi.com

Field Staff

Brian Wert
Project Manager
(484) 788-3844
bwert@ewmi.com

Field Staff
Dan Linsinbigler – EO
Thatcher David – FT
Tom Wilkens – FT
Marcin Kochan – FT
Nick Aquilino - HST

Jon Gialouris
Foreman/EO
(484) 788-3007
jgialouris@ewmi.com

Tammie Franta
Site Safety Representative
(830) 243-2744
TFranta@getdsservices.com

ATTACHMENT D

Submittal Log

Table 1
Specification Section 01 33 00A - Submittal Log
National Grid Non-Owned Rensselaer Former MGP Site
Rensselaer, NY

ARCADIS Design & Consultancy for natural and built assets

Specification / Document Reference	Submittal Description	Schedule of Submittal	Submittal Type	Submittal Number	Date Received
Section 01 15 00 Contractor's Project Operations Plan	Contractor's Organizational Structure	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site	Informational		
	Work Schedule				
	List of Major Construction Equipment				
	List of major Subcontractors and Suppliers				
	Site Utilization Plan				
	Comprehensive Work Plan				
Section 01 31 19.13 Pre-Construction Conference	Preliminary Progress Schedule	Submit prior to Pre-Construction Conference	Informational		
	Preliminary Schedule of Submittals				
	Contractors Emergency Contact Information				
Section 01 31 19.23 Progress Meetings	Up-to-date handouts covering work completed, progress schedule, schedule of submittals, and future schedule for each weekly meeting	Submit prior to each weekly meeting	Informational		
	Status of critical submittals	Submit prior to close of each weekly meeting			
	Review of Schedule of Submittals and Engineer's submittal log				
Section 01 32 16 Construction Progress Schedule	Preliminary Progress Schedule	Submit prior to Pre-Construction Conference	Informational		
	Initial Progress Schedule	Submit after addressing comments from Owner/Engineer on Preliminary Progress Schedule			
	Progress Schedule Updates	Submit at each progress meeting			
	Look-Ahead Schedule	Submit at each progress meeting			
	Recovery Schedules	Submit as necessary			
Section 01 32 26 Construction Progress Reporting	Daily Construction Reports	Submit to Engineer by 9:00 AM the next working day after the day covered in the associated report	Informational		
	Field Condition Reports	Submit with request for interpretation, as necessary			
Section 01 35 29 Contractor's Health and Safety Plan	Contractor's HASP	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the site	Informational		
	Qualification Statements (for HASP preparer and Safety representative)				
	Accident Reports				
	Daily Health and Safety Field Reports				
	Training Certificates				
Section 01 35 43.13 Environmental Procedures for Hazardous Materials	Hazardous Materials Communication Plan	Submit within 3 days of Contractor's receipt of request	Informational		
	Emergency Spill Response Plan				
	Hazardous Materials Proposed for Use at the Site	Submit at least 3 days prior to bringing Hazardous Material to the Site			
	Hazardous Materials Generated at the Site	Submit Information not less than 3 days after Contractor's Receipt of Analytical Results			
	Permits (for storing, handling, using, transporting, and disposing of Hazardous Materials)	Submit at least 3 days prior to bringing Hazardous Material to the Site			
	Other Documents required for the Hazardous Materials Management Plan	Submit within 3 days of Contractor's receipt of request			
Section 01 35 49 Community Air Monitoring Plan	Weekly Air Monitoring Reports	Submit prior to 12:00 PM the Monday after the week covered in the associated report.	Informational		
	Exceedance Reports	Submit within 24 hours after exceedance			
Section 01 41 26 Storm Water Pollution Prevention Plan and Permit	Storm Water Permit Certification Statement	Submit at least 2 weeks prior to performing any work at the Site	Informational		
	Qualifications Statements				
	Storm Water Inspection Reports	Submit within 3 days after each inspection			
Section 01 51 41 Temporary Pumping	Temporary Pumping System Plan	Provide to Engineer at least 15 days prior to delivery to Site	Informational		
Section 01 52 13 Field Offices and Sheds	Field Office Submittal (site plan, field office dimensions, layout, internet service information, office equipment)	Submit to Engineer for approval prior to staging on Site	Action		
Section 01 55 26 Maintenance and Protection of Traffic	Traffic Maintenance and Protection Plan	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site	Informational		
Section 01 57 05 Temporary Controls	Product Data for fiber roll	Submit at least 2 weeks prior to installation at the Site	Action		
	Product Data for vapor mitigation agents				
Section 01 57 33 Site Security	Shop Drawings	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site	Informational		
	Product Data for temporary fencing, temporary gates, and privacy screens				

Specification / Document Reference	Submittal Description	Schedule of Submittal	Submittal Type	Submittal Number	Date Received
	Daily Security Logs	Submit with Daily Construction Reports	Action		

Table 1
Specification Section 01 33 00A - Submittal Log
National Grid Non-Owned Rensselaer Former MGP Site
Rensselaer, NY

Specification / Document Reference	Submittal Description	Schedule of Submittal	Submittal Type	Submittal Number	Date Received
Section 01 58 13 Temporary Project Signage	Shop Drawings - layout, text, font, character size, colors, graphics or logos (if any), materials of construction, and dimensions of each temporary sign, and the proposed locations and orientations at the Site	Submit at least 2 weeks prior to installation at the Site	Action		
Section 01 71 23 Field Engineering	Qualification Statements - Contractor Field Engineer	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site	Informational		
	Certificates - Accuracy of Field Engineering	Submit upon request by Engineer			
Section 01 71 26 Construction Surveying and Layout	Survey Plan	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site	Informational		
	Survey Field Books				
	Qualification Statements - Surveyor	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site			
	Certificates - Accuracy of Surveying	Submit upon request by Engineer			
	Pre-Construction Survey Results	Submit prior to commencement of intrusive activities			
	Interim Survey Results	Submit upon request by Engineer			
	Post-Removal Survey Results	Submit prior to commencement of backfill activities			
	Post-Restoration Survey Results	Submit prior to demobilization and not more than 2 weeks after completion of the survey			
Section 01 74 19 Construction Waste Management and Disposal	Waste Management Plan	Submit within 14 days before the date the Contract Times commence running, and before removing any waste	Informational		
	Waste Profiles	Submit counter-signed waste profile and proof of acceptance of waste for each landfill and incinerator facility			
	Disposal Records	Submit counter-signed manifests with each concurrent Application for Payment			
Section 01 77 19 Closeout Procedures	Work Completion Documentation - Actual excavated volumes	Submit prior to submitting an application for Final Certification Inspection	Informational		
	Work Completion Documentation - Actual backfill volumes				
	Work Completion Documentation - Construction Drawings				
	Work Completion Documentation - Certified survey data				
	Work Completion Documentation - Executed warranties				
	Work Completion Documentation - Certified weigh slips from disposal facilities				
	Work Completion Documentation - Maintenance Agreements				
	Work Completion Documentation - Inspection certificates				
	Truck volume counts and measurement summary				
Section 01 78 39 Project Record Documents	Record Documents	Submit to Engineer prior to readiness for final payment	Closeout		
Section 01 71 26 Construction Surveying and Layout	Qualification Statement (for Professional Engineer performing surveys)	Submit at least 14 days before performing each survey	Informational		
	Notification of Intended Survey Start				
	Pre-Construction Survey	Submit within 14 days after each survey			
	Post-Removal Survey				
	Post-Restoration Survey				
	Final Site Plan				
Section 02 41 00 Demolition	Demolition and Removal Plan	Submit at least 21 days prior to starting demolition Work	Informational		
	Qualification Statements				
	Notification of Intended Demolition Start	Submit at least 48 hours prior to commencing demolition or removal work			
Section 02 51 00 Decontamination	SDSs for all cleaning/decontamination solutions	Submit as part of Contractor's Health and Safety Plan	Informational		
Section 02 61 05 Removal and Disposal of Contaminated Material	Product Data for soil during agent	Submit as part of Contractor's POP or Separately	Action		
	Waste Profiles and Manifests	Submit at least 10 days prior to material transport			
	Waste Transporter Permits	Submit at least 10 days prior to material transport	Informational		
	Waste Profiles for all materials transported off-site	Submit weekly			
	Chain of Custody records				

Specification / Document Reference	Submittal Description	Schedule of Submittal	Submittal Type	Submittal Number	Date Received
	Disposal records	Submit monthly			

Table 1
Specification Section 01 33 00A - Submittal Log
National Grid Non-Owned Rensselaer Former MGP Site
Rensselaer, NY

Specification / Document Reference	Submittal Description	Schedule of Submittal	Submittal Type	Submittal Number	Date Received
Section 03 00 05 Concrete	Concrete Materials/Mix designs	Submit to Engineer at least 2 weeks prior to placement of concrete	Action		
	Laboratory Trial Batch Reports				
	Product Data				
	Qualification Statements		Informational		
	Field Quality Control Submittals	Submit to Engineer within 24 hours of completion of test			
	Weigh-tickets/Delivery Tickets	Provide for each batch of concrete delivered to site			
Section 31 05 16 Aggregates for Earthwork	Borrow Source Characterization Report	Submit to Engineer at least 2 weeks prior to placement	Action		
	50-pound sample from each of the borrow pits	Submit to Engineer at least 4 weeks prior to placement of materials			
	Geotechnical and Chemical testing results, as necessary	Submit to Engineer at least 2 weeks prior to placement			
	NYSDEC's Request to Import/reuse Fill or Soil Form	Submit to Engineer at least 2 weeks prior to placement			
	Delivery Tickets	Submit weekly	Informational		
Section 31 05 19.13 Geotextiles for Earthwork	Product Data - lot and roll identification	Submit to Engineer prior to shipment of any geotextile material	Action		
	Geotextile quality assurance tests from the manufacturer		Informational		
Section 31 09 13 Geotechnical Instrumentation and Monitoring	Product data for geotechnical instrumentation and accessories	Submit to Engineer at least 2 weeks prior to start of geotechnical monitoring	Action		
	Qualification Statements - Independent Geotechnical Monitoring Specialist				
	Displacement Monitoring and Installation Plan				
	Displacement Monitoring Reports	Submit to Engineer by the end of the next day after monitoring	Informational		
	Qualification Statements - Instrumentation Personnel	Submit to Engineer at least 2 weeks prior to start of geotechnical monitoring			
	Final Geotechnical Monitoring Report	Submit to Engineer within 20 days of completion of of excavation, demolition, backfilling, or any shoring installation	Closeout		
Section 31 05 19.16 Geomembranes for Earthwork	Manufacturer's certification	Submit to Engineer at least 2 weeks prior to mobilizing material to Site	Informational		
	Manufacturer's standard warranty for the geomembrane				
	Results of QC tests conducted by the manufacturer				
	Contractor's written certification that material is not damaged				
	HDPE lot and roll number of field-delivered material		Action		
	QC testing results				
Section 31 23 00 Excavation and Fill	Excavation and Backfilling Plan	Submit at least 2 weeks prior to starting excavation operations	Action		
	Qualification Statements - Nuclear Density Testing firm				
	Soil Solidification Gravity Wall Installation and Removal Plan				
	Slide Rail Installation and Removal Plan				
	Field Quality Control Submittals	Submit to Engineer within 24 hours of completion of test	Informational		
	Field test results				
	Excavation Dewatering Log	Submit daily with Daily Construction Reports			

Table 1
Specification Section 01 33 00A - Submittal Log
National Grid Non-Owned Rensselaer Former MGP Site
Rensselaer, NY

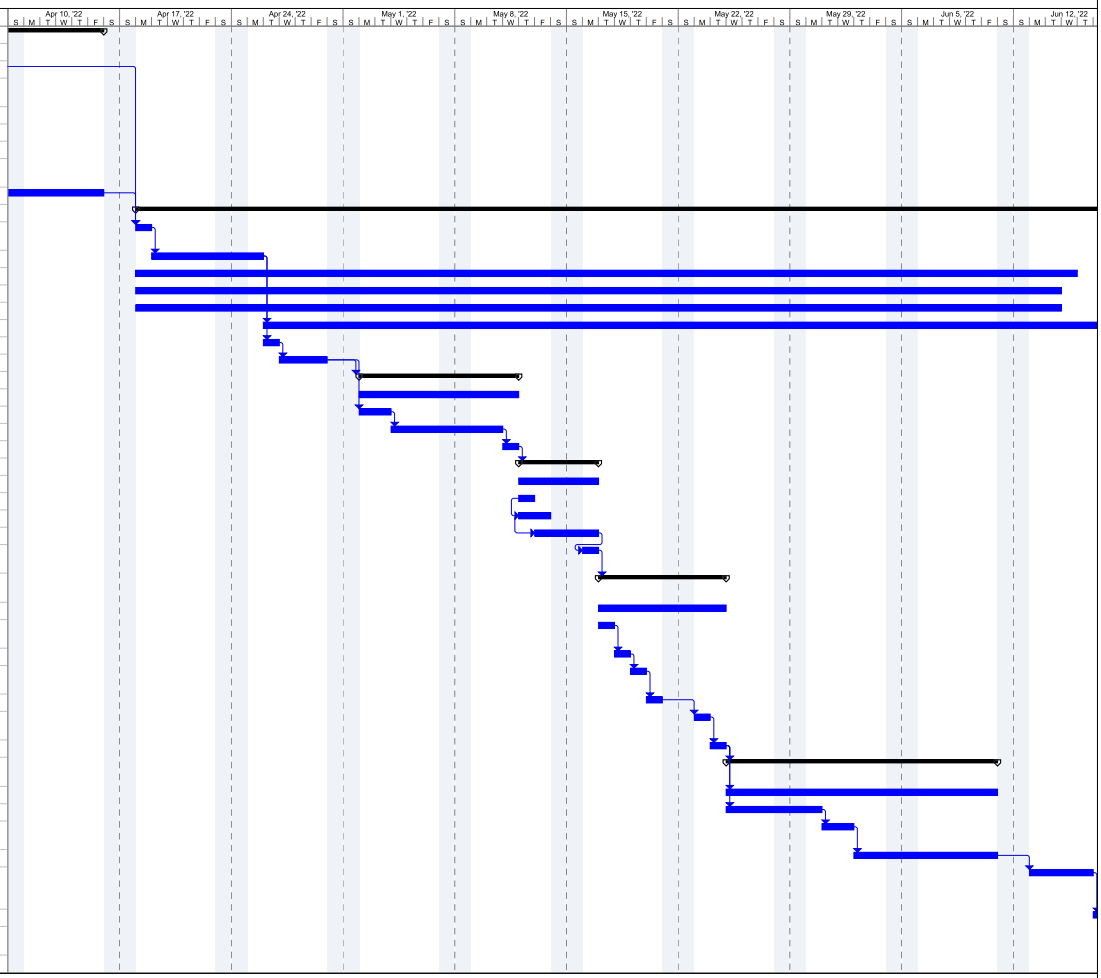
Specification / Document Reference	Submittal Description	Schedule of Submittal	Submittal Type	Submittal Number	Date Received
Section 31 50 00 Excavation Support and Protection	Soil Solidification Gravity Wall Installation and Removal Plan	Submit the sooner of seven days prior to pre-construction conference or 30 days prior to Contractor's scheduled mobilization to the Site	Action		
	Slide Rail Installation and Removal Plan				
	Qualifications Statements				
	Off-site Water Source Information	Submit to Engineer at least 2 weeks prior to use on-site			
	Weekly Soil Solidification Report	Submit weekly			
	Daily Soil Solidification Report	Submit Daily	Informational		
	Daily Slide Rail Solidification Report				
	Field Quality Control Submittals	Submit to Engineer within 24 hours of completion of test			
	Gravity Wall Mixture Preparation Calculations	Submit to Engineer at least 24 hours prior to preparing mixture			
Section 32 12 00 Flexible Paving	Shop drawings	Submit to Engineer at least 2 weeks prior to installation	Action		
	Qualification Statement- Asphalt Concrete Production Facility		Informational		
	Qualification Statement- Contractor's Testing Laboratory				
	Quality Assurance Test Data Submittals	Submit to Engineer within 24 hours of completion of test			
	Delivery Tickets	Submit Daily			
	Field Quality Control Submittals	Submit to Engineer within 24 hours of completion of test			

ATTACHMENT E

Preliminary Construction Schedule

National Grid Former MGP Site, EWMI RAWP Schedule
Contract # 116717 (Rensselaer, NY)

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Pre-Mobilization Planning Activities**	**254 days**	**Mon 5/3/21**	**Fri 4/15/22**	
2	Notice to Proceed	1 day	Mon 5/3/21	Mon 5/3/21	
3	Project Preparation and Submittals	246 days	Tue 5/4/21	Wed 4/6/22	2
4	Imported Fill Geotechnical and Chemical Analysis	37 days	Wed 2/23/22	Fri 4/8/22	
5	Health and Safety Implementation	1 day	Sat 3/5/22	Sat 3/5/22	
6	Underground Utility Location	1 day	Sat 3/5/22	Sat 3/5/22	
7	Site Sampling	2 days	Sat 3/5/22	Sun 3/6/22	
8	Sampling Waste Transportation and Disposal	1 day	Mon 3/7/22	Mon 3/7/22	7
9	Analysis and Waste Approvals	30 days	Mon 3/7/22	Fri 4/15/22	7
10	**On-Site Remediation**	**48 days**	**Mon 4/18/22**	**Wed 6/22/22**	
11	Mobilization and Pre-Construction Survey	1 day	Mon 4/18/22	Mon 4/18/22	3,9
12	Site Preparation and SESC	5 days	Tue 4/19/22	Mon 4/25/22	11
13	Vibration and Settlement Monitoring	43 days	Mon 4/18/22	Wed 6/15/22	
14	Community Air Monitoring	42 days	Mon 4/18/22	Tue 6/14/22	
15	Dust, Odor, and Vapor Control	42 days	Mon 4/18/22	Tue 6/14/22	
16	Wastewater Storage and Handling	42 days	Tue 4/26/22	Wed 6/22/22	12
17	Asphalt Removal and Disposal	1 day	Tue 4/26/22	Tue 4/26/22	12
18	Pilot Cut of ISS Wall and Soil Disposal	3 days	Wed 4/27/22	Fri 4/29/22	17
19	**Gravity Wall Installation**	**8 days**	**Mon 5/2/22**	**Wed 5/11/22**	18
20	In-Construction Surveys	8 days	Mon 5/2/22	Wed 5/11/22	
21	ISS Sub Mobilization/Setup	2 days	Mon 5/2/22	Tue 5/3/22	18
22	ISS Installation 1,650 CY	5 days	Wed 5/4/22	Tue 5/10/22	21
23	ISS Sub Demobilization	1 day	Wed 5/11/22	Wed 5/11/22	22
24	**Tar Well Excavation & Backfill**	**3 days**	**Thu 5/12/22**	**Mon 5/16/22**	23
25	In-Construction Surveys	3 days	Thu 5/12/22	Mon 5/16/22	
26	Unload Slide Rail/Pilot Cut	1 day	Thu 5/12/22	Thu 5/12/22	
27	Excavation and Disposal 150 CY	2 days	Thu 5/12/22	Fri 5/13/22	26SS
28	Backfill 150 CY	2 days	Fri 5/13/22	Mon 5/16/22	27SS+1 day
29	Remove and Decontaminate Slide Rail	1 day	Mon 5/16/22	Mon 5/16/22	28FS-1 day
30	**Northern Holder Excavation & Backfill**	**6 days**	**Tue 5/17/22**	**Tue 5/24/22**	29
31	In-Construction Surveys	6 days	Tue 5/17/22	Tue 5/24/22	
32	Excavation and Disposal Segment A 150 CY	1 day	Tue 5/17/22	Tue 5/17/22	
33	Backfill Segment A flowable fill	1 day	Wed 5/18/22	Wed 5/18/22	32
34	Excavation and Disposal Segment B 100 CY	1 day	Thu 5/19/22	Thu 5/19/22	33
35	Backfill Segment B flowable fill	1 day	Fri 5/20/22	Fri 5/20/22	34
36	Excavation and Disposal Segment C 100 CY	1 day	Mon 5/23/22	Mon 5/23/22	35
37	Backfill Segment C flowable fill	1 day	Tue 5/24/22	Tue 5/24/22	36
38	**Southern Holder Excavation & Backfill**	**13 days**	**Wed 5/25/22**	**Fri 6/10/22**	37
39	In-Construction Surveys	13 days	Wed 5/25/22	Fri 6/10/22	37
40	Excavation and Disposal 1,450 CY	4 days	Wed 5/25/22	Mon 5/30/22	37
41	ISS Wall Removal and Disposal 550 CY	2 days	Tue 5/31/22	Wed 6/1/22	40
42	Backfill 2,000 CY	7 days	Thu 6/2/22	Fri 6/10/22	41
43	Removal and Disposal of Remaining Asphalt and Place Subbase, In-Construction Surveys	4 days	Mon 6/13/22	Thu 6/16/22	42
44	Curb and Sidewalk Restoration	1 day	Fri 6/17/22	Fri 6/17/22	43
45	Paving and Striping, Post-Construction Surveys	2 days	Mon 6/20/22	Tue 6/21/22	44
46	Demobilization	1 day	Wed 6/22/22	Wed 6/22/22	45

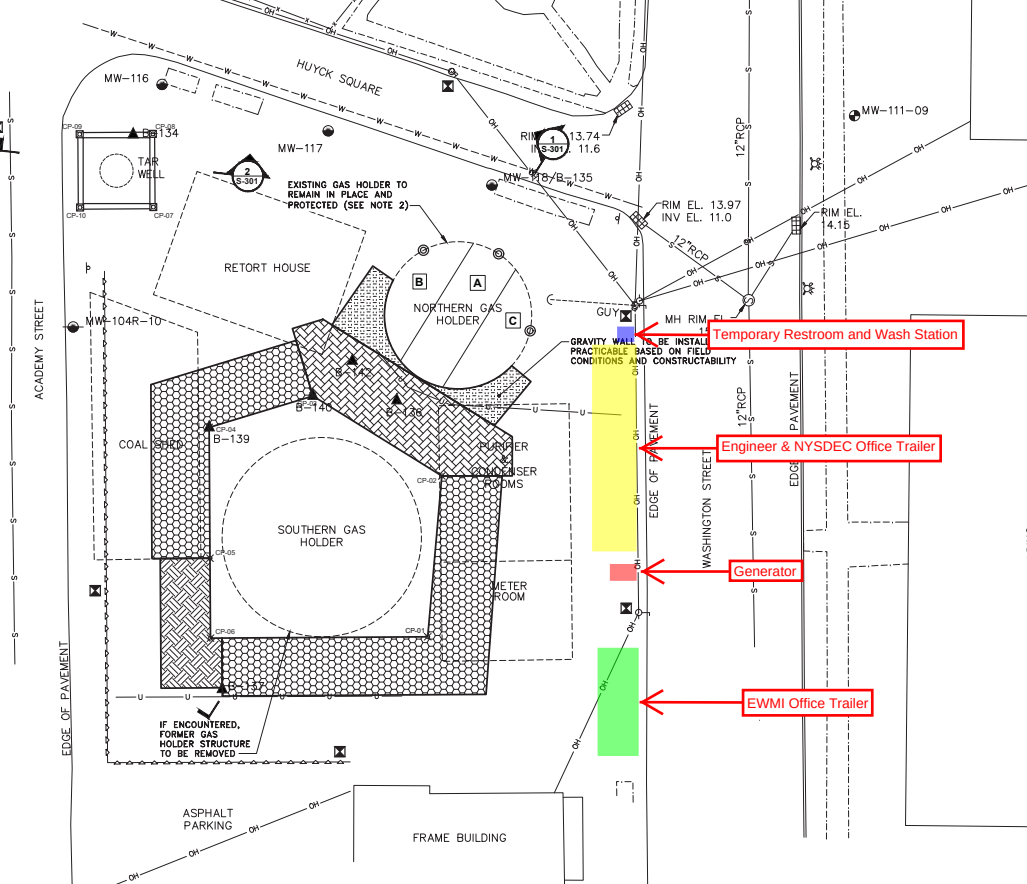


Perliminary Draft Schedule.

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Progress | Deadline

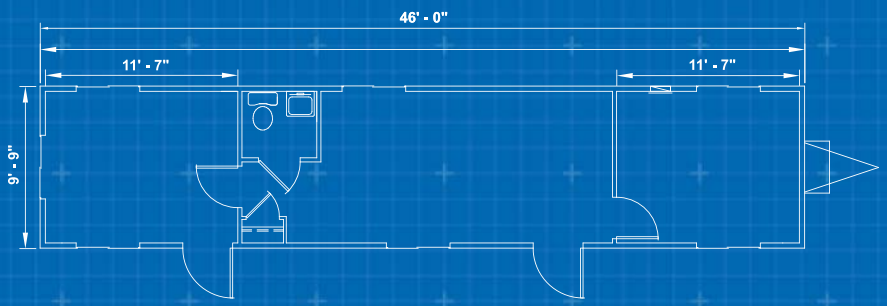
ATTACHMENT F

Field Offices Plan Drawing


Temporary Restroom and Wash Station
Engineer & NYSDEC Office Trailer
Generator
EWMI Office Trailer
HUYCK SQUARE
MW-116
MW-117
MW-118/B-135
MW-111-09
TAR WELL
CP-08
CP-09
CP-10
CP-07
B-134
EXISTING GAS HOLDER TO REMAIN IN PLACE AND PROTECTED (SEE NOTE 2)
RETORT HOUSE
NORTHERN GAS HOLDER
SOUTHERN GAS HOLDER
MW-104R-10
B-142
B-140
B-138
B-139
CP-04
COAL SHED
PURIFIER & CONDENSER ROOMS
CP-02
METER ROOM
CP-05
CP-06
CP-01
IF ENCOUNTERED, FORMER GAS HOLDER STRUCTURE TO BE REMOVED
GUY
MH RIM EL. 15
GRAVITY WALL TO BE INSTALLED IF PRACTICABLE BASED ON FIELD CONDITIONS AND CONSTRUCTABILITY
RIM EL. 13.97
INV EL. 11.0
RIM EL. 13.74
INV EL. 11.6
RIM EL. 4.15
12"RCP
EDGE OF PAVEMENT
WASHINGTON STREET
ACADEMY STREET
ASPHALT PARKING
FRAME BUILDING
S-301

50' x 10' OFFICE TRAILER

In addition to your office solution, we can provide additional products and services that complete your space- creating a more productive, comfortable, and safe work environment.



CUSTOMIZATION

- Steps & Ramps
- Furniture & Appliances
- Technology
- Site Services
- Loss Protection

Dimensions

50’ Long (including hitch)
46’ Box size
10’ Wide
8’ Ceiling height

Exterior Finish

Aluminum or wood siding
I-Beam Frame
Standard drip rail gutters

Interior Finish

Paneled walls
Carpet or vinyl tile floor
Gypsum or T-grid suspended ceiling

Electric

Fluorescent ceiling lights
Breaker panel

Heating/Cooling

Central HVAC or thru-wall AC

Windows/Doors

Horizontal slider windows
(2) Vision panel doors with standard locks or (2) steel doors with dead bolt lock

Other

Private office(s)
Optional restroom

** Photos are representational; actual products vary. Additional floor plans and specifications may vary from those shown and are subject to in-stock availability*

DCA45SSIU4F

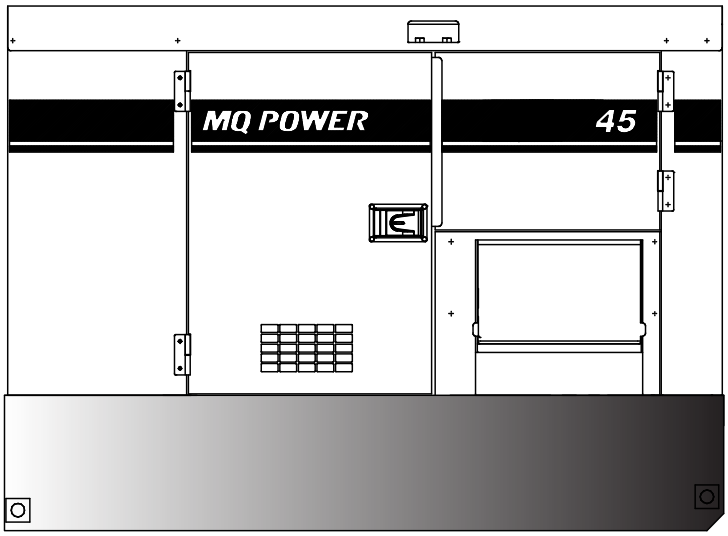
MQ POWER Series Generator

WhisperWatt™

Prime Rating — 36 kW (45 kVA)

Standby Rating — 40 kW (50 kVA)

Three-Phase, 60 Hertz, 0.8 PF



STANDARD FEATURES

- Heavy duty, 4-cycle, direct injection, turbocharged, charge air cooled diesel engine provides maximum reliability.
- Brushless alternator reduces service and maintenance requirements and meets temperature rise standards for Class H insulation systems.
  - Open delta excitation design provides virtually unlimited excitation for maximum motor starting capability.
  - Automatic voltage regulator (AVR) provides precise regulation.
- Electronic Governor Control — isochronous control, maintains frequency to within ±0.25% from no load to full load.
- Full load acceptance of standby nameplate rating in one step (NFPA 110, para 5-13.2.6).
- Sound attenuated, weather resistant, steel housing provides operation at 66 dB(A) at 23 feet. Fully lockable enclosure allows safe unattended operation.
- Internal fuel tank with direct reading of fuel gauge.
- E-coat and powder coat paint provides durability and weather protection.
- Fuel/water separator removes condensation from fuel for extended engine life. Panel mounted alarm light included.
- Complete engine analog instrumentation includes DC ammeter, oil pressure gauge, water temp. gauge, fuel level gauge, tachometer/hour meter, preheat indicator, and emergency shutdown monitors.
- ECU750 — automatic CANBUS engine control with LED status indicator lights.
- Automatic start/stop control — automatically starts the generator set during a commercial power failure when used in conjunction with a transfer switch.
- Complete generator analog instrumentation includes voltage regulator control, ammeter phase selector switch, voltmeter phase selector switch, AC voltmeter, AC ammeter, frequency meter, panel light, and circuit breaker.
- Automatic safety shutdown system monitors the water temperature, engine oil pressure, overspeed and overcrank. Warning lights indicate abnormal conditions.
- Complete power panel. Fully covered; three-phase terminals and single phase receptacles allow fast and convenient hookup for most applications including temporary power boxes, tools and lighting equipment. The GFCI receptacles are NEMA 5-20, and the auxiliary outputs use CS6369 twist-lock receptacles.
- Voltage selector switch offers the operator a wide range of voltages that are manually selectable. Fine tuning of the output voltage can be accomplished by adjusting the voltage regulator control knob to obtain the desired voltage.
- EPA emissions certified — Tier 4 final emissions compliant.
- Spill containment — Bunded design protects environment by capturing up to 119% of engine fluids.

DCA45SSIU4F

MQ POWER Series Generator

SPECIFICATIONS

Generator Specifications		
Design	Revolving field, self-ventilated Drip-proof, single bearing	
Armature Connection	Star with Neutral	Zig Zag
Phase	3	Single
Standby Output	40 KW (50 KVA)	28.8 KW
Prime Output	36 KW (45 KVA)	26 KW
3Ø Voltage (L-L/L-N) Voltage Selector Switch at 3Ø 240/139	208Y/120, 220Y/127, 240Y/139	N/A
3Ø Voltage (L-L/L-N) Voltage Selector Switch at 3Ø 480/277	416Y/240, 440Y/254, 480Y/277	N/A
1Ø Voltage (L-L/L-N) (Voltage Selector Switch at 1Ø 240/120)	N/A	240/120
Power Factor	0.8	1.0
Voltage Regulation (No load to full load)	±0.5%	
Generator RPM	1800	
Frequency	60 Hz	
No. of Poles	4	
Excitation	Brushless with AVR	
Frequency Regulation: No Load to Full Load	Isochronous under varying loads from no load to 100% rated load	
Frequency Regulation: Steady State	±0.25% of mean value for constant loads from no load to full load.	
Insulation	Class H	
Sound Level dB(A) Full load at 23 feet	66	

Engine Specifications	
Make / Model	Isuzu / 4LE2X
Emissions	EPA Tier 4 Final Certified
Starting System	Electric
Design	4-cycle, water cooled, direct injection, turbocharged, charge air cooled and EGR
Displacement	133.0 in^3 (2179 cc)
No. cylinders	4
Bore x Stroke (mm)	85 x 96
Gross Engine Power Output	65.7 hp (49 kW)
BMEP	217 psi (1499 kPa)
Piston Speed	1133.9 ft./min. (5.76 m/s)
Compression Ratio	17.6:1
Engine Speed	1800 rpm
Overspeed Limit	2070 rpm
Oil Capacity	3.2 gallons (12.2 liters)
Battery	12V 72Ah x 1

Fuel System		
Recommended Fuel	ASTM-D975-No.1 & No.2-D	
Maximum Fuel Flow (per hour)	3.4 gallons (13 liters)	
Maximum Inlet Restriction (Hg)	11 in. (280 mm)	
Fuel Tank Capacity	79.2 gallons (300 liters)	
Fuel Consumption	**gph**	**lph**
At full load	2.93	11.1
At 3/4 load	2.20	8.31
At 1/2 load	1.60	6.04
At 1/4 load	1.04	3.92

Cooling System	
Fan Load	2.01 hp (1.5 kW)
Coolant Capacity (with radiator)	4.44 gallons (16.8 liters)
Coolant Flow Rate (per minute)	16.9 gallons (64.2 liters)
Heat Rejection to Coolant (per minute)	1934 Btu (2.04 MJ)
Maximum Coolant Friction Head	14.5 psi (100 kPa)
Maximum Coolant Static Head	3.35 feet (1.04 meters)
Ambient Temperature Rating	104°F (40°C)

Air	
Combustion Air	174 cfm (4.94 m^3/min)
Maximum Air Cleaner Restriction	25 in. H_2O (6.23 kPa)
Alternator Cooling Air	526 cfm (14.9 m^3/min)
Radiator Cooling Air	1900 cfm (53.8 m^3/min)
Minimum Air Opening to Room	3.5 ft^2 (0.33 m^2)
Minimum Discharge Opening	2.27 ft^2 (0.21 m^2)

Exhaust System	
Gas Flow (full load)	237 cfm (6.7 m^3/min)
Gas Temperature	1078°F (581°C)
Maximum Back Pressure	38.1 in. H_2O (9.5 kPa)

Amperage	
Rated Voltage	**Maximum Amps**
1Ø 120 Volt	100 Amps (4 wire),108A x 2 (Zigzag)
1Ø 240 Volt	50 Amps (4 wire),108A (Zigzag
3Ø 240 Volt	108 Amps
3Ø 480 Volt	54 Amps
Main Line Circuit Breaker Rating	125 Amps
Over Current Relay Trip Set Point 480V Mode Only	54 Amps

WARRANTY*

Isuzu Engine**

12 months from date of purchase with unlimited hours or 36 months from date of purchase with 3,000 hours (whichever comes first).

Generator

24 months from date of purchase or 2,000 hours (whichever occurs first).

Trailer

12 months excluding normal wear items.

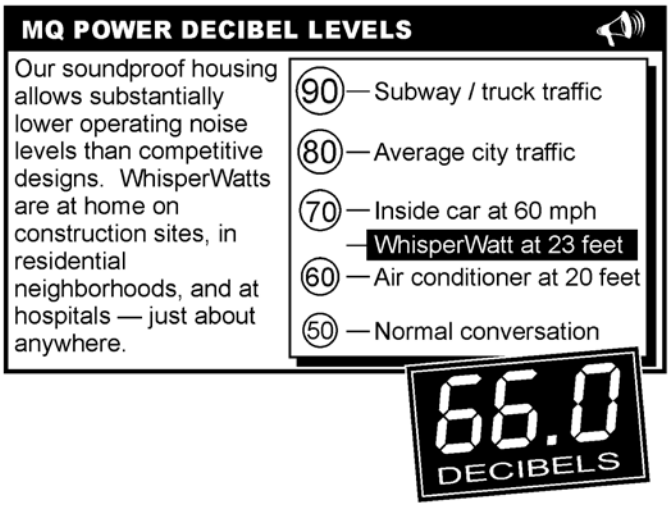
*Refer to the express written, one-year limited warranty sheet for additional information.
**Refer to Isuzu Diesel Engine Limited Warranty for details.

NOTICE

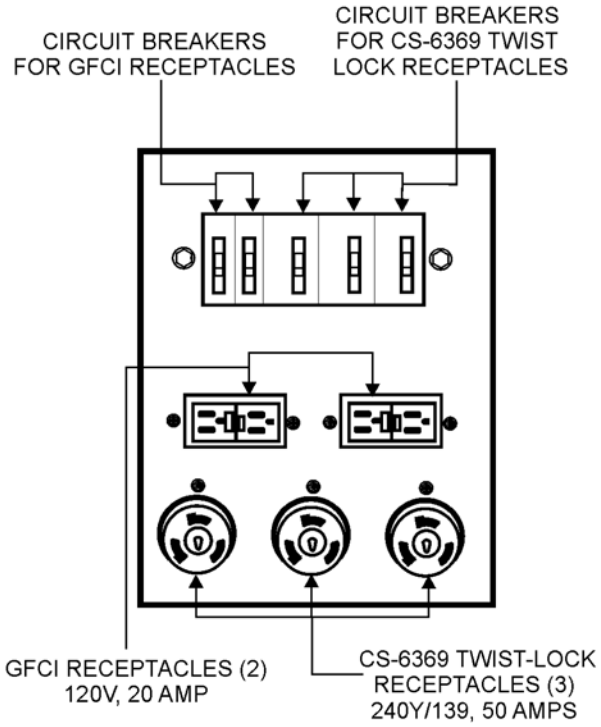
Specifications sheet is subject to change and is not intended for use in installation design.

DCA45SSIU4F

MQ POWER Series Generator



GENERATOR OUTPUT PANEL



OPTIONAL GENERATOR FEATURES

- **PowerBalance™** — designed to assist generators when operating under low temperature and/or low load conditions to insure peak performance.
- **Battery Charger** — provides fully automatic and self-adjusting charging to the generator's battery system.
- **Jacket Water Heater** — for easy starting in cold weather climates.
- **Heavy-Duty Batteries** — long life batteries provide extra engine cranking power.
- **Low Coolant Level Shutdown** — provides protection from critically low coolant levels. Includes control panel warning light.
- **Spring Isolators** — provides extra vibration protection for standby applications.
- **Trailer Mounted Package** — meets National Highway Traffic Safety Administration (NHTSA) regulations. Trailer is equipped with electronic or surge brakes with double or triple axle configuration.

OPTIONAL CONTROL FEATURES

- **Emergency Stop Switch** — when manually activated shuts down generator in the event of an emergency.
- **Audible alarm** — alerts operator of abnormal conditions

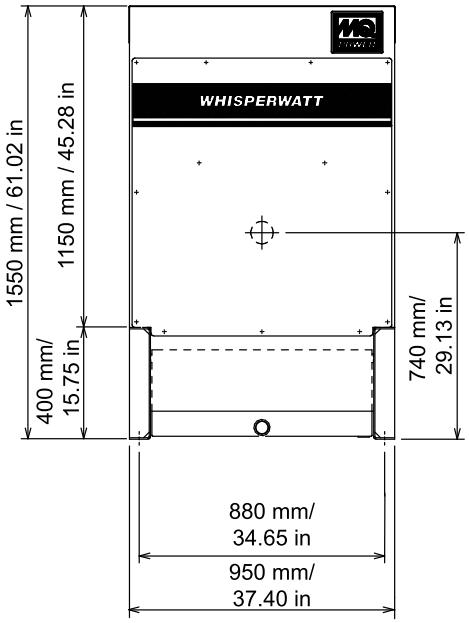
OPTIONAL OUTPUT CONNECTIONS

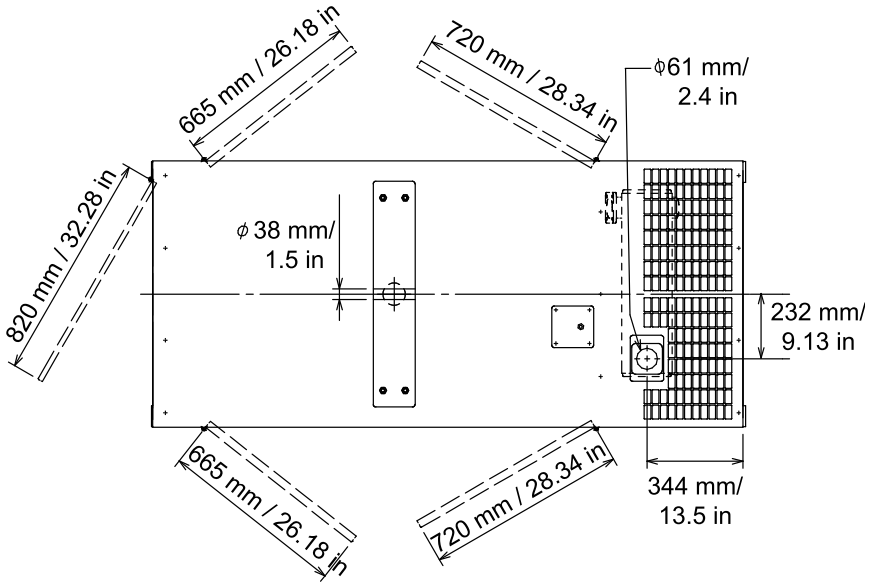
- **Cam-Lok Connectors** — provides quick disconnect alternative to bolt-on connectors.
- **Pin and Sleeve Connectors** — provides industry standard connectors for all voltage requirements.
- **Output Cable** — available in any custom length and size configuration.

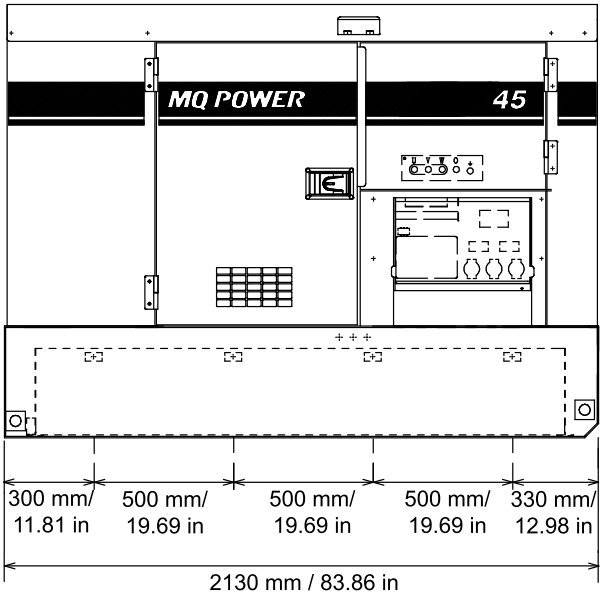
DCA45SSIU4F

MQ POWER Series Generator

DIMENSIONS







Weight	
Dry Weight	2,337 lbs. (1,060 kg)
Wet Weight	2,976 lbs. (1,350 kg)
Max. Lifting Point Capacity	5,150 lbs. (2,335 kg)

NOTICE

Features and Specifications are subject to change without notice.

Generator can be placed on MQ Trailer Models TRLR45 and TRLR75XF2.

Manufactured by Denyo Co.

Your Multiquip dealer is:

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DCA45SSIU4F Rev. #5 (04/03/18)

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FAX: 310-604-3831
E-MAIL: sales@multiquip.com
WEBSITE: www.multiquip.com

NVG558 Fixed Wireless Broadband Gateways

LTE or CBRS with 802.11ac/ax Wi-Fi options

FEATURES

- Fast indoor Fixed Wireless Broadband alternative to wireline broadband solutions
- Supports licensed and unlicensed Wireless WAN options including 3.5GHz CBRS and private LTE applications
- Flexible architecture supports dual-band or tri-band 802.11ac or 802.11ax Wi-Fi options
- HomeAssure® capable for smart whole-home Wi-Fi
- Optional IoT service capability
- Docker container support for simplified application deployment
- Optimized for IPTV video triple-play deployments

PRODUCT OVERVIEW

The ARRIS NVG558 series FWB Gateways deliver high speed broadband services over wireless access, with variants that support 4G LTE / LTE-A / LTE-A Pro and 3.5GHz. These multiservice gateways supports HomeAssure® for optimal in-home Wi-Fi performance as well as managed voice, video, data and IoT services.

These devices provide Service Providers with a cost-effective alternative to wireline networks, for example to move consumers to higher service tiers in rural areas or where new cable installation to the premises is required. Wireless access offers lower cost and faster installation time than wired access.

The NVG558 family offers an option for 3.5 GHz Citizen Broadband Radio Services (CBRS) applications for Service Providers. Enterprises may also use these devices on a private CBRS LTE network benefitting from the flexibility, performance and security of their own network.

The WAN connectivity is complemented by high-specification local networking: 1Gbps Ethernet and Wi-Fi, with the option of dual-band or tri-band concurrent Wi-Fi with either 4x4 802.11ac or 4x4 802.11ax. All supported via a 5 gigabit non-blocking core routing capability.

ARRIS 9.x Firmware includes advanced Quality of Service (QoS) features, security firewall, extensive remote management features and Docker support for 3rd party applications. The NVG55x-Series Gateways enable reliable, single-platform delivery of voice-over-IP (VoIP/VoLTE (IR.92)), data, and streaming broadcast-quality video.

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ARRIS HomeAssure Capable

The HomeAssure solution delivers high-performance Wi-Fi to every corner of the home via additional Wi-Fi extenders while offering ease of use for the consumer and reduced OPEX costs for the service provider. The NVG558 gateways provides automated network optimization, interworking with the self-configuring extenders, a consumer App and a cloud-management platform for remote management, analytics and help-desk tools.

Service Assurance

The ARRIS 9x gateway software is a widely deployed, mature, secure platform for advanced services. ARRIS designs its gateways to be remotely manageable for reduce support costs. The NVG558 Gateway is interoperable with any ACS solution that follows the Broadband Forum's TR-069/TR-098 specification.

A platform for advanced services

The 9x software supports Docker containerization for accelerated application development and deployment. Hardware and software options are available to support IoT services including ZigBee®, Z-Wave®, and Bluetooth® LE.

Product Variants

The following variants are differentiated by their ability to support LTE or CBRS WAN service:

- NVG558: LTE with either Dual-band or Tri-band Wi-Fi
- NVG558C: CBRS with either Dual-band or Tri-band Wi-Fi

GENERAL SPECIFICATIONS

Interfaces	
WAN	4G LTE / LTE-A / LTE-A pro / CBRS Internal and external antennas options 1G Ethernet RJ-45 (can be used as LAN)
LAN	Concurrent 2.4GHz and 5GHz Wi-Fi support for 802.11ac or 802.11ax Four-port 10/100/1000 Ethernet switch, RJ-45 Single USB 3.0 network interface Dual-port, dual-line voice FXS, RJ-11 ports Optional IoT radios: ZigBee®, Z-Wave®, Bluetooth® LE or DECT ULE

Embedded Firmware, Encoding and Access Protocols	
IP Addressing and Routing	IPv4, IPv6 / 6rd DHCP server DNS proxy, dynamic DNS support Multiple subnet support

Embedded Firmware, Encoding and Access Protocols (continued)	
Traffic Management and QoS (Quality of Service)	Network Address Port Translation (NAPT) Application Level Gateway (ALG) support IP maps (pinholes) Diffserv QoS with Weighted Fair Queuing IGMPv2, IGMPv3 with Fast Leave IEEE 802.1P/Q VLANs DSCP setting for SIP/RTP Speed Test Deep Packet Inspection (DPI)
Security	Stateful packet inspection firewall Virtual DMZ/IP pass-through Denial of service (DoS) protection VPN pass-through (PPTP, L2TP, IPSec)
Device Management	Password protected access, statistics, and log reporting
Remote Management	TR-069/TR-098, TR-104, TR-111, WebUI, CLI (Telnet), SSH
Local Management	TR-064, UPnP, WebUI, CLI (Telnet), captive portal
Utilities	Ping, traceroute, reverse DNS, NTP, diagnostics. Docker container support

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Wi-Fi Features	
Concurrent Wi-Fi	802.11 b/g/n/ac or 802.11ax (OFDMA)
Wi-Fi Characteristics	2.4 GHz 4x4, 5 GHz 4x4 High-power design for multi-radio co-location 5 GHz UNII bands (5.15-5.35 GHz, 5.470-5.725 GHz and 5.725 – 5.850 GHz bands) 20MHZ, 40MHz, 80MHz, 160MHz (802.11ax only)
Wi-Fi Features	Multiple BSSID (unique authentication per SSID) Wi-Fi Protected Setup (WPS) Wi-Fi Multimedia (WMM), WMM-PS (power save) Transmit power control HomeAssure capable
Wi-Fi Security	WEP (64-bit, 128-bit, 256-bit) encryption WPA, WPA-PSK, 802.11i/WPA2, WPA2-PSK, EAP-TTLS MAC address filtering

Voice Features	
General Voice Features	VoIP/VoLTE (IR92), SIP v2 call, SIPv2 call control DNS SRV, A records re-registration with primary SIP proxy server Geo-Redundancy—DNS SRV, A records Flexible dial plan support Hook flash event signaling RTP audio transport RFC2833 RTP payload, SIP INFO and InBand DTMF mode
Voice Audio Codecs	G.711 (a-law and u-law), G.729a and G.726 (16, 24, 32, 40 kbps) AMR (narrowband) Adaptive jitter buffer PLC—(G.711 Appendix I and Frame repeat) VAD (voice activity detection) with silence suppression and comfort noise generation G.168 network echo cancellation G.167 acoustic echo cancellation

Voice Features (continued)	
FAX Relay Protocols Compliance	T.38 pass-through and over IP Fax/modem detection control, T.38 (IP) compliant Group 3 and SG3 fallback to Transport T.30, V.34 fax and modem bypass (automatic fallback to G.711) support
CLASS Calling Features	Call Waiting; Call Hold; Call Resume; Call Forward Unconditional; Call Forward on Busy; Caller ID; 3-Way Conference; Call Consultant; Call Transfer and network-initiated class services—MWI messaging, VMWI via FSK

Regulatory Compliance and Conformance	
Europe	2014/35/EU (Low Voltage Directive) 2014/30/EU (EMC Directive) 2014/53/EU (RED Directive) EN62368-1 (Safety) • EN 62368-1 (LVD - Safety) • EN55032 (EMC, Emissions) • EN55024 (EMC, Immunity) • EN 300 386 (EMC) • EN 301 489-1 (EMC, Part 1) • EN 300 328 (RED, 2.4 GHz) • EN 301 893 (RED, 5 GHz) • EN 301 489-17 (RED, pending)
North America	UL/cUL 62368 FCC Part 15 Class B Subparts B, C, and E ISED RSS-GEN / RSS-247, ICES-003
Conformance	ITU-T K.21 Basic (optional K.21 Enhanced)

Environmental Specifications	
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	–40°C to 60°C (–40°F to 140°F)

CUSTOMER CARE

Contact Customer Care for product information and sales:

- United States: 866-36-ARRIS
- International: +1-678-473-5656

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www.arris.com

Datasheet

HP LaserJet Pro MFP M227fdw

Get more pages, performance, and protection[1] from an HP LaserJet Pro MFP powered by JetIntelligence Toner cartridges. Set a faster pace for your business: Print two-sided documents, plus scan, copy, fax, and manage to help maximize efficiency.

Print speed: Letter: Up to 30 ppm; First Page Out: As fast as 6.7 sec
Print Resolution: Black (best): Up to 1200 x 1200 dpi
Print Technology Resolution:HP FastRes 1200, HP ProRes 1200
Standard Connectivity:1 Hi-Speed USB 2.0; 1 Hi-Speed USB 2.0 (host); 1 Ethernet 10/100Base-TX; 1 phone line (in); 1 phone line (out); Wireless, NFC
Standard Memory: Standard: 256 MB
Mobile Printing Capability:HP ePrint;Wi-Fi Direct printing; AirPrint 1.5 with media presence sensor; Google Cloud Print™ 2.0; NFC touch-to-print enabled; HP Smart App
Paper Handling:250 sheet input tray, 10 sheet priority tray; 150 sheet output tray
Display:2.7-in touch screen, LCD (color graphics)

Fast speeds, low energy use

- Print, scan, copy, and fax with a compact multifunction laser printer that fits into tight workspaces.
- Print at the pace of business with fast two-sided printing—first pages are ready in as fast as 7 seconds.[6]
- Help save energy with HP Auto-On/Auto-Off Technology.[7]
- Tackle tasks and scan to email, USB, and network folders from the 2.7-inch (6.9 cm) color touchscreen.[8]

Mobile printing made simple

- Get simple setup, and print and scan from your phone, with the HP Smart app.[2]
- Easily print from a variety of smartphones and tablets.[10]
- Print from your mobile device with Wi-Fi Direct® and NFC touch-to-print technology—no network needed.[3,4]
- Send jobs from your smartphone, tablet, or PC to any company printer, using Google Cloud Print™ 2.0.[5]

Strong HP Security

- This printer is designed to help detect, stop and give notifications of security breaches.
- Includes write-protected memory that helps prevent malware intrusion.
- Employ policy-based, fleet-wide protection features, using optional HP JetAdvantage Security Manager.

HP quality—print after print

- Produce sharp text, bold blacks, and crisp graphics with precision black toner.
- Don't be fooled by cartridges that mimic Original HP. Help ensure you're getting the quality you paid for.
- Print over 2x more pages than standard cartridges, using optional Original HP high-yield toner cartridges.[13]
- Get more pages than ever before,[1] and track remaining pages to help ensure you get what you paid for.[14]

Compatible with Windows 10

Mac

ENERGY STAR

mopria

AirPrint

HP Smart App

[1] Based on ISO/IEC 19752 cartridge yields for HP 30A Black Original LaserJet Toner Cartridges compared with HP 83A Black Original LaserJet Toner Cartridges, and HP 30X High Yield Black Original LaserJet Toner Cartridges compared with HP 83X High Yield Black Original LaserJet Toner Cartridges. Learn more at http://www.hp.com/go/learnaboutsupplies [2] Requires the HP Smart app download. Features controlled may vary by mobile device operating system. Full list of supported operating systems and details at http://support.hp.com/us-en/document/c03561640. For details on local printing requirements see http://hp.com/go/mobileprinting. [3] Requires a compatible NFC-printing-enabled mobile device. For a list of compatible NFC-printing-enabled mobile devices, see http://www.hp.com/go/nfcprinting [4] Mobile device needs to be connected directly to the signal of a Wi-Fi Direct® supported MFP or printer prior to printing. Depending on mobile device, an app or driver may also be required. For details, see http://www.hp.com/go/mobileprinting Wi-Fi Direct is a registered trademark of Wi-Fi Alliance®. [5] Requires Google Cloud Print™ registration and Google account. Learn more at http://www.hp.com/go/mobileprinting [6] Measured using ISO/IEC 17629. Exact speed varies depending on the system configuration, software application, driver, and document complexity. Learn more at http://www.hp.com/go/printerclaims [7] HP Auto-On/Auto-Off Technology capabilities are subject to printer and settings [8] Requires an Internet connection to the printer. Services may require registration. App availability varies by country, language, and agreements. For details, see hpconnected.com. [9] App or software and HP ePrint account registration also may be required. Some features require purchase of an optional accessory. Learn more at http://www.hp.com/go/mobileprinting [10] For details on local printing requirements see http://hp.com/go/mobile printing. [11] Not all HP Web Jetadmin features are supported on the HP LaserJet Pro MFP M227. HP Web Jetadmin is available for download at no additional charge at http://www.hp.com/go/webjetadmin [12] Based on HP internal research on competitor offerings (Device Security Comparison 1/2015) and Solutions Report on HP JetAdvantage Security Manager 2.1 from Buyers Lab, 2/2015. Requires separate purchase. For details, see http://www.hp.com/go/securitymanager [13] Comparison based on ISO 24711 cartridge yields for HP 30X High Yield Black Original LaserJet Toner Cartridges compared with HP 30A Black Original LaserJet Toner Cartridges. Learn more at http://www.hp.com/go/learnaboutsupplies [14] As compared with cartridge gauges for HP predecessor products.

HP LaserJet Pro MFP M227fdw Specifications Table

Functions / Multitasking Supported	Print, copy, scan, fax/ Yes
Print Speed[14 16]	**Letter:** Up to 30 ppm; **First Page Out Black**: As fast as 6.7 sec
Duplex Print Speed	**Letter**: Up to 18 ipm
Print Resolution	**Black (best)**: Up to 1200 x 1200 dpi
Print Technology	Laser
Print Resolution Technologies	HP FastRes 1200, HP ProRes 1200
Print Cartridges Number	1 Black
Standard Print languages	PCL5c; PCL6; PS; PCLmS; PDF; URF; PWG
Printer Smart Software Features	AirPrint 1.5 with media presence sensor, Instant-on Technology, HP Auto-On/Auto-Off Technology, JetIntelligence cartridges, Mopria-certified, Wi-Fi Direct Printing, Duplex Printing; HP Smart App
Scan Type / Technology	ADF, Flatbed/ CIS
Scan Resolution	**Hardware**: Up to 300 x 300 dpi (color and mono, ADF); Up to 600 x 600 dpi (color, flatbed); Up to 1200 x 1200 dpi (mono, flatbed); **Optical**: Up to 300 dpi (color and mono, ADF); Up to 600 dpi (color, flatbed); Up to 1200 dpi (mono, flatbed)
Scan File Format	JPG, RAW (BMP), PNG, TIFF, PDF
Scan Input Modes	Front control panel, scanning via HP LaserJet Software Scan or TWAIN-compliant or WIA-compliant software
Scan Size Maximum	**ADF**: 8.5 x 14 in; **Flatbed**: 8.5 x 11.7 in
Scan Speed[18]	Up to 15 ppm
Scanner Advanced Features	Scan to email and network folders
Bit Depth / Grayscale levels	24-bit/ 256
Digital Sending Standard Features	Scan to email; Scan to network folder
Copy Resolution	**Black (text and graphics)**: 600 x 600 dpi; 600 x 600 dpi
Maximum Number Of Copies	Up to 99 copies
Copier Resize	25 to 400%
Copier Settings	Number of Copies; Lighter/Darker; Optimize; Paper; Multi-Page Copy; Collation; Draft Mode
Fax Speed[17]	**Letter**: 3 sec per page
Fax Resolution	**Black (best)**: Up to 300 x 300 dpi (halftone enabled); **Black (standard)**: 203 x 98 dpi
Fax Smart Software Features	Fax address book; Speed-dial; fax billing codes; Fax archiving and forwarding; Block incoming faxes
Fax Features	**Fax Memory**: Up to 1,000 pages; **Auto Fax Reduction Supported**: Yes; **Auto-Redialing**: Yes; **Fax Delayed Sending**: Yes; **Distinctive Ring Detection Supported**: Yes; **Fax Forwarding Supported**: Yes; **Fax Phone TAM Interface Supported**: Yes; **Fax Polling Supported**: Yes (poll to receive only); **Fax Telephone Mode Supported**: Yes; **Junk Barrier Supported**: Yes; **Maximum Speed Dialing Numbers**: Up to 120 numbers (119 group dials); **PC Interface Supported**: Yes; **Remote Retrieval Capability Supported**: No; **Telephone Handset Supported**: Yes
Standard Connectivity	1 Hi-Speed USB 2.0; 1 Hi-Speed USB 2.0 (host); 1 Ethernet 10/100Base-TX; 1 phone line (in); 1 phone line (out); Wireless, NFC
Network Capabilities	10/100 Ethernet
Network Ready	Standard (built-in Ethernet, Wi-Fi 802.11b/g/n)
Wireless Capability	built-in Wi-Fi 802.11b/g/n
Mobile Printing Capability[10]	HP ePrint;Wi-Fi Direct printing; AirPrint 1.5 with media presence sensor; Google Cloud Print™ 2.0; NFC touch-to-print enabled; HP Smart App
Memory	**Standard**: 256 MB; **Maximum**: 256 MB
Processor Speed	800 MHz
Duty Cycle[12]	**Monthly, letter**: Up to 30,000 pages
Recommended Monthly Page Volume[13]	250 to 2500
Media Types Supported	Paper (laser, plain, photo, rough, vellum), envelopes, labels, cardstock, postcards
Media Weight Supported	16 to 43 lb
Media Sizes Supported	Letter; legal; executive; 8.5 x 13 in; envelopes
Media Sizes Custom	3 x 5 to 8.5 x 14 in
Paper Handling	250-sheet input tray, 10-sheet priority tray; 150-sheet output tray; **Duplex Options**: Automatic (standard); **Auto Document Feeder Capacity**: 35 sheets; **Envelope Feeder**: No; **Standard Paper Trays**: 1 Main tray and plus 10 sheet priority tray; **Input Capacities**: Up to 260 sheets standard; Up to 10**Output Capacities**: Up to 150 sheets standard
What's in the box	**G3Q75A** HP LaserJet Pro MFP M227fdw; HP Black LaserJet Toner Cartridge ~1600 pages; HP LaserJet Imaging Drum ~23,000 pages; Power cord; Getting started guide; Set up poster; Support flyer; Printer documentation and software on CD-ROM
Replacement Cartridges[8]	HP 30A Original Black LaserJet Toner Cartridge CF230A (~1600 pages), HP 30X Original Black LaserJet Toner Cartridge CF230X (~3500 pages), HP 32A Original LaserJet Imaging Drum CF232A (~23000 pages)
Product Dimensions[4]	**W x D x H**: 15.9 x 16 x 12.3 in; **Maximum**: 15.9 x 24.6 x 17.9 in
Product Weight	20.7 lb
Warranty Features	One year limited warranty
Energy Efficiency Compliance	ENERGY STAR® qualified; CECP
Control Panel	2.7 in touch screen, LCD (color graphics)
Display Description	2.7-in touch screen, LCD (color graphics)
Software Included	For Windows OS: HP Software Installer, HP Software Uninstaller (exclude Win8+), HP PCL6 Printer Driver, HP Device Experience (DXP), HP Connected, Device Setup & Software, HP Printer Assistant, HP Product Improvement Study, Online user manuals, HP Scan Driver, HP Scan Application, HP Fax Driver (4:1 bundle only), HP Fax Application (4:1 bundle only), For Mac OS: Welcome Screen, (Directs users to HP.com or OS App Source for LaserJet Software)
Compatible Operating Systems[19]	Windows 10, 8.1, 8, 7: 32-bit or 64-bit, 2 GB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer. Windows Vista: (32-bit only), 2 GB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer 8. Windows XP SP3 or higher (32-bit only): any Intel Pentium II, Celeron or 233 MHz compatible processor, 850 MB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer 8, Apple OS X Mavericks (v10.9), OS X El Capitan (v10.11), OS X Yosemite (v10.10) ; 1 GB HD; Internet required; USB. Linux (For more information, see http://hplipopensource.com/hplip-web/index.html). Unix (For more information, see http://www.hp.com/go/unixmodelscripts)
Compatible Network Operating Systems	Windows 10, 8.1, 8, 7: 32-bit or 64-bit, 2 GB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer. Windows Vista: (32-bit only), 2 GB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer 8. Windows XP SP3 or higher (32-bit only): any Intel Pentium II, Celeron or 233 MHz compatible processor, 850 MB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer 8 Apple OS X Sierra(v10.12), OS X El Capitan (v10.11), OS X Yosemite (v10.10) ; 1 GB HD; Internet required; USB. Linux (For more information, see http://hplipopensource.com/hplip-web/index.html). Unix (For more information, see http://www.hp.com/go/unixmodelscripts)
Minimum System Requirements	**PC**: Windows 10, 8.1, 8, 7: 32-bit or 64-bit, 2 GB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer. Windows Vista: (32-bit only), 2 GB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer 8. Windows XP SP3 or higher (32-bit only): any Intel Pentium II, Celeron or 233 MHz compatible processor, 850 MB available hard disk space, CD-ROM/DVD drive or Internet connection, USB port, Internet Explorer 8; **MAC**: Apple OS X Sierra (v10.12), OS X El Capitan (v10.11), OS X Yosemite (v10.10); 1
Power[5]	**Power Supply Type**: Internal; **Power Requirements**: 110-volt input voltage: 110 to 127 VAC (+/- 10%), 60 Hz/50 Hz, 5.9 A; 220-volt input voltage: 220 to 240 VAC (+/- 10%), 60 Hz/50 Hz, 3.3A; **Power Consumption**: 475 watts (active printing), 4.5 watts (ready), 1.0 watts (sleep), 0.8 watts (Auto Off/Wake on USB, enabled at shipment)
Acoustics	**Acoustic Power Emissions**: 6.6 B(A) (printing at 28 ppm)
Operating Environment	**Operating Temperature Range**: 59 to 90.5ºF; **Recommended Operating Temperature**: 63.5 to 77ºF; **Storage Temperature Range**: -4 to 140ºF; **Non-Operating Humidity Range**: 10 to 90% RH; **Operating Humidity Range**: 10 to 80% RH; **Recommended Humidity Operating Range**: 30 to 70% RH
Accessories	No
HP Service and Support Options	UQ220E - HP 2 YearCare Pack Business Priority Support with Next Business Day Exchange; UQ221E - HP 3 Year Care Pack Business Priority Support with Next Business Day Exchange; UQ222E - HP 4 Year Care Pack Business Priority Support with Next Business Day Exchange; U6M41E - HP 2 Year Care Pack Business Priority Support with Onsite Exchange; U6M42E - HP 3 Year Care Pack Business Priority Support with Onsite Exchange; U6M43E - HP 4 Year Care Pack Business Priority Support with Onsite Exchange

Learn more at
hp.com

[2] HP 30A Original Black LaserJet Toner Cartridge (~1600 pages), HP 32A Original LaserJet Imaging Drum (~23,000 pages). Actual yields vary considerably based on images printed and other factors. For details see http://www.hp.com/go/learnaboutsupplies [3] Dimensions vary as per configuration [4] Dimensions vary as per configuration [5] Power requirements are based on the country/region where the printer is sold. Do not convert operating voltages. This will damage the printer and void the product warranty. Power consumption values typicality based on measurement of 115V device. [6] Power requirements are based on the country/region where the printer is sold. Do not convert operating voltages. This will damage the printer and void the product warranty. Energy Star value typically based on measurement of 115 V device. [7] Based on the BA TEC method with the following possible exceptions: 1 minute or less sleep delay setting, Wi-Fi disabled. [8] Declared yield value in accordance with ISO/IEC 19752. Actual yields vary considerably based on images printed and other factors. For details see http://www.hp.com/go/learnaboutsupplies [9] Declared yield value in accordance with ISO/IEC 19752. Actual yields vary considerably based on images printed and other factors. For details see http://www.hp.com/go/learnaboutsupplies [10] HP ePrint Printer requires ePrint account registration. App or software may be required. Wireless operations are compatible with 2.4 GHz operations only. Learn more at hp.com/go/mobileprinting Apple Airprint Mobile device must have AirPrint 1.5. Wireless operations are compatible with 2.4 GHz operations only. Learn more at hp.com/go/mobileprinting Google Cloud Print™ 2.0Requires Google Cloud Print™ registration and Google account. Wireless operations are compatible with 2.4 GHz operations only. Learn more at hp.com/go/mobileprinting Wi-Fi Direct printing.Feature is supported on select printers. Mobile device needs to be connected directly to the signal of a Wi-Fi Direct supported MFP or printer prior to printing. Depending on mobile device, an app or driver may also be required. For details, see hp.com/go/mobileprinting Wi-Fi Direct is a registered trademark of Wi-Fi Alliance. NFC touch-to-print enabled requires a compatible NFC printing enabled mobile device. For a list of compatible NFC printing enabled mobile devices, see hp.com/go/nfcprinting [11] Duty cycle is defined as the maximum number of pages per month of imaged output. This value provides a comparison of product robustness in relation to other HP LaserJet or HP Color LaserJet devices, and enables appropriate deployment of printers and MFPs to satisfy the demands of connected individuals or groups. [12] Duty cycle is defined as the maximum number of pages per month of imaged output. This value provides a comparison of product robustness in relation to other HP LaserJet or HP Color LaserJet devices, and enables appropriate deployment of printers and MFPs to satisfy the demands of connected individuals or groups. [13] HP recommends that the number of printed pages per month be within the stated range for optimum device performance, based on factors including supplies replacement intervals and device life over an extended warranty period. [14] Measured using ISO/IEC 24734, excludes first set of test documents. For more information see http://www.hp.com/go/printerclaims. Exact speed varies depending on the system configuration, software application, driver, and document complexity. [15] Measured using ISO 24734 Feature Test A5 Landscape Feed. Speed may vary based on content, PC, media orientation, and media type. [16] Measured using ISO/IEC 17629. For more information see http://www.hp.com/go/printerclaims. Exact speed varies depending on the system configuration, software application, driver, and document complexity. [17] Based on standard ITU-T test image #1 at standard resolution. More complicated pages or higher resolution will increase the transmission time. [18] Measured using ISO/IEC 17991, excludes first set of test documents. For more information see http://www.hp.com/go/printerclaims.Exact speed varies depending on the system configuration and document complexity. [19] Not supporting Windows XP (64-bit) and Windows Vista (64-bit); Not all "Compatible Operating Systems" are supported with INBOX software; Full solution software available only for Windows 7 and newer; Legacy Windows Operation Systems (XP, Vista, and equivalent servers) get print drivers only; For Windows Server 2003 32-bit and 2008 32-bit and 64-bit, 2008 R2 64-bit, 2012 64-bit, 2012 R2 64-bit only print driver is installed; Windows RT OS for Tablets (32 & 64-bit) uses a simplified HP print driver built into the RT OS; Linux systems use in-OS HPLIP software

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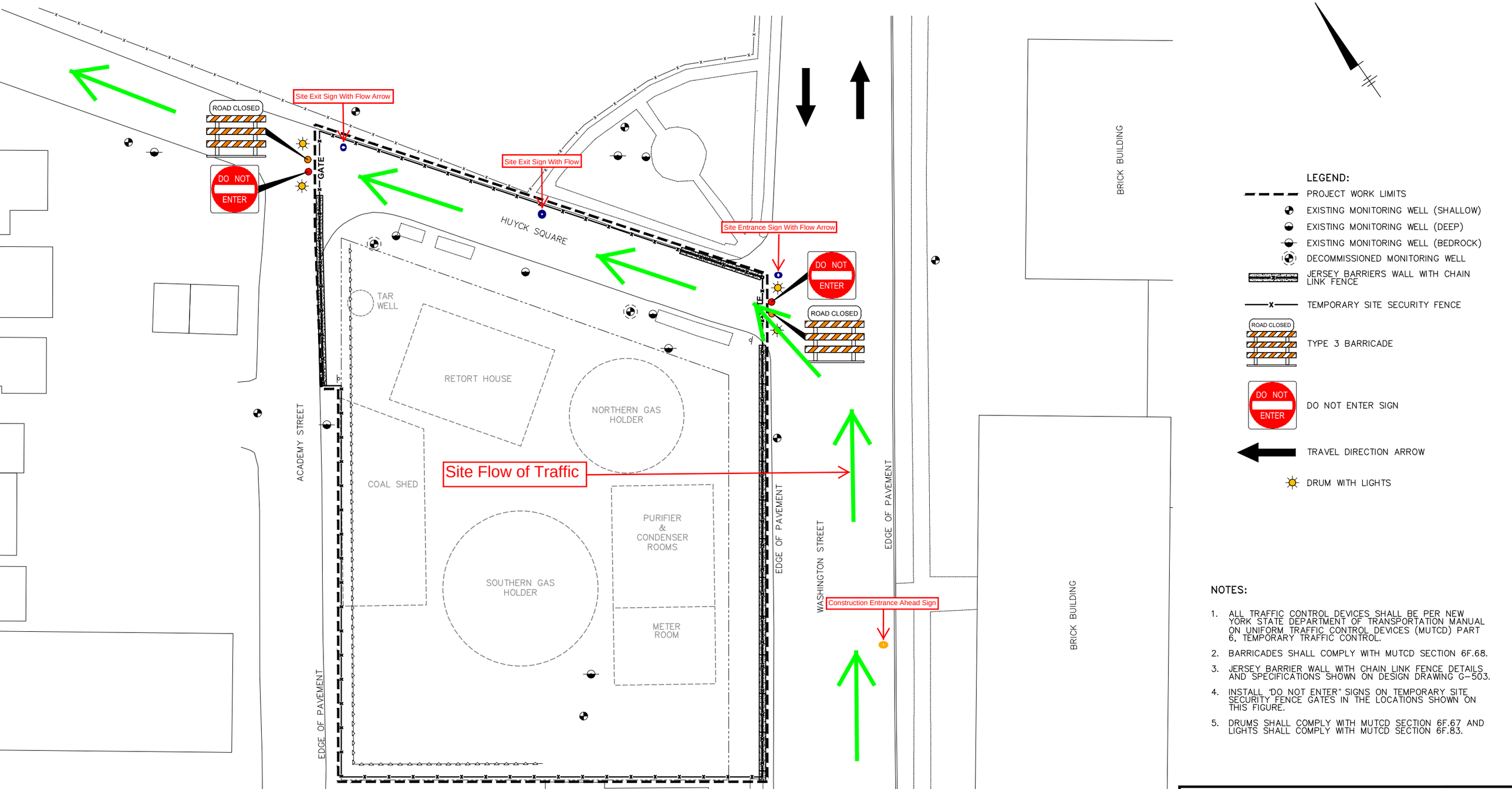
c05275081, June 2019, R3

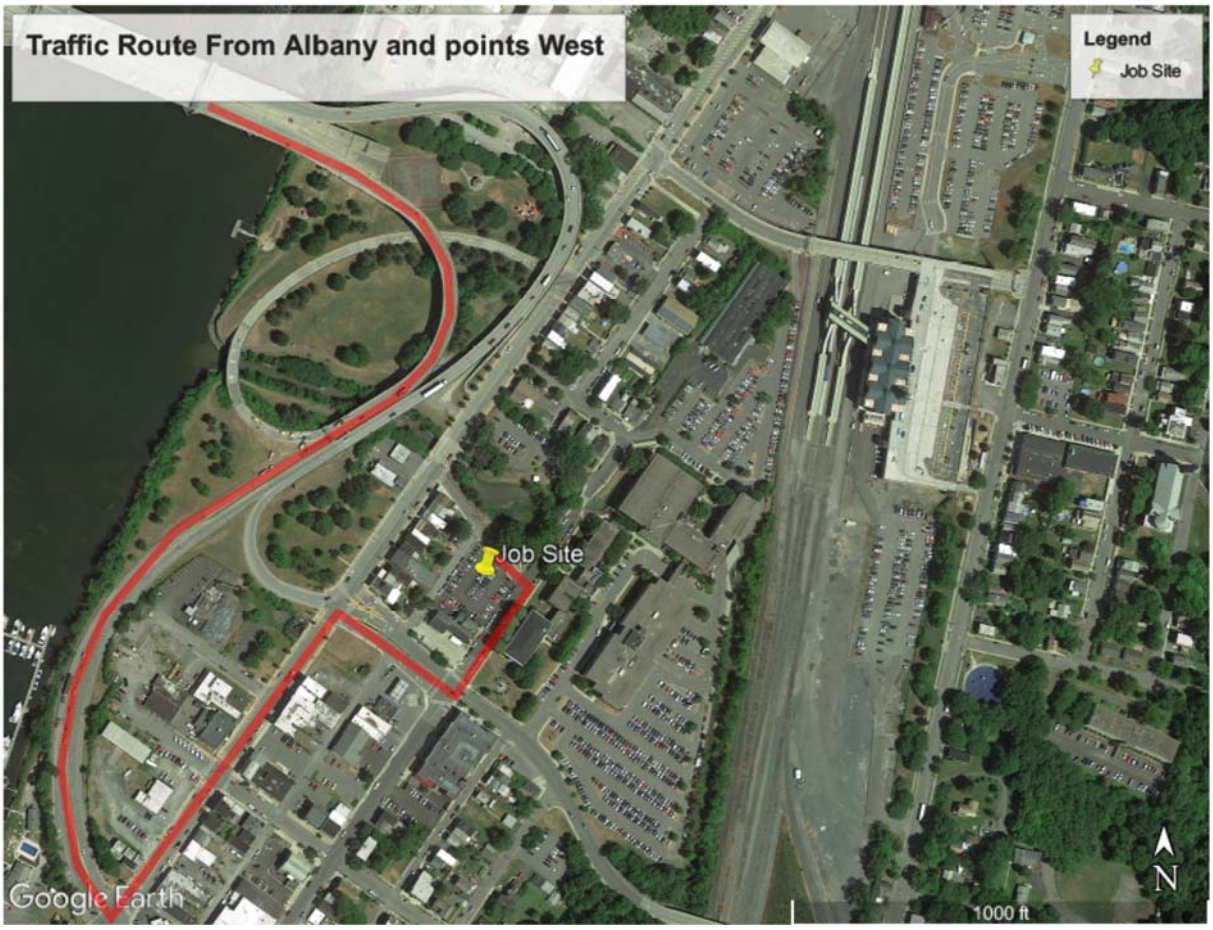
ATTACHMENT G

Traffic Control Plan Drawing and Directions



NOTES:

1. ALL TRAFFIC CONTROL DEVICES SHALL BE PER NEW YORK STATE DEPARTMENT OF TRANSPORTATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PART 6, TEMPORARY TRAFFIC CONTROL.
2. BARRICADES SHALL COMPLY WITH MUTCD SECTION 6F.68.
3. JERSEY BARRIER WALL WITH CHAIN LINK FENCE DETAILS AND SPECIFICATIONS SHOWN ON DESIGN DRAWING G–503.
4. INSTALL "DO NOT ENTER" SIGNS ON TEMPORARY SITE SECURITY FENCE GATES IN THE LOCATIONS SHOWN ON THIS FIGURE.
5. DRUMS SHALL COMPLY WITH MUTCD SECTION 6F.67 AND LIGHTS SHALL COMPLY WITH MUTCD SECTION 6F.83.



Turn By Turn Directions

To Site From Albany, NY:

1. Head east on Dunn Memorial Bridge
2. Turn left onto Broadway Avenue
3. Turn right onto 3rd Avenue
5. Turn left onto Washington Street
6. Turn left onto Huyck Square
7. Arrived at job site

Turn By Turn Directions

Leaving site towards Albany, NY

1. Turn left onto Huyck Square from job site
2. Turn left onto Broadway
3. Continue onto US-20 West toward 1-787
4. Continue west across Dunn Memorial Bridge

Turn By Turn Directions

To Site From Route 151 West (3rd Avenue)

1. Follow Route 151 West (3rd Avenue) to Washington Street
2. Turn right onto Washington Street
3. Turn left onto Huyck Square
4. Arrived at site

Turn By Turn Directions

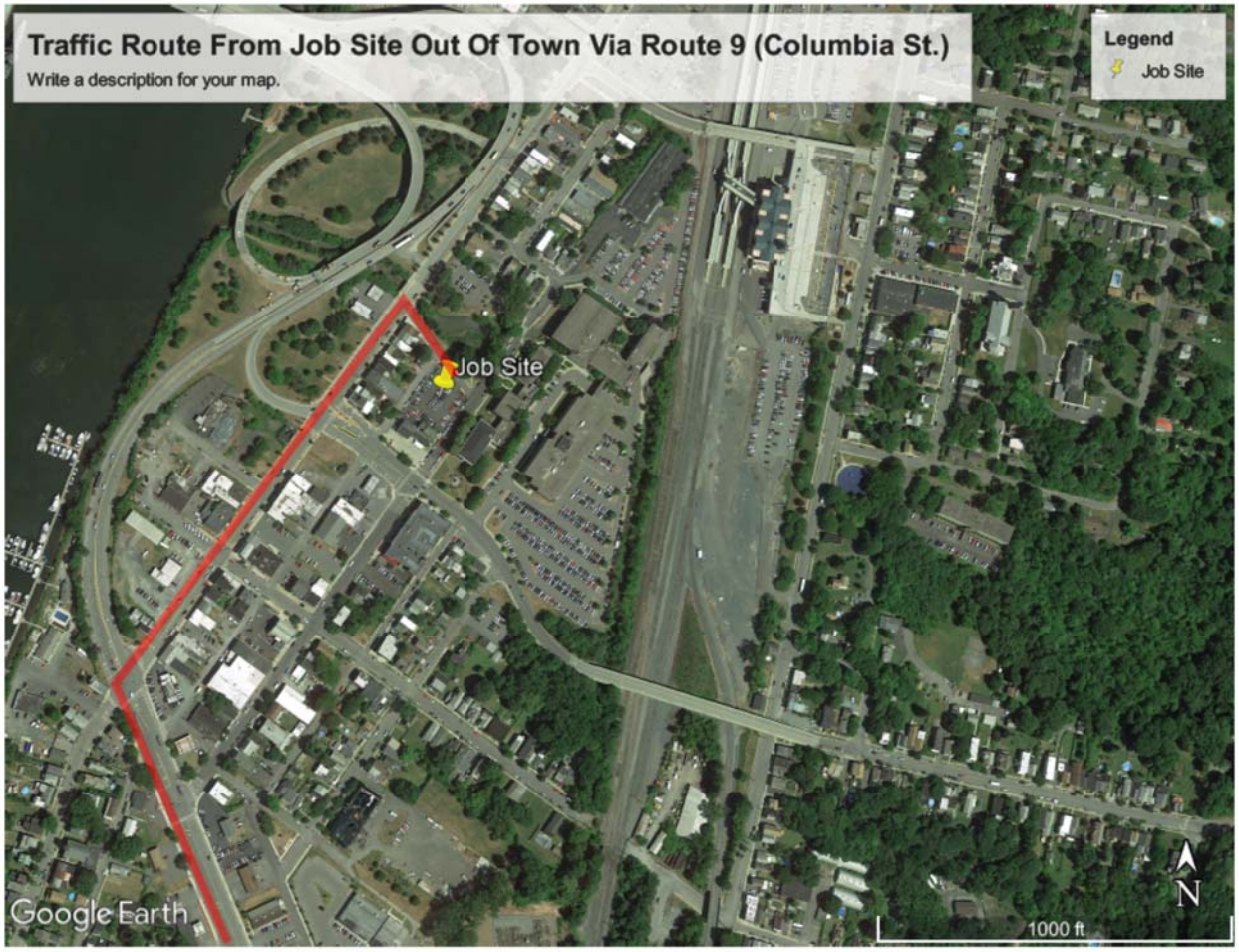
Leaving Town From Site Via Route 151 East (3rd Avenue)

1. Turn left onto Huyck Square from job site
2. Turn left onto Broadway
3. Turn left onto Route 151 East (3rd Avenue)
4. Continue out of town

Turn By Turn Directions

To Site From Route 9 North (Columbia Street)

1. Follow Route 9 North (Columbia Street) to Broadway
2. Turn right onto Broadway
3. Turn right onto Route 151 East (3rd Avenue)
4. Turn left onto Washington Street
5. Turn left onto Huyck Square
6. Arrived at site



Turn By Turn Directions

Leaving Town From Site Via Route 9 South (Columbia Street)

1. Turn left onto Huyck Square from job site
2. Turn left onto Broadway
3. Turn left onto Route 9 South (Columbia Street)
4. Continue out of town

ATTACHMENT H

Survey Plan Phases

Section I – Scope of Services

Based on our conversations and information noted above, we propose to complete the following:

Phase 1.0 Pre-Construction Site Control Establishment and Survey Control Plan

Colliers Engineering & Design will perform field checks on existing control, establish additional site control, and shall prepare a survey control plan and submit to EWMI Inc. Control found and located, and additional control set will be network adjusted utilizing least-squares methodology. Preparation of a final master control plan annotating additional horizontal and vertical control throughout the site is included in this phase. These control points will be set in areas to facilitate subsequent stake-out and topographic survey operations. (While attempts will be made to set our control points in areas of least disturbance, obliteration of clearly marked survey control points by others may necessitate efforts above and beyond what is included in the lump sum fee for this phase. Re-establishment of obliterated survey control will require additional fees which will be negotiated at or before the time of service). This work will be done in accordance with the code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors, Inc.; the guidelines of the New York State Education Department and the State Board of Engineers and Land Surveyors. Existing site digital photos will be collected during this phase to document site conditions prior to construction activities.

Site survey limits:

(Red polygon, Figure 1 & 2, Below)

Deliverables. Civil 3D drawing with control points annotated in AutoCAD Civil 3D format using Colliers Engineering & Design CADD standards and .pdf format digital prints.

Phase 2.0 Pre-Construction Topographic Survey

Colliers Engineering & Design will perform a topographic survey of the site outlined below per current existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors, Inc.; the guidelines of the New York State Education Department and the State Board of Engineers and Land Surveyors.

Site survey limits:

(Red polygon, Figure 1 & 2, Below)

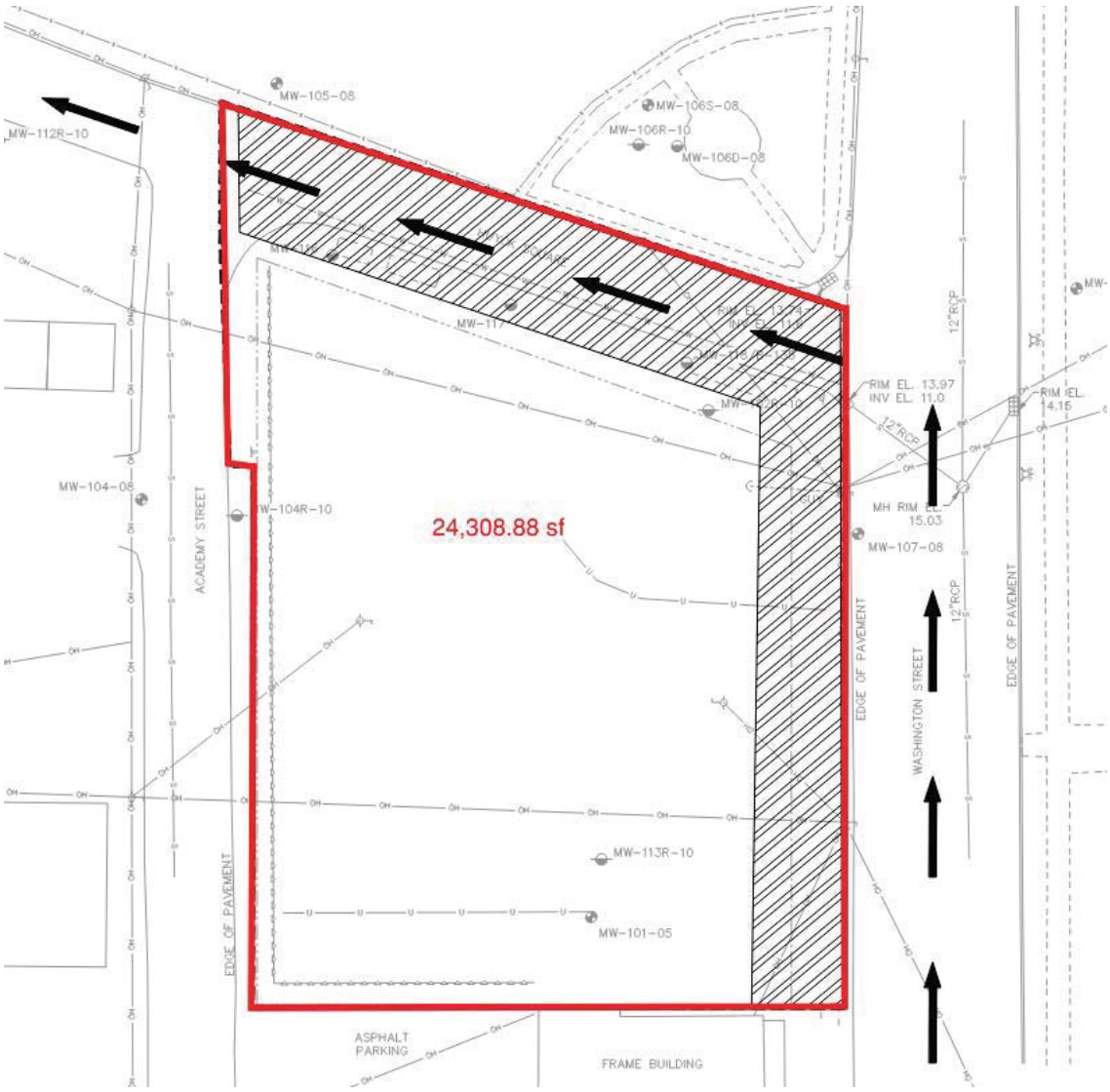


Fig. 1, graphical site limits per documents received from client

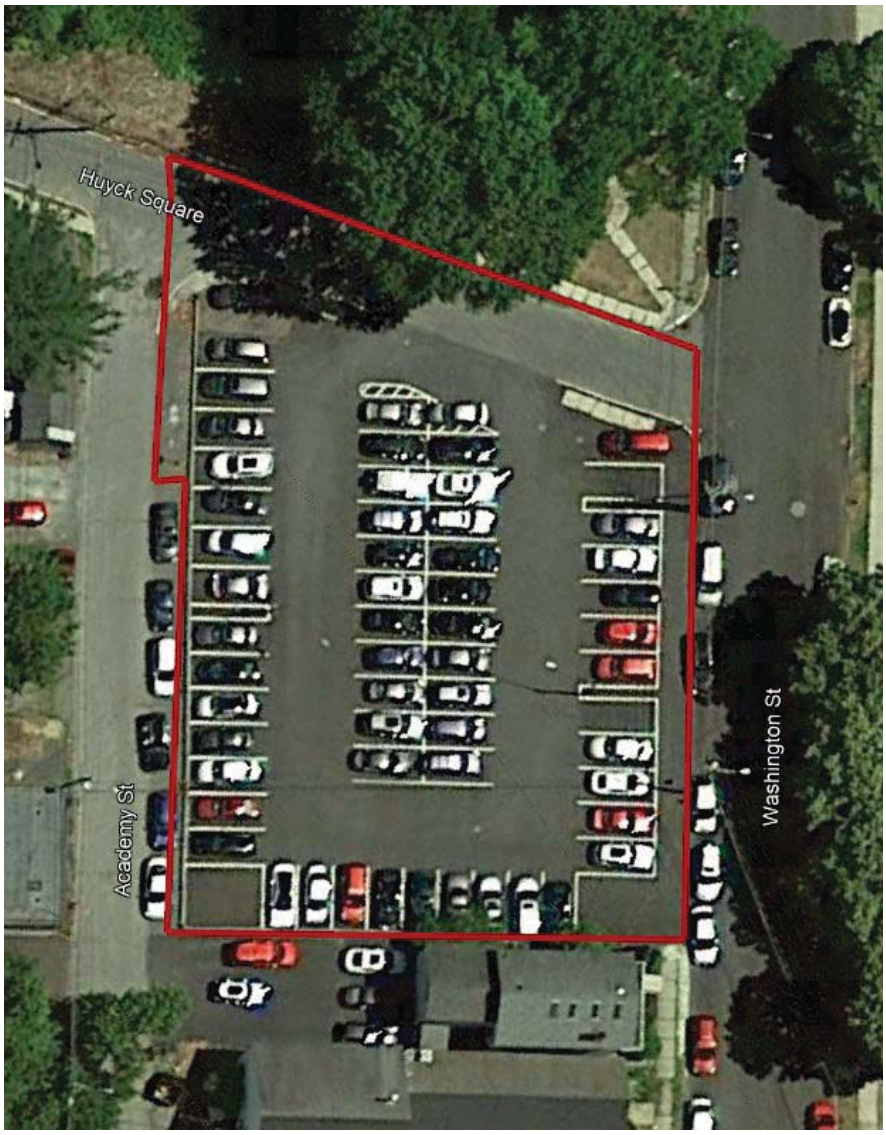


Fig. 2, Graphical limits from fig. 1 above, projected onto a satellite view

The topographic survey will include all visible and accessible plottable features, spot elevations, and contours a 1' interval within the limits depicted above. More specifically:

- Establish on site project survey control tied to the New York State Plane Coordinate System, North American Datum (NAD) 1983 adjustment, and to the North American Vertical Datum of 1988 (NAVD88) utilizing the control survey as described above and/or GPS methods (if necessary).
- Field data collection will be performed utilizing conventional survey methods.
- Field survey and map visible utility hardware including inverts of accessible storm and sanitary sewer within the survey limits;
- Field survey and map existing physical features such as pavement edges, curbs, driveways, sidewalks, guide rails, buildings, tree lines, hedge rows, utility poles, mailboxes, signs, valves, storm and sanitary structures, fences, retaining wall, observed boundary evidence, and pavement markings;
- Delineate differences in paving and curb material;
- Plot elevation contours at 1' interval;
- Compile topographic survey map in AutoCAD Civil 3D 2018 format.

We will survey visible evidence of existing utilities within the survey limits but will not be able to confirm the existence, or actual position of all underground utilities which may be running through or servicing the subject property. Underground utilities (besides sanitary and storm installations if visible and accessible) will not be shown on the plan deliverables

For the purposes of this contract, accessible utilities shall be defined as those utilities that are visible to the naked eye at ground level and are safely accessible by foot by Colliers Engineering & Design field survey personnel without the need for additional safety measures and/or assistance with making pipes visible, open and clear for viewing and measuring. Traffic safety protection for field survey crew, and cleaning of clogged or obstructed drain and sewer structures is **not** included in the fee for this survey. If it is determined that safety protection is required for any of the survey services performed under this contract, we will advise you of the approximate cost prior to moving forward. Such additional cost would be invoiced as a reimbursable expense pursuant to prior authorization.

Deliverables. Civil 3D drawing with mapped features and a DTM Surface in AutoCAD Civil 3D format using Colliers Engineering & Design CADD standards and .pdf format digital prints.

Phase 3.0 Interim Survey & Monitoring/Post Removal Surveys

Colliers Engineering & Design will perform iterative field data collection and cad deliverables as needed and decided upon by the client on a **per mobilization basis**. This includes (if necessary) volumes analysis and updates to the pre-construction topographic survey plan per site conditions as of the date of the iterative field mobilization.

Site survey limits:

(Red polygon, Figure 1 & 2, Above)

Deliverables. Civil 3D drawing with mapped features and a DTM Surface in AutoCAD Civil 3D format using Colliers Engineering & Design CADD standards and .pdf format digital prints.

Phase 4.0 Post-Restoration Topographic Survey

Upon completion of the site restoration process, Colliers Engineering & Design will perform a post-restoration survey of the site depicted in fig. 1 & fig. 2, above per current existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors, Inc.; the guidelines of the New York State Education Department and the State Board of Engineers and Land Surveyors.

The post-restoration topographic survey will include all visible and accessible plottable features, spot elevations, and contours a 1' interval within the limits depicted above. More specifically:

- Field data collection will be performed utilizing conventional survey methods.
- Field survey and map visible utility hardware including inverts of accessible storm and sanitary sewer within the survey limits;
- Field survey and map existing physical features such as pavement edges, curbs, driveways, sidewalks, guide rails, buildings, tree lines, hedge rows, utility poles, mailboxes, signs, valves, storm and sanitary structures, fences, retaining wall, observed boundary evidence, and pavement markings;
- Delineate differences in paving and curb material;
- Plot elevation contours at 1' interval;
- Compile topographic survey map in AutoCAD Civil 3D 2018 format.

We will survey visible evidence of existing utilities within the survey limits but will not be able to confirm the existence, or actual position of all underground utilities which may be running through or servicing the subject property. Underground utilities (besides sanitary and storm installations) will not be shown on the plan deliverables

For the purposes of this contract, accessible utilities shall be defined as those utilities that are visible to the naked eye at ground level and are safely accessible by foot by Colliers Engineering & Design field survey personnel without the need for additional safety measures and/or assistance with making pipes visible, open and clear for viewing and measuring. Traffic safety protection for field survey crew, and cleaning of clogged or obstructed drain and sewer structures is **not** included in the fee for this survey. If it is determined that safety protection is required for any of the survey services performed under this contract, we will advise you of the approximate cost prior to moving forward. Such additional cost would be invoiced as a reimbursable expense pursuant to prior authorization.

Final Deliverable. The final deliverable will be a Civil 3D drawing with mapped features and a DTM Surface in AutoCAD Civil 3D format using Colliers Engineering & Design CADD standards. A maximum of eight (8) hardcopies signed and sealed by a New York Professional Licensed Land Surveyor, and an electronic file copy in Adobe pdf format. Draft deliverables will be in form of electronic file Adobe pdf format.

Delivery of hard copy maps will be limited to one (1) package sent to one (1) address, one (1) time. Additional delivery of hard copy maps will be billed as a reimbursable expense in accordance with Section III of this agreement.

ATTACHMENT I

Sample Chemical Inventory Tracking Spread Sheet

T-177 Chemical Inventory June 21'

Name	Usage	Manufacturer	Quantity	Size	SDS
10W-30 Motor Oil	Engine Lubricant	Phillips 66 Lubricants	2	Quart	SDS Guide\Phillips 66\10w30.pdf
CAPSUR	PCB Extractor	Integrated Chemistries	1	Gallon	SDS Guide\Capsur\Capsur PCB removal.pdf
Diesel	Fuel	Various	1	5 Gallons	SDS Guide\Diesel\Diesel.pdf
Echo Red Armor 50:1 Fuel	Small Engine Fuel	Philips 66 Spectrum Corp.	2	110 Ounce	SDS Guide\Echo Red Armor\50-1.PDF
Gasoila Thread Sealant	Thread Sealer	Federal Process Corp.	1	Pint	SDS Guide\Gasoila\Soft Set.pdf
Gasoline	Fuel	Various	1	5 Gallons	SDS Guide\Gasoline\Gasoline.pdf
GOJO Hand Soap	Cleaner	GOJO Industries, Inc.	2	16 Ounce	SDS Guide\Gojo Luxury Foam Antibacterial Handwash\Gojo Luxury Foam Antibacterial Handwash.pdf
Honeywell Eye Saline	Eye Wash	Honewell Life Safety	2	32 Ounce	SDS Guide\Eyewash\Eyewash.pdf
JD Fuel Protectant	Fuel Treatment	TIG Distribution	1	Quart	SDS Guide\Fuel Protect John Deere Winter Formula\Winter Formula Fuel-Protect.pdf
JD SD Polyurea Grease	Equipment Lubricant	Fuchs Lubricants	1	10 Ounce	SDS Guide\John Deere Grease\polyurea.pdf
Off Bug Repellant	Bug Spray	S.C. Johnson & Son, Inc.	4	8 Ounce	SDS Guide\Off Insect Repellent\Off Insect Repellent.pdf
Original Orange Hand Soap	Cleaner	ZEP, Inc.	2	16 Ounce	SDS Guide\Zep Orange Cleaner\Heavy Duty Orange.pdf
PB Blaster	Lubricant	B'laster Corporation	2	10 Ounce	SDS Guide\PB Blaster\PB Penetrating Catalyst.pdf
Permithrin	Bug Spray	Sawyer Products, Inc.	1	16 Ounce	SDS Guide\Permethrin\Sawyer Products.pdf
Propane	Fuel	Various	1	20 Pound	SDS Guide\Bennzomattic PROPANE CAMPING GAS CYLINDER\WC002-Propane-US-(English).pdf
Rustoleum Proffesional Line Marking Paint	Painting	Rust-oleum Corp.	6	15 Ounce	SDS Guide\Rustoleum Zone Marking Paint\Marking Paint.pdf
Simple Green	Cleaner	Sunshine Makers, Inc.	1	Gallon	SDS Guide\Simple Green\Simple Green All Purpose Cleaner.pdf
Stihl 50:1 2-Cycle Oil	Small Engine Fuel Component	Omni Specialty Corp.	2	2.5 Ounce	SDS Guide\Stihl Ultra\2 Cycle Oil.pdf
WD-40	Lubricant	WD-40 Company	2	10 Ounce	SDS Guide\WD-40\WD-40 Multi-Use Product Aerosol.pdf

ATTACHMENT J

Proposed Hazardous Materials SDSs

SAFETY DATA SHEET

SHELL DIESEL

Infosafe No.: LQ4CF
ISSUED Date : 18/07/2016
ISSUED by: VIVA ENERGY AUSTRALIA PTY LTD (FORMERLY: SHELL COMPANY OF AUSTRALIA LTD)

1. IDENTIFICATION

GHS Product Identifier
SHELL DIESEL

Company Name
VIVA ENERGY AUSTRALIA PTY LTD (FORMERLY: SHELL COMPANY OF AUSTRALIA LTD) (ABN 46 004 610 459)

Address
Level 16, 720 Bourke Street Docklands
Victoria 3008 Australia

Telephone/Fax Number
Tel: +61 (0)3 8823 4444
Fax: +61 (0)3 8823 4800

Emergency phone number
1800 651 818 (Australia) / Poisons Information Centre:13 11 26 (Australia)

Recommended use of the chemical and restrictions on use
Fuel for on-road diesel-powered engines, in marine diesel engines, boilers, gas turbines and other combustion equipment.
This product is intended for use in closed systems only.

Other Names

Name	Product Code
DIESOLINE B5	
DIESOLINE	
SHELL DIESEL EXTRA	
SHELL DIESEL EXTRA B5	
SHELL V POWER DIESEL B5	
SHELL ALPINE DIESEL EXTRA	
AUTOMOTIVE DIESEL FUEL	
SHELL V POWER ALPINE DIESEL	
SHELL EROMANGA DIESEL	
SHELL MARINE DIESEL	
SHELL DIESOLINE 10	
SHELL V POWER DIESEL	
SHELL MARINE GAS OIL	

2. HAZARD IDENTIFICATION

GHS classification of the substance/mixture
Classified as Hazardous according to the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) including

Work, Health and Safety Regulations, Australia.
Classified as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. (7th edition)
Aspiration Hazard: Category 1
Carcinogenicity: Category 2
Flammable Liquids: Category 4
Hazardous to the Aquatic Environment - Long-Term Hazard: Category 2

Signal Word (s)
DANGER

Hazard Statement (s)
AUH066 Repeated exposure may cause skin dryness or cracking.
H227 Combustible liquid.
H304 May be fatal if swallowed and enters airways.
H351 Suspected of causing cancer.
H411 Toxic to aquatic life with long lasting effects.

Pictogram (s)
Health hazard,Environment

Precautionary statement – Prevention
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.

Precautionary statement – Response
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P331 Do NOT induce vomiting.
P370+P378 In case of fire: Use foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only for extinction.
P391 Collect spillage.

Precautionary statement – Storage
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Precautionary statement – Disposal
P501 Dispose of contents/container to an approved waste disposal plant.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Name	CAS	Proportion
Fuels, diesel	68334- 30- 5	95- 100 %
Fatty acids, vegetable oil, methyl esters	68990- 52- 3	0- 5 %

Preparation Description
Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C9 to C25 range. May also contain several additives at <0.1% v/v each. May contain cetane improver (Ethyl Hexyl Nitrate) at <0.2% v/v. May contain catalytically cracked oils in which polycyclic aromatic compounds, mainly 3-ring but some 4- to 6-ring species are present.

4. FIRST-AID MEASURES

Inhalation
If inhaled, remove affected person from contaminated area. Keep at rest until recovered. If symptoms develop and/or persist seek medical attention.

Ingestion
Do NOT induce vomiting. Wash out mouth and lips with water. Where vomiting occurs naturally have affected person place head below hip level in order to reduce risk of aspiration. Seek immediate medical attention.

Skin
Remove all contaminated clothing immediately. Wash affected area thoroughly with soap and water. Wash contaminated clothing before reuse or discard. Seek medical attention.

Eye contact
If in eyes, hold eyelids apart and flush the eyes continuously with running water. Remove contact lenses. Continue flushing for several minutes until all contaminants are washed out completely. If symptoms develop and/or persist seek medical attention.

First Aid Facilities
Eyewash and normal washroom facilities.

Advice to Doctor
Treat symptomatically.

Other Information
For advice in an emergency, contact a Poisons Information Centre or a doctor at once. (131 126)

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media
Do not use water in a jet.

Hazards from Combustion Products
Under fire conditions this product may emit toxic and/or irritating fumes, smoke and gases including carbon monoxide, carbon dioxide, oxides of sulphur and oxides of nitrogen.

Specific Hazards Arising From The Chemical
This product will burn if exposed to fire.

Decomposition Temperature
Not available

Precautions in connection with Fire
Fire fighters should wear Self-Contained Breathing Apparatus (SCBA) operated in positive pressure mode and full protective clothing to prevent exposure to vapours or fumes. Water spray may be used to cool down heat-exposed containers. Fight fire from safe location. This product should be prevented from entering drains and watercourses.

Other Information
Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Emergency Procedures
Wear appropriate personal protective equipment and clothing to prevent exposure. Extinguish or remove all sources of ignition and stop leak if safe to do so. Increase ventilation. Evacuate all unprotected personnel. If possible contain the spill. Place inert absorbent, non combustible material onto spillage. Use clean non-sparking tools to collect the material and place into suitable labelled containers for subsequent recycling or disposal. Dispose of waste according to the applicable local and national regulations. If contamination of sewers or waterways occurs inform the local water and waste management authorities in accordance with local regulations.

7. HANDLING AND STORAGE

Precautions for Safe Handling
Avoid inhalation of vapours and mists, and skin or eye contact. Use only in a well ventilated area. Keep containers sealed when not in use. Prevent the build up of mists or vapours in the work atmosphere. Do not use near ignition sources. Do not pressurise, cut, heat or weld containers as they may contain hazardous residues. Maintain high standards of personal hygiene by washing hands prior to eating, drinking, smoking or using toilet facilities. Avoid exposure. Do not handle until all safety precautions have been read and understood.

Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well-ventilated area away from sources of ignition, oxidising agents, strong acids, foodstuffs, and clothing. Keep containers closed when not in use, securely sealed and protected against physical damage. Inspect regularly for deficiencies such as damage or leaks. Have appropriate fire extinguishers available in and near the storage area. Take precautions against static electricity discharges. Use proper grounding procedures. Ensure that storage conditions comply with applicable local and national regulations.

For information on the design of the storeroom, reference should be made to Australian Standard AS1940 - The storage and handling of flammable and combustible liquids.

Storage Regulations

Classified as a Class C1 (COMBUSTIBLE LIQUID) for the purpose of storage and handling, in accordance with the requirements of AS1940.

Recommended Materials

For containers, or container linings use mild steel, stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE) and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use amine-adduct cured epoxy paint. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.

Unsuitable Materials

Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene.; However, some may be suitable for glove materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limit values

No exposure standards have been established for the mixture. However, over-exposure to some chemicals may result in enhancement of pre-existing adverse medical conditions and/or allergic reactions and should be kept to the least possible levels.

Biological Limit Values

No biological limits allocated.

Appropriate Engineering Controls

This substance is hazardous and should be used with a local exhaust ventilation system, drawing vapours away from workers' breathing zone. A flame-proof exhaust ventilation system is required. If the engineering controls are not sufficient to maintain concentrations of vapours/mists below the exposure standards, suitable respiratory protection must be worn. Refer to relevant regulations for further information concerning ventilation requirements.

Refer to AS 1940 - The storage and handling of flammable and combustible liquids and AS/NZS 60079.10.1:2009 Explosive atmospheres - Classification of areas - Explosive gas atmospheres, for further information concerning ventilation requirements.

Respiratory Protection

If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable vapor/ mist filter should be used. Refer to relevant regulations for further information concerning respiratory protective requirements.

Reference should be made to Australian Standards AS/NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

Eye Protection

Safety glasses with side shields, chemical goggles or full-face shield as appropriate should be used. Final choice of appropriate eye/face protection will vary according to individual circumstances. Eye protection devices should conform to relevant regulations.

Eye protection should conform with Australian/New Zealand Standard AS/NZS 1337 - Eye Protectors for Industrial Applications.

Hand Protection

Wear gloves of impervious material such as nitrile gloves (Breakthrough time of > 240 minutes), neoprene, PVC gloves. Final choice of appropriate gloves will vary according to individual circumstances i.e. methods of handling or according to risk assessments undertaken. Occupational protective gloves should conform to relevant regulations.

Reference should be made to AS/NZS 2161.1: Occupational protective gloves - Selection, use and maintenance.

Body Protection

Suitable protective workwear, e.g. cotton overalls buttoned at neck and wrist is recommended. Chemical resistant apron is recommended where large quantities are handled.

Other Information

No exposure standards have been established for this material, however, the TWA exposure standards for refined mineral oil mist is 5 mg/m^3. As with all chemicals, exposure should be kept to the lowest possible levels.

TWA (Time Weighted Average): The average airborne concentration of a particular substance when calculated over a normal eight-hour working day, for a five-day week.

Source: Safe Work Australia

9. PHYSICAL AND CHEMICAL PROPERTIES

Form
Liquid

Appearance
Colourless to straw liquid.

Colour
Colourless to straw

Odour
May contain a reodorant

Decomposition Temperature
Not available

Melting Point
Not available

Freezing Point
Not available

Boiling Point
170 - 390 °C

Solubility in Water
Not available

Specific Gravity
0.82 - 0.85 gm/cm at 15°C

pH
Not available

Vapour Pressure
< 1 hPa at 20 °C

Vapour Density (Air=1)
Not available

Evaporation Rate
Not available

Odour Threshold
Not available

Viscosity
Not available

Partition Coefficient: n-octanol/water
3 - 6

Density
Typical 0.84 g/cm^3 at 15 °C

Flash Point
Typical 63 °C (ASTM D-93 / PMCC)

Flammability
Combustible

Auto-Ignition Temperature
> 220 °C

Flammable Limits - Lower
1 %(V)

Flammable Limits - Upper
6 %(V)

Kinematic Viscosity
2 - 4.5 mm^2/s at 40 °C

10. STABILITY AND REACTIVITY

Chemical Stability
Stable under normal conditions of storage and handling.

Reactivity and Stability
Reacts with incompatible materials.

Conditions to Avoid
Avoid heat, sparks, open flames and other ignition sources.

Incompatible materials
Strong oxidising agents.

Hazardous Decomposition Products
Under fire conditions this product may emit toxic and/or irritating fumes, smoke and gases including carbon monoxide, carbon dioxide and oxides of nitrogen.

Possibility of hazardous reactions
Not available

Hazardous Polymerization
Not available

11. TOXICOLOGICAL INFORMATION

Toxicology Information
The available toxicity data for material given below.

Acute Toxicity - Oral
LD50:(Rat): >2000 mg/kg

Acute Toxicity - Inhalation
LD50:(Rat): >5 mg/l / 4 h

Acute Toxicity - Dermal
LD50:(Rabbit): >2000 mg/kg

Ingestion
May be fatal if swallowed and enters airways. Small amounts of liquid aspirated into the respiratory system during ingestion or from vomiting may cause severe pulmonary injury that may lead to death. May cause irritation to the mouth, throat, esophagus and stomach with symptoms of nausea, abdominal discomfort, vomiting and diarrhoea.

Inhalation
Inhalation of product vapours may cause irritation of the nose, throat and respiratory system.

Skin
Repeated exposure may cause skin dryness and cracking and may lead to dermatitis.

Eye
May be irritating to eyes. The symptoms may include redness, itching and tearing.

Respiratory sensitisation
Not expected to be a respiratory sensitiser.

Skin Sensitisation
Not expected to be a skin sensitiser.

Germ cell mutagenicity
Not considered to be a mutagenic hazard.

Carcinogenicity
Suspected of causing cancer. Classified as a suspected human carcinogen.

Reproductive Toxicity
Not considered to be toxic to reproduction.

STOT-single exposure
Not expected to cause toxicity to a specific target organ.

STOT-repeated exposure
Not expected to cause toxicity to a specific target organ.

Aspiration Hazard
May be fatal if swallowed and enters airways.

Other Information
Repeated Dose Toxicity: Kidney: Caused kidney effects in male rats which are not considered relevant to humans.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Toxic to aquatic life with long lasting effects.

Persistence and degradability
Major constituents are expected to be inherently biodegradable. The volatile constituents will oxidize rapidly by photochemical reactions in air.

Mobility
Floats on water. Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. Large volumes may penetrate soil and could contaminate groundwater. Contains volatile constituents.

Bioaccumulative Potential
Contains constituents with the potential to bioaccumulate.

Other Adverse Effects
Films formed on water may affect oxygen transfer and damage organisms.

Environmental Protection
Do not discharge this material into waterways, drains and sewers.

Acute Toxicity - Other Organisms
LL/EL/IL50:(Aquatic organisms): 1-10 mg/l

13. DISPOSAL CONSIDERATIONS

Disposal considerations
Dispose of waste according to applicable local and national regulations. Do not allow into drains or watercourses or dispose of where ground or surface waters may be affected. Wastes including emptied containers are controlled wastes and should be disposed of in accordance with all applicable local and national regulations.

14. TRANSPORT INFORMATION

Transport Information
Road and Rail Transport (ADG Code):
Not classified as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. (7th edition)
This product meet the requirement of special provision AU01.

Note: Special Provision AU01:
Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to this Code when transported by road or rail in:
packagings that do not incorporate a receptacle exceeding 500 kg(L); or
IBCs

This product is not classified as Dangerous Goods UN number 1202.

Note: Special Provision AU02:
GAS OIL or DIESEL OIL or HEATING OIL, LIGHT or PETROLEUM DISTILLATE is not subject to this Code if it does not meet the criteria of Chapter 2.3 for assignment to Class 3; i.e. if the flash point is more than 60 oC and the substance is not offered for transport at a temperature above its flash point. Such substances will normally be C1 combustible liquids which are not classified as dangerous goods for transport purposes. However, the presence of a C1 combustible liquid in one or more compartments of a tank vehicle or portable tank transporting other refined petroleum products must be considered when determining the application of UN Number 1270 in accordance with 3.2.5.4 and 5.3.1.3.3.

Marine Transport (IMO/IMDG):
Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.
Class/Division: 9
UN No: 3082
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (CONTAINS: FUEL, DIESEL)(MARINE POLLUTANT)
Packing Group: III
EMS : F-A, S-F
Special Provisions: 274, 335, 969

Air Transport (ICAO/IATA):

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.
Class/Division:
UN No: 3082
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Contains: Fuel, diesel)
Packing Group: III
Packaging Instructions (passenger & cargo): 964
Packaging Instructions (cargo only): 964
Hazard Label: Miscellaneous
Special Provisions: A97, A158, A197

U.N. Number
None Allocated

UN proper shipping name
None Allocated

Transport hazard class(es)
None Allocated

IMDG Marine pollutant
Yes

Transport in Bulk
Not available

Special Precautions for User
Not available

Other Information
This product is classified as Oils under MARPOL Annex I. MARPOL Annex I rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

Regulatory information
Classified as Hazardous according to the Globally Harmonised System of classification and labelling of chemicals (GHS) including Work, Health and Safety regulations, Australia.

SUSMP Schedule: Not scheduled. When packed in containers having capacity of greater than 20 litres.
SUSMP Schedule: S5. When packed in containers having capacity of less than 20 litres.

Poisons Schedule
S5

16. OTHER INFORMATION

Date of preparation or last revision of SDS
SDS Reviewed: July 2016
Supersedes: April 2015

References
- Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice.

- Standard for the Uniform Scheduling of Medicines and Poisons.

- Australian Code for the Transport of Dangerous Goods by Road & Rail.

- Model Work Health and Safety Regulations, Schedule 10: Prohibited carcinogens, restricted carcinogens and restricted hazardous chemicals.

- Workplace exposure standards for airborne contaminants, Safe work Australia.

- American Conference of Industrial Hygienists (ACGIH).

- Globally Harmonised System of classification and labelling of chemicals.

END OF SDS

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SAFETY DATA SHEET

SDS ID NO.: 0127MAR019
Revision Date 03/19/2018

1. IDENTIFICATION

Product Name: Marathon Petroleum Gasoline - All Grades

Synonym: Gasoline; Regular Unleaded Gasoline; Conventional Regular Unleaded Gasoline; Mid Grade Unleaded Gasoline; Conventional Mid Grade Unleaded Gasoline; Premium Unleaded Gasoline; Conventional Premium Unleaded Gasoline; Sub-Octane Gasoline; Regular RBOB; Super RBOB; Premium RBOB; RBOB; Reformulated Blend Stock For Oxygenated Blending; 84 Octane Gasoline; CBOB; Premium CBOB; Conventional Blend Stock for Oxygenate Blending; Recreational Gasoline; Recreational Gasoline; Recreational Unleaded Gasoline; 89 Recreational Gasoline; Brand 89 Recreational Gasoline; 7.0 Max RVP 89 Recreational Gasoline; BR 7.0 Max RVP 89 Recreational Gasoline; 90 Recreational Gasoline; 90 Marina Gasoline; Brand EX 90 UL Recrtnl Gasoline; Brand 91 Recreational Gasoline; 91 Recreational Gasoline; 91 Marina Gasoline; 90 Octane Midgrade Gasoline with No Ethanol; 7.8# New York CBOB Gasoline Blend Grade; Non-Summer New York CBOB Gasoline Blend Grade 0125MAR019; 0126MAR019; 0134MAR019; 0313MAR019; 0314MAR019

Product Code: 0127MAR019
Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:

MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information (M-F, 8-5 EST): 1-419-421-3070

Emergency Telephone (24/7): CHEMTREC: 1-800-424-9300 CCN#: 13740

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Skin corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 1
Aspiration toxicity	Category 1

Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)
Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode
May be fatal if swallowed and enters airways
Causes skin irritation
May cause respiratory irritation
May cause drowsiness or dizziness
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
Causes damage to organs (blood, blood-forming organs, immune system) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Appearance Clear yellow liquid **Physical State** Liquid **Odor** Hydrocarbon

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools.
Take action to prevent static discharges
Do not eat, drink or smoke when using this product
Do not breathe mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Wash hands and any possibly exposed skin thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response
IF exposed, concerned or you feel unwell: Get medical attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction
Collect spillage

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having molecular chains ranging in length from four to ten carbons. May contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Composition Information:

Name	CAS Number	% Concentration
Gasoline	86290-81-5	100
Heptane (mixed isomers)	142-82-5	2.5-26
Butane (mixed isomers)	106-97-8	0.5-19
Pentane (mixed isomers)	78-78-4	6.5-19
Hexane Isomers (other than n-Hexane)	107-83-5	2-12
Toluene	108-88-3	3-9.5
Xylene (mixed isomers)	1330-20-7	3.5-9.5
Benzene	71-43-2	0.1-4.9
n-Hexane	110-54-3	0.1-4.5
Cumene	98-82-8	0-4
1,2,4 Trimethylbenzene	95-63-6	1-4
Ethylbenzene	100-41-4	0.5-2.5
Cyclohexane	110-82-7	0-1.5
Octane	111-65-9	0-1.5
1,2,3-Trimethylbenzene	526-73-8	0-1
Naphthalene	91-20-3	0.1-0.5

Benzene concentration is percent by volume. All other concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. If symptoms occur get medical attention.

Skin Contact: Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while

flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Prolonged or repeated exposure may cause adverse effects on blood, blood-forming organs, and immune system. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Indication of any immediate medical attention and special treatment needed

Notes To Physician: INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media
Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical
This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.

Hazardous combustion products
Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data
Sensitivity to Mechanical Impact No.
Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters

Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Additional firefighting tactics
FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles: if this is impossible, withdraw from area and let fire burn.

EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA	Health 1	Flammability 3	Instability 0	Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.
Protective equipment:	Use personal protection measures as recommended in Section 8.
Emergency procedures:	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions:	Avoid release to the environment. Avoid subsoil penetration. Ethanol in gasoline phase seperates in contact with water. Monitor downstream for dissolved ethanol or other appropriate indicators.
Methods and materials for containment:	Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
Methods and materials for cleaning up:	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions:

NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid contact with skin, eyes and clothing. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the

presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions: Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible Materials Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELS:	OSHA - Vacated PELs	NIOSH IDLH
Gasoline 86290-81-5	300 ppm TWA 500 ppm STEL	-	300 ppm TWA 900 mg/m^3 TWA 500 ppm STEL 1500 mg/m^3 STEL	-
Heptane (mixed isomers) 142-82-5	400 ppm TWA 500 ppm STEL	TWA: 500 ppm TWA: 2000 mg/m^3	400 ppm TWA 1600 mg/m^3 TWA 500 ppm STEL 2000 mg/m^3 STEL	750 ppm
Butane (mixed isomers) 106-97-8	1000 ppm STEL	-	800 ppm TWA 1900 mg/m^3 TWA	-
Pentane (mixed isomers) 78-78-4	1000 ppm TWA	-	-	-
Hexane Isomers (other than n-Hexane) 107-83-5	500 ppm TWA 1000 ppm STEL	-	500 ppm TWA 1800 mg/m^3 TWA 1000 ppm STEL 3600 mg/m^3 STEL	-
Toluene 108-88-3	20 ppm TWA	TWA: 200 ppm Ceiling: 300 ppm	100 ppm TWA 375 mg/m^3 TWA 150 ppm STEL 560 mg/m^3 STEL	500 ppm
Xylene (mixed isomers) 1330-20-7	100 ppm TWA 150 ppm STEL	TWA: 100 ppm TWA: 435 mg/m^3	100 ppm TWA 435 mg/m^3 TWA 150 ppm STEL 655 mg/m^3 STEL	900 ppm
Benzene	0.5 ppm TWA	TWA: 10 ppm (applies to	25 ppm Ceiling	500 ppm

71-43-2	2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route	industry segments exempt from the benzene standard) TWA: 1 ppm STEL: 5 ppm (see 29 CFR 1910.1028)	1 ppm TWA 5 ppm STEL	
n-Hexane 110-54-3	50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 500 ppm TWA: 1800 mg/m^3	50 ppm TWA 180 mg/m^3 TWA	1100 ppm
Cumene 98-82-8	50 ppm TWA	TWA: 50 ppm TWA: 245 mg/m^3 Skin	50 ppm TWA 245 mg/m^3 TWA Limit applies to skin	900 ppm
1,2,4 Trimethylbenzene 95-63-6	25 ppm TWA	-	25 ppm TWA 125 mg/m^3 TWA	-
Ethylbenzene 100-41-4	20 ppm TWA	TWA: 100 ppm TWA: 435 mg/m^3	100 ppm TWA 435 mg/m^3 TWA 125 ppm STEL 545 mg/m^3 STEL	800 ppm
Cyclohexane 110-82-7	100 ppm TWA	TWA: 300 ppm TWA: 1050 mg/m^3	300 ppm TWA 1050 mg/m^3 TWA	1300 ppm
Octane 111-65-9	300 ppm TWA	TWA: 500 ppm TWA: 2350 mg/m^3	300 ppm TWA 1450 mg/m^3 TWA 375 ppm STEL 1800 mg/m^3 STEL	1000 ppm
1,2,3-Trimethylbenzene 526-73-8	25 ppm TWA	-	25 ppm TWA 125 mg/m^3 TWA	-
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m^3	10 ppm TWA 50 mg/m^3 TWA 15 ppm STEL 75 mg/m^3 STEL	250 ppm

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection: Use goggles or face-shield if the potential for splashing exists.

Skin and body protection: Use nitrile rubber, Viton® or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.

Respiratory protection: Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State Liquid
Appearance Clear yellow liquid

Color	Yellow
Odor	Hydrocarbon
Odor Threshold	No data available.

Property	**Values (Method)**
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	24-210 °C / 75-410 °F (ASTM D86)
Flash Point	-43 °C / -45 °F
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	7.6
Lower Flammability Limit:	1.4
Explosion limits:	No data available.
Vapor Pressure	5.5-15 psi (ASTM D4814)
Vapor Density	3-4
Specific Gravity / Relative Density	0.70-0.76
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	2.13-4.5
Decomposition temperature	No data available.
pH:	Not applicable
Autoignition Temperature	280 °C / 536 °F
Kinematic Viscosity	No data available.
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	100%
Density	No data available.
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

Reactivity	The product is non-reactive under normal conditions.
Chemical stability	The material is stable at 70°F (21°C), 760 mmHg pressure.
Possibility of hazardous reactions	None under normal processing.
Hazardous polymerization	Will not occur.
Conditions to avoid	Excessive heat, sources of ignition, open flame.
Incompatible Materials	Strong oxidizing agents.
Hazardous decomposition products	None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.
Eye contact	Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.
Skin contact	Irritating to skin. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.

Ingestion May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
Gasoline 86290-81-5	14000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h
Heptane (mixed isomers) 142-82-5	-	3000 mg/kg (Rabbit)	103 g/m^3 (Rat) 4 h
Butane (mixed isomers) 106-97-8	-	-	658 mg/L (Rat) 4 h
Pentane (mixed isomers) 78-78-4	-	-	450 mg/L (Mouse) 2 h
Hexane Isomers (other than n-Hexane) 107-83-5	> 5000 mg/kg (Rat)	-	-
Toluene 108-88-3	> 2000 mg/kg (Rat)	8390 mg/kg (Rabbit)	12.5 mg/L (Rat) 4 h
Xylene (mixed isomers) 1330-20-7	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.04 mg/L (Rat) 4 h
Benzene 71-43-2	> 2000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 20 mg/l (Rat) 4 h
n-Hexane 110-54-3	15000 mg/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h
Cumene 98-82-8	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 20 mg/L (Rat) 6 h
1,2,4 Trimethylbenzene 95-63-6	3280 mg/kg (Rat)	> 3160 mg/kg (Rabbit)	18,000 mg/m^3 (Rat) 4 h
Ethylbenzene 100-41-4	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h
Cyclohexane 110-82-7	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	13.9 mg/L (Rat) 4 h
Octane 111-65-9	-	-	118 g/m^3 (Rat) 4 h
1,2,3-Trimethylbenzene 526-73-8	-	-	-
Naphthalene 91-20-3	490 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 340 mg/m^3 (Rat) 1 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats.

Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

BUTANES: Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure with evidence of maternal toxicity. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

BENZENE: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a case control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included an increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene

suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC. The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

CUMENE: Overexposure to cumene may cause upper respiratory tract irritation and CNS depression. Studies in laboratory animals indicate evidence of respiratory tract hyperplasia, and adverse effects on the liver, kidney and adrenal glands following high level exposure. The relevance of these findings to humans is not clear at this time. Findings from lifetime laboratory rodent inhalation studies were as follows: In F344/N rats: an increased incidence of renal carcinomas and adenomas, respiratory epithelial adenomas, and interstitial cell adenomas of the testes. In B6C3F1 mice: an increased incidence of carcinomas and adenomas of the bronchi and lung, liver neoplasms, hemangiosarcomas of the spleen, and adenomas of the thyroid.

1,2,4-TRIMETHYLBENZENE: The following information pertains to a mixture of C9 aromatic hydrocarbons, over 40% of which was composed of 1,2,4-trimethylbenzene. A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm. Embryotoxicity has been reported in studies of laboratory animals. Adverse effects included increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate.<n><n>

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure with evidence of maternal toxicity. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss)

following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of conciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

WHOLLY-VAPORIZED UNLEADED GASOLINE: Lifetime exposure to wholly vaporized unleaded gasoline produced an increased incidence of liver tumors in female mice exposed to the highest exposure concentration (2056 ppm) and α-2 urinary globulin-mediated kidney tumors in male rats. No exposure-related tumors were observed in male mice or female rats. The male-specific rat kidney tumors are not considered relevant to human health. Mice receiving lifetime repeated skin application of various petroleum naphthas exhibited an irritation-dependent increased incidence of skin tumors. Additional studies suggest that these tumors occur through a mechanism that may not be relevant to human health. Epidemiological data from over 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer resulting from gasoline exposure. Unleaded gasoline has been identified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs. Gasoline exhaust has been classified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms

Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Prolonged or repeated exposure may cause damage to organs. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects May cause genetic defects.

Carcinogenicity May cause cancer.

Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Heptane (mixed isomers) 142-82-5	Not Listed	Not Listed	Not Listed	Not Listed
Butane (mixed isomers) 106-97-8	Not Listed	Not Listed	Not Listed	Not Listed
Pentane (mixed isomers) 78-78-4	Not Listed	Not Listed	Not Listed	Not Listed
Hexane Isomers (other than n-Hexane) 107-83-5	Not Listed	Not Listed	Not Listed	Not Listed
Toluene 108-88-3	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
Xylene (mixed isomers) 1330-20-7	Not classifiable (A4)	Not classifiable (3)	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen
n-Hexane 110-54-3	Not Listed	Not Listed	Not Listed	Not Listed
Cumene 98-82-8	Not listed	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not listed
1,2,4 Trimethylbenzene 95-63-6	Not Listed	Not Listed	Not Listed	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Cyclohexane 110-82-7	Not Listed	Not Listed	Not Listed	Not Listed
Octane 111-65-9	Not Listed	Not Listed	Not Listed	Not Listed
1,2,3-Trimethylbenzene 526-73-8	Not Listed	Not Listed	Not Listed	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Blood. Blood-forming organs. Immune system.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Gasoline 86290-81-5	72-hr EC50 = 56 mg/l Algae	96-hr LC50 = 11 mg/l Rainbow trout (static)	-	48-hr LC50 = 7.6 mg/l Daphnia magna
Heptane (mixed isomers)	-	96-hr LC50 = 375 mg/L	-	-

142-82-5		Tilapia		
Butane (mixed isomers) 106-97-8	-	-	-	-
Pentane (mixed isomers) 78-78-4	-	96-hr LC50 = 3.1 mg/L Rainbow trout	-	48-hr EC50 = >1 - <10 mg/L Daphnia magna
Hexane Isomers (other than n-Hexane) 107-83-5	-	-	-	-
Toluene 108-88-3	72-hr EC50 = 12.5 mg/l Algae	96-hr LC50 <= 10 mg/l Rainbow trout	-	48-hr EC50 = 5.46-9.83 mg/l Daphnia magna 48-hr EC50 = 11.5 mg/l Daphnia magna (Static)
Xylene (mixed isomers) 1330-20-7	72-hr EC50 = 11 mg/l Algae	96-hr LC50 = 8 mg/l Rainbow trout	-	48-hr LC50 = 3.82 mg/l Daphnia magna
Benzene 71-43-2	72-hr EC50 = 29 mg/l Algae	96-hr LC50 = 5.3 mg/l Rainbow trout (flow-through)	-	48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)
n-Hexane 110-54-3	-	96-hr LC50 = 2.5 mg/l Fathead minnow	-	-
Cumene 98-82-8	72-hr EC50 = 2.6 mg/l Algae	96-hr LC50 = 6.04-6.61 mg/l Fathead minnow (Flow-through) 96-hr LC50 = 2.7 mg/l Rainbow trout (semi-static)	-	48-hr EC50 = 7.9-14.1 mg/l Daphnia magna (static)
1,2,4 Trimethylbenzene 95-63-6	-	96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)	-	48-hr EC50 = 6.14 mg/L Daphnia magna
Ethylbenzene 100-41-4	72-hr EC50 = 1.7-7.6 mg/l Algae	96-hr LC50 = 4 mg/L Rainbow trout	-	48-hr EC50 = 1-4 mg/L Daphnia magna
Cyclohexane 110-82-7	72-hr EC50 = 500 mg/l Algae	96-hr LC50 = 3.96-5.18 mg/l Fathead minnow	-	48-hr EC50 = 1.7-3.5 mg/L Bay shrimp
Octane 111-65-9	-	-	-	48-hr LC50 = 0.38 mg/l Daphnia magna
1,2,3-Trimethylbenzene 526-73-8	-	96-hr LC50 = 7.72 mg/l Fathead Minnow (flow-through)	-	-
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/l Daphnia magna

Persistence and degradability Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Class:	3
Packing Group:	II

TDG (Canada):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Gasoline	NA
Heptane (mixed isomers)	NA
Butane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	NA
Xylene (mixed isomers)	NA
Benzene	NA
n-Hexane	NA
Cumene	NA
1,2,4 Trimethylbenzene	NA
Ethylbenzene	NA
Cyclohexane	NA
Octane	NA
1,2,3-Trimethylbenzene	NA
Naphthalene	NA

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Gasoline	NA
Heptane (mixed isomers)	NA
Butane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA

Toluene	1000 lb final RQ 454 kg final RQ
Xylene (mixed isomers)	100
Benzene	10
n-Hexane	5000
Cumene	5000
1,2,4 Trimethylbenzene	NA
Ethylbenzene	1000
Cyclohexane	1000
Octane	NA
1,2,3-Trimethylbenzene	NA
Naphthalene	100 lb final RQ 45.4 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Gasoline	None
Heptane (mixed isomers)	None
Butane (mixed isomers)	None
Pentane (mixed isomers)	None
Hexane Isomers (other than n-Hexane)	None
Toluene	1.0 % de minimis concentration
Xylene (mixed isomers)	1.0 % de minimis concentration
Benzene	0.1 % de minimis concentration
n-Hexane	1.0 % de minimis concentration
Cumene	1.0 % de minimis concentration
1,2,4 Trimethylbenzene	1.0 % de minimis concentration
Ethylbenzene	0.1 % de minimis concentration
Cyclohexane	1.0 % de minimis concentration
Octane	None
1,2,3-Trimethylbenzene	None
Naphthalene	0.1 % de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Gasoline

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0957
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree
New Jersey - Environmental Hazardous	SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental

Substances List:	hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Heptane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1339
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Butane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0273
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 0273 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Pentane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1064
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 1064 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 -	Not Listed

List of Hazardous Substances:

Hexane Isomers (other than n-Hexane)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1285
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Toluene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Developmental toxicity, initial date 1/1/91 Female reproductive toxicity, initial date 8/7/09
New Jersey Right-To-Know:	SN 1866
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree; Teratogen
New Jersey - Environmental Hazardous Substances List:	SN 1866 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Xylene (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 2014
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold all isomers
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 2014 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Benzene

Louisiana Right-To-Know:	Not Listed

California Proposition 65:	Carcinogen, initial date 2/27/87 Developmental toxicity, initial date 12/26/97 Male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know:	SN 0197
Pennsylvania Right-To-Know:	Environmental hazard; Special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Carcinogen; Extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Present
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree; Mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	10 lb RQ (air); 1 lb RQ (land/water)

n-Hexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1340
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1340 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1 lb RQ (air); 1 lb RQ (land/water)

Cumene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/6/10
New Jersey Right-To-Know:	SN 0542
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0542 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	5000 lb RQ (air); 1 lb RQ (land/water)

1,2,4 Trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929

Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Ethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 6/11/04
New Jersey Right-To-Know:	SN 0851
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; flammable - Third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Cyclohexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0565
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0565 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Octane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1434
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable

Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

1,2,3-Trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	SN 1322 SN 3758
Pennsylvania Right-To-Know:	Environmental hazard Present (particulate)
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 1 lb RQ (land/water)

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Gasoline	B2,D2A,D2B	0.1%
Heptane (mixed isomers)	B2,D2B	1%

Butane (mixed isomers)	A,B1	1%
Pentane (mixed isomers)	B2	1%
Hexane Isomers (other than n-Hexane)	B2	1%
Toluene	B2,D2A,D2B	0.1%
Xylene (mixed isomers)	B2,D2A,D2B	m-, o-isomers 1.0%; p-isomer 0.1%
Benzene	B2,D2A,D2B	0.1%
n-Hexane	B2,D2A,D2B	1%
Cumene	B2,D2A	0.1%
1,2,4 Trimethylbenzene	B3,D2B	1%
Ethylbenzene	B2,D2A,D2B	0.1%
Cyclohexane	B2,D2B	1%
Octane	B2,D2B	1%
1,2,3-Trimethylbenzene	B3	1%
Naphthalene	B4,D2A	0.1%

Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Notes

Revision Date 03/19/2018
Previous Publish Date 11/06/2017
Revised Sections The following sections (§) have been updated:
2. HAZARD IDENTIFICATION
3. COMPOSITION/INFORMATION ON INGREDIENTS
4. FIRST AID MEASURES
11. TOXICOLOGICAL INFORMATION

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200)

SECTION 1: Identification

Product Identifier: **John Deere Hy-Gard and Hy-Gard LV Transmission and Hydraulic Fluid**

Other means of identification: John Deere Hy-Gard Transmission and Hydraulic Fluid
John Deere Hy-Gard LV Transmission and Hydraulic Fluid

SDS Number: **775485**

Relevant identified uses: Tractor Hydraulic Fluid

Uses Advised Against: All others

24 Hour Emergency Phone Number: CHEMTREC 800-424-9300 (24 Hours)
CANUTEC 613-996-6666
CHEMTREC Mexico 01-800-681-9531

Manufacturer/Supplier:
Phillips 66 Lubricants
P.O. Box 4428
Houston, TX 77210

SDS Information:
Phone: 800-762-0942
Email: SDS@P66.com
URL: www.Phillips66.com

Customer Service:
U.S.: 800-368-7128 or International: 1-832-765-2500
Technical Information: 1-877-445-9198

SECTION 2: Hazard identification

Classified Hazards
This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Other Hazards
None Known

Label Elements

No classified hazards

SECTION 3: Composition/information on ingredients

Chemical Name	CASRN	Concentration[1]
Distillates, petroleum, hydrotreated heavy paraffinic	64742-54-7	<90
Non-Hazardous Materials	VARIOUS	<15

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician. (see Note to Physician)

Inhalation (Breathing): First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea. Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

SECTION 5: Firefighting measures

NFPA 704 Hazard Class

Health: 0 **Flammability:** 1 **Instability:** 0

0 (Minimal)
1 (Slight)
2 (Moderate)
3 (Serious)
4 (Severe)

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for firefighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

SECTION 7: Handling and storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure controls/personal protection

Chemical Name	ACGIH	OSHA	Other
Distillates, petroleum, hydrotreated heavy paraffinic	TWA: 5mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	TWA: 5mg/m^3 as Oil Mist, if Generated	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance: Amber, Transparent
Physical Form: Liquid
Odor: Petroleum
Odor Threshold: No data
pH: Not applicable
Vapor Density (air=1): >1
Upper Explosive Limits (vol % in air): No data
Lower Explosive Limits (vol % in air): No data
Evaporation Rate (nBuAc=1): No data
Particle Size: Not applicable
Percent Volatile: Negligible
Flammability (solid, gas): Not applicable
Solubility in Water: Negligible

Flash Point: > 356 °F / > 180 °C
Test Method: Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Initial Boiling Point/Range: No data
Vapor Pressure: <1 mm Hg
Partition Coefficient (n-octanol/water) (Kow): No data
Melting/Freezing Point: No data
Auto-ignition Temperature: No data
Decomposition Temperature: No data
Specific Gravity (water=1): 0.863 - 0.878 @ 60ºF (15.6ºC)
Bulk Density: 7.23 - 7.31 lbs/gal
Viscosity: 7.3 - 9.3 cSt @ 100°C; 34 - 43 cSt @ 40°C
Pour Point: -49 to -33 °F / -45 to -36 °C

SECTION 10: Stability and reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of hazardous reactions: Hazardous reactions not anticipated.

Conditions to avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous decomposition products: Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

Information on Toxicological Effects of Substance/Mixture

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Specific Target Organ Toxicity (Repeated Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Distillates, petroleum, hydrotreated heavy paraffinic

Carcinogenicity: This oil has been highly refined by a variety of processes to reduce aromatics and improve performance characteristics. It meets the IP-346 criteria of less than 3 percent PAH's and is not considered a carcinogen by the International Agency for Research on Cancer.

SECTION 12: Ecological information

GHS Classification:
No classified hazards

Toxicity: All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

Other adverse effects: None anticipated.

SECTION 13: Disposal considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

SECTION 14: Transport information

U.S. Department of Transportation (DOT)

Shipping Description:	*Not regulated*
Note:	*If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)*

International Maritime Dangerous Goods (IMDG)

Shipping Description:	*Not regulated*
Note:	*U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25.*

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:
Not applicable

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)
UN/ID #: *Not regulated*
Note: *U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 24.*

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	---	---	---
Max. Net Qty. Per Package:	---	---	---

SECTION 15: Regulatory information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)
Acute Health Hazard: No
Chronic Health Hazard: No
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Chemical Name	Concentration[1]	de minimis
Zinc Compound(s)	<1.5	1.0%

EPA (CERCLA) Reportable Quantity (in pounds):
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65:
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations.

WHMIS Hazard Class:
none

National Chemical Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA.
All components are either on the DSL, or are exempt from DSL listing requirements.

U.S. Export Control Classification Number: EAR99

SECTION 16: Other information

Date of Issue:	Previous Issue Date:	SDS Number:	Status:
05-Nov-2014	22-Mar-2013	775485	FINAL

Revised Sections or Basis for Revision:
Composition (Section 3); Personal Protective Equipment (Section 8); Physical Properties (Section 9); Toxicological (Section 11)

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Safety Data Sheet

Section 1 – Chemical Products and Company Identification

Product Names: BioSolve® Pinkwater®

Product Uses: Remediation of hydrocarbon (oil, fuel, petrochemical) contamination, including: impacted soils, suppression of VOCs, surface cleaning of equipment and protective clothing.

Manufacturer:
The BioSolve Company
329 Massachusetts Avenue
Lexington, MA 02420 USA

Contact Information:

+1 (800) 225-3909	US, Canada, Mexico and Puerto Rico
+1 (781) 482-7900	All other locations

Section 2 – Hazards Identification

Health Hazards:

Eye Contact:	Causes transient eye irritation
Skin Contact:	May cause mild, transient irritation
Ingestion:	May be harmful if swallowed; can cause gastrointestinal irritation, nausea, vomiting and/or diarrhea

Hazard Mitigation: Wear protective gloves and eye/face protection
Avoid prolonged breathing of spray

Environmental Hazards: Moderately toxic to aquatic life. Avoid discharge to storm drains and waterways

GHS Classification: Toxic to aquatic life, Acute Category 2

Section 3 – Composition/Information on Ingredients

Proprietary formulation with nonionic surfactants (32% active ingredients in water)

BioSolve products contain no caustic, d-limonene or hydrocarbon solvents.

BioSolve products do not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California Prop 65. All ingredients are TSCA compliant.

Section 4 – First Aid Measures

Eyes: Immediately flush eyes with water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Seek medical attention for lasting irritation.

Skin: Rinse exposed area and wash with mild soap and water for several minutes. Seek medical attention if irritation develops.

Ingestion: Seek medical attention in the event of serious or persistent abdominal discomfort, nausea or diarrhea.

Inhalation: Inhalation of concentrated vapors resulting from spraying or heating in confined or poorly ventilated areas may cause irritation of nose and throat. Remove person to fresh air and seek medical attention if irritation persists.

Section 5 – Fire Fighting Measures

Suitable Extinguishing Media: None required; BioSolve products are non-flammable

Special Protective Equipment for Firefighters: None necessary

Unusual Fire or Explosive Hazards: None

Section 6 – Accidental Release Measures

In case of accidental release, breakage or leakage: Eliminate or contain source with inert material, such as sand, earth, absorbent pads, etc. Transfer liquid to suitable containers for recovery, re-use or disposal. Wipe up or mop up using water. Hard surfaces (e.g., floors, driveways) may be slippery; use care to avoid falling.

Rinse area with water. Avoid flow of run-off to surface waters. Always check with local regulations before discharging effluent to storm drains or sewers.

Section 7 – Handling and Storage

Handling: Minimize periods of exposure to extreme temperatures. Keep from freezing. If frozen, separation may occur; thaw and stir thoroughly prior to use. Freezing will not affect product performance.

Precautions: Chemical resistant gloves and eye protection are recommended while mixing and using.

Incompatibilities: Avoid contact with strong acids or strong oxidants.

Storage: Recommended storage temperature: 35^{o} – 120^{o} F (1^{o} – 48^{o} C).

Shelf Life: If unopened, more than 10 years.

Section 8 – Exposure Controls / Personal Protection

Eyes Protection: Safety glasses; chemical goggles or face shield recommended when spraying to protect against backsplash and drift.

Skin Protection: Rubber or latex gloves recommended.

Respiratory Protection: None required, except if application results in significant misting of product. If so, use of an approved air purifying respirator is recommended.

Engineering Controls: For indoor use or for use in a confined space, normal ventilation is generally satisfactory.

Section 9 – Physical and Chemical Properties

Appearance: Deep red

Odor: Mild, pleasant sassafras fragrance

Concentration: ~32% active ingredients as sold

Boiling Point	265°F/129°C	**Vapor Pressure mm/Hg**	Not available
Melting/Freezing Point	28°F/-2°C	**Vapor Density (Air=1)**	Not available
Flash Point	Non-flammable	**Surface Tension***	29 Dyne/cm @25°C
Flammability Limits	Not applicable	**Viscosity (concentrate)**	490 centipoise
Reactivity with Water	None	**Viscosity (6% solution)**	1.5 centipoise
Evaporation Rate	Not determined	**Solubility in Water**	100%
Specific Gravity	1.01 gms/cc	**VOC Content**	Not determined
	8.43 lbs/U.S. gal	**pH**	9.1 +/- 0.3

*6% solution

Section 10 – Stability and Reactivity

Chemical Stability: Stable; will not decompose if used according to manufacturer's directions.

Conditions to Avoid: Prolonged exposure to heat may cause product degradation. Freezing should also be avoided as discussed in Section 7.

Incompatible Materials: Normally unreactive. Avoid strong alkalis, strong acids, strong oxidizing agents and materials with reactive hydroxyl compounds. These materials could damage the product and reduce its effectiveness during application.

Hazardous Decomposition Products: None are known.

Hazardous Polymerization: Will not occur.

Section 11 – Toxicological Information

Overview: No adverse acute or chronic health effects expected if product used in accordance with manufacturer's directions.

Carcinogenicity: No ingredient has been shown to cause cancer in laboratory animals.

Specific Organ Toxicity: None are known.

Section 12 – Ecological Considerations

Persistence and Degradability: The total of the organic components contained in this product is not classified as readily biodegradable (OECD-301 A-F). However, this product is inherently biodegradable with 60% degradation in 28 days (OECD-301B) and estimated >95% degradation in 120 days.

Bioaccumulation Potential: The bioaccumulation factor in fish has been estimated to be low, ranging from 87 to 344.

Mobility: No data available

Aquatic Toxicity:

LC_{50} of Concentrate (As shipped)		
Mysidopsis bahia	48-hours	3.6 mg/L
Menidia beryllina	96-hours	6.4 mg/L
LC50 of 3% Dilute Solution (As Used)		
Mysidopsis bahia	48-hours	185 mg/L
Menidia beryllina	96-hours	247 mg/L
LC50 of 6% Dilute Solution (As Used)		
Daphnia magna	48-hours	287 mg/L
Pimephales promelas	96-hours	124 mg/L
Onchorhynchus mykiss	96-hours	177 mg/L

Section 13 - Disposal

DO NOT DUMP INTO STORM DRAINS OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. As manufactured, BioSolve products do not meet the definition of a hazardous waste. Small quantities of unused and uncontaminated product may be discharged to a qualified wastewater treatment facility. Always obtain approval from local and Federal regulatory agencies prior to discarding this product into public sewers.

As your supplier, we have no control over your handling and use of this product. However, the intended use of this product as a remediation and/or surface washing agent may produce wastewater containing emulsified or dispersed hydrocarbons that may be classified as a hazardous waste and should be treated and disposed of accordingly.

Section 14 – Transportation Information

USDOT Freight Class 55 (Liquid Cleaning Compound, Non-Hazardous)
This product is not regulated by USDOT or Canadian TDG when shipped domestically by land.

North American Industry Classification System (NAICS) # 325613

U.S. ITC, Harmonized Tariff Schedule B Classification: 3402.90.30.00

Section 15 – Regulatory Information

This product is considered non-hazardous as defined by CERCLA, according to OSHA, Massachusetts Right to Know Law and California Prop 65.

Toxic Substances Control Act:	All components of this product are on the TSCA inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.
CEPA – Domestic Substances List:	All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or not required to be listed.
Canadian CPR Compliance:	This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR
WHMIS Classification:	D2B Eye or skin irritant

Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with Federal, state or provincial and local laws.

Section 16 – Other Information

HMIS Rating	Health Hazard:	1 (Eye/Skin Irritant)
	Fire Hazard:	0
	Reactivity:	0
	Personal Protective Equipment:	Rubber gloves, safety glasses or face shield
NFPA Rating	Health:	1 (Eye/Skin Irritant)
	Flammability:	0
	Reactivity:	0
	Other Hazard:	None

BioSolve Pinkwater is on the US Environmental Protection Agency's NCP Product Schedule. This listing does NOT mean that EPA approves, recommends, licenses, certifies or authorizes the use of BioSolve Pinkwater on an oil discharge. This listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, 40 CFR Section 300.915.

SDS Effective Date: May 12, 2016

The information contained herein is accurate to the best of our knowledge. The BioSolve Company makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or application or in combination with other substances.

For more information, visit: www.biosolve.com

SAFETY DATA SHEET

LONG DURATION FOAM AC-645

Section 1. Identification

GHS product identifier : LONG DURATION FOAM AC-645

Chemical name : Proprietary Surfactant.

Other means of identification : Aqueous anionic surfactant mixture.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Aqueous Surfactant. Spray application for VOC and Odor control.

Area of application : Industrial applications.

Supplier/Manufacturer : Rusmar, Inc.
216 Garfield Avenue
West Chester, PA 19380
Phone: 610-436-4314
Fax: 610-436-8436

e-mail address of person responsible for this SDS : info@rusmarinc.com
Website: www.rusmarinc.com

Emergency telephone number (with hours of operation) : 888 488 8044 or 212 682 1200
CHEMTREC 800 424 9300

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Proprietary Surfactant.

Other means of identification : Aqueous anionic surfactant mixture.

CAS number/other identifiers

CAS number : Not available.

Product code : Not available.

Ingredient name	Other names	%	CAS number
Proprietary Surfactant.	-	100	-

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Clear viscous liquid.]

Color : Translucent. White.

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Melting point : Not available.

Boiling point : 99°C (210.2°F)

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 3.3 kPa (25 mm Hg) [room temperature]

Vapor density : Not available.

Relative density : 1.01 to 1.06

Solubility : Easily soluble in the following materials: cold water and hot water.

Solubility in water : Easily soluble.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : Keep away from heat.

Incompatible materials : No specific data.

Hazardous decomposition products : Low levels of sulfur oxides on exposure to high temperatures (concentrate).

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Conclusion/Summary : Not expected.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Section 11. Toxicological information

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

United States

Section 12. Ecological information

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: Not determined.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

No products were found.

SARA 313

Not applicable.

State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is not listed.

Pennsylvania : This material is not listed.

California Prop. 65

None of the components are listed.

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

United States

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of issue/Date of revision : 05/28/2015

Date of previous issue : No previous validation

Version : 1

Prepared by : IHS

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Section 16. Other information

References : HCS (U.S.A.)- Hazard Communication Standard
International transport regulations

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

2440 Dayton Xenia Rd, Suite D
Beavercreek, OH 45434
888-431-0218
www.mintekresources.com

Safety Data Sheet (SDS)

OSHA Hazard Communication Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

Section 1. Identification

Product Name	Distributor	Telephone
Calciment®	Mintek Resources, Inc.	937-431-0218 Office
	PO Box 340187	937-431-1305 Fax
	Beavercreek, OH 45434	800-255-3924 ChemTel Inc. (MIS8507735)

Chemical Name
Calcium Oxide, Calcium Carbonate, Calcium Hydroxide

Uses
Soil Stabilization, De-Watering, Solidification, Fixation, Neutralization, Desulphurization, Agriculture, Cement

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS03 Exclamation Mark

GHS05 Corrosion

Signal word Danger

Hazard-determining components of labeling
Calcium Oxide, Calcium Carbonate, Calcium Hydroxide

Hazard Statements
H303 May be harmful if swallowed
H315 Causes skin irritation
H319 Causes serious eye irritation
H335 May cause respiratory irritation

Precautionary statements
P101 If medical advice is needed, have product container or label at hand

P102	Keep out of reach of children
P280	Wear protective gloves, clothing, eye protection
P281	Use personal protective equipment as required
P284	Wear respiratory protection

Section 3. Composition				
Component	**Formula**	**% Wt.**	**CAS No.**	**PEL**
Calcium Carbonate	$CaCO_3$	0-30	1317-65-3	10 mg/m^3
Calcium Oxide	CaO	20-80	1305-78-8	2 mg/m^3
Calcium Hydroxide	$Ca(OH)_2$	0-10	1305-62-0	5 mg/m^3
Calcium Magnesium Carbonate	$CaMg(CO_3)_2$	0-30	16389-88-1	10 mg/m^3
Crystalline Silica Quartz	SiO_2	0-10	14808-60-7	0.1 mg/m^3 respirable
Aluminum Oxide	Al_2O_3	0-15	1344-28-1	10 mg/m^3
Ferric Oxide	Fe_2O_3	0-5	1309-37-1	15 mg/m^3
Magnesium Oxide	MgO	0-60	1309-48-4	5 mg/m^3
Sulfur	SO_3	0-10	7704-34-9	10 mg/m^3

SECTION 4. First-Aid Measures

Effects:

Inhalation: **Acute:** Irritation, sore throat, cough, sneezing. **Chronic:** Persistent coughing and breathing problems. Long-term exposure to silica can cause a chronic lung disorder, silicosis.

Eyes: **Acute:** Severe irritation, intense tearing, burns. **Chronic:** Possible blindness when exposure is prolonged.

Skin: **Acute:** Removes natural skin oils, blotches, itching and superficial burns in case of sweating. **Chronic:** No known effects.

Ingestion: **Acute:** Sore throat, stomach aches, cramps, diarrhea, vomiting. **Chronic:** No known effects.

Treatments:

Inhalation: Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration.

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes. Pull back the eyelid to make sure all the lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.

Skin: Flush exposed area with large amounts of water. Seek medical attention immediately.

Ingestion: Give large quantities of water or fruit juice. Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth if victim is rapidly losing consciousness or is unconscious or convulsing.

SECTION 5. Fire-Fighting Measures

Flash Point: Non-flammable

Autoignition Temperature: Non-flammable

Inflammability Limits: None, Non combustible solid, but will support combustion by liberation of oxygen

Explosion Risk: None by itself, but heat produced by reaction with strong acids can generate steam and pressure

Hazardous Combustion Products: Decomposes to produce calcium oxide (CaO), which can react with water to produce steam and pressure

Extinguishing Media: Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of lime kiln dust. Use appropriate extinguishing media for surrounding fire conditions.

Fire Fighting Instructions: Keep personnel away from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (self-contained breathing apparatus.

SECTION 6. Accidental Release Measures

Individual and collective precautions: Avoid creating conditions which release dust – use mechanical vacuums to remove dust from work spaces.

Avoid inhalation of Dust: Wear respiratory protection – minimum NIOSH N-95 Dust Mask.

Cleaning methods (Leaks & Spills): Use personal protective equipment (eyes, skin and inhalation, see Section 8). Use dry methods (vacuuming, sweeping) to collect spilled materials. Avoid generating dust. For large spills, evacuate area downwind of clean-up area operations to minimize dust exposure. For small spills, store spilled materials in dry, sealed plastic or metal containers. Dust residue on surfaces may be washed with water.

Precautions for the protection of the environment: May not be released into surface waters without controls (increases pH).

Waste Disposal: Dispose according to federal, provincial/state and local environmental regulations.

SECTION 7. Handling and Storage

Handling: In open air or in ventilated places, avoid skin and eye contact, avoid creating airborne dust.

Storage: Store in dry places sheltered from humidity. Keep away from acids. Keep out of reach of children.

SECTION 8. Exposure Controls/Personal Protection

Exposure Limits:

Calcium Carbonate: 15 mg/m^3 (total dust), 5 mg/m^3 (respirable) (OSHA); 10 mg/m^3 (ACGIH, O. Reg. 833);
Calcium oxide: 5 mg/m^3 (OSHA); 2 mg/m^3 (ACGIH, O. Reg. 833);
Calcium Magnesium Carbonate: 10 mg/m^3 (ACGIH, OSHA)
Calcium Magnesium Oxide: 2 mg/m^3 (ACGIH, OSHA)
Magnesium Carbonate: 15 mg/m^3 (total dust), 5 mg/m^3 (respirable) (OSHA); 5 mg/m^3 (ACGIH, O. Reg. 833); 10 mg/m^3 (ACGIH, O. Reg. 833);
Calcium Hydroxide: mg/m^3 (total dust), 5 mg/m^3 (respirable) (OSHA); 5 mg/m^3 (ACGIH, O. Reg. 833)
Magnesium oxide: 15 mg/m^3 (OSHA); 10 mg/m^3 (ACGIH, O. Reg. 833)
Silica (crystalline quartz): 2.5 mg/m^3 (total dust), 0.8 mg/m^3 (respirable) (OSHA); 0.5 mg/m^3 (respirable – ACGIH); 0.1 mg/m^3 (O. Reg. 845)

Engineering Controls: Use ventilation and dust collection to control exposure to below applicable limits.

Respiratory Protection:	Wear NIOSH N-95 Dust Mask.
Eye Protection:	Eye protection (chemical goggles, safety glasses and/or face shield) should be worn where there is a risk of lime exposure. Contact lenses should not be work when working with lime products.
Hand Protection:	Use clean dry gloves.
Skin Protection:	Cover body with suitable clothes (long sleeves shirts and trousers). Use over the angle waterproof caustic resistant footwear.

SECTION 9. Physical and Chemical Properties

Appearance:	Solid, white/tan/gray powder
Odor:	Odorless
Odor Threshold:	NA
pH:	12.4 pH graduated solution at 25º C
Melting Point:	1410º C
Boiling Point:	1565º C
Flash Point:	NA
Evaporation Rate:	NA
Flammability:	NA
Upper/Lower Flammability	NA
Vapor Pressure (+tº)	Non volatile.
Vapor Density (air=ml):	Non volatile.
Relative Density:	720-1130 kg/ m^3
Solubility in Water:	0.100 – 1.125g/100g – reactive with water to product $Ca(OH)_2$ with large amounts of heat
Partition coefficient:	NA
Auto-Ignition Temperature:	NA
Decomposition Temperature:	580ºC
Viscosity:	NA

SECTION 10. Stability and Reactivity

Stability:	Stable products, not very soluble.
Decomposition temperature:	580ºC, forms calcium oxide (CaO) and water.
Reactivity:	Reacts with acids to form calcium salts while generating heat. Reacts with carbon dioxide in air to form calcium carbonate.
Conditions to avoid:	Vicinity of incompatible materials.
Incompatible materials:	Acids; reactive fluoridated, brominated or phosphorous compounds; aluminum (may form hydrogen gas), reactive powdered metals; organic acid anhydrides; nitro-organic compounds; interhalogenated compounds.
Hazardous decomposition products:	Calcium oxide (CaO).

SECTION 11. Toxicological Information

Toxicity:	LD_{50} oral (rat) for calcium hydroxide is 7340 mg/kg. This product is not listed by MSA, OSHA, or IARC as a carcinogen, but this product may contain crystalline silica, which has been classified by IARC as (Group 1) carcinogenic to humans when inhaled in the form of quartz or cristobalite. No reported Carcinogenicity, Reproductive Effects, Teratogenicity or Mutagenicity.
Exposure Limits:	Refer to Section 8.
Irritancy:	Can cause severe irritation of eyes, skin, respiratory tract and gastrointestinal tract.
Chronic Exposure:	Inhalation of silica can cause a chronic lung disorder, silicosis.

SECTION 12. Ecological Information

Alkaline substance that increases pH to 12.4 in a saturated water solution at 25ºC.
Calcium hydroxide gradually reacts with CO_2 in air to form calcium carbonate ($CaCO_3$).
Calcium carbonate is ecologically neutral.
Uncontrolled spillage in surface waters should be avoided since the increase pH could be detrimental to fish.
Harmful to aquatic life in high concentration.

SECTION 13. Disposal Considerations

Dispose according to federal, provincial/state and local environmental regulations.

SECTION 14. Transportation Information

Classification: TDG: Not listed for ground transportation
HMR: Not listed for ground transportation

TDG: Transportation of Dangerous Goods Regulation (Canada)
HMR: Hazardous Materials Regulation (USA)

SECTION 15. Regulatory Information

Symbol:

WHMIS Rating
D2A, E

NFPA RATING
HEALTH-3 SPECIFIC HAZARD – ALK FLASH POINTS-0 REACTIVITY-1

HMIS RATING
HEALTH-2 SPECIFIC HAZARD – ALK FLASH POINTS-0 REACTIVITY-1

SECTION 16. Other Information

Original Prepared: 05/13/13
Revision Date: 07/7/16
Revision #: 2

Calciment can be removed from vehicles using rags dampened with dilute vinegar. After applying dilute vinegar, vehicles (especially chrome surfaces) must be washed with water.

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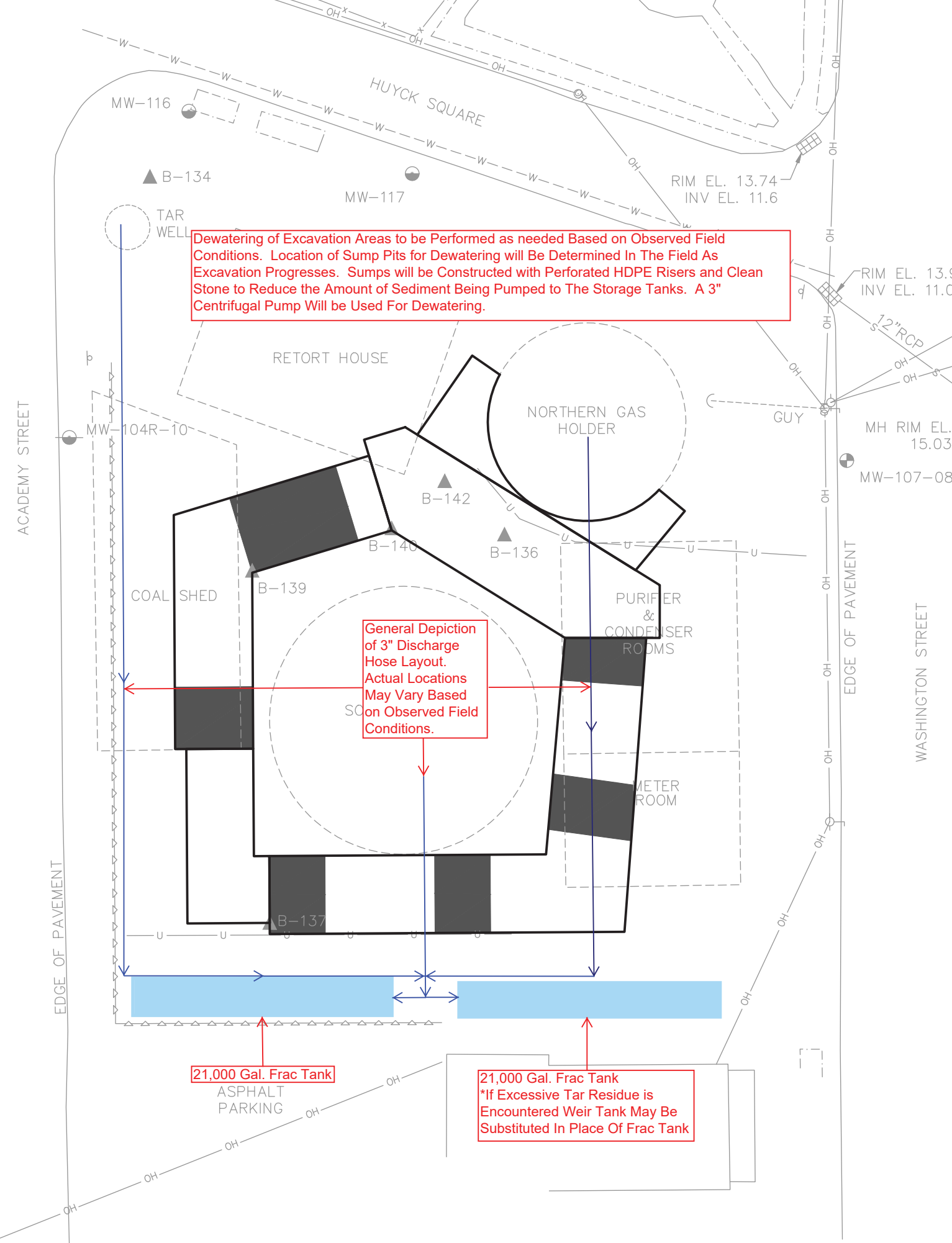
ATTACHMENT K

Temporary Dewatering System Layout Plan


HUYCK SQUARE
MW-116
B-134
MW-117
TAR WELL
RIM EL. 13.74
INV EL. 11.6
Dewatering of Excavation Areas to be Performed as needed Based on Observed Field Conditions. Location of Sump Pits for Dewatering will Be Determined In The Field As Excavation Progresses. Sumps will be Constructed with Perforated HDPE Risers and Clean Stone to Reduce the Amount of Sediment Being Pumped to The Storage Tanks. A 3" Centrifugal Pump Will be Used For Dewatering.
RETORT HOUSE
NORTHERN GAS HOLDER
GUY
12"RCP
MW-104R-10
B-142
B-140
B-136
B-139
COAL SHED
PURIFIER & CONDENSER ROOMS
General Depiction of 3" Discharge Hose Layout. Actual Locations May Vary Based on Observed Field Conditions.
METER ROOM
B-137
ACADEMY STREET
EDGE OF PAVEMENT
WASHINGTON STREET
MW-107-08
21,000 Gal. Frac Tank
ASPHALT PARKING
21,000 Gal. Frac Tank
*If Excessive Tar Residue is Encountered Weir Tank May Be Substituted In Place Of Frac Tank

ATTACHMENT L

Slide Rail Shoring System Detail

DHC
D.H. CHARLES ENGINEERING, INC.
4706 Hoen Avenue • Santa Rosa, CA 95405
(707) 537-8282 • (707) 537-8338 (Fax) • www.charlesengineering.com

Experience Record

Jasper Calcara, P.E.
D.H. Charles Engineering, Inc.
4706 Hoen Ave.
Santa Rosa, CA 95405

(707) 537-8282

Mr. Calcara has over 22 years experience in the review or design of excavation shoring, cofferdams, and many other design types. Although, the majority of projects completed have been performed in the state of California, many designs have been prepared in other states.

Lake Parsons Dam Valve Vault Rehab Project
Parsons, KS
United Rentals – Trench Safety

Prepared stamped design plans for a ~66'-long x 18'-wide x 27'-deep braced sheet pile cofferdam to allow for installation of a new 20"∅ pipe.

Water Res Recovery Facility Project
San Luis Obispo, CA
McBratney Company

Prepared stamped design plans for a ~190'-long x 23'-deep tie-back soldier pile shoring system to allow for construction of two new bioreactors.

Santa Ana River Interceptor Project
Orange County, CA
Los Angeles Engineering, Inc.

Prepared stamped design plans for a ~32' ID x 36'-deep secant pile jacking shaft and a ~18' ID x 37'-deep secant pile receiving shaft to allow for installation of a new 77"∅ casing.

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(707) 537-8282 • (707) 537-8338 (Fax) • www.charlesengineering.com

Ollie Pump Station Project
Plaquemines Parish, LA
Aquaterra Contracting, Inc.

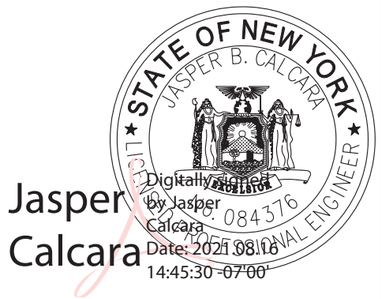
Prepared stamped design plans for a ~160'-long x 57'-wide x 13'-deep braced sheet pile cofferdam and a ~142'-long x 49'-wide x 11'-deep braced sheet pile cofferdam to allow for construction of new foundations.

Delta Water Supply Project
Stockton, CA
Preston Pipeline

Prepared stamped design plans for multiple sheet pile shoring systems, including a ~70'-long x 67'-wide x 32'-deep braced sheet pile shoring system to allow for construction of new foundations.

EXCAVATION SHORING DESIGN

NON-OWNED FORMER MGP SITE
REMEDIATION
RENSSELAER, NY



Jasper Calcara

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ENVIRONMENTAL WASTE MINIMIZATION, INC.
ICON EQUIPMENT DISTRIBUTORS, INC.

NOTES:

1. SHORING DESIGN IS BASED ON SOILS CONSISTING OF MEDIUM TO LOOSE SAND, AS OUTLINED IN THE BORELOGS PROVIDED BY ARCADIS DATED 1/15/17 (PROJECT: B0036730.0000.00004). CONTRACTOR'S COMPETENT PERSON SHALL CONFIRM SITE SOILS AND CONTACT ENGINEER IF DIFFERING SOIL CONDITIONS ARE ENCOUNTERED.
2. SLIDE RAIL SYSTEM SHALL BE CERTIFIED ICON ASSEMBLIES. PE STAMPED TABULATED DATA SHALL BE PROVIDED AT JOBSITE, AND MANUFACTURER'S TABULATED DATA APPLIES EXCEPT AS IS NOTED HERE.
3. PROVIDE ACCESS, BARRICADING, AND FALL PROTECTION, IN ACCORDANCE WITH ALL OSHA GUIDELINES.
4. SHORING MUST BE PROPERLY INSTALLED PRIOR TO WORKERS ENTERING EXCAVATION. WORKERS MAY ONLY ENTER, EXIT, AND WORK WITHIN SHORED AREAS.
5. STEEL SHAPES TO BE ASTM A572 GR. 50 OR A992, MIN Fy = 50 KSI.
6. STEEL SHAPES SHALL BE IN GOOD CONDITION AND SHALL BE FREE OF ANY HOLES OR VISUAL DEFECTS.
7. ALL VOIDS BETWEEN THE EXCAVATED SOIL AND THE FACE OF THE SHORING SYSTEM MUST BE BACKFILLED WITH EXCAVATED SOIL OR OTHER APPROVED BACKFILL PRIOR TO WORKERS ENTERING THE EXCAVATION. FOR EXCAVATIONS ADJACENT TO TRAFFIC LOADING, ALL VOIDS SHALL BE BACKFILLED WITH SAND OR CLASS II AGGREGATE BASE MATERIAL.
8. GROUNDWATER LEVEL MUST BE MAINTAINED AT OR BELOW THE MINIMUM LEVEL SHOWN ON THESE PLANS AT ALL TIMES. IF DEWATERING SYSTEM IS NECESSARY TO ACHIEVE THIS, IT IS THE CONTRACTOR'S RESPONSIBILITY FOR DEVELOPING, INSTALLING, AND MONITORING DEWATERING SYSTEM, AND VERIFYING THAT THE GROUNDWATER LEVEL BEHIND THE SHORING WALLS HAS BEEN LOWERED AT LEAST TO THE MINIMUM LEVEL SHOWN ON THESE PLANS AT ALL TIMES. IF CONTRACTOR IS UNABLE TO LOWER THE GROUNDWATER TO THE LEVEL SHOWN, CONTACT THE SHORING ENGINEER IMMEDIATELY.
9. D.H. CHARLES ENGINEERING, INC. WILL NOT SUPERVISE, DIRECT, CONTROL OR HAVE AUTHORITY OVER OR BE RESPONSIBLE FOR CONTRACTOR'S MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION, OR THE SAFETY PRECAUTIONS AND PROGRAMS INCIDENT THERETO, OR FOR ANY FAILURE OF CONTRACTOR TO COMPLY WITH LAWS AND REGULATIONS APPLICABLE TO THE FURNISHING OR PERFORMANCE OF WORK.
10. VERIFY THE ACCURACY OF ALL DIMENSIONS FOR BOTH EXISTING AND PROPOSED WORK. VERIFY THAT REQUIRED CLEARANCES ARE OBTAINED PRIOR TO COMMENCEMENT OF THE WORK.
11. VERIFY THE LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING THE EXCAVATION.
12. ICON EQUIPMENT DISTRIBUTORS, INC. AND D.H. CHARLES ENGINEERING, INC. BEAR NO RESPONSIBILITY OR LIABILITY FOR ANY SETTLEMENT, MOVEMENT, OR DAMAGE OF ANY KIND THAT MAY OCCUR TO SURROUNDING SOILS, EXISTING BUILDING STRUCTURES, OR UTILITIES DUE TO SHORING INSTALLATION, DEFLECTION, REMOVAL, OR OTHER CONSTRUCTION ACTIVITIES.

REVISIONS	
NO.	DATE

11x17 SHEET
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EXCAVATION SHORING DESIGN
NON-OWNED FORMER MGP SITE
REMEDIATION
RENSSELAER, NY
ENVIRONMENTAL WASTE
MINIMIZATION
ICON EQUIPMENT DISTRIBUTORS

ICON EQUIPMENT DISTRIBUTORS
Total Underground Solutions Since 1982
300 RYDERS LANE, EAST BRUNSWICK, NJ 08816
Ph: (800) 836-5011, Fax: (732) 254-0101

D.H. CHARLES ENGINEERING, INC.
135 Liverpool Drive, Suite C
Cardiff, CA 92007
(760) 436-9756 www.charlesengineering.com

DATE: 8-12-21
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SHEET 1 OF 3
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STATE OF NEW YORK
JASPER B. CALCARA
LICENSED No. 084376
PROFESSIONAL ENGINEER

Jasper Calcara

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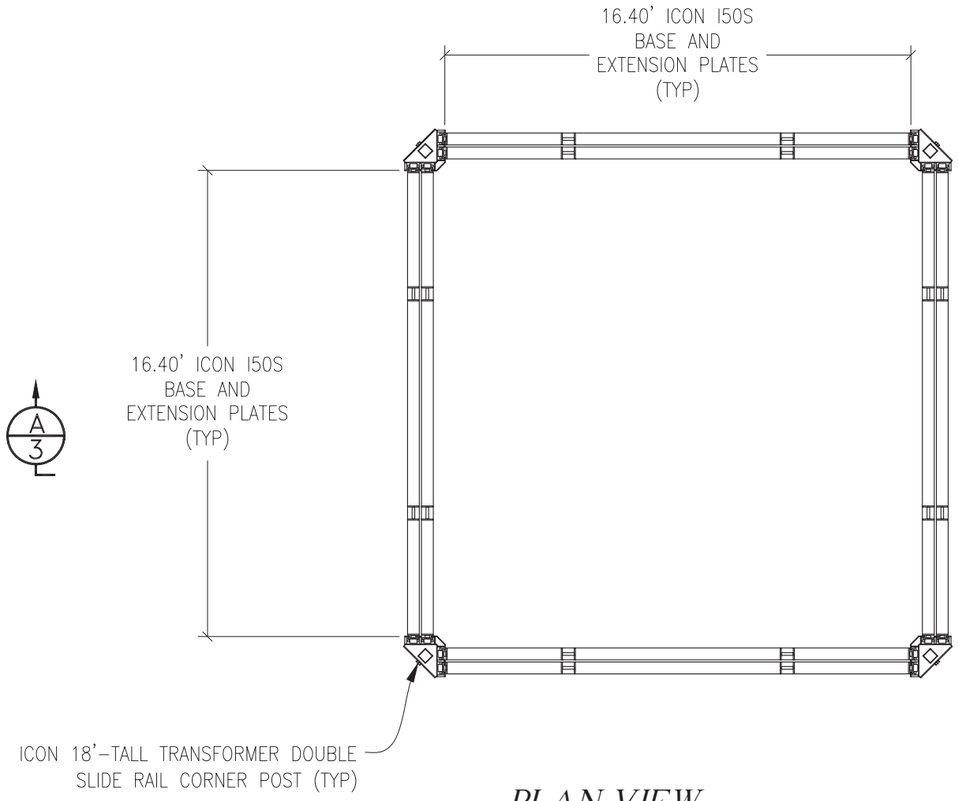

PLAN VIEW
SCALE: 3/16"=1'-0"

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SETBACK TABLE	
CRANE TO 30 TON MAX	X = 12'
CAT 325 EXCAVATOR	X = 7'
CAT 345 EXCAVATOR	X = 10'
CAT 365 EXCAVATOR	X = 12'
5 CY LOADER	X = 5'
DUMPTRUCK	X = 5'
SPOIL PILE (4'–TALL)	X = 6'
CONCRETE TRUCK	X = 8'
BUILDING STRUCTURES	X = 50'
RAILROAD TRACKS	X = 100'
STREET TRAFFIC	X = 5'

ABOVE LISTED SETBACKS SHALL BE MAINTAINED A DISTANCE "X" FROM ALL EDGES OF SHORING AT ALL TIMES WORKERS ARE IN EXCAVATION. HOWEVER, DURING SHORING INSTALLATION OR REMOVAL, CONTRACTOR MAY TEMPORARILY REDUCE SETBACKS FOR EARTHMOVING EQUIPMENT AS DEEMED SAFE BY CONTRACTORS COMPETENT PERSON.

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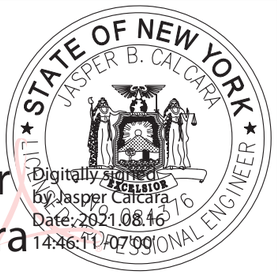

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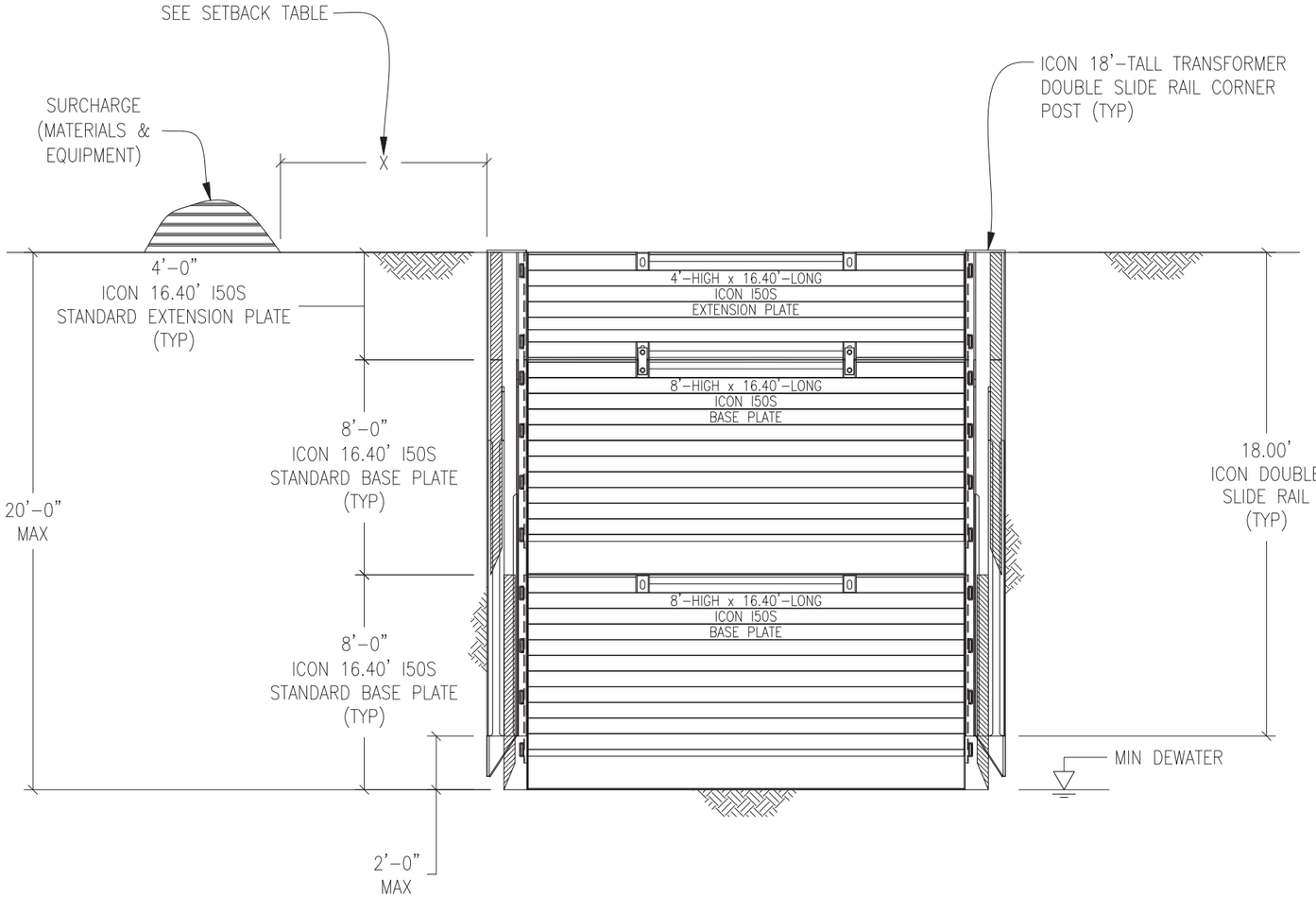

A/3 SECTION
SCALE: 3/16"=1'-0"

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Shoring Design

Contractor to install a 16.4'-wide x 16.4'-long x 20'-deep slide rail pit for remediation of existing Tar Well.

H_{max} = 20 ft

H_{SR} = 20 ft

Active Soil Pressure

Per the borelogs provided by the Contractor and prepared by Arcadis dated 1/15/17 (Project: B0036730.0000.00004), soils consist primarily of medium dense to loose sand. This calculation will be conservative and design soil as a loose to medium dense granular material using the following properties:

$\phi = 28°$

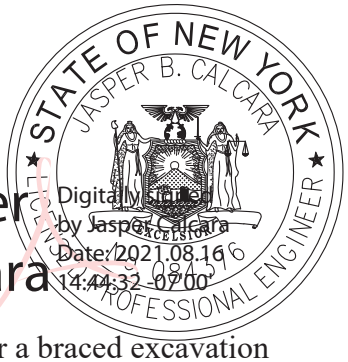
$\gamma = 110$ pcf

$K_a = \text{Tan}(45° - \phi / 2)^2 = 0.36$

$P_a = 0.65 \times K_a \times \gamma \times H_{max} = 516$ psf

↑

Rectangular pressure distribution for a braced excavation



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$P_s = 200$ psf

↑

Construction equipment and materials surcharge

$P_w = 0$ psf

↑

Contractor must dewater to the base of the excavation to ensure no hydrostatic pressure develops behind the shoring

$P_{max} = P_a + P_s + P_w = 716$ psf

↑

Maximum lateral pressure acting on shoring system

Check Slide Rail Panels

P_{max} = 716 psf

Per the attached tabulated data for the ICON slide rail shoring system, the panels used on this project have the following allowable pressure rating:

Panel Size	Allow. Pressure		Max. Pressure	
4x16.48-I50S	P_{allow} = 1920 psf	>	P_{max} = 716 psf	OK
8x16.48-I50S	P_{allow} = 1465 psf	>	P_{max} = 716 psf	OK

★★ICON slide rail panels are adequate

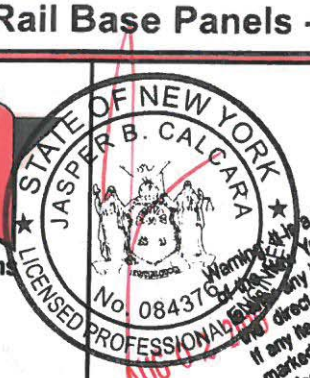
-End-

8'-Tall Slide Rail Base Panels - Manufacturer's Tabulated Data

ICON

Total Underground Solutions
Since 1982

300 Ryders Lane, E. Brunswick NJ
(800) 836-5011



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Model Number	Height (ft)	Length (ft)	Wall Thickness (In)	Pressure Rating (psf)	Depth Rating*			
					A	B	C-60	C-80
I20E	7.83	6.56	4	6443	40	40	40	20
I25E	7.83	8.2	4	4123	40	40	40	20
I30E	7.83	9.84	4	2863	40	40	40	20
I35E	7.83	11.48	4	2104	40	40	37	20
I40E	7.83	13.12	4	1611	40	37	29	20
I45E	7.83	14.76	4	1273	40	30	23	19
I50E	7.83	16.48	4	1021	40	24	19	15
I55E	7.83	18.04	4	852	34	21	16	13
I625E	7.83	20.5	4	660	26	16	13	11
I20S	7.83	6.56	5	8500	40	40	40	20
I25S	7.83	8.2	5	5916	40	40	40	20
I30S	7.83	9.84	5	4108	40	40	40	20
I35S	7.83	11.48	5	3018	40	40	40	20
I40S	7.83	13.12	5	2311	40	40	40	20
I45S	7.83	14.76	5	1826	40	40	33	20
I50S	7.83	16.48	5	1465	40	34	27	20
I55S	7.83	18.04	5	1222	40	29	23	18
I625S	7.83	20.5	5	947	38	23	18	14
I20HD	7.83	6.56	5	8500	40	40	40	20
I25HD	7.83	8.2	5	7059	40	40	40	20
I30HD	7.83	9.84	5	4902	40	40	40	20
I35HD	7.83	11.48	5	3601	40	40	40	20
I40HD	7.83	13.12	5	2757	40	40	40	20
I45HD	7.83	14.76	5	2179	40	40	39	20
I50HD	7.83	16.48	5	1748	40	40	31	20
I55HD	7.83	18.04	5	1458	40	34	27	20
I625HD	7.83	20.5	5	1129	40	27	21	17
I20XHD	7.83	6.56	5	8500	40	40	40	20
I25XHD	7.83	8.2	5	8500	40	40	40	20
I30XHD	7.83	9.84	5	6308	40	40	40	20
I35XHD	7.83	11.48	5	4634	40	40	40	20
I40XHD	7.83	13.12	5	3548	40	40	40	20
I45XHD	7.83	14.76	5	2803	40	40	40	20
I50XHD	7.83	16.48	5	2249	40	40	40	20
I55XHD	7.83	18.04	5	1877	40	40	34	20
I625XHD	7.83	20.5	5	1453	40	34	26	20
I732HD7	6	24	7	1435	40	33	25	20
I854HD7	6	28	7	1054	40	24	19	15
I976HD10	7	32	10	1650	40	38	29	20
I732TB6	8	24	6	1079	40	26	20	16

Notes & Limitations:

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3. 100 PSF UNIFORM SURCHARGE LOAD HAS BEEN INCLUDED IN ALL DEPTH RATINGS. DEPTH RATINGS SHALL BE REDUCED TO ACCOUNT FOR ANY SURCHARGE LOADING WHICH EXCEEDS 100 PSF, OTHERWISE SITE SPECIFIC ENGINEERING IS REQUIRED.
4. BOTTOM OF PANEL MUST NOT BE MORE THAN TWO FEET ABOVE BASE OF EXCAVATION PER OSHA 29 CFR PART 1926.652(g)(2).
5. SOILS SHALL BE SLOPED IN ACCORDANCE WITH OSHA GUIDELINES, AND MUST EXTEND TO NO LESS THAN 18" BELOW THE TOP OF THE SHORING PANELS. ANY EXCAVATIONS WITH SLOPING THAT EXCEED 20' IN DEPTH, REQUIRE SITE SPECIFIC ENGINEERING.
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7. MEANS AND METHODS ASSOCIATED WITH THE EXCAVATION, INSTALLATION & REMOVAL OF THE SHORING SYSTEM, EVALUATION OF SURCHARGES, AND DEWATERING, ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
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12. DEPTH AND PRESSURE RATINGS ACCOUNT FOR 33% OVERSTRESS FOR TEMP. LOADING CONDITIONS.

*Soils shall be classified by Competernt Person in Accordance with OSHA guidelines. Some depth ratings have been capped at 40' for A, B & C-60 soils and 20' for C-80 soils, however, the pressure rating is based on the full capacity of the panel with no cap in place.

DH Charles Engineering, Inc.
(707) 537-8282

4'-Tall Slide Rail Extension Panels - Manufacturer's Tab. Data

Total Underground Solutions
Since 1982

300 Ryders Lane, E. Brunswick NJ
(800) 836-5011

Model Number	Height (ft)	Length (ft)	Wall Thickness (In)	Pressure Rating (psf)	Depth Rating*			
					A	B	C-60	C-80
I20S	4.25	6.56	5	8500	40	40	40	20
I25S	4.25	8.2	5	7757	40	40	40	20
I30S	4.25	9.84	5	5387	40	40	40	20
I35S	4.25	11.48	5	3957	40	40	40	20
I40S	4.25	13.12	5	3030	40	40	40	20
I45S	4.25	14.76	5	2394	40	40	40	20
I50S	4.25	16.48	5	1920	40	40	32	20
I55S	4.25	18.04	5	1603	40	36	27	20
I625S	4.25	20.5	5	1241	40	27	21	16
I20HD	4.25	6.56	5	8500	40	40	40	20
I25HD	4.25	8.2	5	8500	40	40	40	20
I30HD	4.25	9.84	5	6136	40	40	40	20
I35HD	4.25	11.48	5	4508	40	40	40	20
I40HD	4.25	13.12	5	3451	40	40	40	20
I45HD	4.25	14.76	5	2727	40	40	40	20
I50HD	4.25	16.48	5	2188	40	40	37	20
I55HD	4.25	18.04	5	1826	40	40	31	20
I625HD	4.25	20.5	5	1414	40	31	24	19
I20XHD	4.25	6.56	5	8500	40	40	40	20
I25XHD	4.25	8.2	5	8500	40	40	40	20
I30XHD	4.25	9.84	5	7390	40	40	40	20
I35XHD	4.25	11.48	5	5429	40	40	40	20
I40XHD	4.25	13.12	5	4157	40	40	40	20
I45XHD	4.25	14.76	5	3284	40	40	40	20
I50XHD	4.25	16.48	5	2635	40	40	40	20
I55XHD	4.25	18.04	5	2199	40	40	37	20
I625XHD	4.25	20.5	5	1703	40	38	29	20
I732TB6	4	24	6	1161	40	26	20	15

STATE OF NEW YORK
JASPER B. CALCARA
No. 084376
LICENSED PROFESSIONAL ENGINEER

AUG 02 2016

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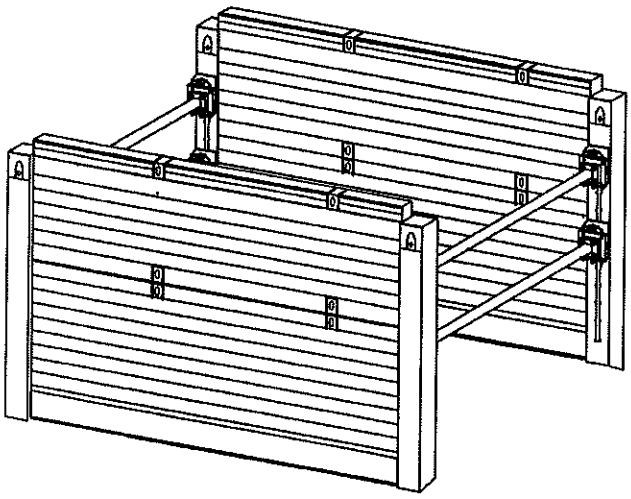
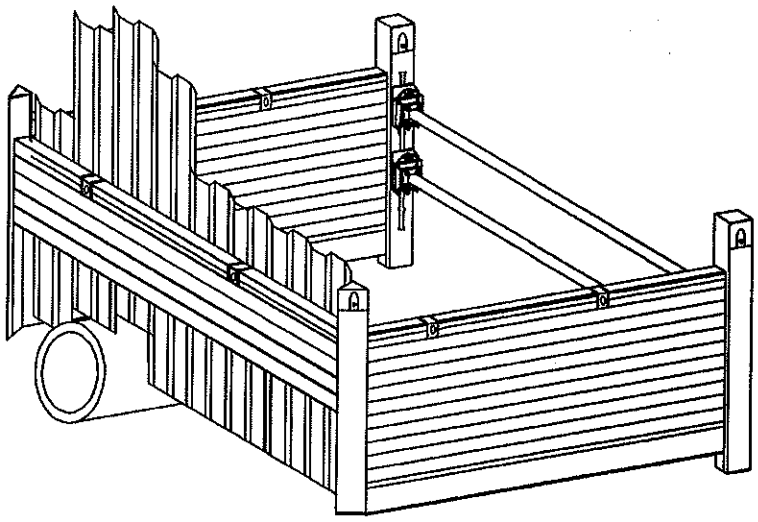
DH Charles Engineering, Inc.
(707) 537-8282

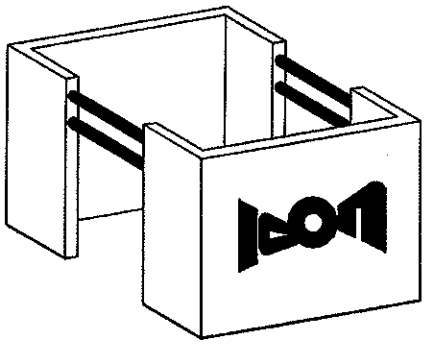
ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE, EAST BRUNSWICK, NJ 08816
Ph: (800) 836-5011, Fax: (732) 254-0101

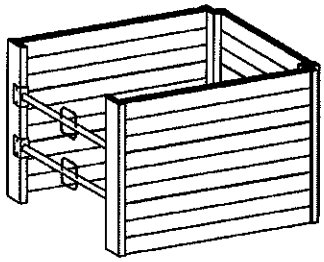
Safety & Assembly Guide

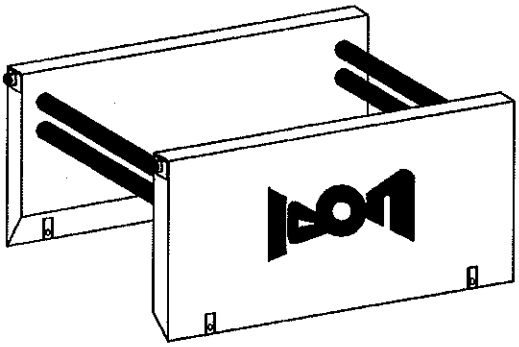
Slide Rail System

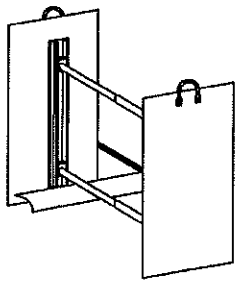


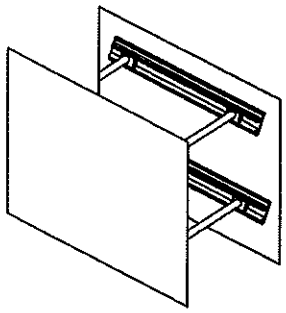












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800-836-5011

ICON Equipment Distributors, Inc.

300 Ryders Lane, East Brunswick, NJ 08816, Ph: 800-836-5011, Fax: 732-254-0101

IMPORTANT NOTICE --- TRENCH SUPPORT SAFETY

This ICON assembly and safety guide is provided as a service to our customers and

MUST BE READ

In its entirety prior to installing and sheeting and shoring systems supplied; The information contained herein provides insight into proper assembly, handling and use of this equipment. Where necessary and applicable, refer to professionally engineered shop / site specific drawings and the OSHA federal register 29 CFP Part 1926 subpart P. Failure to do so may result in damage to equipment, personal injury, and/or property damage, for which contractor is responsible and for which ICON Equipment Distributors, Inc. shall be held harmless without exception. Specifically, the use of steel plates and other materials to increase the side wall area of trench boxes and other trench support equipment is illegal and voids all equipment tabulated data and certification. Field and personnel should direct questions and inquiries to the corporate headquarters at 800-836-5011.

The definition of a "COMPETENT PERSON", as it applies to Subpart P, is the same as the definition found in Subpart C – 1926.32(f): One who is capable of identifying existing or predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

When applied to trenching or shoring excavation operations, the "Competent Person" must have specific training in, and be knowledgeable about soil analysis, the use use of protective systems and the requirements of this standard.

To learn more about Soil Class definition: This all comes from OSHA. This link will direct you to all of the Soil Class information as published by OSHA. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10931

8'-Tall Slide Rail Base Panels - Manufacturer's Tabulated Data

Total Underground Solutions
Since 1982

300 Ryders Lane, E. Brunswick NJ
(800) 836-5011

MAY 16 2016

Model Number	Height (ft)	Length (ft)	Wall Thickness (In)	Pressure Rating (psf)	Depth Rating*			
					A	B	C-60	C-80
I20E	7.83	6.56	4	6443	40	40	40	20
I25E	7.83	8.2	4	4123	40	40	40	20
I30E	7.83	9.84	4	2863	40	40	40	20
I35E	7.83	11.48	4	2104	40	40	37	20
I40E	7.83	13.12	4	1611	40	37	29	20
I45E	7.83	14.76	4	1273	40	30	23	19
I50E	7.83	16.48	4	1021	40	24	19	15
I55E	7.83	18.04	4	852	34	21	16	13
I625E	7.83	20.5	4	660	26	16	13	11
I20S	7.83	6.56	5	8500	40	40	40	20
I25S	7.83	8.2	5	5916	40	40	40	20
I30S	7.83	9.84	5	4108	40	40	40	20
I35S	7.83	11.48	5	3018	40	40	40	20
I40S	7.83	13.12	5	2311	40	40	40	20
I45S	7.83	14.76	5	1826	40	40	33	20
I50S	7.83	16.48	5	1465	40	34	27	20
I55S	7.83	18.04	5	1222	40	29	23	18
I625S	7.83	20.5	5	947	38	23	18	14
I20HD	7.83	6.56	5	8500	40	40	40	20
I25HD	7.83	8.2	5	7059	40	40	40	20
I30HD	7.83	9.84	5	4902	40	40	40	20
I35HD	7.83	11.48	5	3601	40	40	40	20
I40HD	7.83	13.12	5	2757	40	40	40	20
I45HD	7.83	14.76	5	2179	40	40	39	20
I50HD	7.83	16.48	5	1748	40	40	31	20
I55HD	7.83	18.04	5	1458	40	34	27	20
I625HD	7.83	20.5	5	1129	40	27	21	17
I20XHD	7.83	6.56	5	8500	40	40	40	20
I25XHD	7.83	8.2	5	8500	40	40	40	20
I30XHD	7.83	9.84	5	6308	40	40	40	20
I35XHD	7.83	11.48	5	4634	40	40	40	20
I40XHD	7.83	13.12	5	3548	40	40	40	20
I45XHD	7.83	14.76	5	2803	40	40	40	20
I50XHD	7.83	16.48	5	2249	40	40	40	20
I55XHD	7.83	18.04	5	1877	40	40	34	20
I625XHD	7.83	20.5	5	1453	40	34	26	20
I732HD7	6	24	7	1435	40	33	25	20
I854HD7	6	28	7	1054	40	24	19	15
I976HD10	7	32	10	1650	40	38	29	20
I732TB6	8	24	6	1079	40	26	20	16

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DH Charles Engineering, Inc.
(707) 537-8282

4'-Tall Slide Rail Extension Panels - Manufacturer's Tab. Data

ICON

Total Underground Solutions
Since 1982

300 Ryders Lane, E. Brunswick NJ
(800) 836-5011

MAY 16 2016

Model Number	Height (ft)	Length (ft)	Wall Thickness (In)	Pressure Rating (psf)	Depth Rating*			
					A	B	C-60	C-80
I20S	4.25	6.56	5	8500	40	40	40	20
I25S	4.25	8.2	5	7757	40	40	40	20
I30S	4.25	9.84	5	5387	40	40	40	20
I35S	4.25	11.48	5	3957	40	40	40	20
I40S	4.25	13.12	5	3030	40	40	40	20
I45S	4.25	14.76	5	2394	40	40	40	20
I50S	4.25	16.48	5	1920	40	40	32	20
I55S	4.25	18.04	5	1603	40	36	27	20
I625S	4.25	20.5	5	1241	40	27	21	16
I20HD	4.25	6.56	5	8500	40	40	40	20
I25HD	4.25	8.2	5	8500	40	40	40	20
I30HD	4.25	9.84	5	6136	40	40	40	20
I35HD	4.25	11.48	5	4508	40	40	40	20
I40HD	4.25	13.12	5	3451	40	40	40	20
I45HD	4.25	14.76	5	2727	40	40	40	20
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I30XHD	4.25	9.84	5	7390	40	40	40	20
I35XHD	4.25	11.48	5	5429	40	40	40	20
I40XHD	4.25	13.12	5	4157	40	40	40	20
I45XHD	4.25	14.76	5	3284	40	40	40	20
I50XHD	4.25	16.48	5	2635	40	40	40	20
I55XHD	4.25	18.04	5	2199	40	40	37	20
I625XHD	4.25	20.5	5	1703	40	38	29	20
I732TB6	4	24	6	1161	40	26	20	15

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3. 100 PSF UNIFORM SURCHARGE LOAD HAS BEEN INCLUDED IN ALL DEPTH RATINGS. DEPTH RATINGS SHALL BE REDUCED TO ACCOUNT FOR ANY SURCHARGE LOADING WHICH EXCEEDS 100 PSF, OTHERWISE SITE SPECIFIC ENGINEERING IS REQUIRED.
4. BOTTOM OF PANEL MUST NOT BE MORE THAN TWO FEET ABOVE BASE OF EXCAVATION PER OSHA 29 CFR PART 1926.652(g)(2).
5. SOILS SHALL BE SLOPED IN ACCORDANCE WITH OSHA GUIDELINES, AND MUST EXTEND TO NO LESS THAN 18" BELOW THE TOP OF THE SHORING PANELS. ANY EXCAVATIONS WITH SLOPING THAT EXCEED 20' IN DEPTH, REQUIRE SITE SPECIFIC ENGINEERING.
6. THIS TABULATED DATA IS NOT INTENDED TO BE USED AS A JOB SPECIFIC SAFETY PLAN.
7. MEANS AND METHODS ASSOCIATED WITH THE EXCAVATION, INSTALLATION & REMOVAL OF THE SHORING SYSTEM, EVALUATION OF SURCHARGES, AND DEWATERING, ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. ANY MODIFICATIONS TO PANELS OR POSTS IN ANY WAY NOT APPROVED IN WRITING BY ICON, VOIDS THIS CERTIFICATION.
9. CERTIFICATION IS NOT VALID IF THE SHORING SYSTEM SHOWS EXCESSIVE WEAR, IS PERMANENTLY DAMAGED, IS NOT MAINTAINED OR REPAIRED PROPERLY.
10. FILL VOIDS BETWEEN FACE OF EXCAVATION AND SHORING PANELS.
11. THIS TABULATED DATA IS A GENERAL SET OF GUIDELINES & CHARTS TO ASSIST THE COMPETENT PERSON IN SELECTING A SAFETY SYSTEM WITH PROPER SHORING EQUIPMENT. THE COMPETENT PERSON HAS SOLE RESPONSIBILITY FOR JOB SITE SAFETY & THE PROPER SELECTION OF THE SHORING EQUIPMENT.
12. DEPTH AND PRESSURE RATINGS ACCOUNT FOR 33% OVERSTRESS FOR TEMP. LOADING CONDITIONS.

*Soils shall be classified by Competernt Person in Accordance with OSHA guidelines. Some depth ratings have been capped at 40' for A, B & C-60 soils and 20' for C-80 soils, however, the pressure rating is based on the full capacity of the panel with no cap in place.

DH Charles Engineering, Inc.
(707) 537-8282

Internal Waler Frame & Panels Capacity (WF-1)

Total Underground Solutions
Since 1982

300 Ryders Lane, E. Brunswick NJ
(800) 836-5011

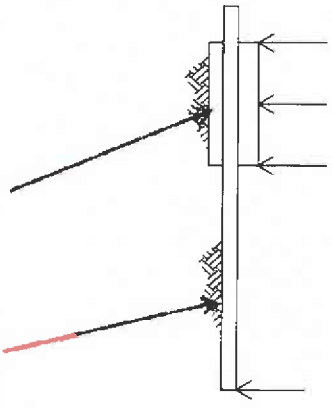
REGISTERED PROFESSIONAL ENGINEER
JASPER B. CALCARA
No. 62941
CIVIL
STATE OF CALIFORNIA

MAY 16 2016

COMPONENT	Model No.	Length (ft)	Allowable Distributed Load (klf)	Allowable Moment (k-ft)	Allowable Shear (k)
36"-TALL WALER FRAMES	IW20	6.56	43.6	235	226
	IW25	8.20	27.9		
	IW30	9.84	19.4		
	IW35	11.48	14.2		
	IW40	13.12	10.9		
	IW45	14.76	8.6		
	IW50	16.48	6.9		
	IW55	18.04	5.8		
	IW625	20.50	4.5		
18"-WIDE WALER PANELS	IUP12	12	NA	34	90
	IUP14	14			
	IUP15	15			
	IUP16	16			
	IUP18	18			
	IUP20	20			
	IUP22	22			

36"-TALL
WALER FRAME

18'-WIDE UTILITY PANELS
(TYP)



WALER FRAME PROVIDING
UNIFORM SUPPORT

UTILITY PANELS SUPPORTED AT
THE BASE (IF
NOT SUPPORTED AT THE BASE
USE TAB DATA WF-2)

Note: This is not a stand alone tabulated data sheet and is only to be used to aid in the preparation of a site specific shoring plan designed and stamped by a licensed professional engineer. Waler frames and sheets must be checked for the proposed configurations to ensure the maximum capacities outlined on this doc are not exceeded. Ratings account for 33% overstress for tempory loading condition.

D.H. Charles Engineering, Inc.
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Internal Waler Frame & Panels Capacity (WF-2)

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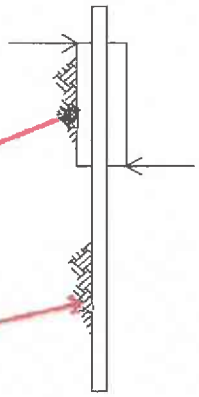
REGISTERED PROFESSIONAL ENGINEER
JASPER B. CALCARA
No. 62941
CIVIL
STATE OF CALIFORNIA

MAY 16 2016

COMPONENT	Model No.	Length (ft)	Allowable Distributed Load (klf)	Allowable Moment (k-ft)	Allowable Shear (k)
36"-TALL WALER FRAMES	IW20	6.56	30.5	164	168
	IW25	8.20	19.5		
	IW30	9.84	13.5		
	IW35	11.48	10.0		
	IW40	13.12	7.6		
	IW45	14.76	6.0		
	IW50	16.48	4.8		
	IW55	18.04	4.0		
	IW625	20.50	3.1		
18"-WIDE WALER PANELS	IUP12	12	NA	34	90
	IUP14	14			
	IUP15	15			
	IUP16	16			
	IUP18	18			
	IUP20	20			
	IUP22	22			

36"-TALL
WALER FRAME

18'-WIDE UTILITY PANELS
(TYP)



WALER FRAME WITH LOAD
CONCENTRATED AT THE BOTTOM

CANTILEVER UTILITY PANELS NOT
SUPPORTED AT THE BASE
(IF SUPPORTED AT THE BASE USE
TAB DATA WF-1)

Note: This is not a stand alone tabulated data sheet and is only to be used to aid in the preparation of a site specific shoring plan designed and stamped by a licensed professional engineer. Waler frames and sheets must be checked for the proposed configurations to ensure the maximum capacities outlined on this doc are not exceeded. Ratings account for 33% overstress for tempory loading condition.

D.H. Charles Engineering, Inc.
(707) 537-8282

Icon
Total Underground Solutions

TRANSFORMER RAIL TABULATED DATA

TRANSFORMER RAIL MOMENT AND SHEAR CAPACITY			
NAME	**MODEL #**	**MOMENT (K-FT)**	**SHEAR (KIPS)**
12' TRANSFORMER SINGLE SLIDE RAIL	SRSR-12-TR	230	130
12' TRANSFORMER SINGLE CORNER SLIDE RAIL	SRSRC-12-TR	200	120
10' TRANSFORMER DOUBLE SLIDE EXTENSION RAIL	SRDR-10-TR	**553**	**200**
14' TRANSFORMER DOUBLE SLIDE RAIL	SRDR-14-TR	**699**	**210**
18' TRANSFORMER DOUBLE SLIDE RAIL	SRDR-18-TR	**699**	**210**
22' TRANSFORMER DOUBLE SLIDE RAIL	SRDR-22-TR	**699**	**210**
26.5' TRANSFORMER TRIPLE SLIDE RAIL	SRTR-26-TR	**1,258**	**371**
10' TRANSFORMER DOUBLE SLIDE CORNER EXTENSION RAIL	SRDRC-10-TR	**442**	**100**
14' TRANSFORMER DOUBLE CORNER SLIDE RAIL	SRDRC-14-TR	**540**	**100**
18' TRANSFORMER DOUBLE SLIDE CORNER RAIL	SRDRC-18-TR	**540**	**100**
22' TRANSFORMER DOUBLE SLIDE CORNER RAIL	SRDRC-22-TR	**540**	**100**

GENERAL NOTES:

1. MOMENT AND SHEAR CAPACITY ARE BASED ON THE SECTION PROPERTIES OF THE BOTTOM HALF OF THE RAIL ONLY.
2. EXTENSION RAIL TO RAIL CONNECTION HAS NOT BEEN DESIGNED FOR ALLOWABLE MOMENT AND SHEAR. EACH INDEPENDENT SECTION SHALL HAVE AN INDEPENDENT STRUT CART.
3. THIS TABULATED DATA SHEET IS ONLY TO BE USED TO SUPPLEMENT A SITE SPECIFIC SHORING PLAN.
4. PROFESSIONAL ENGINEER PREPARING SITE SPECIFIC PLAN IS RESPONSIBLE FOR ENSURING ALL SOIL AND SURCHARGE LOADING ASSOCIATED WITH SITE SPECIFIC CONDITION IS WITHIN THE LIMITS OF THE ALLOWABLE LOAD RATINGS SPECIFIED IN THE TABULATED DATA FOR ALL COMPONENTS OF SLIDE RAIL SYSTEM AND RAIL ASSEMBLY.
5. ALL EXCAVATIONS SHALL BE IN ACCORDANCE WITH OSHA CFR 29, PART 1926, SUBPART P.
6. ALL EQUIPMENT COVERED UNDER THIS TABULATED DATA SHALL BE CERTIFIED ICON.
7. SLIDE RAIL SHORING SYSTEM SHALL BE USED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER.
8. EQUIPMENT IS NOT CERTIFIED FOR USE IF RAILS ARE MODIFIED IN ANY MANNER.
9. CERTIFICATION IS NOT VALID IF THE SHORING SYSTEM SHOWS EXCESSIVE WEAR, IS PERMANENTLY DAMAGED, IS NOT MAINTAINED OR REPAIRED PROPERLY.
10. THESE RAILS SHALL ONLY BE USED WITH CERTIFIED ICON SLIDE RAIL EQUIPMENT.

DESIGN HAS BEEN REVIEWED BY THE PROFESSIONAL ENGINEERING FIRM OF D.H. CHARLES ENGINEERING, INC.

Icon Equipment Distributors, Inc.
300 Ryders Lane - East Brunswick, NJ 08816
Phone: (800) 836-5011 - Fax: (732) 254-0101

Slide Rail System Strut Capacities

Total Underground Solutions
Since 1982

300 Ryders Lane, E. Brunswick NJ
(800) 836-5011

MAY 16 2016

Strut Size	Strut Length	Allowable Compression (kips)	Grade of Steel
W14x99	0.5	871	ASTM A572 Grade 50 Fy = 50 ksi
	1	870	
	1.64	869	
	3.28	863	
	4	860	
	4.92	854	
	6.56	842	
	8.2	826	
	9.84	806	
	11.48	784	
	13.12	760	
	14.76	733	
	16.4	703	
	21	613	
HSS8x8x1/2"	0.5	404	ASTM A500 Grade C Fy = 50 ksi
	1	403	
	1.64	403	
	3.28	399	
	4	396	
	4.92	392	
	6.56	383	
	8.2	372	
	9.84	359	
	11.48	344	
	13.12	328	
	14.76	310	
	16.4	291	
HSS4x4x1/2"	0.5	180	ASTM A500 Grade C Fy = 50 ksi
	1	179	
	1.64	177	
	3.28	170	
	4	165	
	4.92	158	
	6.56	142	
	8.2	124	
	9.84	106	

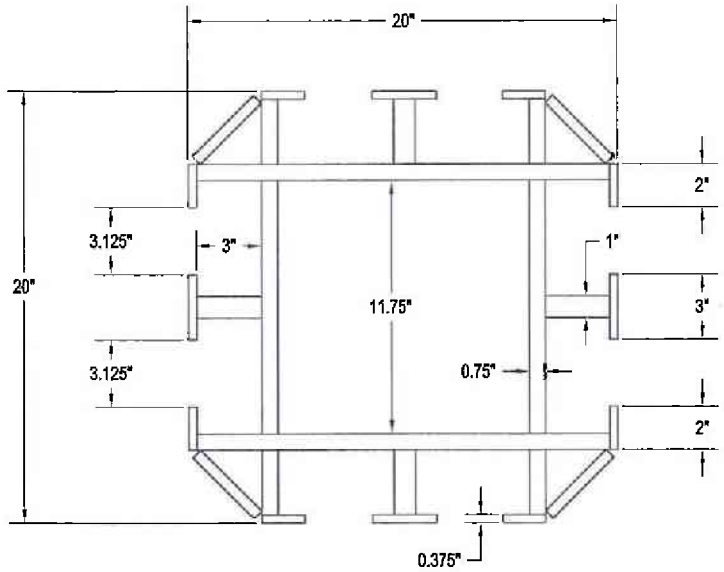
Note: This is not a stand alone tabulated data sheet and is only to be used to aid in the preparation of a site specific shoring plan designed and stamped by a licensed professional engineer.

D.H. Charles Engineering, Inc.
(707) 537-8282

Total Underground Solutions
Since 1982

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE, EAST BRUNSWICK, NJ 08816
Ph: (800) 836-5011, Fax: (732) 254-0101

FOUR-SIDED CORNER RAIL
ICON SLIDE RAIL SHORING SYSTEM
MANUFACTURER'S TABULATED DATA



4-SIDED RAIL
ALLOWABLE MOMENT & SHEAR

M = 800 KIP-FT

V = 300 KIPS

4-SIDED RAIL
SECTION PROPERTIES

$S = 348\ IN^3$

$A = 86\ IN^2$

$A_V = 17.6\ IN^2$

SPECIFICATIONS FOR USE

1. THIS TABULATED DATA SHEET IS ONLY TO BE USED TO SUPPLEMENT A SITE SPECIFIC SHORING PLAN.
2. PROFESSIONAL ENGINEER PREPARING SITE SPECIFIC PLAN IS RESPONSIBLE FOR ENSURING ALL SOIL AND SURCHARGE LOADING ASSOCIATED WITH SITE SPECIFIC CONDITION IS WITHIN THE LIMITS OF THE ALLOWABLE LOAD RATINGS SPECIFIED IN THE TABULATED DATA FOR ALL COMPONENTS OF SLIDE RAIL SYSTEM AND RAIL ASSEMBLY.
3. ALL EXCAVATIONS SHALL BE IN ACCORDANCE WITH OSHA CFR 29, PART 1926, SUBPART P.
4. ALL EQUIPMENT COVERED UNDER THIS TABULATED DATA SHALL BE CERTIFIED ICON AND MARKED WITH ONE OF THE SERIAL NUMBERS COVERED BY THIS TABULATED DATA, CONTACT MANUFACTURER IF MARKING IS NOT FOUND.
5. SLIDE RAIL SHORING SYSTEM SHALL BE USED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER.
6. EQUIPMENT IS NOT CERTIFIED FOR USE IF RAILS ARE MODIFIED IN ANY MANNER.
7. CERTIFICATION IS NOT VALID IF THE SHORING SYSTEM SHOWS EXCESSIVE WEAR, IS PERMANENTLY DAMAGED, IS NOT MAINTAINED OR REPAIRED PROPERLY.
8. THESE RAILS SHALL ONLY BE USED WITH CERTIFIED ICON SLIDE RAIL EQUIPMENT.

CERTIFIED FOR:

SERIAL NUMBERS COVERED BY TAB DATA:

3275
3276
3277
3278
3279
3280

CERTIFIED BY:
MUST BE SIGNED & DATED

REGISTERED PROFESSIONAL ENGINEER
CHONG M KIM
No. 76674
Exp. 12/12
CIVIL
STATE OF CALIFORNIA

JAN 25 2012

D.H. CHARLES ENGINEERING, INC.
119 Aberdeen Drive, Suite 8
Cardiff, CA 92007
Ph: (760) 436-9756 Fax: (760) 436-9757

PREPARED BY: RAYMOND E. PRYMUS P.C.

FOR: ICON EQUIPMENT DISTRIBUTORS

TABULATED DATA OF ALLOWABLE LOADS FOR KRINGS SHORING PLATES

SHORING PLATE	DIMENSIONS			ALLOW. PRESSURE	MAX. ALLOWABLE DEPTH IN FT.			
	L	H	WALL		SOIL TYPE			
	FT.	FT.	IN.	PSF	A	B	C60	C80
070020	6.56	7.87	4.10	2,344	112.2	62.3	46.8	35.1
070020HD	6.56	7.87	4.72	6,345	312.3	173.5	130.1	97.6
070020XHD	6.56	7.87	4.72	7,091	349.6	194.2	145.6	109.2
070020XXHD	6.56	7.87	4.72	9,191	454.6	252.5	189.4	142.0
070020XXXHD	8.20	7.87	4.72	10,077	498.9	277.1	207.9	155.9
070025	8.20	7.87	4.10	1,500	70.0	38.9	29.2	21.9
070025HD	8.20	7.87	4.72	4,061	198.1	110.0	82.5	61.9
070025XHD	8.20	7.87	4.72	4,539	222.0	123.3	92.5	69.4
070025XXHD	8.20	7.87	4.72	5,882	289.1	160.6	120.5	90.3
070025XXXHD	8.20	7.87	4.72	6,449	317.5	176.4	132.3	99.2
070030	9.84	7.87	4.10	1,042	47.1	26.2	19.6	14.7
070030HD	9.84	7.87	4.72	2,820	136.0	75.6	56.7	42.5
070030XHD	9.84	7.87	4.72	3,152	152.6	84.8	63.6	47.7
070030XXHD	9.84	7.87	4.72	4,085	199.3	110.7	83.0	62.3
070030XXXHD	9.84	7.87	4.72	4,479	219.0	121.6	91.2	68.4
070035	11.48	7.87	4.10	765	33.3	18.5	13.9	10.4
070035HD	11.48	7.87	4.72	2,072	98.6	54.8	41.1	30.8
070035XHD	11.48	7.87	4.72	2,316	110.8	61.6	46.2	34.6
070035XXHD	11.48	7.87	4.72	3,001	145.1	80.6	60.4	45.3
070035XXXHD	11.48	7.87	4.72	3,291	159.6	88.6	66.5	49.9
070040	13.12	7.87	4.10	784	34.2	19.0	14.3	10.7
070040HD	13.12	7.87	4.72	1,364	63.2	35.1	26.3	19.8
070040XHD	13.12	7.87	4.72	1,525	71.3	39.6	29.7	22.3
070040XXHD	13.12	7.87	4.72	1,976	93.8	52.1	39.1	29.3
070040XXXHD	13.12	7.87	4.72	2,167	103.4	57.4	43.1	32.3

NOTES:

1. THE ABOVE DEPTH RATINGS INCLUDE LATERAL PRESSURE FROM A 300 P. S.F. SURCHARGE.
2. THE ALLOWABLE SOIL PRESSURES INCLUDE 33 1/3% OVERSTRESS FOR TEMPORARY USE.

DESIGN HAS BEEN REVIEWED BY THE PROFESSIONAL ENGINEERING FIRM OF RAYMOND E. PRYMUS P.C., N.Y. LICENSE # 050457.

PREPARED BY: RAYMOND E. PRYMUS P.C.

FOR: ICON EQUIPMENT DISTRIBUTORS

TABULATED DATA OF ALLOWABLE LOADS FOR KRINGS SHORING PLATES

SHORING PLATE	DIMENSIONS			ALLOW. PRESSURE	MAX. ALLOWABLE DEPTH IN FT.			
	L	H	WALL		SOIL TYPE			
	FT.	FT.	IN.	PSF	A	B	C60	C80
070045	14.76	7.87	4.88	620	26.0	14.4	10.8	8.1
070045SHD	14.76	7.87	3.94	933	41.7	23.1	17.4	13.0
070045HD	14.76	7.87	4.72	1,078	48.9	27.2	20.4	15.3
070045XHD	14.76	7.87	4.72	1,205	55.2	30.7	23.0	17.3
070045XXHD	14.76	7.87	4.72	1,561	73.1	40.6	30.4	22.8
070045XXXHD	14.76	7.87	4.72	1,712	80.6	44.8	33.6	25.2
070050	16.40	7.87	4.88	502	20.1	11.2	8.4	6.3
070050SHD	16.40	7.87	4.72	827	36.4	20.2	15.1	11.4
070050HD	16.40	7.87	4.72	873	38.7	21.5	16.1	12.1
070050XHD	16.40	7.87	4.72	976	43.8	24.3	18.2	13.7
070050XXHD	16.40	7.87	4.72	1,265	58.2	32.4	24.3	18.2
070050XXXHD	16.40	7.87	4.72	1,387	64.3	35.7	26.8	20.1
070055HD	18.04	7.87	4.72	722	31.1	17.3	13.0	9.7
070055XHD	18.04	7.87	4.72	806	35.3	19.6	14.7	11.0
070055XXHD	18.04	7.87	4.72	1,045	47.3	26.3	19.7	14.8
070055XXXHD	18.04	7.87	4.72	1,146	52.3	29.1	21.8	16.3
0700625HD	20.51	7.87	4.72	558	22.9	12.7	9.5	7.2
0700625XHD	20.51	7.87	4.72	624	26.2	14.6	10.9	8.2
0700625SXHD	20.51	7.87	4.72	819	35.9	20.0	15.0	11.2
0700625XXHD	20.51	7.87	4.72	809	35.4	19.7	14.8	11.1
0700625XXXHD	20.51	7.87	4.72	887	39.3	21.9	16.4	12.3

NOTES:

1. THE ABOVE DEPTH RATINGS INCLUDE LATERAL PRESSURE FROM A 300 P. S.F. SURCHARGE.
2. THE ALLOWABLE SOIL PRESSURES INCLUDE 33 1/3% OVERSTRESS FOR TEMPORARY USE.

DESIGN HAS BEEN REVIEWED BY THE PROFESSIONAL ENGINEERING FIRM OF RAYMOND E. PRYMUS P.C., N.Y. LICENSE # 050457.

PREPARED BY: RAYMOND E. PRYMUS P.C.

FOR: ICON EQUIPMENT DISTRIBUTORS

TABULATED DATA OF ALLOWABLE LOADS FOR ICON SHEETING SYSTEM

TABLE "F":	SLIDE RAIL SECTIONS		ASTM 572, GR 50 STEEL	
			Mr	Vr
RAIL SECTION			K-FT.	KIPS
STANDARD SINGLE SLIDE RAIL		SSR	86.9	91.7
CORNER SINGLE SLIDE RAIL		CSSR	69.9	64.2
STANDARD DOUBLE SLIDE RAIL		DSR	311.5	170.0
CORNER DOUBLE SLIDE RAIL		CDSR	216.5	103.3
HEAVY DUTY DOUBLE SLIDE RAIL		HDDSR	385.8	176.7
EXTRA HEAVY DUTY DOUBLE SLIDE RAIL		XHDDSR	469.2	183.3
PARALLEL SLIDE RAIL		22'	723.4	156.7

NOTE: LOADS SHOWN IN TABLE "F" INCLUDE 33 1/3% OVERSTRESS FOR TEMPORARY USE.

DESIGN HAS BEEN REVIEWED BY THE PROFESSIONAL ENGINEERING FIRM OF RAYMOND E, PRYMUS P.C., N.Y. LICENSE # 050457.

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PREPARED BY: RAYMOND E. PRYMUS P.C.
FOR: ICON EQUIPMENT DISTRIBUTORS

KRINGS SHEETING SYSTEM
ALLOWABLE LOADS

TABLE "C": RAIL SECTIONS

RAIL SECTION	ST-37 STEEL Mr K-FT.	Vr KIPS	ST-52 STEEL Mr K-FT.	Vr KIPS
KR-DG KOMBI (W/O GUIDE)	117.4	121.1	176.1	181.6
KR-DG KOMBI (WITH GUIDE)	129.3	121.1	193.9	181.6
KR-DG KOMBI-SL	227.9	121.1	341.8	181.6
HEAVY DUTY (SECTION I) Bottom KMD	462.1	121.1	693.0	181.6
HEAVY DUTY (SECTION II) Middle KMD	596.0	121.1	893.9	181.6
HEAVY DUTY (SECTION III) Top KMD	572.3	121.1	858.4	181.6
SUPER SYSTEM (CENTER)	848.7	264.7	1273.0	396.9
SUPER SYSTEM (ENDS)	483.4	264.7	725.1	396.9
TRIPLE SLIDE RAIL (SECTION A-A)	1842.2	316.7	2763.0	475.0
TRIPLE SLIDE RAIL (SECTION B-B)	1428.3	316.7	2142.2	475.0
TRIPLE SLIDE RAIL (SECTION C-C)	1338.5	316.7	2007.6	475.0
TRIPLE SLIDE RAIL (SECTION D-D)	875.2	316.7	1312.7	475.0

NOTE: LOADS SHOWN IN TABLE "C" INCLUDE 33 1/3% OVERSTRESS FOR TEMPORARY USE

Design has been reviewed by the professional engineering firm of Raymond E. Prymus P.C.
N.Y. license # 050457.

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RAYMOND E. PRYMUS P.C.
P.O. Box 234
Bayport, New York 11705
Phone: 631-472-4964 Fax: 631-472-6083

PREPARED BY: RAYMOND E. PRYMUS P.C.

FOR: ICON EQUIPMENT DISTRIBUTORS

TABULATED DATA OF ALLOWABLE LOADS FOR MODIFIED G A F SLIDE RAILS

	ST-37 STEEL	
	Mr	Vr
SLIDE RAIL SECTION	K-FT.	KIPS
SECTION A-A	483.7	267.8
SECTION B-B	827.0	309.7
SECTION C-C	849.2	310.8
SECTION D-D	1,298.5	340.0

NOTE:

LOADS SHOWN IN TABLE "F" INCLUDE 33 1/3% OVERSTRESS FOR TEMPORARY USE.

DESIGN HAS BEEN REVIEWED BY THE PROFESSIONAL ENGINEERING FIRM OF RAYMON PRYMUS P.C., N.Y. LICENSE # 050457.

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ICON Equipment Distributors, Inc.
300 Ryders Lane, East Brunswick, NJ 08816

Standard Installation Instructions for Slide Rail (SR)

1. Determine the proper inside trench width required from the contract drawings and consult the trench width tables indicating the proper brace configurations. Also, check contract plans to determine the trench depth required and the type of soil to be excavated. These items will determine the soil pressure on the system and also determine the proper lining plates to use based upon that soil pressure. Single Slide Rails are used for the excavation up to 12' and Double Slide Rail systems are used up to 32'. Additionally, the size of pipe, box culvert or structure will dictate the clear span (cantilever) below the bottom brace required for installation. Several slide rail designs are available to provide the required rail strength to support the lining plates in cantilever. Generally, Single SR are for small pipe installations, Standard Double SR systems are for small to medium size pipes, Transformer or KMD (Krings) Double SR systems are for medium to large pipes, as, high earth pressures combined with large pipe or box culvert installations. Finally, Krings Triple, GAF or Transformer Triple SR Systems are for deep excavations (Generally 24' to 32') with high soil pressures and large pipe or box culvert installations. Typically, the Triple SR System will provide up to 15' below the bottom brace for working room. Upon deciding the proper plates, rails and braces to use, assemble the steel tube braces or W I-beam braces with extensions where required, to form the SR pair conforming to the inner trench width for your project.
2. Before excavating, locate existing utilities that cross your trench by calling the utility companies for existing utility locations or reviewing as built plans. It is best to use plate lengths that will allow you to install the most modules per linear foot of trench. For example, with utilities at 25' spacing on average, the 9.84', 11.48' and 13.12' plates would be best sizes to select. Areas that allow utility relocation or with very few utilities lend themselves to the use of 14.76' and 16.4' lining plates so that productivity can be increased. Utility lines parallel to the proposed trenches shall be identified and located. Determine the inner trench dimension required (based upon the contract documents) and add 1.26' for Single SR, 2' for Double SR and 2.8' for Double Transformer SR to inside dimension to determine the outside dimension of Slide Rail System. When Krings Triple, GAF or Transformer Triple Rails are used, add 4' to the inside width to determine outside width of sheeting system. Proper use of the equipment during installation will insure that no soil adjacent to the system is lost and therefore parallel utility lines will be supported at all the times.

Installation Instructions for Slide Rail (SR) Trench

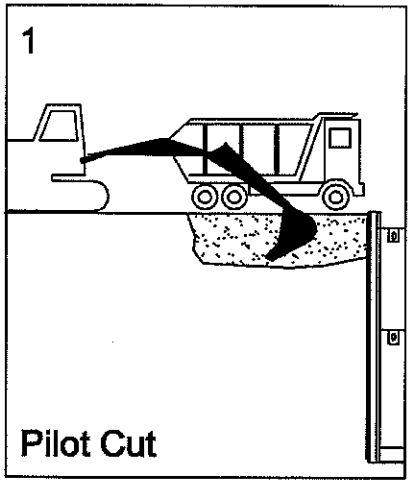
3. Excavation and installation of the trench support system may now begin. Excavate the length of one module (6.56' to 20.5') and the outside width of the system allowing extra room for some adjustment in the sheeting position. When saw cutting pavement, allow distance for outside width of system plus an additional 0.5' (minimum). Depending upon the soil, location and condition of parallel utility lines, the pilot cut should be to such a depth that there are no breaks in the vertical trench walls but in no case shall the initial trench depth exceed 5' [29 CFR 1926.650 - .653 (Subpart P)]. If no utility lines are uncovered crossing the trench or are indicated on as-built plans or by the utility companies, then follow directions for lining plate installation (see step 5). If utility lines

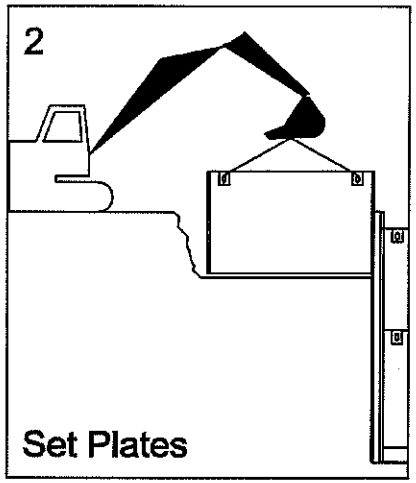
are uncovered or indicated on plans or by utility companies, then proceed with step 4 for utility line shoring and support instructions.

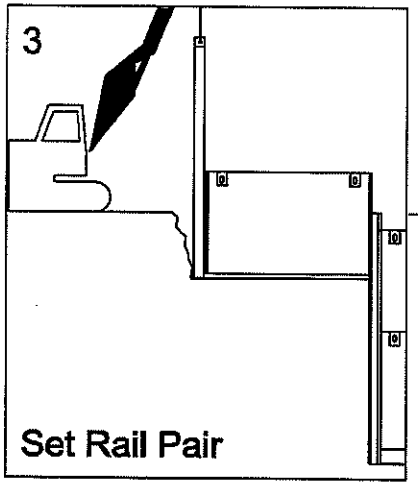
4. Several methods for utility line shoring are used. Upon encountering utility line crossing that are perpendicular to the trench centerline and are within 5’-6’ from the last slide rail pair placed into the trench you may install horizontal wood lagging on both sides of the trench. In the case of multiple utility line crossings which span a distance greater than 5’-6’ along the pipe centerline you may install an Internal Waler Frame with utility panels.
5. Assuming no utility lines will be encountered, proceed with lining plate installation. To start the first bay of sheeting, pick a pre-assembled slide rail pair and place it in the pilot cut perpendicular to the centerline of the trench. Make sure the rail pair is centered. Use a large timber, H-Beam or lining plate laid across the trench to lean the rail pair against until the first lining plate is interlocked and the rail pair can stand by itself. Use the longest lining plate possible conforming to project conditions so that the sheeted trench is maximized with each module is installed. Pick up a base plate (with cutting edge) and interlock the plate end with the slide rail just placed in the trench. Interlock another base plate of identical size in the other rail (the base plate must be inserted in the outermost track first in the case of double and triple slide rail systems). Position both plates so that they are centered around the trench centerline and they are the proper distance apart to allow the next slide rail pair to be lowered over the top of the end sections. A wooden template can be cut to conform to the proper plate spread and a target can be placed in the center of the template to indicate the centerline. This procedure is especially helpful to excavator operators and surveyors. Upon proper placement of the two plates, pick up a pre-assembled slide rail pair and place it over the end of the two plates interlocking the rails and plates.
6. After installing the second slide rail pair, begin excavating inside the sheeting. Initially excavated material must be deposited behind the lining plates to stabilize the system. Back filling the pilot cut prevents the sides of excavation from failing and causing the trench sides to crack and move. Once the space between the plates and the pilot cut wall has been filled the lining plates can be pushed in the ground as the excavation proceeds. It is suggested that a full back hoe bucket be used to push the rails and plates into the ground as excavation proceeds. The back hoe should excavate material, push the system down and then cast the material aside or load a waiting truck. This method will allow the trench support system to lower into the ground as excavation proceeds thus reducing stress and will make installation and removal of the equipment easier. The initial plates and rails should be pushed to depth of 7.5’. At this time if an unexpected utility is encountered an Internal Waler Frame can be inserted in the inner rail and utility panels can be used to sheet vertically around the utility. Alternatively, the utility can be temporarily disconnected, with approval of the responsible utility, to allow installation of additional lining plates.
7. If a Single Slide Rail system is used, (Maximum allowable depth is 12’) then pick up two extension plates (4’ High) and place them on top of the previously placed lining base plates one at a time. If you are to excavate to 20’ or more with a Double Slide Rail system, an extension plate must be installed in the outside rail on top of the first lining base plate. Remember, the purpose of Double and Triple Slide

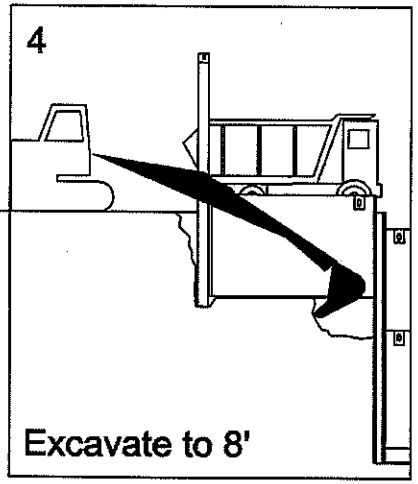
Rail system is to limit the area of plate in any one track so that installation and withdrawal is as easy as possible.

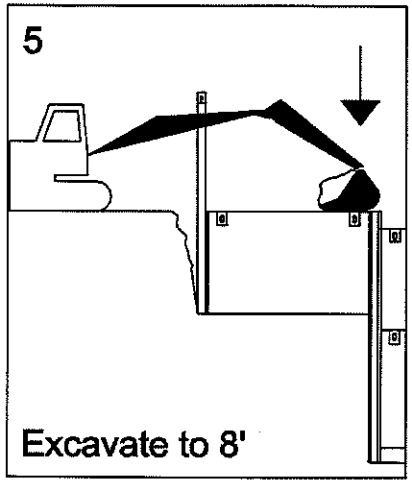
8. Excavations from 12’ to 16’ require 8’ base plates to be installed in both inner and outer tracks. Excavations to 20’ deep require 8’ base plates and 4’ extension plates to be installed in the outer track and 8’ base plates to be installed in the inner track. Extension and Base plates should be connected with H-Brackets and Pins. Failure to do this will result in unsafe conditions and difficulty in removing the lining plates during back fill operations.
9. Slide Rails come in many lengths for different applications.
   Single SR are 11.48’ or 12’ long for shallow excavations up to 12’.
   Double SR of 14.76’ & 18’L are used for excavations 16’ and 20’ depth.
   Double SR of 22’L are used for excavations 20’ and 24’ depth.
   Many times, for deeper excavations extension rails are used with 14.76’, 18’ or 22’ DS Rails.
   The procedure of excavating and pushing plates and rails into the ground is always the same, regardless of depth, width or configuration of the system.
10. Most SR sheeting can be installed using a track excavator. Packed gravel, clay or small rocks may become lodged in the slide rail preventing the plate from moving down the rail into the excavation. When this occurs, hand work with a pick is required to clean the rail. Obstructions such as timber and boulders must also be removed before attempting to push the sheeting into the ground.
    ** If the excavator has trouble pushing the system into the ground there is a reason for this. Check for alignment, boulder, clogged rails or other obstruction problems. **
11. Very large structures or pipes may require that a system brace be removed prior to installation of the structure. This can be accomplished by installing a strut below the proposed structure which spans between the slide rails located on opposite sides of the trench. Once the strut has been installed then bottom brace can be removed. The large structure can be placed without obstruction. The excavation shall be backfilled and the system extracted.
12. In all cases after the sheeting system has been installed and excavation is complete to subgrade, the pipe and/or structure(s) shall be constructed or installed in accordance with the contract documents.
13. Removal of Slide Rail sheeting system is accomplished by reversing all installation procedures and properly compacting the trench in accordance with the contract documents. Inner lining plates are removed first and slide rail pairs are withdrawn as back fill proceeds. Outer plates are removed last and upon reaching a back fill depth of less than 5’ in stable ground, the last plates and slide rail pairs are removed from the trench.
14. If the surcharge exceeds 3’ of soil the contractor shall reinforce the sheeting system and protect it from damage. Additionally, all slide rail designs assume that the contractor shall properly DEWATER the excavation.
15. All manufacturer’s instruction as well as applicable contract provisions shall be observed in connection with sheeting installation and removal.
16. Excavations deeper than 20’ requires Site Specific Engineering by a Professional Engineer.

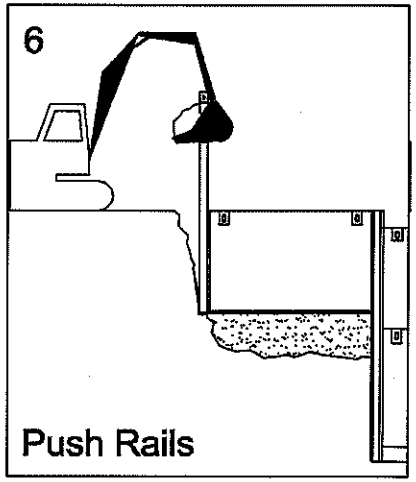


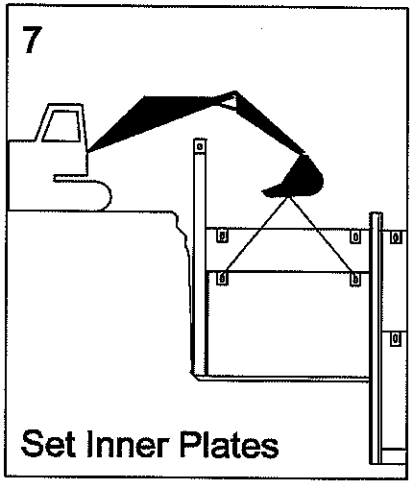


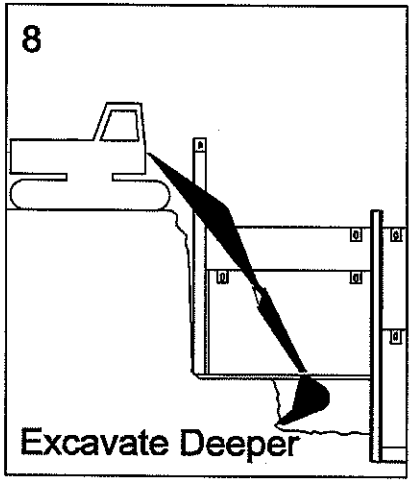


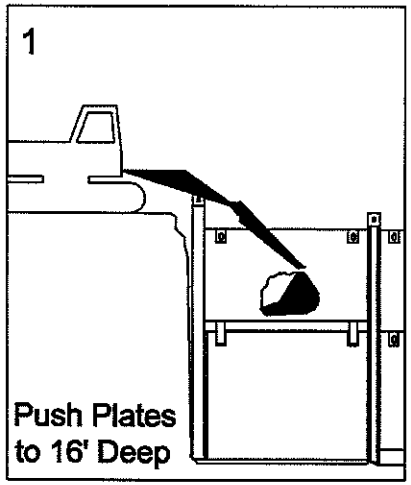


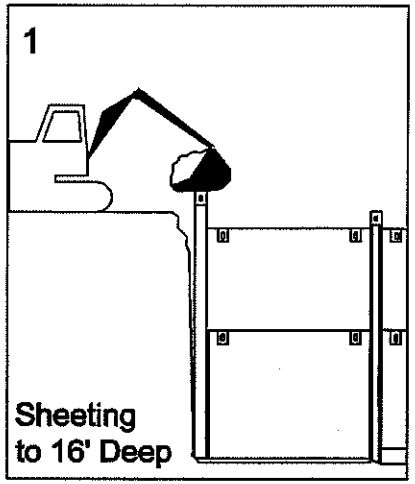












Installation Sketches

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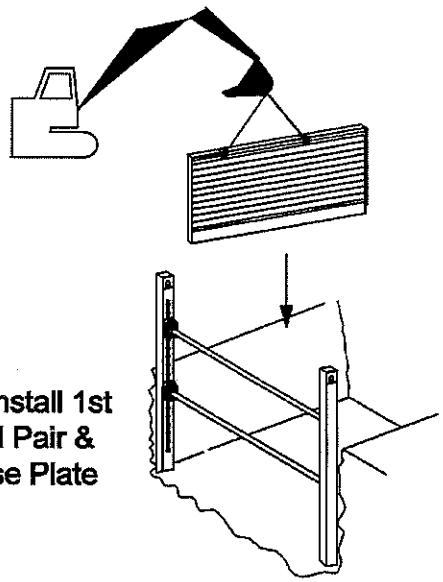
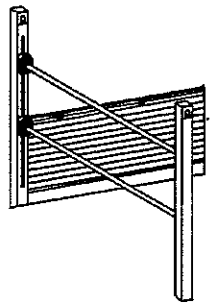
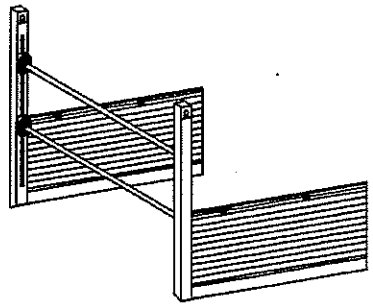


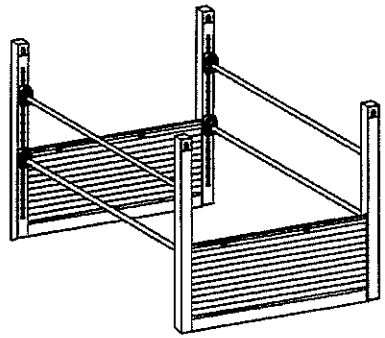
1. Install 1st Rail Pair & Base Plate



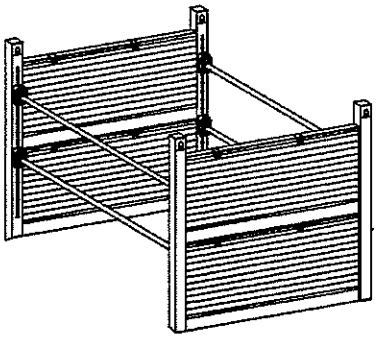
2. Completed installation of 1st Rail Pair & Base Plate in outer track



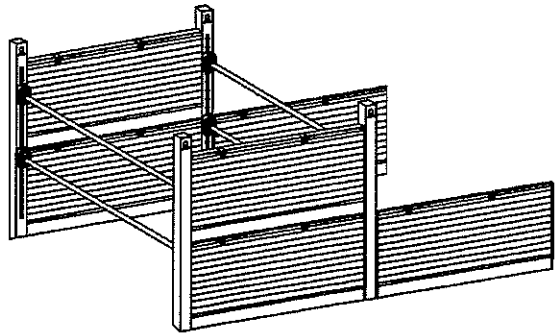
3. Install Base Plate in outer track on other side of trench



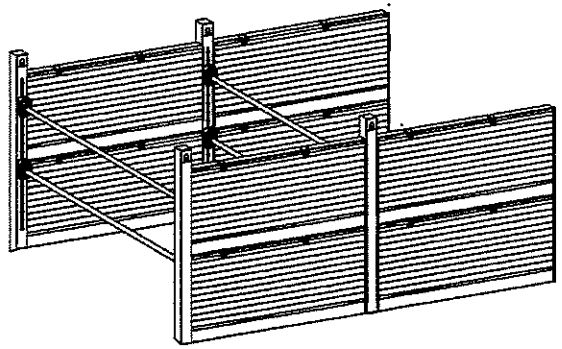
4. Install 2nd Rail Pair at the end of panels



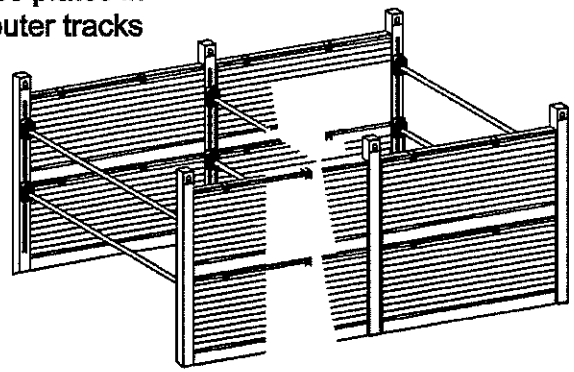
5. Install base plates in inner tracks on both sides



6. Install base plates in 2nd bay in outer tracks



4. Install base plates in inner tracks on both sides in 2nd bay



4. Install 3rd Rail Pair at the end of panels

Slide Rail Trench Installation

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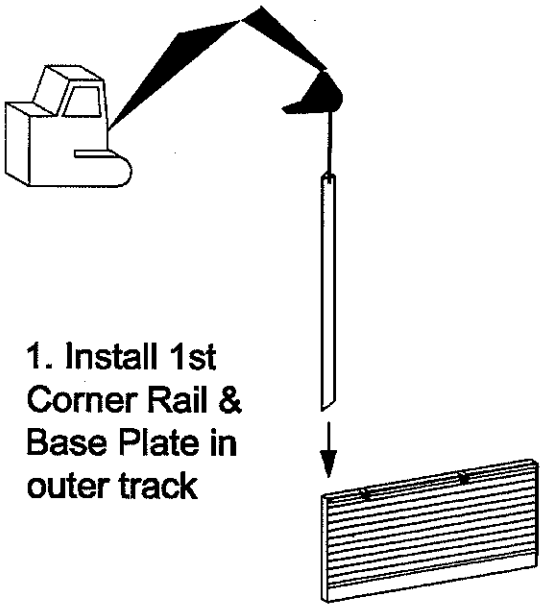
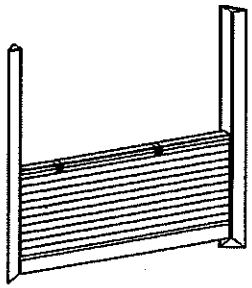
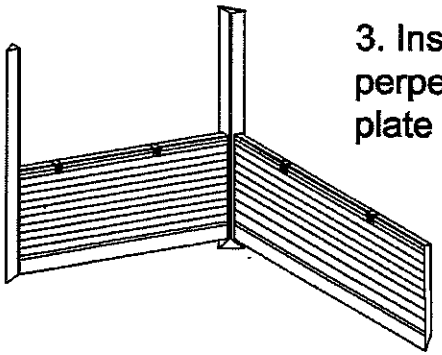


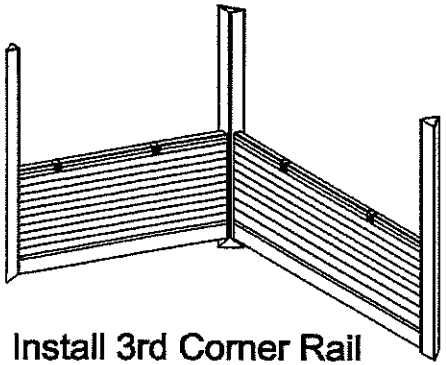
1. Install 1st Corner Rail & Base Plate in outer track



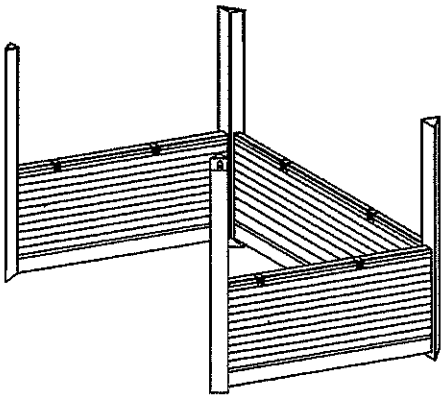
2. Install 2nd Corner Rail at the end of panel



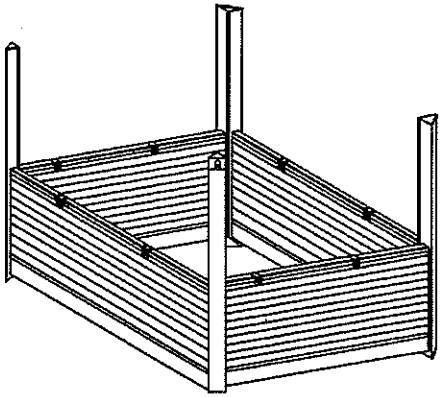
3. Install base plate perpendicular to first plate in outer track



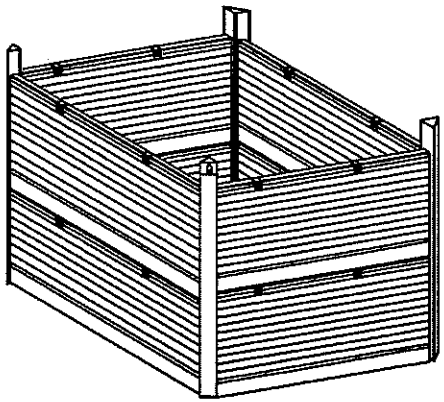
4. Install 3rd Corner Rail at the end of 2nd panel



5. Install base plate perpendicular to 2nd plate in outer track and 4th corner rail



6. Install 4th base plate in outer track between 4th and 1st corner rails



7. Install more base plates in inner tracks to go deeper

Slide Rail Pit Installation

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Roller Rail Use Instructions

1. After assembly of the Roller Rail Pair, a pilot cut approximately 4 feet in depth must be dug. The pilot cut should be several inches larger than the outside width of the rail pair and as long as two rail pairs and set of lining plates. Since the Roller Rail Mechanism is pinned at the first hole location the rail extends below the brace. If possible a small hole, 12 inches deep, can be dug at each future rail location (see excavation pilot cut sketch). This will allow the rail pair to rest in the holes and the brace frame will rest on the excavation subgrade.
2. Two methods can be used to set up the initial bay of Roller Rail Sheeting.

   Method # 1: If the work area is not restricted and the pilot cut can be a couple of feet wider than the slide rail pair the first base lining plate can be placed in the pilot cut in a location that coincides with the outside track of the double rail. Once the lining plate knife edge is properly positioned the excavator can place a bucket of soil on either side of the plate to stabilize it and give it enough support to stand vertical. After the base lining plate has been stabilized, the Roller Rail Pair can be lifted into position over the base lining plate interlock so that the outer track can be lowered over the interlock.

   Method # 2: If the work area is very tight requiring the pilot cut to be cut close to the rail outside dimension the Roller Rail should be placed in the pilot cut first, making sure the rail pair is perpendicular to the excavation centerline and centered on that centerline. The rail pair can be held vertically by another machine, the excavation itself or a beam or rail pair placed on the ground across the excavation. The first base lining plate is then lifted above the rail pair and the plate interlock is lowered into the rail pair outer track.
3. After the initial rail pair and base plate have been set the second plate is placed in the opposite outer rail and parallel to the other plate.
4. The second Roller Rail Pair is lifted into position over the ends of the previously placed base plates and lowered on the interlock in the outer track of the rail pair. This completes your initial assembly of the first bay of sheeting and we can now proceed with excavation and shoring.
5. Your initial buckets of soil that are excavated from the system can be placed outside the base lining plates to fill the annular space between pilot cut and the shoring system. Make sure to place an equal amount of soil on each side so that the system remains erect. When the both spaces have been filled, the excavator can be used to adjust the rails and plate to a vertical and horizontal position. You are now ready to begin excavation.
6. Excavate inside the shoring system and with each full bucket push on the rails and plates alternately, lowering the system into the excavation as soil is removed. Since this is a Roller Rail System the rails will roll vertically and the brace frame will maintain it's position. Watch the plate and rail interlock to make sure they are tight and parallel. If this interlock separates it indicates that the system is not square and needs to be adjusted before proceeding. Close supervision of this fact will allow the system to go into the ground easily and be removed easily. When the first 8'high base plates are at ground level we are now ready for the next set of plates.
7. At this point if you are excavating to 16', you will pick up second set of base plate and insert them into the rail inner tracks. If you intend to excavate to 12'or 20'you must pick up your first set of 4'high extension plates. H-Brackets can be connected at the bottom of extension

plates so that they can be attached to the base plates already in the shoring system. The extension plates are inserted into the outer tracks of the rail pair and pinned to the base plates using the previously attached H-Brackets. Once the base plates or extension plates are inserted the excavation inside of the system can proceed. As before as full buckets of soil are excavated the plates and rails are pushed into the ground. As the system extends to 12', 16', 20' or ultimately 24' keep the bottom of the brace frame approximately no more than 6-8 from subgrade.

8. If you are excavating to 12 or 16 feet, once the base/extension plate combination or second base plate pair reaches ground level you can adjust the brace frame to the appropriate dimension from excavation subgrade, the mechanism pins that were placed in the bottom hole of the rail can be relocated to the hole under the brace frame that corresponds to the engineered dimension above subgrade and then proceed with the next bay of sheeting. If you are excavating to 20' after the base/extension plate combination reaches ground level a second set of base plates is inserted into the inner rail track and excavation can proceed. Once subgrade is obtained the brace frame can be adjusted to the required dimension above subgrade. Finally, if you are excavating to 24' a second extension plate pair can be placed on top of the inner base plates and the system can be excavated and pushed to that depth.
9. Removal of Roller Rail System and back fill of the excavation involves a direct reversal of the installation process. The inner plates are withdrawn as back fill proceeds. The mechanism pins are moved to the top and bottom holes in the rails so that the rails can be withdrawn. Once the inner plates are removed the outer plates are removed as the excavation is completely back filled.

WARNINGS !!!

1. Never push on the Roller Rail Brace Frame with the backhoe bucket. Permanent damage to the system may occur.
2. Always maintain the Brace Frame near the bottom of excavation in shallow cuts (12') and in the middle of the excavation in deeper cuts. Exceeding the design cantilever during excavation may lead to deflection and deformation of the rail that cannot be repaired.
3. During excavation, the Roller Rail Brace Frame must be free to roll vertically. Never leave the pins in the rail and try to push both rails and brace frame as a unit. This will damage the entire support system.
4. All plates must be withdrawn vertically so that they exit the rail track without damage to the track.
5. Roller Rails and Brace Frames must be withdrawn using lifting rings (lifting holes) on the rails and never use your bucket to pull the entire system out of the ground using brace frames.

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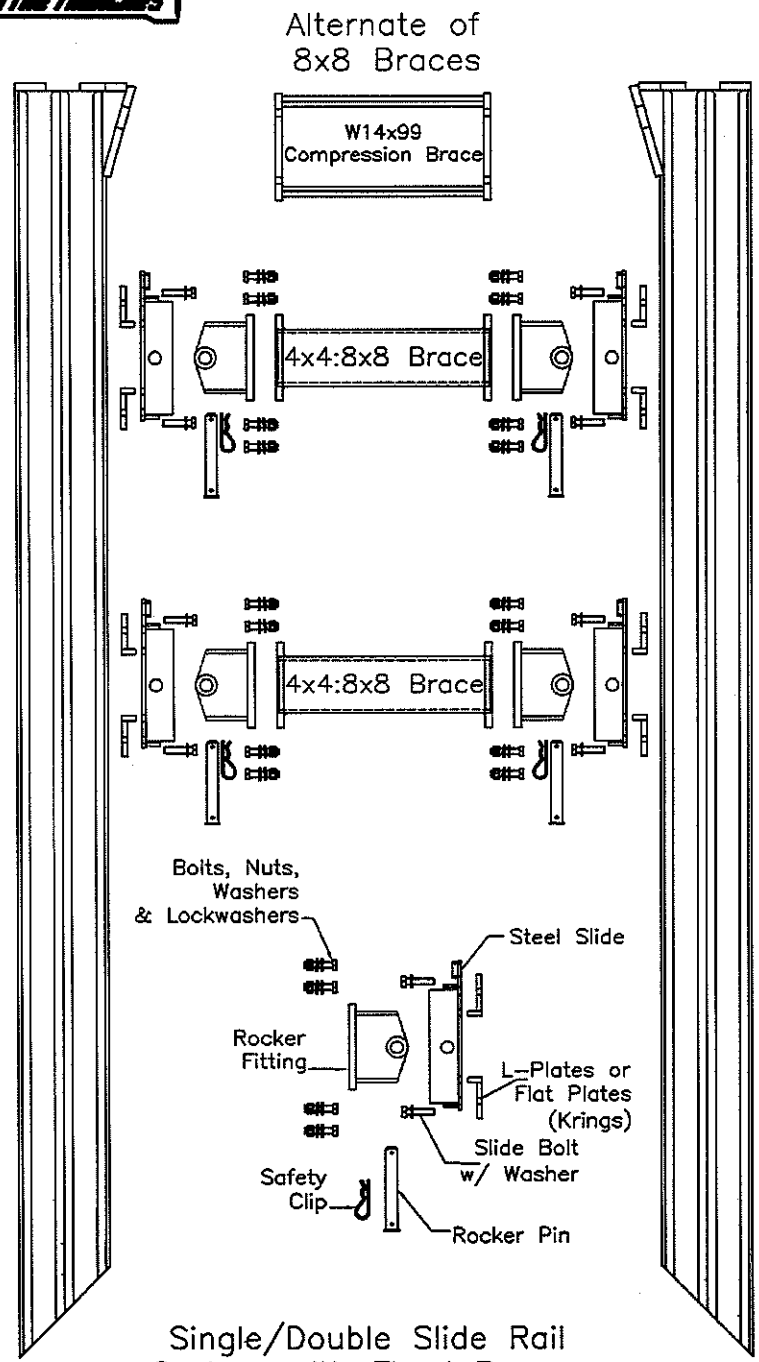
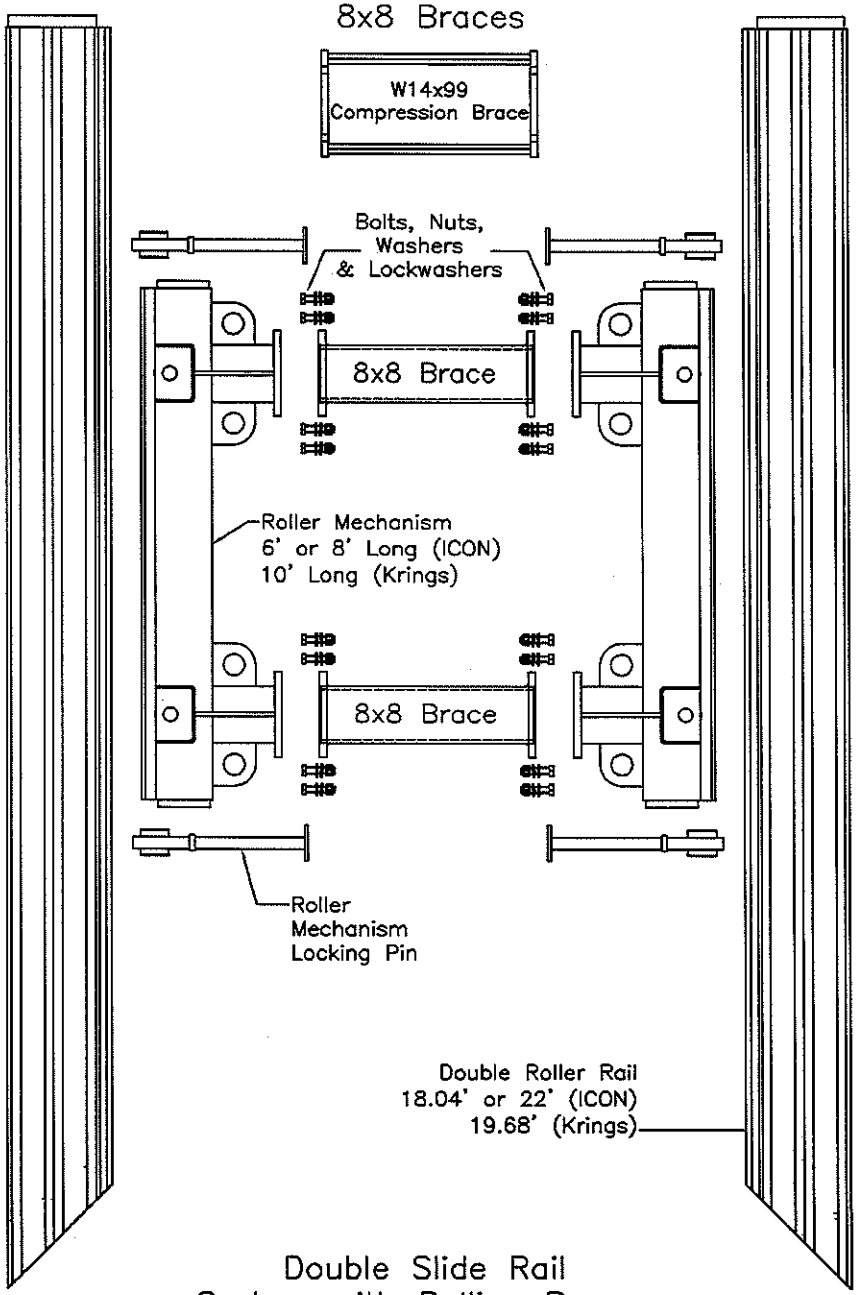


Single/Double Slide Rail
System with Fixed Braces



Double Slide Rail
System with Rolling Braces

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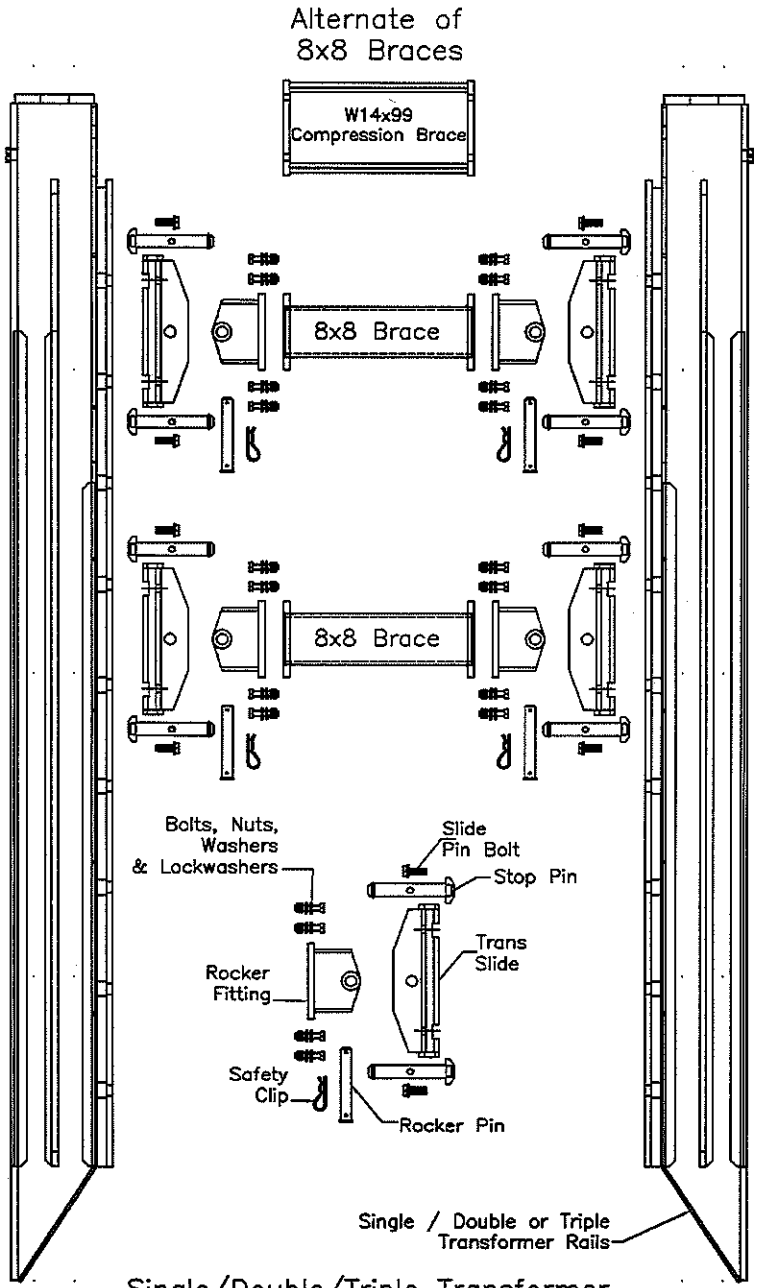
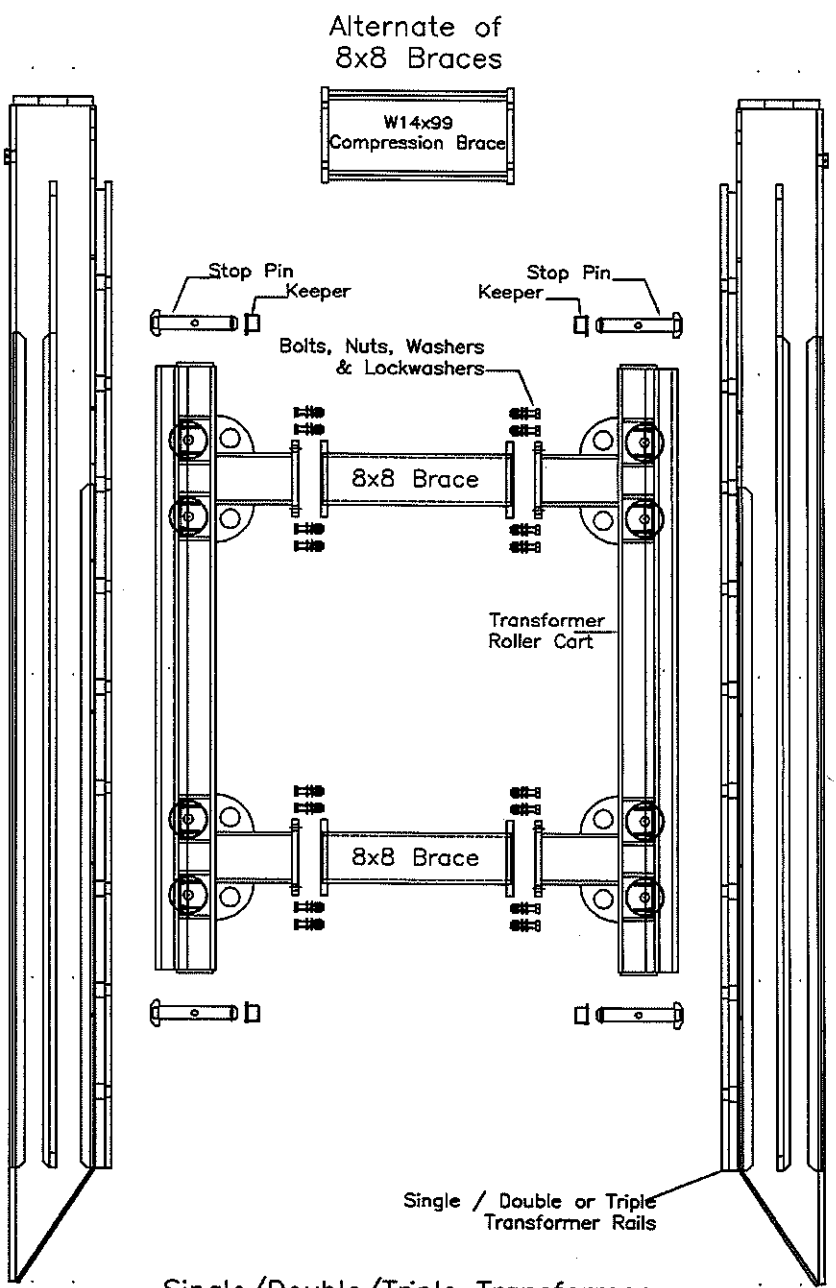


Single/Double/Triple Transformer
Slide Rail System with Fixed Braces



Single/Double/Triple Transformer
Slide Rail System with Rolling Braces

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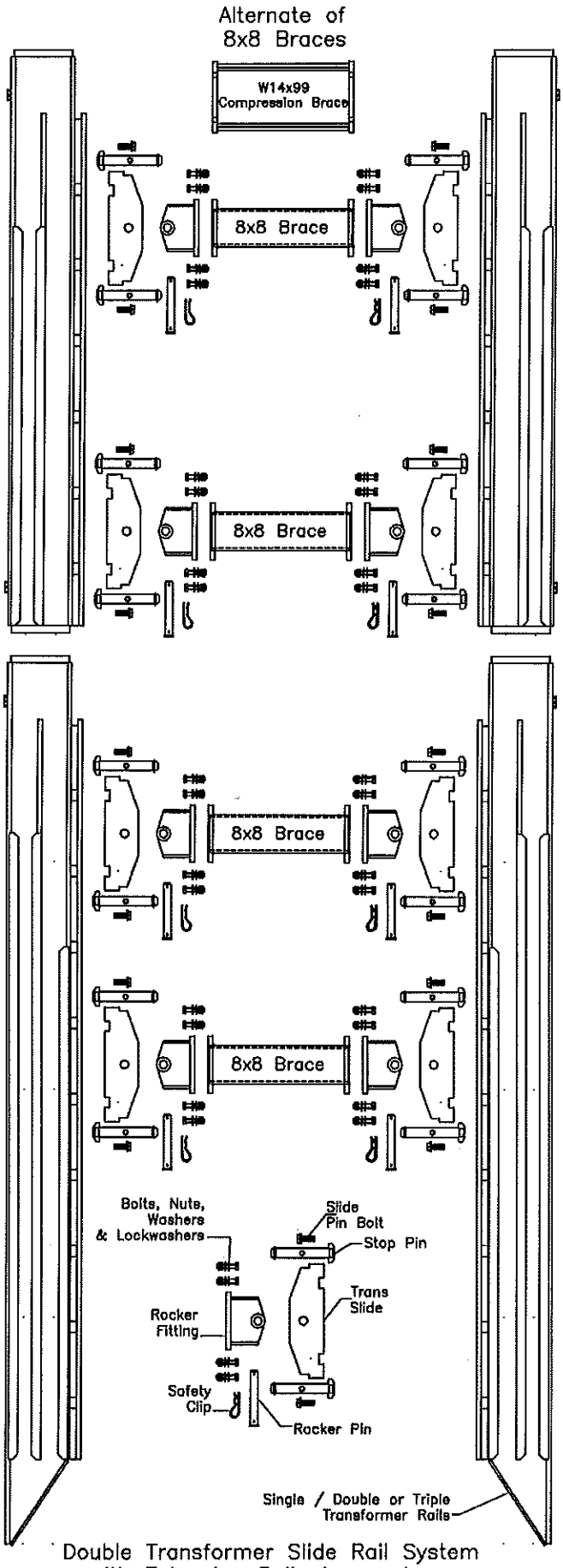
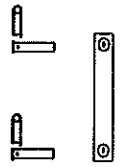
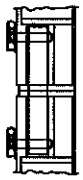
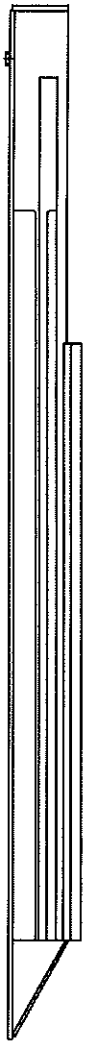


Double Transformer Slide Rail System
with Extension Rails to go deeper
(Fixed Bracing)

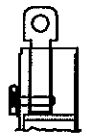
SAME
Rail Connector
for
Trench Rails
&
Corner Rails

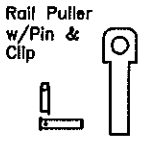


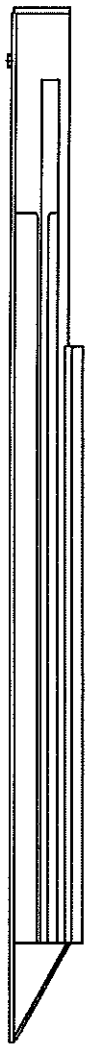




Double SR Corners
with Extension Rails
to go deeper





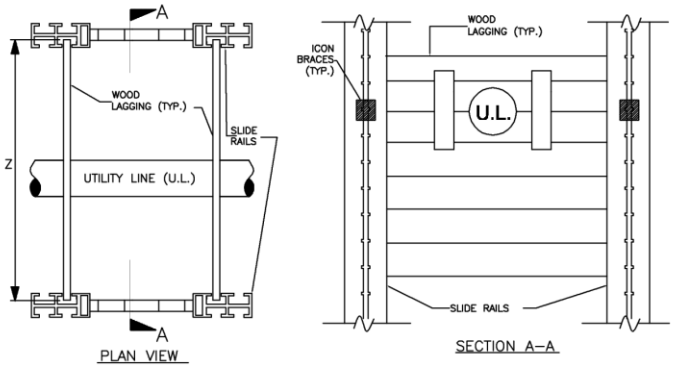


Corner Rail
Lifting

ICON Equipment Distributors, Inc.
300 Ryders Lane, East Brunswick, NJ 08816

Suggested Utility Crossing Instructions (Fig. A)

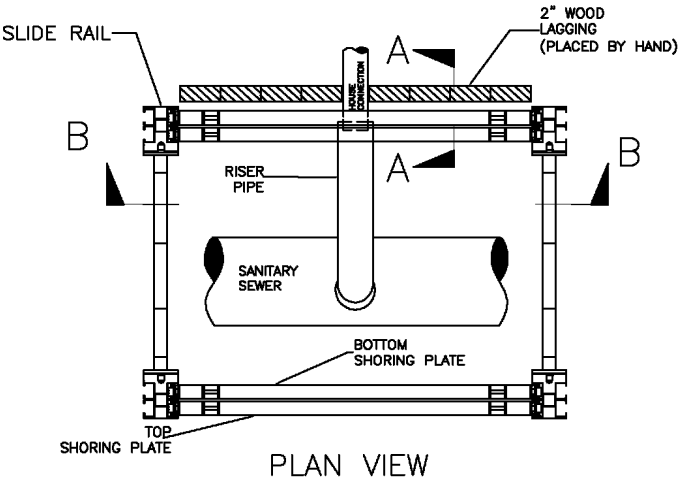
1. Determine location of all utility lines crossing trench.
2. Where utility lines cross trench, place one slide rail pair on either side of the utility line or lines. Stabilize the slide rail pairs and lag with wood between the flanges of the slide rail tracks.

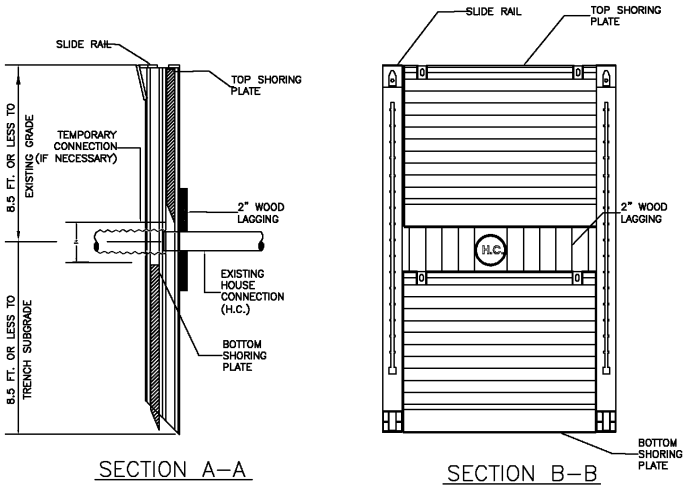


3. Move the backhoe back along centerline and excavate for the next module of sheeting and follow directions for slide rail lining installations. As the rails and linings are pushed into the excavation lag the area between the adjacent rails and around the utilities.
4. Support the utility line as excavation proceeds as required by the responsible utility company.

Sewer House Connection Flume Procedure

1. Determine the location and approximate depth of the existing house connection. If the house connection is within 8.5’ of existing grade and the proposed trench subgrade proceed with this method.
2. Pilot cut to 5’ maximum. Install slide rail system and proceed as usual with the excavation while pushing the slide rail system into the soil.
3. Advance the excavation until the utility is exposed and stop lowering the sheeting system.
4. Expose the house connection, cut the pipe and install the inner lining plates to proceed with the excavation. Advance the inner plates to such an elevation (beyond proposed subgrade if necessary) until the top of the plate is lower than the house connection invert. The space between the upper and lower plate must not exceed 18”.

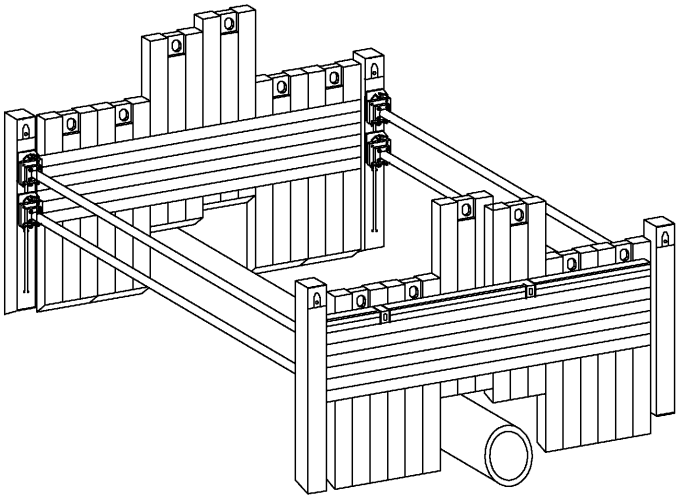




5. Install 2” wood lagging by hand behind the two plates at the exposed face.
6. Install temporary pipe or flume, if necessary, to handle discharge from the house connection.

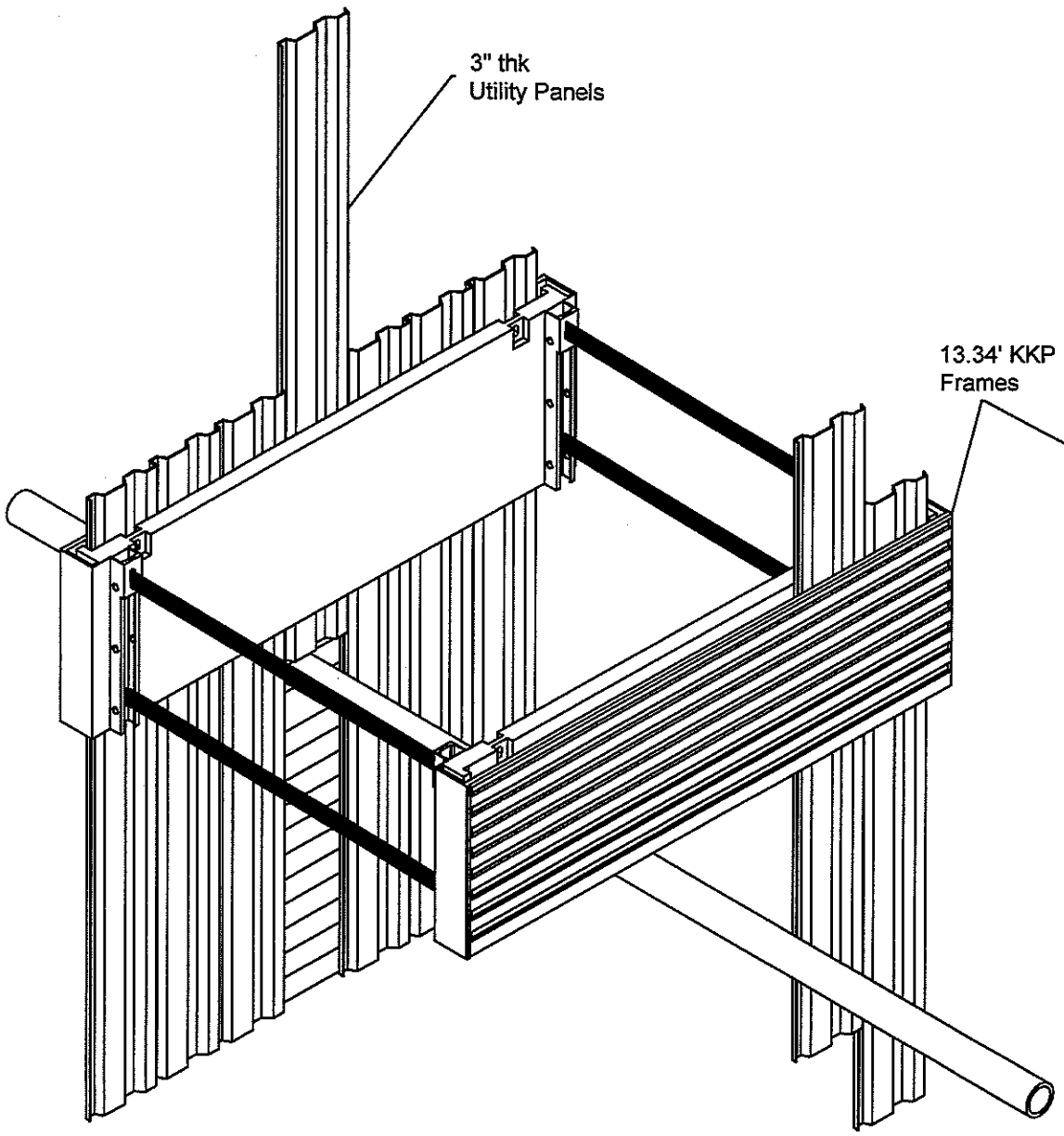
7. Construct the sanitary sewer and riser pipe for the house connection.
8. When backfilling is to begin, remove any temporary connections, deposit soil, compact and raise lower (inner plate to an elevation just above the house connection crown).
9. Complete the new house connection tie in and resume backfilling.

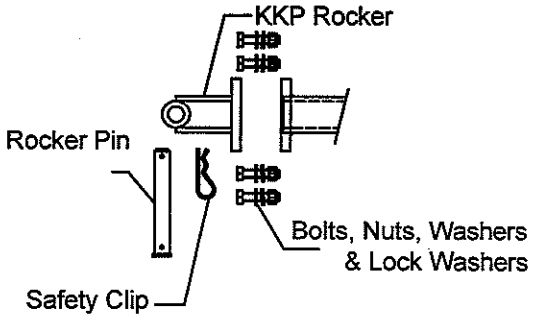
Internal Waler / Utility Frame Procedure

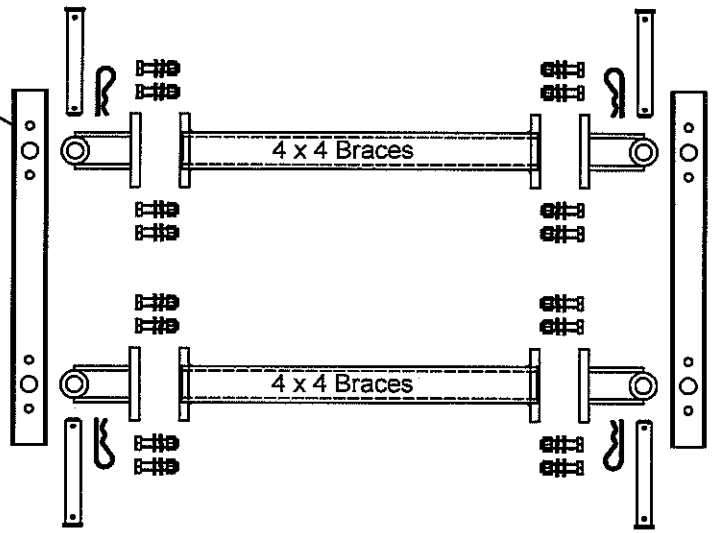


1. Excavate the pilot cut, not to exceed 5' and expose any existing utility lines. When using Internal Waler Frame (IWF) in conjunction with the slide rail systems, lift a frame and slide frame interlock in the most inner track of the rail. If the utility is crossing other side of the trench, install a frame on that side as well. If utility is not crossing other side, then install lining plate on that side. Pick up a pre-assembled rail pair and place it over the end of the side panels to complete the module.
2. If you are using KKP Frames independently then assemble appropriate length steel tube braces with 2- KKP Frames to complete the module. After digging pilot cut, place this pre-assembled KKP Frame module in that.
3. Utility panels are inserted vertically in the Internal Waler or KKP Frame so that they conform to the template in the frame around existing utilities. Utility support measures must be installed at this time in accordance with contract requirements and utility company's direction. Bottom of the utility must be shored with wood lagging to close the gap in the sheeting. As excavation proceeds, the utility panels are pushed vertically making sure the trench walls are supported at all time.
4. The utility panels are supported in the upper section of the trench by Internal Waler or KKP Frame and in the lower section of the trench by unexcavated soil. As the excavation proceeds, the unsupported span from the excavation lengthens and may require walers or cross braces to lend additional support to the utility panels. These additional waler or cross braces can be hung from the frame by chains (See your SS Engineering Design calculations for waler and cross brace locations and sizes). If the span is short, then this can be achieved by towing utility panels in to unexcavated soil.
5. Upon installation of all pipes and structures and completion of all underground work, the utility panels can be lifted as backfill and compaction is accomplished in accordance with contract requirements. The utility panels shall not be withdrawn ahead of the backfill.

This is a Stand-Alone shoring system to be used where lots of utilities are present. Multiple bays can form continuous system





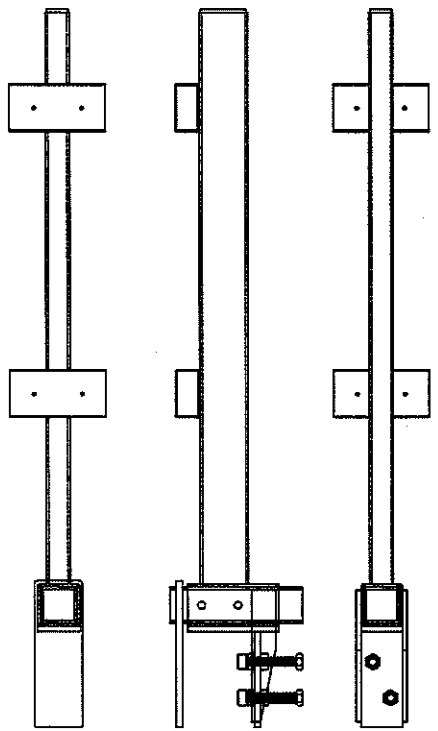


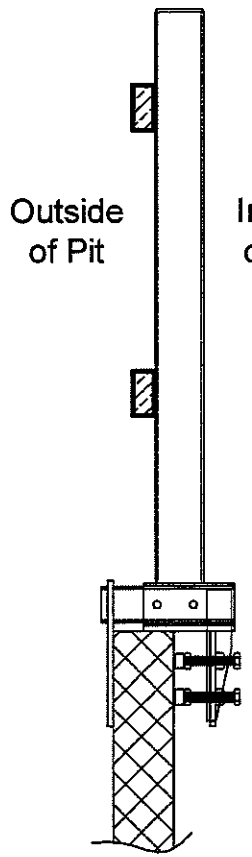
Add 1.46' for Rocker Length
to calculate Trench Width

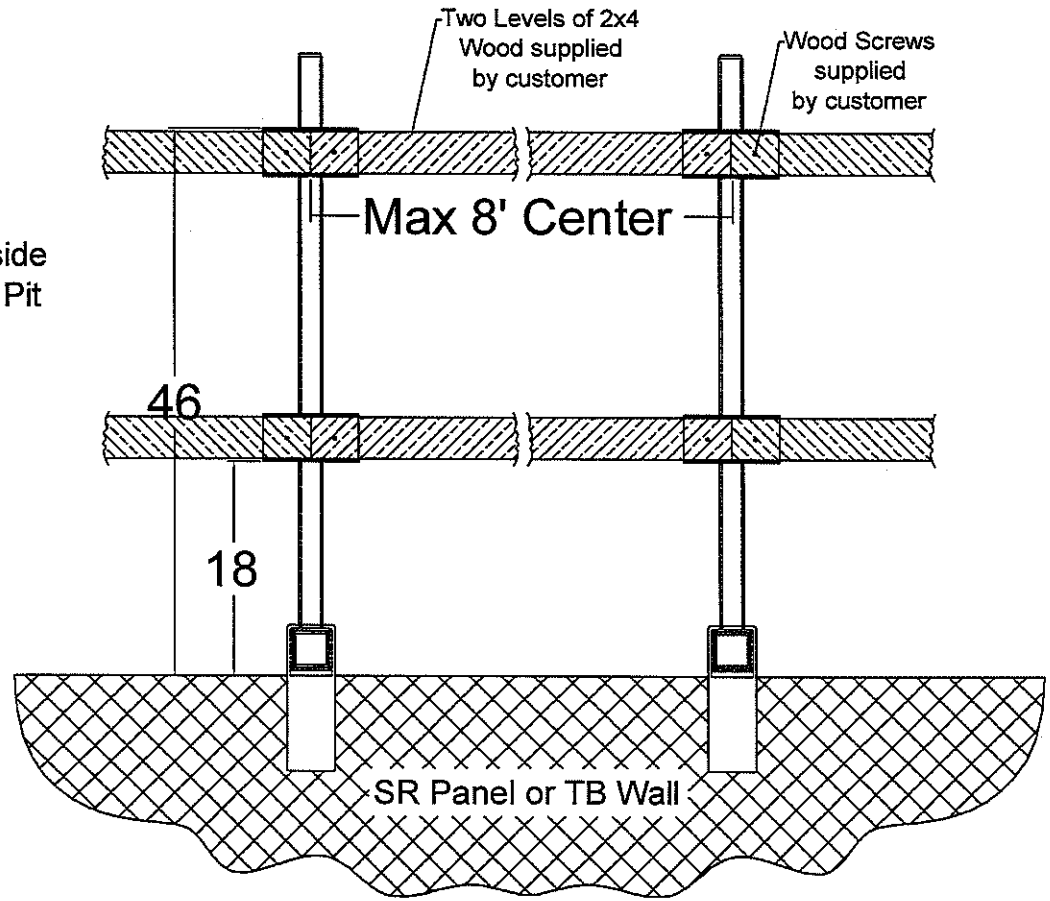
KKP Frame Trench

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE, EAST BRUNSWICK, NJ 08816
Ph: (800) 836-5011, Fax: (732) 254-0101
www.iconjds.com

Guard Rails are not part of Shoring.
Guard Rails are add-on accessory for Slide Rails or Trench Boxes.







Assembled View

Guard Rail Post

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300 RYDERS LANE, EAST BRUNSWICK, NJ 08816
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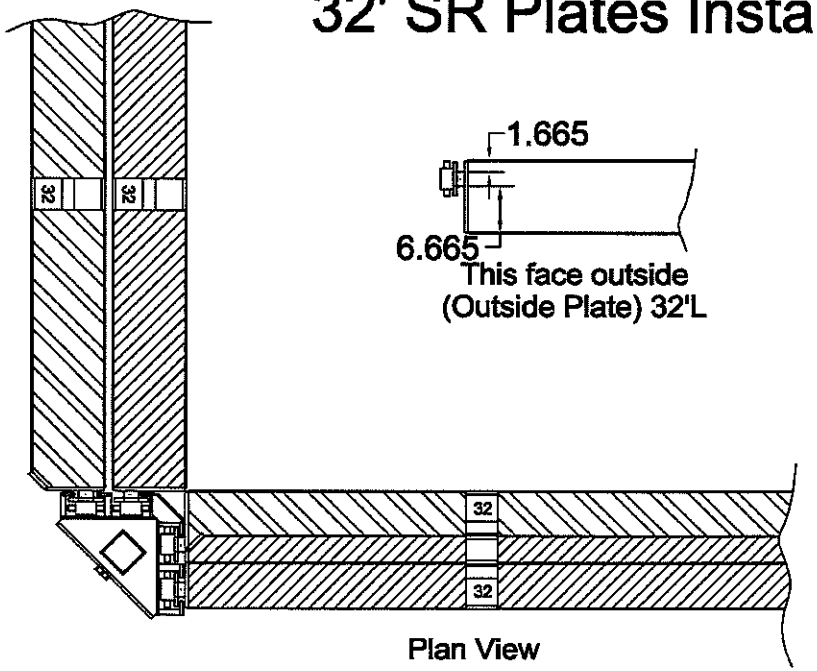
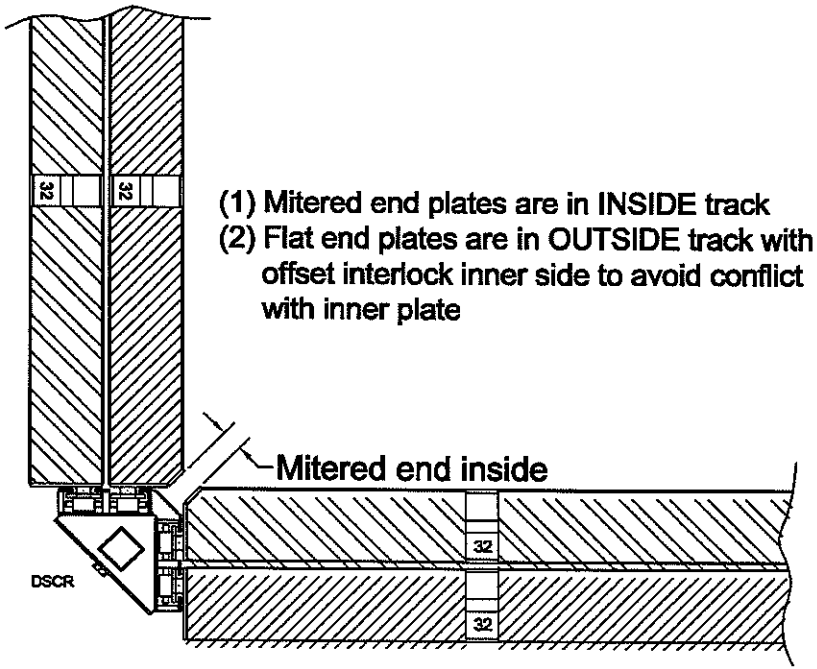
32' SR Plates Installation



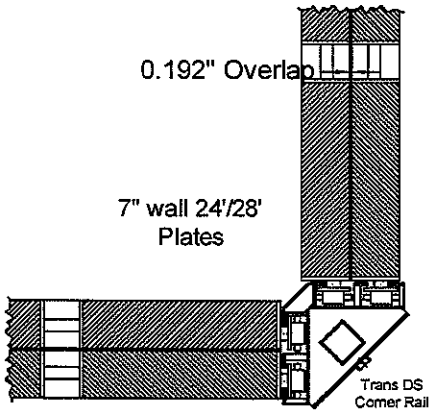
Plan View
(Incorrect Installation)



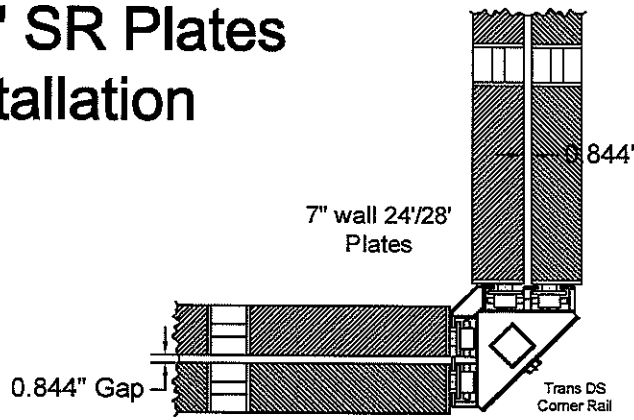
(1) Mitered end plates are in INSIDE track
(2) Flat end plates are in OUTSIDE track with offset interlock inner side to avoid conflict with inner plate

Plan View
(Correct Installation)

24' / 28' SR Plates Installation



PLAN VIEW
(In-Correct Orientation)



PLAN VIEW
(Correct Orientation)

24' / 28' / 32' SR Plates Installation

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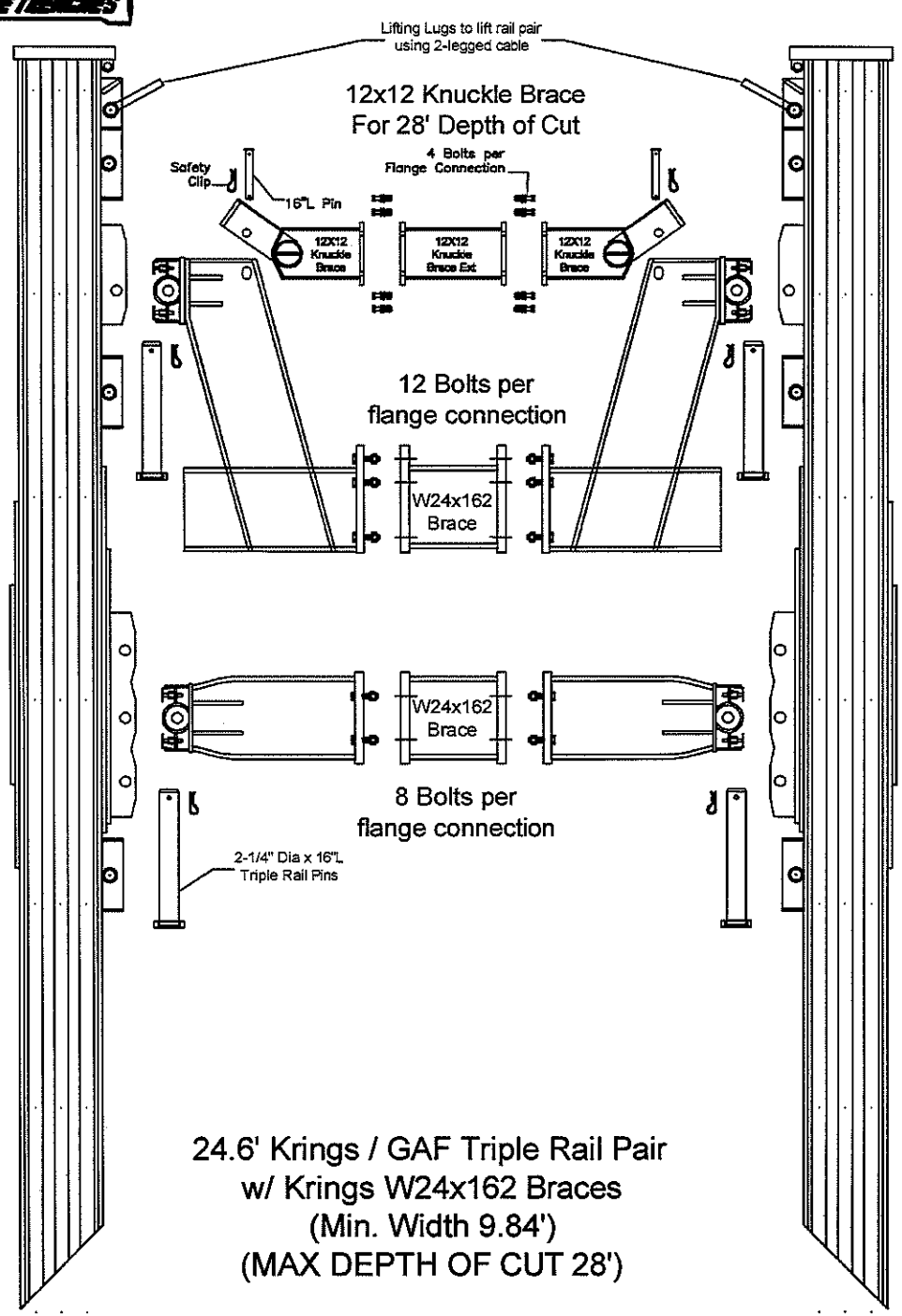
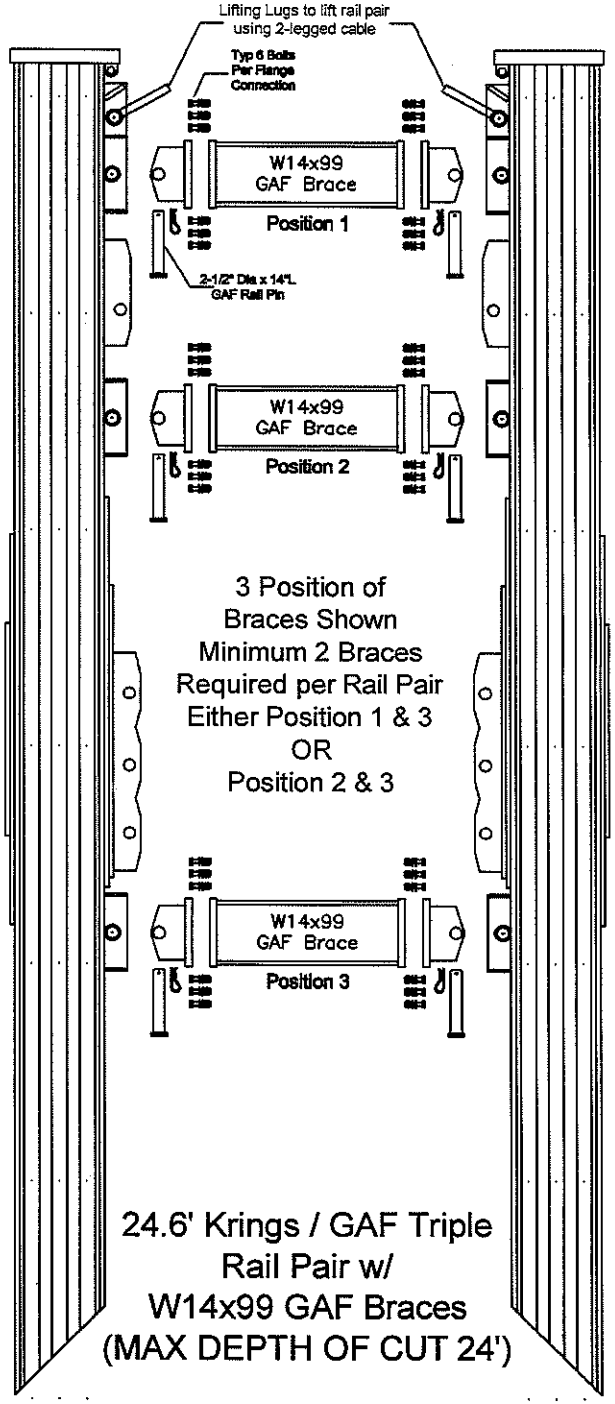
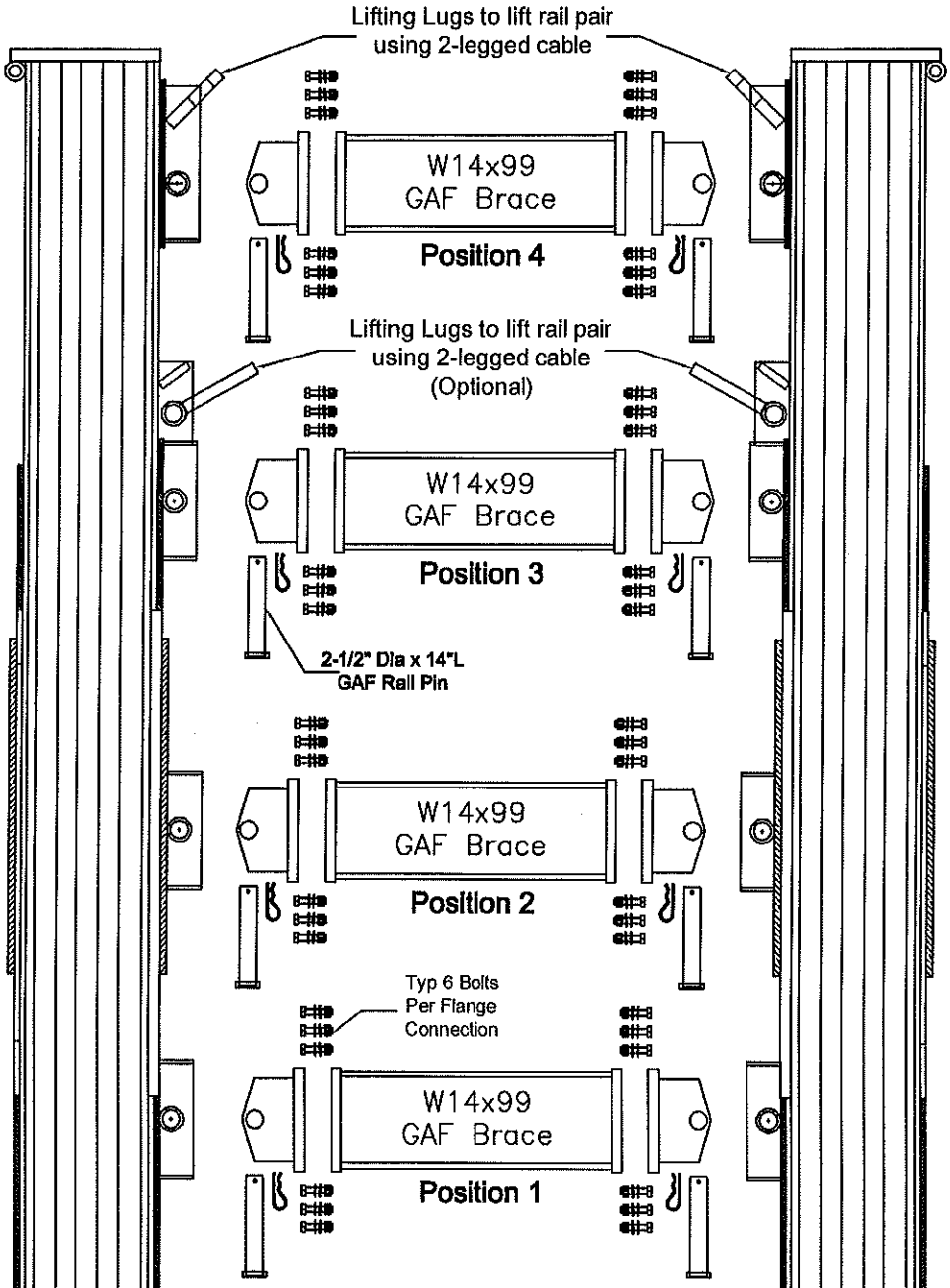


24.6' Krings / GAF Triple Rail Pair w/ Krings W24x162 Braces (Min. Width 9.84') (MAX DEPTH OF CUT 28')



24.6' Krings / GAF Triple Rail Pair w/ W14x99 GAF Braces (MAX DEPTH OF CUT 24')

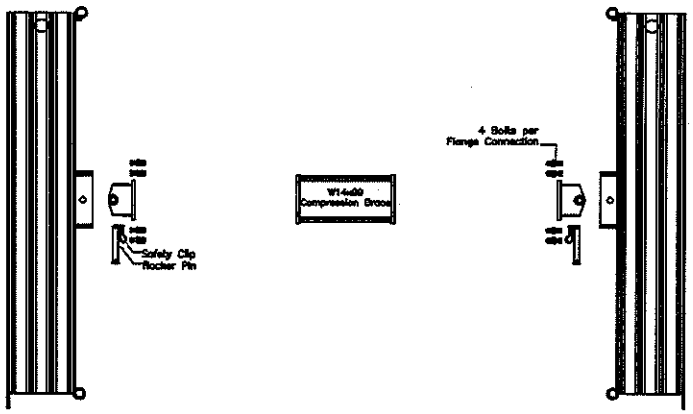
ICON Equipment Distributors, Inc., 300 Ryders Lane, East Brunswick, NJ 08816 Ph: (800) 836-5011, Fax: (732) 254-0101

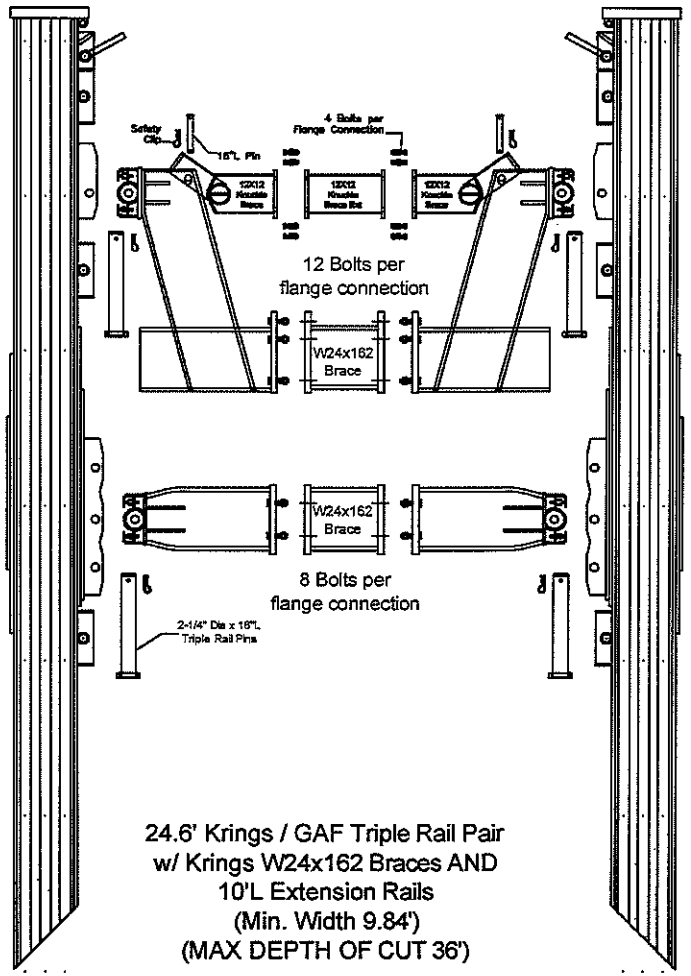


4 Position of
Braces Shown
Minimum 2 Braces
Required per Rail Pair
Either Position 1 & 3
OR 1 & 4 OR 2 & 4

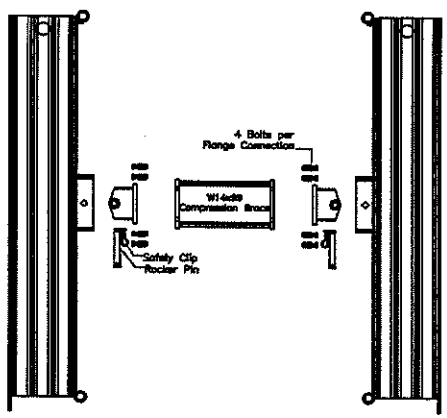
22' GAF Triple Rail Pair w/ W14x99 GAF Braces (MAX DEPTH OF CUT 24')

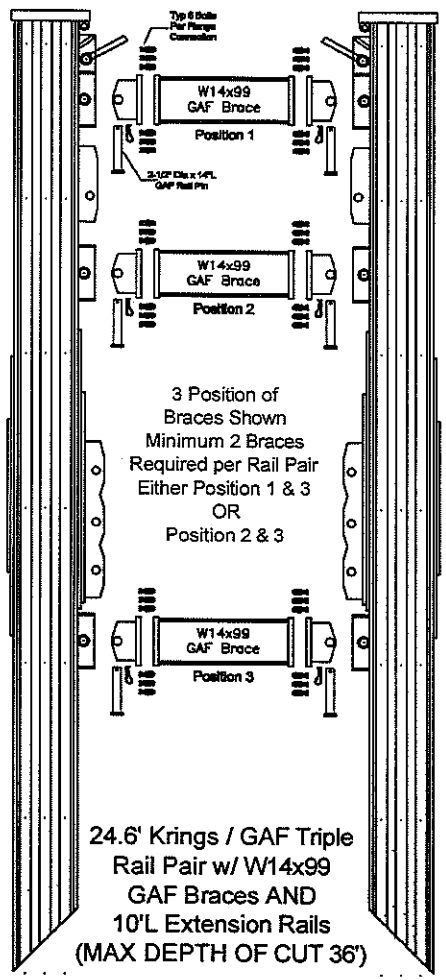
ICON Equipment Distributors, Inc., 300 Ryders Lane, East Brunswick, NJ 08816 Ph: (800) 836-5011, Fax: (732) 254-0101





24.6' Krings / GAF Triple Rail Pair
w/ Krings W24x162 Braces AND
10'L Extension Rails
(Min. Width 9.84')
(MAX DEPTH OF CUT 36')





24.6' Krings / GAF Triple Rail Pair w/ W14x99 GAF Braces AND 10'L Extension Rails
(MAX DEPTH OF CUT 36')

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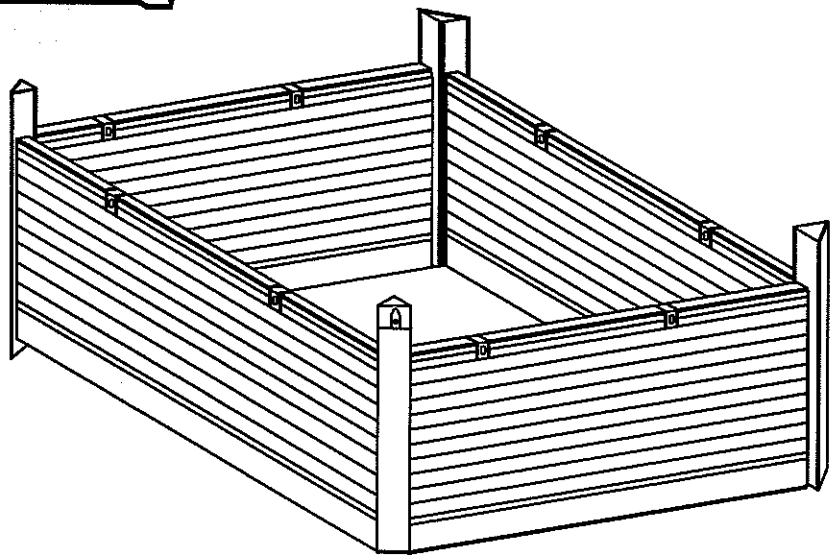
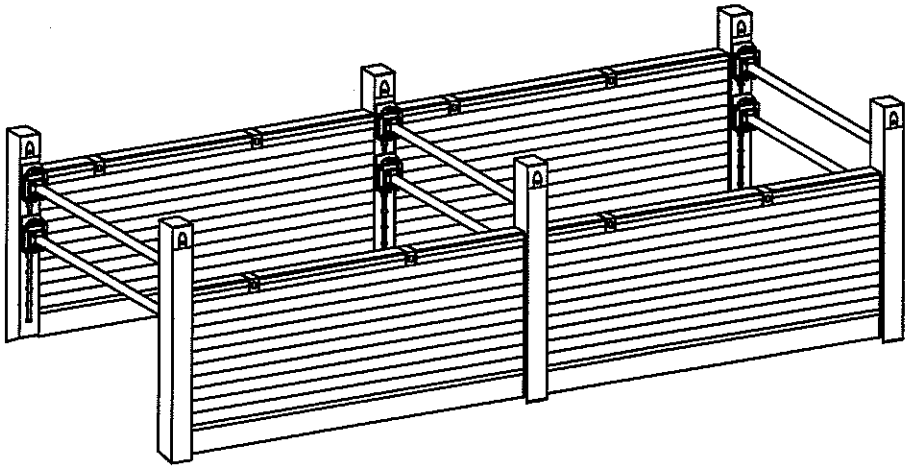
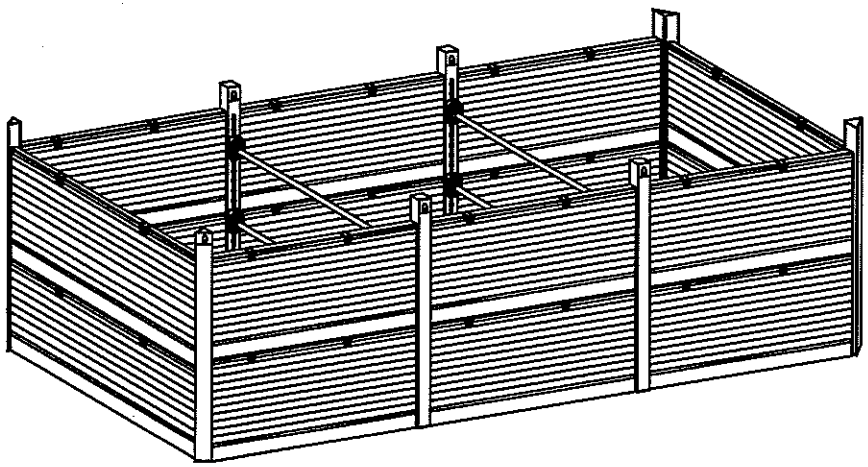


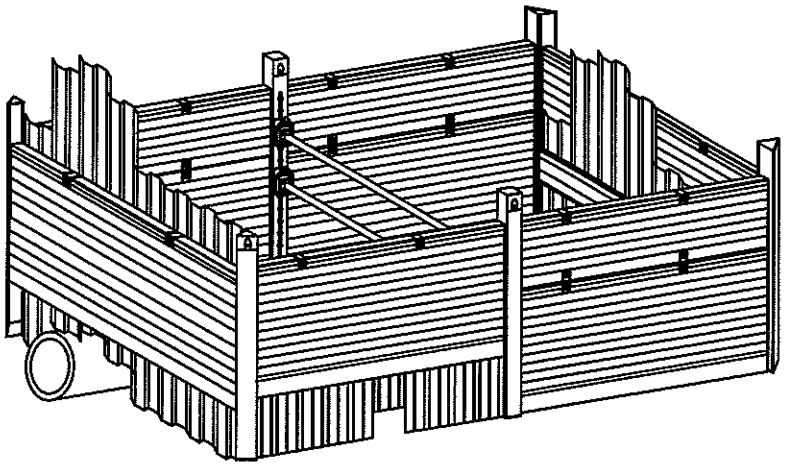
1-Bay SR Pit, 8'D



2-Bay SR Trench, 8'D



3-Bay SR Pit, 16'D



2-Bay SR Utility Pit
w/Waler Frames, 16'D

EXAMPLES OF DIFFERENT SLIDE RAIL CONFIGURATIONS

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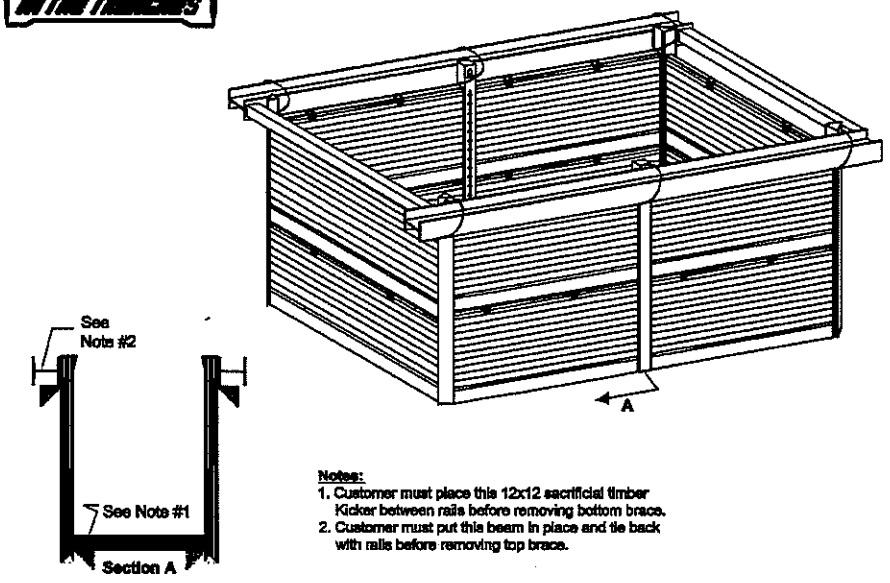
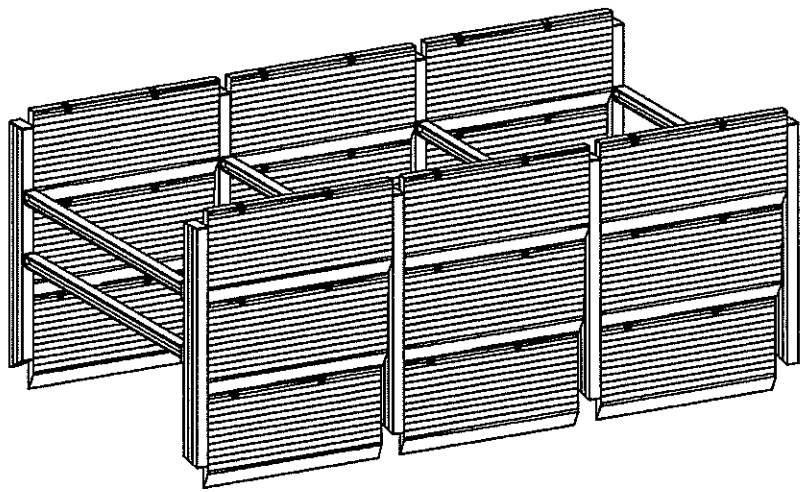
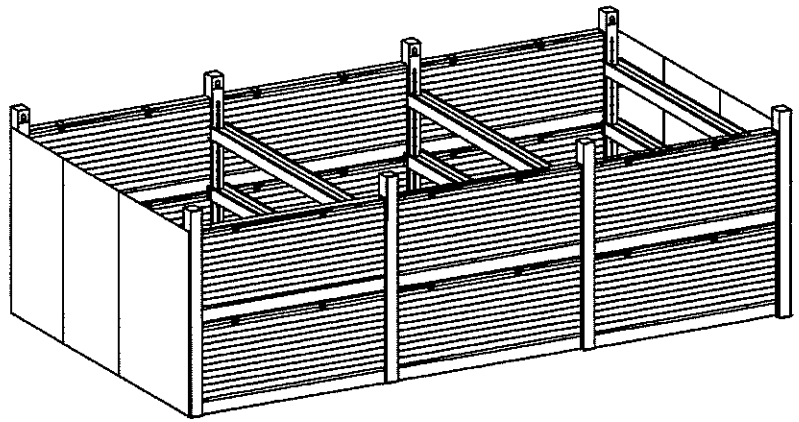


Notes:
1. Customer must place this 12x12 sacrificial timber Kicker between rails before removing bottom brace.
2. Customer must put this beam in place and tie back with rails before removing top brace.

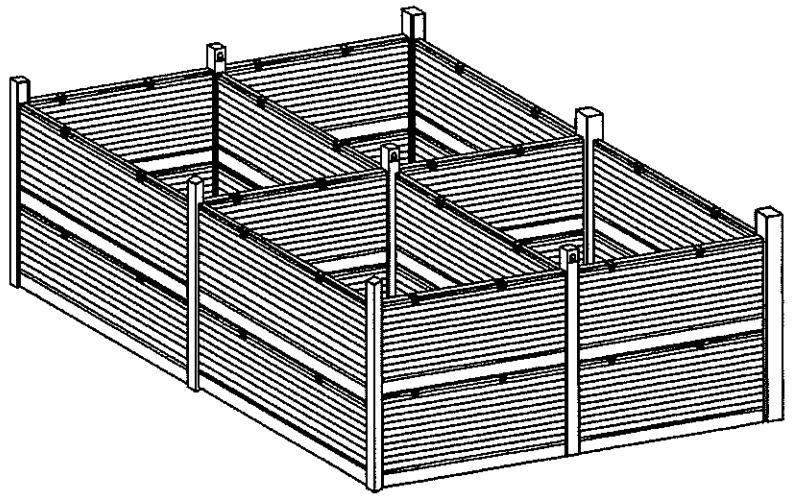
2-Bay SR Rebraced Pit, 16'D



3-Bay SR Trench, 24'D



3-Bay SR Trench, 16'D
(Wider Trench w/Pit Waler Braces
& Ends closed w/Road Plates



2x2 Bays SR Pit
w/4-Sided Env Corners, 16'D

EXAMPLES OF DIFFERENT SLIDE RAIL CONFIGURATIONS

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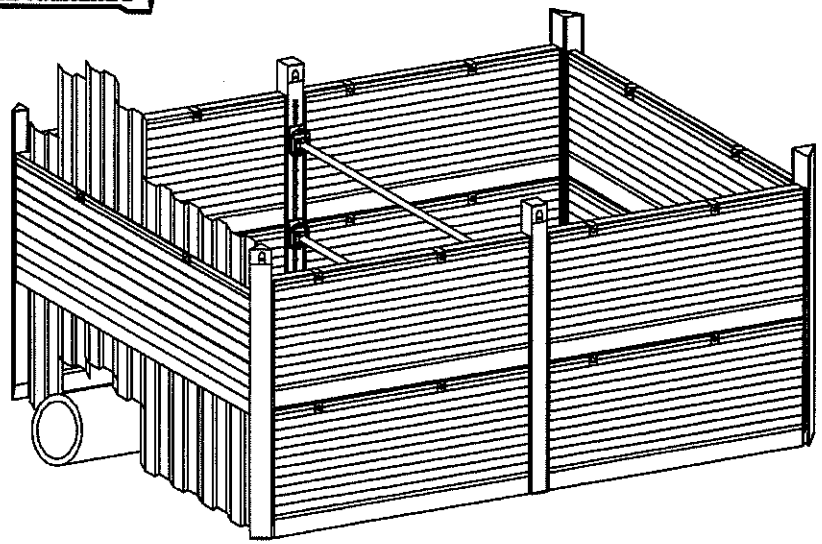
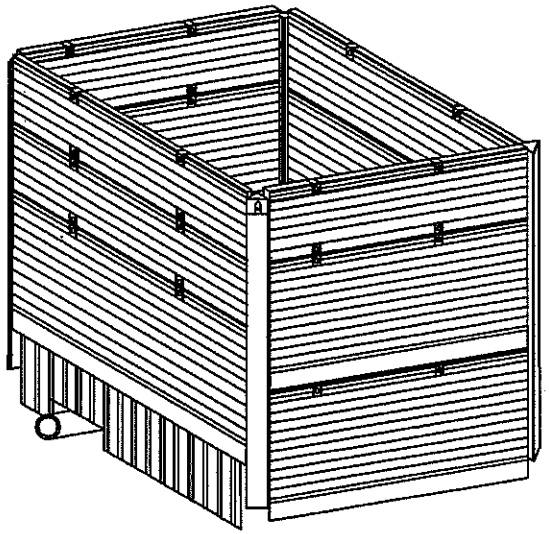
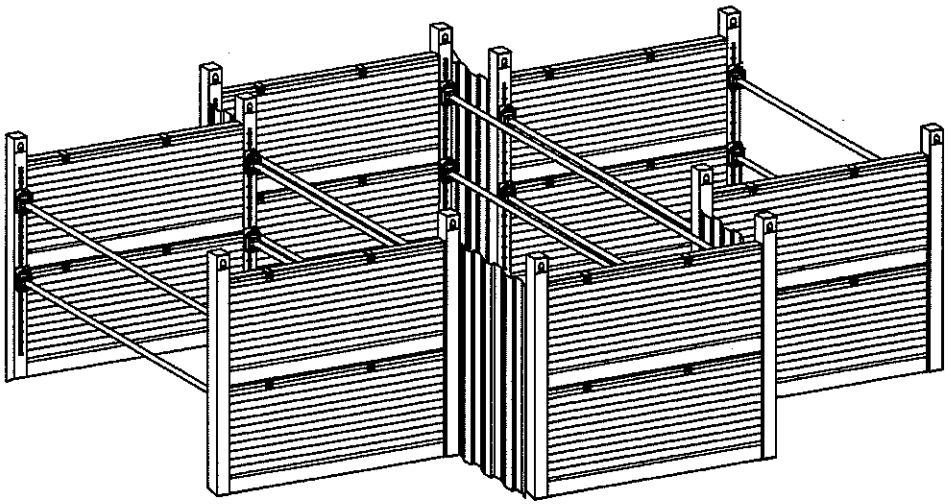


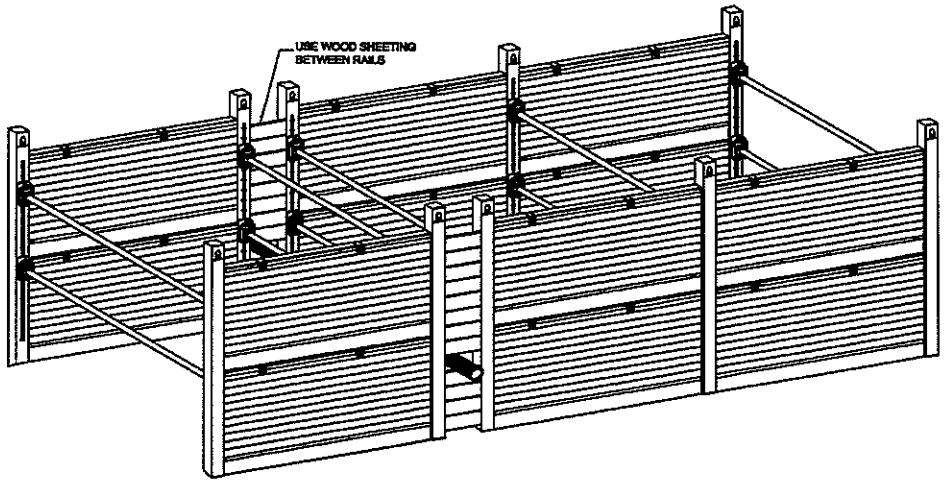
2-Bays SR Jacking Pit, 16'D



1-Bay SR Receiving Pit, 20'D



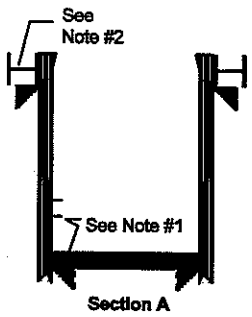
(3) 1-Bay SR Trenches, 16'D
Middle Wider Trench for Manhole

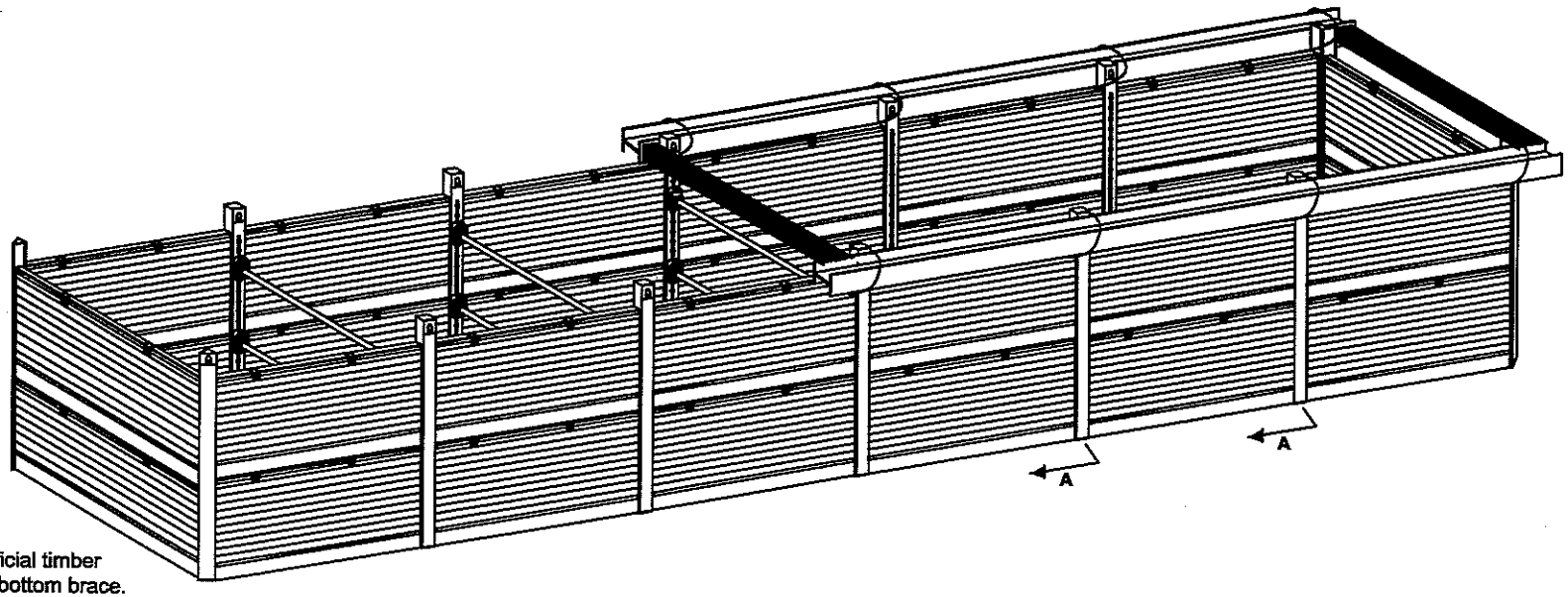


3-Bay SR Trench, Utility
Crossing w/Wood Lagging, 16'D

EXAMPLES OF DIFFERENT SLIDE RAIL CONFIGURATIONS

ICON Equipment Distributors, Inc., 300 Ryders Lane, East Brunswick, NJ 08816 Ph: (800) 836-5011, Fax: (732) 254-0101

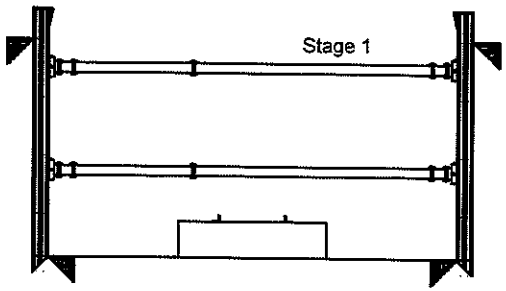


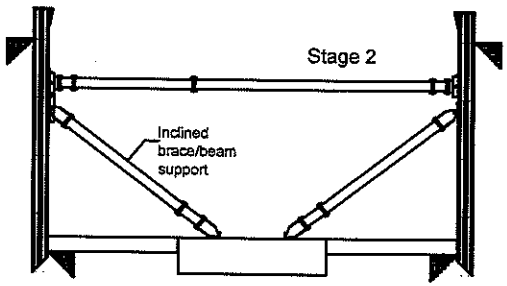


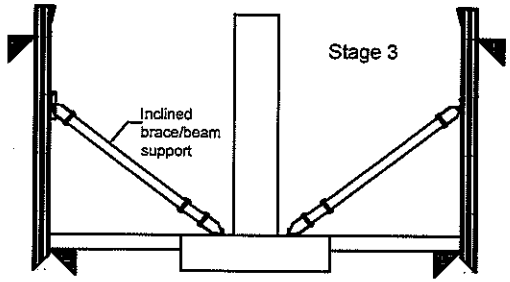
Notes:

1. Customer must place this 12x12 sacrificial timber Kicker between rails before removing bottom brace.
2. Customer must put this beam in place and tie back with rails before removing top brace.

6-Bay SR Partially Rebraced Pit, 16'D







STEP 1: INSTALL SLIDE RAIL SYSTEM

STEP 2: POUR CONCRETE BASE FOR RETAINING WALL.

STEP 3: BRACE SLIDE RAIL AGAINST BASE OF RETAINING WALL (WHEN CURED) OR AGAINST SPACERS (INSERTED BETWEEN BASE AND SLIDE RAIL)

STEP 4: REMOVE BOTTOM BRACE

Raker System Display

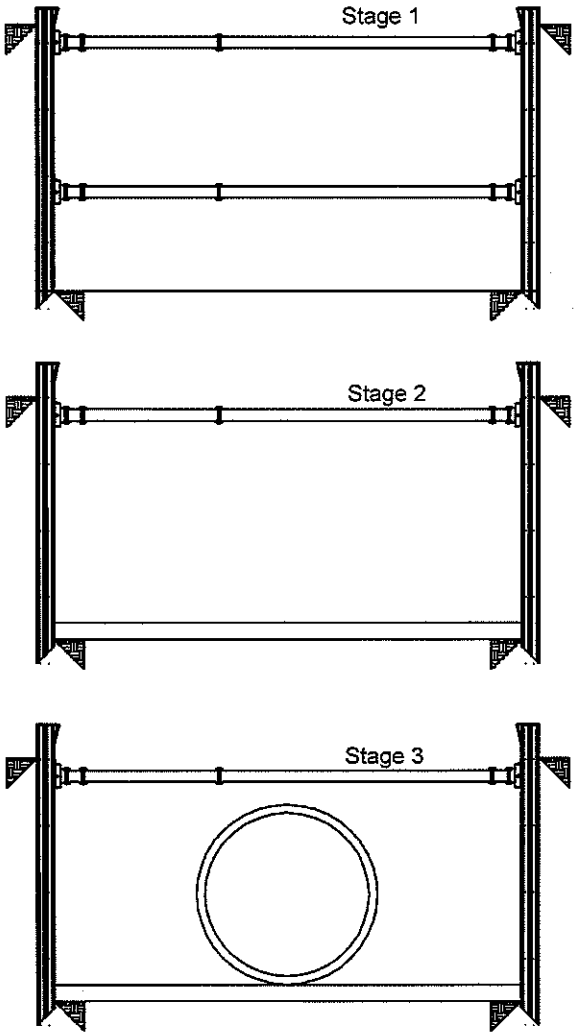
STEP 5: INSTALL INCLINED RAKER BRACE/BEAM SUPPORT (EITHER EMBED IN CONCRETE OR CONNECT TO BEAM DOWEL IN CONCRETE) @ EACH RAIL PAIR.

STEP 6: REMOVE TOP BRACE.

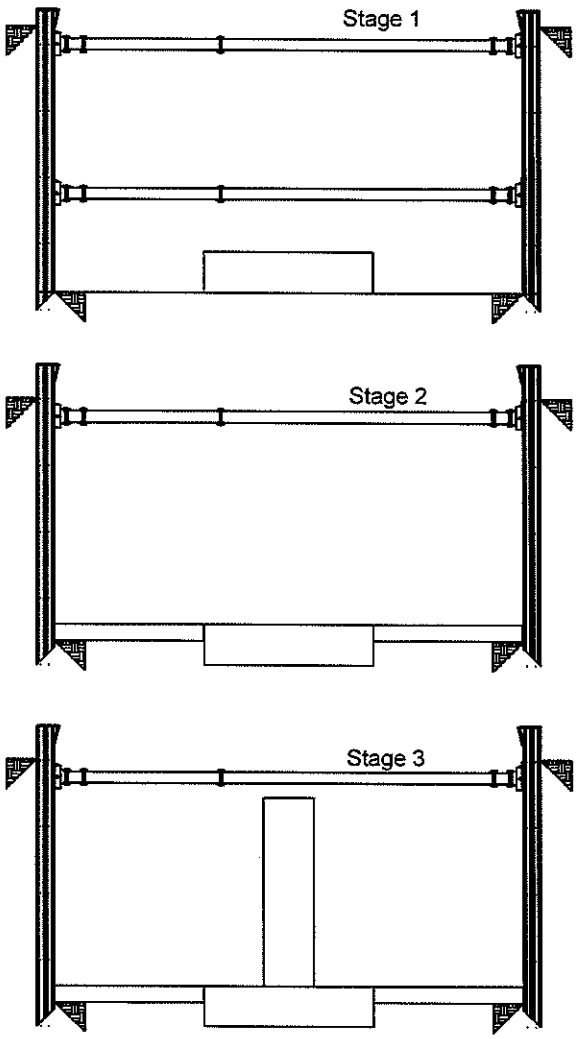
STEP 7: REMOVE SLIDE RAIL SHEETING (ONE SIDE, IF REQUIRED).

EXAMPLES OF DIFFERENT SLIDE RAIL CONFIGURATIONS

ICON Equipment Distributors, Inc., 300 Ryders Lane, East Brunswick, NJ 08816 Ph: (800) 836-5011, Fax: (732) 254-0101



Placing pipe on slab after removing bottom brace



Retaining wall after removing bottom brace

EXAMPLES OF DIFFERENT SLIDE RAIL CONFIGURATIONS

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EXCAVATION CHECKLIST

(To be completed by a Competent Person)

SITE LOCATION:			
DATE:	TIME:	COMPETENT PERSON:	
SOIL CLASSIFICATION:	EXCAVATION DEPTH:	EXCAVATION WIDTH:	
TYPE OF PROTECTIVE SYSTEM USED:			

Indicate for each item: YES - NO - or N/A for not applicable

1. General Inspection of Jobsite:	
A. Excavations, adjacent areas, and protective systems inspected by a competent person daily before the start of work.	
B. Competent person has the authority to remove employees from the excavation immediately.	
C. Surface encumbrances removed or supported.	
D. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.	
E. Hard hats worn by all employees.	
F. Spoils, materials, and equipment set back at least two feet from the edge of the excavation.	
G. Barriers provided at all remotely located excavations, wells, pits, shafts, etc.	
H. Walkways and bridges over excavations four feet or more in depth are equipped with standard guardrails and toeboards.	
I. Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic.	
J. Employees required to stand away from vehicles being loaded or unloaded.	
K. Warning system established and utilized when mobile equipment is operating near the edge of the excavation.	
L. Employees prohibited from going under suspended loads.	
M. Employees prohibited from working on the faces of slopes or benched excavations above other employees.	
2. Utilities:	
A. Utility companies contacted and/or utilities located.	
B. Exact location of utilities marked.	
C. Underground installations protected, supported, or removed when excavation is open.	
3. Means of Access and Egress:	
A. Lateral travel to means of egress no greater than 25 feet in excavations four feet or more in depth.	
B. Ladders used in excavations secured and extended three feet above the edge of the trench.	
C. Structural ramps used by employees designed by a competent person.	
D. Structural ramps used for equipment designed by a registered professional engineer (RPE)	
E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with no-slip surface.	
F. Employees protected from cave-ins when entering or exiting the excavation.	

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4. Wet Conditions:	
A. Precautions take to protect employees from the accumulation of water.	
B. Water removal equipment monitored by a competent person.	
C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation.	
D. Inspections made after every rainstorm or other hazard-increasing occurrence.	
5. Hazardous Atmosphere:	
A. Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard.	
B. Adequate precautions taken to protect employees from exposure to an atmosphere containing less than 19.5% oxygen and/or to other hazardous atmospheres	
C. Ventilation provided to prevent employee exposure to an atmosphere containing flammable gas in excess of 10% of the lower explosive limit of the gas.	
D. Testing conducted often to ensure that the atmosphere remains safe.	
E. Emergency equipment, such as breathing apparatus, safety harness and lifeline, and/or basket stretcher readily available where hazardous atmospheres could or do exist.	
F. Employees trained to use personal protective and other rescue equipment.	
G. Safety harness and lifeline used and individually attended when entering bell bottom or other deep confined excavations.	
6. Support Systems:	
A. Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads.	
B. Materials and equipment used for protective systems inspected and in good condition.	
C. Materials and equipment not in good condition have been removed from service.	
D. Damaged materials and equipment used for protective systems inspected by a registered professional engineer (RPE) after repairs and before being placed back into service.	
E. Protective systems installed without exposing employees to the hazards of cave-ins, collapses, or threat of being struck by materials or equipment.	
F. Members of support system securely fastened to prevent failure.	
G. Support systems provided in ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.	
H. Excavations below the level of the base or footing supported, approved by an RPE.	
I. Removal of support systems progresses from the bottom and members are released lowly as to note any indication of possible failure.	
J. Backfilling progresses with removal of support system.	
K. Excavation of material to a level no greater than two feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.	
L. Shield system placed to prevent lateral movement.	
M. Employees are prohibited from remaining in shield system during vertical movement.	

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DAILY TRENCHING LOG

DATE:	SIGNATURE:
WEATHER:	PROJECT:

Was One Call System contacted: Yes _____ No _____

Protective system: Trench shield (box) _____ Wood shoring _____
Sloping _____ Other _____

Purpose of trenching: Drainage _____ Water _____
Sewer _____ Gas _____
Other _____

Were visual soil tests made: Yes_____ No _____
If yes, what type?

Type of Soil: Stable Rock _____ Type A _____ Type B _____ Type C _____

Surface encumbrances: Yes _____ No _____
If yes, what type?

Water conditions: Wet _____ Dry _____ Submerged _____

Hazardous atmosphere exists: Yes _____ No _____
(If yes, follow confined space entry procedures policy; complete confined Space Entry Permit; monitor for toxic gas(es))

Is trenching or excavation exposed to public vehicular traffic (exhaust emission): Yes _____ No _____
(If yes, refer to confined space entry procedures; complete Confined Space Entry Permit; monitor for toxic gas(es))

Measurements of trench: Depth _____ Length _____ Width _____

Is ladder within 25 feet of all workers: Yes _____ No _____

Is excavated material stored two feet or more from edge of excavation: Yes _____ No_____

Are employees exposed to public vehicular traffic: Yes _____ No_____
(If yes, warning vests required)

Are other utilities protected: Yes _____ No _____
(Water, sewer, gas or other structures)

Are sewer or natural gas lines exposed: Yes _____ No _____

Periodic Inspection: Yes _____ No _____

Did employees receive training in excavating: Yes _____ No _____

Corrective Actions and Remarks:

Sloping and Benching Standards per OSHA

(a) Scope and application. This appendix contains specifications for sloping and benching when used as methods of protecting employees working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protective systems is to be performed in accordance with the requirements set forth in § 1926.652(b)(2).

(b) Definitions.

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and ravelling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the face of an excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) Requirements -- (1) Soil classification.

Soil and rock deposits shall be classified in accordance with appendix A to subpart P of part 1926.

(2) Maximum allowable slope. The maximum allowable slope for a soil or rock deposit shall be determined from Table B-1 of this appendix.

(3) Actual slope. (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allowable slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with § 1926.651(i).

(4) Configurations. Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)(1) FOR EXCAVATIONS LESS THAN 20 FEET DEEP(3)
STABLE ROCK	VERTICAL (90°)
TYPE A (2)	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 ½:1 (34°)

Footnote (1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
Footnote (2) A short-term maximum allowable slope of 1/2H:1V (63º) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53º).
Footnote (3) Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

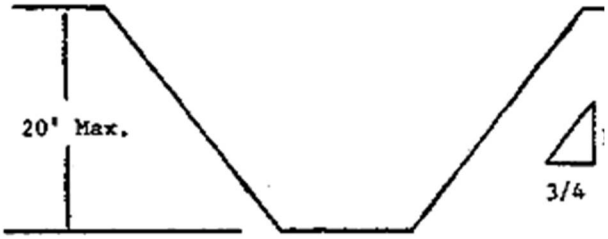
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

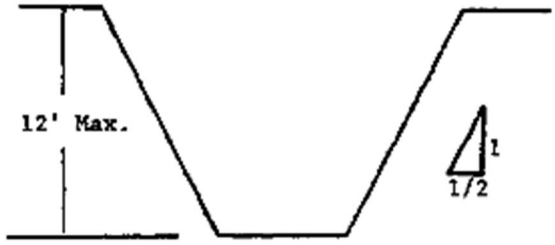
B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



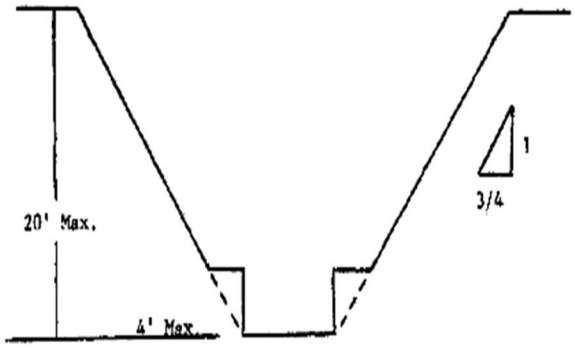
SIMPLE SLOPE -- GENERAL

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.

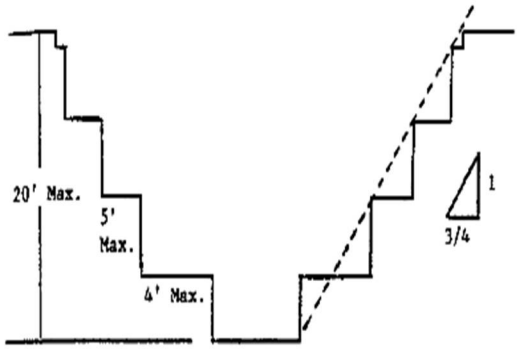


SIMPLE SLOPE -- SHORT TERM

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:

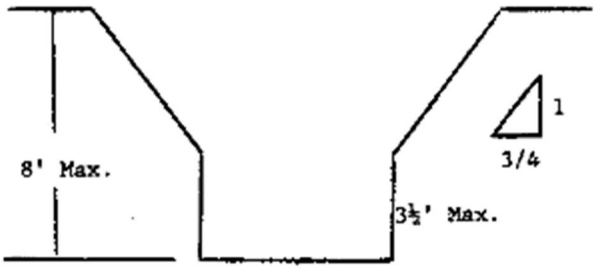


SIMPLE BENCH



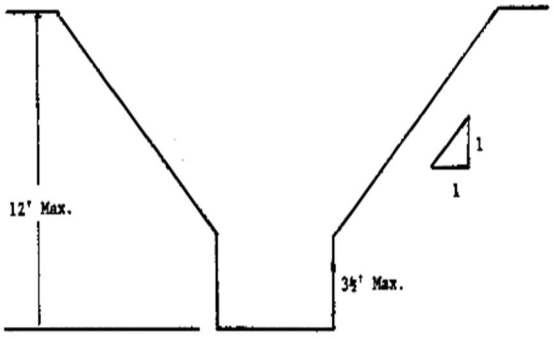
MULTIPLE BENCH

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3½ feet.



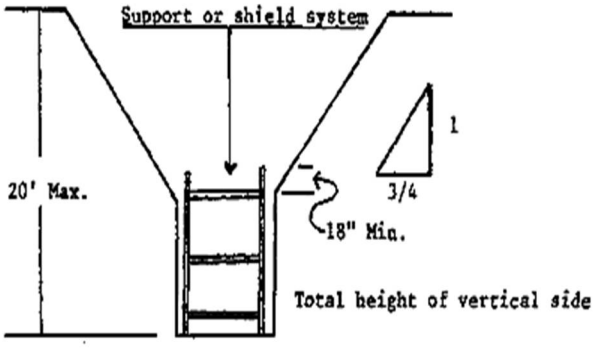
UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH)

All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3½ feet.



UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 12 FEET IN DEPTH)

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

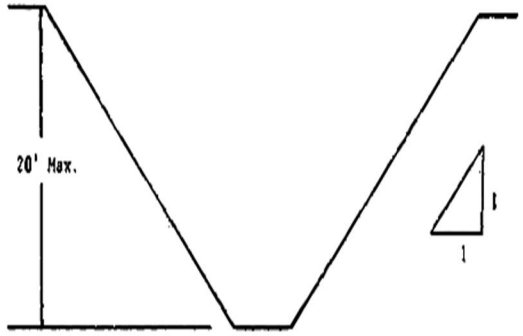


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under § 1926.652(b).

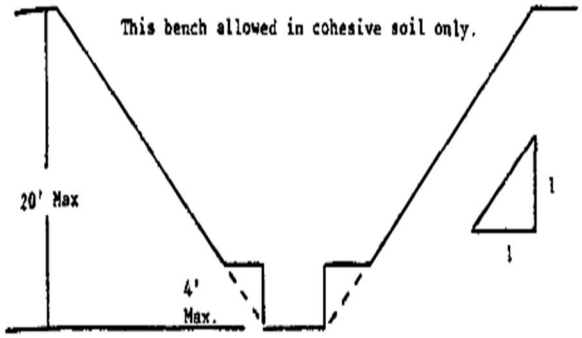
B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

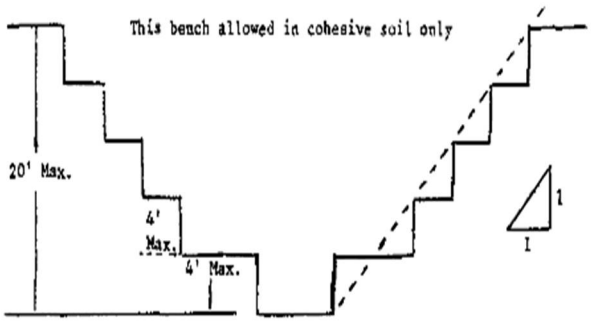


SIMPLE SLOPE

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

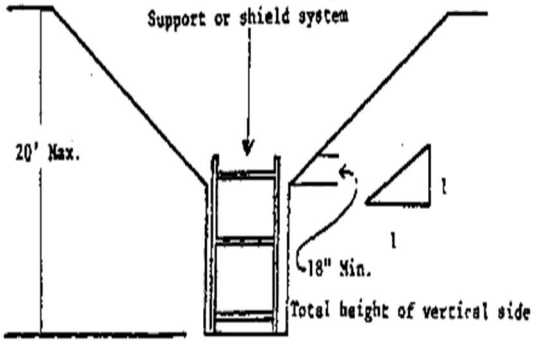


SINGLE BENCH



MULTIPLE BENCH

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

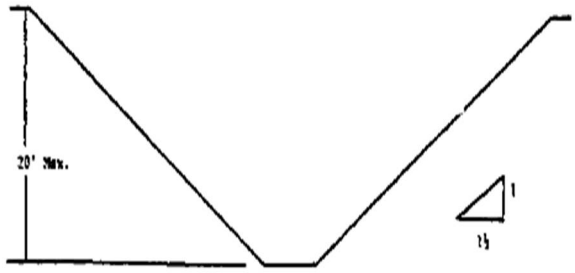


VERTICALLY SIDED LOWER PORTION

4. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

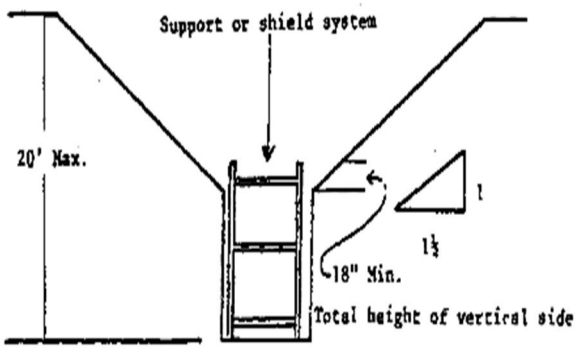
B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



SIMPLE SLOPE

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.

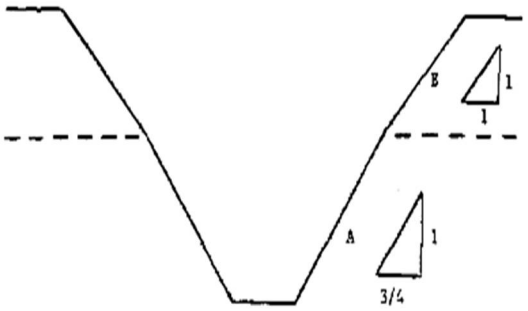


VERTICAL SIDED LOWER PORTION

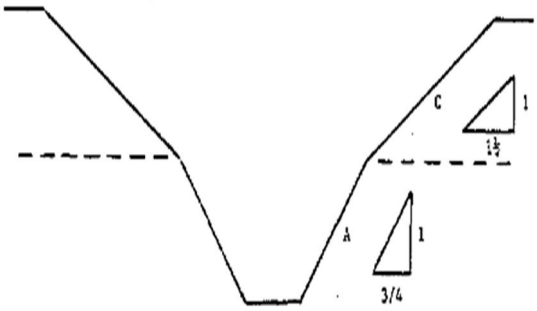
3. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

B-1.4 Excavations Made in Layered Soils

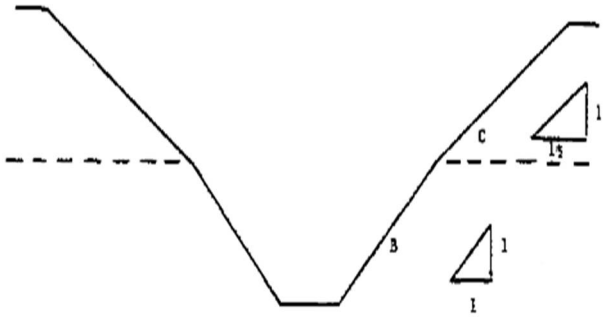
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.



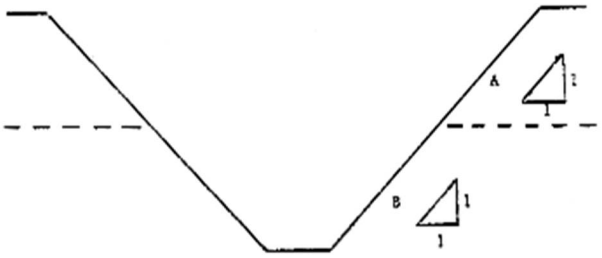
B OVER A



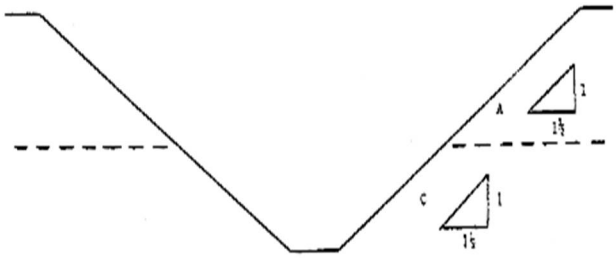
C OVER A



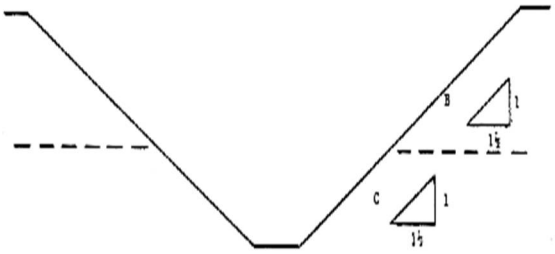
C OVER B



A OVER B



A OVER C

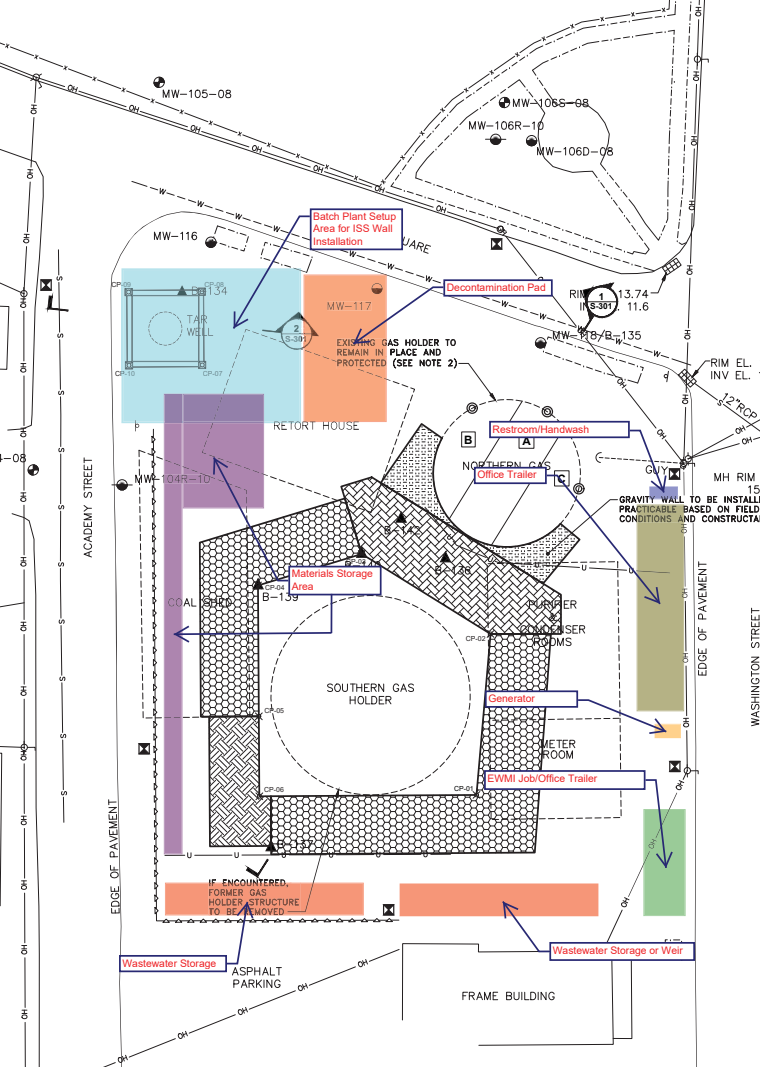


B OVER C

2. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

ATTACHMENT M

Site Use Plan


MW-105-08
MW-105S-08
MW-106R-10
MW-106D-08
MW-116
Batch Plant Setup Area for ISS Wall Installation
Decontamination Pad
MW-117
TAR WELL
EXISTING GAS HOLDER TO REMAIN IN PLACE AND PROTECTED (SEE NOTE 2)
MW-118/B-135
RETORT HOUSE
Restroom/Handwash
Office Trailer
NORTHERN GAS HOLDER
MW-104R-10
ACADEMY STREET
Materials Storage Area
COAL SHED
B-139
B-142
B-138
PURIFIER & CONDENSER ROOMS
SOUTHERN GAS HOLDER
Generator
METER ROOM
EWMI Job/Office Trailer
EDGE OF PAVEMENT
IF ENCOUNTERED, FORMER GAS HOLDER STRUCTURE TO BE REMOVED
Wastewater Storage
ASPHALT PARKING
Wastewater Storage or Weir
FRAME BUILDING
WASHINGTON STREET
GRAVITY WALL TO BE INSTALLED PRACTICABLE BASED ON FIELD CONDITIONS AND CONSTRUCTA
MH RIM
RIM EL.
INV EL.
12"RCP