



RECOMMENDED INDUSTRY PRACTICES

*For Safe Working Platforms
For Construction Equipment*

December 15, 2020

This guide was produced by the hard work and dedication of members of the Industry-Wide Working Platforms Working Group, a collaboration between The International Association of Foundation Drilling (ADSC), Deep Foundations Institute (DFI), and Pile Driving Contractors Association (PDCA). This effort would not have been possible if the three organizations did not hold worker safety as paramount.

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Executive Summary

Currently, no regulation exists in North America (except in Ontario) concerning the proper evaluation, design, construction, and maintenance of Working Platforms for equipment used in foundation construction, other than for cranes. Worker safety is of paramount importance in the successful completion of any construction project; this document presents an administrative procedure designed to institutionalize a clear method for ensuring that safe Working Platforms are in place for foundation construction equipment. This document also serves as a suggested framework by which allocation of responsibility can be communicated and determined long before work is performed on the jobsite.

The critical pieces of the Working Platforms evaluation process lie in the steps during which an Initial Project Assessment is performed and a decision is made whether a full Engineering Analysis is needed or an Empirical Evaluation will suffice. Threshold criteria are given to aid in that decision-making process. Design, installation, and maintenance of the Working Platform should be completed according to recommended guidelines given herein, and contract documents should clearly define where responsibility lies for each of these activities. Contract documents also should outline cost responsibilities and pay items for those activities required for proper Working Platform installation and performance. A clearly defined contract and communication between Controlling Entities and Specialty Subcontractors are the necessary means by which all of these needs can be fulfilled successfully.

I. Introduction

Evaluation, design and construction of Working Platforms for suitable support for heavy equipment, (specifically excavation, pile driving and drilling equipment used in the specialty foundations subcontracting industry), currently are not regulated by law or guided by standards that specifically address Working Platforms in the United States and most of Canada. (In the United States, the Occupational Safety and Health Act (OSHA) does regulate working platforms for cranes under 29 C.F.R. §1926.1402). The responsibility for providing safe Working Platforms (on prepared or existing subgrades) for such equipment traditionally has been delegated to Specialty Subcontractors and is not addressed as part of overall project documents, including contracts and safety procedures. The cost of providing safe Working Platforms is not universally included as part of project costs by Controlling Entities (Owners, Construction Managers and General Contractors) when the Specialty Subcontractor is not serving as the Prime Contractor. In order to ensure that safe practices are observed and that Subcontractors do not bear a disproportionate burden of the cost of such safety measures, the construction industry should adopt a standard guideline for evaluation, administration, and documentation of safe Working Platform conditions for construction sites that places clear responsibility for the creation and maintenance of safe Working Platforms on contractually designated Controlling Entities.

II. Background

The construction industry evolves and develops constantly in an effort to create equipment and procedures that will complete projects more quickly and efficiently and on larger and larger scales. One product of this progress is the increase in size of construction equipment, which presents increasing safety hazards both to those operating it and to those within close proximity.

Ground pressures generated by such equipment increase with the increase in operating weight. In some cases, pressures exerted by equipment on soil subgrades on construction sites are in excess of the loads that will be produced by the structure being built. However, the subgrade under the construction equipment (the Working Platform) rarely receives much, if any, attention with regard to its suitability to support the equipment proposed to be used. Unfortunately, this situation has resulted in dramatic increases in instances of overturned or otherwise destabilized equipment and corresponding injury to personnel and damage to property.

No common standard specifically pertaining to Working Platforms currently exists in the United States and Canada (with the exception of Ontario) that addresses the evaluation/analysis of equipment subgrades and improvement of subgrades for equipment support. The absence of such a standard has led to the potential for unsafe conditions and avoidable accidents throughout North America. The lack of regulatory controls also has led to wide variations in the implementation of Working Platform programs across the Specialty Subcontracting fields in which the use of large equipment occurs most frequently.

In order to improve the allocation of responsibility between Controlling Entities and Contractors, which has been poorly defined in the past, some measures should be taken. As a safety issue, Working Platforms constitute a project requirement, not a Specialty Subcontractor burden. Defining the Working Platforms process and clarifying roles and responsibilities will improve project safety by taking much of the ambiguity out of project requirements and eliminating disputes over “unnecessary” Working Platform measures.

This document provides a framework for administering a responsible program for maintaining safety while promoting communication among project stakeholders concerning roles and responsibilities in the process, including Controlling Entities. Equipment covered herein includes large Tracked Plant, which are tracked and wheeled equipment intended for loading, excavating, drilling, pile driving, hoisting, and similar purposes. This document is not intended to be used for skid steers, dump trucks, scrapers, and other equipment utilized primarily in transit, although prudence should always be employed when placing personnel in situations where unstable subgrade conditions might lead to overturned or otherwise compromised heavy equipment. Furthermore, this document is intended to provide guidelines and should not supplant Engineering Analysis of site and project-specific facts and circumstances.

III. Definitions

- a. **Working Platform** - temporary geotechnical structures or existing subgrade providing a stable support surface for a piece of construction equipment working in a semi-static condition or in transport between operating locations on a single site, including during unloading or loading and setup; specifically a Tracked Plant or similar machine. A Working Platform may consist only of the existing subgrade or may be improved using aggregate, geosynthetics, soil, steel or timber crane mats, or other constructed features.
- b. **Tracked Plant (plural-Tracked Plant)** - any large construction equipment on either tracks or wheels that operates in a semi-static position but may be mobile between operating locations (i.e. drill rig, crane). The Tracked Plant designation does not apply to dump trucks, skid steers, or any other equipment that operates primarily in transport mode, but does pertain to concrete trucks and other equipment functioning along a confined path.
- c. **Static Track Pressure** – average rig weight, including tooling, divided by total track or contact area upon subgrade
- d. **Specialty Subcontractor**- The contracted entity utilizing a Tracked Plant or similar equipment on a construction site.
- e. **Controlling Entity** - An employer that is a Prime Contractor, General Contractor, Construction Manager, Owner or any other legal entity which has the overall responsibility for the construction of the project -its planning, quality and completion, including having specifically stated contractual responsibility to build and maintain safe Working Platforms. If the Specialty Subcontractor is functioning as the General Contractor, it is a Controlling Entity on the project.
- f. **Designated Representative** – A qualified employee representing the Specialty Subcontractor or the Controlling Entity who is responsible for Working Platform operations, beginning with Initial Project Assessment and continuing all the way through to inspection. The Controlling Entity and the Specialty Subcontractor should each have Designated Representatives, and the specific division of labor between the Representatives should be established at the start of the project. A Designated Representative should be experienced in standard safety procedures and should have field experience sufficient to identify general soil types and understand strength characteristics and site conditions as they relate to safe operation of construction equipment. The Designated Representative may or may not actually perform Engineering Analyses and/or Empirical Evaluations depending on their technical capabilities and professional licensure.
- g. **Initial Project Assessment**- the first phase in the Working Platform process in which a Designated Representative (from either a Controlling Entity or a Specialty

Subcontractor) uses all available information about the project site, including geotechnical reports, experience, published data, and other available information, to determine whether an Empirical Evaluation or an Engineering Analysis will be required to produce a safe Working Platform for the portion of the project to be completed by the Specialty Subcontractor.

- h. **Engineering Analysis**- An engineering design analysis of site subgrade conditions with regard to proposed Tracked Plant loading performed by a registered professional engineer in accordance with current industry standards and all appropriate local, state, and federal codes and regulations for temporary works or similar undertakings.
- i. **Empirical Evaluation**- An evaluation of site subgrade conditions with regard to proposed Tracked Plant loading using experience, available data, and established practices. The participation by a registered professional engineer is not required to complete an empirical evaluation.
- j. **Platform Recommendations**- Drawings, sketches, notes, and any other directions describing the construction, composition, dimensions, testing requirements, and inspection procedures for a Working Platform. This can include standard, pre-engineered solutions.
- k. **Full Platform Design**- Drawings, notes, specifications, and any other directions describing the composition, dimensions, testing requirements, and inspection procedures for a Working Platform. The design must be signed and sealed by a registered professional engineer in accordance with all local, state, and federal standards.
- l. **Platform Certification**- A form, letter, or report completed and transmitted to involved project parties (Controlling Entities and Specialty Subcontractors) prior to construction of a Working Platform. The certificate identifies the project, the location of the platform, the maximum loading conditions, whether an Empirical Evaluation or Engineering Analysis was performed, the name and signature of the engineer completing the Engineering Analysis (where applicable), and the signature of the Designated Representatives from the Controlling Entity and the Specialty Subcontractor.

IV. Administrative Procedure

a. Designated Representative

Each Specialty Subcontractor performing work using Tracked Plant or similar heavy equipment should designate a primary, qualified employee (Designated Representative) who is responsible for Initial Project Assessment and oversight of subsequent activities related to Working Platforms at the site and/or who will serve as a liaison with the Designated Representative from the Controlling Entity who is performing these tasks.. This person should stay current on the general concepts related to technical methods of subgrade evaluation, Working Platform design procedures and details; equipment loading information pertinent to rigs and machinery owned or operated by the company; and applicable local and national building codes, design manuals, and safety standards. The Designated Representative for the Specialty Subcontractor will be responsible for obtaining information from the equipment manufacturer, regardless of who is performing the Initial Project Assessment and the subsequent Evaluations and/or Analyses. Companies having more than one location may need to designate an individual at each location or within each regional area. Adequate staff should be available to evaluate all project sites.

Very small companies may not have the resources to have a Designated Representative with suitable qualifications on staff and may need to subcontract these duties. In such instances, the subcontracted Designated Representative should be consulted on every project. In addition, a consistent representative of the Specialty Subcontractor should be designated as the liaison between the subcontracted Designated Representative and the Controlling Entities.

Supervisory personnel within the Specialty Subcontractor's company should be aware of the identity of the Working Platform Designated Representative. Standard procedures should include communication between supervisory personnel and the Designated Representative at the start of each project.

Prime Contractors and other Controlling Entities also should have Designated Representatives on staff to confirm that Working Platforms are being evaluated, designed, and constructed properly for each project. The Designated Representative for the Controlling Entity may be responsible for performing an Empirical Evaluation/ Engineering Analysis for a Working Platform on a project, as defined in contract documents, and often will perform an Initial Project Assessment at the start of the job. It is recommended that the Designated Representative role for the Prime Contractor and other Controlling Entities be under the jurisdiction of the Site Safety Representative so that it remains a priority item. Responsibility for performing the evaluations and administration must be established and identified prior to bidding so that the Specialty Subcontractor can incorporate appropriate activities into his/her bid.

b. Contracts

Every contract should include provisions that clearly spell out how responsibility for Working Platform preparation and maintenance are apportioned in terms of risk, execution, and payment. Simple access clauses such as “dry, level, and stable” do not address adequately the requirements for stable Working Platforms. Contract terms should address access, equipment operation, tramping, and all other situations in which support of the equipment will be an issue. At a minimum, the contract should state (i) who will evaluate/analyze, design, and/or certify the subgrade; (ii) who will construct an improved Working Platform, if needed; (iii) the governing equipment or loading upon which the Working Platform evaluation or design is based; (iv) which parties are specifically designated as the Controlling Entity(ies); and (v) measurement and payment terms for initial construction, daily and/or continuous maintenance, and professional liability insurance, where needed. Contract terms also should include provisions for communication of changed conditions during construction that might require modifications of the Working Platform. It is critical that the scope of work, responsibilities, and standards are clear in all contract documents.

Contracts cannot and do not supersede, and should not be in conflict with, the responsibilities of general contractors or Specialty Subcontractors under the U.S. Occupational Safety and Health Act (OSHA) and the Canadian Ministry of Labour (CML) and other federal and state health and safety regulations and laws, and directives by OSHA/CML and other federal, state, and local governing bodies with jurisdiction over the project or work thereon. Any contractor operating equipment has inherent basic safety responsibilities that cannot be transferred contractually to another entity.

c. Training

Each company should conduct annual training to ensure that employees operating and working in close proximity to heavy equipment are aware of the need for Initial Project Assessment and corresponding evaluation of the subgrade for proper support of Tracked Plant and similar equipment. Site personnel should be advised to constantly observe whether the prepared Working Platform is performing well or needs to be modified. Such observations are part of basic OSHA/CML regulations for contractors operating heavy equipment. Persons working on a site daily are in the best position to observe conditions in the area of their work that could be unsuitable and report them to the Designated Representative or to project management personnel for re-assessment. Site-specific training, task hazard analyses, and pre-shift and daily huddles should be conducted for each project, as required.

d. Evaluation/Analysis and Certification

Designated Working Platform personnel representing either the Controlling Entity or the Specialty Subcontractor, (as defined by contract), should make an Initial Project Assessment for every project irrespective of whether an Engineering Analysis must be conducted or whether an Empirical Evaluation is sufficient. Other than when

hoisting is involved, no regulatory threshold for this decision exists in North America except in Ontario. Under Ontario Regulations 213/91, Rotary Foundation Drill Rigs, an Engineering Analysis is required where any piece of equipment exerts a pressure of 200 kPa (29 psi) under its tires, tracks or outriggers. This threshold applies to any configuration in which the equipment will operate while in use on the site. Where hoisting is involved, the OSHA crane standard (29 C.F.R. §1926.1402) takes effect: “The equipment must not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer’s specifications for adequate support and degree of level of the equipment are met.”

Until such time as general U.S. and/or Canadian standards are developed, this Industry Group recommends the approach to Working Platform design and construction outlined in this document should be used.

1. An Initial Project Assessment should be made without exception for all sites, regardless of sizes and weights of Tracked Plant. An Engineering Analysis and Full Platform Design should be performed where any of the following apply:
 - a. any Tracked Plant will have gross weight in excess of 50 tons (45,000 kg)
 - b. any Tracked Plant will have static average track pressure more than 3,000 psf (145 kPa)
 - c. Sites where the top 20 ft (6 m) of the subgrade below the underside of the platform has either:
 - i. undrained shear strength less than 3,000 psf* (kPa) (145 kPa) (cohesive material) or
 - ii. angle of shearing resistance is 32 degrees* or less (granular material)
 - d. Sites in urban areas that lack complete data regarding the presence, condition, and location of old foundations, buried structures, and utilities.
 - e. Sites with known unusual site conditions, including but not limited to artesian or elevated pressure groundwater conditions, groundwater levels susceptible to flooding or that fluctuate rapidly immediately after a precipitation event, steep or unstable adjacent slopes, sites with geometrical constraints such as limited set back from top of slope, occupied adjacent structures, and documented karst terrain. The specifics of these situations may warrant evaluations of depths greater than 20 feet (6 m).
2. An Empirical Evaluation and Platform Recommendations should be performed for all sites not meeting the threshold requirements for an Engineering Analysis and Full Platform Design.

*These values should be determined based on a composite evaluation of the 0 – 20 feet (0 – 6 m) stratigraphy. In addition, the Initial Project Assessment should consider evaluation of deeper subsurface conditions for the larger classes or weights of machines or where the approximate depth of influence based on machine geometry exceeds 20 feet (6 m).

Individual companies may define more stringent internal thresholds for triggering an Engineering Analysis and Design of the Working Platform. The decision-making process should have some consistent parameters to ensure continuity between projects even if personnel change. The decision to perform an Engineering Analysis and Working Platform Design should not be arbitrary and should be a function of industry recommendations and specific company standards.

Even when an Engineering Analysis and Design are not performed, the Designated Representatives for the Specialty Subcontractor and the Controlling Entity(ies) should acknowledge the adequacy of platform conditions at a site as determined in the Empirical Evaluation. This acknowledgment should be executed in the form of a standard Certification form. A standard form should be adopted by each company and include signature options for both internal personnel with no engineering analysis and internal/external personnel with engineering analysis and design.

A sample Certification form is included in the Appendix of this report.

V. Working Platform Evaluation Process

a. Assembly of Available Information

In order to evaluate a subgrade properly, Designated Representatives engaging in Empirical Evaluation or engineers engaging in Engineering Analyses should consider all available information on subgrade conditions. Every effort should be made to obtain any data that could affect the evaluation and characterization of the support conditions on a site, including working positions and configurations planned for the work. Site information will include geotechnical reports and other published sources, experience, and visual observations. More information about each of these forms of information is included in the Appendix of this document.

No amount of evaluation effort or policy-making will help prevent injuries and equipment loss if the data going into the evaluation are incomplete. Historically, many equipment manufacturers only provide limited information, such as rig weight in a static position. Critical loading situations often occur when a drill rig or similar equipment is in operation, and pressures exerted by such machinery exceed static loading conditions described in manufacturer manuals.

Specialty Subcontractors should communicate with manufacturers of the equipment they own in order to ascertain loading information that is as detailed and accurate as possible. If the Specialty Subcontractor uses any one piece of equipment in a consistent and/or unusual configuration, the Working Platform Designated Representative should request as much information as possible about that specific arrangement. Of critical concern is information on the weights of the actual machine, undercarriage, counterweights, mast (including backstay assemblies), drill head, and tooling, and locations of the centers of gravity for all components. Operators should provide input

into likely loading conditions during construction, including those created by ground conditions.

b. Initial Project Assessment

The Initial Project Assessment should be made without exception for all sites, regardless of sizes and weights of any Tracked Plant. The Initial Project Assessment should be performed by the Designated Representative identified in the project documents and contract and by support personnel to determine whether an Empirical Evaluation will be conducted to produce Working Platform Recommendations or whether an Engineering Analysis for Full Platform Design is required. This Initial Project Assessment should take into account all available information provided by the Controlling Entity, including but not limited to those items given in the Appendix, as well as company expertise and experience. Each company should develop policies that create some decision-making structure without eliminating the value of professional judgment within the process.

Following the Initial Project Assessment, the Designated Representative should evaluate whether an Empirical Evaluation is sufficient, or whether an Engineering Analysis and Full Platform Design are required following the threshold criteria given in Section IV d. 1.

Contractors also should check local regulations for specific thresholds that trigger an Engineering Analysis for temporary works. Each organization should implement clear and consistent Initial Project Assessment procedures to maintain a safe working environment for its personnel and equipment.

c. Empirical Evaluation and Platform Recommendations

In situations where company policy indicates that Working Platform Designated Representatives can perform an Empirical Evaluation, standard procedures should be used for both the Evaluation and the Recommendations. The contractor may wish to use a catalogue of typical platform configurations as recommended options when an Engineering Analysis is not deemed necessary. In any event, standard policies that minimize subjective judgments and are based upon sound construction safety principles should be implemented in order to provide defensible practices.

If an Engineering Analysis is determined not to be required, Working Platform Designated Representatives should document who made the decision and what information was available and utilized to support the determination.

If an Empirical Evaluation is conducted, the methods and procedures should follow generally accepted industry practices based upon an understanding of soil mechanics principles and safe operation of construction equipment, obtained either through formal training or through experience in the construction field, and should be documented accordingly. The Building Research Establishment Ltd document (BR 470), "Working platforms for tracked plant: good practice guide to the design, installation, maintenance

and repair of ground-supported working platforms” is one example of a widely accepted evaluation method that can be used by engineers and non-engineering personnel. The Federation of Piling Specialists (FPS) Calculation Tool also can be used to determine equipment loading.

If site conditions are observed to change during construction; if unforeseen conditions are encountered; or if different equipment is put into use, the Designated Representative and any support staff must be contacted to re-evaluate the Platform Recommendations. Site personnel should be instructed to assume that changes in site conditions warrant an updated Evaluation.

The Designated Representative or other person performing the Empirical Evaluation should identify applicable methods of QA-QC and testing for confirmation of final Platform support conditions. Such testing may include proofrolling the completed Platform surface, plate load testing, or other suitable procedures.

d. Engineering Analysis and Full Platform Design

Initial Project Assessment may indicate that an Engineering Analysis is necessary. This Analysis should be performed by a licensed professional engineer either within the company responsible for the Working Platform evaluation (general contractor or Specialty Subcontractor) or from an external firm. In either case, the Designated Representative from the Specialty Subcontractor should transmit all available information on the equipment to be used to the engineer if the Designated Representative for the Specialty Subcontractor is not performing the Analysis personally. The Designated Representatives for the Controlling Entity and the Specialty Subcontractor should provide all available subsurface information, equipment data, and clear and complete descriptions of equipment use and proposed locations on the site from all applicable persons involved with the project to the engineer performing the Analysis. Analyses should be conducted using the standard of care and accepted industry tools and practices, such as BR 470, the FPS Calculation Tool (for the equipment loading input), and other design methods and should be based upon sound principles of engineering and soil mechanics.

A full Platform Design should include all necessary sketches, plans, calculations, and specifications to construct the Working Platform in the field. A registered professional engineer, licensed and duly authorized to practice in the state/jurisdiction of the project, should sign and seal these plans.

If site conditions are observed to change during construction; if unforeseen conditions are encountered; or if different equipment is put into use, the engineer and the Controlling Entity must be contacted to re-analyze the Platform Recommendations and Design. Site personnel should be instructed to assume that changes in site conditions warrant an updated Analysis.

Project managers for the Prime Contractor and the Specialty Subcontractor should include adequate time in the project schedule to allow for the Engineering Analysis. In addition, time should be factored into the schedule in case modifications to the Platform are necessary.

The engineer should identify methods of QA-QC and testing for confirmation of final platform support conditions. Such testing may include proofrolling the completed platform surface, plate load testing or other suitable procedures.

e. Certification Form

A standard Certification form should be used to document completion of either the Empirical Evaluation or the Engineering Analysis. This form may be completed by the Designated Representative of either the Controlling Entity or the Specialty Subcontractor, but must be co-signed by both. The form should include, at a minimum and without limitation:

- Project Name
- Project Location
- Extents of Project Area
- Proposed Equipment
- Maximum Loading Conditions
- Name of Personnel Completing Empirical Evaluation (if applicable)
- Name of Engineer Performing Engineering Analysis (if applicable)
- Engineer's Company and Contact Information
- Testing or Confirmation Requirements for Platform in the Field
- Signature of Designated Representatives Accepting Plan
- Company Name and Date
- Cover Sheet with Name and Position of Controlling Entity (Owner/General Contractor) Representative to Whom Form Was Transmitted
- Attached Platform Recommendations
- Attached Full Platform Design (if applicable)
- Attached Maintenance Log for Daily Inspection

Separate Working Platform Certification forms must be filled out for each area where different equipment will be used and/or materially different loading conditions imposed.

A Maintenance Log should be provided to both the Controlling Entity and the Specialty Subcontractor for daily completion, as well as the Controlling Entity if it is not the Prime Contractor. The parties should agree in advance and identify the Controlling Entity as the party who will be responsible for performing the maintenance, monitoring the maintenance, and entering information on the Maintenance Logs.

An example of a Working Platform Certification form is included in the Appendix of this document. Additional exhibits may be found at www.fps.org.uk.

f. Submittal Process

The completed Working Platform Certification should be provided to appropriate representatives of the Controlling Entities, including the Prime Contractor and Owner, as well as the Specialty Subcontractor operating the equipment, as required by the project contract and subcontract documents. Submission of the Certification forms, ongoing inspection during equipment operation, notification of changes requiring Platform modifications, and terms stipulating who is financially and physically responsible for implementing such modifications should be contractually agreed upon prior to the start of the project.

VI. Execution

a. Installation

Construction of the Working Platform should be documented thoroughly, including information on the condition and the elevations/grades of the site at the start of platform installation. As-built drawings or sketches should be filed with project documents, along with test results obtained throughout platform construction. The Designated Representative for the Controlling Entity(ies) should be provided with these documents, whether they are generated by the Specialty Subcontractor or by another entity.

The borders of the Working Platform should be clearly marked so as to be visible to personnel working on the Platform and in surrounding sections of the site. If stakes or other easily damaged materials are used as boundary markers, the condition of those items should be checked daily and the borders re-marked as necessary. Special project environments in which visibility is obstructed or where activity is dense may warrant more highly visible and durable platform border markers.

The status of construction of the platform should be communicated clearly to operators and other workers utilizing the platform so that work is not commenced prematurely on an incomplete Working Platform.

The project team, including the Controlling Entity, also should be apprised of the completion of the Platform. They should be shown the Platform borders, and clear understanding should be reached regarding other entities traversing or otherwise using the Platform. Where agreements are reached to allow other entities to use the Platform, clear information should be communicated to those parties defining the loading conditions for which the Platform was designed. Furthermore, conditions that could affect ongoing performance of the Platform, such as site drainage and adjacent excavations, should be discussed with the Controlling Entity.

b. Inspection and Documentation of Ongoing Conditions

Specific personnel for both the Specialty Subcontractor and the Controlling Entity should be designated at the start of the project to document the condition of the Platform and identify and record situations in which modifications might be required. The Inspection Log should be retained on the jobsite, and a copy of the completed log entries should be transmitted to the Specialty Subcontractor's office and to the Controlling Entity on a pre-defined regular basis.

The Specialty Subcontractor should implement procedures by which the inspection personnel identify and document conditions that require attention/modifications and transmit those to company personnel to effect the necessary changes. A process should be defined to implement repairs or modifications to a Platform when unsuitable conditions arise. Delays in making changes could lead to accidents/incidents.

The Controlling Entity is responsible for damage or alterations made to the Working Platform by third parties, such as other subcontractors, on the project site. The Controlling Entity will monitor the work of other entities on the project site and will ensure that such parties do not materially alter the Working Platform.

Similarly, an established procedure for alerting the Controlling Entity of unsuitable Platform conditions requiring corrective actions by the Controlling Entity also should be in place at the start of the project. Daily walk-throughs of the site and Working Platform area before initiating/resuming work should be performed. Working Platform conditions and maintenance should be a topic for each morning's safety meetings/huddles and for all Job Hazard Analysis/Toolbox Hazard Awareness (JHA/THA) meetings. Communication procedures to alert the Controlling Entity(ies) of potential problems and procedures for remediating problems, as well as payment terms for the repairs/modifications, should be defined before any work begins.

Equipment should not be allowed to continue operating once unsuitable Working Platform conditions have been identified.

VII. Completion

a. Administrative Terms for Removal or Abandonment

Contract documents should define clearly whether Working Platform elements may be abandoned in-place at the site to be used by the Controlling Entities or others, or all parts of the Platform should be removed. If any other party decides to use the Working Platform after the Specialty Subcontractor's work is complete, the Working Platform process should start over at the Initial Project Assessment stage. Compensation for abandoned materials or penalties for non-removal of Platform materials when specified should be spelled out, and provisions for incorporating Working Platforms into slab bases, pavement bases, and other structural sections should be addressed, if appropriate.

b. Internal Performance Documentation

The Specialty Subcontractor should retain records of the site evaluation, the platform design, the inspection logs, records of modifications or repairs to the platform, if applicable, and internal comments about performance of the platform. Where possible, photographic documentation is desirable.

APPENDIX

WORKING PLATFORMS PROCESS

ALL AVAILABLE INFORMATION IS GATHERED: GEOTECHNICAL REPORTS, PUBLISHED GEOLOGIC DATA, OLD SEWER MAPS, HISTORICAL RECORDS, EQUIPMENT LOADS, ETC.

INITIAL PROJECT ASSESSMENT

Do any of the following apply to the project?

1. Tracked Plant will have gross weight in excess of 50 tons (45,000 kg)
2. Tracked plant will have static average track pressure more than 3,000 psf (145 kPa)
3. The top 20 ft (6 m) of the subgrade below the underside of the platform has either:
 - Undrained shear strength less than 3,000 psf (kPa) (145 kPa) (cohesive material) or...
 - angle of shearing resistance is 32 degrees or less (granular material)
4. Site is in urban areas that lack complete data regarding the presence, condition, and location of old foundations, buried structures, and utilities.
5. Site has known unusual site conditions, including but not limited to artesian or elevated pressure groundwater conditions, groundwater levels susceptible to flooding or that fluctuate rapidly immediately after a precipitation event, steep or unstable adjacent slopes, sites with geometrical constraints such as limited set back from top of slope, occupied adjacent structures, and documented karst terrain. The specifics of these situations may warrant evaluations of depths greater than 20 feet (6m)

NOTE: This step may take place during project planning for bidding purposes and may be repeated later in the project when specific means and methods are determined

No

Yes

EMPIRICAL EVALUATION AND PLATFORM RECOMMENDATIONS

ENGINEERING ANALYSIS AND PLATFORM DESIGN

PLATFORM CERTIFICATION

HAS ANYTHING CHANGED SINCE THE INITIAL PROJECT ASSESSMENT WAS STARTED?

No

BUILD AND MAINTAIN WORKING PLATFORM

Yes

Information Sources

SUBSURFACE INFORMATION

Sanborn maps for historic conditions - <https://edrnet.com/prods/sanborn-maps/>

National Resource and Conservation Service (NRCS) Soil Surveys (These include information on engineering properties of existing soils) - <https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/>

Google Earth for historical aerial photographs - <https://www.google.com/earth/>

EMPLOYEE EDUCATION

Working Platform Safety Poster (<https://www.adsc-iafd.com/wp-content/uploads/2019/12/Working-Platform-Poster.pdf>)

VOLUNTARY CONSENSUS STANDARDS

American National Standards Institute (ANSI)

ANSI / ASSP A10.19-2017 - Safety Requirements for Pile Installation and Extraction Operations, Section 4.4, Paragraphs 4.4.1 – 4.4.2 (<https://store.assp.org/PersonifyEbusiness/Store/Product-Details/productId/27198752>)

ANSI/ASSP A10.23-2019 - Safety Requirements for the Installation of Drilled Shafts, Section 6, Paragraphs 6.1 – 6.2, and Section 8, Paragraphs 8.1 – 8.2 (<https://store.assp.org/PersonifyEbusiness/Publications/Publications-on-Demand/On-Demand-Product-Details/productId/200625854>)

ANSI/ASSP A10.30 – Safety Requirements for the Installation of Ground Anchors and Micropiles, Section 6, Paragraphs 6.1 – 6.2, and Section 8, Paragraphs 8.1 – 8.2 (<https://store.assp.org/PersonifyEbusiness/Store/Product-Details/productId/213257306>)

ANSI/ASSP A10.6 (2018) - Safety Requirements for Concrete and Masonry Work, Section 4.6, Paragraphs 4.6.1 – 4.6.2 (<https://store.assp.org/PersonifyEbusiness/Store/Product-Details/productId/101625765>)

LEGAL REQUIREMENTS IN NORTH AMERICA

US Occupational Safety and Health Administration (OSHA)

CFR 1926 Subpart O - Motor Vehicles, Mechanized Equipment, and Marine Operations
CFR 1926.602(a)(3)(i) (<https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.602>)

CFR 1926 Subpart R – Steel Erection

CFR 1926.752(c) (<https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.752>)

CFR 1926 Subpart CC - Cranes and Derricks in Construction

CFR 1926.1402 – Ground Conditions (<https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.1402>)

OSHA Letter of Interpretation regarding the term controlling entity and responsibility for ground conditions for safe crane operations – (<https://www.osha.gov/laws-regs/standardinterpretations/2012-10-01>)

Ministry of Labour, Occupational Health and Safety Act, Ontario Canada

Regulation 345/15, Rotary Foundation Drill Rigs (<https://www.ontario.ca/laws/regulation/r15345>)

WORKING PLATFORM INFORMATION AND GUIDANCE

WorkSafe Victoria Australia - Piling work and foundation engineering sites, Section 4, Paragraphs 4.3 (<https://content.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Piling-work-and-foundation-engineering-sites-a-guide-to-managing-safety-2014-01.pdf>)

Federation of Piling Specialists (FPS), Working Platform Guidance Information (<https://www.fps.org.uk/guidance/working-platform-guidance/>)

Guide to Working Platforms EFFC/DFI Working Platforms Task Group (<http://www.dfi.org/viewpub.asp?tid=TM-PLATFORMS>)

Working Platforms for Tracked Plants (BR470) Good Practice Guide (<https://www.bre-bookshop.com/details.jsp?id=146444>)

Design of granular working platforms for construction plant (Temporary Works Forum) (<https://www.twforum.org.uk/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=f74318ff-716b-79a3-f483-77f77a584e05&forceDialog=0>)

The Investigation for, and Design of, Working Platforms, Brian Wilson (<https://www.keller-na.com/sites/keller-na/files/2019-11/The%20Investigation%20for%2C%20and%20design%20of%2C%20working%20platforms.pdf>)

Economic design of working platforms for tracked plant, David Corke (<https://cdn.ca.emap.com/wp-content/uploads/sites/9/2010/02/GE-Feb-2010-Economic-design-of-working-platforms-for-tracked-plant-Corke-Gannon.pdf>)

Working Platform Design Spreadsheet to BRE Digest 470 (<https://www.yourspreadsheets.co.uk/working-platform-design.html>)

CICA & CANZ Guidance Note Crane Stability and Ground Pressure (https://www.cranes.org.nz/uploads/2/0/5/7/20572552/crane_stability_and_ground_pressure.pdf)
Safety on Working Platforms (Video) (<https://www.youtube.com/watch?v=K-kUn90iqG2U&feature=youtu.be>)

Ground Conditions for Construction Plant, Good Practice Guide (https://s3.eu-central-1.amazonaws.com/vertikal.net/sfpsg-guidance-on-ground-conditions-141103_24a2ebc9.pdf)

LEAFLET FOR THE PREVENTION OF MACHINE TIPPING OVER IN SPECIAL FOUNDATION ENGINEERING
(<https://www.bauindustrie.de/themen/bundesfachabteilungen/spezialtiefbau/>) Found near bottom right of home page

Piling Rigs Overturning On Construction Sites - HSB Engineering Insurance Paper (https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/HSBEI-1294.pdf/_jcr_content/renditions/original./HSBEI-1294.pdf)

Working Platform Certificate (FPS/WPC/4d)

Project Name	
Work area covered by this certificate	

(A sketch or marked up pile layout drawing may be attached to this certificate. Include haul roads and gridlines.)

Part 1 – WORKING PLATFORM DESIGN (INCLUDING RAMPS AND ACCESS ROUTES)

Equipment to be used on site.	
Maximum plant loading	

(Note: BR470 'Working Platforms for Tracked Plant: Good practice guide to the design, installation, maintenance and repair of ground-supported platforms' is available from IHS BRE Press – Tel 01344 328 038)

Designer Name		Tel No.
Designer Organisation		
Specification of testing required to verify the design		

Part 2 – VERIFICATION BY PRINCIPAL CONTRACTOR

The working platform detailed above has been designed, installed to the design and, if specified, tested to safely support the equipment detailed in Part 1 above. The limits of the platform have been clearly identified on site as necessary.

The working platform will be REGULARLY INSPECTED, MAINTAINED, MODIFIED, REPAIRED, and REINSTATED to the as-designed condition after any excavation or damage, throughout the period when the equipment is on the site. A completed copy of this certificate signed by an authorised person from the Principal Contractor shall be given to each user of the working platform prior to commencement of any works on site.

Name & Position		Date
Organisation		Signature

The HSE has worked closely with the FPS to develop this initiative and supports the principle of reducing accidents by the certification of properly designed, prepared and maintained working platforms

Working Platform Certificate (FPS/WPC/4d)



Working Platform Regular Inspection Log

(To be completed by an authorised representative of the Principal Contractor)

The working platform has been inspected *prior to handover and provides safe access for people and plant*. All necessary maintenance, modification, repair or re-instatement of the working platform is to the as-designed installed condition. If necessary, a revised Working Platform Layout Drawing has been issued to the specialist contractor.

Date	Organisation	Name & Position	Signature	Comments (include key details of alteration, modification, maintenance, repair, date of next inspection, and whether or not revised drawing issued etc. as appropriate)

Working Platform Certificate (FPS/WPC/4d)

Guidance on working platforms for tracked plant

1. Design

- 1.1. The HSWA 1974 and CDM Regulations 2015 require the Principal Contractor to appoint competent Designers in respect of Working Platform design. This legislation explains how competence can be assessed by reference to professional qualifications or professional memberships and by reference to practical experience of the design of working platforms. Principal Contractors must be satisfied that a competent Designer has been appointed by them in accordance with the relevant legislation before they complete and sign the WPC.
- 1.2. The stability of tracked plant is fundamentally dependent upon the provision of a suitable and sufficient working platform. It must be properly designed and installed to a recognised standard. Whilst the same type of rig may be operated by different companies, the design bearing pressures may differ due to the specific operating configuration of the rig and/or any modifications. Details of the plant to be used and bearing pressures will be provided by the specialist contractor in advance of work commencing.
- 1.3. Working platform design is extremely sensitive to the bearing pressure and type of fill used in the platform. (For example, changing the angle of friction of the fill from 35 degrees to 45 degrees can halve the platform thickness.) It is therefore advised that the Designer may have to adopt conservative/cautious estimates of platform shear strength unless higher values can be demonstrated by testing or with reference to appropriate published data.
- 1.4. The working platform must be *safe for pedestrian access and* free draining to prevent the build-up of water and slurry. It must be free from harmful materials and contaminants. In the case of fine-grained sub-grades, a separation/filter membrane should be installed beneath the platform material to inhibit 'pumping' and infiltration of the fine-grained soils up into the platform material during wet weather (which can impair platform performance and increase maintenance costs).
- 1.5. Proof testing of the platform can be carried out with a suitably sized circular plate subjected to the maximum design loading. Such testing, as part of an appropriately designed testing regime, should highlight any gross inconsistencies in platform performance. Potentially, significant savings in platform thickness and cost may be realised by adopting a more detailed testing strategy.
- 1.6. The working platform must have a design life which starts before delivery of the piling equipment and ends on completion of all piling works. This includes load testing, integrity testing, investigation of non-conformances and any remedial works.
- 1.7. The specialist contractor is to advise the Principal Contractor at the earliest practicable opportunity should the specialist contractor become aware of any circumstances relating to the working platform that renders it unsafe.

2. Installation

- 2.1. The FPS Working Platform Certificate is mandatory for all sites where a rig or attendant plant operates. It must be signed by an authorised representative of the Principal Contractor. This signature confirms that the legal duties required under CDM have been carried out.
- 2.2. If the working platform is to be constructed or removed in phases while piling works are ongoing, then the extent of the platform must be clearly defined on the certificate and, in accordance with good practice, physically on site. This is particularly important where the platform material is removed from an area previously made available to the specialist contractor.
- 2.3. The working platform *must* provide *safe* access for all plant deliveries, sub-contractors and personnel associated with the specialist operations. Properly designed and installed, the working platform could also provide suitable and safe access for following trades for the whole project.
- 2.4. Poor definition of the edge of the working platform is a major cause of tracked plant instability. It is good practice that the working platform should extend at least 2m beyond the pile position/edge of the building to ensure sufficient safe working area for the specialists personnel and attendant plant. Where having to work within this 2m zone is unavoidable the Designer is to be informed of the requirement to design the platform for working up to its edge.
- 2.5. Where access ramps are used to move between working levels these must be of sufficient gradient and width to allow the plant to move safely with the stability constraints of the machine. Ramps must be in a straight line between working areas. Rigs and cranes cannot change direction on ramps. Where a change in direction is required, this must be on a flat level platform.

3. Maintenance, modification, repair and reinstatement

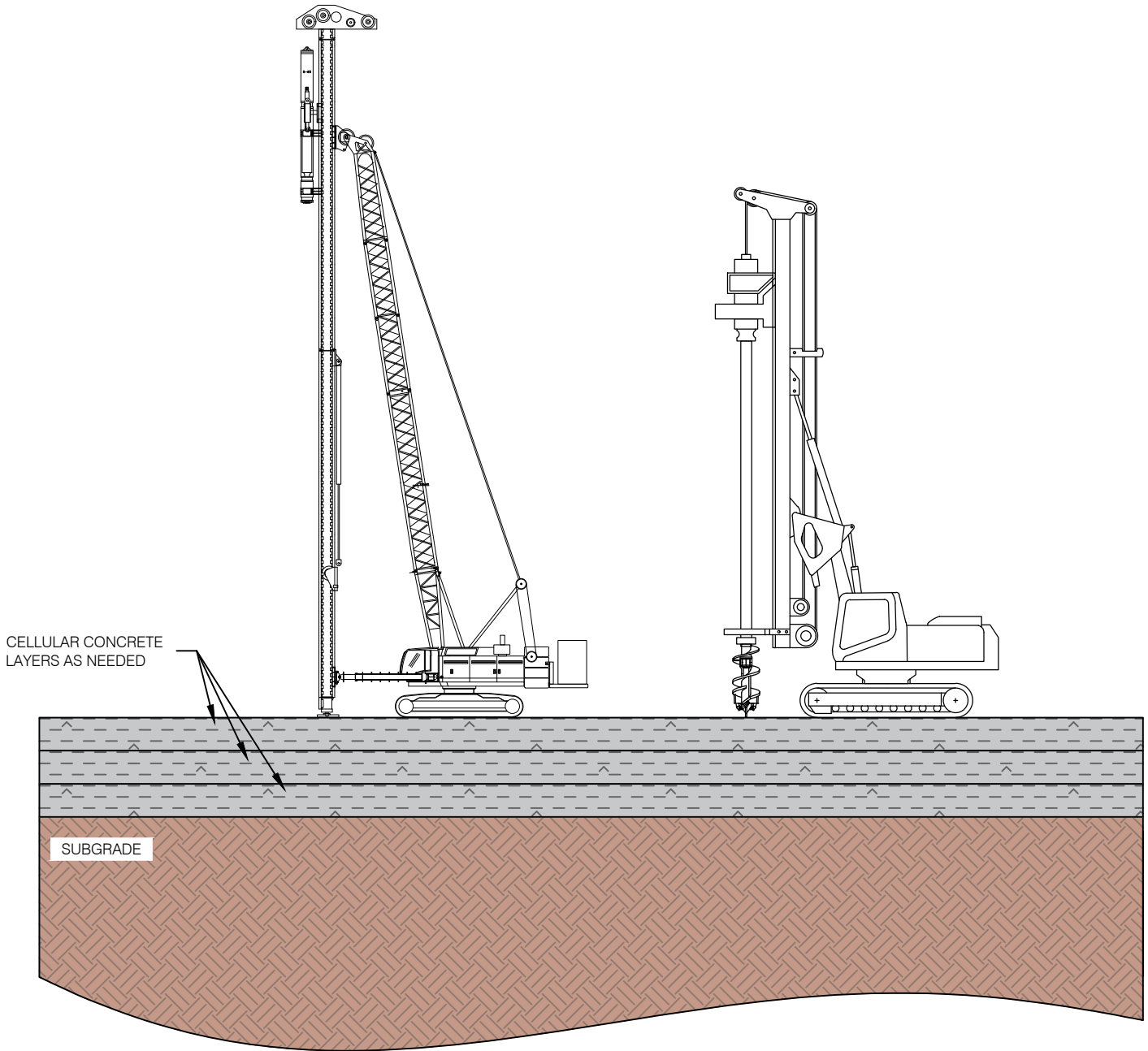
- 3.1. The working platform must be kept free draining. Water and slurry which is allowed to build up on the working platform can hide such hazards as recently constructed piles, trip hazards, uneven or unstable ground, services and excavations. Slurry can be transferred to work equipment which increases the risk of slips on steps as well as difficult handling of work tools.
- 3.2. Obstructions encountered during installation of the piling works will generally require excavation to remove them. This can create a 'soft spot' which can result in the rig overturning. It is essential, therefore, that any excavations made in the working platform are reinstated to the designed standard, including any reinforcement and separation filter/membrane.
- 3.3. The working platform shall be subject to regular inspection by a competent individual appointed by the Principal Contractor (e.g. the Temporary Works Co-ordinator) throughout its design life and after any reinstatement or any works which might have modified it. Any damaged or inadequate areas identified must be reinstated to the designed standard. Following the regular inspection, the Working Platform Regular Inspection Log shall be signed by an authorised representative of the Principal Contractor and issued to the specialist contractor with a layout drawing of the working platform amended as appropriate.

4. Working Platform Layout

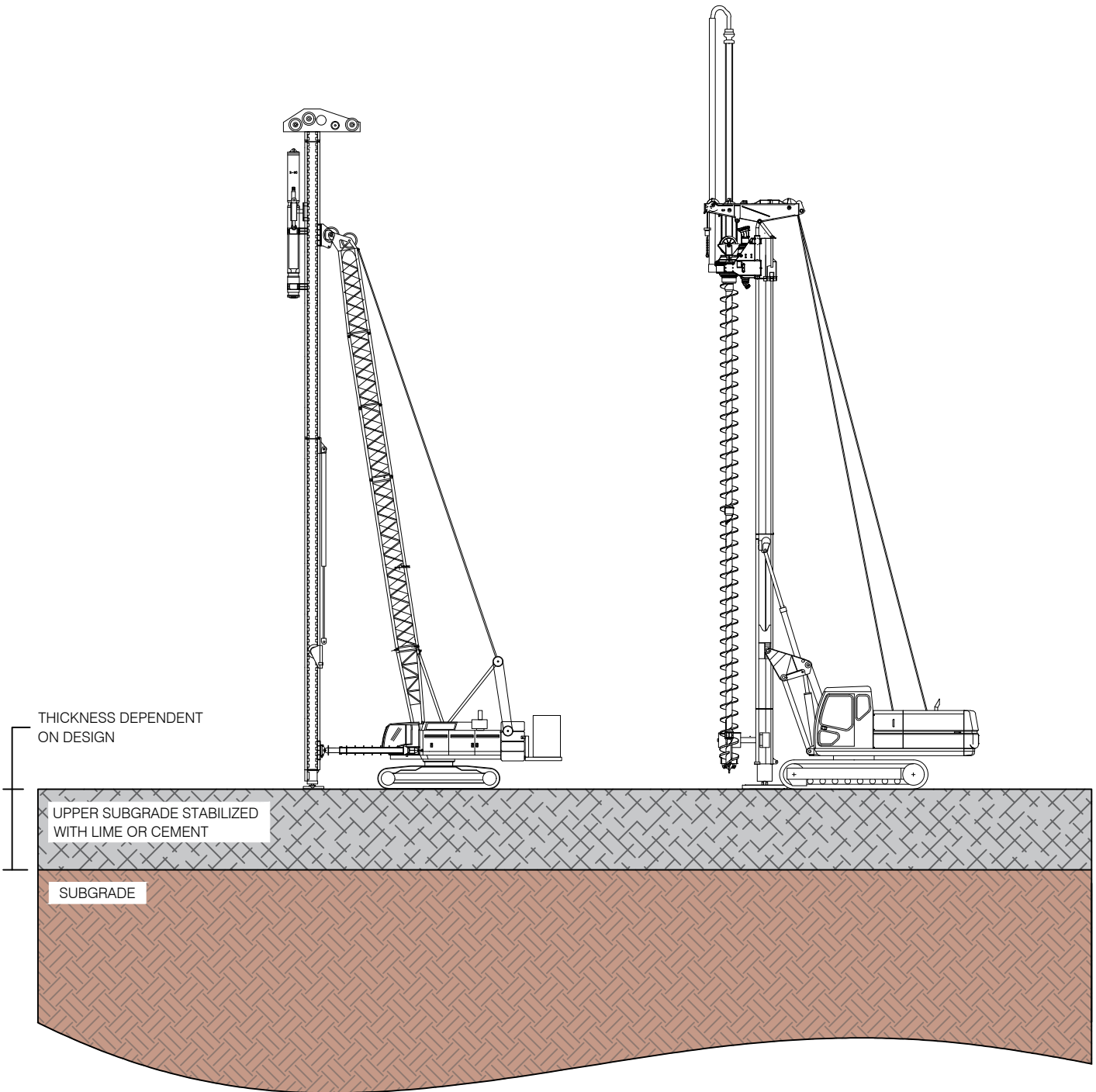
- 4.1. Items that must be included and properly located on the working platform layout drawing and be notified by the Principal Contractor to the specialist contractor would include: detail of platform edges and 2m delineation, trial pits, services or voids, areas of backfilling, known underground basements; areas that are covered by the certificate or permit, test locations (if specified by the Designer of the platform) and any other feature that may affect the safety of operations.

Typical Working Platform Certification Report Elements

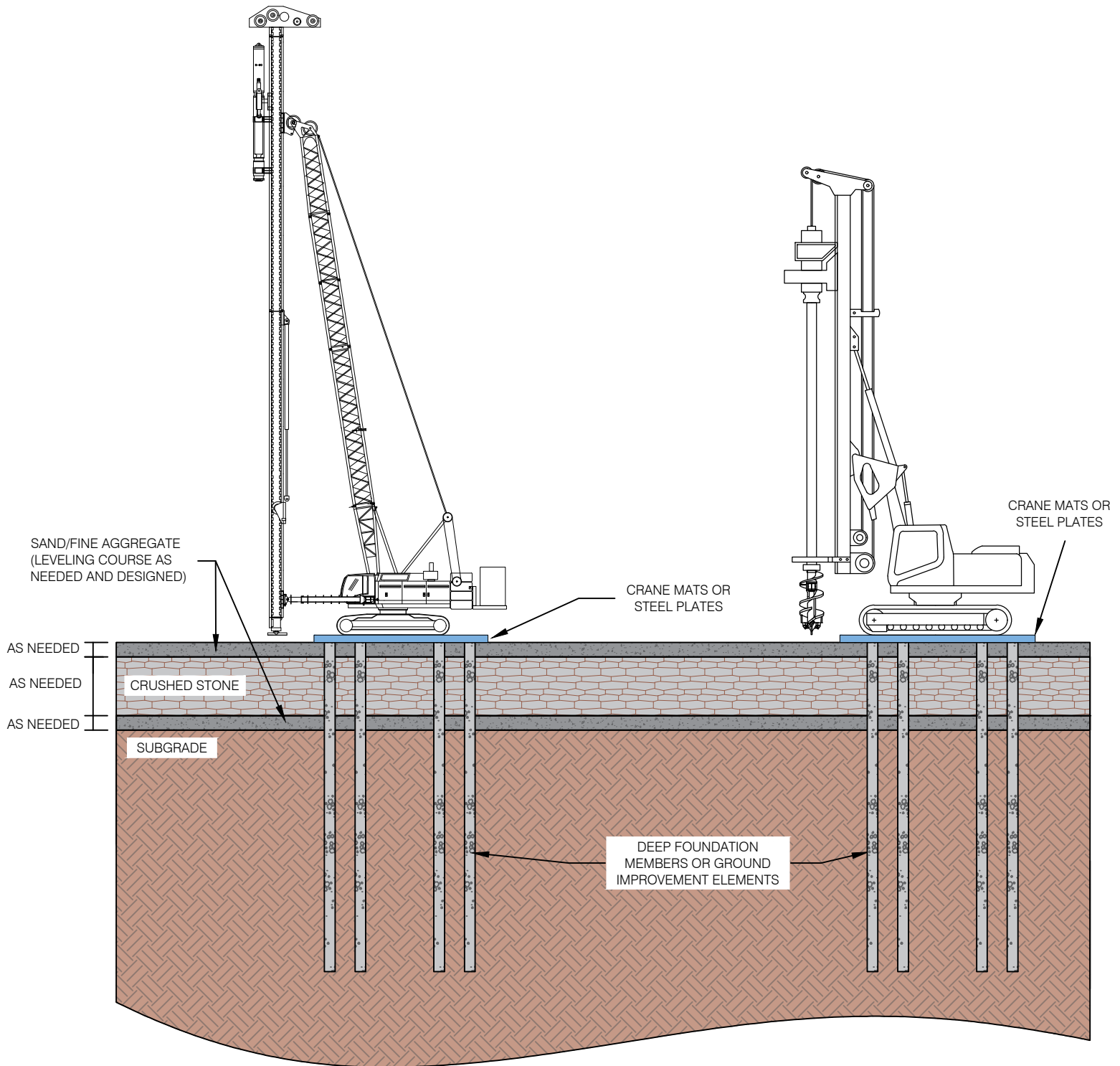
1. Project Overview/Site Location/Site History
2. Available Project Information
3. Rig Details
4. Platform Construction Recommendations
5. Confirmation Testing and QA/QC
6. Subgrade Conditions
 - a. Soil Conditions
 - b. Stratigraphy
- c. Design Parameters
7. Design Methodology and Factor of Safety
8. Working Platform Design Elevation and Boundaries
9. Platform Maintenance
10. Design Calculations
11. Platform Plan Drawing
12. Platform Location Drawing



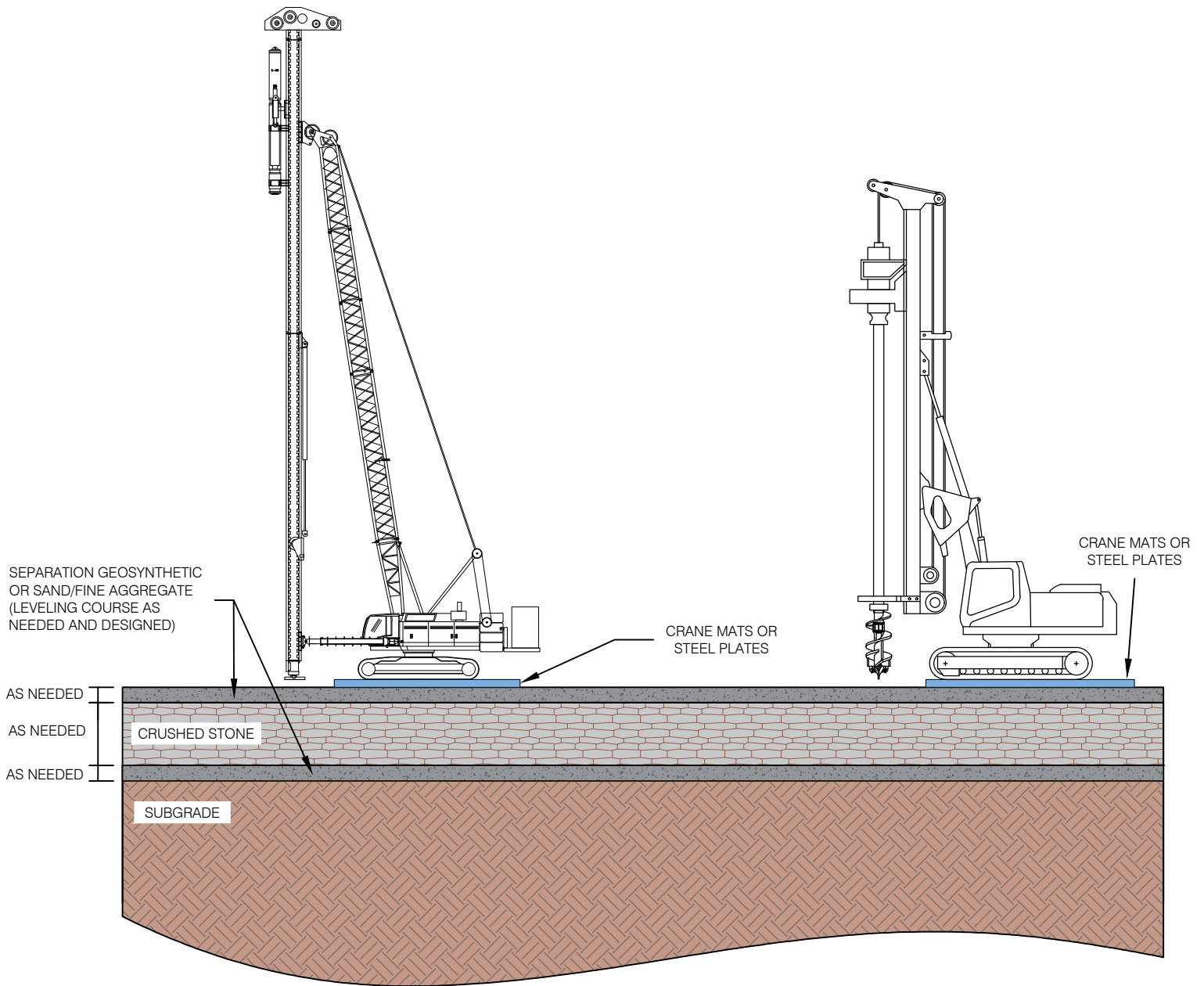
WORKING PLATFORM: Cellular Concrete



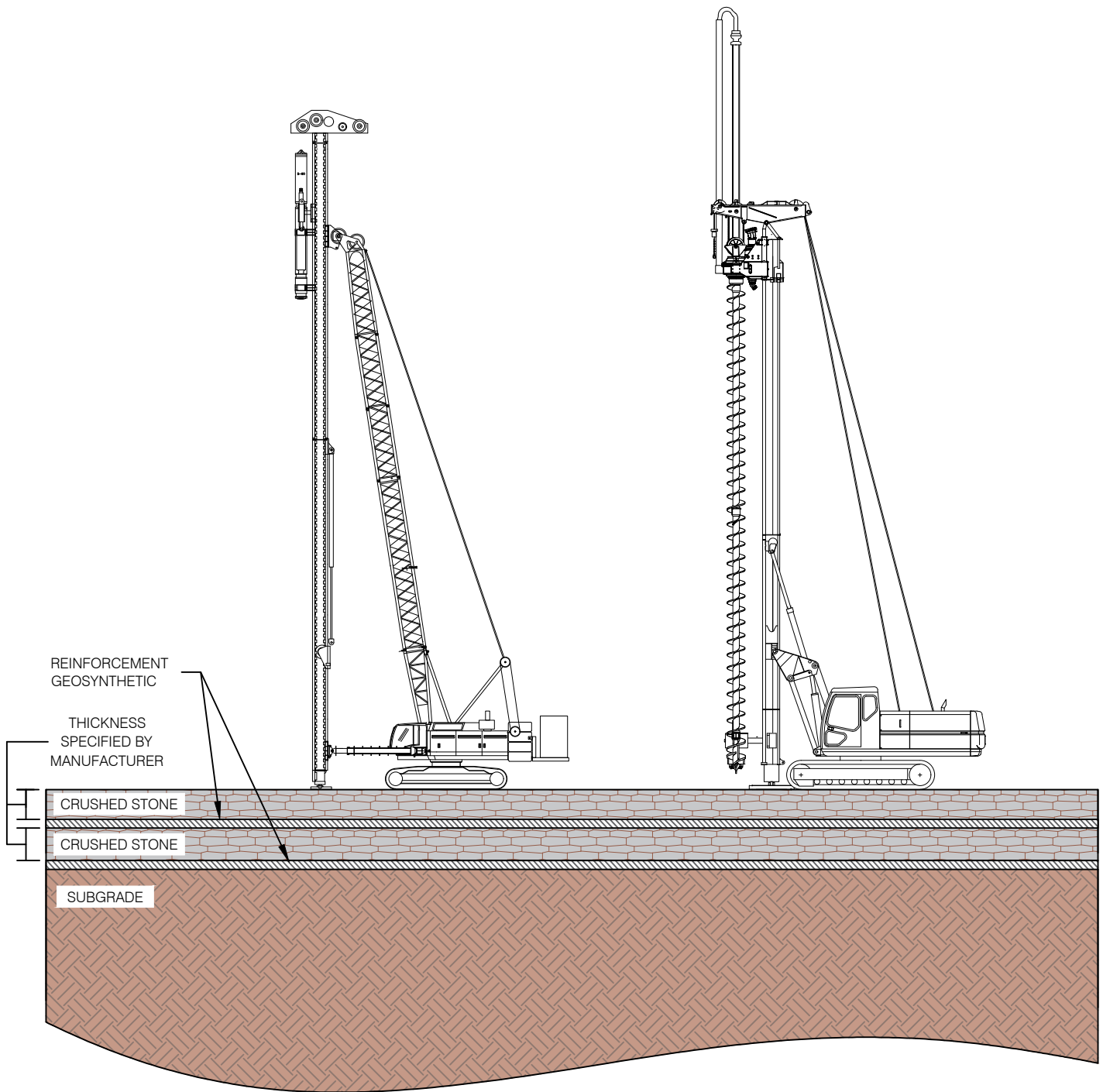
WORKING PLATFORM: Cement/Lime Stabilized Layer



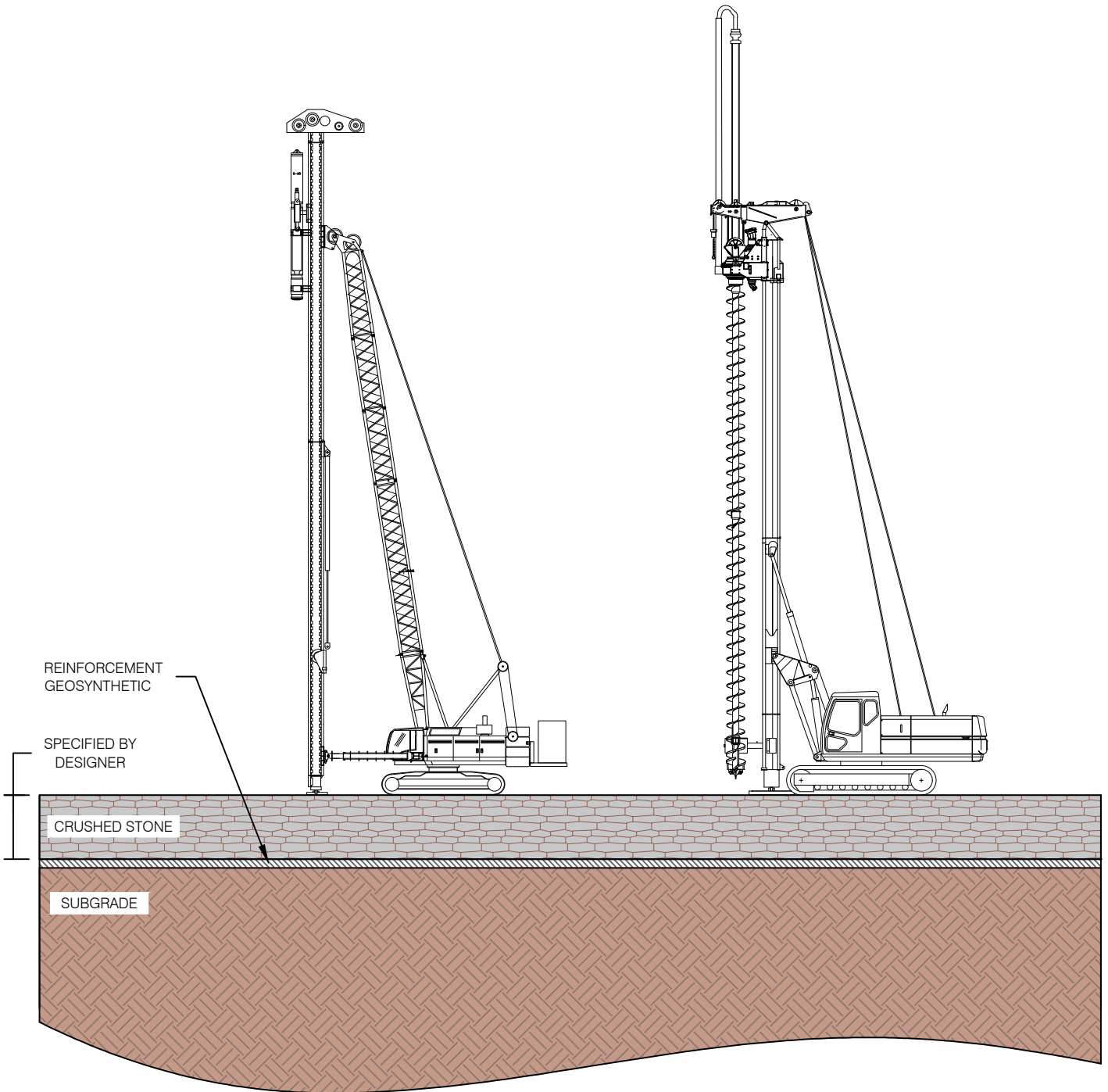
WORKING PLATFORM: Crane Mats or Steel Plates with Deep Foundation or Ground Improvement Elements



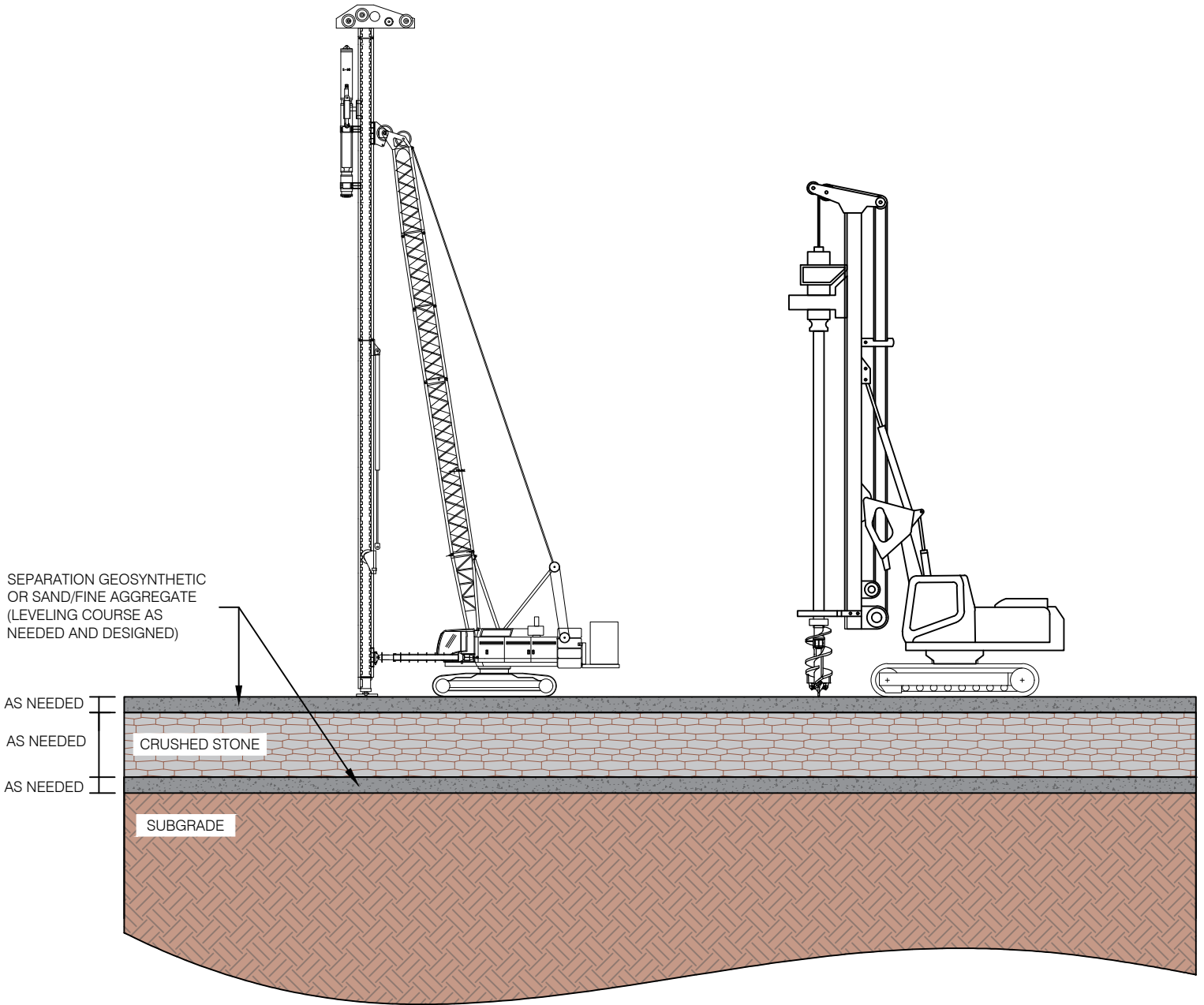
WORKING PLATFORM: Crane Mats or Steel Plates



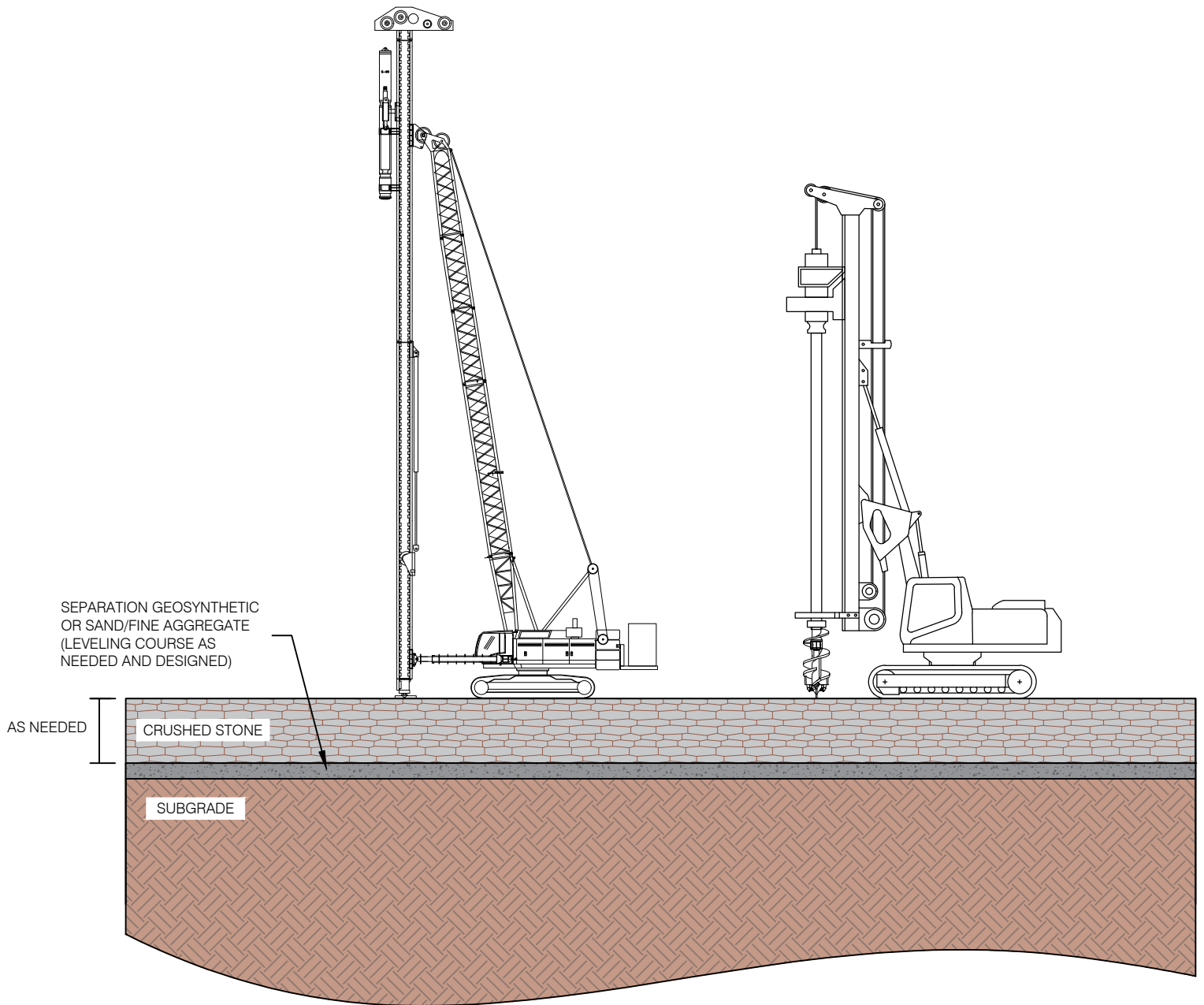
WORKING PLATFORM: Crushed Stone Over Designed Geosynthetic Layers



WORKING PLATFORM: Crushed Stone Over Designed Geosynthetic



WORKING PLATFORM: Crushed Stone with Separator and/or Leveling Course



WORKING PLATFORM: Crushed Stone Only

Suggested Evaluations for Working Platforms

Estimating Stage

- Historical data on the project's previous use – Chemicals/Contamination, Underground vaults, tanks, pits, ducts
- Urban, Suburban, Rural
- Scope of work – drilled shafts, soldier piles, micropiles, ground/rock anchors, ground improvement, diaphragm wall
- Proposed foundation equipment to be used
- Proposed support equipment to be used
- Contract includes provisions that clearly spell out how responsibility for Working Platform design (if necessary) preparation, and maintenance are apportioned in terms of risk, execution, and payment.

Pre-Construction Stage

- Actual foundation equipment to be used
- Actual support equipment to be used
- Ground bearing pressure generated by foundation equipment in the correct configuration for project – Static Condition
- Ground bearing pressure generated by foundation equipment in the correct configuration for project – Working Condition (worst case)
- Ground bearing pressure generated by support equipment in the correct configuration for project – Static Condition
- Ground bearing pressure generated by support equipment (i.e. mobile crane, grout plant, concrete delivery trucks) in the correct configuration for project – Working Condition (worst case)
- Submit bearing pressures to owner/general contractor/project constructor

Pre-Construction Meeting Onsite

- Overhead / underground obstructions
- Utility locates

- Equipment assembly/disassembly areas identified
- Material storage (rebar, soldier piles, anchor/micropile tendons, casing, cement, etc.)
- Material fabrication area(s) – rebar cage, soldier pile, waler, wall panels
- Design, Construction, and Maintenance of Working Platform – by others or in-house?
- Designated Working Platform Representative (internal) and for Client assigned
- Site Control Plan – A plan detailing how a Working Platform will be installed, tested, and monitored, and how it integrates with the overall safety and operations plan of the project.

Onsite Stage

- Confirmed Utility locate performed. Actual locate ongoing during project (potholing).
- Equipment assembly area accessible and ready for use.
- Material laydown area(s) accessible and ready for use
- Designated Representative – trained in the recognition of a change of conditions of the platform which would render it unsafe to work/tram from; should be accessible at all times when work is being performed
- Ground personnel have received training to ensure that employees operating and working in close proximity to heavy equipment are aware of the need for initial project assessment and corresponding evaluation of the subgrade for proper support of foundation installation equipment and support equipment. Site personnel should be advised to constantly observe whether the prepared Working Platform is performing well or needs to be modified.
- Equipment disassembly area accessible and ready for use
- Maintenance
- Inspection