CONSULTING AND TECHNICAL SERVICES+ (CATS+)

TASK ORDER REQUEST FOR PROPOSALS (TORFP)

DEPARTMENT OF INFORMATION TECHNOLOGY (DOIT)

SOLICITATION NUMBER F50B9400027

TABLE ROCK SHA
COMMUNICATIONS TOWER

ISSUE DATE: 08/02/2019

DEPARTMENT OF INFORMATION TECHNOLOGY (DOIT)

KEY INFORMATION SUMMARY SHEET

Solicitation Title:	**Table Rock SHA Communications Tower**
Solicitation Number (TORFP#):	F50B9400027
Functional Area:	Functional Area 13 – Tower Installation
TORFP Issue Date:	**08/02/2019**
TORFP Issuing Office:	Department of Information Technology ("DoIT" or the "Department")
Department Location:	100 Community Place Crownsville, MD 21032
TO Procurement Officer: **e-mail:** **Office Phone:**	Kimberly Funk 100 Community Place Crownsville, MD 21032 Kimberly.Funk@maryland.gov 410-697-9682
TO Manager: **e-mail:** **Office Phone:**	Ed Macon DoIT 301 W. Preston Street, Room 1304 Baltimore, MD 21201 ed.macon@maryland.gov 410-370-2430
TO Proposals are to be sent to:	100 Community Place RM 2.309 Crownsville, MD 21032 Attention: Kimberly Funk **Kimberly.funk@maryland.gov**
TO Pre-Proposal Site Visit:	Site visits will be conducted at the Table Rock SHA site on **08/13/2019** at 12:00 PM local time See **Attachment A** for directions and instructions.
TO Proposal Question and Answer Period	**08/20/2019 5:00 PM** Local Time All questions must be submitted to the TO Procurement Officer at the following email address **Kimberly.Funk@Maryland.gov** Responses will be provided as per section 4.2
TO Proposals Due (Closing) Date and Time:	**09/10/ 2019 at 11:00 AM Local Time** Offerors are reminded that a completed Feedback Form is requested if a no-bid decision is made (see **Section 5**).

MBE Subcontracting Goal:	3%
VSBE Subcontracting Goal:	0%
Task Order Type:	Fixed Price
Task Order Duration:	The estimated period of performance for this effort, barring excusable delays, is 120 Business Days after Notice to Proceed ("NTP")
Primary Place of Performance:	Table Rock SHA Communications Tower Site 4675 George Washington Hwy. (U.S. Route 50) Oakland, Md. 21550 **Grid Coordinates: Latitude: N39-18-09.80, Longitude: W79-24-51.30**
SBR Designation:	No
Federal Funding:	No
Questions Due Date and Time	Local Time

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1 Minimum Qualifications

1.1 TO Contractor Minimum Qualifications

Only those Master Contractors that fully meet all minimum qualification criteria shall be eligible for TORFP proposal evaluation.

1.1.1 The Master Contractor's technical proposal, as stated in **Section 5.4.2(10)**, shall demonstrate proof of Master Contractor's current Green/Yellow Card E&S control credentials.

1.2 TO Contractor Personnel Minimum Qualifications

There are no contractor personnel minimum qualifications for evaluation; however, TO Contractor is responsible for utilizing the appropriate personnel to accomplish the tasks in **Section 2 – Scope of Work**.

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2 TO Contractor Requirements: Scope of Work

2.1 Summary Statement

The Department of Information Technology ("DoIT" or the "Department") is issuing this CATS+ TORFP in order to purchase and install the following for the State:

2.1.1 One (1) 430-foot self-supporting tower

2.1.2 One (1) 12x38 ft. concrete foundation

2.1.3 One (1) 12x12 concrete foundation

2.1.4 One (1) 12x38x10-foot equipment shelter

2.1.5 One (1) 12x12 shelter with a 75KW propane-fueled generator

2.1.6 One (1) 1000 gallon propane tank with concrete foundation

2.1.7 Installation shall be completed at the following location:

TABLE ROCK SHA TOWER SITE
4675 George Washington Highway
Oakland, Md. 21550
Grid Coordinates: Latitude: N39-18-09.80, Longitude: W79-24-51

2.1.8 DoIT intends to award this Task Order to one (1) Master Contractor that proposes a team of resources and a Work Plan that can best satisfy the Task Order requirements.

2.1.9 Master Contractors are advised that, should a solicitation or other competitive award be initiated as a result of activity or recommendations arising from this Task Order, the Offeror awarded this Task Order may not be eligible to compete if such activity constitutes assisting in the drafting of specifications, requirement, or design thereof.

2.2 Roles and Responsibilities

Personnel roles and responsibilities under the Task Order:

2.2.1 TO Procurement Officer – The TO Procurement Officer has the primary responsibility for the management of the TORFP process, for the resolution of TO Agreement scope issues, and for authorizing any changes to the TO Agreement.

2.2.2 TO Manager - The TO Manager has the primary responsibility for the management of the work performed under the TO Agreement, administrative functions, including issuing written directions, and for ensuring compliance with the terms and conditions of the CATS+ Master Contract.

2.2.3 TO Contractor – The TO Contractor is the CATS+ Master Contractor awarded this Task Order and is responsible for the performance **Attachment Q – Technical Specifications**.

2.2.4 TO Contractor Manager – The TO Contractor Manager will serve as primary point of contact with the TO Manager to regularly discuss progress of tasks, upcoming tasking, historical performance, and resolution of any issues that may arise pertaining to the TO Contractor Personnel. The TO Contractor Manager will serve as liaison between the TO Manager and the senior TO Contractor management. The TO Contractor Manager may not be a subcontractor.

2.2.5 TO Contractor Personnel – Any official, employee, agent, Subcontractor, or Subcontractor agents of the TO Contractor who is involved with the Task Order over the course of the Task Order period of performance.

2.3 Background and Purpose

DoIT supports Maryland's Executive Branch agencies and commissions through its leadership as a principal procurement unit and in establishing the State strategic direction for information technology (IT) and telecommunications, establishing a long-range target technology architecture, encouraging cross agency collaboration for the mutual benefit of all, and advocating best practices for operations and project management.

DoIT is involved with a multi-year, infrastructure project to provide Maryland's public safety agencies a network of State-owned radio tower sites.

2.4 Requirements

2.4.1 Required Project Policies, Guidelines and Methodologies

The TO Contractor shall comply with all applicable laws, regulations, policies, standards, and guidelines affecting information technology and technology projects, which may be created or changed periodically.

The TO Contractor shall adhere to and remain abreast of current, new, and revised laws, regulations, policies, standards and guidelines affecting security and technology project execution.

The foregoing may include, but are not limited to, the following policies, guidelines and methodologies that can be found at the DoIT site: http://doit.maryland.gov/policies/Pages/ContractPolicies.aspx.

A. The State of Maryland Information Technology Security Policy and Standards.

B. TO Contractor assigned personnel shall follow a consistent methodology for all TO activities.

2.4.2 TO Contractor Responsibilities

The TO Contractor shall:

A. Meet technical specifications as described in **Attachment Q Technical Specifications – Table Rock SHA Communications Tower**.

B. Perform according to the schedule proposed in **Attachment O - Construction Schedule**, following the processes described in this TORFP and associated attachments.

C. Provide notifications to State and other appropriate authorities as expected by best practices, regulation, and as may be specified in the TORFP and its attachments.

D. Obtain and retain all appropriate certifications and permits for the jurisdiction(s) covered by the location where the tower and other products/services will be installed.

E. Acceptance of the products and services shall be made by the TO Manager using Closeout binders and generally following **Attachment W - Closeout Acceptance Standard**. A closeout binder shall be produced and left at the site, with a second closeout binder submitted to the TO Manager for review and acceptance.

F. Be responsible for scheduling any required inspections with the appropriate authority (local, county, state) and the TO Manager, as well as, if required, the Maryland Department of the Environment (MDE).

G. Furnish supervision/certification by a certified Professional Engineer for the construction of all appropriate storm water management devices as required.

H. Repair any damage to finished surfaces, surrounding areas, equipment shelter, etc., from this installation to the damaged party's satisfaction at the TO Contractor's expense.

2.4.3 The TO Contractor must document for itself and any subcontractors, for evaluation purposes, a professional level of expertise in:

1. Construction of erosion and sediment control devices in accordance with the latest Maryland Department of the Environment (MDE) specifications and construction drawings.

2. Prior experience performing jobs similar to the scope of work in this TORFP.

2.5 Deliverables

2.5.1 Deliverable Acceptance

A deliverable must satisfy the scope and requirements of this TORFP for that deliverable.

The TO Manager will review a final deliverable to determine compliance with the acceptance criteria as defined for that deliverable.

In the event of the rejection of a deliverable, the TO Manager will formally communicate in writing any deliverable deficiencies or non-conformities to the TO Contractor, describing in those deficiencies what shall be corrected prior to acceptance of the deliverable.

At the TO Manager's discretion, subsequent project tasks may not continue until deliverable deficiencies are rectified and accepted by the TO Manager or the TO Manager has specifically issued, in writing, a waiver for conditional continuance of project tasks.

2.5.2 Deliverable Descriptions/Acceptance Criteria

The TO Contractor may suggest other subtasks, artifacts, or deliverables to improve the quality and success of the assigned tasks.

Additional deliverables are listed within Attachment Q – Technical Specifications – Table Rock SHA Communications Tower.

Table 1: Deliverables

ID #	Deliverable Description	Acceptance Criteria	Due Date / Frequency
2.5.2.1	Integrated Project Schedule	A document suitable for tracking all current and pending activities. At a minimum, the schedule shall show milestones, deliverables, times of performance, degrees of completion and resources for all activities starting with NTP and ending with final deliverables. This is a single, periodically updated deliverable encompassing all activities.	NTP + 14 Calendar Days Weekly Updates
2.5.2.2	Bi-Weekly Construction Schedule and Updates	The TO Contractor will be expected to update progress, forecast upcoming milestones and discuss other items as directed by the TO Manager	Submission on 2nd and final Thursday of every month for the duration of the project or as required. Submission in writing per details in attached Scope of Work. Attendance on a biweekly conference call with a representative of the State and a suitable TO Contractor representative. This will occur on the 2nd and final Thursday of every month for the duration of the project.
2.5.2.3	"As Built" Drawings	Submit three hard copies and one soft copy of As-Built drawings to the TO Manager	Project completion estimated period of performance, barring excusable delays, 120 Business Days after NTP
2.5.2.4	Close Out Final	Final required Close Out documents as referenced in Attachment W - Closeout Process Final	Project Completion

ID #	Deliverable Description	Acceptance Criteria	Due Date / Frequency
2.5.2.5	Final Walkthrough	TO Contractor schedules a walkthrough with TO Manager to verify any deficiencies identified in a punch list are completed to the State's satisfaction. Acceptable Final Inspection Sediment & Erosion Control Reports.	Project Completion

Acceptance by the State of the work to be performed hereunder shall be final and conclusive except regarding latent defects, fraud, or such gross mistakes as may amount to fraud, or regarding any warranty or guaranty hereunder.

3 TO Contractor Requirements: General

3.1 Invoicing

3.1.1 Definitions

A. "Proper Invoice" means a bill, written document, or electronic transmission, readable by the agency, provided by a vendor requesting an amount that is due and payable by law under a written procurement contract for property received or services rendered that meets the requirements of COMAR 21.06.09.02.

B. "Late Payment" means any amount that is due and payable by law under a written procurement contract, without deferral, delay, or set-off under COMAR 21.02.07.03, and remains unpaid more than 45 days after an agency receives a Proper Invoice.

C. "Payment" includes all required processing and authorization by the Comptroller of the Treasury, as provided under COMAR 21.02.07, and may be deferred, delayed, or set-off as applicable under COMAR 21.02.07.03.

3.1.2 General

A. Invoice payments to the TO Contractor shall be governed by the terms and conditions defined in the CATS+ Master Contract.

B. The TO Contractor may submit invoices for progress payments no more than monthly by e-mailing the original of each invoice and signed authorization to the TO Procurement Officer with a copy to the TO Manager.

C. All invoices for services shall be verified by the TO Contractor as accurate at the time of submission.

D. Invoices submitted without the required information cannot be processed for payment. A Proper Invoice, required as Payment documentation, must include the following information, without error:

1. TO Contractor name and address;
2. Remittance address;
3. Federal taxpayer identification (FEIN) number, social security number, as appropriate;
4. Invoice period (i.e. time period during which services covered by invoice were performed);
5. Invoice date;
6. Invoice number;
7. State assigned TO Agreement number;
8. State assigned (Blanket) Purchase Order number(s);
9. Goods or services provided;
10. Amount due; and
11. Any additional documentation required by regulation or the Task Order.

E. Invoices that contain both fixed price and time and material items shall clearly identify the items as either fixed price or time and material billing.

F. The Department reserves the right to reduce or withhold Task Order payment in the event the TO Contractor does not perform within the time frame specified in the Task Order or otherwise breaches the terms and conditions of the Task Order until such time as the TO Contractor brings itself into full compliance with the Task Order.

G. Any action on the part of the Department, or dispute of action by the TO Contractor, shall be in accordance with the provisions of Md. Code Ann., State Finance and Procurement Article §§ 15-215 through 15-223 and with COMAR 21.10.

H. The State is generally exempt from federal excise taxes, Maryland sales and use taxes, District of Columbia sales taxes and transportation taxes. The TO Contractor; however, is not exempt from such sales and use taxes and may be liable for the same.

I. Invoices for final payment shall be clearly marked as "FINAL" and submitted when all work requirements have been completed and no further charges are to be incurred under the TO Agreement. In no event shall any invoice be submitted later than 60 calendar days from the TO Agreement termination date.

J. Payment for deliverables will only be made upon completion and acceptance of the deliverables as defined in **Section 2.5**.

3.1.3 Travel Reimbursement

Travel will not be reimbursed under this TORFP.

3.1.4 Retainage

Ten percent (10%) of the total TO Agreement value shall be retained by the State and will not be released until final payment and, in making progress payments, the State will retain ten percent (10%) of the progress payments earned. Retainage shall be withheld for each deliverable specified in this TO and released upon completion and acceptance of the project.

TO Contractor shall invoice the State for the retainage amount as part of the final invoice for this Task Order.

3.2 Liquidated Damages

Time is an essential element of the contract and it is important that the work be vigorously prosecuted until completion.

For each day that any work shall remain uncompleted beyond 120 Business Days from date of Notice to Proceed, except for days added due to excusable delay, the TO Contractor shall be liable for liquidated damages in the amount of $700 per day, provided, however, that due account shall be taken of any adjustment of specified completion time(s) for completion of work as granted by approved change orders.

Additionally, for each day that the project has a 'D' rating as assigned by a MDE Field Inspector or authorized State representative, the TO Contractor shall be liable for liquidated damages in the amount of $745 per day. Failure to upgrade the project to the minimum of a 'B' rating within 72 hours will result in the project being rated 'F.' For each day that the project has an 'F' rating, the TO Contractor shall be liable for liquidated damages in the amount of $1,045 per day.

3.3 Prevailing Wages

For TO Proposals with a price totaling $500,000 or more, Prevailing Wage Rates (as that term is defined in State Finance and Procurement Article, § 17-209, Annotated Code of Maryland) apply. For these TO Proposals only, the wage rates to be paid laborers and mechanics on this TO Agreement is by order of the Commissioner of Labor and Industry as outlined on **Attachment P – Prevailing Wage Rates**. It is mandatory upon the TO Contractor and any subcontractor, to pay not less than the specific rates to all workers employed by the TO Contractor and subcontractor(s). (Reference: State Finance and Procurement, §§ 17-201 thru 17-226, Annotated Code of Maryland, inclusive. These rates were taken from the locality determination, issued pursuant to the Commissioner's authority under State Finance and Procurement Article §17-209, Annotated Code of Maryland.)

IMPORTANT: Master Contractors must submit documentation as instructed in **Attachment P**.

3.4 Insurance Requirements

3.4.1 Master Contractors shall confirm that, as of the date of its proposal, the insurance policies incorporated into its Master Contract are still current and effective at the required levels (See Master Contract Section 2.7).

3.4.2 The Master Contractor shall also confirm that any insurance policies intended to satisfy the requirements of this TORFP are issued by a company that is licensed to do business in the State of Maryland.

3.4.3 The recommended awardee must provide a certificate(s) of insurance with the prescribed coverages, limits and requirements set forth in this Section 3.4 “Insurance Requirements” within five (5) Business Days from notice of recommended award. During the period of performance for multi-year contracts the TO Contractor shall update certificates of insurance annually, or as otherwise directed by the TO Manager

3.4.4 TO Contractor shall maintain commercial general liability (CGL) insurance and, if necessary, commercial umbrella insurance, with a limit of not less than $2,000,000 per each occurrence and shall insure against liability to third parties for accidental death, bodily injury or illness, property damage, and personal injury arising out of the work in connection with the TO Agreement

3.5 Performance and Personnel

3.5.1 TO Contractor Personnel Maintain Certifications

Any TO Contractor Personnel shall maintain in good standing any required professional certifications for the duration of the TO Agreement.

3.6 Substitution of Personnel

3.6.1 Directed Personnel Replacement

The TO Manager may direct the TO Contractor to replace any TO Contractor Personnel who, in the sole discretion of the TO Manager, are perceived as being unqualified, non-productive, unable to fully perform the job duties, disruptive, or known, or reasonably believed, to have committed a major infraction(s) of law or Department, Contract, or Task Order requirement.

A. If deemed appropriate in the discretion of the TO Manager, the TO Manager shall give written notice of any TO Contractor Personnel performance issues to the TO Contractor, describing the problem and delineating the remediation requirement(s). The TO Contractor

shall provide a written Remediation Plan within three (3) days of the date of the notice. If the TO Manager rejects the Remediation Plan, the TO Contractor shall revise and resubmit the plan to the TO Manager within five (5) days of the rejection, or in the timeframe set forth by the TO Manager in writing. Once a Remediation Plan has been accepted in writing by the TO Manager, the TO Contractor shall immediately implement the Remediation Plan.

B. Should performance issues persist despite the approved Remediation Plan, the TO Manager will give written notice of the continuing performance issues and either request a new Remediation Plan within a specified time limit or direct the removal and replacement of the TO Contractor Personnel whose performance is at issue.

C. In circumstances of directed removal, the TO Contractor shall provide a suitable replacement for TO Manager approval within fifteen (15) days of the date of the notification of directed removal, or the actual removal, whichever occurs first, or such earlier time as directed by the TO Manager in the event of a removal on less than fifteen days' notice

D. Normally, a directed personnel replacement will occur only after prior notification of problems with requested remediation, as described above. However, the TO Manager reserves the right to direct immediate personnel replacement without utilizing the remediation procedure described above.

E. Replacement or substitution of TO Contractor Personnel under this section shall be in addition to, and not in lieu of, the State's remedies under the Master Contract, Task Order, or which otherwise may be available at law or in equity.

3.7 Minority Business Enterprise Participation Reports

The Department will monitor both the TO Contractor's efforts to achieve the Minority Business Enterprise (MBE) participation goal and compliance with reporting requirements.

3.7.1 Monthly reporting of MBE participation is required in accordance with the terms and conditions of the CATS+ Master Contract.

1. The TO Contractor shall submit the following reports by the 15th of each month to the Department at the same time the invoice copy is sent:

2. A Prime Contractor Paid/Unpaid MBE Invoice Report (**Attachment D-4A**) listing any unpaid invoices, over 45 days old, received from any certified MBE subcontractor, the amount of each invoice and the reason payment has not been made; and

3. (If Applicable) An MBE Prime Contractor Report (**Attachment D-4B**) identifying an MBE prime self-performing work to be counted towards the MBE participation goals.

3.7.2 The TO Contractor shall ensure that each MBE subcontractor provides a completed Subcontractor Paid/Unpaid MBE Invoice Report (**Attachment D-5**) by the 15th of each month.

3.7.3 Subcontractor reporting shall be sent directly from the subcontractor to the Department. The TO Contractor shall e-mail all completed forms, copies of invoices and checks paid to the MBE directly to the TO Manager.

3.8 Veteran Small Business Enterprise Reports

There is no Veteran Small Business Enterprise (VSBE) Goal for this Task Order.

3.9 Contract Management Oversight Activities

3.9.1 DoIT is responsible for contract management oversight on the CATS+ Master Contract. As part of that oversight, DoIT has implemented a process for self-reporting contract management activities of Task Orders under CATS+. This process typically applies to active TOs for operations and maintenance services valued at $1 million or greater, but all CATS+ Task Orders are subject to review.

3.9.2 A sample of the TO Contractor Self-Reporting Checklist is available on the CATS+ website at http://doit.maryland.gov/contracts/Documents/CATSPlus/CATS+Self-ReportingChecklistSample.pdf DoIT may send initial checklists out to applicable/selected TO Contractors approximately three months after the award date for a Task Orders. The TO Contractor shall complete and return the checklist as instructed on the form. Subsequently, at six month intervals from the due date on the initial checklist, the TO Contractor shall update and resend the checklist to DoIT.

3.10 Purchasing and Recycling Electronic Products

This section does not apply to this solicitation.

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4 TORFP Instructions

4.1 TO Pre-Proposal Site Visit

A pre-proposal site visit will be held at the time, date and location indicated on the Key Information Summary Sheet. Attendance at the pre-proposal site visit is not mandatory, but all Master Contractors are encouraged to attend in order to facilitate better preparation of their proposals. Master Contractors are advised of the Site Investigation clause in Section 4.19 of this TORFP.

The pre-proposal site visit will be summarized in writing. As promptly, as is feasible, subsequent to the pre-proposal site visit, the attendance record and pre-proposal site visit summary will be distributed via e-mail to all Master Contractors known to have received a copy of this TORFP.

In order to assure adequate accommodations at the pre-proposal site visit, please e-mail the TO Procurement Officer no later than three (3) business days prior indicating planned attendance. In addition, if there is a need for sign language interpretation and/or other special accommodations due to a disability, please contact the TO Procurement Officer no later than five (5) business days prior to the pre-proposal site visit. The TO Requesting Agency will make reasonable efforts to provide such special accommodation.

The Pre-Proposal site visit will meet at the location (directions in **Attachment A**) and proceed as a group to the Table Rock SHA Tower site.

4.2 Questions

All questions must be submitted via e-mail to the TO Procurement Officer no later than the date and time indicated in the Key Information Summary Sheet. Answers applicable to all Master Contractors will be distributed to all Master Contractors who are known to have received a copy of the TORFP.

The statements and interpretations contained in responses to any questions, whether responded to orally or in writing, are not binding on the Department unless the TORFP is expressly amended. Nothing in any response to any questions is to be construed as agreement to or acceptance by the Department of any statement or interpretation on the part of the entity asking the question.

4.3 TO Proposal Due (Closing) Date and Time

4.3.1 TO Proposals, in the number and form set forth in Section 5, must be received by the TO Procurement Officer no later than the TO Proposal due date and time indicated on the Key Information Summary Sheet in order to be considered.

4.3.2 Requests for extension of this date or time shall not be granted.

4.3.3 Master Contractors submitting TO Proposals should allow sufficient delivery time to ensure timely receipt by the TO Procurement Officer. Except as provided in COMAR 21.05.03.02.F and 21.05.02.10, TO Proposals received after the due date and time listed in the Key Information Summary Sheet will not be considered.

4.3.4 The date and time of an e-mail submission is determined by the date and time of arrival in the e-mail address indicated on the Key Information Summary Sheet.

4.3.5 TO Proposals may be modified or withdrawn by written notice received by the TO Procurement Officer before the time and date set forth in the Key Information Summary Sheet for receipt of TO Proposals.

4.4 Award Basis

Based upon an evaluation of TO Proposal responses as provided in **Section 6.4**, a Master Contractor will be selected to conduct the work defined in **Sections 2 and 3, and Attachments Q through and including Attachment Z**. A specific TO Agreement, **Attachment M**, will then be entered into between the State and the selected Master Contractor, which will bind the selected Master Contractor (TO Contractor) to the contents of its TO Proposal, including the TO Financial Proposal.

4.5 Oral Presentation

Oral presentations/interviews will not be held for this solicitation.

4.6 Limitation of Liability

The TO Contractor's liability is limited in accordance with the Limitations of Liability section of the CATS+ Master Contract. TO Contractor's liability for this TORFP is limited to two (2) times the total TO Agreement amount.

4.7 Change Orders

4.7.1 If the TO Contractor is required to perform work beyond the scope of this TORFP as determined by the Procurement Officer, or there is a work reduction due to unforeseen scope changes, a TO Change Order is required. The TO Contractor and TO Manager shall negotiate a mutually acceptable price modification based on the TO Contractor's proposed rates in the Master Contract and scope of the work change.

4.7.2 No scope of work changes shall be performed until a change order is approved by DoIT and executed by the TO Procurement Officer.

4.8 MBE Participation Goal

4.8.1 A Master Contractor that responds to this TORFP shall complete, sign, and submit all required MBE documentation at the time of TO Proposal submission (See **Attachment D Minority Business Enterprise** Forms).

IMPORTANT: Failure of the Master Contractor to complete, sign, and submit all required MBE documentation at the time of TO Proposal submission will result in the State's rejection of the Master Contractor's TO Proposal.

4.8.2 In 2014, Maryland adopted new regulations as part of its Minority Business Enterprise (MBE) program concerning MBE primes. Those new regulations, which became effective June 9, 2014 and are being applied to this task order, provide that when a certified MBE firm participates as a prime contractor on a contract, an agency may count the distinct, clearly defined portion of the work of the contract that the certified MBE firm performs with its own forces toward fulfilling up to fifty-percent (50%) of the MBE participation goal (overall) and up to one hundred percent (100%) of not more than one of the MBE participation subgoals, if any, established for the contract. Please see the attached MBE forms and instructions.

4.9 VSBE Goal

There is no VSBE participation goal for this procurement.

4.10 Living Wage Requirements

The Master Contractor shall abide by the Living Wage requirements under Title 18, State Finance and Procurement Article, Annotated Code of Maryland and the regulations proposed by the Commissioner of Labor and Industry.

All TO Proposals shall be accompanied by a completed **Living Wage Affidavit of Agreement**, **Attachment E** of this TORFP.

4.11 Federal Funding Acknowledgement

This Task Order does not contain federal funds.

4.12 Conflict of Interest Affidavit and Disclosure

4.12.1 Master Contractors shall complete and sign the **Conflict of Interest Affidavit and Disclosure** (**Attachment H**) and submit it with their Proposals. All Master Contractors are advised that if a TO Agreement is awarded as a result of this solicitation, the TO Contractor's Personnel who perform or control work under this TO Agreement and each of the participating subcontractor personnel who perform or control work under this TO Agreement shall be required to complete agreements substantially similar to **Attachment H Conflict of Interest Affidavit and Disclosure**.

4.12.2 If the TO Procurement Officer makes a determination that facts or circumstances exist that give rise to or could in the future give rise to a conflict of interest within the meaning of COMAR 21.05.08.08A, the TO Procurement Officer may reject an Master Contractor's TO Proposal under COMAR 21.06.02.03B.

4.12.3 Master Contractors should be aware that the State Ethics Law, Md. Code Ann., General Provisions Article, Title 5, might limit the selected Master Contractor's ability to participate in future related procurements, depending upon specific circumstances.

4.12.4 By submitting a Conflict of Interest Affidavit and Disclosure form, the Master Contractor shall be construed as certifying all TO Contractor Personnel and Subcontractors are without a conflict of interest as defined in COMAR 21.05.08.08A.

4.13 Proposal Affidavit

A TO Proposal submitted by the Master Contractor must be accompanied by a completed Proposal Affidavit. A copy of this Affidavit is included as **Attachment C** of this TORFP.

4.14 Mercury and Products That Contain Mercury

This solicitation does not include the procurement of products known to include mercury as a component.

4.15 Bonds

4.15.1 TO Proposal Bond

1. Each Master Contractor must submit with its TO Proposal a TO Proposal Bond or other suitable security, as summarized in **Section 4.15.4**, in the amount of five percent (5%) of the Total Evaluated Price, guaranteeing the availability of the goods and services at the offered price for 180 days after the due date for receipt of TO Proposals.

2. The bond shall be in the form provided in **Appendix 5**.

3. A Master Contractor may request a release of the bond after the date of the award in return for a release signed by the TO Contractor and accepted by the Department.

4. The cost of this bond, or other suitable security, is to be included in the total prices proposed, is not to be proposed, and will not be recoverable as a separate cost item.

4.15.2 Performance Bond

1. The TO Contractor shall deliver a Performance Bond, or other suitable security, to the State within ten (10) business days after notification of recommended award in the amount of $1,000,000.00, guaranteeing that the TO Contractor shall well and truly perform the TO Agreement.

2. The Performance Bond shall be in the form provided in **Appendix 3** and underwritten by a surety company authorized to do business in the State and shall be subject to approval by the State, or other acceptable security for bond as described in COMAR 21.06.07, as summarized in **Section 4.15.4**.

3. The Performance Bond shall be maintained throughout the term of this TO Agreement. This Performance Bond shall also secure liquidated damages.

4. The Performance Bond may be renewable annually. The TO Contractor shall provide to the State, 30 days before the annual expiration of the bond, confirmation from the surety that the bond will be renewed for the following year. Failure to timely provide this notice shall constitute an event of default under the TO Agreement. Such a default may be remedied if the TO Contractor obtains a replacement bond that conforms to the requirements of the TO Agreement and provides that replacement bond to the State prior to the expiration of the existing Performance Bond.

5. The cost of this bond, or other suitable security, is to be included in the total prices proposed, is not to be proposed, and will not be recoverable as a separate cost item.

6. After the first year of the TO Agreement, the TO Contractor may request a reduction for Performance Bond. The amount and the duration of the reduction, if any, will be at the Department's sole discretion. If any reduction is granted, the Department's shall have the right to increase the amount of the Performance Bond to any amount, up to the original amount, at any time and at the Department's sole discretion.

4.15.3 Payment Bond

The TO Contractor shall submit to the Procurement Officer, within ten (10) business days after notice of recommended award, a Payment Bond in the amount of the TO Agreement. The bond shall be in the form provided in **Appendix 4** and issued by a surety company licensed to do business in the State. The Payment Bond shall be maintained throughout the term of this TO Agreement, or renewal option period, if exercised. Evidence of renewal of the Payment Bond and payment of the required premium shall be provided to the TO Manager. This bond shall also secure liquidated damages.

Failure of the TO Contractor to submit and maintain the required Payment and Performance Bond coverage throughout the term of the TO Agreement will constitute an event of Default under the Master Contract.

The Payment Bond shall be forfeited to DoIT in whole or part, if the Master Contractor defaults in its payment of subcontractors or vendors for work performed under this TO Agreement.

A letter must be submitted from a bonding company with the Technical Proposal providing evidence that the Master Contractor is capable of securing the required Payment and Performance bonds.

4.15.4 Acceptable Security

Acceptable security shall be as described below, identified within and excerpted from COMAR 21.06.07:

Acceptable security for proposal/bid, performance, and payment bonds is limited to:

A. A bond in a form satisfactory to the State underwritten by a surety company authorized to do business in this State;

B. A bank certified check, bank cashier's check, bank treasurer's check, cash, or trust account;

C. Pledge of securities backed by the full faith and credit of the United States government or bonds issued by the State;

D. An irrevocable letter of credit in a form satisfactory to the Attorney General and issued by a financial institution approved by the State Treasurer.

4.15.5 Surety Bond Assistance Program

Assistance in obtaining bid, performance and payment bonds may be available to qualifying small businesses through the Maryland Small Business Development Financing Authority (MSBDFA). MSBDFA can directly issue bid, performance or payment bonds up to $750,000. MSBDFA may also guarantee up to 90% of a surety's losses because of a TO Contractor's breach of TO Agreement; MSBDFA exposure on any bond guaranteed may not, however, exceed $900,000. Bonds issued directly by the program will remain in effect for the duration of the TO Agreement, and those surety bonds that are guaranteed by the program will remain in effect for the duration of the surety's exposure under the TO Agreement. To be eligible for bonding assistance, a business must first be denied bonding by at least one surety on both the standard and specialty markets within 90 days of submitting a bonding application to MSBDFA. The applicant must employ fewer than 500 full-time employees or have gross sales of less than $50 million annually, have its principal place of business in Maryland or be a Maryland resident, must not subcontract more than 75 percent of the work, and the business or its principals must have a reputation of good moral character and financial responsibility. Finally, it must be demonstrated that the bonding or guarantee will have a measurable economic impact, through job creation and expansion of the state's tax base. Applicants are required to work through their respective bonding agents in applying for assistance under the program. Questions regarding the bonding assistance program should be referred to the following:

Maryland Department of Business and Economic Development
Maryland Small Business Development Financing Authority
MMG Ventures
826 E. Baltimore Street
Baltimore, Maryland 21202
Phone: (410) 333-4270
Fax: (410) 333-2552

4.16 Prompt Payment of Subcontractors

This TO Agreement is subject to the provisions of State Finance and Procurement Article, §15-226, Annotated Code of Maryland, and COMAR 21.10.08. A TO Contractor shall promptly pay its subcontractors an undisputed amount to which a subcontractor is entitled for work performed under the

TO Agreement within 10 days after the TO Contractor receives a progress payment or final payment for work under this TO Agreement.

If a TO Contractor fails to make payment within the period prescribed above, a subcontractor may request a remedy in accordance with COMAR 21.10.08.

A TO Contractor shall include in its subcontracts for work under this TO Agreement, wording that incorporates the provisions, duties and obligations of §A-D, State Finance and Procurement Article, §15-226, Annotated Code of Maryland, and COMAR 21.10.08.

4.17 Warranty

4.17.1 All tower materials, galvanizing, tower foundation materials, tower structures and all attachments and appurtenances thereto shall be guaranteed against defects in material and workmanship for a minimum of five (5) years after final, written acceptance of the project.

4.17.2 All equipment shelters, equipment shelter foundations, HVAC units, generator and other associated equipment shall be guaranteed against defects in material and workmanship for a minimum of two (2) years after final, written acceptance of the project.

4.17.3 The tower lighting system supplied by the Master Contractor shall be guaranteed against defects in material and workmanship for a minimum period of five (5) years after final, written acceptance of the project.

4.17.4 All other materials and labor provided by the Master Contractor shall be guaranteed against defects in materials and workmanship for a minimum of two (2) years after final, written acceptance of the project.

4.17.5 After the initial, two-year warranty period, the state, in its discretion, may reduce the performance bond amount to 40% of the total TO Agreement price.

4.18 Differing Site Conditions

The Master Contractor shall promptly, and before such conditions are disturbed, notify the TO Manager in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this TORFP, or (2) unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this TORFP. The TO Manager will promptly investigate the conditions, and if the TO Manager and Procurement Officer find that such conditions do materially so differ and cause an increase or decrease in the Master Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

No claim of the Master Contractor under this clause shall be allowed unless the Master Contractor has given the notice required in above; provided, however, the time prescribed therefore may be extended by the State.

No claim by the Master Contractor for an equitable adjustment here under shall be allowed if asserted after final payment under this contract.

4.19 Site Investigation

The Master Contractor acknowledges that the Master Contractor has investigated and is satisfied as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of

weather, river stages, tides or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Master Contractor further acknowledges that it is satisfied as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the State, as well as from information presented by the drawings and specifications made a part of this contract. Any failure by the Master Contractor to acquaint itself with the available information may not relieve the Master Contractor from responsibility for estimating properly the difficulty or cost of successfully performing the work. The State assumes no responsibility for any conclusions or interpretations made by the Master Contractor based on the information made available by the State.

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5 TO Proposal Format

5.1 Required Response

Each Master Contractor receiving this CATS+ TORFP shall respond no later than the submission due date and time designated in the Key Information Summary Sheet. Each Master Contractor is required to submit one of two possible responses: 1) a TO Proposal or 2) a completed Master Contractor Feedback Form (available online within the Master Contractor Admin System). The feedback form helps the State understand for future contract development why Master Contractors did not submit proposals. The form is accessible via the CATS+ Master Contractor login screen and clicking on TORFP Feedback Response Form from the menu.

A TO Proposal shall conform to the requirements of this CATS+ TORFP.

5.2 Two Part Submission

Master Contractors shall submit TO Proposals in separate volumes:

- Volume I – TO TECHNICAL PROPOSAL
- Volume II – TO FINANCIAL PROPOSAL

5.3 TO Proposal Packaging and Delivery

5.3.1 Proposals delivered by email or facsimile shall not be considered.

5.3.2 Provide no pricing information in the TO Technical Proposal.

5.3.3 Offerors may submit TO Proposals by hand or by mail as described below to the address provided in the Key Information Summary Sheet.

A. For U.S. Postal Service deliveries, any TO Proposal that has been received at the appropriate mailroom, or typical place of mail receipt, for the respective procuring unit by the time and date listed in the TORFP will be deemed timely. If an Offeror chooses to use the U.S. Postal Service for delivery, the Department recommends that it use Express Mail, Priority Mail, or Certified Mail only as these are the only forms for which both the date and time of receipt can be verified by the Department. An Offeror using first class mail will not be able to prove a timely delivery at the mailroom, and it could take several days for an item sent by first class mail to make its way by normal internal mail to the procuring unit.

B. Hand-delivery includes delivery by commercial carrier acting as agent for the Offeror. For any type of direct (non-mail) delivery, Offerors are advised to secure a dated, signed, and time-stamped (or otherwise indicated) receipt of delivery.

5.3.4 The TO Procurement Officer must receive all TO Technical and TO Financial Proposal material by the TORFP due date and time specified in the Key Information Summary Sheet. Requests for extension of this date or time will not be granted. Except as provided in COMAR 21.05.03.02F, TO Proposals received by the TO Procurement Officer after the due date will not be considered.

5.3.5 Two Part Submission: Offerors shall provide their TO Proposals in two separately sealed and labeled packages as follows:

TO Technical Proposal consisting of:

1. One (1) original executed TO Technical Proposal and all supporting material marked and sealed,

2. One (1) duplicate copy of the above separately marked and sealed,
3. a password protected electronic version (USB drive) of the TO Technical Proposal in Microsoft Word format, version 2007 or greater,

TO Financial Proposal consisting of:

1. One (1) original executed TO Financial Proposal and all supporting material marked and sealed,
2. a password protected (USB drive) of the TO Technical Proposal in Microsoft Word or Excel format, version 2007 or greater,

5.3.6 It is preferred, but not required, that the name, email address, and telephone number of a contact person for the Offeror be included on the outside of the packaging for each volume. Unless the resulting package will be too unwieldy, the State's preference is for the separately sealed Technical and TO Financial Proposals to be submitted together in a single package to the TO Procurement Officer. Affix the following to the outside of each sealed TO Proposal:

- TORFP title and number,
- Name and address of the Offeror, and
- Closing date and time for receipt of TO Proposals

5.3.7 Label each electronic media on the outside with the TORFP title and number, name of the Offeror, and volume number. Electronic media must be packaged with the original copy of the appropriate TO Proposal (Technical or Financial).

5.4 Volume I - TO Technical Proposal

IMPORTANT:Provide **no pricing information** in the TO Technical Proposal (Volume I). Include pricing information only in the TO Financial Proposal (Volume II).

5.4.1 In addition to the instructions below, responses in the Offeror's TO Technical Proposal shall reference the organization and numbering of Sections in the TORFP (e.g., "Section 2.2.1 Response . . .; "Section 2.2.2 Response . . .,"). All pages of both TO Proposal volumes shall be consecutively numbered from beginning (Page 1) to end (Page "x").

5.4.2 The TO Technical Proposal shall include the following documents and information in the order specified as follows:

A. Proposed Services:

1. Executive Summary: A one-page summary describing the Offeror's understanding of the TORFP scope of work (Section 2) and proposed solution.
2. Proposed Solution: A more detailed description of the Offeror's understanding of the TORFP scope of work, proposed methodology and solution. The proposed solution shall be organized to match the requirements outlined in Section 2.
3. Assumptions: A description of any assumptions formed by the Offeror in developing the TO Technical Proposal. Offerors should avoid assumptions that counter or constitute exceptions to TORFP terms and conditions.
4. Organization Chart: Identify all permanent personnel and subcontractors working on the project.

5. Schedule of delivery for the products and services requirements in the TORFP.
6. Safety Manual – General and Tower site construction safety procedures and policies, in-house training programs, and certifications obtained and maintained
7. Tower Technical Details: A description of the manufacture, any technical documents related to the tower and tower foundation design. This will include, but is not limited to, preliminary shop drawings, technical sheets or correspondence from the manufacturer. List assumptions used for the tower design.
8. Shelter Technical Details: A description of the manufacturer, any technical documents related to the shelter and shelter foundation design. This will include, but is not limited, to preliminary shop drawings, technical sheets or correspondence from the manufacturer. List any appropriate assumptions used for the shelter design.
9. Shelter Delivery Plan – describe in detail how the shelter will be transported to the proposed site.
10. Copies of green/yellow E&S credentials.
11. Performance Bond Capability letter from a bonding company providing evidence that the Master Contractor is capable of securing the bond required in TORFP **Section 4.15**.
12. Payment Bond Capability letter from a bonding company providing evidence that the Master Contractor is capable of securing the bond required in TORFP **Section 4.15**.

B. TORFP Staffing

1. Provide a Staffing Management Plan with brief qualifications of up to four people demonstrating how the Offeror will provide the resources necessary to perform the Scope of Work required in this TORFP.
2. Provide the names and titles of the Offeror's management staff who will supervise the personnel and quality of services rendered under this TO Agreement.

C. MBE Participation

Submit completed MBE documents D-1A.

D. Subcontractors

Identify all proposed subcontractors, including MBEs, and their roles in the performance of **Section 2 - Scope of Work**.

E. Master Contractor and Subcontractor Experience and Capabilities

1. Provide up to three examples of engagements or contracts the Master Contractor has completed that were similar to **Section 2 - Scope of Work**. Include contact information for each client organization complete with the following:
   a) Name of organization.
   b) Point of contact name, title, e-mail and telephone number (point of contact shall be accessible and knowledgeable regarding experience)
   c) Services provided as they relate to **Section 2 - Scope of Work**.

d) Start and end dates for each example engagement or contract.

e) Current Master Contractor team personnel who participated on the engagement/contract.

f) If the Master Contractor is no longer providing the services, explain why not.

2. State of Maryland Experience: If applicable, the Master Contractor shall submit a list of all contracts it currently holds or has held within the past five years with any entity of the State of Maryland. For each identified contract, the Master Contractor shall provide the following (if not already provided in sub paragraph 1 above):

a) Contract or task order name

b) Name of organization.

c) Point of contact name, title, e-mail, and telephone number (point of contact shall be accessible and knowledgeable regarding experience)

d) Start and end dates for each engagement or contract. If the Master Contractor is no longer providing the services, explain why not.

e) Dollar value of the contract.

f) Indicate if the contract was terminated before the original expiration date.

g) Indicate if any renewal options were not exercised.

IMPORTANT: State of Maryland experience can be included as part of **Section 1** above as engagement or contract experience. State of Maryland experience is neither required nor given more weight in proposal evaluations.

A. State Assistance

Provide an estimate of expectation concerning participation by State personnel.

B. Confidentiality

A Master Contractor should give specific attention to the identification of those portions of its TO Proposal that it considers confidential, proprietary commercial information or trade secrets, and provide justification why such materials, upon request, should not be disclosed by the State under the Public Information Act, Title 4, of the General Provisions Article of the Annotated Code of Maryland. Master Contractors are advised that, upon request for this information from a third party, the TO Procurement Officer will be required to make an independent determination regarding whether the information may be disclosed.

C. Proposed Facility

Identify Master Contractor's facilities, including address, from which any work will be performed.

5.5 Volume II – TO Financial Proposal

5.5.1 The TO Financial Proposal shall contain all price information in the format specified in **Attachment B – Price Sheet**. The Offeror shall complete the Financial Proposal Form only as provided in the Financial Proposal Form Instructions and the Financial Proposal Form itself.

5.5.2 The TO Financial Proposal shall contain a description of any assumptions on which the Master Contractor's TO Financial Proposal is based (Assumptions shall not constitute conditions, contingencies, or exceptions to the Financial Proposal Form);

5.5.3 Prices shall be valid for 60 days.

6 Evaluation and Selection Process

The TO Contractor will be selected from among all eligible Master Contractors within the appropriate Functional Area responding to the CATS+ TORFP. In making the TO Agreement award determination, the Department will consider all information submitted in accordance with **Section 5**.

6.1 Evaluation Committee

Evaluation of TO Proposals will be performed in accordance with COMAR 21.05.03 by a committee established for that purpose and based on the evaluation criteria set forth below. The Evaluation Committee will review TO Proposals and provide input to the TO Procurement Officer. The Department reserves the right to utilize the services of individuals outside of the established Evaluation Committee for advice and assistance, as deemed appropriate.

During the evaluation process, the TO Procurement Officer may determine at any time that a particular Offeror is not susceptible for award.

6.2 TO Technical Proposal Evaluation Criteria

The criteria to be used to evaluate each TO Technical Proposal are listed below in descending order of importance. Unless stated otherwise, any sub-criteria within each criterion have equal weight.

The following are technical criteria for evaluating a TO Proposal in descending order of importance:

A. The Master Contractor's proposed solution.

B. Proposed Construction Schedule for completion of the project as submitted in **Attachment O – Construction Schedule**.

C. Proposed shelter delivery plan.

D. The Master Contractor's overall experience, capability and references as described in the Master Contractor's TO Technical Proposal.

E. The Master Contractor's safety policies and procedures.

6.3 TO Financial Proposal Evaluation Criteria

All Qualified Offerors (see **Section 6.4**) will be ranked from the lowest to the highest price based on the Total Proposal Price within the stated guidelines set forth in this TORFP and as submitted on **Attachment B – Price Sheet**.

6.4 Selection Procedures

TO Technical Proposals shall be evaluated based on the criteria set forth above in **Section 6.2**. TO Technical Proposals and TO Financial Proposals will be evaluated independently of each other.

1. TO Proposals will be assessed throughout the evaluation process for compliance with the minimum qualifications listed in Section 1 of this TORFP, and quality of responses to **Section 5.3** TO Technical Proposal. Failure to meet the minimum qualifications shall render a TO Proposal not reasonably susceptible for award. The TO Procurement Officer will notify those Offerors who have not been selected to perform the work.

2. TO Technical Proposals will be evaluated for technical merit and ranked.

3. The Procurement Officer will only open the TO Financial Proposals where the associated TO Technical Proposals have been classified as reasonably susceptible for award.
4. TO Financial Proposals for qualified Offerors will be reviewed and ranked from lowest to highest price proposed.
5. The most advantageous TO Proposal considering both the technical and financial submissions shall be selected for TO award. In making this selection, technical merit has greater weight.
6. All Master Contractors submitting a TO Proposal shall receive written notice from the TO Procurement Officer identifying the awardee.

6.5 Documents Required upon Notice of Recommendation for Task Order Award

Upon receipt of a Notification of Recommendation for Task Order award, the apparent awardee shall complete and furnish the documents and attestations as directed in **Table 1 of Section 7** – **TORFP Attachments and Appendices**.

Commencement of work in response to a TO Agreement shall be initiated only upon the completed documents and attestations, plus:

1. Issuance of a fully executed TO Agreement,
2. Purchase Order, and
3. By a Notice to Proceed authorized by the TO Procurement Officer. See (see online example at http://doit.maryland.gov/contracts/Documents/CATSPlus/CATS+NoticeToProceedSample.pdf).

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7 TORFP ATTACHMENTS AND APPENDICES

Instructions Page

A TO Proposal submitted by an Offeror must be accompanied by the completed forms and/or affidavits identified as "With TO Proposal" in the "When to Submit" column in Table 1 below. All forms and affidavits applicable to this TORFP, including any applicable instructions and/or terms, are identified in the **Table 1**.

All Offerors are advised that if a Task Order is awarded as a result of this solicitation, the successful Offeror will be required to complete certain forms and affidavits after notification of recommended award. The list of forms and affidavits that must be provided is described in Table 1 below in the "When to Submit" column.

For documents required after award, submit three (3) copies of each document within the appropriate number of days after notification of recommended award, as listed in **Table 1** below in the "When to Submit" column.

When to Submit	Label	Attachment Name
Before Proposal	A	Pre-Proposal Conference Response Form
With Proposal	B	Financial Proposal Instructions and Form
With Proposal	C	Bid/Proposal Affidavit (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/AttachmentC-Bid_Proposal-Affidavit.pdf)
With Proposal	D	MBE Forms D-1A (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/05/AttachmentDMBE-Forms-1.pdf) **IMPORTANT:** If this RFP contains different Functional Areas or Service Categories. A separate **Attachment D-1A** is to be submitted for each Functional Area or Service Category where there is a MBE goal.
10 Business Days after recommended award	D	MBE Forms D-1B, D-1C,D-2, D-3A, D-3B (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/05/AttachmentDMBE-Forms-1.pdf) **Important: Attachment D-1C**, if a waiver has been requested, is also required within 10 days of recommended award.
As directed in forms	D	MBE Forms D-4A, D-4B, D-5 (see link at http://procurement.maryland.gov/wp-

When to Submit	Label	Attachment Name
		content/uploads/sites/12/2018/05/AttachmentDMBE-Forms-1.pdf)
N/A	E	Veteran-Owned Small Business Enterprise (VSBE) Form E-1A
With Proposal	F	Maryland Living Wage Requirements for Service Contracts and Affidavit of Agreement (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/AttachmentF-LivingWageAffidavit.pdf)
N/A	G	Federal Funds Attachments
With Proposal	H	Conflict of Interest Affidavit and Disclosure (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/05/AttachmentH-Conflict-of-InterestAffidavit.pdf)
N/A	I	Non-Disclosure Agreement (Contractor) (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/Attachment-I-Non-DisclosureAgreementContractor.pdf)
N/A	J	HIPAA Business Associate Agreement
N/A	K	Mercury Affidavit
N/A	L	Location of the Performance of Services Disclosure
5 Business Days after recommended award	M	Sample Task Order (included in this TORFP)
N/A	N	DHS Hiring Agreement
N/A (informational only)	O	Construction Schedule (separate document)
With Proposal	P	Prevailing Wage Rate Documentation (separate document)
N/A (informational only)	Q	Technical Specifications (separate document)
N/A (informational only)	R	Foundation Inspection (separate document)
N/A (informational only)	S	430 Foot State Tower Loading Plan (separate document)
N/A (informational only)	T	Typical Equipment Shelter without Generator (separate document)

When to Submit	Label	Attachment Name
N/A (informational only)	U	Tower Layout (separate document)
N/A (informational only)	V	Geo-tech-boring logs (separate document)
N/A (informational only)	W	Closeout Process Final (separate document)
N/A (informational only)	X	MDE Approval (separate document)
N/A (informational only)	Y	Construction Drawings (separate document)
N/A (informational only)	Z	Typical Generator Shelter (separate document)
When to Submit	**Label**	**Appendix Name**
n/a	1	Abbreviations and Definitions (included in this TORFP)
With Proposal	2	Offeror Information Sheet (see link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/Appendix2-Bidder_OfferorInformationSheet.pdf)
5 Business Days after recommended award	3	Performance Bond
5 Business Days after recommended award	4	Payment Bond
With Proposal	5	Proposal Bond
5 Business Days after recommended award	N/A	Evidence of meeting insurance requirements (see **Section 3.6**); 1 copy

Attachment A. TO Pre-Proposal Conference Response Form

Solicitation Number F50B9400027

Table Rock SHA Communications Tower

A TO Pre-proposal conference will be held on [preProposalDate], at [preProposalLocation].

Please return this form by [preProposalFormDue], advising whether or not you plan to attend. The completed form should be returned via e-mail or fax to the TO Procurement Officer at the contact information below:

Kimberly Funk
DOiT
E-mail: Kimberly. Funk@ Maryland.gov

Please indicate:

_____ Yes, the following representatives will attend.
Attendees (Check the TORFP for limits to the number of attendees allowed):
1.
2.
3.

_____ No, we will not attend.

Please specify whether any reasonable accommodations are requested (see TORFP § 4.1"TO Pre-proposal conference"):

Offeror: _____
Offeror Name (please print or type)

By: _____
Signature/Seal

Printed Name: _____
Printed Name

Title: _____
Title

Date: _____
Date

Directions to the TO Pre-Proposal Conference

PLEASE BE ADVISED BRIDGE/ROAD CLOSURES EXIST AT US 50 BETWEEN 219 AND THE SITE DUE TO ONGOING CONSTRUCTTION

From the Baltimore area, take I-70 w to I-68 to Rt. 219 to Oakland, Md. Site is located at 4675 George Washington Highway (U.S. Route 50)

Grid Coordinates: Latitude: N39-18-09.80, Longitude: W79-24-51.30

Attachment B. TO Financial Proposal Instructions & Form

See separate Excel TO Price Sheet labeled Attachment B - Table Rock SHA Communications Tower Price Proposal.xls.

Attachment C. Bid/Proposal Affidavit

See link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/AttachmentC-Bid_Proposal-Affidavit.pdf.

Attachment D. Minority Business Enterprise (MBE) Forms

See link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/05/AttachmentDMBE-Forms-1.pdf.

Attachment E. Veteran-Owned Small Business Enterprise (VSBE) Forms

This solicitation does not include a Veteran-Owned Small Business Enterprise goal.

Attachment F. Maryland Living Wage Affidavit of Agreement for Service Contracts

See link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/AttachmentF-LivingWageAffidavit.pdf to complete the Affidavit.

A. This contract is subject to the Living Wage requirements under Md. Code Ann., State Finance and Procurement Article, Title 18, and the regulations proposed by the Commissioner of Labor and Industry (Commissioner). The Living Wage generally applies to a Contractor or subcontractor who performs work on a State contract for services that is valued at $100,000 or more. An employee is subject to the Living Wage if he/she is at least 18 years old or will turn 18 during the duration of the contract; works at least 13 consecutive weeks on the State Contract and spends at least one-half of the employee's time during any work week on the State Contract.

B. The Living Wage Law does not apply to:

(1) A Contractor who:

(a) Has a State contract for services valued at less than $100,000, or

(b) Employs 10 or fewer employees and has a State contract for services valued at less than $500,000.

(2) A subcontractor who:

(a) Performs work on a State contract for services valued at less than $100,000,

(b) Employs 10 or fewer employees and performs work on a State contract for services valued at less than $500,000, or

(c) Performs work for a Contractor not covered by the Living Wage Law as defined in B(1)(b) above, or B (3) or C below.

(3) Service contracts for the following:

(a) Services with a Public Service Company;

(b) Services with a nonprofit organization;

(c) Services with an officer or other entity that is in the Executive Branch of the State government and is authorized by law to enter into a procurement ("Unit"); or

(d) Services between a Unit and a County or Baltimore City.

C. If the Unit responsible for the State contract for services determines that application of the Living Wage would conflict with any applicable Federal program, the Living Wage does not apply to the contract or program.

D. A Contractor must not split or subdivide a State contract for services, pay an employee through a third party, or treat an employee as an independent Contractor or assign work to employees to avoid the imposition of any of the requirements of Md. Code Ann., State Finance and Procurement Article, Title 18.

E. Each Contractor/subcontractor, subject to the Living Wage Law, shall post in a prominent and easily accessible place at the work site(s) of covered employees a notice of the Living Wage Rates, employee rights under the law, and the name, address, and telephone number of the Commissioner.

F. The Commissioner shall adjust the wage rates by the annual average increase or decrease, if any, in the Consumer Price Index for all urban consumers for the Washington/Baltimore metropolitan

area, or any successor index, for the previous calendar year, no later than 90 days after the start of each fiscal year. The Commissioner shall publish any adjustments to the wage rates on the Division of Labor and Industry's website. An employer subject to the Living Wage Law must comply with the rate requirements during the initial term of the contract and all subsequent renewal periods, including any increases in the wage rate, required by the Commissioner, automatically upon the effective date of the revised wage rate.

G. A Contractor/subcontractor who reduces the wages paid to an employee based on the employer's share of the health insurance premium, as provided in Md. Code Ann., State Finance and Procurement Article, §18-103(c), shall not lower an employee's wage rate below the minimum wage as set in Md. Code Ann., Labor and Employment Article, §3-413. A Contractor/subcontractor who reduces the wages paid to an employee based on the employer's share of health insurance premium shall comply with any record reporting requirements established by the Commissioner.

H. A Contractor/subcontractor may reduce the wage rates paid under Md. Code Ann., State Finance and Procurement Article, §18-103(a), by no more than 50 cents of the hourly cost of the employer's contribution to an employee's deferred compensation plan. A Contractor/subcontractor who reduces the wages paid to an employee based on the employer's contribution to an employee's deferred compensation plan shall not lower the employee's wage rate below the minimum wage as set in Md. Code Ann., Labor and Employment Article, §3-413.

I. Under Md. Code Ann., State Finance and Procurement Article, Title 18, if the Commissioner determines that the Contractor/subcontractor violated a provision of this title or regulations of the Commissioner, the Contractor/subcontractor shall pay restitution to each affected employee, and the State may assess liquidated damages of $20 per day for each employee paid less than the Living Wage.

J. Information pertaining to reporting obligations may be found by going to the Division of Labor and Industry website http://www.dllr.state.md.us/labor/prev/livingwage.shmtl and clicking on Living Wage for State Service Contracts.

Attachment G. Federal Funds Attachments

This solicitation does not include a Federal Funds Attachment.

Attachment H. Conflict of Interest Affidavit and Disclosure

See link at http://procurement.maryland.gov/wp-content/uploads/sites/12/2018/04/AttachmentH-ConflictofInterestAffidavit.pdf.

Attachment I. Non-Disclosure Agreement (TO Contractor)

This solicitation does not require a Non-Disclosure Agreement.

Attachment J. HIPAA Business Associate Agreement

This solicitation does not require a HIPAA Business Associate Agreement.

Attachment K. Mercury Affidavit

This solicitation does not include the procurement of products known to include mercury as a component.

Attachment L. Location of the Performance of Services Disclosure

This solicitation does not require a Location of the Performance of Services Disclosure.

Attachment M. Task Order Agreement

CATS+ TORFP#F50B9400027 OF
MASTER CONTRACT #060B2490023

This Task Order Agreement ("TO Agreement") is made this day of Month, 20XX by and between _____(TO Contractor) and the STATE OF MARYLAND, [issuingAgencyName] ([ISSUINGAGENCYACRONYM] or the "[typeofAgency]").

IN CONSIDERATION of the mutual promises, the covenants herein contained, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Definitions. In this TO Agreement, the following words have the meanings indicated:

   a. "Agency" means [issuingAgencyName], as identified in the CATS+ TORFP # [solicitationNumber].

   b. "CATS+ TORFP" means the Task Order Request for Proposals #F50B9400027, dated MONTH DAY, YEAR, including any addenda and amendments.

   c. "Master Contract" means the CATS+ Master Contract between the Maryland Department of Information Technology and TO Contractor.

   d. "TO Procurement Officer" means [TO Procurement Officer]. The Department may change the TO Procurement Officer at any time by written notice.

   e. "TO Agreement" means this signed TO Agreement between [ISSUINGAGENCYACRONYM] and TO Contractor.

   f. "TO Contractor" means the CATS+ Master Contractor awarded this TO Agreement, whose principal business address is _____.

   g. "TO Manager" means [contractManagerName]. The Department may change the TO Manager at any time by written notice to the TO Contractor.

   h. "TO Technical Proposal" means the TO Contractor's technical response to the CATS+ TORFP dated date of TO Technical Proposal.

   i. "TO Financial Proposal" means the TO Contractor's financial response to the CATS+ TORFP dated date of TO Financial Proposal.

   j. "TO Proposal" collectively refers to the TO Technical Proposal and TO Financial Proposal.

2. Scope of Work

2.1 This TO Agreement incorporates all of the terms and conditions of the Master Contract and shall not in any way amend, conflict with or supersede the Master Contract.

2.2 The TO Contractor shall, in full satisfaction of the specific requirements of this TO Agreement, provide the services set forth in Section 3 of the CATS+ TORFP. These services shall be provided in accordance with the Master Contract, this TO Agreement, and the following Exhibits, which are attached and incorporated herein by reference. If there is any conflict among the Master Contract, this TO Agreement, and these Exhibits, the terms of the Master Contract shall govern. If there is any conflict between this TO Agreement and any of these Exhibits, the following order of precedence shall determine the prevailing provision:

The TO Agreement,

Exhibit A – CATS+ TORFP

Exhibit B – TO Technical Proposal

Exhibit C – TO Financial Proposal

2.3 The TO Procurement Officer may, at any time, by written order, make changes in the work within the general scope of the TO Agreement. No other order, statement or conduct of the TO Procurement Officer or any other person shall be treated as a change or entitle the TO Contractor to an equitable adjustment under this Section. Except as otherwise provided in this TO Agreement, if any change under this Section causes an increase or decrease in the TO Contractor's cost of, or the time required for, the performance of any part of the work, whether or not changed by the order, an equitable adjustment in the TO Agreement price shall be made and the TO Agreement modified in writing accordingly. The TO Contractor must assert in writing its right to an adjustment under this Section within thirty (30) days of receipt of written change order and shall include a written statement setting forth the nature and cost of such claim. No claim by the TO Contractor shall be allowed if asserted after final payment under this TO Agreement. Failure to agree to an adjustment under this Section shall be a dispute under the Disputes clause of the Master Contract. Nothing in this Section shall excuse the TO Contractor from proceeding with the TO Agreement as changed.

3. Time for Performance

The TO Contractor shall provide the services described in the TO Proposal in accordance with the CATS+ TORFP on receipt of a Notice to Proceed from the TO Manager. The term of this TO Agreement shall commence on the date the TO Agreement is fully executed and, unless terminated earlier as provided in the Master Contract, conclude upon completion of the scope of work in accordance with the CATS+ TORFP.

4. Consideration and Payment

4.1 In consideration of its performance hereunder, the TO Contractor shall be paid the fixed price of $..... .

4.2 Payments to the TO Contractor shall be made as outlined Section 3 of the CATS+ TORFP, but no later than thirty (30) days after the [typeofAgency]'s receipt of a proper invoice for services provided by the TO Contractor, acceptance by the [typeofAgency] of services provided by the TO Contractor, and pursuant to the conditions outlined in Section 4 of this Agreement.

4.3 Each invoice for services rendered must include the TO Contractor's Federal Tax Identification Number which is _____. Charges for late payment of invoices other than as prescribed by Title 15, Subtitle 1, of the State Finance and Procurement Article, Annotated Code of Maryland, as from time-to-time amended, are prohibited. Invoices must be submitted to the TO Manager unless otherwise specified herein.

4.4 In addition to any other available remedies, if, in the opinion of the TO Procurement Officer, the TO Contractor fails to perform in a satisfactory and timely manner, the TO Procurement Officer may refuse or limit approval of any invoice for payment, and may cause payments to the TO Contractor to be reduced or withheld until such time as the TO Contractor meets performance standards as established by the TO Procurement Officer.

4.5 Liquidated Damages for MBE

1. The Master Contract requires the Master Contractor to comply in good faith with the MBE Program and Master Contract provisions. The State and the Master Contractor acknowledge and agree that the State will incur damages, including but not limited to loss of goodwill, detrimental impact on economic development, and diversion of internal staff resources, if the Master Contractor

does not comply in good faith with the requirements of the MBE Program and MBE Contract provisions. The parties further acknowledge and agree that the damages the State might reasonably be anticipated to accrue as a result of such lack of compliance are difficult to ascertain with precision.

2. Therefore, upon issuance of a written determination by the State that the Master Contractor failed to comply in good faith with one or more of the specified MBE Program requirements or MBE Contract provisions, the Master Contractor shall pay liquidated damages to the State at the rates set forth below. The Master Contractor expressly agrees that the State may withhold payment on any invoices as a set-off against liquidated damages owed. The Master Contractor further agrees that for each specified violation, the agreed upon liquidated damages are reasonably proximate to the loss the State is anticipated to incur as a result of such violation.

(a) Failure to submit each monthly payment report in full compliance with COMAR 21.11.03.13B (3): $20.00 per day until the monthly report is submitted as required.

(b) Failure to include in its agreements with MBE subcontractors a provision requiring submission of payment reports in full compliance with COMAR 21.11.03.13B (4): $50.00 per MBE subcontractor.

(c) Failure to comply with COMAR 21.11.03.12 in terminating, canceling, or changing the scope of work/value of a contract with an MBE subcontractor and amendment of the MBE participation schedule: the difference between the dollar value of the MBE participation commitment on the MBE participation schedule for that specific MBE firm and the dollar value of the work performed by that MBE firm for the Contract.

(d) Failure to meet the Master Contractor's total MBE participation goal and sub goal commitments: the difference between the dollar value of the total MBE participation commitment on the MBE participation schedule and the MBE participation actually achieved.

(e) Failure to promptly pay all undisputed amounts to an MBE subcontractor in full compliance with the prompt payment provisions of the Contract: $100.00 per day until the undisputed amount due to the MBE subcontractor is paid.

2 Notwithstanding the assessment or availability of liquidated damages, the State reserves the right to terminate the Task Order and exercise any and all other rights or remedies, which may be available under the Task Order or Law.

SIGNATURES ON NEXT PAGE

IN WITNESS THEREOF, the parties have executed this TO Agreement as of the date hereinabove set forth.

TO Contractor Name

_____ _____

By: Type or Print TO Contractor POC Date

Witness: _____

STATE OF MARYLAND, [ISSUINGAGENCYACRONYM]

_____ _____

By: [procurementOfficerName], TO Procurement Officer Date

Witness: _____

Approved for form and legal sufficiency this _____ day of _____ 20___.

_____

Assistant Attorney General

Attachment N. DHS Hiring Agreement

This solicitation does not require a DHS Hiring Agreement.

Attachment O. Construction Schedule

Attached as a separate document.

Attachment P. Prevailing Wage Rate Documentation

Attached as a separate document.

Attachment Q. Technical Specifications – Table Rock

Attached as a separate document.

Attachment R. Foundation Inspection

Attached as a separate document.

Attachment S. Typical 330 Foot State Tower Loading Plan

Attached as a separate document.

Attachment T. Typical Equipment Shelter Without Generator

Attached as a separate document.

Attachment U. Typical Tower Layout

Attached as a separate document.

Attachment V. Geo-Tech-Boring Logs

Attached as a separate document.

Attachment W. Closeout Process Final

Attached as a separate document.

Attachment X. MDE Final Approval Letter

Attached as a separate document.

Attachment Y. Construction Drawings

Attached as a separate document.

Attachment Z. Typical Generator Shelter

Attached as a separate document.

Appendix 1 Abbreviations and Definitions

A. Business Day(s) – The official working days of the week to include Monday through Friday. Official working days excluding State Holidays (see definition of "Normal State Business Hours" below).

B. COMAR – Code of Maryland Regulations available on-line at http://www.dsd.state.md.us/COMAR/ComarHome.html.

C. Effective Date - The date of mutual TO Agreement execution by the parties

D. Local Time – Time in the Eastern Time Zone as observed by the State of Maryland. Unless otherwise specified, all stated times should be Local Time, even if not expressly designated as such.

E. Minority Business Enterprise (MBE) – Any legal entity certified as defined at COMAR 21.01.02.01B (54) which is certified by the Maryland Department of Transportation under COMAR 21.11.03.

F. Normal State Business Hours - Normal State business hours are 8:00 a.m. – 5:00 p.m. Monday through Friday except State Holidays, which can be found at: www.dbm.maryland.gov – keyword: State Holidays.

G. Notice to Proceed (NTP) – A written notice from the TO Procurement Officer that work under the Task Order, project or Work Order (as applicable) is to begin as of a specified date. The NTP Date is the start date of work under the Task Order, project or Work Order. Additional NTPs may be issued by either the TO Procurement Officer or the TO Manager regarding the start date for any service included within this solicitation with a delayed or non-specified implementation date.

H. NTP Date – The date specified in a NTP for work on Task Order, project or Work Order to begin.

I. Offeror – A Master Contractor that submits a Proposal in response to this TORFP.

J. State – The State of Maryland.

K. Source Code – Executable instructions for Software in its high level, human readable form

L. Task Order (TO) – The scope of work described in this TORFP.

M. TO Agreement - The contract awarded to the successful Offeror pursuant to this Task Order Request for Proposals, the form of which is attached to this TORFP as **Attachment H.**

N. TO Contractor Personnel - Employees and agents and subcontractor employees and agents performing work at the direction of the TO Contractor under the terms of the Task Order awarded from this TORFP.

O. TO Proposal – As appropriate, either or both of an Offeror's TO Technical or TO Financial Proposal.

P. Veteran-owned Small Business Enterprise (VSBE) – A business that is verified by the Center for Verification and Evaluation (CVE) of the United States Department of Veterans Affairs as a veteran-owned small business. See Code of Maryland Regulations (COMAR) 21.11.13.

Appendix 2 Offeror Information Sheet

Offeror	
Company Name	
Street Address	
City, State, Zip Code	
TO Contractor Federal Employer Identification Number (FEIN)	
TO Contractor eMM ID number	As of the date of Proposal submission, are you registered to do business with the state of Maryland?
SBE / MBE/ VSBE Certification	
SBE	Number: Expiration Date:
VSBE	Number: Expiration Date:
MBE	Number: Expiration Date: Categories to be applied to this solicitation (dual certified firms must choose only one category).
Offeror Primary Contact	
Name	
Title	
Office Telephone number (with area code)	
Cell Telephone number (with area code)	
e-mail address	
Authorized Offer Signatory	
Name	
Title	
Office Telephone number (with area code)	
Cell Telephone number (with area code)	
e-mail address	

Appendix 3 Performance Bond

PERFORMANCE BOND

Principal	Business Address of Principal
Surety A corporation of the State of and authorized to do business in the State of Maryland	Obligee STATE OF MARYLAND By and though the following Administration
Penal Sum of Bond (express in words and figures) Description of Task Order Table Rock SHA Communications Tower Site Preparation Task Order Number: XXX	(Date of TO Agreement), 20__ Date Bond Executed , 20__

KNOW ALL MEN BY THESE PRESENTS, that we, the Principal named above and Surety named above, are held and firmly bound unto the Obligee named above in the Penal Sum of this Performance Bond stated above, for the payment of which Penal Sum we bind ourselves, our heirs, executors, administrators, personal representatives, successors, and assigns, jointly and severally, firmly by these presents. However, where Surety is composed of corporations acting as co-sureties, we the co-sureties, bind ourselves, our successors and assigns, in such Penal Sum jointly and severally as well as severally only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each co-surety binds itself, jointly and severally with the Principal, for the payment of such sum as appears above its name below, but if no limit of liability is indicated, the limit of such liability shall be the full amount of the Penal Sum.

WHEREAS, Principal has entered into or will enter into a contract with the State of Maryland, by and through the Administration named above acting for the State of Maryland, which contract is described and dated as shown above, and incorporated herein by reference. The contract and all items incorporated into the contract, together with any and all changes, extensions of time, alterations, modifications, or additions to the contract or to the work to be performed thereunder or to the Plans, Specifications, and Special Provisions, or any of them, or to any other items incorporated into the contract shall hereinafter be referred as "the TO Agreement."

WHEREAS, it is one of the conditions precedent to the final award of the TO Agreement that these presents be executed.

NOW, THEREFORE, during the original term of said TO Agreement, during any extensions thereto that may be granted by the Administration and during the guarantee and warranty period, if any, required under the TO Agreement, unless otherwise stated therein, this Performance Bond shall remain in full force and effect unless and until the following terms and conditions are met:

1. Principal shall well and truly perform the TO Agreement; and

2. Principal and Surety shall comply with the terms and conditions in this Performance Bond.

Whenever Principal shall be declared by the Administration to be in default under the TO Agreement, the Surety may, within 15 days after notice of default from the Administration, notify the Administration of

its election to either promptly proceed to remedy the default or promptly proceed to complete the contract in accordance with and subject to its terms and conditions. In the event the Surety does not elect to exercise either of the above stated options, then the Administration thereupon shall have the remaining contract work completed, Surety to remain liable hereunder for all expenses of completion up to but not exceeding the penal sum stated above.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the TO Agreement or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this Performance Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the TO Agreement or to the work or to the Specifications.

This Performance Bond shall be governed by and construed in accordance with the laws of the State of Maryland and any reference herein to Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, Principal and Surety have set their hands and seals to this Performance Bond. If any individual is a signatory under the Principal heading below, then each such individual has signed below on his or her own behalf, has set forth below the name of the firm, if any, in whose name he or she is doing business, and has set forth below his or her title as a sole proprietor. If any partnership or joint venture is a signatory under the Principal heading below, then all members of each such partnership or joint venture have signed below, each member has set forth below the name of the partnership or joint venture, and each member has set forth below his or her title as a general partner, limited partner, or member of joint venture, whichever is applicable. If any corporation is a signatory under the Principal or Surety heading below, then each such corporation has caused the following: the corporation's name to be set forth below, a duly authorized representative of the corporation to affix below the corporation's seal and to attach hereto a notarized corporate resolution of power of attorney authorizing such action, and each such duly authorized representative to sign below and set forth below his or her title as a representative of the corporation. If any individual acts as a witness to any signature below, then each such individual has signed below and has set forth below his or her title as a witness. All of the above has been done as of the Date of Bond shown above.

Individual Principal

In Presence of:
Witness

_____ as to _____ (Name)

_____ (SEAL)

Co-Partnership Principal

In Presence of:
Witness

_____ as to _____ (Name of Co-Partnership)

_____ (SEAL)
Partner

_____ as to _____ (SEAL)
Partner

_____ as to

_____ (SEAL)
Partner

Corporate Principal

Attest:

_____
(Name of Corporation) AFFIX CORPORATE SEAL

_____
Corporate Secretary

By: _____
President

Attest:

_____
Signature

_____
(Individual or Corporate Surety)

Bonding Agent's Name:

By: _____

SEAL

_____
Agent's Address:

Title: _____

_____

_____

_____
(Business Address of Surety)

Approved as to form and legal sufficiency this ____ day of _____ 20___

_____
Assistant Attorney General

Appendix 4 Payment Bond

PAYMENT BOND

Principal	Business Address of Principal
Surety A corporation of the State of and authorized to do business in the State of Maryland	Obligee STATE OF MARYLAND By and though the following Administration
Penal Sum of Bond (express in words and figures) Description of Task Order: Table Rock SHA Communications Tower Site Preparation Task Order Number: XXX	(Date of TO Agreement), 20__ Date Bond Executed , 20__

KNOW ALL MEN BY THESE PRESENTS, That we, the Principal named above and Surety named above, being authorized to do business in Maryland, and having business address as shown above, are held and firmly bound unto the Obligee named above, for the use and benefit of claimants as hereinafter defined, in the Penal Sum of this Payment Bond stated above, for the payment of which Penal Sum we bind ourselves, our heirs, executors, administrators, personal representatives, successors, and assigns, jointly and severally, firmly by these co-sureties, bind ourselves, our successors and assigns, in such Penal Sum jointly and severally as well as severally only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each co-surety binds itself, jointly and severally with the Principal, for the payment of such sum as appears above its name below, but if no limit of liability is indicated, the limit of such liability shall be the full amount of the Penal Sum.

WHEREAS, Principal has entered into or will enter into a contract with the State, by and through the Administration named above acting for the State of Maryland, which contract is described and dated as shown above, and incorporated herein by reference. The contract and all items incorporated into the contract, together with any and all changes, extensions of time, alterations, modifications, or additions to the contract or to the work to be performed thereunder or to the Plans, Specifications, and Special Provisions, or any of them, or to any other items incorporated into the contract shall hereinafter be referred to as the "TO Agreement".

WHEREAS, it is one of the conditions precedent to the final award of the TO Agreement that these presents be executed.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials furnished, supplied and reasonably required for use in the performance of the TO Agreement, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject to the following conditions:

1. A claimant is defined to be any and all of those persons supplying labor and materials (including lessors of the equipment to the extent of the fair market value thereof) to the Principal or its subcontractors and subcontractors in the prosecution of the work provided for in the TO Agreement, entitled to the protection provided by Section 9-113 of the Real Property Article of the Annotated Code of Maryland, as from time to time amended.

2. The above named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been in full may, pursuant to and when in compliance with the provisions of the aforesaid Section 9-113, sue on this Bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant and have execution thereon. The Obligee shall not be liable for the payment of any costs or expenses of any such suit.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the TO Agreement or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this Payment Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the TO Agreement or to the work or to the Specifications.

This Payment Bond shall be governed by and construed in accordance with the laws of the State of Maryland and any reference herein to Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, Principal and Surety have set their hands and seals to this Payment Bond. If any individual is a signatory under the Principal heading below, then each such individual has signed below on his or her own behalf, has set forth below the name of the firm, if any, in whose name he or she is doing business, and has set forth below his or her title as a sole proprietor. If any partnership or joint venture is a signatory under the Principal heading below, then all members of each such partnership or joint venture have signed below, each member has set forth below the name of the partnership or joint venture, and each member has set forth below his or her title as a general partner, limited partner, or member of joint venture, whichever is applicable. If any corporation is a signatory under the Principal or Surety heading below, then each such corporation has caused the following: the corporation's name to be set forth below, a duly authorized representative of the corporation to affix below the corporation's seal and to attach hereto a notarized corporate resolution of power of attorney authorizing such action, and each such duly authorized representative to sign below and set forth below his or her title as a representative of the corporation. If any individual acts as a witness to any signature below, then each such individual has signed below and has set forth below his or her title as a witness. All of the above has been done as of the Date of Bond shown above.

Individual Principal

In Presence of:
Witness

_____ as to _____ (Name)

_____ (SEAL)

Co-Partnership Principal

In Presence of:
Witness

_____ as to _____ (Name of Co-Partnership)

_____ (SEAL)

Partner

_____ as to _____ (SEAL)

Partner

_____ as to

_____ (SEAL)
Partner

Corporate Principal

Attest:

_____
(Name of Corporation) AFFIX CORPORATE SEAL

_____
Corporate Secretary

By: _____
President

Attest:

_____
Signature

_____
(Individual or Corporate Surety)

Bonding Agent's Name:

By: _____

SEAL

_____
Agent's Address:

Title: _____

_____

_____

_____
(Business Address of Surety)

Approved as to form and legal sufficiency this ____ day of _____ 20___

_____
Assistant Attorney General

Appendix 5 Proposal/Bid Bond

PROPOSAL/BID BOND

Bond No. _____

We, _____ as Principal, hereinafter called the Principal, and _____, a corporation duly organized under the laws of the State of _____, as Surety, hereinafter called the Surety, are held and firmly bound unto the State of Maryland, hereinafter called "State", for the sum of _____ for the payment of which sum, the Principal and the Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for (Identify project by number and brief description):

NOW, THEREFORE, if the Principal, upon acceptance by the State of its bid identified above, within the period specified therein for acceptance (ninety (90) days, if no period is specified), shall execute such further contractual documents, if any, and give such bond(s) as may be required by the terms of the bid as accepted within the time specified (ten (10) days if no period is specified) after receipt of the forms, or in the event of failure so to execute such further contractual documents and give such bonds, if the Principal shall pay the State the difference not to exceed the penalty hereof between the amount specified in Principal's bid and such larger amount for which the State may in good faith contract with another party to perform the work covered by said bid, then the above obligation shall be void and of no effect.

The Surety executing this instrument hereby agrees that its obligation shall not be impaired by any extension(s) of the time for acceptance of the bid that the Principal may grant to the State, notice of which extension(s) to the Surety being hereby waived; provided that such waiver of notice shall apply only with respect to extensions aggregating not more than ninety (90) calendar days in addition to the period originally allowed for acceptance of the bid.

Individual Principal

_____
(Name)

In Presence of:
Witness

_____ as to _____ (SEAL)

Partnership Principal

_____
(Name)

In Presence of:
Witness

_____ as to _____ (SEAL)
Partner

_____ as to _____ (SEAL)
Partner

_____ as to _____ (SEAL)
Partner

Corporate Principal

Attest:

(Name of Corporation) AFFIX SEAL

By:

Secretary

President

Attest:

(Surety)

By:

Attorney-in-fact AFFIX SEAL

Bonding Agent's Name

Agent's Address:

Approved as to form and legal sufficiency this ____ day of _____ 20___

Assistant Attorney General

Maryland Division of Labor & Industry

STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

07/24/2019

REQUEST FOR ADVERTISEMENT AND NOTICE TO PROCEED

Kimberly Funk - Procurement Officer
Department of Information Technology
100 Community Place
Crownsville , MD 21032

Re: Table Rock SHA Communications Tower

Project No: F50B9400027

Enclosed please find the Prevailing Wage Determination and Instructions for Contractors for the project referenced above.

Upon advertisement for bid or proposal of this project, you are requested to submit to this office the date and name of publication in which such advertisement appeared.

Once awarded, you are further directed to submit to this office, the NOTICE TO PROCEED for the project, complete with the date of notice, the name of the general contractor, and the dollar amount of the project. In addition, we ask that a representative of the prevailing wage Unit be invited to attend the Pre-Construction Conference.

Any questions concerning this matter may be referred to PrevailingWage@dllr.state.md.us

Sincerely,

Enclosures
Wage Determination
Instruction for the Contractor

Prevailing Wage Unit

PREVAILING WAGE INSTRUCTIONS FOR THE CONTRACTOR & SUBCONTRACTOR

The contractor shall electronically submit completed copies of certified payroll records to the Commissioner of Labor & Industry, Prevailing Wage Unit by going on-line to https://www.dllr.state.md.us/prevwage and following the instructions for submitting payroll information (NOTE: A contractor must register prior to submitting on-line certified payroll information).

If you have technical questions regarding electronic submittal, contact the Department at dldliprevailingwage-dllr@maryland.gov.

All certified payroll records shall have an accurate week beginning and ending date. The contractor shall be responsible for certifying and submitting to the Commissioner of Labor and Industry, Prevailing Wage Unit all of their subcontractors' payroll records covering work performed directly at the work site. By certifying the payroll records, the contractor is attesting to the fact that the wage rates contained in the payroll records are not less than those established by the Commissioner as set forth in the contract, the classification set forth for each worker or apprentice conforms with the work performed, and the contractor or subcontractor has complied with the provisions of the law.

A contractor or subcontractor may make deductions that are (1) required by law; (2) required by a collective bargaining agreement between a bona fide labor organization and the contractor or subcontractor; or (3) contained in a written agreement between an employee and an employer undertaken at the beginning of employment, if the agreement is submitted by the employer to the public body awarding the public work and is approved by the public body as fair and reasonable.

A contractor or subcontractor is required to submit information on-line on their fringe benefit packages including a list of fringe benefits for each craft employed by the contractor or subcontractor, by benefit and hourly amount. Where fringe benefits are paid in cash to the employee or to an approved plan, fund, or program, the contribution is required to be indicated.

Payroll records must be electronically submitted and received within 14 calendar days after the end of each payroll period. If the contractor is delinquent in submitting payroll records, processing of partial payment estimates may be held in abeyance pending receipt of the records. In addition, if the contractor is delinquent in submitting the payroll records, the contractor shall be liable to the contracting public body for liquidated damages. The liquidated damages are $10.00 for each calendar day the records are late.

Only apprentices registered with the Maryland Apprenticeship and Training Council shall be employed on prevailing wage projects. Apprentices shall be paid a percentage of the determined journey person 's wage for the specific craft.

Overtime rates shall be paid by the contractor and any subcontractors under its contracts and agreements with their employees which in no event shall be less than time and one-half the prevailing hourly rate of wages for all hours worked in excess of ten (10) hours in any one calendar day; in excess of forty (40) hours per workweek; and work performed on Sundays and legal holidays.

Contractors and subcontractors employing a classification of worker for which a wage rate was not issued SHALL notify the Commissioner of Labor & Industry, Prevailing Wage Unit, for the purpose of obtaining the wage rate for said classification PRIOR TO BEING EMPLOYED on the project. To obtain a prevailing wage rate which was NOT listed on the Wage Determination, a contractor or subcontractor can look on the DLLR webpage under prevailing wage.

Contractors and subcontractors shall maintain a valid copy of proper State and county licenses that permit the contractor and a subcontractor to perform construction work in the State of Maryland. These licenses must be retained at the worksite and available for review upon request by the Commissioner of Labor and Industry's designee.

**Each contractor under a public work contract subject to Section 17-219 shall:

1. Post a clearly legible statement of each prevailing wage rate to be paid under the public work contract; and
2. Keep the statement posted during the full time that any employee is employed on the public work contract.
3. The statement of prevailing wage rates shall be posted in a prominent and easily accessible place at the site of the public work.

****Penalty - Subject to Section 10-1001 of the State Goverment Article, the Commissioner may impose on a**

person that violates this section a civil penalty of up to $50.00 per violation.

Under the Maryland Apprenticeship and Training Council requirements, consistent with proper supervision, training and continuity of employment and applicable provisions in collective bargaining agreements, a ratio of one journey person regularly employed to one apprentice shall be allowed. No deviation from this ratio shall be permitted without prior written approval from the Maryland Apprenticeship and Training Council.

Laborers may NOT assist mechanics in the performance of the mechanic's work, NOR USE TOOLS peculiar to established trades.

ALL contractors and subcontractors shall employ only competent workers and apprentices and may NOT employ any individual classified as a HELPER or TRAINEE on a prevailing wage project.

The State Apprenticeship and Training Fund (Fund) law provides that contractors and certain subcontractors performing work on certain public work contracts are required to make contributions toward apprenticeship. See §17-601 through 17-606, State Finance and Procurement, Annotated Code of Maryland. Contractors and subcontractors have three options where they can choose to make their contributions: (1) participate in a registered apprenticeship training program; (2) contribute to an organization that has a registered apprenticeship training program; or (3) contribute to the State Apprenticeship and Training Fund.

The Department of Labor, Licensing and Regulation (DLLR) is moving forward with final adoption of regulations. The regulations were published in the December 14, 2012 edition of the Maryland Register.

IMPORTANT: Please note that the obligations under this law will become effective on JULY1, 2013. This law will require that contractors and certain subcontractors make contributions toward apprenticeship and report those contributions on their certified payroll records that they submit pursuant to the prevailing wage law.

The Department is offering outreach seminars to any interested parties including contractors, trade associations, and any other stakeholders. Please contact the Department at dldliprevailingwage-dllr@maryland.gov or (410) 767-2968 for seminar times and locations. In addition, information regarding this law will be provided at pre-construction meetings for projects covered by the Prevailing Wage law.

For additional information, contact:
Division of Labor and Industry
Maryland Apprenticeship and Traning
1100 North Eutaw Street, Room 606
Baltimore, Maryland 21201
(410) 767-2246
E-Mail Address: matp@dllr.state.md.us.

STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

The wage rates to be paid laborers and mechanics for the locality described below is announced by order of Commissioner of Labor and Industry.

It is mandatory upon the successful bidder and any subcontractor under him, to pay not less than the specific rates to all workers employed by them in executing contracts in this locality. Reference: Annotated Code of Maryland State Finance and Procurement, Section 17-201 thru 17-226.

These wage rates were taken from the locality survey of 2018 for Garrett County, issued pursuant to the Commissioner's authority under State Finance and Procurement Article Section 17-209, Annotated Code of Maryland or subsequent modification.

**Note: If additional Prevailing Wage Rates are needed for this project beyond those listed below, contact the Prevailing Wage Unit. Phone: (410) 767-2342, email: prevailingwage@dllr.state.md.us.

Name and Title of Requesting Officer: Kimberly Funk - Procurement Officer

Department, Agency or Bureau: Department of Information Technology
100 Community Place Crownsville , MD 21032

Project Number
F50B9400027

Determination Number
42013

Location and Description of work:

Garrett County: The Department of Information Technology is issuing this CATS+ TORFP in order to purchase and install the following for the State: 430-foot self-supporting tower.
TABLE ROCK SHA TOWER SITE
4675 George Washington Highway
Oakland, Md. 21550

Grid Coordinates: Latitude: N39-18-09.80, Longitude: W79-24-51.30

Date of Issue: Jul 24, 2019

BUILDING CONSTRUCTION

CLASSIFICATION	MODIFICATION REASON	BASIC HOURLY RATE	BORROWED FROM	FRINGE BENEFIT PAYMENT
BALANCING TECHNICIAN	AD	$30.67	043	$3.77
BRICKLAYER	AD	$28.00		$22.05
BRICKLAYER/SAWMAN	AD	$30.50	001	$21.25
CARPENTER	AD	$28.25		$18.00
CARPET LAYER	AD	$24.95	001	$10.02
COMMUNICATION INSTALLER TECHNICIAN	AD	$25.23		$4.78
DRYWALL - SPACKLING, TAPING, & FINISHING	AD	$26.10	001	$15.10
ELECTRICIAN	AD	$32.00		$17.96

ELEVATOR MECHANIC	AD	$45.43	001	$38.08
FIREPROOFER - BY HAND	AD	$27.24	001	$0.00
FIREPROOFER - SPRAYER	AD	$27.00	001	$0.00
GLAZIER	AD	$23.76	001	$7.98
INSULATION WORKER	AD	$35.26		$24.80
IRONWORKER - REINFORCING	AD	$27.06	001	$20.83
IRONWORKER - STRUCTURAL	AD	$27.06		$20.83
MILLWRIGHT	AD	$30.92	001	$17.50
PAINTER	AD	$18.50	001	$7.98
PLUMBER	AD	$33.18		$14.18
POWER EQUIPMENT OPERATOR - ASPHALT DISTRIBUTOR	AD	$33.37		$13.95
POWER EQUIPMENT OPERATOR - BACKHOE	AD	$32.77		$13.95
POWER EQUIPMENT OPERATOR - BULLDOZER	AD	$32.77	001	$13.95
POWER EQUIPMENT OPERATOR - CONCRETE PUMP	AD	$32.22	001	$13.95
POWER EQUIPMENT OPERATOR - CRANE	AD	$33.37		$13.95
POWER EQUIPMENT OPERATOR - EXCAVATOR	AD	$32.77		$13.95
POWER EQUIPMENT OPERATOR - FORKLIFT	AD	$32.77		$13.95
POWER EQUIPMENT OPERATOR - GRADER	AD	$32.77	001	$13.95
POWER EQUIPMENT OPERATOR - HOIST	AD	$33.37	001	$13.95
POWER EQUIPMENT OPERATOR - LOADER	AD	$32.77		$13.95
POWER EQUIPMENT OPERATOR - MECHANIC	AD	$32.77	001	$13.95
POWER EQUIPMENT OPERATOR - OILER	AD	$32.22	001	$13.95
POWER EQUIPMENT OPERATOR - PAVER	AD	$27.72	001	$13.40
POWER EQUIPMENT OPERATOR - ROLLER - ASPHALT	AD	$27.72	001	$13.40
POWER EQUIPMENT OPERATOR - ROLLER - EARTH	AD	$28.87	001	$13.40
POWER EQUIPMENT OPERATOR - SCREED	AD	$28.97		$13.62
POWER EQUIPMENT OPERATOR - SKID STEER (BOBCAT)	AD	$32.77		$13.95
POWER EQUIPMENT OPERATOR - SKIDDER	AD	$28.27	001	$13.40
POWER EQUIPMENT OPERATOR - TRENCHER	AD	$32.77	001	$13.95
ROOFER/WATERPROOFER	AD	$30.00	001	$12.15
SHEETMETAL WORKER	AD	$25.47		$21.89
SPRINKLERFITTER	AD	$36.77	001	$19.34
STEAMFITTER/PIPEFITTER	AD	$33.18		$14.18
STONE MASON	AD	$37.91	043	$17.79
TILE & TERRAZZO FINISHER	AD	$23.28	001	$11.19
TILE & TERRAZZO MECHANIC	AD	$28.20	001	$12.23
TRUCK DRIVER - DUMP	AD	$24.82	001	$13.10
TRUCK DRIVER - TACK/TAR TRUCK	AD	$19.84		$4.70
TRUCK DRIVER - TANDEM	AD	$21.99	001	$8.10
LABORER GROUP II				
LABORER - ASPHALT RAKER	AD	$20.71		$19.80
LABORER - COMMON	AD	$20.71		$19.80
LABORER - CONCRETE PUDDLER	AD	$20.71		$19.80
LABORER - CONCRETE TENDER	AD	$20.71		$19.80
LABORER - CONCRETE VIBRATOR	AD	$20.71		$19.80
LABORER - DENSITY GAUGE	AD	$20.71		$19.80

LABORER - FIREPROOFER - MIXER	AD	$20.71		$19.80
LABORER - FLAGGER	AD	$20.71		$19.80
LABORER - GRADE CHECKER	AD	$20.71		$19.80
LABORER - HAND ROLLER	AD	$20.71		$19.80
LABORER - JACKHAMMER	AD	$20.71		$19.80
LABORER - LANDSCAPING	AD	$20.71		$19.80
LABORER - LAYOUT	AD	$20.71		$19.80
LABORER - LUTEMAN	AD	$20.71		$19.80
LABORER - MORTAR MIXER	AD	$20.71		$19.80
LABORER - PLASTERER - HANDLER	AD	$20.71		$19.80
LABORER - TAMPER	AD	$20.71		$19.80
LABORERS GROUP I				
LABORER - AIR TOOL OPERATOR	AD	$20.89	001	$19.80
LABORER - ASPHALT PAVER	AD	$20.89	001	$19.80
LABORER - BLASTER - DYNAMITE	AD	$20.89	001	$19.80
LABORER - BURNER	AD	$20.89	001	$19.80
LABORER - CONCRETE SURFACER	AD	$20.89	001	$19.80
LABORER - HAZARDOUS MATERIAL HANDLER	AD	$20.89	001	$19.80
LABORER - MASON TENDER	AD	$20.89	001	$19.80
LABORER - PIPELAYER	AD	$20.89	001	$19.80
LABORER - SCAFFOLD BUILDER	AD	$20.89	001	$19.80

FRINGE REFERENCES AS NOTED:

a. PAID HOLIDAYS: New Year Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.

b. PAID VACATIONS: Employees with 1 year service - 1 week paid vacation;
2 years service - 2 weeks paid vacation;
10 years service - 3 weeks paid vacation.

Incidental Craft Data: Caulker, Man Lift Operator, Rigger, Scaffold Builder, and Welder receive the wage and fringe rates prescribed for the craft performing the operation to which welding, scaffold building, rigging, operating a Man Lift, or caulking is incidental.

These **Informational Prevailing Wage Rates** may not be substituted for the requirements of pre-advertisement or onsite job posting for a public work contract that exceeds $500,000 in value and either of the following criteria are met: (1) the contracting body is a unit of State government or an instrumentality of the State and there is any State funding for the project; or (2) the contracting body is a political subdivision, agency, person or entity (such as a county) and the State funds 50% or more of the project.

Modification Codes:

(AD) 17-209 Annual Determination from Survey Wage Data Received
(CH) 17-211 Commissioners' Hearing
(CR) 17-208 Commissioners' Review
(SR) 17-208 Survey Review by Staff

Each "Borrowed From" county is identified with the FIPS 3-digit county code unique for the specific jurisdiction in Maryland.

For additional information on the FIPS (Federal Information Processing Standard) code, see http://www.census.gov/datamap/fipslist/AllSt.txt

The Prevailing Wage rates appearing on this form were originally derived from Maryland's annual Wage Survey. The Commissioner of Labor & Industry encourages all contractors and interested groups to participate in the voluntary Wage Survey, detailing wage rates paid to workers on various types of construction throughout Maryland.

A mail list of both street and email addresses is maintained by the Prevailing Wage Unit to enable up-to-date prevailing wage information, including Wage Survey notices to be sent to contractors and other interested parties. If you would like to be included in the mailing list, please forward (1) your Name, (2) the name of your company (if applicable), (3) your complete postal mailing address, (4) your email address and (5) your telephone number to PWMAILINGLIST@dllr.state.md.us. Requests for inclusion can also be mailed to: Prevailing Wage, 1100 N. Eutaw Street - Room 607, Baltimore MD 21201-2201.

ATTACHMENT Q – Table Rock SHA CommunicationsTower
TECHNICAL SPECIFICATIONS

TORFP #F50B9400027

1. Summary

This task order is for the purchase and turnkey installation of one (1) 430-foot self-supporting tower, one (1) 12x38 ft. concrete equipment shelter foundation, one (1) 12x12x10-foot generator shelter foundation, along with one (1) 12x12 ft. generator shelter containing a 75kW backup generator, one (1) 12x38x10-foot equipment shelter and one (1) 1000 gallon propane tank for the State of Maryland at the following location:

TABLE ROCK SHA TOWER
4675 George Washington Hwy (U.S. Rt. 50)
Oakland, MD. 21550
Grid Coordinates: Latitude: N39-18-09.80, Longitude: W79-24-51.30

The TO Contractor shall comply with all applicable sections of the MD State Highway Administration Standards of Construction Specifications for Construction and Materials, July 2008 (Grey Book).

TO Contractors will only use approved tower and shelter designs. The following manufacturers have preapproved designs:

Nello Towers www.nelloinc.com
Tower Innovations www.towerinnovations.net
Sabre Towers www.sabreindustriesinc.com
Valmont www.Valmont.com

Cellxion www.cellxion.com
Fibrebond www.fibrebond.com
Thermobond www.thermobond.com

2. TORFP Specifications

The TO Contractor shall provide all coordination, functions, labor, materials, insurance and purchase items required to install a fully functional microwave and wireless communications site in accordance with the following specifications:

A. Site Preparation Work

1. Locating of any buried electrical and/or telephone cables on all of the property affected by the tower site construction and installation of electrical and communications conduits.

2. The TO Contractor shall follow the approved sequence of constructions as shown in the attached construction drawings. Any deviations must be approved by the County or MDE, as required.

3. TO Contractors may use subcontractors who have experience in civil / site work, Erosion and Sediment Control (E&S) implementation and Storm Water Management (SWM) and Storm Drain (SD) construction, etc in the context of SHA projects and meeting MD Dept of the Environment requirements. TO Contractors without green and yellow cards must use approved subcontractors to install and maintain soil and erosion controls who do have these certificates.

4. TO Contractor shall, if applicable, coordinate and meet with County or MDE environmental inspectors to obtain and ensure compliance with permits and regulations for maintaining sediment and erosion control. This will be done at least 7 days prior to any construction.

5. The TO Contractor will maintain an A or B rating for the E&S controls for the duration of the project. Grades of C, D or F may result in liquidated damages.

6. The TO Contractor will clear, grade, survey and mark the Limits of Disturbance (LOD) in accordance with the attached construction drawings.

7. The TO Contractor shall furnish and install sediment and erosion control systems and **all** storm water management features in accordance with the attached drawings. Sediment and erosion control systems may include but are not limited to: silt fencing, silt stakes, hay bales, etc. Disposition of any spoils shall be conducted in accordance with the most current version of Maryland Dept of the Environment (MDE) policy. Details are provided in Attachment Y - Construction Drawings. Deviations from the drawings require County or MDE approval as appropriate. **A watertight container will be placed on site to contain up to and including the following: Approved Construction drawings, daily completed SWM/ES inspection logs, all applicable permits for construction, and copies of all materials related to the construction of the site (i.e., concrete delivery tickets, stone delivery tickets, MDI, etc.). The container must be placed in a conspicuous location on the site.** The site will be subject to random and scheduled inspections. Sites left dormant will be stabilized prior to departure in accordance with County or MDE standards as appropriate. Sites are subject to inspection even during dormant periods. Maintenance of all E&S measures will be required until approval is granted to remove each feature. One individual, designated by the TO Contractor, will be responsible for the supervision of all E&S controls and issues. This individual shall have a current green and yellow card.

8. The TO Contractor shall furnish and install a stabilized construction entrance in accordance with the construction drawings. Near completion of the site improvements the stabilized

construction entrance will be restored to match the grade of the existing access road in accordance with the approved construction drawings.

9. All concrete supplied shall originate from a State certified / SHA approved plant. Supplied concrete shall meet SHA, tower designer specifications and comply with Section 902 of the Grey Book. TO Contractors shall use an SHA approved concrete mix that complies with the tower and shelter foundation designers' specifications.

10. Construct the tower foundation per tower manufacturer's specifications.

11. Construct one (1) 12x38ft. equipment shelter foundation and one (1) 12x12ft. generator shelter foundation. The foundation designs shall be approved by the shelter manufacturer. At a minimum their footers will extend at least 6 IN below the local frost line. The construction of each concrete foundation shall contain an integrated continuous stoop for the doors.

12. Construct one (1) 4x20ft. Concrete foundation for one (1) 1,000 gallon LP fuel tank. The foundation will be constructed on compacted dirt and no less than 3 IN of #57 stone. The foundation will be at least six inches above final grade and be reinforced with rebar or 6x6 metal mesh.

13. Install tower and shelter ground rings per the latest version of Motorola R56 installation standards. This will include at least two test wells. Test wells shall not interfere with vehicular traffic. Locations will be verified by the Project Manager

14. Upon completion of tower, shelter and site improvements, the TO Contractor will furnish and install surface materials in accordance with Attachment Y - Construction Drawings. TO Contractor shall restore all areas of grass or existing pavement which have been disturbed during construction.

15. The TO Contractor shall install an eight (8) ft. high-galvanized chain link fence with two (2) feet of barbed wire on top, with a twenty (20) ft. wide, double leaf vehicle gate; and one (1) five (5) foot man gate around the site (includes tower, equipment shelter and generator shelter) as shown on Attachment Y- Construction Drawings. The fence materials will be bonded/ grounded in accordance with the latest version of R56. The TO Contractor shall utilize sufficiently sized insulated copper wire to bond the fence fabric and barbed wire. The insulation will be UV rated and black or grey in color. If the copper is not tinned, anti-oxidation compound will be furnished for any mechanical connections. The TO Contractor shall provide chains and combination style commercial grade padlocks for the security and man gates. The State Project Manager shall be given the combination and shall control access to the site.

B. <u>Tower Specifications</u>

1. The tower shall be a solid steel leg constructed, self-supporting, 430-ft tower. The tower shall be constructed of high-strength steel. All components and hardware are to be hot-dip

galvanized with a zinc coating (per EIA standards) after fabrication. A zinc coating shall be permanently fused to the steel, so all surfaces are protected and no painting is required for rust protection. Upon delivery, the tower shall be subject to approval by the State Project Manager.

2. Exact placement of the tower and shelter shall be coordinated by the TO Contractor with the State Project Manager.

3. The tower shall be required to meet or exceed the latest EIA 222-H standards for this type of tower. It will be designed to carry the number and type of antennas as per attached 430-ft State Tower loading plan (see TORFP Attachment S- Typical 430-ft State Tower Loading Plan). The tower and associated installation shall conform to all local, County, State and Federal Equipment Shelter codes. The State of Maryland shall be responsible for obtaining Federal Aviation Administration (FAA) approval and permits. The tower will be designed with the following 222-H design criteria:

Three second wind gust:	90 MPH
Three second wind gust concurrent with radial ice:	40 MPH
Concurrent radial ice:	3/4IN
Structure classification:	III
Exposure category:	C
Topographic category:	3
Crest Height:	3200 ft.

4. The bottom 20 feet (minimum) of the tower shall have K-bracing construction to allow for ingress and egress under the tower. The top 60 ft. (minimum) of the tower shall contain no slope.

5. Spacing between tower legs shall not exceed 40 ft. If using a pad and pier foundation, keep the pad to no more than 55x55ft.

6. Proper and thorough grounding and bonding methods in accordance with currently published Motorola R56 standards shall be employed to provide maximum lightning protection.

7. The TO Contractor shall use soil borings supplied by the State for analysis to assure that the engineered tower foundation and the calculated ground loadings are acceptable. The TO Contractor shall furnish two (2) copies of the foundation designs and the ground loading calculations certified by a Maryland registered Professional Engineer (P.E.) to the Maryland State Department of Information Technology. The TO Contractor shall furnish a statement that the engineered tower foundations and the calculated ground loadings meet the manufacturer's recommended requirements.

8. Step bolts on one leg, safety climb and grounding bars are to be furnished and installed by the TO Contractor as part of the tower. Safety climb stand offs will be of sufficient length to ensure the safety climb does not rub on the flanges. Step bolt mounts will be permanently attached to the side of the climbing leg instead of the face/apex of the climbing leg. Tower ground bus bars will be grounded to the tower ground ring and bonded directly to the tower structure through the use of stainless steel hardware. Tower ground bus bars will be a minimum of ¼"x4"x24", (minimum 33 hole pairs) copper bars. One tower bus bar will be provided for each shelter installed.

9. The tower will be designed to accommodate two (2)"State" cable ladders (supplied by the TO Contractor) and one (1) "Cellular" cable ladder (supplied by others). The "State" cable ladders will be designed in accordance with the Tower Layout (Attachment U). The "State" cable ladders will be a "rail" configuration with cable ladder side rails and rungs to accommodate at least fifteen (15) ¾ IN snap-ins and be at least three (3) FT wide. If the cable ladders are required to meet, a single ladder will extend to the top of the tower. The single cable ladder will accommodate at least fifteen (15) ¾ IN snap-ins and be at least three (3) FT wide. The project manager will determine where the two cable ladders meet and transition to the single cable ladder. The cable ladders will be mounted on the same face and the outside edge of the tower. The ladders will each originate on opposite outer edges of the face of the tower. They will originate approximately one foot from the leg of the tower and will remain one foot from the edge of the tower. One foot edge spacing will be maintained to the point where both cable ladders meet. From that point, a single cable ladder will extend, centered on the face, to the top of the tower. Cable ladders will not be positioned back to back. The "Cellular" cable ladder will be designed in accordance with the Tower layout (Attachment U). The cellular cable ladder will be a "rail" configuration with cable ladder side rails and rungs to accommodate at least fifteen (15) ¾ in. snap-ins and be at least three (3) ft. wide and will extend the full height of the tower. The feed lines will be arranged in accordance with the Tower Loading Plan (Attachment S). Feed Lines heights will terminate at its corresponding antenna on the Tower Loading Plan. The tower will be designed in compliance with the state loading plan, the above configuration and all other applicable sections of this task order.

10. All leg and leg flange PL material is ASTM A-572 grade 50 (F_y >= 50 ksi). All other material is ASTM A36 (F_y >= 36 ksi).

11. Anchor bolts will comply with ASTM A449 and be any number or size determined by the tower designer to comply with the requested load requirements.

12. Tower foundation concrete strength will be at least 4000 PSI or the tower foundation designer's recommendation; whichever is greater. Concrete testing will be conducted in accordance with DoIT's concrete inspection policy memorandum (see Attachment R). Test cylinders will be crushed and results provided to the State project manager prior to stacking the tower. Tower erection will NOT commence until verification is provided that the concrete has reached the minimum compressive strength. Compressive strength can be tested prior to 28 days to expedite the tower erection, but this does not exclude the TO Contractor's responsibility to supply 28 day crush reports.

13. Non-chloride, non-corrosive concrete set accelerate may be utilized in compliance with ASTM-C-494 type C and ACI-318.

14. Water reducing admixture may be utilized in compliance with ASTM-C-494.

15. All admixtures should be dispensed into fresh concrete and sufficiently mixed. All admixtures must be added separately.

16. Minimum concrete cover of 3" on all steel.

17. Crown top of piers for drainage and chamfer all exposed concrete edges 1".

18. Compact backfill in 9" lifts. Remove all forms prior to backfill.

19. The TO Contractor shall purchase and install tower lighting equipment on the 430 ft. tower (Total finished height of the tower including all appurtenances will be 448 ft.) as per FAA Advisory Circular AC70/7460-1-G or latest revision according to the following specifications:

    i. The TO Contractor *shall use tower lighting manufacturer trained and certified personnel* to install tower lighting equipment on the 430 ft. tower.
    ii. The side markers shall be installed using stainless steel hose clamps, not plastic cable ties.
    iii. The tower lighting system shall be an all LED system by Flash Technology Systems (http://www.flashtechnology.com/) (Part # FTS370d LED SMART IR with NVG compatibility using infrared "IR" LEDs) or approved equivalent and manufactured to specifications for FAA type L-864/ L-865 and FAA-AC 150/5345-43E.
    iv. The TO Contractor shall install a dual, medium intensity, Type E-2 LED system that provides white flashing LEDs for day operation and red flashing LEDs (with IR LEDs) for night operation as per FAA requirements. The L-810 side markers will also utilize NVG-compatible LED technology. A 15 foot beacon extension assembly, with safety climb, shall be installed with flash head and lightning rod mounts and step bolts spaced alternately at approximately 15 inch intervals from the tower flange to the beacon. The beacon extension will be centrally mounted and not anchored to just one tower leg. It will be anchored to all three tower legs to distribute weight evenly. The beacon extension can be solid like the other legs on the tower or

hollow, but no less than 4.5 IN outside diameter and ¼ IN wall thickness. The design must be approved by the State Project Manager prior to shipment.

v. The lighting rod will extend at least four (4) Ft. above the top of the beacon. No part of the lightning rod or mount that obstructs the beacon will be larger than 7/8" in diameter.

vi. The tower lighting system shall be supplied with remote and onsite diagnostics capabilities including software and direct connect cable.

vii. TO Contractor will supply temporary power to the lighting controller until permanent power is supplied. This will include all materials and labor to install temporary power and may include the use of a portable generator or a utility approved metering device, means of disconnect and receptacles. Delays in permanent power will be evaluated on a case by case basis and solutions will be directed by the State Project Manager.

viii. The supplied tower lighting system shall include 5-year parts warranty.

ix. The lighting controller will be bonded to the internal halo inside the generator room.

C. Equipment Shelter Specifications

12x38 ft. Single Compartment Shelter

1. Shelter installation must be in conformance with manufacturer's requirements for application of warranties provided by the manufacturer as well as be compliant with the current version of the Motorola R56 grounding requirements.

2. The equipment shelter supplied shall be a one-piece concrete communications equipment shelter. The shelter shall be equipped with a 400-amp integrated load center, such as Transtector ISP Series, incorporating the main service disconnect, manual transfer switch, surge protection and load center. The supplied equipment shelter shall be nominally sized 12 X 38 X 10 ft (height is inside dimension) and configured as a one-room shelter as depicted in the Equipment Shelter Layout Drawing (TORFP Attachment T).

3. The shelter shall be provided with a NEMA 4, 250 Volt D.C., 600 Volt A.C. 200 amp, weatherproof emergency generator receptacle such as Appleton AJA20044-200, mounted on the front of the shelter to allow connection of a 50kW portable Emergency Generator in case of failure of the site generator during a power outage. The generator receptacle shall be located in such a place that it will not interfere with the operation of the equipment room door. The receptacle's operation will be controlled by operating the manual transfer switch inside the equipment shelter.

4. Furnish a compatible Appleton plug such as AP20044CD with 50 Ft of conductors terminated in a pig tail. The plug will be designed to interface a portable generator with the Appleton receptacle mounted on the building. The plug will be weatherproof and the conductors will be adequately insulated and weatherproofed. They should be sized to safely connect a 50 kW emergency generator and mitigate any voltage drop. The cable assembly will be provided with each shelter and installed inside each shelter on an adequately sized hose bib in

accordance with the attached shelter layout. If made of a conductive material the cable holder will be bonded per the latest version of R56. Shelters without generators will have the cable installed/stored just inside the door in accordance with the shelter layout drawings.

5. One 24-port cable entry port and one 16-port cable entry port complete with weatherproof caps shall be provided for antenna cable entry. The main cable entry port will be a 24 position cable entry port and will be located on the back wall of the building. The secondary cable entry port will be a 16 position cable entry port and will be located on the end wall of the building between the air conditioner units. These locations are shown in the supplied Typical Equipment Shelter Layout Drawings. Each port within both assemblies shall be four (4) inches in diameter, and shall be located with the top of the assembly located directly under the cable rack. In addition to the two cable entry ports, two (2) 4- inch PVC conduit sleeves for communications and tower lighting conduits shall be installed. The actual location of these penetrations and sleeves must be confirmed with the Project Manager prior to the fabrication of the shelter.

6. Cable ladders (24 inches wide), centered across the main cable entry port, and shall be mounted using all-thread and “cherry” insulators eight feet above the finished floor, measured from the floor to the bottom of the cable ladder, as shown in the attached (Attachment T) Shelter layout drawing.

7. Two 5-ton 230/208V-Single-phase, dual (redundant) wall-mounted, vertical, self- contained HVAC units with 5-kw heat strips shall be installed at the locations specified on the equipment shelter drawing. Separate circuit breakers for each unit shall be installed in the main load circuit panel. The provided HVAC units shall have sufficient capacity for the building size supplied, fully loaded with equipment. Each unit shall contain a time delay startup relay, low ambient control, and a forced air resistive heat strip. The HVAC controller will have a humidity control module installed. The outside portions of the units will be weather/rodent and tamper proof.

8. The shelter shall be equipped with one 16” ventilation fan with gravity operated back draft louvers and 16” gravity intake damper with filters and hoods (bug and rodent intrusion resistant). Each fan shall be connected to a thermostatic device to allow automatic fan on-off control. The openings will be provided with shutters and weather hoods. All openings in the shelter structure for the provision of entry or exit of cables, equipment, ventilation, etc. must be sealed to prevent the invasion of the shelter interior by insects, rodents and external moisture.

9. Insulation shall be non-combustible, with a vapor barrier. Wall and floor thickness shall provide an R-11 (minimum) rating, and the roof shall have an R-19 (minimum) rating.

10. Concrete Construction – The wall outer finish will be natural stone aggregate finish with an aesthetically pleasing earth tone.

11. The foundation shall be comprised of concrete piers or concrete pad with steel reinforcement. The top of the finished foundation shall be 6 inches higher than finished grading. The

foundation shall level the shelter such that all foundation to shelter contact points shall have equal loads. The equipment shelter is to rest flush on the poured concrete foundation without showing any gaps between shelter and pad and to be level to within ½ degree. The shelter shall have a poured concrete entrance stoop for the entrance, and steps if necessary, to provide safe entry into the shelter. Installations requiring stoops more than 24 inches above grade shall have 42 inch safety rails installed.

12. The minimum live floor loading design will be 300 lbs. per square foot (PSF)
The minimum roof loading design will be 100 lbs. per square foot (PSF)
The minimum wall loading design will be 34 lbs. per square foot (PSF)
The minimum wind loading design will be 50 lbs. per square foot (PSF)

13. One reinforced steel finished door shall be located on the shelter, per the attached drawings. The door will be finished to match the appearance of the shelter. The door shall be pre-hung, gasket sealed, insulated, approximately 3 foot by 7 foot, and in a metal frame. Door will be supplied with door-closer, magnetic weather stripping, drip strip over door, doorstop, door sweep and a 42-inch door canopy. Door checks and door stops shall be provided along with a three (3) point locking system for maximum security. The door will have non-removable ball bearing hinges and deadbolt locks with tamper plates installed. These deadbolts locks shall be security type with removable cylinders, such as "Best" locks. Each equipment room door will be bonded to its frame with welding cable of an appropriate gauge in accordance with the latest version of R56. Braided cable will not be used.

14. The equipment shelter floor shall be covered with 1/8", 12" x 12" vinyl tile, light in color (beige, tan or white). The walls will be trimmed with a 4-inches high and 1/8 inch thick rubber base trim against the floor.

15. The walls will be covered with a minimum of white wood-grained paneling or white vinyl over ½ inch plywood. The equipment shelter shall have one (1) ¾" X 4ft X 8ft plywood telephone mounting board installed as per attached shelter layout drawing (TORFP Attachment T).

16. Electrical installation and wiring shall conform to the latest version of the National Electrical Code. Surface mounted, grounded, duplex outlets shall be provided at five (5) foot intervals (where possible) around the interior walls. All wiring shall be installed in surface mount EMT conduit. Outlets shall be installed 18 inches above finished floor. Horizontal runs of conduit will be installed a minimum of 7 1/2 feet above the floor whenever possible with vertical connections to the surface mounted devices to minimize interference with installing equipment against the wall. Two weatherproof outlets will be installed on the exterior of the shelter. These outlets are to be located at both ends of the shelter. In addition, circuits supplying power to equipment racks # 3-24 in the shelter shall extend downward six (6) feet from boxes mounted at 22" intervals on the ceiling as shown in the supplied Typical Equipment Shelter Layout Drawing (Attachment T – Shelter without Generator). Wiring for these drops shall be housed in "Sealtite" flexible conduit and each drop shall be terminated in a quad receptacle box. Each quad box shall contain two circuits and each circuit shall have its own dedicated 15 or 20-amp circuit breaker. These drops shall be planned to fall

immediately adjacent to the edge of the cable tray. The exact location for each drop must be confirmed with the Project Manager before the shelter is fabricated. The circuit breakers for the quad boxes supplying power to equipment racks # 1-4 shall be located in the main load center. Racks # 1-3 shall each be supplied with one junction box each containing one 20 amp 240 volt circuit. These junction boxes will be fastened to the wall in accordance with the shelter drawing and supplied photos. These junction boxes will be mounted vertically in line. Racks # 3 & 4 shall each be supplied with a quad box containing (2) two 120 volt 20 amp circuits. All circuits will have a dedicated neutral installed in accordance with the latest Motorola R56 standard.

17. Power to the shelter shall be fed through a properly sized 240-Volt, single-phase fused disconnect switch mounted on the exterior wall of the shelter. (See TORFP Attachment T Shelter without Generator drawing for locations.)

18. As mentioned previously, the shelter is to be provided with 400-amp, 20-position (minimum) integrated main load center, equipped with a minimum of twenty (20) 20-amp breakers. Breakers shall be "high magnetic" or high inrush current type (Square D, HM or equivalent). This box shall be installed at one end of the equipment area within five (5) feet of the primary cable entry port. In addition to the 400-ampere main load center, a 100-amp, 40-position (minimum) quad box load center with 15 or 20-amp circuit breakers shall be installed, fed from a 100 amp breaker in the main load center; the quad box load center shall be located on the left end wall. Load centers, circuit breakers and quad boxes shall be properly marked.

19. An interior system ground (halo) with a single #2 AWG stranded wire will be provided with proper connections to the shelter and, in turn, to the tower ground system. The halo will have a 6-inch break roughly opposite the Master Ground Bar. The #2 AWG ground wire for each row of racks will be suspended on independent ground lead stand offs as outlined in the typical shelter drawing. They will be positioned to ensure the #2 AWG lead is isolated from the main cable racks. No electrical conduit is allowed to bridge the 6" gap in the halo ground. The internal ground system will be mounted on the wall using 2-inch (2") standoff insulators, connected to two (2) minimum ¼" x 5"x 24", (33 hole pairs) minimum copper master ground bus bars that are installed directly under each cable entry port. The ground bus system shall be a Harger EPK24MOT bus bar system or an approved substitute. The copper ground bars on the back interior wall of the shelter will be connected to the corresponding exterior ground bar with stainless steel insulated feed through. The external ground bar will be connected through a minimum of three (3) 2-inch copper straps to the external building ground ring and tower grounding system. All exterior connections shall be exothermically welded to ensure proper connection. Electrical ground will be bonded to the RF ground

20. An IEEE Type 1 SAD/MOV protection device shall be part of the integrated load center and approved per the latest version of Motorola R56.

21. The Air conditioning units shall be connected to the internal (halo) grounding system **only**, not to the external equipment shelter grounding system.

22. 48-inch, two or four-tube, energy efficient fluorescent fixtures shall provide sufficient lighting (minimum 50 foot candles) for the shelter. The lights shall be controlled by a wall

switch/ timer internal to the shelter, and located next to the entry door. An exterior entry light shall be installed outside the main doorway of the structure. This light shall be controlled by a motion sensor wired through a wall switch inside the shelter.

23. The shelter shall be pre-wired, with the following functions, to a common point in the radio compartment and terminated with a split 66 Block. The 66 Block shall be mounted in the upper right-hand side of the punch block board. All alarms shall be punched down on the left-hand side of the punch block using solid wire. The 66 block will not be enclosed in any box or enclosure.
All functions/alarms will be programmed to be normally open. Upon alarm they will close.

    i. High Temperature Alarm – Adjustable for over-temperature alert (may be integrated with HVAC system).
    ii. Low Temperature Alarm – Adjustable for under-temperature alert (may be integrated with HVAC system).
    iii. HVAC Failure Alarm- derived from the HVAC controller
    iv. Generator Running Alarm – Closure when generator is running.
    v. Remote Generator Start – No transfer to load (a dry contact closure will remote start the generator but will not transfer to the load if commercial power is good)
    vi. Generator transfer to Load (a dry contact closure will initiate a transfer to load. If the generator is off, it will start the generator)
    vii. Low Oil Pressure Alarm
    viii. Low Coolant Alarm
    ix. Generator Overcrank Alarm
    x. High Coolant Temperature alarm
    xi. Transfer Panel Switched- indicates that the transfer panel has switched to backup power
    xii. Equipment Room Door Alarm
    xiii. Generator Room Door Alarm
    xiv. Equipment Room Smoke Alarm
    xv. Equipment Room Heat Detector Alarm
    xvi. Generator Room Smoke Alarm
    xvii. Generator Room Heat Detector Alarm
    xviii. Type I Surge Suppressor Alarm
    xix. Type II Surge Suppressor Alarm
    xx. Type III Lighting Controller Surge Suppressor Alarm
    xxi. Strobe White Alarm (per strobe controller)
    xxii. Strobe Red Alarm (per strobe controller)
    xxiii. Marker Alarm (per strobe controller)
    xxiv. Spare
    xxv. Spare

24. An external ground ring is to be provided around each shelter foundation. The buried external ground ring shall be in direct contact with the earth at a depth of 30 inches below the

earth's surface with ground rods driven into the earth at intervals not to exceed twice the ground rod length. In the event 10-foot ground rods cannot be driven shorter rods are acceptable if driven at the proper intervals. The external ground ring is to be placed 3 feet outside the shelter footprint in order to be outside the drip line of the shelter.

25. All grounds must be bonded together. This includes the generator, the shelters, the fuel tank, the fencing, and the equipment shelter grounding systems, the ice bridges and the tower. The ground test reading must not normally exceed 5 OHMS. The State shall test all grounds using a fall-of-potential method test to determine compliance. In the event 5 OHMS cannot be reached by reasonable means and through no fault of the TO Contractor, the State will determine the course of action to be taken by the TO Contractor at an additional cost to the State. Grounds must test fewer than 10 OHMS for the site to be acceptable for reasons of personal safety.

26. The shelter shall be designed and installed per the latest version of Motorola R56 to include eye wash station, first aid kit, chemical and CO2 type fire extinguisher.

27. The shelter shall include one broom and dust pan (mounted to the wall), one six foot step ladder, one 30 gallon (plastic) garbage can and one box of 30 gallon garbage can liners.

D. Generator Shelter Specifications

12x12 ft Shelter with 75 Kw Generator:

1. Shelter installations must be in conformance with manufacturer's requirements for application of warranties provided by the manufacturer as well as be compliant with the current version Motorola R56 grounding requirements.

2. The equipment shelter supplied shall be a one-piece concrete shelter and include a 75 Kw vapor propane fueled generator, 400-amp load center, 400A. main service disconnect, 400 amp manual transfer switch, surge protection devices for the load center, and a 400-amp fused disconnect for the equipment shelter with installation. The supplied generator shelter shall be nominally sized 12x12x10 ft. (height is inside dimension.)

3. The shelter shall be provided with a NEMA 4, 250 Volt D.C., 600 Volt A.C. 200 amp, weatherproof emergency generator receptacle such as Appleton AJA20044-200, mounted on the side wall of the shelter to allow connection of a 50kW portable Emergency Generator in case of failure of the internal generator during a power outage. The receptacle's operation will be controlled by operating the manual transfer switch located on the outside of the shelter.

4. Furnish a compatible Appleton plug such as AP20044CD with 50 Ft of conductors terminated in a pig tail. The plug will be designed to interface a portable generator with the Appleton receptacle mounted on the building. The plug will be weatherproof and the conductors will be adequately insulated and weatherproofed. They should be sized to safely connect a 50 kW

emergency generator and mitigate any voltage drop. The cable assembly will be provided with the shelter and installed inside the generator compartment on an adequately sized hose bib in accordance with the attached shelter layout. If made of a conductive material the cable holder will be bonded per the latest version of R56. Shelters without generators will have the cable installed/stored just inside the door in accordance with the shelter layout drawing

5. The shelter shall be equipped with 16" ventilation fans with gravity operated back draft louvers and 16" gravity intake damper with filter and hood (bug and rodent intrusion resistant). Each fan shall be connected to a thermostatic device to allow automatic fan on-off control. The openings will be provided with shutters and weather hoods. All required exhaust piping and intake and exhaust plenums required for the manufacturer's recommended air flow shall be included as part of the installed equipment. All openings in the shelter structure for the provision of entry or exit of cables, equipment, ventilation, etc. must be sealed to prevent the invasion of the shelter interior by insects, rodents and external moisture.

6. Electric baseboard heater strips shall supply heating for the generator room. A thermostat mounted on the wall opposite the heater shall control the heater strips. The heater strips shall be sufficient for the size of the generator room to maintain a room temperature of 72 degrees F.

7. Insulation shall be non-combustible, with a vapor barrier. Wall and floor thickness shall provide an R-11 (minimum) rating, and the roof shall have an R-19 (minimum) rating.

8. Concrete Construction – The wall outer finish will be natural stone aggregate finish with an aesthetically pleasing earth tone.

9. The foundation shall be comprised of concrete piers or concrete pad with steel reinforcement. The top of the finished foundation shall be 6 inches above finished grade. The foundations shall level each shelter such that all foundation to shelter contact points shall have equal loads. The shelter is to rest flush on the poured concrete foundation without showing any gaps between shelter and pad and to be level to within ½ degree. The shelter shall have an integrated continuous stoop for the doors, and steps if necessary, to provide safe entry into the shelter. Installations requiring stoops more than 24 inches above grade shall have safety rails installed.

10. The minimum floor loading design will be 300lbs. per square foot (PSF)
The minimum roof loading design will be 100lbs. per square foot (PSF)
The minimum wall loading design will be 34 lbs. per square foot (PSF)
The minimum wind loading design will be 50 lbs. per square foot (PSF)

11. One reinforced steel finished door shall be located on the shelter, per the attached drawings. The door will be finished to match the appearance of the shelter. The door shall be pre-hung, gasket sealed, insulated, approximately 3 foot by 7 foot, and in a metal frame. Doors will be supplied with door-closer, magnetic weather stripping, drip strip over door, doorstop, door sweep and a 42-inch door canopy. Door checks and door stops shall be provided along with a three (3) point locking system for maximum security. The door will have non-removable ball bearing hinges and deadbolt locks with tamper plates installed. These deadbolt locks shall be

security type with removable cylinders, such as "Best" locks. The door will be bonded to its frame with welding cable of an appropriate gauge in accordance with the latest version of R56. Braided cable will not be used.

12. The shelter floor shall be covered with 1/8", 12" x 12" vinyl tile, light in color (beige, tan or white). The walls will be trimmed with a 4-inches high and 1/8 inch thick rubber base trim against the floor.

13. The walls will be covered with a minimum of white wood-grained paneling or white vinyl over ½ inch plywood.

14. Electrical installation and wiring shall conform to the latest version of the National Electrical Code. Surface mounted, grounded, duplex outlets shall be provided at five (5) foot intervals (where possible) around the interior walls. All wiring shall be installed in surface mount EMT conduit. Outlets shall be installed 18 inches above finished floor. Two weatherproof outlets will be installed on the exterior of the shelter. These outlets are to be located at both ends of the shelter.

15. All low voltage wiring (i.e. alarm, control, etc.) shall be routed in separate conduits in accordance with the national electrical code.

16. Power to the shelter shall be fed through a properly sized 240-Volt, fused single-phase disconnect switch mounted on the exterior wall of the shelter. (See Attachment Z – Typical Generator Shelter).

17. Shelter is to be provided with 400-amp, 20-position (minimum) main load center, equipped with a minimum of twenty (20) 20-amp breakers. Breakers shall be "high magnetic" or high inrush current type (Square D, HM or equivalent).

18. An interior system ground (halo) with a single #2 AWG stranded wire will be provided with proper connections to the shelter and, in turn, to the tower ground system. The halo will have a 6-inch break roughly opposite the main load center. No electrical conduit is allowed to bridge the 6" gap in the halo ground. The internal ground system will be mounted on the wall using 2-inch (2") standoff insulators. All exterior connections shall be exothermically welded to ensure proper connection. Electrical ground will be bonded to the RF ground.

19. Purchase and installation of the following lightning protection devices in the equipment shelter:
    i. An IEEE Type 2 MOV protection device will be installed at the main power input inside the shelter, by means of a 60-Ampere (per "leg") breaker or fused disconnect, across the utility lugs of the transfer switch. The device will be installed inside of the generator shelter and approved for use in the latest version of R56 such as Transtector IMAX series. Its installation will comply with the latest version of R56 and maintain the device's UL1449 (latest edition) listing.
    ii. All surge suppression devices will have the ability to create a dry contact alarm (contact closure upon alarm). This alarm will be integrated with the shelter alarm wiring. The dry contact alarms will be enabled from the factory.

20. 48-inch, two or four-tube, energy efficient fluorescent fixtures shall provide sufficient lighting (minimum 50 foot candles) for the shelter in accordance with Attachment Z. The lights shall be controlled by a wall switch / timer internal to the shelter, and located next to the entry door. An exterior entry light shall be installed outside the doorway of the structure. This light shall be controlled by a motion sensor wired through a wall switch inside the shelter.

21. The TO Contractor shall supply with this shelter a 75 Kilowatt, liquid propane vapor fueled, 1800-RPM generator, 60 Hz, 120/240 volt, single phase with a 400-amp Automatic Transfer Switch (ATS).

22. Installation shall include all materials, parts, labor, etc. to provide a fully functional generator back-up system. Included in the installed price is the transfer switch and all associated wiring as well as generator alarm programming in accordance with state requirements. Block heaters with necessary wiring are to be included. Fuel tank hookup, fuel tank, fuel tank pad and fuel supply piping to the shelter is to be provided by the site work TO Contractor. Fuel supply piping shall be non-metallic to comply with R56 single point grounding requirements. The fuel tank shall be connected to the tower ground ring.

23. Fuel strainers on the propane fuel systems must be installed for proper drainage to prevent moisture buildup in the line. Proper sized flex fuel lines need to be installed on all generators and the fuel line so as to not impede the proper flow of fuel and must not be sharply bent, or crimped. The flex jumper must be placed to ensure minimal engine vibration is transferred to the fuel solenoid assemblies to prevent rupture. The fuel line from the secondary regulator to the manifold shall not be less than 1" to minimize fuel pressure drop from no load to full load. The metal fuel line inside the room will be bonded to the internal halo where it enters the room. This can be done with a c-clamp style device at the fuel line. Proper venting of the fuel system must be installed to ensure no buildup of pressure and safe venting will occur. Fuel lines run in conduit or sleeves must be sealed from moisture. All exhaust piping that can come in contact with personnel will have a heat shield installed. Proper battery chargers must be installed for the appropriate system, either 12 VDC or 24 VDC, 110 VAC. Note: two (2) 12 VDC battery chargers is not acceptable on 24-volt systems.

24. The TO Contractor must perform on-site startup of the generator under full load, using a load bank. The original of the startup form must be completed and submitted prior to submission of an invoice for work performed. The State Project Manager or his designee must be notified in advance to attend the event at their discretion. The load bank test will be at least one hour and conducted under full load. The startup will also include the programming of all generator related alarms/function.

25. All alarm outputs from the generator are to be extended to the equipment shelter via a data cable and terminated in a remote annunciator panel which provides both visual and audible alarm indications for each circuit monitored. The annunciator panel will also provide either normally open or normally closed dry contacts which can be field selectable as needed to provide the proper inputs to the existing "66 block" for the dissemination of alarm

information to the system. The annunciator panel will be located directly below the existing "66 block" in the equipment shelter.

26. All wiring for the generator must be routed overhead. It is unacceptable to cross the floor with conduits.

27. The shelter shall be designed and installed per the latest version of Motorola R56 to include chemical and CO2 type fire extinguishers mounted on the inside wall of the generator shelter.

28. An external ground ring shall be provided around each shelter foundation. Above grade ground tails will be provided for both shelter foundations. The same number, general location and length will be provided for the spare pad as are provided for the occupied foundation. The buried external ground ring shall be in direct contact with the earth at a depth of 30 inches below the earth's surface with ground rods driven into the earth at intervals not to exceed twice the ground rod length. In the event 10-foot ground rods cannot be driven shorter rods are acceptable if driven at the proper intervals. The external ground ring is to be placed 3 feet outside each shelter foundation in order to be outside the drip line of the shelters.

29. All grounds must be bonded together. This includes the generator, the shelters, the fuel tank, the fencing, and equipment shelter grounding systems, the ice bridge and the tower. The ground test reading must not normally exceed 5 OHMS. The State shall test all grounds using a fall-of-potential method test to determine compliance. In the event 5 OHMS cannot be reached by reasonable means and through no fault of the TO Contractor, the State will determine the course of action to be taken by the TO Contractor at an additional cost to the State. Grounds must test fewer than 10 OHMS for the site to be acceptable for reasons of personal safety.

D. <u>Specifications for Installation</u>

1. Purchase and delivery of one (1) fully functional, 430 ft. above ground level, three (3) legged, solid legged, heavy duty, self-supporting, two-way microwave radio tower.

2. Installation of the tower shall include placing a foundation which is certified, signed and stamped by a Maryland registered Professional Engineer (certification must be provided with the response to the bid) that it is designed in accordance with the tower manufacturer's recommendations based upon the soil borings provided by the State (see TORFP Attachment V – Radio Tower Geotechnical Report).

3. The TO Contractor will furnish and install two (2), "State" cable ladders on one face of the tower. The supplied cable ladders will be installed in accordance with the state loading plan (Attachment S), Tower layout (Attachment U) and all other applicable sections of this task order.

4. The tower shall be erected to a height of 430 ft. (AGL) above ground in such a manner as to assure straightness and plumb.

5. Install tower lighting flash and SO cable on outside of cable ladder rail. The flash and SO cable should be routed along the cable ladder rail in a manner to prevent damage over sharp edges, inadvertent climbing, etc; and attached per manufactures specifications

6. Purchase and installation of one (1) 12x38x10 ft. concrete equipment shelter (height is inside dimension), and one (1) 12x12x10 ft. concrete generator shelter with a 75kW vapor propane generator. The equipment shelters must rest flush on the poured concrete foundations without showing any gaps between Equipment Shelters and pad and leveled to within ½ degree. Typical Equipment Shelter drawings are supplied with this Task Order (Attachments T and Z) and should be used for pricing purposes.

7. An approved/certified shelter manufacturer representative will be on site for all shelter deliveries to supervise the setting of each shelter. This individual will correct any foundation gaps or any deficiencies found due to shipment. This individual will also supervise the installation of any field installable items (e.g. hoods, light fixtures, etc).

8. Provision and installation of a liquid cooled, 1800 RPM, 75 kW propane vapor fueled generator housed in a 12x12 ft. concrete shelter complete with a 400-Amp automatic transfer switch capable of zero cross-over (in-phase switching) and time-delay neutral switching to eliminate service interruptions of the electronic equipment and the tower lighting system. The transfer switch will also have a programmable exercise timer. Time delay neutral will be programmable from at least 0-3 seconds. The exercise timer will allow preprogramming of time and date of weekly generator runs. The transfer switch will allow the weekly generator runs to be conducted with or without load.

9. Purchase and installation of one (1) new 1,000 gallon LP fuel tank with hookup to the generator and shall include first LP fill-up. Underground fuel supply piping shall be "plastic" high-performance polyethylene piping or equivalent. The above ground piping must be UV rated rubber jacketed corrugated metallic piping. The fuel tank shall be connected to the tower ground ring. A VALID BILL OF SALE FOR THE FUEL TANK SHALL BE SUPPLIED UPON COMPLETION OF INSTALLATION.

10. Generator start-up and test under full load (using load bank) after permanent power is connected to the equipment shelter must be coordinated with the State Project Manager. The test using the load bank will be one hour. The startup will include generator alarm/function programming.

11. Purchase and install one (1) extruded metal, 24-inch wide, no cantilever ice-bridge with a four tier "tee" or "tree" trapeze cable management systems to facilitate easy installation and removal of cables, such as Andrew WB-T24-4 or suitable equivalent. Ice bridge posts will be no less that 3" in diameter, spaced no more than 6' apart. Posts will be buried 36" encased in concrete. The ice bridge will be electrically insulated from the tower. The trapeze sections will be no more than four (4) feet apart. The ice bridge will be bonded to the external ground bus bar.

12. Purchase and installation, per local utility standard, of an electrical backboard of steel post and unistrut construction to include CT cabinet if required, wire trough, main disconnect, at least one (1) electric company approved meter socket with room to accommodate a minimum of three (3) additional meters.

13. Purchase and installation of two (2) 4-inch conduits, from the power company supplied pad mounted transformer, to the TO Contractor supplied electrical backboard, and from the backboard into the disconnect switch, located on the generator shelter side wall.

14. Purchase and connection of electrical wiring, per local electrical code, from the TO Contractor installed backboard to the fused disconnect on the side wall of the generator shelter and from fused disconnect located on the side wall of the generator shelter into the equipment shelter's 400-amp fused disconnect and from there to the equipment shelter's 400 amp load center. Electrical work must be completed by a State of Maryland certified electrician.

15. Purchase and installation of two (2) 4-inch conduits, one (1) for electrical service, and one (1) for alarm wiring, both with pull strings, each approximately 60-ft in length, from the 12x12 ft generator shelter to the 12x38 ft. equipment shelter. The alarm conduit will terminate in a minimum of 12x12x12 IN or larger communications cable pull box mounted on the exterior of the equipment shelter. In addition to the alarm conduit, one (1) 4" conduit for future fiber connection to the site shall extend from this pull box to a location beyond the compound limits to a point to be determined by the state project manager. The pull box will accommodate at least three (3) 4IN, schedule 40 conduits. This box will be weather proof and constructed of plastic or other non- conductive materials. Locator tape will be installed in all communications and electric trenches one (1) ft. above new conduits.

16. Supplied materials, including, but not limited to, equipment and generator shelters, tower, LP tank, etc shall be new, unused and shall meet the latest design and fabrication standards of the Electronics Industry Association (EIA). A valid bill of sale must be provided upon installation.

17. All supplied materials shall be purchased, not leased.

18. Supply bollards as needed in accordance with the attached construction drawings.

19. The TO Contractor will provide placards affixed to every equipment and generator shelter door stating there is Electro Magnetic Energy dangers. These signs will comply with the latest version of Motorola's R56. The TO Contractor will provide placards affixed to every vehicle and man gate indicating the site is alarmed and under 24 hour surveillance. The signs will say: "Private property – No trespassing. This site is monitored by remote surveillance equipment. Equipment and entrances are alarmed and will notify local police of any intrusion." The TO Contractor will provide placards to the fence along the entrance to the site with the FCC ASR number. The sign will comply with FCC guidelines. The ASR number will be provided by the project manager. All signs will be metal, fade and weather

proof. They will be permanently affixed to their respective gate or door. ASR signs will be provided with the delivery of the tower.

E. Inspection schedule/requirements

1. Sediment and Erosion Controls – A preconstruction meeting will be conducted if applicable with the required inspectors at least 7 days prior to any disturbance. Controls will be randomly inspected by the appropriate inspectors having jurisdiction (County or State), but emphasis is placed after rain events. Corrections/repairs must be made within time limits specified by County or State requirements.
2. Compaction tests – Construction inspectors will inspect each lift required for site grading, retaining wall footers, road work and fill (to include the tower foundation). Non compliance may require the removal of fill and/or halting work.
3. Storm Water Management – To Contractor will provide evidence of the installation of Storm Water Management materials and techniques. This is outlined in Attachment Y – Construction Drawings and will be done at the TO contractor's expense.
4. Cylinder break reports – The tower and shelter foundations will require PE certified crush reports at a minimum of 28 days. Tower erection or shelter installation may not occur until compressive strength is tested and verified in compliance with manufacturer and task order specification. Concrete used for the wall foundation will require tests. This will be coordinated through a private party at the TO Contractor's expense.
5. Electrical inspection – Final wiring will be inspected prior to energizing the site. An approved third party inspection agency can be utilized if recognized by the local utility. This will be supplied by the TO Contractor.
6. Tower Inspection – The tower's structural integrity, galvanizing condition and assembly will be inspected by a third party inspector furnished by DoIT.
7. R56 Inspection – the site, tower and shelter will be subject to a R56 inspection. Discrepancies will be corrected at the TO Contractor's expense. The inspector will be furnished by DoIT.
8. Punch-list – A final inspection will be conducted by DoIT personnel to ensure all items in the task order are completed to the satisfaction of the State.

F. Commencement of Work

Work in response to this Task Order shall be initiated only upon issuance of a fully executed Notice to Proceed, authorized by the State Program Manager.

G. Approvals

Prior to ordering the following drawings/designs shall be approved by the State Project Manager:

1. Tower profile (Final drawings will have PE stamp)
2. Tower foundation design (Final drawings will have PE stamp)
3. Shelter drawings (Final drawings will have PE stamp)
4. Foundation design (Final drawings will have PE stamp)

5. Shop drawings for LP tank foundation
6. Shop drawings for fence

H. <u>Final Acceptance Sign-off</u>

The TO Contractor will provide all items as outlined in Attachment W – Closeout Process Final. The following is required to be demonstrated to the State of Maryland Project Manager upon project completion:

1. The lighting system has operated without fault for thirty (30) days.

2. The State receives a satisfactory inspection report from an independent tower vendor, funded by the State to perform a tower inspection, and all deficient items identified in the inspection report have been corrected to the State's satisfaction. The inspector will mark all deficiencies with blue, permanent paint pens. All corrections will be marked with yellow, permanent paint pens. The correction will be initialed and dated by the crew. Photos will be taken showing the correction to include the initials as proof that the correction was made. The State reserves the right to perform additional tower inspections to verify that deficient items have been corrected. Should the State require two (2) or more tower inspections to verify correction of deficient items, all costs of the additional inspections, beyond the second inspection, shall be deducted from the TO Contractor's final payment.

3. All other deficiencies noted by the State have been corrected to the State's satisfaction.

4. All construction materials, equipment, excess tools and other materials will be removed from the site. The shelter interior (equipment and generator room) will be swept and all protective paper removed from the floors. The site should be neat and organized.

5. If applicable final acceptance by MDE that all work has been completed in accordance with the MDE permit.

6. All warranty information pertinent to various site items such as tower, shelter, tower lighting, generator and transfer switch, etc. is supplied to the State Project Manager.

ATTACHMENT R – FOUNDATION INSPECTION SCOPE OF WORK

SUMMARY: Tower construction vendors will incorporate the following series of tests and inspections to ensure proper quality/strength of all concrete poured and the proper foundation installation on all CATS II, FA13 jobs. These inspections will also incorporate verification of foundation dimensions, rebar dimensions, rebar layout and soil compaction. Test results will be supplied, reviewed and approved by DoIT prior to any structures being set on foundations, tower erection or backfilling operations. Field testing will be conducted by an independent, third party.

DETAILS: Each concrete batch (6-9 cubic yards) will have a corresponding batch report provided by the supplier. These will be included in the close out documentation. Batches will be uniquely identified on the batch report. The vendor will use MD SHA approved concrete mixes for all FA13 projects. Mix tables and more information on concrete specifications can be found in section 900.10.03 in the MD SHA grey book.

These mandatory tests/inspections must take place for the tower and shelter foundations:

1. Construction inspectors will verify the excavated foundation dimensions are correct.
2. The compaction of the tower foundation excavated materials will be tested in accordance with AASHTO T99 (Standard Proctor Test). Compaction results will be in accordance with the tower foundation designer's specification or the geotechnical report provided, whichever is greater. Excavated fill will only be used to backfill the foundation if they pass the compaction test.
3. The bearing pressure of the tower foundation sub grade will be tested. Bearing results will be in accordance with the tower foundation designer's specifications or the geotechnical report provided, whichever is greater. In the event, the vendor cannot meet the required bearing pressure they will solicit advice from the tower manufacturer and geotechnical engineer to achieve the desired results.
4. Construction inspectors will verify the proper rebar size, dimension, grade, configuration, layout, fastener/wire ties and other provisions as specified by the foundation designer are correct prior to any concrete pours.
5. Ambient air temperature and general weather conditions will be recorded and noted by the inspector. Readings will be taken at the time of delivery.
6. Concrete slump will be tested for each continuously poured section of caisson or every fifty (50) cubic yards of concrete on a pad and pier foundation. The slump will be tested in accordance with ASSHTO T119 testing standard. The slump will meet the tower foundation designer's specification. If none are noted, then the Slump will be measured in accordance with SHA Grey Book Specification 902.10.03, Chart A. Results will be recorded and supplied prior to acceptance of the given foundation. Work may be halted if the slump is not deemed acceptable.
7. Concrete temperature will be measured for each continuously poured section of a caisson or every fifty (50) cubic yards of concrete on a pad and pier foundation. Temperatures will be tested in accordance with ASSHTO T309 testing standard. Temperature will be in accordance with the foundation designer's specification. If no specifications are supplied then the temperature will be measured in accordance with SHA Grey Book Specification 902.10.03, Chart A. Results will be recorded and supplied prior to acceptance of the given foundation.
8. Air entrainment will be tested and documented in accordance with ASSHTO T152 or T196. The results will be documented for each continuously poured caisson or 50 cubic yards for a pad and pier foundation. Air content will be within the foundation designer's specification or no more than 5-8%.

9. Compressive strength will be measured at 7 days after pour and 28 days after pour. Compressive strength tests will be tested in accordance with ASSHTO T23 testing standard. A minimum of one (1) set of four (4) cylinders will be taken for each continuously poured section of caisson or every fifty (50) cubic yards of concrete on a pad and pier foundation. Compressive strength will be a minimum of the tower foundation's specification or 4000 psi at 28 days, whichever is greater. At least one cylinder per set will be broken at 7 days and one at 28 days. If all 7 day sets have reached the required compressive strength then back fill operations and/or tower erection can commence. 14 day tests can be conducted if the 7 day tests are not within specification to expedite construction. 28 day tests will be conducted even if 7 day tests are deemed acceptable. Written results must be provided to the state project manager prior to tower erection. Shelter foundations will be at least 3000 psi or the shelter foundation designer's requirements, whichever is greater, at 28 days. Shelter foundations will require one (1) set of four (4) cylinders for both shelter foundations. Test cylinders will be cured on site. As weather conditions dictate, the vendor will provide a cure box to adequately insulate the test cylinders as they cure.

The inspector will provide photographs if necessary. If specifications are not met then the inspector has the authority to stop work until specifications are met.

Tower Loading for 430’ Self Supporting Tower

ITEM	MOUNTING LOCATION **AGL(ft)**	ANT. MODEL	AZIMUTH	FREQ.	LINE SIZE	SUPPLY W/ TOWER
1	430	BMR-12	0°	800 MHZ	1 5/8"	N
2	430	BMR-12	120°	800 MHZ	1 5/8"	N
3	430	BMR-12	240°	800 MHZ	1 5/8"	N
4	400	BMR-12	0°	800 MHZ	1 5/8"	N
5	400	BMR-12	120°	800 MHZ	1 5/8"	N
6	400	BMR-12	240°	800 MHZ	1 5/8"	N
7	380	BMR-12	0°	800 MHZ	1 5/8"	N
8	380	BMR-12	120°	800 MHZ	1 5/8"	N
9	380	BMR-12	240°	800 MHZ	1 5/8"	N
10	360	BMR-12	0°	800 MHZ	1 5/8"	N
11	360	BMR-12	120°	800 MHZ	1 5/8"	N
12	360	BMR-12	240°	800 MHZ	1 5/8"	N
13	340	BMR-12	0°	800 MHZ	1 5/8"	N
14	340	BMR-12	120°	800 MHZ	1 5/8"	N
15	340	BMR-12	240°	800 MHZ	1 5/8"	N
16	320	DB 420-D	0°	450 MHZ Dual fed antenna	2 X 7/8	N
17	320	DB 420-D	120°	450 MHZ Dual fed antenna	2 X 7/8"	N
18	320	DB 420-D	240°	450 MHZ Dual fed	2 X 7/8"	N
19	300	DB 224	0°	138-174 MHZ	7/8"	N
20	300	DB 224	120°	138-174 MHZ	7/8"	N

21	300	DB 224	240°	138-174 MHZ	$^{7}/_{8}$"	N
22	280	(9) DAPA 59210 Panel Antenna Array	360°	1710-1990 MHZ	24 X 1 $^{5}/_{8}$"	N
23	260	(9) DB858HV90E-SX Panel Antenna Array	360°	806-896 MHZ	9 X 1 $^{5}/_{8}$"	N
24	240	8' HP Solid Dish	0°	6.000 GHz	EW63	N
25	240	8' HP Solid Dish	120°	6.000 GHz	EW63	N
26	240	8' HP Solid Dish	240°	6.000 GHz	EW63	N
27	220	(9) DAPA 59210 Panel Antenna Array	360°	1710-1990 MHZ	12 X 1 $^{5}/_{8}$"	N
28	200	(9) DB858HV90E-SX Panel Antenna Array	360°	806-896 MHZ	9 X 1 $^{5}/_{8}$"	N
29	180	8' HP Solid Dish	0°	6.000 GHz	EW63	N
30	180	8' HP Solid Dish	120°	6.000 GHz	EW63	N
31	180	8' HP Solid Dish	240°	6.000 GHz	EW63	N
32	170	(9) DB858HV90E-SX Panel Antenna Array	360°	806-896 MHZ	9 X 1 $^{5}/_{8}$"	N
33	150	(9) DAPA 59210 Panel Antenna Array	360°	1710-1990 MHZ	24 X 1 $^{5}/_{8}$"	N

TITLE

LATEST REVISION | DATE ORIGINAL

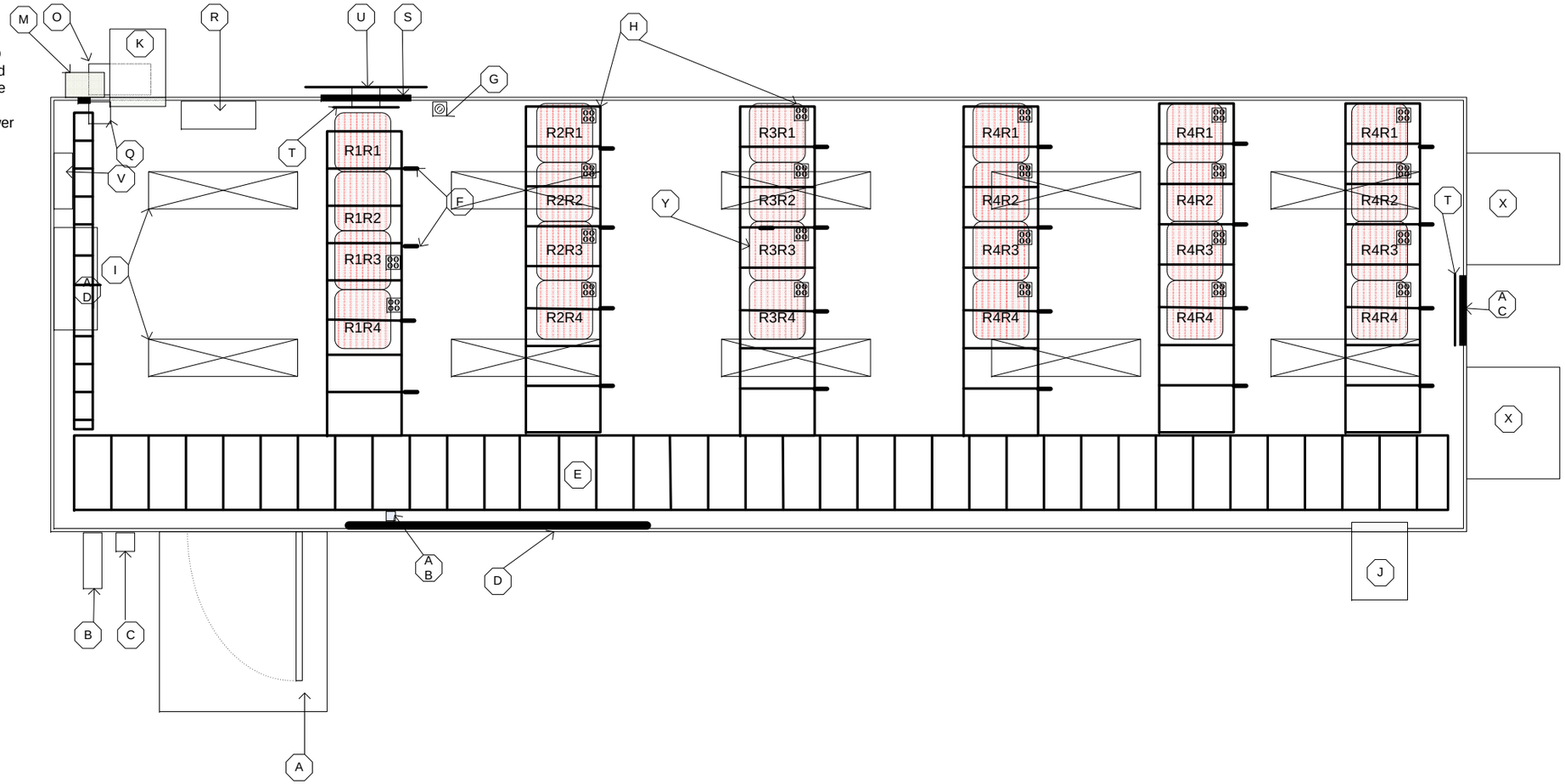
JOB NO. | SCALE

CHECKED | DRAWN

REVISIONS

NO.	DATE	DESCRIPTION

If there are two shelters ordered do not penetrate 12x38 without generator for tower light cables



A	Door
B	Appleton Plug
C	Exterior Light
D	4x8 Telco board
E	24" cable ladders
F	Stand offs for #2 ground lead
G	240v outlets (twist lock type)
H	120V Quad box outlet
I	48IN lights

J	Intake hood
K	Temp activated fans
L	Light controller and penetration for SO cables
M	Pull box and 4IN penetration for telco
N	Auto transfer switch
O	Main service disconnect
P	Building subfeed disconnect
Q	Type2 MOV
R	Integrated load center

S	24 Port cable entry port
T	Internal ground bus bar
U	External ground bus bar
V	Subfeed
W	Teleco cable ladder
X	HVAC
Y	Rack footprint
Z	Generator
AA	Generator exhaust

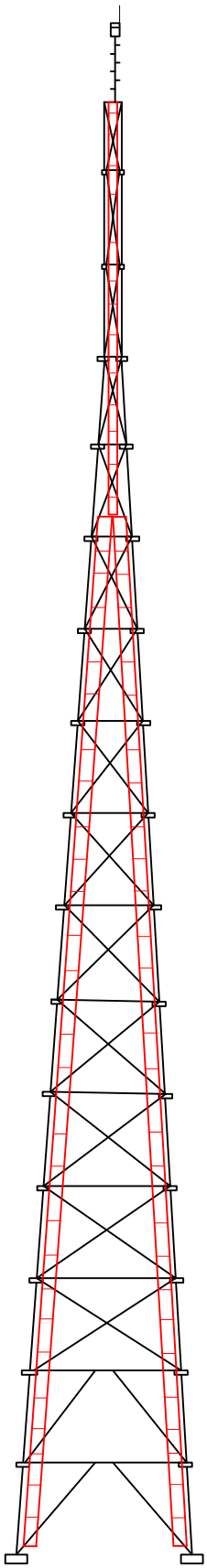
AB	Alarm 66 Block (no enclosure)
AC	16 Port cable entry port
AD	Appleton cable/hose bib
AE	
AF	
AG	
AH	
AI	
AJ	

Typical State tower layout

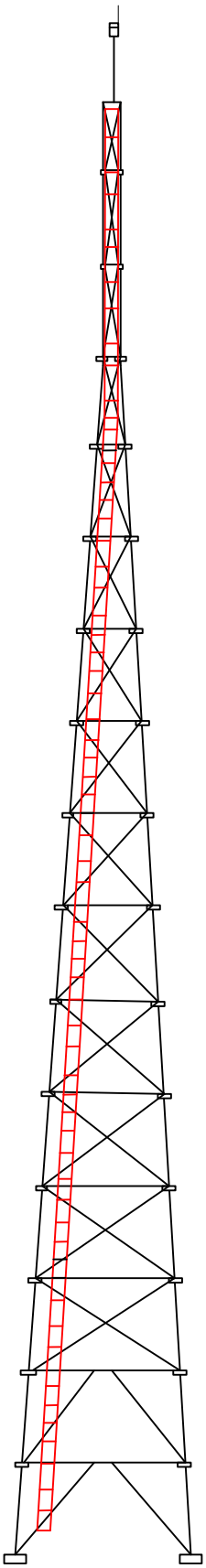
Drawn by: Sean Javins
sean.javins@doit.state.md.us

SIZE	FSCM NO	DWG NO	REV
			A

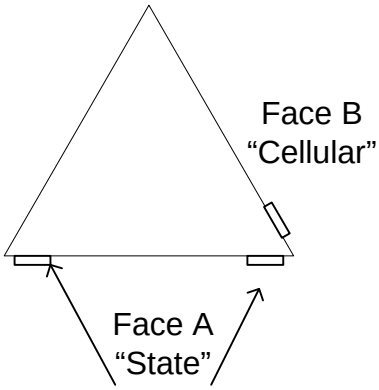
SCALE	SHEET
1in = 40ft. 0in.	1 OF 3



Face A
“State”

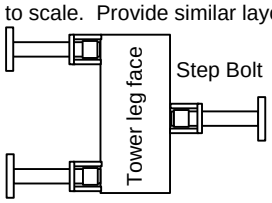


Face B
“Cellular”

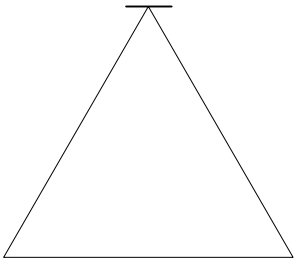


Cable Ladders
at base of tower
(not to scale)

Step Bolt Detail
Not to scale. Provide similar layout.



Tower Leg Face



REPORT OF GEOTECHNICAL EXPLORATION

TABLE ROCK TOWER SITE
GARRETT COUNTY, MARYLAND

TRIAD PROJECT NO. 01-18-0205

PREPARED FOR:

SABRE INDUSTRIES
761 W. HIGH STREET
HICKSVILLE, OH 43526

PREPARED BY:

TRIAD ENGINEERING, INC.

1097 CHAPLIN ROAD
MORGANTOWN, WV 26501
WWW.TRIADENG.COM

OCTOBER 31, 2018

October 31, 2018

Mr. Joseph Dunbar, Senior Project Manager
Sabre Industries
761 W. High Street
Hicksville, OH 43526

RE: Report of Geotechnical Exploration
Table Rock Tower Site
Garrett County, Maryland
Triad Project No. 01-18-0205

Dear Mr. Dunbar:

In accordance with your request, we have completed a geotechnical exploration for the proposed Table Rock Tower Site in Garrett County, Maryland. Authorization to proceed with this project was provided by receipt of Professional Services Agreement dated August 28, 2018. The subsurface exploration was performed to evaluate the subsurface conditions encountered at the proposed Table Rock Tower Site for the limited purposes of preparing design and construction recommendations for geotechnical aspects of the project. It is emphasized that subsurface conditions may vary dramatically between borings, and Triad makes no representations as to subsurface conditions other than those encountered at the specific boring locations.

This report has been prepared for the exclusive use of Sabre Industries for specific application to the design of the proposed Table Rock Tower Site in Garrett County, Maryland. Triad's responsibilities and liabilities are limited to our Client and apply only to their use of our report for the purposes described above. To observe compliance with design concepts and specifications, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction, it is recommended that Triad be retained to provide continuous engineering and testing services during the earthwork and foundation construction phases of the work.

We appreciate the opportunity to assist you on this project and trust this report satisfies your needs at this time. Please feel free to contact us if you have questions concerning this report, or if we can provide further assistance.

Sincerely,

TRIAD ENGINEERING, INC.

Benjamin G. Campbell, P.E.
Senior Engineer

Timothy M. Gary, P.E.
Regional Manager

"Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 22106, Expiration Date: 09/18/2020."

Report of Geotechnical Exploration
Table Rock Tower Site
Garrett County, Maryland

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APPENDICES

Report of Geotechnical Exploration
Table Rock Tower Site
Garrett County, Maryland
Triad Project No. 01-18-0205

FOREWORD

This report has been prepared for the exclusive use of Sabre Industries for specific application to the design of the proposed Table Rock Tower Site in Garrett County, Maryland. The work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

This report should not be used for estimation of construction quantities and/or costs, and contractors should conduct their own investigation of site conditions for these purposes. Please note that Triad is not responsible for any claims, damages or liability associated with any other party's interpretation of the data or reuse of these data or engineering analyses without the express written authorization of Triad. Additionally, this report must be read in its entirety. Individual sections of this report may cause the reader to draw incorrect conclusions if considered in isolation from each other.

The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the borings at the site. The nature and extent of variations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations presented herein. Similarly, in the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions are modified or verified in writing by Triad.

It is recommended that we be provided the opportunity to review the final grading plan, overall foundation design, and specifications so that earthwork and foundation recommendations may be properly interpreted and implemented. If we are not accorded the privilege of making this review, we will not assume responsibility for misinterpretation of our recommendations, as our recommendations are strictly limited to conditions represented to Triad at the time this report was issued.

SITE AND PROJECT DESCRIPTION

The subject site is located just over one-tenth of a mile northeast of the intersection of George Washington Highway and Table Rock Road south of Oakland in Garrett County, Maryland. It is our understanding that the planned project involves construction of a 430-foot tall, self–supported tower with three legs and a revised base spread of 39 feet. The structure has been described to us as a heavy tower with significant wind and overturning loads; however, loads for compression and uplift have not been provided. A small maintenance building is planned for the western portion of the site. No additional

information has been provided associated with the building.

It is our understanding that due to the difficult terrain, the contractor made initial preparations at the site to create access and a pad area for the proposed tower. The site preparation included placement of uncontrolled fill materials prior to commencement of exploration activities. Site development plans were not provided; however, we anticipate that minimal additional excavations and fills will be required to establish final site grades.

GEOLOGIC SETTING AND MINING

Based upon our review of the Geologic Map of the Maryland Portions of the Table Rock and Davis Quadrangles, Garrett County, Maryland, published by the Maryland Geological Survey in 2003, the project site is underlain by the Pottsville Group of the Lower Pennsylvanian geologic series and the Mauch Chunk Formation of the Upper Mississippian geologic series. The Pottsville Group is described as interbedded sandstone, siltstone, claystone, shale, and coal beds. The top is predominantly light gray sandstone, while the base consists of conglomeratic orthoquartzite and protoquartzite known as the Sharon Sandstone. The Sharon Sandstone unconformly overlies red shale and claystone and green-gray sandstones of the Mauch Chunk Formation. The Mauch Chunk Formation is predominantly red shale and siltstone with interbedded flaggy micaceous sandstone. The thickness of the Pottsville Group is 180 to 200 feet in the area surrounding the project site, while the thickness of the Mauch Chunk Formation is approximately 500 feet. The bedrock at the project site lies within the southeastern limb of the Deer Park Anticline and is dipping approximately 23 degrees in a southeast direction.

According to coal mine mapping provided by the Maryland Department of the Environment, no mining has been mapped at the project site.

SUBSURFACE EXPLORATION

As directed, three (3) test borings were drilled within the tower footprint. Also, as directed while on-site, one (1) additional boring was drilled within a proposed building footprint. The borings were drilled October 4 and 5, 2018. The boring locations were determined in the field by Triad by taping distances from existing site features. Surface elevations of the borings were not provided. Elevations were approximated using the Geologic Map of the Maryland Portions of the Table Rock and Davis Quadrangles, Garrett County, Maryland, published by the Maryland Geological Survey in 2003. Figure A-2 in Appendix A depicts the approximate locations of the test borings drilled for the project.

A representative of Triad was present full time during the drilling to direct the drilling crew, log all recovered soil samples, and observe groundwater and rock conditions. The recovered soil samples were transported to our laboratory for further testing. Detailed descriptions of materials encountered in the test borings are contained on the boring logs in Appendix B. Figure Nos. 1 and 2 in Appendix B contain a description of

the classification system and terminology utilized.

SUBSURFACE CONDITIONS

The materials encountered in the borings are generally described below. Stratification lines indicated on the logs represent the approximate boundaries between material types, and the actual transitions between boring locations may be gradual.

Fill - Fill was encountered in each boring to depths ranging from 4.5 to 9.8 feet below existing grades. The fill consisted of a heterogeneous mixture of sandy clay and silty gravel with variable amounts of sand and gravel. Standard Penetration Test (SPT) N-values obtained within the fill ranged from 6 to 54 blows per foot (bpf), which indicates a medium stiff to very stiff consistency or loose to very dense relative density. Sampler refusal was encountered below the fill in each boring at depths ranging from 4.5 to 9.8 feet below existing grades.

Colluvium – Borings B-2 and B-3 encountered colluvium below the fill. The colluvium consisted of coarse and fine materials including clay, gravel, and sandstone boulders that extended to depths of approximately 14.3 to 14.8 feet below the ground surface, at which point bedrock was encountered.

Bedrock - Borings B-1, B-2, and B-3 were advanced beyond sampler refusal to termination depths ranging from 16.3 to 24.5 feet below existing grades utilizing rock coring techniques. Bedrock cored in Boring B-1 primarily consisted of light gray sandstone that was medium to coarse-grained and hard. A thin, intensely fractured coal seam was encountered at a depth of 12.5 to 13.5 feet. An average rock core recovery of 76 percent and an averaged Rock Quality Designation (RQD) per strata of 31 percent was obtained for the combined core run. Bedrock cored below the colluvium in Borings B-2 and B-3 consisted of dark gray siltstone that was medium hard to hard. In Boring B-2, an average rock core recovery of 92 percent and an averaged Rock Quality Designation (RQD) per strata of 4 percent was obtained for the combined core run. In Boing B-3, an average rock core recovery of 92 percent and an averaged Rock Quality Designation (RQD) per strata of 12 percent was obtained for the combined core run. The strata based RQD values for the sandstone and siltstone ranging between 4 and 31 percent are described as very poor to poor. Unconfined compressive strength tests were performed on one sample of rock core recovered from each of these three borings.

Groundwater - Groundwater levels were checked both during and after drilling operations. Groundwater levels are indicated on the boring logs in Appendix B. Water was encountered at the surface after drilling in Boring B-1 that may have been influenced by the use of water for rock coring, while Boring B-4 was dry upon completion. The water levels in Borings B-2 and B-3 were not able to be measured due to hole collapse. It is emphasized that fluctuations in true groundwater levels can occur due to variations in seasonal, climatic and environmental conditions which may not have been evident at the time of the field exploration. Consequently, groundwater levels can vary significantly from those recorded at the time measurements were taken.

LABORATORY TESTING

Laboratory tests were performed on selected soil and rock samples to aid in classification and provide a basis for estimating their engineering properties. The laboratory tests were performed in accordance with ASTM standard test methods. Detailed results are contained in Appendix C, and the results are summarized in the following table:

TEST TYPE	TEST RESULTS
Moisture Content	7 to 18%
Atterberg Limits	Liquid Limit: 17 Plasticity Index: 1
Percent Passing No. 200 Sieve	22%
Unconfined Compressive Strength of Rock	2,770 to 23,040 psi
USCS Classification	GM

DISCUSSION

Based on the results of the field exploration, less than 5 feet to almost 10 feet of fill was encountered in the borings. We understand fill was recently placed at the site to initially prepare the pad and enable access for exploration activities. We understand that no compaction testing was performed during the fill placement.

In Borings B-2 and B-3, beneath the fill, a combination of coarse- and fine-grained colluvial materials were encountered that included boulders. Boulders were also noted around the surrounding property at the site. Boring B-4 also encountered sandstone cobbles.

Considering that the tower is planned to have a height of 430 feet with a revised base spread of 39 feet and the encountered conditions in the tower Borings B-1 to B-3, a deep foundations system should be considered to support the proposed tower. This includes caissons that will transfer tower loads down to the harder bedrock and can be used to resist uplift.

Details of the proposed building were not provided. Also, based on the results of the building Boring B-4, the anticipated vicinity of the proposed building is underlain by approximately 9.8 feet of fill. Foundation bearing conditions and settlement in uncontrolled fill can be inconsistent and difficult to reliably predict. Furthermore, although SPT blow counts in this boring are relatively high, both at the anticipated shallow foundation bearing elevation and below, the presence of sandstone cobble also

was noted. The associated blow counts, when sampling through these zones of material, can be artificially inflated as a result of the split spoon sampler being a smaller diameter than the in-place cobble. As such, the N-values obtained in the cobble materials may not be indicative of actual conditions and analysis of potential fill settlement likely will not be accurate.

Conservatively, uncontrolled fill deposits are not suitable for structural support and should be removed from the building footprint. At a minimum, foundations should extend through the uncontrolled fill deposits to bear on stable natural ground. Foundations can be constructed at this deeper elevation or the excavations can be backfilled to the initially planned bearing elevation with lean mix concrete or flowable fill. Foundations can then be constructed directly on the lean concrete or flowable fill at the specified bearing elevation.

Deep foundations, such as drilled piles, caissons, or micropiles also may be used to extend the foundation through the fill deposits and into the natural ground. Soil and rock values, as well as design and construction recommended, presented for the tower caissons also may be used for deep foundations to support the building.

We understand initial site preparation was performed prior to the field exploration activities. However, if any additional grading is necessary at the site to finalize preparations, be aware that clayey soils encountered on the site are expected to be sensitive to moisture fluctuations. These materials can become unstable under construction traffic traversing the site, especially by rubber-tired equipment. Therefore, site grading should be performed during drier months, if possible.

The following sections of this report include recommendations for design and construction of the geotechnical elements of the project. Provided that these recommendations are followed, it is our opinion that the site is generally suitable for the proposed construction.

DESIGN RECOMMENDATIONS

Foundations

Building Spread Foundations

Based on the results of test Boring B-4, the bedrock should be suitable for support of the proposed building on a shallow spread foundation system. We recommend that conventional spread foundations bearing on rock (below the existing fill) be designed using a maximum allowable bearing pressure of 4,000 pounds per square foot (psf).

The bearing capacity should be verified at the time of construction by our geotechnical engineer. If zones within the foundation subgrade cannot provide an allowable bearing pressure of 4,000 psf, overexcavation may be necessary to achieve the desired bearing capacity.

Foundations should be constructed to bear at a minimum depth of 36 inches below the final exterior grade in order to achieve the recommended allowable bearing pressure and provide adequate frost protection; however, the noted deeper excavations are anticipated to penetrate through the existing fill deposits. Foundations should be designed for minimum widths of 24 and 36 inches for continuous wall and individual column footings, respectively. Although these dimensions may not fully utilize the recommended bearing pressure, they should be maintained to reduce the potential for a local shear or "punching" type bearing failure.

Site soils are susceptible to softening if left exposed to air and/or standing water for an extended period of time. Therefore, footing concrete should be placed as soon as possible after the excavations are completed. We recommend that all foundation excavations be observed by our geotechnical engineer prior to placing footing concrete to verify that the bearing materials are suitable for the design bearing pressure. Testing should be accomplished using a dynamic cone penetrometer (DCP), proving ring cone penetrometer or similar equipment.

The uncontrolled fill deposits extend nearly 10-ft below the ground surface near the anticipated building area. As such, consideration also may be given to supporting the building on deep foundations and grade beams. Soil and rock values, as well as design and construction recommended, presented for the tower caissons also may be used for deep foundations to support the building.

Tower Caisson Foundations

Drilled piers (caissons) constructed to bear in appropriate bedrock will provide adequate foundation bearing support for the tower. The caissons should be drilled through the soil and boulder overburden and should be socketed a minimum of two feet for bearing into acceptable siltstone or sandstone bedrock. However, the structural design of the tower caissons to resist overturning or wind loads likely will require deeper rock embedment. Positive skin friction should be considered only for the bedrock embedment length in excess of one caisson diameter. We recommend using negative skin friction (down drag) in the soils and colluvium for design of deep foundations for this project. The magnitude of negative skin friction load should be calculated by multiplying the surface area of the below-grade components within the fill by a factored skin friction value of 0.5 ksf. In areas where ground storage stockpiles are proposed if any, the factored skin friction value should be increased to 0.75 ksf and should be applied to ⅔ of the caisson length.

Based on the borings we anticipate bearing in the harder bedrock will be encountered at minimum depths ranging from 7.3 to 16.8 feet as indicated in the following table relative to each location. For caissons bearing in sandstone (Boring B-1), we recommend that a

maximum factored end bearing capacity of 25 ksf be utilized for design. Additionally, we recommend using a factored side resistance value of 8 ksf for the sandstone bedrock. For caissons bearing in siltstone (Borings B-2 and B-3), we recommend that a maximum factored end bearing capacity of 5 ksf and side resistance of 2 ksf be utilized for design. A minimum caisson diameter of 30 inches is recommended for clean-out and inspection purposes.

BORING No.	BEARING MATERIAL	Minimum TIP DEPTH (ft.)
B-1	Sandstone	7.3
B-2	Siltstone	16.3
B-3	Siltstone	16.8

It is emphasized that conditions can vary from those depicted by the borings. Consequently, caisson bearing depths may require adjustment during construction. As such, we recommend that a representative from our office be present during caisson construction to verify that appropriate bearing conditions are present.

Lateral Analysis of Deep Foundations

The ultimate lateral load capacity was not evaluated for the anticipated caissons. A full analysis of the lateral capacity should be evaluated by the structural engineer during the design phase of the tower foundations. In order to aid in this evaluation, the following parameters are provided. The given parameters are from the LPILE Reference Manual (unless otherwise noted), and may be used for lateral analysis and design of the proposed foundations:

Material Type	Material Modeled As	Unit Weight ɣ (pcf)	Friction Angle ϕ (degrees)	k (pci)	Cohesion (c) (psf)	E_{50}	Unconfined Compressive Strength (psi)	RQD (%)	End Bearing (ksf)	Skin Friction (ksf)
Fill Soil	Stiff Clay w/o Water (Reese)	120	28	90	100	0.01	N/A	N/A	N/A	N/A
Colluvial Soil and Boulders	Sand (Reese)	125	30	110	150	0.005	N/A	N/A	N/A	N/A
Siltstone	Weak Rock (Reese)	140	32	1,500	1,000	0.0001	2,000	8	5	2
Sandstone	Strong Rock	145	35	N/A	5,000	0.000005	10,000	31	25	8

Caisson spacing should not be less than 30 inches or 2.5 times the caisson diameter, whichever is greater. Settlement of the proposed caissons should be analyzed after selection of the final caisson size, design capacity and spacing. Individual or group caisson settlement should be insignificant since the deep foundations will bear in bedrock. Since deep foundations will be constructed to bear in bedrock, a reduction in capacity for group action is unnecessary.

Settlement Considerations

No building or tower structural loading information was provided. In general, we anticipate that settlement of foundations supported upon intact bedrock will be negligible. If requested, we can perform additional settlement analyses after structure and loading information becomes available.

Floor Slab Recommendations

Based on current information nearly 10-ft of uncontrolled fill is present near the proposed building. Uncontrolled fill generally is not suitable for structural support. As such, we recommend that floor slabs be designed as structural slabs capable of spanning between footings and grade beams as needed.

Alternatively, conventional slab-on-grade construction may be utilized if the uncontrolled fill materials are overexcavated to approved natural ground and the slab subgrade is reestablished with controlled, compacted structural fill placed in accordance with the "Construction Recommendations" presented later in this report. These materials should provide adequate support for slab-on-grade construction using a modulus of subgrade reaction of 90 pounds per cubic inch. A minimum four-inch layer of crushed stone such as ASTM No. 57 coarse aggregate should be placed under the slab-on-grade to serve as a capillary water barrier and a leveling surface. A six-mil thick polyethylene vapor barrier should be placed between the aggregate and concrete slab.

Seismic

The site soils were evaluated and classified according to the 2012/2015 International Building Code Section 1613 - Earthquake Loads - Site Ground Motion. This building code establishes the criteria for project site evaluation. Section 1613.3.2 and 2010 ASCE-7 Standard-Table 20.3-1 defines the parameters for determining the seismic site class based on N-values. The seismic site class may be determined by calculating an $\overline{N}$ value of subsurface materials to a depth of 100 feet. For the determination, the N values recorded in test borings are used for overburden soil, and then, typically, materials below the depth that auger refusal or hard rock is encountered (to a depth of 100 feet) are assigned an N-value of 100. Based on the results of the test borings, the site has an $\overline{N}$ value of 80. Using the calculated $\overline{N}$ value along with knowledge of the site geologic setting, the seismic site class and additional seismic information is as follows:

Seismic Site Class	**C**
Soil Profile Name	**Very Dense Soil and Soft Rock**
Mapped Spectral Acceleration for Short Periods S_s	**0.113 g**
Mapped Spectral Acceleration for Short Periods S_1	**0.056 g**

Based on results from the test borings, published regional geologic information, and the probable maximum strength of earthquake, it is our opinion that liquefaction potential for the on-site soils during seismic activity is low.

CONSTRUCTION RECOMMENDATIONS

Site Preparation

Initial preparation of the site for construction should include installation of sediment and erosion control measures and any upslope diversion ditching or berms that are required. Existing utilities that are in conflict with proposed foundations and/or new utility alignments should be relocated as necessary.

Site Excavations

It is anticipated that the majority of the on-site soils and surficial weathered bedrock can be effectively removed with conventional earth-moving equipment such as backhoes and dozers. However, harder bedrock that is encountered may require rock removal techniques such as hoe-ram chipping or hydraulic splitting for effective removal. Blasting should be prohibited for this project.

The means necessary to excavate rock are a function of the consistency/hardness of the material, the type/size of excavation equipment utilized and the effort the contractor is willing to apply. If the plans call for excavation of rock, for bidding purposes, potential contractors should be instructed to perform their own investigations as to measures necessary to excavate bedrock encountered.

Excavated materials should not be stockpiled and construction equipment should not be positioned beside open excavations, since the added load may cause a sudden collapse of the excavation side walls. The design and construction of all excavations should comply with applicable local, state, and federal safety regulations, including the current requirements of the Occupational Safety and Health Administration (OSHA). In no case should slope height, slope inclination, or excavation depth exceed those specified by OSHA or any other regulatory agencies or local authorities having jurisdiction at the construction site.

Structural Fill Material

Fill required to attain design grades should be placed as controlled, compacted fill. Satisfactory fill includes approved on-site excavated materials, off-site borrow material such as residual soils, soil/rock mixtures, and soft weathered rock, or a well-graded commercial stone such as crusher run aggregate. The fill should be free of trash, wood, coal, topsoil, organics, pyritic material with greater than 0.5 percent by weight of pyritic sulfur, frozen material, pieces of rock greater than 4 inches in any dimension for fill placed in 9-inch lifts, and 1.5 inches in any dimension for fill placed in 4-inch lifts. Materials classified as MH, CH, OH, OL and Pt based on the Unified Soil Classification System (USCS) are not considered suitable for use as new fill. All fill should be tested and approved prior to placement and compaction.

Fill Placement and Compaction

Before initiating fill placement, surficial material should be removed. The subgrade surface should be proof-rolled with appropriate rubber-tired construction equipment and/or visually evaluated to locate any soft spots or areas of excessive "pumping." Any such areas should be over-excavated to a firm subgrade and replaced with new, controlled fill material. The engineer should be contacted if excessive over-excavation is required.

During placement, moisten or aerate each layer of fill, as necessary, to obtain the required compaction. Fill should not be placed on surfaces that are muddy, frozen, or have not been approved by prior testing and/or proof-rolling. Free water should be prevented from appearing on the surface during or subsequent to compaction operations. Fill placed on sloping areas should be properly benched or “notched” into the slope face such that a smooth transition between the new fill and existing slope face is not present.

Soil material which is removed because it is too wet to permit proper compaction may be spread and allowed to dry. Drying can be facilitated by discing, harrowing, or by pulverizing until the moisture content is reduced to an acceptable level. When the soil is too dry, water may be uniformly applied to the subgrade surface or to the layer to be compacted.

Fill material compacted by heavy compaction equipment should be placed in loose layers having a 9-inch maximum thickness. Fill compacted with lightweight equipment, such as hand-operated tampers or walk-behind rollers, should be placed in loose layers not exceeding 4 inches in thickness. The compaction equipment utilized should be suitable for the type of material being compacted. Vibratory rollers are best suited to coarse-grained soils, while pad (often called sheepsfoot) rollers are appropriate for fine-grained materials.

New fill placed within the structure footprint and extending at least five (5) feet beyond its perimeter, or to that extent possible, should be compacted to at least 98 percent of the laboratory maximum dry density as determined by the Standard Proctor method (ASTM D 698). Fill placed outside of these areas should be compacted to at least 95 percent of the maximum dry density as determined by the same standard. The placement moisture content of all fill should be within ±2 percentage points of the optimum moisture content as determined by ASTM D 698. Granular materials, such as clean sand or aggregate, should be compacted to 85% of its relative density, as determined by ASTM D 4253 and D 4254 test methods.

Spread Foundations

Foundation excavations should be cleaned of all loose or otherwise disturbed materials present in the base of the excavations. The excavations should be observed and tested by a qualified geotechnical engineer, or his/her representative, prior to concrete placement to verify that materials capable of providing the recommended bearing capacity are present. Materials exposed in the foundation excavations will be susceptible to softening and/or degradation if exposed to precipitation or surface water runoff. In addition, some foundation excavations could be relatively deep. Consequently, foundation concrete should be placed in the excavations as soon as possible once the excavations have been observed and approved, and only that amount of foundation excavation which can be backfilled with concrete should be opened up on any given day. Once foundation walls have been constructed up to final exterior grades, we recommend that the foundation excavations be backfilled with compacted soil fill to prevent ponding of water adjacent to foundations.

Caissons

Caissons should be constructed as straight shafts, plumb to within one (1) percent of their drilled lengths. Caissons should penetrate through the soils and very weathered underlying bedrock materials encountered in each test boring, in order that they will attain a suitable bearing material capable of supporting the recommended maximum allowable bearing pressure as previously identified. The caisson contractor should be capable of drilling through some cobbles/boulders and removing groundwater from the shaft. It is likely that rock augers and core barrels will be required to achieve the recommended bearing elevations. Temporary casing may be needed during the drilling operations to support the in-situ soils and to produce a seal along the soil-rock contact to reduce infiltration of groundwater into the excavation.

If caisson spacing is less than 6 times the caisson diameter, it is recommended that each caisson be drilled and backfilled with concrete prior to drilling the next caisson. After the caissons have been drilled, the caisson bottom should be prepared to receive concrete. This will require cleaning the hole with the drilling equipment. In order to facilitate smooth placement of concrete, we recommend that the concrete slump range between 5 and 7 inches for the drilled caissons, provided that a suitable mix design is developed to provide the necessary strength at the appropriate water-to-cement ratio.

The caisson bottom must be clean of debris and have less than 2 inches of standing water prior to placement of concrete. If groundwater in the caisson becomes problematic, the concrete may need to be placed with a tremie tube, placing the concrete near the bottom and forcing the water out of the caisson hole. The caisson bottom should not be left open longer than 24 hours to help prevent deterioration of the bearing conditions. We do not recommend down hole inspections of the bearing material at this site. However, we do recommend that a representative from Triad be on site during the caisson construction to verify the bearing conditions in the bottom of each caisson.

Groundwater and Surface Runoff Control

Groundwater levels were checked both during and after drilling operations. Groundwater levels are indicated on the boring logs in Appendix B. Water was encountered at the surface after drilling in boring B-1, while boring B-4 was dry upon completion. The water levels in B-2 and B-3 were not able to be measured due to hole collapse. The contractor should be prepared to implement temporary and/or permanent dewatering measures since groundwater conditions can change. We anticipate that sources of subsurface water which may develop during construction can probably be managed and removed by a gravity drainage system, sump pits and pumps or other minor dewatering procedures.

Surface water runoff should be prevented from flowing through the construction area. If necessary, diversion ditches or berms should be installed upslope of the construction area. Ditches should be protected from excessive erosion through the use of rip-rap, erosion control matting, or vegetation.

Quality Assurance and Control

We recommend that the geotechnical engineer-of-record, Triad, be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our exploration. If significant variations are encountered, or if the design is altered, we should be notified. Additionally, the geotechnical engineer should provide personnel full-time and/or intermittently to:

- Observe and document installation of the drainage features and verify initial subgrade conditions prior to fill placement.
- Observe and test material compaction during fill construction. Field density tests should be performed in accordance with ASTM D 6938 (nuclear method). At least three (3) field density tests should be performed for each lift or at a frequency determined by the geotechnical engineer to be sufficient for the size of the fill area to verify the required soil compaction.
- Observe drilling and placement of concrete for caissons to confirm compliance with our recommendations.
- Examine all subgrade bearing levels to confirm compliance with our recommendations and verify that adequate support is available.
- Test fresh structural concrete placed for the project.

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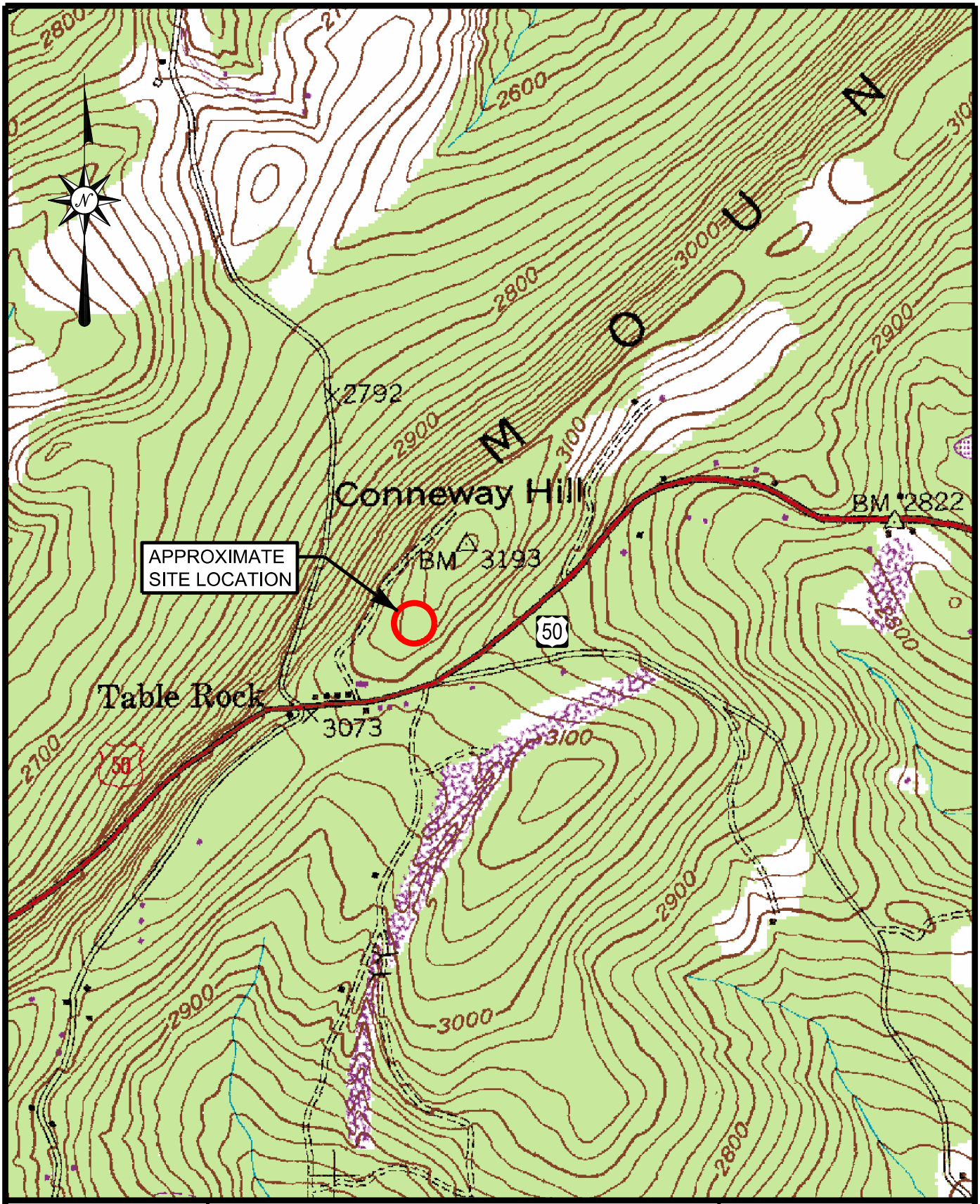
APPENDIX A

Illustrations



CADD FILE: Figure A-1.dgn		TABLE ROCK TOWER US ROUTE 50, GARRETT COUNTY, MD Table Rock, MD USGS Quadrangle (1948 - Photorevised 1981) SITE VICINITY PLAN
DRAWN BY: MAD	CHECKED BY: BGC	
DATE: 10-09-2018	SCALE: 1"= 1000'	PROJECT NO: 01-18-0205 FIGURE A-1

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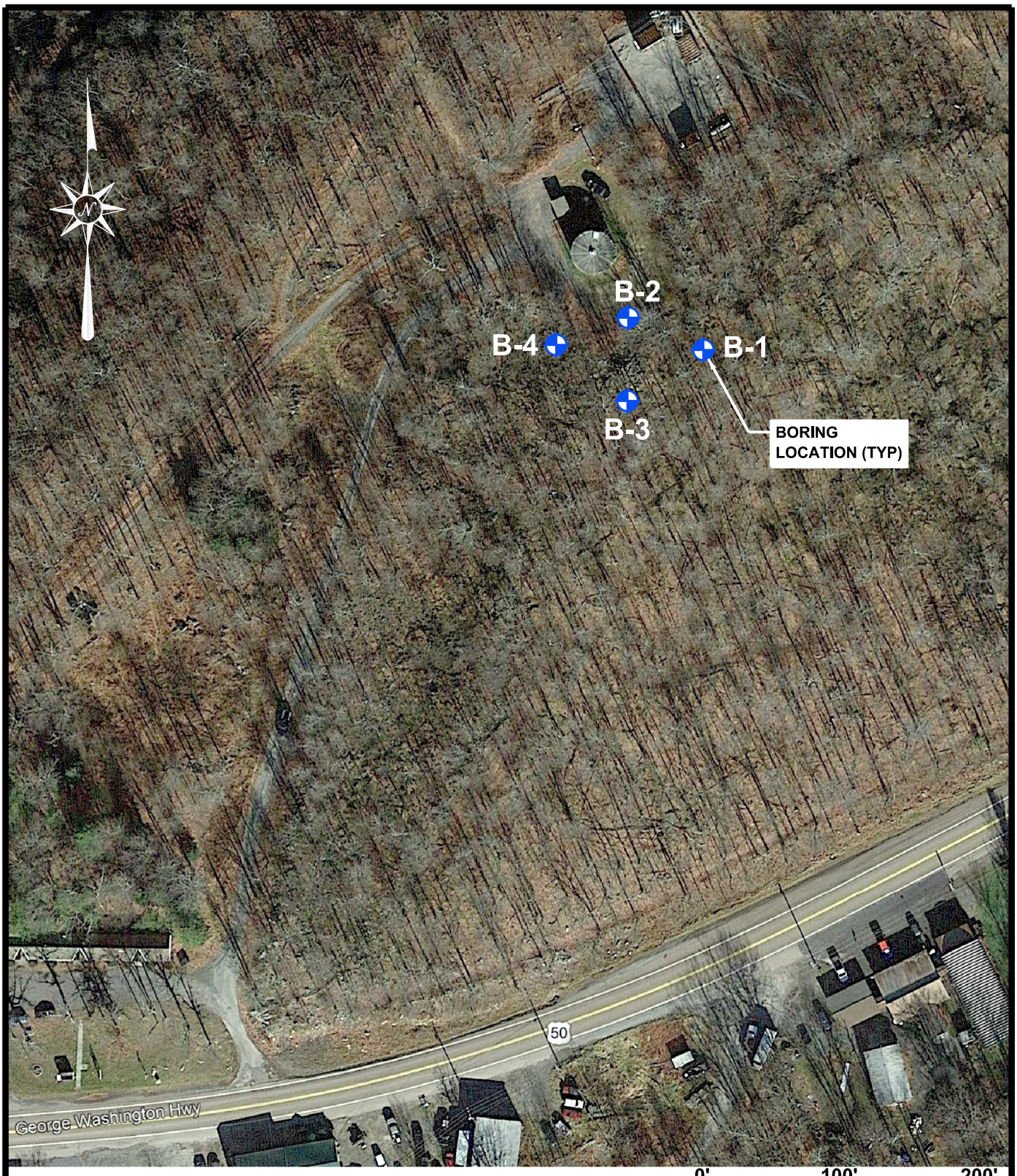

NOTE:
BORING LOCATIONS ARE APPROXIMATE

CADD FILE: Figure A-2.dgn		TABLE ROCK TOWER US ROUTE 50, GARRETT COUNTY, MD Table Rock, MD USGS Quadrangle (1948 - Photorevised 1981) SITE VICINITY PLAN
DRAWN BY: MAD	CHECKED BY: BGC	
DATE: 10-09-2018	SCALE: 1"= 1000'	PROJECT NO: 01-18-0205 FIGURE A-2

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APPENDIX B

Field Exploration

Triad Engineering, Inc.

Field Exploration

A representative from Triad was present to direct the drill crew, log recovered samples and observe groundwater conditions. The borings were drilled utilizing a CME-55 rotary auger drill rig. Samples of in-situ soil and weathered bedrock were obtained using a split-barrel sampler while performing Standard Penetration Tests (ASTM D 1586). The results of these tests (N-values) are commonly interpreted to provide an index to strength, consistency or relative density of the sampled materials and their ability to support foundations.

Once auger or sampler refusal on harder rock was encountered, borings B-1, B-2, and B-3 were further advanced using rock coring techniques. Continuous rock core samples were obtained from auger/sampler refusal depth to the boring termination depth. The harder rock materials were penetrated and sampled using a conventional, double-tubed core barrel and diamond coring bit, producing a rock core sample a nominal two (2) inches in diameter. The rock coring was performed to assess the type, quality and continuity of the bedrock at the drilled locations. The Rock Quality Designation (RQD) noted on the logs provides an indication of the relative quality and soundness of a specific bedrock stratum by measuring the lengths of intact rock core (unbroken core samples) that are larger than twice the core sample diameter for a specific rock stratum and/or core run and dividing the sum of the cumulative lengths by the thickness of the stratum and/or core run.

Groundwater levels were checked both during and after drilling operations. Groundwater levels encountered during the auger drilling are recorded on the individual logs. Groundwater levels indicated after rock coring operations are not considered representative of true groundwater levels, due to the introduction of water into the borehole during rock coring. It is emphasized that groundwater levels typically vary and are dependent upon climatic conditions and other environmental factors.

It is also emphasized that the lines shown on the logs are estimates of the changes in material. Actual changes may be gradual and may vary from those indicated on the logs, and the subsurface conditions between the borings may differ from those depicted on the logs. The boreholes were backfilled upon completion of the drilling with auger cuttings. Samples were transported to our office for temporary storage and additional analysis. The samples will be discarded after a period of 60 days unless other arrangements are made.

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KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the soil and rock recovered from the exploration and are based on the following criteria. Major soil components are designated by capital letters and minor components are described by terms indicating the percentage by weight of each component. Standard Penetration Testing (SPT) and sampling was conducted in accordance with ASTM D1586. N-values in blows per foot are used to describe the *relative density* of coarse-grained soils or the *consistency* of fine-grained soils.

The MAJOR components constitute more than 50% of the sample and have the following size designation.		The MINOR components have the following percentage designation.	
COMPONENT	**PARTICLE SIZE**	**ADJECTIVE**	**PERCENTAGE**
Boulders	12 inches plus		
Cobbles	3 to 12 inches	and	35 - 50
Gravel -coarse	¾ to 3 inches		
-fine	#4 to ¾ inches	some	20 - 35
Sand -coarse	#10 to #4		
-medium	#40 to #10	little	10 - 20
-fine	#200 to #40		
Silt or Clay	Minus #200 (fine-grained soil)	trace	0 - 10

Relative Density – Coarse-grained Soils		**Consistency – Fine-grained Soils**	
Term	***N-Value***	***Term***	***N-Value***
Very Loose	≤4	Very Soft	≤2
Loose	5 to 10	Soft	3 to 4
Medium Dense	11 to 30	Medium Stiff	5 to 8
Dense	31 to 50	Stiff	9 to 16
Very Dense	>50	Very Stiff	>16

Soil Plasticity	**Plasticity Index (PI)**	**Rock Hardness**	
None	Nonplastic	***Term***	***N-Value***
Low	1 to 5	Very Weathered	≤50/.5
Medium	5 to 20	Weathered	50/.4
High	20 to 40	Soft	50/.3
Very High	over 40	Medium hard	50/.2 to 50/.1
		Hard	Auger Refusal

Moisture Description
Dry - Dusty, dry to touch
Slightly Moist - damp
Moist - no visible free water
Wet - visible free water, saturated

Figure No. B-1

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KEY TO IDENTIFICATION OF HARD ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the rock recovered from the NQ/NX coring operations and are based on the following criteria. Core recovery is the ratio of the length of core recovered in each run to the total length of the core run in percent. Rock Quality Designation (RQD) is the ratio of the sum of the lengths of rock core pieces 4 inches or longer divided by the length of the core run or stratum in percent.

Relative Degree of Rock Hardness

Term	*Defining Characteristics*
Very Soft	Can be indented by thumb or crushed under pressure of finger and/or thumb
Soft	Can be scratched by fingernail, peeled by pocket knife or crushed with pressed hammer
Medium Hard	Cannot be scraped or peeled with knife but can be scratched, breaks easily with hammer blow
Hard	Breaks under one or two strong hammer blows or scratched with knife with difficulty
Very Hard	Breaks under several strong hammer blows with very resistant sharp edges

Rock Adjectives

Seam	Thin layer (12 inches or less)
Interbedded	Thin or very thin alternating seams of bedrock occurring in equal amounts
Some	Significant amount of accessory material (15 to 40 percent)
Few	Insignificant amount of accessory material (0 to 15 percent)

Rock Quality Designation (RQD)

Term	*Percent*
Very Poor	≤25
Poor	26 to 50
Fair	51 to 75
Good	76 to 90
Excellent	>90

Recovery

Term	*Percent*
Poor	≤25
Low	26 to 50
Moderate	51 to 75
High	76 to 90
Very High	>90

Rock Structure

Degree of Fracturing

Term	*Spacing*
Intensely fractured or very broken	2 in.
Highly fractured or broken	2 in. to 8 in.
Moderately fractured or blocky	8 in. to 2 ft.
Slightly Fractured	2 ft. to 6 ft.

Thickness of Bedding

Term	*Spacing*
Thinly bedded	<4 in.
Medium bedded	4 in. to 1 ft.
Thickly bedded	1 ft. to 3 ft.
Massive	>3 ft.

Dip of Bed or Fracturing

Flat	0º to 20º
Dipping	20º to 45º
Steeply Dipping	45º to 90º

Figure No. B-2

TRIAD ENGINEERING, INC.

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-1**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/4/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 0.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		2-8-7	40%			FILL: Brown sandy CLAY, some gravel, slightly moist to moist, stiff to very stiff				
	S-2		7-11-35	100%			- Some sand, trace gravel at 3.0 feet				
5.0	S-3		50/0.3	100%		5.3	- Some gravel at 5.0 feet Auger Refusal at 5.3 feet				3144.7
	R-1			63%	20%		Gray SANDSTONE, medium to coarse-grained, minor weathering, steeply dipping fracture planes, broken, hard				
10.0	R-2			78%	22%			31%			
15.0	R-3			92%	64%		- Very thin coal seam, intensely fractured from 12.5 to 13.5 feet - Blocky from 14.0 to 16.3 feet				
						16.3	Boring Terminated at 16.3 feet.				3133.7
20.0											
25.0											

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

TRIAD ENGINEERING, INC.

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Fax: 304.296.8739

Remarks: Water level at surface at termination of boring

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-2**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/4/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		2-3-3	33%			FILL: Brown sandy CLAY, some gravel, slightly moist to moist, medium stiff to very stiff				
	S-2		6-9-5	73%			- Little gravel at 3.0 feet				
5.0	S-3		29-50/0.3	100%		5.8	- Some gravel at 5.0 feet				3144.2
							Auger Refusal at 5.8 feet				
	R-1			42%	0%		COLLUVIUM: Brown CLAY, some gravel, trace to some boulders, heavily weathered, very soft to soft				
10.0							- Light gray, hard, medium to coarse-grained sandstone boulder from 5.8 to 6.4 feet				
	R-2			68%	10%						
						14.3					3135.7
15.0	R-3			84%	0%		Dark gray SILTSTONE, micaceous, heavily weathered, dipping to steeply dipping fracture planes, intensely to highly fractured, medium hard to hard	4%			
20.0	R-4			100%	8%						
						24.1					3125.9
25.0							Boring Terminated at 24.1 feet.				

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

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Remarks: Unable to measure water level due to hole collapse

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-3**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/5/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		4-6-7	40%			FILL: Brown sandy CLAY, some gravel, moist, stiff to very stiff				
	S-2		50/0.1	100%		4.5	Auger Refusal at 4.5 feet				3145.5
5.0	R-1			64%	36%		COLLUVIUM: brown CLAY, some gravel, trace to some boulders, very soft to soft - Mostly medium to coarse-grained sandstone boulders from 4.5 to 9.5 feet, moderate weathering, dipping to steeply dipping fracture planes, broken, medium hard to hard				
10.0	R-2			24%	0%		- Mostly clay from 9.5 to 14.8 feet				
15.0	R-3			88%	8%	14.8	Dark gray SILTSTONE, micaceous, heavily weathered, dipping to steeply dipping fracture planes, intensely to highly fractured, medium hard to hard	12%			3135.2
20.0	R-4			96%	16%						
25.0						24.5	Boring Terminated at 24.5 feet.				3125.5

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

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Remarks: Unable to measure water level due to hole collapse

TEST BORING LOG

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-4**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/4/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1	X	2-2-4	20%			FILL: Brown silty GRAVEL and sand, slightly moist, loose to very dense				
	S-2	X	10-34-20	87%			- Sandstone cobble at 3.0 feet				
5.0	S-3	X	17-24-26	80%							
	S-4	X	7-17-27	67%							
10.0	S-5		50/0.0	0%		9.8	Auger Refusal at 9.8 feet Boring Terminated at 9.8 feet.				3140.2
15.0											
20.0											
25.0											

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

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Remarks: Boring dry upon completion

B-1: Box 1 of 1

B-2: Box 1 of 1

Table Rock Tower 01-1-0205 Appendix B Core Box Photos	TRIAD ENGINEERING, INC.


01-18-0205
Table Rock Tower
B-3
10/5/18
Box 1 of 1
RUN | DEPTH | REC | RQD
1 | 4.5 – 9.5 | 3.2/5.0 | 1.8/5.0
2 | 9.5-14.5 | 1.2/5.0 | Ø/5.0
3 | 14.5–19.5 | 4.4/5.0 | 0.4/5.0
4 | 19.5-24.5 | 4.8/5.0 | 0.8/5.0
4.5
9.5
14.5
19.5
24.5

B-3: Box 1 of 1

TRIAD ENGINEERING, INC.

APPENDIX C

Laboratory Testing

Triad Engineering, Inc.

Laboratory Testing

The samples obtained from the test borings were visually classified in the field by geotechnical engineering personnel from Triad. The recovered soils were further evaluated by laboratory testing. Laboratory soils tests were conducted in accordance with applicable ASTM Standards as listed below:

1) Moisture content tests were performed in accordance with ASTM D 2216.

2) Atterberg Limits tests, consisting of the liquid limit, plastic limit, and plasticity index, were performed in accordance with ASTM D 4318.

3) Sieve analyses with washed No. 200 sieve tests were performed in accordance with ASTM D 422.

4) Rock core compression tests were performed in accordance with ASTM D 7012.

A summary and details of the laboratory test results are included on the following pages of this appendix.

TRIAD ENGINEERING, INC.

LABORATORY DATA SUMMARY

SAMPLE ID	SAMPLE DEPTH (ft)	SAMPLE TYPE	NATURAL MOISTURE (%)	ATTERBERG LIMITS			GRADATION			USCS SOIL CLASS.	PROCTOR		UNCONFINED COMPRESSION TEST (psi)
				LL	PL	PI	% GRAVEL	% SAND	% FINES		MAX. DD (pcf)	OPT. M (%)	
B-1 S-2	2.5-4.0	SS	12										
B-1 RC-1	7.9-8.8	RC											23,040
B-2 S-2	2.5-4.0	SS	18										
B-2 RC-4	23.0-23.6	RC											6,740
B-3 S-1	0.0-1.5	SS	15										
B-3 RC-4	23.5-24.0	RC											2,770
B-4 S-2&3	2.5-6.5	SS	7	17	16	1	40	38	22	GM			
B-4 S-4	7.5-9.0	SS	7										

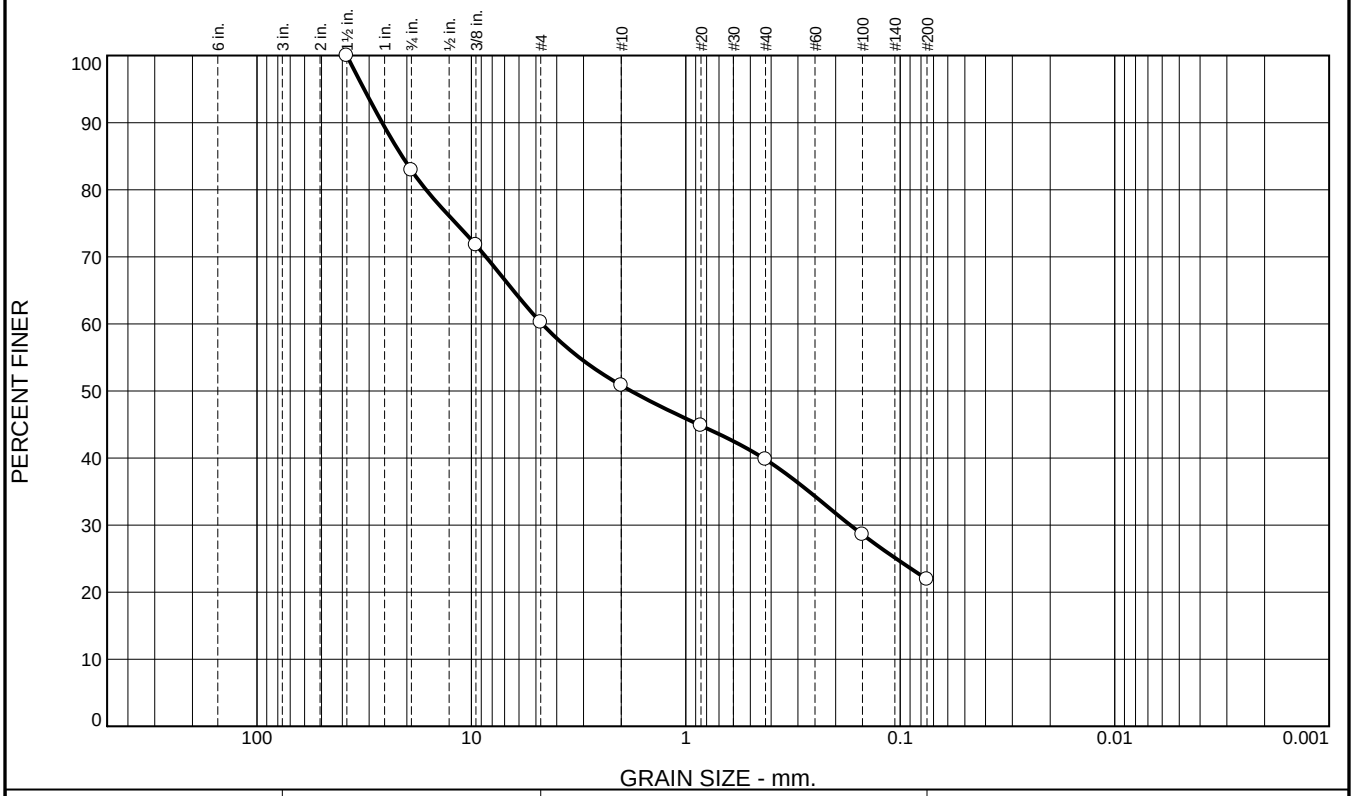
Triad Engineering, Inc.

Notes: 1) Tests performed in accordance with industry-recognized testing standards.
2) SS = Split Spoon; UD = Undisturbed

PROJECT NUMBER: 01-18-0205
PROJECT NAME: Table Rock Tower
Garrett County, MD

PLATE C-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.1	22.7	9.4	11.0	17.9	21.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2	100.0		
.75	82.9		
.375	71.8		
#4	60.2		
#10	50.8		
#20	44.8		
#40	39.8		
#100	28.6		
#200	21.9		

* (no specification provided)

Material Description

medium brown silty gravel with sand

Atterberg Limits

PL= 16 LL= 17 PI= 1

Coefficients

D_{90}= 26.0634 D_{85}= 21.0581 D_{60}= 4.6811
D_{50}= 1.7998 D_{30}= 0.1709 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO= A-1-b

Remarks

Source of Sample: B-4 **Depth:** 2.5'-6.5'
Sample Number: S-2/S-3 **Date:** 10/8/18

Triad Engineering, Inc.

Morgantown, WV

Client: Sabre Industries
Project: Table Rock Tower

Project No: 01-18-0205 **Figure C-2**

Tested By: JKM **Checked By:** DTB

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: Table Rock Tower

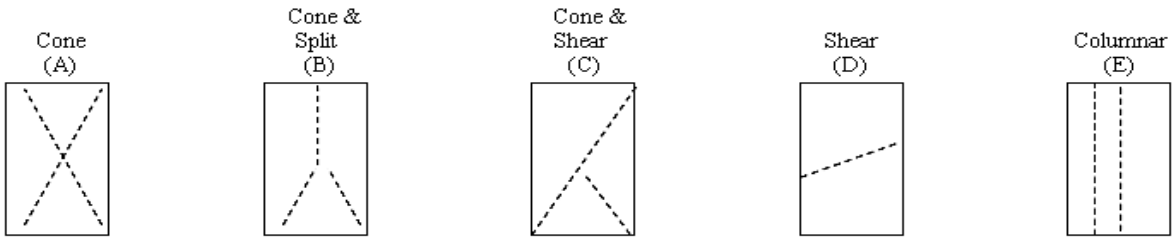
Project # : 01-18-0205 Date : 10/10/2018

Core # : B-1 Depth: 7.9'-8.8'

Sample Description: light tan sandstone

Measurements (inches)		
	Length	Diameter
#1	3.984	1.982
#2	3.980	1.984
#3	3.980	1..985
Avg.	3.981	1.983

Length to Diameter Ratio :	**2.01**		Correction Factor:	**1**
Area:	**3.0884**	in^2	Flatness of Sample:	FLAT
Load:	**71160**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**23041**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**1659**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**23041**	lbs/in^2	Type of Break:	E
Corrected Strength :	**1659**	$tons/ft^2$		



Remarks:

Tested by: JKM Checked by: DTB

Figure C-3

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: Table Rock Tower

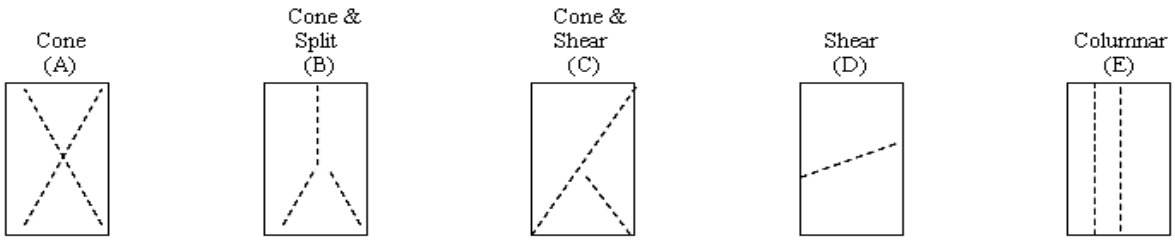
Project # : 01-18-0205 Date : 10/10/2018

Core # : B-2 Depth: 23.0'-23.6'

Sample Description: dark gray siltstone

Measurements (inches)		
	Length	Diameter
#1	2.759	1.981
#2	2.754	1.979
#3	2.755	1.977
Avg.	2.756	1.979

Length to Diameter Ratio :	**1.39**		Correction Factor:	**1**
Area:	**3.0760**	in^2	Flatness of Sample:	FLAT
Load:	**20720**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**6736**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**485**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**6736**	lbs/in^2	Type of Break:	E
Corrected Strength :	**485**	$tons/ft^2$		



Remarks:

Tested by: JKM Checked by: DTB

Figure C-4

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: Table Rock Tower

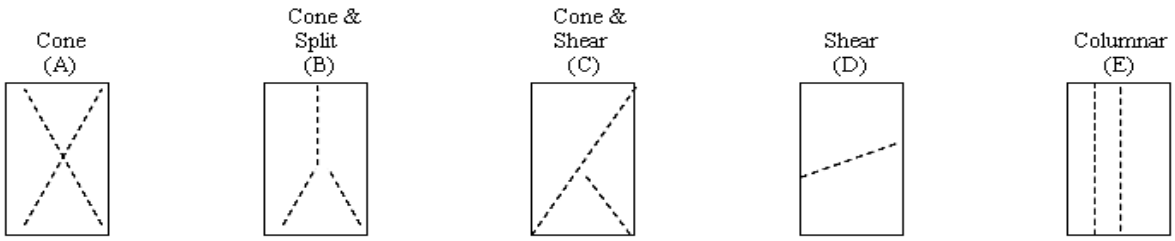
Project # : 01-18-0205 Date : 10/10/2018

Core # : B-3 Depth: 23.5'-24.0'

Sample Description: dark gray siltstone

Measurements (inches)		
	Length	Diameter
#1	3.991	1.977
#2	3.995	1.978
#3	3.993	1.978
Avg.	3.993	1.978

Length to Diameter Ratio :	**2.02**		Correction Factor:	**1**
Area:	**3.0718**	in^2	Flatness of Sample:	FLAT
Load:	**8500**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**2767**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**199**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**2767**	lbs/in^2	Type of Break:	E
Corrected Strength :	**199**	$tons/ft^2$		



Remarks:

Tested by: JKM Checked by: DTB

Figure C-5

TRIAD ENGINEERING, INC.

APPENDIX D

Seismic Information

USGS Design Maps Summary Report

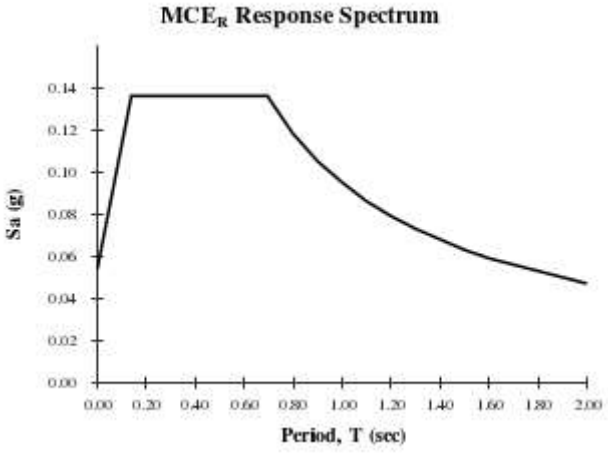
User–Specified Input

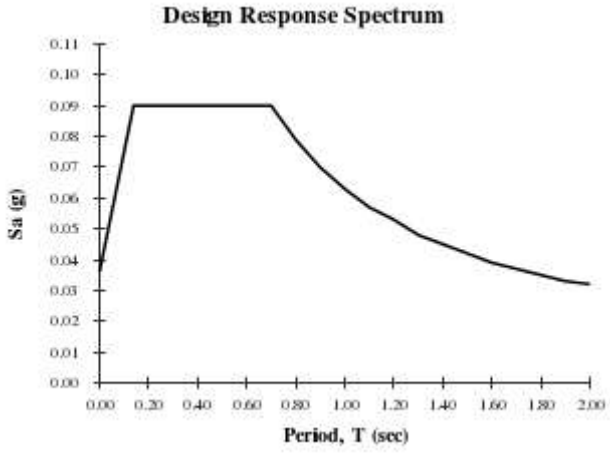
Report Title	01-18-0205 Table Rock Tower Tue October 9, 2018 16:08:07 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	39.303°N, 79.404°W
Site Soil Classification	Site Class C – "Very Dense Soil and Soft Rock"
Risk Category	I/II/III

USGS–Provided Output

S_S =	0.113 g	S_{MS} =	0.136 g	S_{DS} =	0.090 g
S_1 =	0.056 g	S_{M1} =	0.095 g	S_{D1} =	0.063 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

Report of Geotechnical Exploration
Table Rock Tower Site
Garrett County, Maryland

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APPENDICES

Report of Geotechnical Exploration
Table Rock Tower Site
Garrett County, Maryland
Triad Project No. 01-18-0205

FOREWORD

This report has been prepared for the exclusive use of Sabre Industries for specific application to the design of the proposed Table Rock Tower Site in Garrett County, Maryland. The work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

This report should not be used for estimation of construction quantities and/or costs, and contractors should conduct their own investigation of site conditions for these purposes. Please note that Triad is not responsible for any claims, damages or liability associated with any other party's interpretation of the data or reuse of these data or engineering analyses without the express written authorization of Triad. Additionally, this report must be read in its entirety. Individual sections of this report may cause the reader to draw incorrect conclusions if considered in isolation from each other.

The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the borings at the site. The nature and extent of variations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations presented herein. Similarly, in the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions are modified or verified in writing by Triad.

It is recommended that we be provided the opportunity to review the final grading plan, overall foundation design, and specifications so that earthwork and foundation recommendations may be properly interpreted and implemented. If we are not accorded the privilege of making this review, we will not assume responsibility for misinterpretation of our recommendations, as our recommendations are strictly limited to conditions represented to Triad at the time this report was issued.

SITE AND PROJECT DESCRIPTION

The subject site is located just over one-tenth of a mile northeast of the intersection of George Washington Highway and Table Rock Road south of Oakland in Garrett County, Maryland. It is our understanding that the planned project involves construction of a 430-foot tall, self–supported tower with three legs and a revised base spread of 39 feet. The structure has been described to us as a heavy tower with significant wind and overturning loads; however, loads for compression and uplift have not been provided. A small maintenance building is planned for the western portion of the site. No additional

information has been provided associated with the building.

It is our understanding that due to the difficult terrain, the contractor made initial preparations at the site to create access and a pad area for the proposed tower. The site preparation included placement of uncontrolled fill materials prior to commencement of exploration activities. Site development plans were not provided; however, we anticipate that minimal additional excavations and fills will be required to establish final site grades.

GEOLOGIC SETTING AND MINING

Based upon our review of the Geologic Map of the Maryland Portions of the Table Rock and Davis Quadrangles, Garrett County, Maryland, published by the Maryland Geological Survey in 2003, the project site is underlain by the Pottsville Group of the Lower Pennsylvanian geologic series and the Mauch Chunk Formation of the Upper Mississippian geologic series. The Pottsville Group is described as interbedded sandstone, siltstone, claystone, shale, and coal beds. The top is predominantly light gray sandstone, while the base consists of conglomeratic orthoquartzite and protoquartzite known as the Sharon Sandstone. The Sharon Sandstone unconformly overlies red shale and claystone and green-gray sandstones of the Mauch Chunk Formation. The Mauch Chunk Formation is predominantly red shale and siltstone with interbedded flaggy micaceous sandstone. The thickness of the Pottsville Group is 180 to 200 feet in the area surrounding the project site, while the thickness of the Mauch Chunk Formation is approximately 500 feet. The bedrock at the project site lies within the southeastern limb of the Deer Park Anticline and is dipping approximately 23 degrees in a southeast direction.

According to coal mine mapping provided by the Maryland Department of the Environment, no mining has been mapped at the project site.

SUBSURFACE EXPLORATION

As directed, three (3) test borings were drilled within the tower footprint. Also, as directed while on-site, one (1) additional boring was drilled within a proposed building footprint. The borings were drilled October 4 and 5, 2018. The boring locations were determined in the field by Triad by taping distances from existing site features. Surface elevations of the borings were not provided. Elevations were approximated using the Geologic Map of the Maryland Portions of the Table Rock and Davis Quadrangles, Garrett County, Maryland, published by the Maryland Geological Survey in 2003. Figure A-2 in Appendix A depicts the approximate locations of the test borings drilled for the project.

A representative of Triad was present full time during the drilling to direct the drilling crew, log all recovered soil samples, and observe groundwater and rock conditions. The recovered soil samples were transported to our laboratory for further testing. Detailed descriptions of materials encountered in the test borings are contained on the boring logs in Appendix B. Figure Nos. 1 and 2 in Appendix B contain a description of

the classification system and terminology utilized.

SUBSURFACE CONDITIONS

The materials encountered in the borings are generally described below. Stratification lines indicated on the logs represent the approximate boundaries between material types, and the actual transitions between boring locations may be gradual.

Fill - Fill was encountered in each boring to depths ranging from 4.5 to 9.8 feet below existing grades. The fill consisted of a heterogeneous mixture of sandy clay and silty gravel with variable amounts of sand and gravel. Standard Penetration Test (SPT) N-values obtained within the fill ranged from 6 to 54 blows per foot (bpf), which indicates a medium stiff to very stiff consistency or loose to very dense relative density. Sampler refusal was encountered below the fill in each boring at depths ranging from 4.5 to 9.8 feet below existing grades.

Colluvium – Borings B-2 and B-3 encountered colluvium below the fill. The colluvium consisted of coarse and fine materials including clay, gravel, and sandstone boulders that extended to depths of approximately 14.3 to 14.8 feet below the ground surface, at which point bedrock was encountered.

Bedrock - Borings B-1, B-2, and B-3 were advanced beyond sampler refusal to termination depths ranging from 16.3 to 24.5 feet below existing grades utilizing rock coring techniques. Bedrock cored in Boring B-1 primarily consisted of light gray sandstone that was medium to coarse-grained and hard. A thin, intensely fractured coal seam was encountered at a depth of 12.5 to 13.5 feet. An average rock core recovery of 76 percent and an averaged Rock Quality Designation (RQD) per strata of 31 percent was obtained for the combined core run. Bedrock cored below the colluvium in Borings B-2 and B-3 consisted of dark gray siltstone that was medium hard to hard. In Boring B-2, an average rock core recovery of 92 percent and an averaged Rock Quality Designation (RQD) per strata of 4 percent was obtained for the combined core run. In Boing B-3, an average rock core recovery of 92 percent and an averaged Rock Quality Designation (RQD) per strata of 12 percent was obtained for the combined core run. The strata based RQD values for the sandstone and siltstone ranging between 4 and 31 percent are described as very poor to poor. Unconfined compressive strength tests were performed on one sample of rock core recovered from each of these three borings.

Groundwater - Groundwater levels were checked both during and after drilling operations. Groundwater levels are indicated on the boring logs in Appendix B. Water was encountered at the surface after drilling in Boring B-1 that may have been influenced by the use of water for rock coring, while Boring B-4 was dry upon completion. The water levels in Borings B-2 and B-3 were not able to be measured due to hole collapse. It is emphasized that fluctuations in true groundwater levels can occur due to variations in seasonal, climatic and environmental conditions which may not have been evident at the time of the field exploration. Consequently, groundwater levels can vary significantly from those recorded at the time measurements were taken.

LABORATORY TESTING

Laboratory tests were performed on selected soil and rock samples to aid in classification and provide a basis for estimating their engineering properties. The laboratory tests were performed in accordance with ASTM standard test methods. Detailed results are contained in Appendix C, and the results are summarized in the following table:

TEST TYPE	TEST RESULTS
Moisture Content	7 to 18%
Atterberg Limits	Liquid Limit: 17 Plasticity Index: 1
Percent Passing No. 200 Sieve	22%
Unconfined Compressive Strength of Rock	2,770 to 23,040 psi
USCS Classification	GM

DISCUSSION

Based on the results of the field exploration, less than 5 feet to almost 10 feet of fill was encountered in the borings. We understand fill was recently placed at the site to initially prepare the pad and enable access for exploration activities. We understand that no compaction testing was performed during the fill placement.

In Borings B-2 and B-3, beneath the fill, a combination of coarse- and fine-grained colluvial materials were encountered that included boulders. Boulders were also noted around the surrounding property at the site. Boring B-4 also encountered sandstone cobbles.

Considering that the tower is planned to have a height of 430 feet with a revised base spread of 39 feet and the encountered conditions in the tower Borings B-1 to B-3, a deep foundations system should be considered to support the proposed tower. This includes caissons that will transfer tower loads down to the harder bedrock and can be used to resist uplift.

Details of the proposed building were not provided. Also, based on the results of the building Boring B-4, the anticipated vicinity of the proposed building is underlain by approximately 9.8 feet of fill. Foundation bearing conditions and settlement in uncontrolled fill can be inconsistent and difficult to reliably predict. Furthermore, although SPT blow counts in this boring are relatively high, both at the anticipated shallow foundation bearing elevation and below, the presence of sandstone cobble also

was noted. The associated blow counts, when sampling through these zones of material, can be artificially inflated as a result of the split spoon sampler being a smaller diameter than the in-place cobble. As such, the N-values obtained in the cobble materials may not be indicative of actual conditions and analysis of potential fill settlement likely will not be accurate.

Conservatively, uncontrolled fill deposits are not suitable for structural support and should be removed from the building footprint. At a minimum, foundations should extend through the uncontrolled fill deposits to bear on stable natural ground. Foundations can be constructed at this deeper elevation or the excavations can be backfilled to the initially planned bearing elevation with lean mix concrete or flowable fill. Foundations can then be constructed directly on the lean concrete or flowable fill at the specified bearing elevation.

Deep foundations, such as drilled piles, caissons, or micropiles also may be used to extend the foundation through the fill deposits and into the natural ground. Soil and rock values, as well as design and construction recommended, presented for the tower caissons also may be used for deep foundations to support the building.

We understand initial site preparation was performed prior to the field exploration activities. However, if any additional grading is necessary at the site to finalize preparations, be aware that clayey soils encountered on the site are expected to be sensitive to moisture fluctuations. These materials can become unstable under construction traffic traversing the site, especially by rubber-tired equipment. Therefore, site grading should be performed during drier months, if possible.

The following sections of this report include recommendations for design and construction of the geotechnical elements of the project. Provided that these recommendations are followed, it is our opinion that the site is generally suitable for the proposed construction.

DESIGN RECOMMENDATIONS

Foundations

Building Spread Foundations

Based on the results of test Boring B-4, the bedrock should be suitable for support of the proposed building on a shallow spread foundation system. We recommend that conventional spread foundations bearing on rock (below the existing fill) be designed using a maximum allowable bearing pressure of 4,000 pounds per square foot (psf).

The bearing capacity should be verified at the time of construction by our geotechnical engineer. If zones within the foundation subgrade cannot provide an allowable bearing pressure of 4,000 psf, overexcavation may be necessary to achieve the desired bearing capacity.

Foundations should be constructed to bear at a minimum depth of 36 inches below the final exterior grade in order to achieve the recommended allowable bearing pressure and provide adequate frost protection; however, the noted deeper excavations are anticipated to penetrate through the existing fill deposits. Foundations should be designed for minimum widths of 24 and 36 inches for continuous wall and individual column footings, respectively. Although these dimensions may not fully utilize the recommended bearing pressure, they should be maintained to reduce the potential for a local shear or "punching" type bearing failure.

Site soils are susceptible to softening if left exposed to air and/or standing water for an extended period of time. Therefore, footing concrete should be placed as soon as possible after the excavations are completed. We recommend that all foundation excavations be observed by our geotechnical engineer prior to placing footing concrete to verify that the bearing materials are suitable for the design bearing pressure. Testing should be accomplished using a dynamic cone penetrometer (DCP), proving ring cone penetrometer or similar equipment.

The uncontrolled fill deposits extend nearly 10-ft below the ground surface near the anticipated building area. As such, consideration also may be given to supporting the building on deep foundations and grade beams. Soil and rock values, as well as design and construction recommended, presented for the tower caissons also may be used for deep foundations to support the building.

Tower Caisson Foundations

Drilled piers (caissons) constructed to bear in appropriate bedrock will provide adequate foundation bearing support for the tower. The caissons should be drilled through the soil and boulder overburden and should be socketed a minimum of two feet for bearing into acceptable siltstone or sandstone bedrock. However, the structural design of the tower caissons to resist overturning or wind loads likely will require deeper rock embedment. Positive skin friction should be considered only for the bedrock embedment length in excess of one caisson diameter. We recommend using negative skin friction (down drag) in the soils and colluvium for design of deep foundations for this project. The magnitude of negative skin friction load should be calculated by multiplying the surface area of the below-grade components within the fill by a factored skin friction value of 0.5 ksf. In areas where ground storage stockpiles are proposed if any, the factored skin friction value should be increased to 0.75 ksf and should be applied to ⅔ of the caisson length.

Based on the borings we anticipate bearing in the harder bedrock will be encountered at minimum depths ranging from 7.3 to 16.8 feet as indicated in the following table relative to each location. For caissons bearing in sandstone (Boring B-1), we recommend that a

maximum factored end bearing capacity of 25 ksf be utilized for design. Additionally, we recommend using a factored side resistance value of 8 ksf for the sandstone bedrock. For caissons bearing in siltstone (Borings B-2 and B-3), we recommend that a maximum factored end bearing capacity of 5 ksf and side resistance of 2 ksf be utilized for design. A minimum caisson diameter of 30 inches is recommended for clean-out and inspection purposes.

BORING No.	BEARING MATERIAL	Minimum TIP DEPTH (ft.)
B-1	Sandstone	7.3
B-2	Siltstone	16.3
B-3	Siltstone	16.8

It is emphasized that conditions can vary from those depicted by the borings. Consequently, caisson bearing depths may require adjustment during construction. As such, we recommend that a representative from our office be present during caisson construction to verify that appropriate bearing conditions are present.

Lateral Analysis of Deep Foundations

The ultimate lateral load capacity was not evaluated for the anticipated caissons. A full analysis of the lateral capacity should be evaluated by the structural engineer during the design phase of the tower foundations. In order to aid in this evaluation, the following parameters are provided. The given parameters are from the LPILE Reference Manual (unless otherwise noted), and may be used for lateral analysis and design of the proposed foundations:

Material Type	Material Modeled As	Unit Weight γ (pcf)	Friction Angle ϕ (degrees)	k (pci)	Cohesion (c) (psf)	E_{50}	Unconfined Compressive Strength (psi)	RQD (%)	End Bearing (ksf)	Skin Friction (ksf)
Fill Soil	Stiff Clay w/o Water (Reese)	120	28	90	100	0.01	N/A	N/A	N/A	N/A
Colluvial Soil and Boulders	Sand (Reese)	125	30	110	150	0.005	N/A	N/A	N/A	N/A
Siltstone	Weak Rock (Reese)	140	32	1,500	1,000	0.0001	2,000	8	5	2
Sandstone	Strong Rock	145	35	N/A	5,000	0.000005	10,000	31	25	8

Caisson spacing should not be less than 30 inches or 2.5 times the caisson diameter, whichever is greater. Settlement of the proposed caissons should be analyzed after selection of the final caisson size, design capacity and spacing. Individual or group caisson settlement should be insignificant since the deep foundations will bear in bedrock. Since deep foundations will be constructed to bear in bedrock, a reduction in capacity for group action is unnecessary.

Settlement Considerations

No building or tower structural loading information was provided. In general, we anticipate that settlement of foundations supported upon intact bedrock will be negligible. If requested, we can perform additional settlement analyses after structure and loading information becomes available.

Floor Slab Recommendations

Based on current information nearly 10-ft of uncontrolled fill is present near the proposed building. Uncontrolled fill generally is not suitable for structural support. As such, we recommend that floor slabs be designed as structural slabs capable of spanning between footings and grade beams as needed.

Alternatively, conventional slab-on-grade construction may be utilized if the uncontrolled fill materials are overexcavated to approved natural ground and the slab subgrade is reestablished with controlled, compacted structural fill placed in accordance with the "Construction Recommendations" presented later in this report. These materials should provide adequate support for slab-on-grade construction using a modulus of subgrade reaction of 90 pounds per cubic inch. A minimum four-inch layer of crushed stone such as ASTM No. 57 coarse aggregate should be placed under the slab-on-grade to serve as a capillary water barrier and a leveling surface. A six-mil thick polyethylene vapor barrier should be placed between the aggregate and concrete slab.

Seismic

The site soils were evaluated and classified according to the 2012/2015 International Building Code Section 1613 - Earthquake Loads - Site Ground Motion. This building code establishes the criteria for project site evaluation. Section 1613.3.2 and 2010 ASCE-7 Standard-Table 20.3-1 defines the parameters for determining the seismic site class based on N-values. The seismic site class may be determined by calculating an $\overline{N}$ value of subsurface materials to a depth of 100 feet. For the determination, the N values recorded in test borings are used for overburden soil, and then, typically, materials below the depth that auger refusal or hard rock is encountered (to a depth of 100 feet) are assigned an N-value of 100. Based on the results of the test borings, the site has an $\overline{N}$ value of 80. Using the calculated $\overline{N}$ value along with knowledge of the site geologic setting, the seismic site class and additional seismic information is as follows:

Seismic Site Class	**C**
Soil Profile Name	**Very Dense Soil and Soft Rock**
Mapped Spectral Acceleration for Short Periods S_s	**0.113 g**
Mapped Spectral Acceleration for Short Periods S_1	**0.056 g**

Based on results from the test borings, published regional geologic information, and the probable maximum strength of earthquake, it is our opinion that liquefaction potential for the on-site soils during seismic activity is low.

CONSTRUCTION RECOMMENDATIONS

Site Preparation

Initial preparation of the site for construction should include installation of sediment and erosion control measures and any upslope diversion ditching or berms that are required. Existing utilities that are in conflict with proposed foundations and/or new utility alignments should be relocated as necessary.

Site Excavations

It is anticipated that the majority of the on-site soils and surficial weathered bedrock can be effectively removed with conventional earth-moving equipment such as backhoes and dozers. However, harder bedrock that is encountered may require rock removal techniques such as hoe-ram chipping or hydraulic splitting for effective removal. Blasting should be prohibited for this project.

The means necessary to excavate rock are a function of the consistency/hardness of the material, the type/size of excavation equipment utilized and the effort the contractor is willing to apply. If the plans call for excavation of rock, for bidding purposes, potential contractors should be instructed to perform their own investigations as to measures necessary to excavate bedrock encountered.

Excavated materials should not be stockpiled and construction equipment should not be positioned beside open excavations, since the added load may cause a sudden collapse of the excavation side walls. The design and construction of all excavations should comply with applicable local, state, and federal safety regulations, including the current requirements of the Occupational Safety and Health Administration (OSHA). In no case should slope height, slope inclination, or excavation depth exceed those specified by OSHA or any other regulatory agencies or local authorities having jurisdiction at the construction site.

Structural Fill Material

Fill required to attain design grades should be placed as controlled, compacted fill. Satisfactory fill includes approved on-site excavated materials, off-site borrow material such as residual soils, soil/rock mixtures, and soft weathered rock, or a well-graded commercial stone such as crusher run aggregate. The fill should be free of trash, wood, coal, topsoil, organics, pyritic material with greater than 0.5 percent by weight of pyritic sulfur, frozen material, pieces of rock greater than 4 inches in any dimension for fill placed in 9-inch lifts, and 1.5 inches in any dimension for fill placed in 4-inch lifts. Materials classified as MH, CH, OH, OL and Pt based on the Unified Soil Classification System (USCS) are not considered suitable for use as new fill. All fill should be tested and approved prior to placement and compaction.

Fill Placement and Compaction

Before initiating fill placement, surficial material should be removed. The subgrade surface should be proof-rolled with appropriate rubber-tired construction equipment and/or visually evaluated to locate any soft spots or areas of excessive "pumping." Any such areas should be over-excavated to a firm subgrade and replaced with new, controlled fill material. The engineer should be contacted if excessive over-excavation is required.

During placement, moisten or aerate each layer of fill, as necessary, to obtain the required compaction. Fill should not be placed on surfaces that are muddy, frozen, or have not been approved by prior testing and/or proof-rolling. Free water should be prevented from appearing on the surface during or subsequent to compaction operations. Fill placed on sloping areas should be properly benched or "notched" into the slope face such that a smooth transition between the new fill and existing slope face is not present.

Soil material which is removed because it is too wet to permit proper compaction may be spread and allowed to dry. Drying can be facilitated by discing, harrowing, or by pulverizing until the moisture content is reduced to an acceptable level. When the soil is too dry, water may be uniformly applied to the subgrade surface or to the layer to be compacted.

Fill material compacted by heavy compaction equipment should be placed in loose layers having a 9-inch maximum thickness. Fill compacted with lightweight equipment, such as hand-operated tampers or walk-behind rollers, should be placed in loose layers not exceeding 4 inches in thickness. The compaction equipment utilized should be suitable for the type of material being compacted. Vibratory rollers are best suited to coarse-grained soils, while pad (often called sheepsfoot) rollers are appropriate for fine-grained materials.

New fill placed within the structure footprint and extending at least five (5) feet beyond its perimeter, or to that extent possible, should be compacted to at least 98 percent of the laboratory maximum dry density as determined by the Standard Proctor method (ASTM D 698). Fill placed outside of these areas should be compacted to at least 95 percent of the maximum dry density as determined by the same standard. The placement moisture content of all fill should be within ±2 percentage points of the optimum moisture content as determined by ASTM D 698. Granular materials, such as clean sand or aggregate, should be compacted to 85% of its relative density, as determined by ASTM D 4253 and D 4254 test methods.

Spread Foundations

Foundation excavations should be cleaned of all loose or otherwise disturbed materials present in the base of the excavations. The excavations should be observed and tested by a qualified geotechnical engineer, or his/her representative, prior to concrete placement to verify that materials capable of providing the recommended bearing capacity are present. Materials exposed in the foundation excavations will be susceptible to softening and/or degradation if exposed to precipitation or surface water runoff. In addition, some foundation excavations could be relatively deep. Consequently, foundation concrete should be placed in the excavations as soon as possible once the excavations have been observed and approved, and only that amount of foundation excavation which can be backfilled with concrete should be opened up on any given day. Once foundation walls have been constructed up to final exterior grades, we recommend that the foundation excavations be backfilled with compacted soil fill to prevent ponding of water adjacent to foundations.

Caissons

Caissons should be constructed as straight shafts, plumb to within one (1) percent of their drilled lengths. Caissons should penetrate through the soils and very weathered underlying bedrock materials encountered in each test boring, in order that they will attain a suitable bearing material capable of supporting the recommended maximum allowable bearing pressure as previously identified. The caisson contractor should be capable of drilling through some cobbles/boulders and removing groundwater from the shaft. It is likely that rock augers and core barrels will be required to achieve the recommended bearing elevations. Temporary casing may be needed during the drilling operations to support the in-situ soils and to produce a seal along the soil-rock contact to reduce infiltration of groundwater into the excavation.

If caisson spacing is less than 6 times the caisson diameter, it is recommended that each caisson be drilled and backfilled with concrete prior to drilling the next caisson. After the caissons have been drilled, the caisson bottom should be prepared to receive concrete. This will require cleaning the hole with the drilling equipment. In order to facilitate smooth placement of concrete, we recommend that the concrete slump range between 5 and 7 inches for the drilled caissons, provided that a suitable mix design is developed to provide the necessary strength at the appropriate water-to-cement ratio.

The caisson bottom must be clean of debris and have less than 2 inches of standing water prior to placement of concrete. If groundwater in the caisson becomes problematic, the concrete may need to be placed with a tremie tube, placing the concrete near the bottom and forcing the water out of the caisson hole. The caisson bottom should not be left open longer than 24 hours to help prevent deterioration of the bearing conditions. We do not recommend down hole inspections of the bearing material at this site. However, we do recommend that a representative from Triad be on site during the caisson construction to verify the bearing conditions in the bottom of each caisson.

Groundwater and Surface Runoff Control

Groundwater levels were checked both during and after drilling operations. Groundwater levels are indicated on the boring logs in Appendix B. Water was encountered at the surface after drilling in boring B-1, while boring B-4 was dry upon completion. The water levels in B-2 and B-3 were not able to be measured due to hole collapse. The contractor should be prepared to implement temporary and/or permanent dewatering measures since groundwater conditions can change. We anticipate that sources of subsurface water which may develop during construction can probably be managed and removed by a gravity drainage system, sump pits and pumps or other minor dewatering procedures.

Surface water runoff should be prevented from flowing through the construction area. If necessary, diversion ditches or berms should be installed upslope of the construction area. Ditches should be protected from excessive erosion through the use of rip-rap, erosion control matting, or vegetation.

Quality Assurance and Control

We recommend that the geotechnical engineer-of-record, Triad, be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our exploration. If significant variations are encountered, or if the design is altered, we should be notified. Additionally, the geotechnical engineer should provide personnel full-time and/or intermittently to:

- Observe and document installation of the drainage features and verify initial subgrade conditions prior to fill placement.
- Observe and test material compaction during fill construction. Field density tests should be performed in accordance with ASTM D 6938 (nuclear method). At least three (3) field density tests should be performed for each lift or at a frequency determined by the geotechnical engineer to be sufficient for the size of the fill area to verify the required soil compaction.
- Observe drilling and placement of concrete for caissons to confirm compliance with our recommendations.
- Examine all subgrade bearing levels to confirm compliance with our recommendations and verify that adequate support is available.
- Test fresh structural concrete placed for the project.

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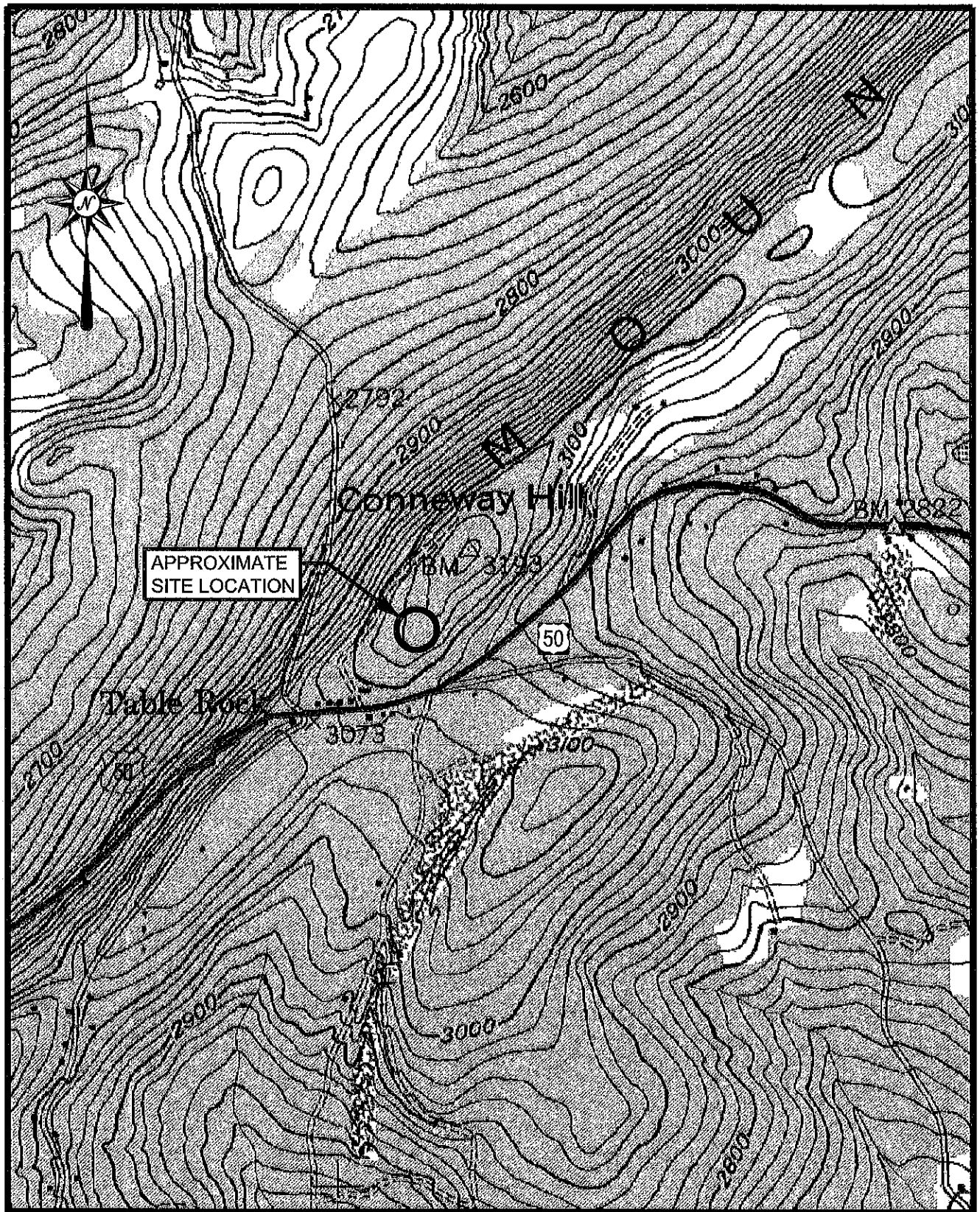
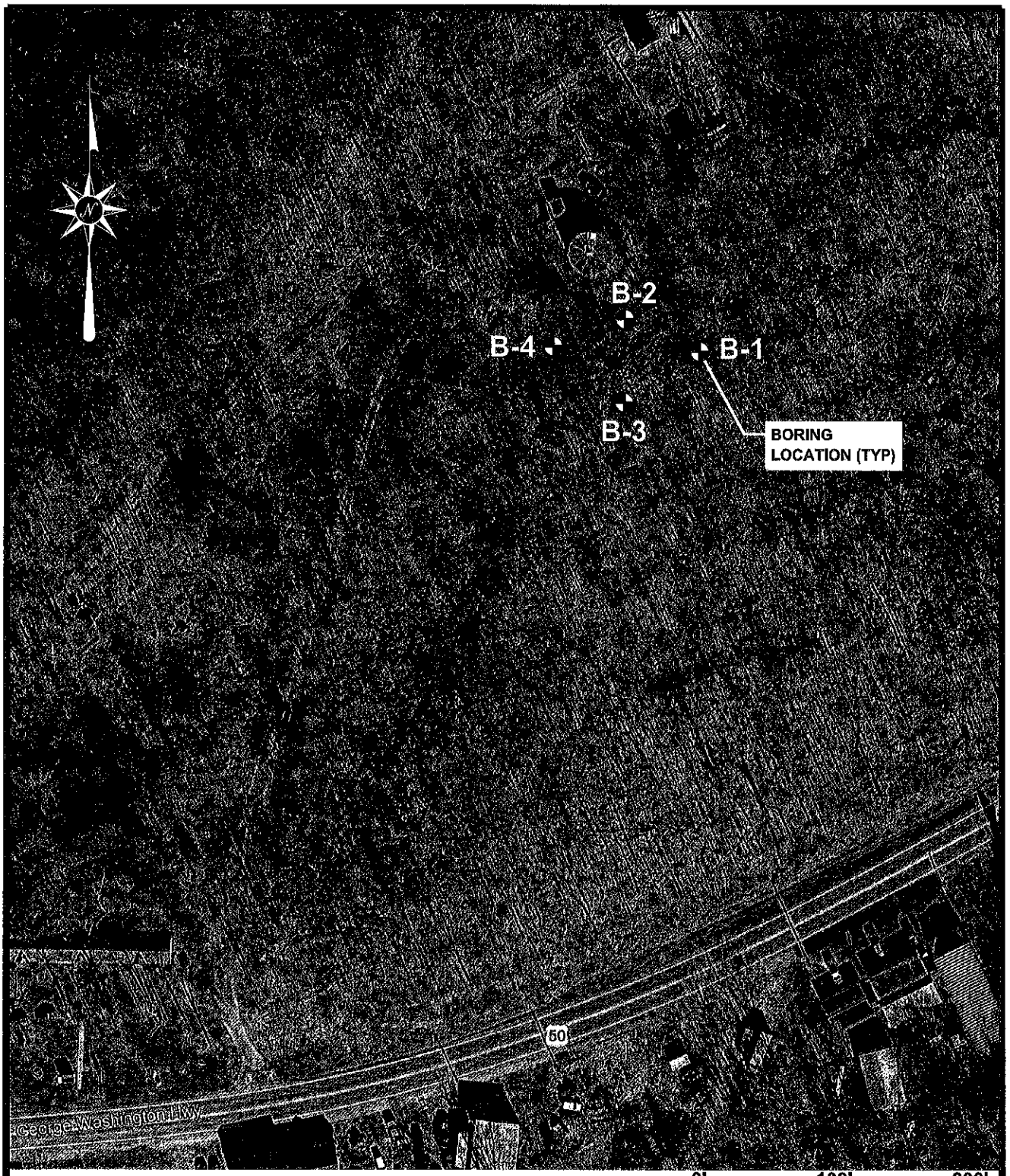
APPENDIX A

Illustrations



CADD FILE: Figure A-1.dgn		TABLE ROCK TOWER US ROUTE 50, GARRETT COUNTY, MD Table Rock, MD USGS Quadrangle (1948 - Photorevised 1981) SITE VICINITY PLAN	TRIAD ENGINEERING, INC. www.triadeng.com 1097 CHAPLIN ROAD MORGANTOWN, WV
DRAWN BY: MAD	CHECKED BY: BGC		
DATE: 10-09-2018	SCALE: 1"= 1000'	PROJECT NO: 01-18-0205 FIGURE A-1	



0' 100' 200'

Scale: 1" = 100'

NOTE:
BORING LOCATIONS ARE APPROXIMATE

CADD FILE: Figure A-2.dgn		TABLE ROCK TOWER US ROUTE 50, GARRETT COUNTY, MD Table Rock, MD USGS Quadrangle (1948 - Photorevised 1981) SITE VICINITY PLAN
DRAWN BY: MAD	CHECKED BY: BGC	
DATE: 10-09-2018	SCALE: 1"= 1000'	PROJECT NO: 01-18-0205 FIGURE A-2

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www.triadeng.com
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MORGANTOWN, WV

TRIAD ENGINEERING, INC.

APPENDIX B

Field Exploration

Triad Engineering, Inc.

Field Exploration

A representative from Triad was present to direct the drill crew, log recovered samples and observe groundwater conditions. The borings were drilled utilizing a CME-55 rotary auger drill rig. Samples of in-situ soil and weathered bedrock were obtained using a split-barrel sampler while performing Standard Penetration Tests (ASTM D 1586). The results of these tests (N-values) are commonly interpreted to provide an index to strength, consistency or relative density of the sampled materials and their ability to support foundations.

Once auger or sampler refusal on harder rock was encountered, borings B-1, B-2, and B-3 were further advanced using rock coring techniques. Continuous rock core samples were obtained from auger/sampler refusal depth to the boring termination depth. The harder rock materials were penetrated and sampled using a conventional, double-tubed core barrel and diamond coring bit, producing a rock core sample a nominal two (2) inches in diameter. The rock coring was performed to assess the type, quality and continuity of the bedrock at the drilled locations. The Rock Quality Designation (RQD) noted on the logs provides an indication of the relative quality and soundness of a specific bedrock stratum by measuring the lengths of intact rock core (unbroken core samples) that are larger than twice the core sample diameter for a specific rock stratum and/or core run and dividing the sum of the cumulative lengths by the thickness of the stratum and/or core run.

Groundwater levels were checked both during and after drilling operations. Groundwater levels encountered during the auger drilling are recorded on the individual logs. Groundwater levels indicated after rock coring operations are not considered representative of true groundwater levels, due to the introduction of water into the borehole during rock coring. It is emphasized that groundwater levels typically vary and are dependent upon climatic conditions and other environmental factors.

It is also emphasized that the lines shown on the logs are estimates of the changes in material. Actual changes may be gradual and may vary from those indicated on the logs, and the subsurface conditions between the borings may differ from those depicted on the logs. The boreholes were backfilled upon completion of the drilling with auger cuttings. Samples were transported to our office for temporary storage and additional analysis. The samples will be discarded after a period of 60 days unless other arrangements are made.

TRIAD ENGINEERING, INC.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the soil and rock recovered from the exploration and are based on the following criteria. Major soil components are designated by capital letters and minor components are described by terms indicating the percentage by weight of each component. Standard Penetration Testing (SPT) and sampling was conducted in accordance with ASTM D1586. N-values in blows per foot are used to describe the *relative density* of coarse-grained soils or the *consistency* of fine-grained soils.

The MAJOR components constitute more than 50% of the sample and have the following size designation.		The MINOR components have the following percentage designation.	
COMPONENT	**PARTICLE SIZE**	**ADJECTIVE**	**PERCENTAGE**
Boulders	12 inches plus		
Cobbles	3 to 12 inches	and	35 - 50
Gravel -coarse	¾ to 3 inches		
-fine	#4 to ¾ inches	some	20 - 35
Sand -coarse	#10 to #4		
-medium	#40 to #10	little	10 - 20
-fine	#200 to #40		
Silt or Clay	Minus #200 (fine-grained soil)	trace	0 - 10

Relative Density – Coarse-grained Soils		Consistency – Fine-grained Soils	
Term	***N-Value***	***Term***	***N-Value***
Very Loose	≤4	Very Soft	≤2
Loose	5 to 10	Soft	3 to 4
Medium Dense	11 to 30	Medium Stiff	5 to 8
Dense	31 to 50	Stiff	9 to 16
Very Dense	>50	Very Stiff	>16

Soil Plasticity	Plasticity Index (PI)	Rock Hardness	
None	Nonplastic	***Term***	***N-Value***
Low	1 to 5	Very Weathered	≤50/.5
Medium	5 to 20	Weathered	50/.4
High	20 to 40	Soft	50/.3
Very High	over 40	Medium hard	50/.2 to 50/.1
		Hard	Auger Refusal

Moisture Description
Dry - Dusty, dry to touch
Slightly Moist - damp
Moist - no visible free water
Wet - visible free water, saturated

Figure No. B-1

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KEY TO IDENTIFICATION OF HARD ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the rock recovered from the NQ/NX coring operations and are based on the following criteria. Core recovery is the ratio of the length of core recovered in each run to the total length of the core run in percent. Rock Quality Designation (RQD) is the ratio of the sum of the lengths of rock core pieces 4 inches or longer divided by the length of the core run or stratum in percent.

Relative Degree of Rock Hardness

Term	*Defining Characteristics*
Very Soft	Can be indented by thumb or crushed under pressure of finger and/or thumb
Soft	Can be scratched by fingernail, peeled by pocket knife or crushed with pressed hammer
Medium Hard	Cannot be scraped or peeled with knife but can be scratched, breaks easily with hammer blow
Hard	Breaks under one or two strong hammer blows or scratched with knife with difficulty
Very Hard	Breaks under several strong hammer blows with very resistant sharp edges

Rock Adjectives

Seam	Thin layer (12 inches or less)
Interbedded	Thin or very thin alternating seams of bedrock occurring in equal amounts
Some	Significant amount of accessory material (15 to 40 percent)
Few	Insignificant amount of accessory material (0 to 15 percent)

Rock Quality Designation (RQD)

Term	*Percent*
Very Poor	≤25
Poor	26 to 50
Fair	51 to 75
Good	76 to 90
Excellent	>90

Recovery

Term	*Percent*
Poor	≤25
Low	26 to 50
Moderate	51 to 75
High	76 to 90
Very High	>90

Rock Structure

Degree of Fracturing

Term	*Spacing*
Intensely fractured or very broken	2 in.
Highly fractured or broken	2 in. to 8 in.
Moderately fractured or blocky	8 in. to 2 ft.
Slightly Fractured	2 ft. to 6 ft.

Thickness of Bedding

Term	*Spacing*
Thinly bedded	<4 in.
Medium bedded	4 in. to 1 ft.
Thickly bedded	1 ft. to 3 ft.
Massive	>3 ft.

Dip of Bed or Fracturing

Flat	0° to 20°
Dipping	20° to 45°
Steeply Dipping	45° to 90°

Figure No. B-2

TRIAD ENGINEERING, INC.

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-1**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/4/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 0.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		2-8-7	40%			FILL: Brown sandy CLAY, some gravel, slightly moist to moist, stiff to very stiff				
	S-2		7-11-35	100%			- Some sand, trace gravel at 3.0 feet				
5.0	S-3		50/0.3	100%		5.3	- Some gravel at 5.0 feet Auger Refusal at 5.3 feet				3144.7
	R-1			63%	20%		Gray SANDSTONE, medium to coarse-grained, minor weathering, steeply dipping fracture planes, broken, hard				
10.0	R-2			78%	22%			31%			
							- Very thin coal seam, intensely fractured from 12.5 to 13.5 feet - Blocky from 14.0 to 16.3 feet				
15.0	R-3			92%	64%	16.3					3133.7
							Boring Terminated at 16.3 feet.				
20.0											
25.0											

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

TRIAD ENGINEERING, INC.

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Morgantown, WV 26501
304.296.2562
Fax: 304.296.8739

Remarks: Water level at surface at termination of boring

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-2**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/4/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		2-3-3	33%			FILL: Brown sandy CLAY, some gravel, slightly moist to moist, medium stiff to very stiff				
	S-2		6-9-5	73%			- Little gravel at 3.0 feet				
5.0	S-3		29-50/0.3	100%		5.8	- Some gravel at 5.0 feet				3144.2
							Auger Refusal at 5.8 feet				
	R-1			42%	0%		COLLUVIUM: Brown CLAY, some gravel, trace to some boulders, heavily weathered, very soft to soft				
							- Light gray, hard, medium to coarse-grained sandstone boulder from 5.8 to 6.4 feet				
10.0	R-2			68%	10%						
						14.3					3135.7
15.0	R-3			84%	0%		Dark gray SILTSTONE, micaceous, heavily weathered, dipping to steeply dipping fracture planes, intensely to highly fractured, medium hard to hard	4%			
20.0	R-4			100%	8%						
						24.1					3125.9
25.0							Boring Terminated at 24.1 feet.				

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

TRIAD ENGINEERING, INC.

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Fax: 304.296.8739

Remarks: Unable to measure water level due to hole collapse

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-3**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/5/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		4-6-7	40%			FILL: Brown sandy CLAY, some gravel, moist, stiff to very stiff				
	S-2		50/0.1	100%		4.5	Auger Refusal at 4.5 feet				3145.5
5.0	R-1			64%	36%		COLLUVIUM: brown CLAY, some gravel, trace to some boulders, very soft to soft - Mostly medium to coarse-grained sandstone boulders from 4.5 to 9.5 feet, moderate weathering, dipping to steeply dipping fracture planes, broken, medium hard to hard				
10.0	R-2			24%	0%		- Mostly clay from 9.5 to 14.8 feet				
15.0	R-3			88%	8%	14.8	Dark gray SILTSTONE, micaceous, heavily weathered, dipping to steeply dipping fracture planes, intensely to highly fractured, medium hard to hard	12%			3135.2
20.0	R-4			96%	16%						
25.0						24.5	Boring Terminated at 24.5 feet.				3125.5

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

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Remarks: Unable to measure water level due to hole collapse

TEST BORING LOG

Sheet 1 of 1

Project Number: **01-18-0205** Project Name: **Table Rock Tower** Boring No.: **B-4**

Logger: RMS Boring Location: See Boring Location Plan

Date Started: 10/4/18 Drill/Method: CME 55

Date Completed: 10/4/18 Driller: TRIAD Ground Elev.: 3150

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1	X	2-2-4	20%			FILL: Brown silty GRAVEL and sand, slightly moist, loose to very dense				
	S-2	X	10-34-20	87%			- Sandstone cobble at 3.0 feet				
5.0	S-3	X	17-24-26	80%							
	S-4	X	7-17-27	67%							
10.0	S-5		50/0.0	0%		9.8	Auger Refusal at 9.8 feet Boring Terminated at 9.8 feet.				3140.2
15.0											
20.0											
25.0											

TRIAD_C 01-18-0205 BORING LOG.GPJ TRIAD 3.GDT 10/22/18

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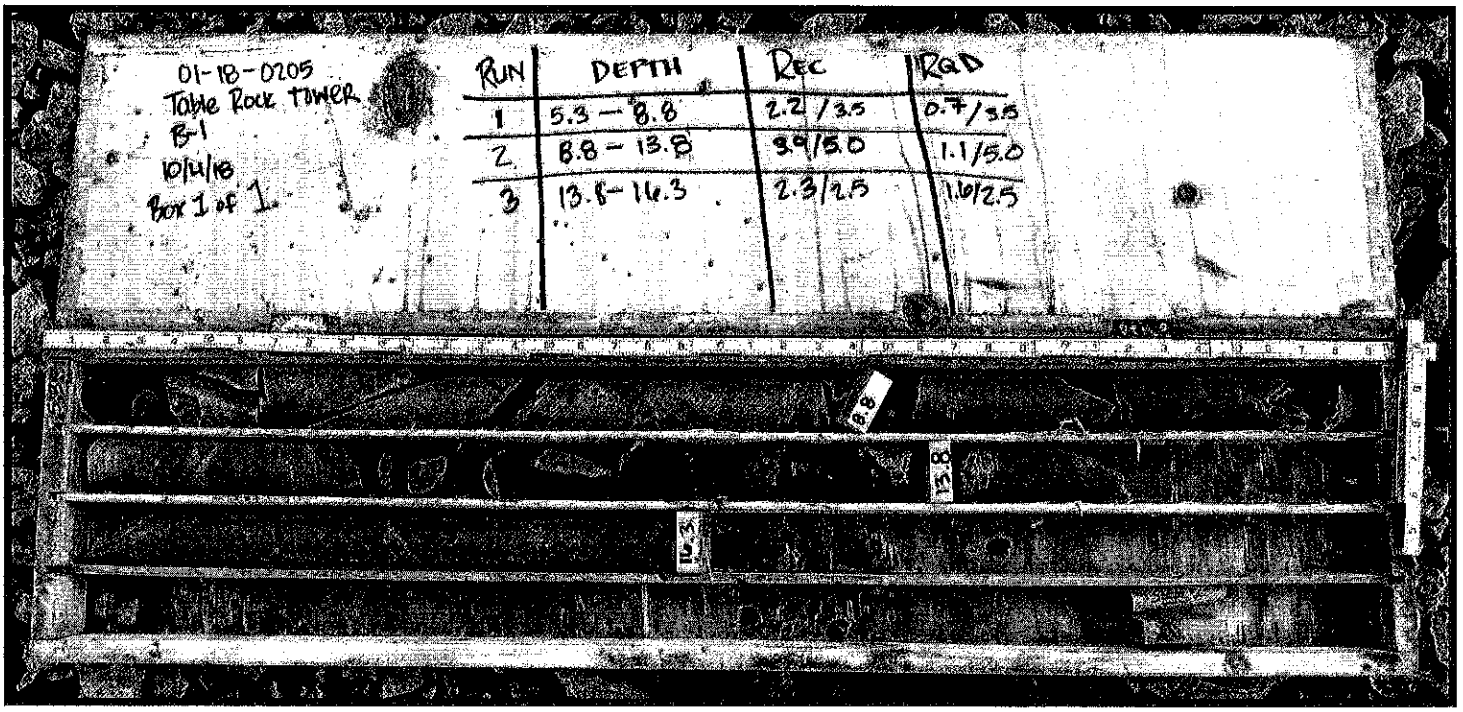
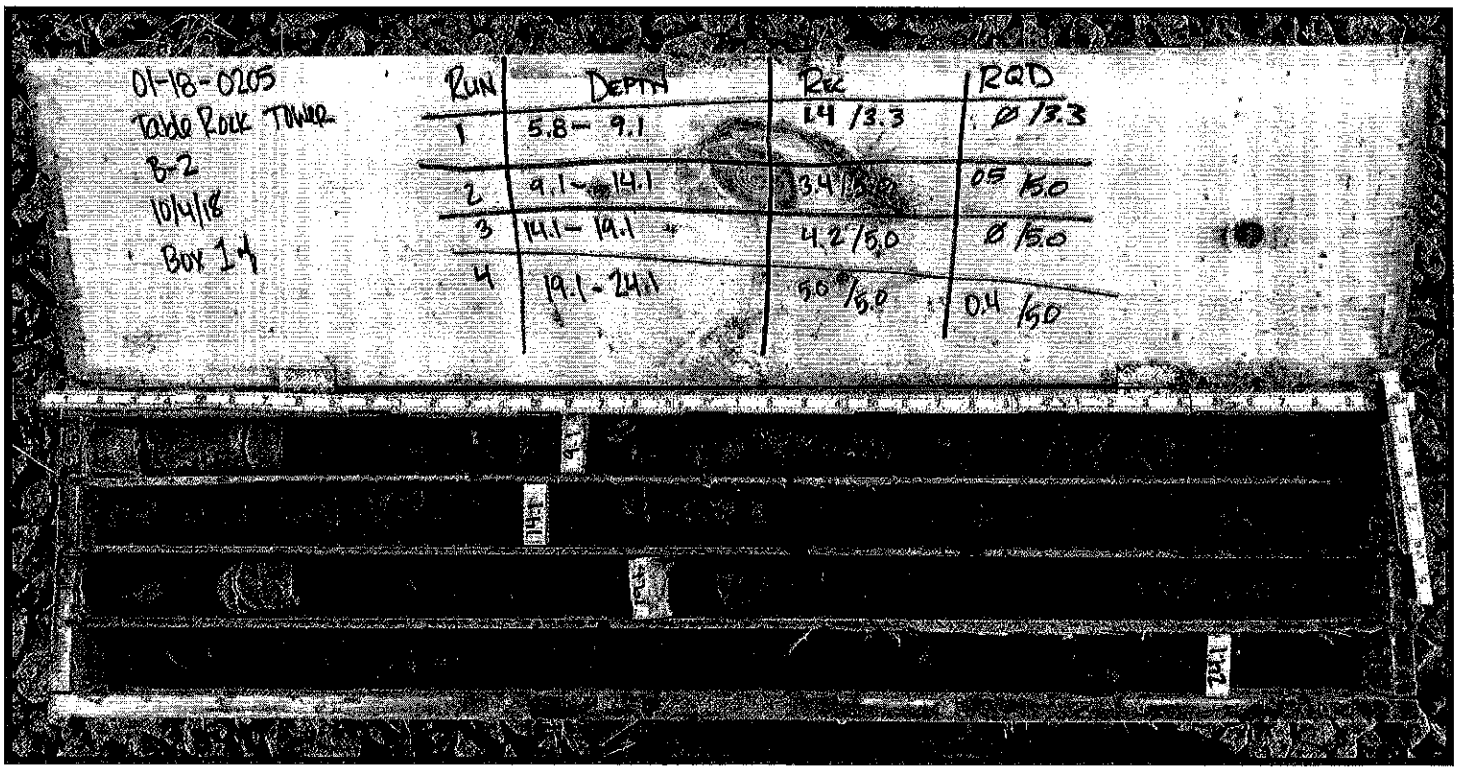
Remarks: Boring dry upon completion

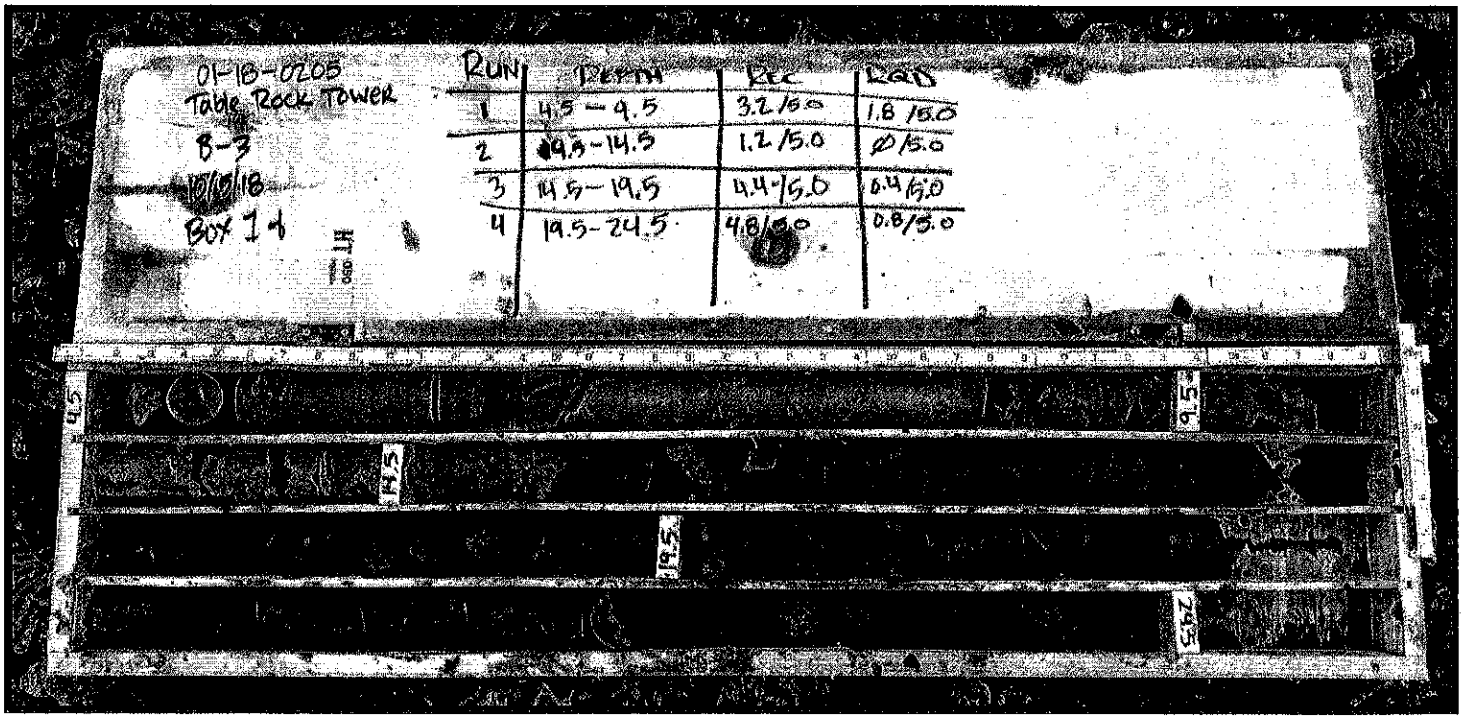


B-1: Box 1 of 1



B-2: Box 1 of 1

Table Rock Tower 01-1-0205 Appendix B Core Box Photos	TRIAD ENGINEERING, INC.



B-3: Box 1 of 1

Table Rock Tower 01-1-0205 Appendix B Core Box Photos	TRIAD ENGINEERING, INC.

TRIAD ENGINEERING, INC.

APPENDIX C

Laboratory Testing

Triad Engineering, Inc.

Laboratory Testing

The samples obtained from the test borings were visually classified in the field by geotechnical engineering personnel from Triad. The recovered soils were further evaluated by laboratory testing. Laboratory soils tests were conducted in accordance with applicable ASTM Standards as listed below:

1) Moisture content tests were performed in accordance with ASTM D 2216.

2) Atterberg Limits tests, consisting of the liquid limit, plastic limit, and plasticity index, were performed in accordance with ASTM D 4318.

3) Sieve analyses with washed No. 200 sieve tests were performed in accordance with ASTM D 422.

4) Rock core compression tests were performed in accordance with ASTM D 7012.

A summary and details of the laboratory test results are included on the following pages of this appendix.

TRIAD ENGINEERING, INC.

LABORATORY DATA SUMMARY

SAMPLE ID	SAMPLE DEPTH (ft)	SAMPLE TYPE	NATURAL MOISTURE (%)	ATTERBERG LIMITS			GRADATION			USCS SOIL CLASS.	PROCTOR		UNCONFINED COMPRESSION TEST (psi)
				LL	PL	PI	% GRAVEL	% SAND	% FINES		MAX. DD (pcf)	OPT. M (%)	
B-1 S-2	2.5-4.0	SS	12										
B-1 RC-1	7.9-8.8	RC											23,040
B-2 S-2	2.5-4.0	SS	18										
B-2 RC-4	23.0-23.6	RC											6,740
B-3 S-1	0.0-1.5	SS	15										
B-3 RC-4	23.5-24.0	RC											2,770
B-4 S-2&3	2.5-6.5	SS	7	17	16	1	40	38	22	GM			
B-4 S-4	7.5-9.0	SS	7										

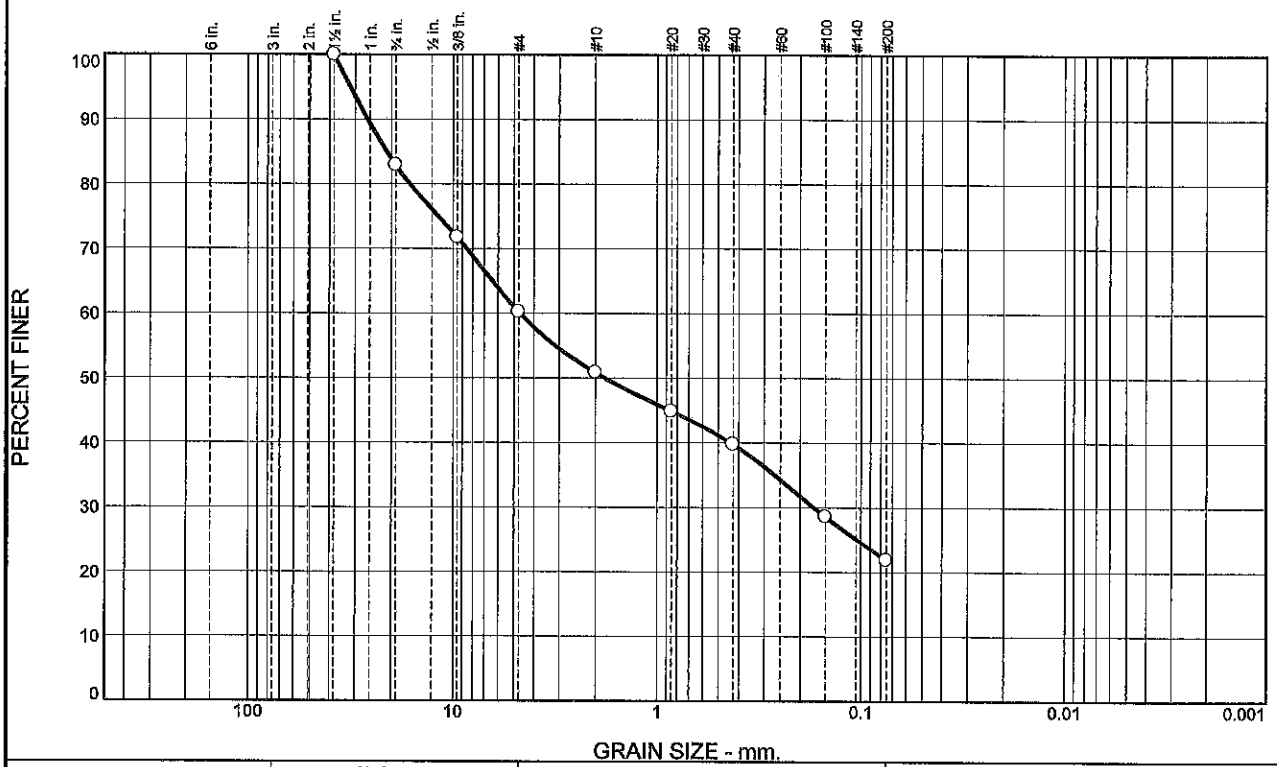
Triad Engineering, Inc.

Notes: 1) Tests performed in accordance with industry-recognized testing standards.
2) SS = Split Spoon; UD = Undisturbed

PROJECT NUMBER: 01-18-0205
PROJECT NAME: Table Rock Tower
Garrett County, MD

PLATE C-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.1	22.7	9.4	11.0	17.9	21.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2	100.0		
.75	82.9		
.375	71.8		
#4	60.2		
#10	50.8		
#20	44.8		
#40	39.8		
#100	28.6		
#200	21.9		

* (no specification provided)

Material Description

medium brown silty gravel with sand

Atterberg Limits

PL= 16 LL= 17 PI= 1

Coefficients

D_{90}= 26.0634 D_{85}= 21.0581 D_{60}= 4.6811
D_{50}= 1.7998 D_{30}= 0.1709 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO= A-1-b

Remarks

Source of Sample: B-4 **Depth:** 2.5'-6.5'
Sample Number: S-2/S-3

Date: 10/8/18

Triad Engineering, Inc.

Morgantown, WV

Client: Sabre Industries
Project: Table Rock Tower
Project No: 01-18-0205 **Figure C-2**

Tested By: JKM **Checked By:** DTB

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Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet

ASTM D7012

Project Name: Table Rock Tower

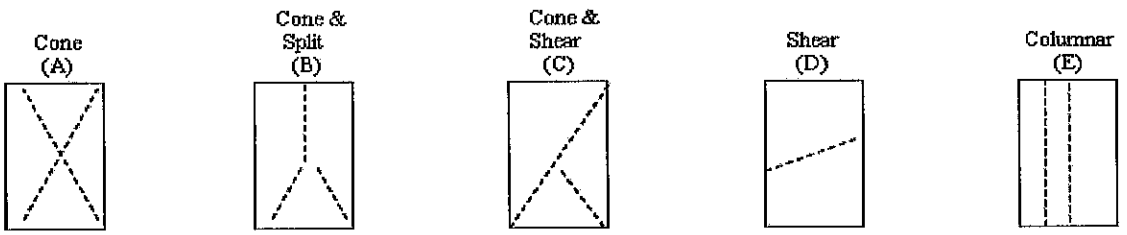
Project # : 01-18-0205 Date : 10/10/2018

Core # : B-1 Depth: 7.9'-8.8'

Sample Description: light tan sandstone

Measurements (inches)		
	Length	Diameter
#1	3.984	1.982
#2	3.980	1.984
#3	3.980	1..985
Avg.	3.981	1.983

Length to Diameter Ratio :	2.01		Correction Factor:	1
Area:	3.0884	in^2	Flatness of Sample:	FLAT
Load:	71160	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	23041	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	1659	$tons/ft^2$	Deformation Rate:	S
Corrected Strength :	23041	lbs/in^2	Type of Break:	E
Corrected Strength :	1659	$tons/ft^2$		



Remarks:

Tested by: JKM Checked by: DTB

Figure C-3

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: Table Rock Tower

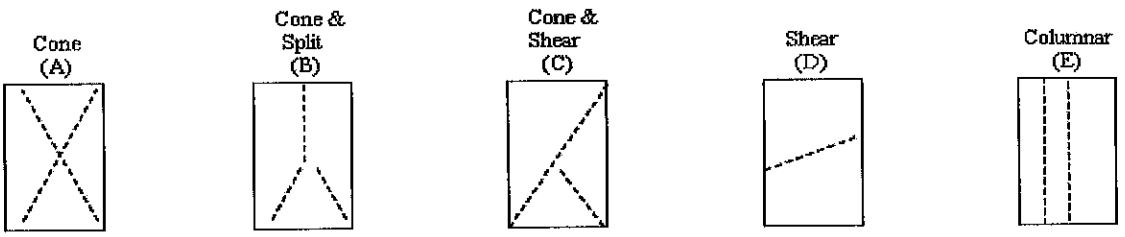
Project # : 01-18-0205 Date : 10/10/2018

Core # : B-2 Depth: 23.0'-23.6'

Sample Description: dark gray siltstone

Measurements (inches)		
	Length	Diameter
#1	2.759	1.981
#2	2.754	1.979
#3	2.755	1.977
Avg.	2.756	1.979

Length to Diameter Ratio :	1.39		Correction Factor:	1
Area:	3.0760	in^2	Flatness of Sample:	FLAT
Load:	20720	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	6736	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	485	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	6736	lbs/in^2	Type of Break:	E
Corrected Strength :	485	$tons/ft^2$		



Remarks:

Tested by: JKM Checked by: DTB

Figure C-4

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet

ASTM D7012

Project Name: Table Rock Tower

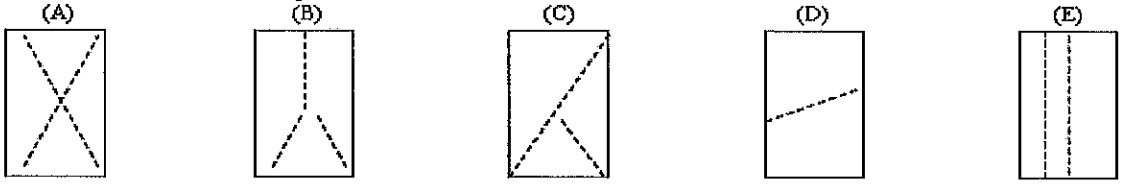
Project # : 01-18-0205 Date : 10/10/2018

Core # : B-3 Depth: 23.5'-24.0'

Sample Description: dark gray siltstone

Measurements (inches)		
	Length	Diameter
#1	3.991	1.977
#2	3.995	1.978
#3	3.993	1.978
Avg.	3.993	1.978

Length to Diameter Ratio :	2.02		Correction Factor:	1
Area:	3.0718	in^2	Flatness of Sample:	FLAT
Load:	8500	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	2767	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	199	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	2767	lbs/in^2	Type of Break:	E
Corrected Strength :	199	$tons/ft^2$		



Remarks:

Tested by: JKM Checked by: DTB

Figure C-5

TRIAD ENGINEERING, INC.

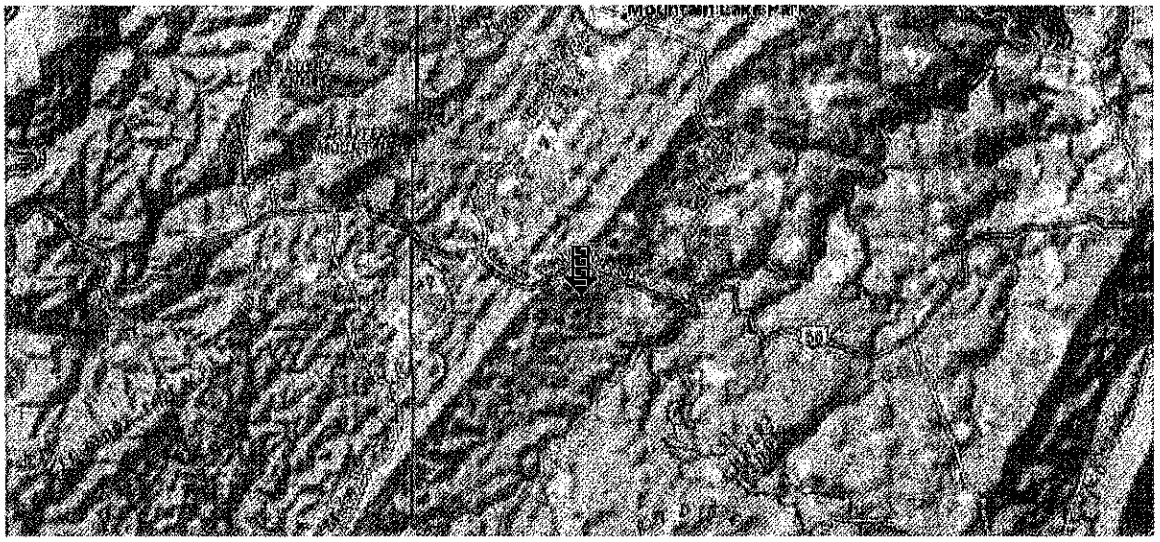
APPENDIX D

Seismic Information

USGS Design Maps Summary Report

User–Specified Input

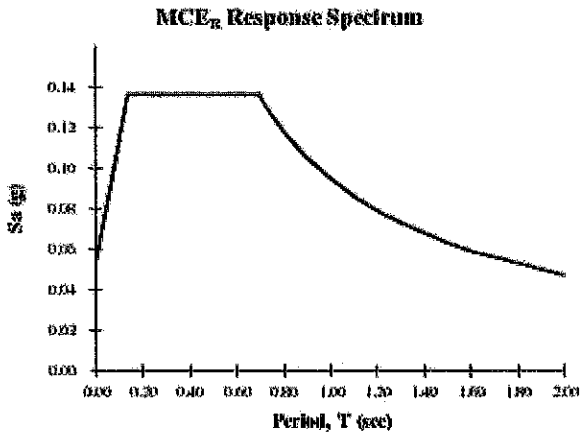
Report Title	01-18-0205 Table Rock Tower Tue October 9, 2018 16:08:07 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	39.303°N, 79.404°W
Site Soil Classification	Site Class C – "Very Dense Soil and Soft Rock"
Risk Category	I/II/III

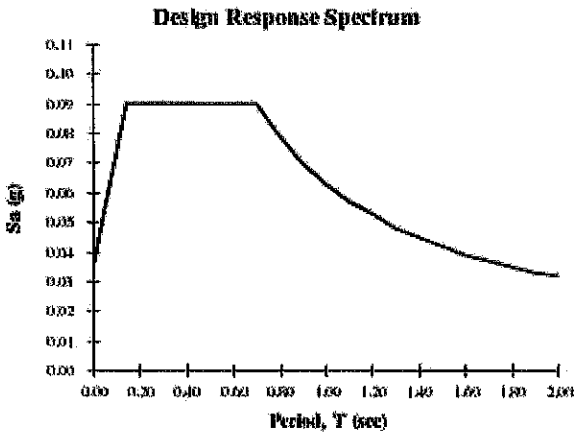


USGS–Provided Output

S_S =	0.113 g	S_{MS} =	0.136 g	S_{DS} =	0.090 g
S_1 =	0.056 g	S_{M1} =	0.095 g	S_{D1} =	0.063 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

ATTACHMENT W

State Of Maryland
Dept. of Information Technology
Communication Tower
Closeout Acceptance Standards

Table of Contents

1. Intent

The intent of this document is to provide designated personnel with set guidelines, including specified performance metrics, for verifying completeness of construction of communication towers, shelters, and ancillary equipment. . Successful completion of the tests, set forth in this document will guarantee acceptance of a quality facility.

1.1. Tower Foundation

Tower foundation closeout documentation will include:
a. The reinforcement bar steel manufacturer will furnish certification of grade steel report. The certification shall include actual mill test results including the chemical and physical properties of the finished metal products.

1.2. Concrete Placement

a. Concrete placement shall comply with current ASTM and/or AASHTO specifications.
b. Concrete delivery tickets will include the following

- Concrete producers name, including address and phone number.
- Date and time batched concrete departed the mix facility.
- Concrete mixture (i.e. 4000 psi mix, % of air, slump, etc).
- Time batched concrete arrived and site location.
- Verified time of discharged concrete.

1.3. Concrete Testing

3rd party independent inspection and certification report to include the following (provided at the vendor's expense):

- The sealed report will include a written report of inspection of the reinforcement bar in accordance with the approved tower foundation design.
- Certified concrete test cylinders break test report
- The report will include results of slump, air entrainment, weather conditions at the time of pour, the use of any admixtures per latest DoIT concrete inspection policy.

1.4. Electrical Conduit/Equipment Installation

Electrical conduit, wiring and materials will be installed in accordance with National NEC codes and standard, local jurisdictional requirements, and local utility requirements. Documentation required for electrical installation is:

a. Photo documentation of underground conduit depicting depth of trench.
b. Photo documentation of underground utility marking tape.
c. Electrician's current Maryland License

1.5. Tower Erection and Installation

The tower installation will be in accordance with ASTM specifications. Closeout documentation will include:

a. A copy of the erection manual specification contained with the tower.
b. A copy of the lighting installation manual.
c. Copies of the safety climb installation manual.
d. Compliance letter from the installer certifying the tower has been installed in accordance with the manufactures specifications.
e. Provide photo documentation of the tower erection process (Photo log attached in Exhibit A).
f. Provide photo documentation of any repairs or corrections made as a result of the State supplied tower inspection report.

1.6. Ground System/Underground Details

a. Provide photo documentation of ground ring depth, welded and mechanical ground connections
b. Provide certified documentation that high performance polyethylene "plastic" fuel line or similar substitute was installed.

1.7. Shelter Placement

Provide copy of shelter documents enclosed with the shelter. Provide shelter set photos.

1.8. Tower Lighting

Provide a copy of the tower light manual and diagnostic materials. Document that the tower light has been functional for at least 30 days and at the time of acceptance.

c. Provide proof of warranty through the manufacturer or CATS II vendor.

1.9. Site Grounding

Provide evidence of site grounding compliance through a three point – fall of potential test and resistance test of at least 10 equipment grounds with a clamp on test meter. These tests will be conducted at the vendor's expense

a. Clamp on test will demonstrate less than 5 ohms of resistance for each ground tested.

b. Report will describe the ground lead tested, relative location within the site and the ground reading.
c. Fall of potential test will describe type of equipment used, soil type, equipment calibration date and test results.
d. All will be conducted by personnel trained on the equipment.

1.10. Liquid Propane Information

Provide evidence to support buried installation. The tank shall be new and unused.

a. Provide an invoice that demonstrates the installation of non metallic fuel line.
b. Provide photos of underground installation.
c. Provide a bill of sale demonstrating the tank's ownership by the State of Maryland.

1.11. Generator Start Up

Provide factory certified inspection/start up documents. The initial setup and testing of the generator will be conducted by a factory certified representative. The required documentation under this section includes:

a. Record serial numbers, models, nomenclature, etc of the generator and automatic transfer switch.
b. Record and document all services performed to check the integrity of the delivered generator, alarm configuration, components and automatic transfer switch.
c. Record and document the generator's performance during the required one (1) hour load bank test (under full load).
    a. This will include indicators such as voltage output, frequency output, oil/water pressure, load, etc.
d. Provide a copy of the generator and transfer switch warranty.

1.12. Site As-Built Drawings

Provide three hard copies of site as built drawings. Provide one soft copy of the as built drawings.

In the event construction drawings are provided by the State the vendor will red line any changes and provide measurements/locations highlighting the actual location.

If no construction drawings are provided, then the vendor will create a set of as built drawings that show the location of the following items: Tower, shelters, LP tank/pad, electrical conduit, transformer, electric backboard, fence, ice bridges, etc. The drawings will be to scale.

1.13. MD Dept of the Environment Permit and Receipt

Provide a copy of the MDE permit. Also provide a copy of the receipt provided by MDE to demonstrate completion of the E&S/SWM portion of the project.

1.14. Photo Documentation

Exhibit A
Photo Documentation Log

Format
All photographs must be submitted printed in color and contained within the photo tab of the closeout binder.

Pre-Construction

1. Access road.
2. Utility path.
3. Utility Pole at primary power location, including pole number.
4. Proposed compound location 4 photos. North, East, West South.
5. Tower Location.
6. Shelter Pad location.

Construction
Tower Foundation

1. Tower foundation excavation and shoring.
2. Placement of rebar.
3. Placement of anchor bolts.
4. Tower foundation concrete placement.
5. Finished concrete.
6. Backfill and compaction of foundation.

Shelter Foundation

1. Shelter foundation excavation, forms and shoring.
2. Placement of rebar.
3. Foundation concrete placement
4. Stoop forms, rebar and reinforcement
5. Finished concrete

Utilities

1. Power routing form primary pole location to tower site.
2. Telco routing from pole to demark.
3. Underground conduit depth.
4. Power and Telco conduit bends.

Generator and fuel tank

1. Installation of pad, including rebar, concrete, etc.
2. Underground fuel supply line trench, trench depth, and connections.
3. Photo evidence of installation of non-metallic fuel line.

Tower Installation

1. Erection of tower process (Minimum of 10).
2. Installation of lighting system.
3. Lighting cable routing (to include strain relief).

Fence Installation

1. Installation of corner, line and gate posts (minimum of 4).
2. Installation of fence fabric (minimum of 4).
3. Installation of barbed wire (minimum of 4).
4. Gates.

Antenna System

1. Antenna and Microwave mounts.
2. Antenna and Microwave model and serial number.
3. Digital photo verifying mounts are plumb and level.
4. Photo verifying mounts are secured to tower (including stiff arms).
5. Photos of coax grounding and ground kits.

Facility Grounding

1. Grounding trench including verification of trench depth.
2. #2 solid to ground rod (minimum of 5 photos).
3. Underground exothermic welds (minimum of 5 photos)
4. Ice bridge grounding.
5. Entry port grounding.
6. Coax grounding (tower and port).
7. Fence grounding including grounding “buttons”.
8. Fence Gate grounding.

9. Shelter grounding exterior / interior.

Post Construction

1. Tower profile. North, East, South West.
2. Compound and Tower with Shelter, North, East, South West.
3. Antenna System, including mount antennas coax, ice bridge entry port.
4. Generator including serial number model number.
5. Primary utility backboard, including meter and meter number.
6. Generator fuel tank location and connections.
7. Shelter bolted down.
8. Shelter door grounds.
9. Tower grounded.
10. Fire Extinguisher.

2. Closeout Book Set Up

Closeout binder will be submitted in one (1) hard copy and one (1) CD version with all photos in jpeg format

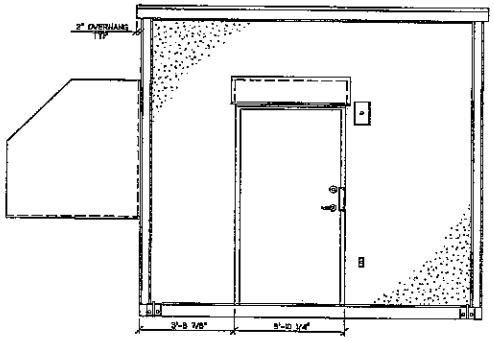
1. Site Name and Notes

   Provide title sheet to include:

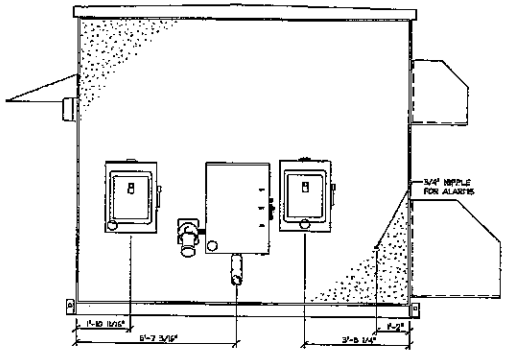
   - Site name
   - Project number
   - Proper physical address
   - Company name
2. Manufacture Warranties
   - Include all manufactures warranties
3. Site Ground Resistance Reports
   - Provide post ground test
4. Concrete Test Reports
   - Provide Certified test reports
5. Site Photos
   - As required by Exhibit A
6. Tower and Foundation Drawings
   - Provide as required
7. Shelter Drawings

- Provide as required

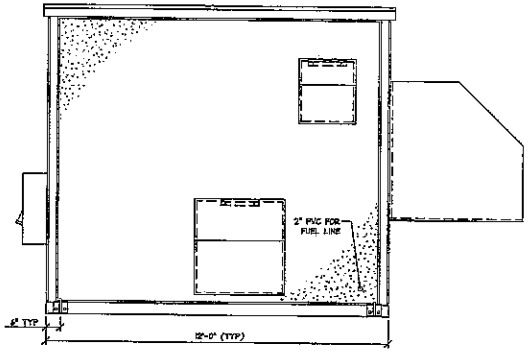
8. Site As-Built
    - Provide as required
9. MDE Permit / Completion Receipt
    - Mandatory submission required
10. Equipment Spec Sheets
    - Provide as required
11. Contract Task Orders
12. Mandatory submission required
13. Contract Purchase Order
    - Mandatory Submission
14. Material Safety Data Sheets
    - Mandatory Submission
15. Liquid Propane Information
    - Mandatory Submission



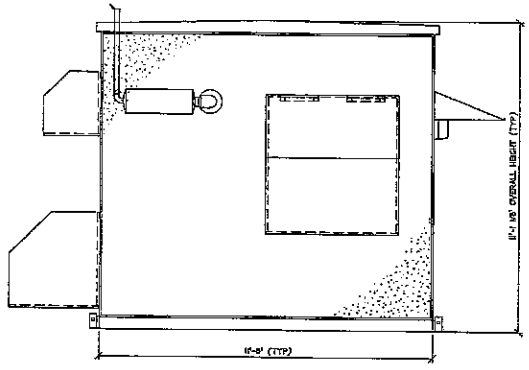
FRONT ELEVATION (WALL A)
SCALE: NONE



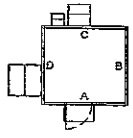
RIGHT ELEVATION (WALL B)
SCALE: NONE



REAR ELEVATION (WALL C)
SCALE: NONE

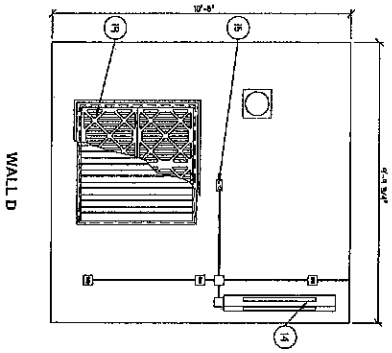


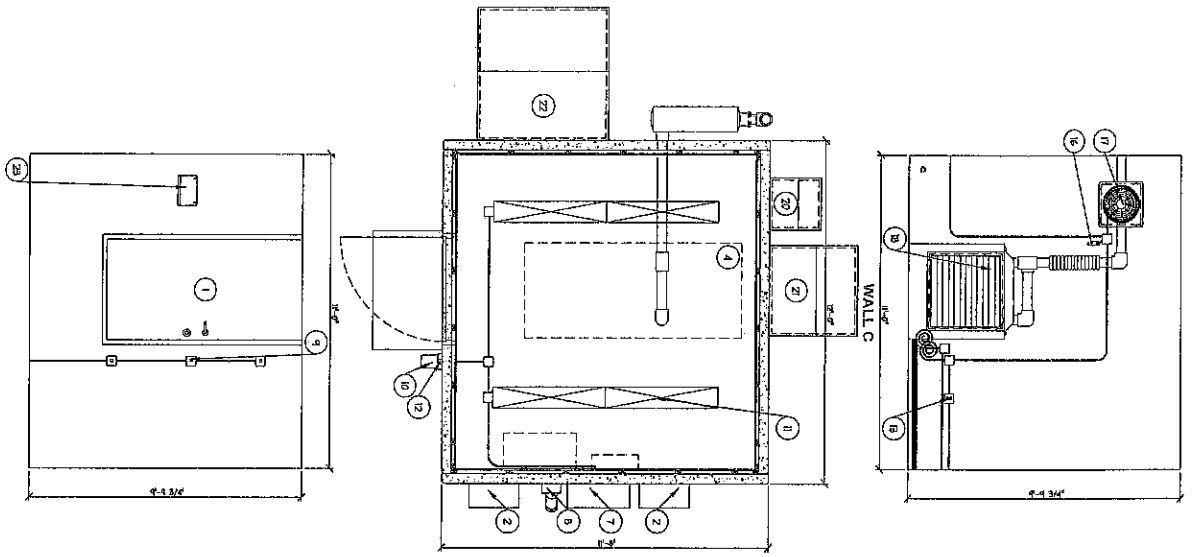
LEFT ELEVATION (WALL D)
SCALE: NONE

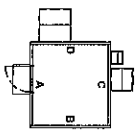


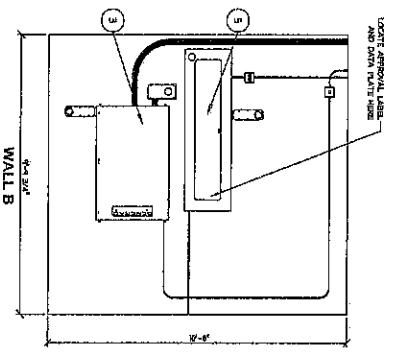
STATE OF MARYLAND
11'-8" X 12'-0" SHELTER
ELEVATIONS

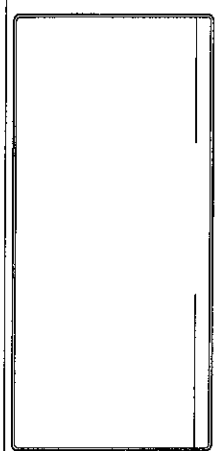
PROJECT NAME:
GENERATOR SHELTER
DRAWING NUMBER:











PROJECT NAME:
GENERATOR SHELTER
DRAWING NUMBER:

STATE OF MARYLAND
11'-8" X 12'-0" SHELTER

FLOOR PLAN