

PLANNING COMMISSION REGULAR MEETING
Tuesday June 13, 2023 AT 6:45 PM
CORDOVA CENTER COMMUNITY ROOMS A & B

Chair

Tania Harrison

Vice Chair

Mark Hall

Commissioners

Tom McGann

Chris Bolin

Trae Lohse

Sarah Trumblee

Kris Ranney

City Planner

Kevin Johnson

AGENDA

1. CALL TO ORDER

2. ROLL CALL

Chair Tania Harrison, Commissioners Tom McGann, Chris Bolin, Trae Lohse, Mark Hall, Sarah Trumblee, and Kris Ranney

3. APPROVAL OF AGENDA

4. APPROVAL OF CONSENT CALENDAR

- a. Record unexcused absence for Trae Lohse from the May 23, 2023 Special meeting

5. DISCLOSURES OF CONFLICTS OF INTEREST AND EX PARTE COMMUNICATIONS

6. CORRESPONDENCE

7. COMMUNICATIONS BY AND PETITIONS FROM VISITORS

- a. Guest Speakers
b. Audience comments regarding agenda items (3 minutes per speaker)

8. PLANNER'S REPORT (verbal)

9. UNFINISHED BUSINESS

10. NEW BUSINESS

- a. Conditional Use Permit & Variance - Telecommunication Tower - Alaska Tideland Survey 459....Page 1

11. AUDIENCE COMMENTS

12. COMMISSION COMMENTS

13. ADJOURNMENT

You may submit written public comments via email to planning@cityofcordova.net, mail comments to City of Cordova, PO Box 1210, Cordova, AK 99574, or delivered to City Hall directly. Written public comments must be received by 4:30 p.m. on the day of the meeting



AGENDA ITEM # 10a
Planning Commission Special Meeting Date: 6/13/23
PLANNING COMMISSION COMMUNICATION FORM

FROM: Kevin Johnson, City Planner
DATE: 6/13/23
ITEM: Conditional Use Permit & Variance - Telecommunication Tower
– Alaska Tideland Survey 459
NEXT STEP: Decide Whether to Grant Conditional Use Permit & Variance

INFORMATION
 MOTION
 RESOLUTION

I. REQUEST OR ISSUE:

Requested Actions: Grant of Conditional Use Permit & Variance
Applicant: Copper Valley Telecom
Address: 205 Sawmill Bay Road (tax lot #02-106-820)
Legal Description: Alaska Tidelands Survey 459
Zoning: Unrestricted

The City of Cordova received an application requesting a Conditional Use Permit (CUP) for the installation of an 85-foot-tall telecommunication tower, along with a variance from Cordova Municipal Code (CMC) 18.60.070 (C) (9).

The application specifically requests a variance from the requirement that a telecommunication tower be set back a distance equal to or greater than the height of the tower. The proposed location of the tower would not meet this requirement along the north and south property line property line (see attachment D).

II. RECOMMENDED ACTION / NEXT STEP:

A Commissioner should make the following motion followed by a second to open the item for discussion

“I move that the Planning Commission grant the Conditional Use Permit and Variance request by Copper Valley Telecomm and to adopt and incorporate the findings and conditions of approval within the staff report.”

Staff recommends the Planning Commission grant the CUP and Variance request only if the suggested conditions are also approved.

The CUP and Variance can be granted with or without special conditions or denied.

III. FISCAL IMPACTS:

N/A

IV. BACKGROUND INFORMATION:

Copper Valley Telecom (CVTC) has determined that to improve cellular coverage a telecommunication tower is required in Sawmill Bay and have identified one of the Rubio properties as the best location for this tower, see attachment E.

The setback requirement for a cell tower is equal to the height of the tower. In this case, the tower should be setback no less than 85 feet from a property line. The location selected by CVTC would create an encroachment across two separate properties (See attachment D) One encroachment would be across a second lot owned by the Rubio's (Tract A USS 3567). The second encroachment would be across a property owned by Luke Borer (ATS 103).

CVTC has indicated that they are unable to adjust the location of the tower to correct these encroachments due to geological constraints such as unstable soil conditions to the south and east of the proposed location and a rocky tree covered hill to the west. The property owner has also identified the proposed location as the best to not disrupt their business operations. So, they are requesting a variance from the setback requirement. Staff recommends that a variance be granted for the Borer setback encroachment, but not for the Rubio encroachment.

The encroachment of the setback to the Borer lot would be 35 feet. Mr. Borer spoke with me regarding this application and said that he was not opposed to the project and he also spoke with CVTC and told them the same. He did ask that CVTC include his property as additionally insured to protect him in the case of an accident involving the tower. Staff recommends that a variance for the setback encroachment to the Borer lot be granted so long as the following condition is met:

Recommended condition #1: Prior to the issuance of a building permit for the telecommunication tower, the applicant shall provide the city with a document that has been recorded with the State of Alaska that shows that the area of Mr. Borer's property that is affected by this encroachment is either 1) included as additionally insured on an insurance policy for the cell tower OR 2) an easement restricting the affected area is created that limits the use of that area to "non-dwelling" uses. The insurance coverage or easement requirement shall run with the land to protect future owners of the Borer property.

Staff believes this compromise would allow for the Rubio's to move forward with leasing space for the cell tower and allow CVTC to provide better coverage while also protecting Mr. Borer and future owners of his lot. If the easement route is taken, limiting the area to "non-dwelling" uses would still allow for shops and storage facilities to be built in that area, just not a residence. The recording of the document would also make future buyers of the Borer property aware of this encroachment when they perform a title search prior to purchasing the land.

Staff does not recommend a variance be granted for the Rubio encroachment. As the Rubio's control both lots affected by this encroachment there is no reason they cannot do a boundary line adjustment to eliminate this proposed encroachment. Staff instead recommends that the following condition be required to be met:

Recommended condition #2: Prior to the issuance of a building permit for the telecommunication tower, the applicant shall complete a subdivision that is approved by the city and recorded with the State of Alaska that repositions the property line so that no encroachment exists between the two properties owned by the Rubio's.

Below you will find the CUP approval criteria in *italics* and staff's responses in normal font type. Staff has also provided the suggested conditions of approval in section VIII.

Suggested Findings:

18.60.020 (B) – Generic Conditional Use Permit Approval Criteria

1. *The use is consistent with the purpose of this chapter and is compatible with the zoning district and the comprehensive plan;*

This criterion is met. The zoning district allows for all legal uses of property. The project is consistent with the comprehensive plan which discusses expansion of communication technology including cell service coverage (economic development strategy #4).

2. *The use will not permanently or substantially injure the lawful use of neighboring properties;*

This criterion can be met with staffs recommended conditions of approval.

Recommended condition #1 would provide the existing neighbor (Borer lot) with protection from damages through either insurance coverage or limiting the type of construction within the affected area. Future owners would be aware of this encroachment prior to purchasing as a document would be recorded to the properties title.

Recommended condition #2 requires a replating of the two lots both under the Rubio's control so that there would be no encroachment and thus no permanent of substantial injury to the lawful use of the neighboring property.

3. *Public services and facilities are adequate to serve the proposed use;*

This criterion is met. The use does not use water or sewer. Electricity is available on site.

4. *The proposed use will not have a permanent negative impact on pedestrian and vehicular traffic*

circulation and safety substantially greater than that anticipated from permitted development; and

This criterion is met. A telecommunication towers are a permitted use with a conditional use permit and the conditional use permit section of the code relevant to telecommunication towers does not have restrictions on placement of the tower in relation to roadways or pedestrian paths.

5. *The proposed use will not adversely affect to the public's safety, health, or general welfare.*

This criterion can be met with staffs recommended conditions of approval. By meeting the above criterion, and the recommended conditions of approval, and being consistent with the comprehensive plan the use does not adversely affect the publics safety, health, and general welfare.

18.60.070 (C) - Telecommunication Tower Specific Conditional Use Permit Approval Criteria

1. *Location and Visual Impact. The proposed location of the telecommunication tower will minimize the visual impact on the surrounding area while allowing the telecommunication tower to function in accordance with minimum standards imposed by the applicable telecommunications regulations and the applicant's technical design requirements. Telecommunication towers and attached antennas and equipment must be painted or coated in a color that blends with the surrounding environment. Muted colors, earth tones, and subdued hues, such as gray, shall be used. All associated structures such as equipment buildings, including the roofs, shall be painted with earth tone colors unless otherwise required under this code or other applicable law. Where necessary to make a telecommunication tower compatible with the historical, environmental or cultural character of its location, the planning and zoning commission may require that the telecommunication tower be disguised, hidden or screened, or integrated as an architectural feature of a structure, to reduce its visual impact.*

This criterion has been met. The telecommunication tower is to be painted a brown earth tone, with attached antennas; ground equipment will be surrounded by an 8ft fence required by CMC 18.60.70 (C) to minimize the visual impact and promote safety. The proposed equipment building is to be 8ft x 10ft stick built with metal roof and siding.

2. *Inability to Collocate. It is not feasible to locate the applicant's telecommunication antenna and other equipment on any existing structure or tower under the control of the applicant.*

This criterion has been met. There are no existing structures located nearby to collocate on. Due to the technical design requirements and significant coverage gap, Copper Valley Wireless has chosen this location for the new facility.

3. *Location in a Residential Zoning District. An applicant seeking to locate a telecommunication tower in a residential zoning district must show that the area cannot be adequately served by a telecommunication tower located in a nonresidential zoning district for valid technical reasons.*

This criterion has been met. The proposed location is zoned “Unrestricted”, which allows for residential uses, but is not a strictly residential zone.

4. *Location on Public Property or Other Private Property. If the applicant proposes to acquire a site on private property for the telecommunication tower, the applicant must show that no available publicly owned site or available privately owned site occupied by a compatible use is suitable under applicable communications regulations and the applicant's technical design requirements.*

This criterion has been met. Based on the application material submitted by the applicant, there are no public locations near the proposed telecommunications facility. The surrounding properties consist of privately owned parcels. These private parcels are not applicable due to the technical design requirements and coverage needs for the surrounding CVTC customers.

5. *Design for Future Use. A new telecommunication tower shall be designed to allow collocation of telecommunication antennas equal in number to the applicant's present and reasonably foreseeable future requirements.*

This criterion has been met. Based on the application material submitted by the applicant, the proposed telecommunications facility is designed to accommodate additional carriers at the same height or separated at different levels on the tower.

6. *Safety Code Met. The telecommunication tower meets all applicable laws and code requirements, including without limitation health, nuisance, noise, fire, building and safety code requirements.*

This criterion has conditionally been met. Based on the application material submitted by the applicant, the proposed telecommunications facility is designed to meet the requirements set by the safety codes posed through the FCC standards in relations to telecommunication facilities to health, nuisance, noise, fire, building and safety code. The State of Alaska Fire Marshalls Department application has been submitted for the 8 x 10 (80 sq. ft) structure.

7. *Distance from Existing Telecommunication Towers. A telecommunications tower shall not be approved if it is located within one-half mile (two thousand six hundred forty feet) of an existing telecommunication tower, unless the applicant certifies that the existing telecommunication tower does not meet the applicant's structural specifications and technical design requirements, or that a collocation agreement could not be obtained.*

This criterion has been met. The applicant has provided a map of existing tower locations, all of which are greater than one-half mile. Staff knows of no other towers within one-half mile.

8. *Zoning Requirements. With the exception of requirements for setback and height, which are established in this section, the telecommunication tower must comply with all applicable zoning laws and regulations, including, without limitation, all laws governing land development, visibility, fencing, screening, landscaping, parking, access, lot size, exterior illumination, and sign, storage.*

This criterion is met. The property is located in the Unrestricted district which allows for this use. The applicant has submitted plans showing the design of the tower, equipment shed and fencing which all meet zoning requirements. The only proposed signs are FCC required signs which this code allows. No illumination is proposed unless FAA requires a light at the top of the tower.

9. *Setback. In all zoning districts, a telecommunication tower must be located no less than a distance equal to the tower height from all lot lines.*

This criterion is met if the Planning Commission approves the variance associated and approves the Conditional Use Permit with staffs recommended conditions.

By including recommended condition #1 the intent of the setback requirement is being served as the neighboring property is being protected either by insurance coverage or through some other form of restriction on the uses that can be built in the affected area. Future owners of the lot are protected by the agreement being recorded so that it will appear with a title search.

By including recommended condition #2 the Rubio encroachment will go away as the line property line will be required to be moved at least 85 feet away. The Rubio encroachment can be cleared up easily as the owner has control of both lots and can preform a boundary line adjustment.

10. Signs. No signs may be located on a telecommunication tower except for identification signage.

This criterion has been met. The only signage will be FCC required and to provide owner contact information.

11. Lighting. No lighting may be located on a telecommunication tower except as reasonably required for safety purposes or as required by the Federal Communications Commission, Federal Aviation Administration or other government agency with jurisdiction.

This criterion has been met. The applicant proposes no lighting unless required by the FAA for safety purposes.

12. Fencing. A fence with a minimum height of eight feet must be placed on the perimeter of the site of a telecommunications tower site to limit access by the public.

This criterion has been met. The applicant proposes to install an 8-foot tall fence around the perimeter to limit access to the public.

13. Height. The height of a telecommunications tower may not exceed the maximum tower height specified in the conditional use permit or in this section.

This criterion has conditionally been met. The applicant has requested a tower height of 85 feet. Staff has added a condition that upon completion of the tower installation the applicant must provide a height survey verifying that the tower height does not exceed 85 feet.

18.64.020 (A) (2) - Variance Approval Criteria

a. That there are exceptional physical circumstances or conditions applicable to the property or to its intended use or development which do not apply generally to the other properties in the same land use district.

This criterion has been met. The applicant believes that the other portions of the rubio property to the south and east of the proposed tower location are not geologically stable. This appears to be due to parts of the lot being filled tidelands and uplifted tide flats. To the west of the proposed location there is a rocky hill that is covered with trees. The proposed area is the most geologically able location according to the applicant. The rubio property is at the tip of land that meets with Orca Inlet so other properties in the area are more inland and would assume they have more stable geological conditions.

- b. *That the strict application of the provisions of this title would result in practical difficulties or unnecessary hardship.*

This criterion has been met. Strict adherence to the code would create a hardship on the owner's future property development & future business needs. Siting the tower in other areas that strictly meet the setback requirement would significantly reduce the landowner's available property for their business uses including fishing vessel storage.

- c. *That the granting of the variance will not result in material damage or prejudice to other properties in the vicinity nor be detrimental to the public health, safety or welfare.*

This criterion can be met with the approval of staffs recommended condition #1. The height of the tower (85ft) is proposed in an area away from potential future and current use of the property. The placement is 50 ft from the shared property line, extending 35ft into the adjacent property as depicted in attachment D. CVTC was contacted by property owner Lucas Borer on 4.24.23 and Mr. Borer provided approval of the separation distance between his northeast property line and the tower. With Br Borer's approval and including recommended condition #1 this criterion can be met

- d. *That the granting of the variance will not be contrary to the objectives of the comprehensive plan.*

This criterion has been met. The granting of the variance will not be contrary to the Comprehensive Plan. The Comprehensive Plan supports the expansion of cellular service through out the community which this tower will provide.

V. LEGAL ISSUES:

The public or applicant may appeal the decision of the Planning Commission to the City Council.

VI. ENVIRONMENTAL ISSUES:

N/A

VII. SUMMARY AND ALTERNATIVES:

The applicant proposes to build an 85-foot-tall telecommunication tower on the Rubio property on Sawmill Bay Road. Due to site conditions, unique property lines, and to minimize impacts to the Rubio's business the proposed location for the tower would create two setback encroachments. One would be between a second property owned by the Rubio's, a second to a property owned by Luke Borer. The applicant has requested a variance to these two setbacks. Staff believes that the variance could be granted for the Borer setback encroachment if recommended condition #1 is applied to this approval. Staff does not believe that a variance should be granted to the Rubio encroachment as that can be easily rectified with a boundary line adjustment as they own both properties involved.

Staff recommends the Planning Commission Grant the Conditional Use Permit and Variance with the conditions below in Section VIII.

VIII. CONDITIONS:

1. Prior to the issuance of a building permit for the telecommunication tower, the applicant shall

provide the city with a document that has been recorded with the State of Alaska that shows that the area of Mr. Borer's property that is affected by this encroachment is either 1) included as additionally insured on an insurance policy for the cell tower OR 2) an easement restricting the affected area is created that limits the use of that area to "non-dwelling" uses. The insurance coverage or easement requirement shall run with the land to protect future owners of the Borer property.

2. Prior to the issuance of a building permit for the telecommunication tower, the applicant shall complete a subdivision that is approved by the city and recorded with the State of Alaska that repositions the property line so that no encroachment exists between the two properties owned by the Rubio's.

IX. ATTACHMENTS:

- A. Conditional Use Permit & Variance Applicable Code Sections
- B. Conditional Use Permit Application and Attachments
- C. Variance Application and Attachments
- D. Encroachment Exhibit
- E. Location Map

Attachment A

Applicable Codes:

18.60 - Conditional Use Permit

CMC 18.60.020 – Applications

Applications for a conditional use permit shall be filed with the city planner.

- A. The application shall include but is not limited to the following:
 1. Name and address of the applicant;
 2. If applicant is not the owner of the subject lot, the owner's signed authorization granting applicant the authority to (a) apply for the conditional use permit and (b) bind the owner to the terms of the conditional use permit, if granted;
 3. A legal description of the property involved;
 4. A narrative description of the proposed use;
 5. A proposed time frame for the new use and/or the period of construction;
 6. Dimensioned plot plans showing the location of all existing and proposed buildings or alterations, and their existing and proposed uses;
 7. The nonrefundable fee as established by city council resolution;
 8. Narrative evidence that the application meets all of the review criteria in Section 18.60.020B. Evidence shall be sufficient to enable meaningful review of the application;
 9. Any additional information required by the Municipal Code; and
 10. Any additional information the city planner may require to determine whether the application satisfies the criteria for issuance of a permit.
- B. Prior to granting a conditional use permit, the planning and zoning commission must determine that the proposed use meets all of the following review criteria:
 1. The use is consistent with the purpose of this chapter and is compatible with the zoning district and the comprehensive plan;
 2. The use will not permanently or substantially injure the lawful use of neighboring properties;
 3. Public services and facilities are adequate to serve the proposed use;
 4. The proposed use will not have a permanent negative impact on pedestrian and vehicular traffic circulation and safety substantially greater than that anticipated from permitted development; and
 5. The proposed use will not adversely affect to the public's safety, health, or general welfare.
- C. The planning and zoning commission shall hold a public hearing upon each properly submitted application. Such hearing shall be held not less than ten days nor later than thirty days following the date of filing of such application and the applicant shall be notified of the date of such hearing.
- D. The commission shall cause to be sent to each owner of property within a distance of three hundred feet of the exterior boundary of the lot or parcel of land described in such application notice of the time and place of hearing and a description of the property involved. For the purposes of this section, "property owner" means that owner shown upon the latest tax assessment roll.
- E. The commission shall cause to be made by its own members, or its authorized agent, an investigation of facts bearing on any application sufficient to assure that the action taken is consistent with the intent and purpose of this section.

- F. The planning and zoning commission shall hear and consider evidence and facts from any person at any public hearing or written communication from any person relative to the matter. The right of any person to present evidence shall not be denied for the reason that any such person was not required to be informed of such public hearing.
- G. Within thirty days from the conclusion of the public hearing, the planning and zoning commission shall render its decision unless such time limit be extended by common consent and agreement signed by both applicant and the commission. If, in the opinion of the commission, the necessary facts and conditions set forth in this chapter apply in fact to the property or use referred to, it may grant the conditional use permit. If, however, such facts and conditions do not prevail nor apply the commission shall deny the application.
- H. The commission, in granting approval, may establish conditions under which a lot or parcel of land may be used or a building constructed or altered; make requirements as to architecture, height of building or structure open spaces or parking areas; require conditions of operation of any enterprise; or may make any other condition, requirements or safeguards that it may consider necessary to prevent damage or prejudice to adjacent properties or detriment to the city. When necessary, the commission may require guarantees in such form as deemed proper under the circumstances to ensure that the conditions designed will be complied with.
- I. The decision of the planning and zoning commission, either for the granting with or without conditions, or the denial of an application, shall become final and effective ten days following such decision.
- J. Any aggrieved person or party may appeal the planning and zoning commission decision following the protocol in 18.64.030.
- K. Any application approved by the planning and zoning commission shall be conditional upon the privilege granted being utilized within six months after the effective date of approval.
- L. Construction work must commence within the stated period and must be diligently prosecuted to completion, otherwise the approval is automatically voided.
- M. In the case of construction, the planning and zoning commission may extend the time of construction if satisfactory evidence of planning and/or construction progress is presented.
- N. A conditional use permit shall automatically expire if for any reason the conditioned use ceases for a period of twenty-four months or longer
- O. A permittee who disputes the administrative official's determination that the conditioned use has not been timely initiated or has ceased for a period of twenty-four months or longer may appeal the official's determination under 18.64.040.
- P. A conditional use permit is not transferable from one parcel of land to another. Conditional use permits may be transferred from one owner to another for the same use, but if there is a change in use on the property, a new permit must be obtained.

(Ord. No. 1162, § 2, 6-20-2018)

18.60.070 – Conditional Use for Telecommunication Tower

- A. The planning and zoning commission may grant a conditional use permit for a telecommunication tower in any zoning district subject to the conditions in this section.
- B. In addition to the requirements 18.60.020 the application for a conditional use permit for a telecommunication tower shall include the following information:
 - 1. A written narrative explaining why the proposed site has been chosen, why the telecommunication tower is necessary, why the requested height was chosen, and a full explanation regarding the telecommunication tower's ability to accommodate other providers; and

2. Specifications for the telecommunication tower and all antennas to be located on it, including a description of design characteristics and material;
 3. A site plan drawn to scale showing property boundaries, telecommunication tower location, telecommunication tower height, guy wires and anchors and existing structures and land uses on the site and on adjacent property;
 4. A map showing the locations of the applicant's existing telecommunication towers that serve customers in the city and of all telecommunication towers that the applicant proposes to construct to serve customers in the city;
 5. A report prepared by a person registered as a structural engineer in Alaska showing the capacity by type and number of the telecommunication tower and antennas, and that the telecommunication tower and antennas are designed to withstand winds in accordance with the latest revision of ASI/EIA/TIA/222 standards ("Structural standards for steel communications antenna towers and communications antenna supporting structures");
 6. Identification of the person or persons who own the telecommunication tower and the equipment that is to be located on it;
 7. Written authorization for the application from the owner of the site;
 8. Evidence that the applicant has a valid FCC license for the use of the telecommunication tower;
 9. A line of sight analysis showing the potential visual and aesthetic impacts of the telecommunication tower on adjacent residential districts through the use of photo simulations of the telecommunication tower, including all antennas, structures, and equipment, using the vantage points and number of photo simulations requested by the planning department;
 10. A written agreement, on a form approved by the city attorney, to remove the telecommunication tower and restore the site to its original condition within one hundred eighty days after the telecommunication tower is substantially unused for a period of twelve consecutive months, and providing that if the telecommunication tower is not removed within this one hundred eighty-day period, the city may remove the telecommunication tower at the cost of the owner;
 11. A cell phone coverage map showing the applicant's proposed cell phone coverage within the city;
 12. A certificate from an engineer licensed in Alaska that the telecommunication tower, and all antennas and other equipment located on it, are built and installed to approved specifications and will contain only equipment meeting Federal Communications Commission requirements;
 13. Any additional information required by the planning department during the application process.
- C. In addition to the requirements 18.60.020 the planning and zoning commission may approve an application under this section, with or without conditions, if the application meets the following criteria:
1. Location and Visual Impact. The proposed location of the telecommunication tower will minimize the visual impact on the surrounding area while allowing the telecommunication tower to function in accordance with minimum standards imposed by the applicable telecommunications regulations and the applicant's technical design requirements. Telecommunication towers and attached antennas and equipment must be painted or coated in a color that blends with the surrounding environment. Muted colors, earth tones, and subdued hues, such as gray, shall be used. All associated structures such as equipment buildings, including the roofs, shall be painted with earth tone colors unless otherwise required under this code or other applicable law. Where necessary to make a telecommunication tower compatible with the historical, environmental or cultural character of its location, the planning and zoning commission may require that the telecommunication tower be disguised, hidden or screened, or integrated as an architectural feature of a structure, to reduce its visual impact.
 2. Inability to Collocate. It is not feasible to locate the applicant's telecommunication antenna and other equipment on any existing structure or tower under the control of the applicant.

3. Location in a Residential Zoning District. An applicant seeking to locate a telecommunication tower in a residential zoning district must show that the area cannot be adequately served by a telecommunication tower located in a nonresidential zoning district for valid technical reasons.
 4. Location on Public Property or Other Private Property. If the applicant proposes to acquire a site on private property for the telecommunication tower, the applicant must show that no available publicly owned site or available privately owned site occupied by a compatible use is suitable under applicable communications regulations and the applicant's technical design requirements.
 5. Design for Future Use. A new telecommunication tower shall be designed to allow collocation of telecommunication antennas equal in number to the applicant's present and reasonably foreseeable future requirements.
 6. Safety Code Met. The telecommunication tower meets all applicable laws and code requirements, including without limitation health, nuisance, noise, fire, building and safety code requirements.
 7. Distance from Existing Telecommunication Towers. A telecommunications tower shall not be approved if it is located within one-half mile (two thousand six hundred forty feet) of an existing telecommunication tower, unless the applicant certifies that the existing telecommunication tower does not meet the applicant's structural specifications and technical design requirements, or that a collocation agreement could not be obtained.
 8. Zoning Requirements. With the exception of requirements for setback and height, which are established in this section, the telecommunication tower must comply with all applicable zoning laws and regulations, including, without limitation, all laws governing land development, visibility, fencing, screening, landscaping, parking, access, lot size, exterior illumination, and sign, storage.
 9. Setback. In all zoning districts, a telecommunication tower must be located no less than a distance equal to the tower height from all lot lines.
 10. Signs. No signs may be located on a telecommunication tower except for identification signage.
 11. Lighting. No lighting may be located on a telecommunication tower except as reasonably required for safety purposes or as required by the Federal Communications Commission, Federal Aviation Administration or other government agency with jurisdiction.
 12. Fencing. A fence with a minimum height of eight feet must be placed on the perimeter of the site of a telecommunications tower site to limit access by the public.
 13. Height. The height of a telecommunications tower may not exceed the maximum tower height specified in the conditional use permit or in this section.
- D. No decision regulating the placement, construction or modification of a telecommunication tower may be made on the basis of environmental or health effects of radio frequency emission if the antennas and other equipment on the telecommunication tower comply with Federal Communications Commission regulations.

18.64 – Exceptions, Variances, and Appeals

18.64.020 Variances.

- A. An application for a variance shall be filed in writing and verified by the owner of the property concerned.
 1. The application shall contain the following data with respect to the property and the applicant:
 - a. A legal description of the property involved,
 - b. Plot plans showing the location of all existing and proposed buildings or alterations, elevations of such buildings or alterations, and such other data as may be required,

- c. Evidence of the ability and intention of the applicant to proceed in accordance with the plans within six months after the effective date of the variance;
- 2. The application shall contain a statement and adequate evidence showing the following conditions, all four of which must exist before a variance may be granted.
 - a. That there are exceptional physical circumstances or conditions applicable to the property or to its intended use or development which do not apply generally to the other properties in the same land use district,
 - b. That the strict application of the provisions of this title would result in practical difficulties or unnecessary hardship,
 - c. That the granting of the variance will not result in material damage or prejudice to other properties in the vicinity nor be detrimental to the public health, safety or welfare,
 - d. That the granting of the variance will not be contrary to the objectives of the comprehensive plan.
- B. The planning commission shall hold a public hearing upon each properly submitted application. Such hearing shall be held not less than ten days nor later than thirty days following the date of filing of such application and the applicant shall be notified of the date of such hearing. The commission shall cause to be sent to each owner of property within a distance of three hundred feet of the exterior boundary of the lot or parcel of land described in such application notice of the time and place of the hearing, a description of the property involved and the provisions of this title from which a variance is sought. For the purposes of this section, "property owner" means that owner shown upon the latest tax assessment roll.
- C. From the time of filing such application until the time of such hearing, the application, together with all plans and data submitted, shall be available for public inspection in the office of the city clerk.
- D. The commission shall cause to be made by its own members, or its authorized agent, an investigation of facts bearing on any application sufficient to assure that the action taken is consistent with the intent and purpose of this title.
- E. The planning commission shall hear and consider evidence and facts from any person at the public hearing or written communication from any person relative to the matter. The right of any person to present evidence shall not be denied for the reason that any such person was not required to be informed of such public hearing.
- F. Within thirty days from the conclusion of the public hearing, the planning commission shall render its decision unless such time limit be extended by common consent and agreement signed by both applicant and the commission. If, in the opinion of the commission, the necessary facts and conditions set forth in this section apply in fact to the property referred to, and that the same comes within the purview of the planning commission, it may grant the variance. If, however, such facts and conditions do not prevail nor apply, or if the granting of the variance will adversely affect the property of persons in the vicinity of the applicant's property, or for any other valid reason, the commission shall deny the application.
- G. The commission, in granting the variance, may establish conditions under which a lot or parcel of land may be used or a building constructed or altered; make requirements as to architecture, height of building, or structure, open spaces or parking. areas; require conditions of operation of any enterprise; or may make any other conditions, requirements or safeguards that it may consider necessary to prevent damage or prejudice to adjacent properties or detriment to the city. When necessary, the commission may require guarantees in such form as deemed proper under the circumstances to insure that the conditions designated will be complied with.
- H. The decision of the planning commission, either for the granting, with or without conditions, or the denial of an application for variance, shall become final and effective ten days following such decision.

- I. Any variance approved by the planning commission shall be conditional upon the privilege granted being utilized within six months after the effective date of the variance. In the event some construction work is involved, it must actually commence with the stated period and must be diligently prosecuted to completion, otherwise the variance is automatically voided. In such cases, the planning commission may extend the time of the construction. start if satisfactory evidence of planning progress is presented.
- J. In order to defray the expense of making maps, sending out notices, and incidental administration costs involved in any application for variances and appeals, the person filing such application shall pay a fee to the city to cover the expenses incurred by the city in processing the application. Regardless of the action taken on the application, the fee will not be refunded.

(Ord. 582 (part), 1984; prior code § 15.220(C)).

Attachment B

CITY OF CORDOVA



CONDITIONAL USE PERMIT APPLICATION

City of Cordova, Alaska

INSTRUCTIONS	PERMIT TYPE	FEE
Print or type requested information. Incomplete applications will be returned to the applicant and will delay processing of the request. Applications must be received by the Planning Department 21 days prior to the next Planning Commission Regular Meeting, which is scheduled the second Tuesday of each month.	Conditional Use Permit	\$250

APPLICANT INFORMATION

Name:	
Mailing Address:	
City/State/Zip:	
Phone Number:	
Email Address:	

OWNER INFORMATION

Name:	
Mailing Address:	
City/State/Zip:	
Phone Number:	
Email Address:	

Only complete this section if owner is different from applicant.

PROPERTY INFORMATION

Address:	
Legal Description:	
Tax Lot No.:	
Zone District:	

Planning Department can assist if unknown.

REQUEST DESCRIPTION

Please describe your requested conditional use in detail as well as the proposed time frame for the new use.

Please see attached cover letter, narrative, and exhibit.

You may add any additional documents which will help the Planning Commission better understand the request, such as a cover letter, drawings, maps, or photographs.

CONDITIONAL USE STANDARDS

The Planning Commission may only approve the conditional use if the commission finds that **ALL** of the following standards are met. You must include a statement and adequate evidence showing that each of the standards has been met. Use additional pages if needed.

The use is consistent with the purpose of this chapter (Chapter 18.60 - Conditional Use Permits) and is compatible with the zoning district and the comprehensive plan.

Please see CVTC written CUP application for 18.60.70 - Conditional Use Permit, Telecommunications and CVTC supports the objectives noted in the City of Cordova Comprehensive Plan.

The use will not permanently or substantially injure the lawful use of neighboring properties.

Telecommunication towers are permitted under obtaining a Conditional use [per 18.60.70 - Conditional use]. The use does not permanently or substantially injure the lawful use of the neighboring properties.

Public services and facilities are adequate to serve the proposed use.

The proposed property selected area improves gaps in coverage and is technically designed to provide cellular coverage to existing customers. No public services or facilities are available to serve this proposed use on the property.

The proposed use will not have a permanent negative impact on pedestrian and vehicular traffic circulation and safety substantially greater than that anticipated from permitted development.

The height of the new tower is 85ft. This tower will replace an existing 30 ft communication tower on wheels (COW). The proposed tower is proposed within a large privately owned lot which will not have a permanent negative impact on pedestrian or vehicular traffic circulation and safety.

The proposed use will not adversely affect the public's safety, health, or general welfare.

The proposed telecommunications facility is designed to meet the requirements set by the safety codes posed through the FCC standards in relations to telecommunication facilities to health, nuisance, noise, fire, building, and safety codes met through the structural engineering of the tower.

OTHER CONDITIONAL USE REQUIREMENTS

Any application approved by the planning commission shall be conditional upon the privilege granted being utilized within six (6) months after the effective date of approval.

Plot plan is required. The plot plan needs to be drawn to scale, showing the location of all existing and proposed buildings or improvements, elevations of such buildings or alterations, and off-street parking areas.

The City Planning Commission shall have the authority to impose such conditions and safeguards as it deems necessary to protect the best interests of the surrounding property or neighborhood and the Comprehensive City Plan and zoning ordinance.

If applicant is not the owner of the subject lot, the owner's signed authorization granting applicant the authority to (a) apply for the conditional use permit and (b) bind the owner to the terms of the conditional use permit, if granted.

Some conditional uses (telecommunication tower, marijuana establishments, junkyards, and others) are subject to additional requirements in Chapter 18.60 of the Cordova Municipal Code.

APPLICANT CERTIFICATION

By the signature attached hereto, I certify that I am the owner or duly authorized owner's agent and that the information provided within this application and accompanying documentation is correct. Furthermore, I hereby authorize the City and its representatives to enter the property associated with this application for purposes of conducting site inspections.

Applicant Signature: 

Date: 4/20/23

Print Name: Chris Mishmash

Conditional Use Permit for Tower (Whitshed Tower)

Site Plan:

Please see attached site plan

Project Address and Legal Description of Property:

Legal Description: Rubio Property Parcel of land within Tract A, US Survey 3569, and in ATS 459

Project Representatives:

Chris Mishmash,
Copper Valley Telephone
Director of Facilities & Wireless Operations

Project Petitioner / Engineering

Cindy Coughlin
Temptel, LLC
OSP Engineering

Land

Diana Rubio
PO Box 1109
Cordova, AK 99574
Parcel of land within Tract A, US Survey 3569, and within ATS 459

Narrative Description, Proposed Use and Time Frame:

See below in blue:

Information required per (Cordova Municipal Code 18.60.70 and 18.60.020)

1. A written narrative explaining why the proposed site has been chosen:
Why the telecommunication tower height is necessary; Why the requested height was chosen; Full explanation regarding the telecommunication tower's ability to accommodate other providers:

Copper Valley Telephone Company (CVTC) is proposing construction of a telecommunications facility at Rubio Property, Old Sawmill Bay Rd, Cordova Alaska, per the attached Conditional Use Permit Application. This parcel is located in the Unrestricted zoning district where telecommunications towers are considered a conditional use. As part of the due diligence process of locating a telecommunications tower to serve the cellular needs of the community, an in-depth determination of this work is completed leading up to a selection of the proposed site.

The eighty 80 ft monopole tower with 5 ft of antenna (85 ft) will be constructed within a fenced leased area (see attached site plan) on Alaska Tideland Survey 459. Construction of this tower will provide improved cellular communications to the surrounding area, including significant gaps in current voice and data coverage through the new panel antennas and 8 x 10 equipment shelter. The proposed height is necessary to continue communications for CVTC

customers but also provide accommodations for other carries if so desired to co-locate on the tower.

Applications for the conditional use and required documentation are included and attached as an exhibit.

2. Specifications for the telecommunications tower and all antennas to be located on it, including description of design characteristics and material.

See attached specifications list and design criteria

3. A site plan drawn to scale showing property boundaries,
 - a. telecommunication tower location, telecommunication tower height, guy wires and anchors and existing structures
 - b. land uses on the site and on adjacent property.

See attached site plan

4. A map showing the locations of the applicant's existing telecommunication towers that serve customers in the city and of all telecommunication towers that the applicant proposes to construct to serve customers in the city.

See attached map showing locations of existing tower locations

5. A report prepared by a person registered as a structural engineer in Alaska showing the capacity by type and number of the telecommunication tower and antennas,

See attached structural design of tower and the antennas are designed to withstand winds in accordance with the latest revision of ASI/EIA/TIA/222 standards ("Structural standards for steel communications antenna towers and communications antenna supporting structures")

6. Identification of the person or persons who own the telecommunication tower and the equipment that it is to be located on:

The owner of the telecommunication tower and equipment is:

Copper Valley Wireless.

Address:

329 Fairbanks Street

Valdez, AK 99686

Phone: 1 (800) 235-5414

7. Written authorization for the application from the owner of the site:

[Please see attached letter of Authorization](#)

8. Evidence that the applicant has a valid FCC license for the use of the telecommunication tower

[Please see attached FCC License](#)

9. A line of sight analysis showing the potential visual and aesthetic impacts of the telecommunication tower on adjacent residential districts through the use of photo simulations of the telecommunication tower, including all antennas, structures, and equipment, using the vantage points and number of photo simulations requested by the planning department:

[Please see attached line of site analysis and photo simulations](#)

10. A written agreement, on a form approved by the city attorney, to remove the telecommunication tower and restore the site to its original condition within one hundred eighty days after the telecommunication tower is substantially unused for a period of twelve consecutive months, and providing that if the telecommunication tower is not removed within this one hundred eighty-day period, the city may remove the telecommunication tower at the cost of the owner:

[Please see attached written letter](#)

11. A cell phone coverage map showing the applicant's proposed cell phone coverage within the city

[Please see attached coverage map](#)

12. A certificate from an engineer licensed in Alaska that the telecommunication tower, and all antennas and other equipment located on it, are built and installed to approved specifications and will contain only equipment meeting Federal Communications Commission requirements:

[See attached letter from licensed engineer](#)

13. Additional Items:

In accordance with 18.60.70 (C)

1. Location and Visual Impact

The proposed location of the telecommunication tower will minimize the visual impact on the surrounding area while allowing the telecommunication tower to function in accordance with minimum standards imposed by the applicable telecommunications regulations and the applicant's technical design requirements.

Telecommunication towers and attached antennas and equipment must be painted or coated in a color that blends with the surrounding environment. Muted colors, earth tones, and subdued hues, such as gray, shall be used.

All associated structures such as equipment buildings, including the roofs, shall be painted with earth tone colors unless otherwise required under this code or other applicable law.

Where necessary to make a telecommunication tower compatible with the historical, environmental, or cultural character of its location, the planning and zoning commission may require that the telecommunication tower be disguised, hidden or screened, or integrated as an architectural feature of a structure, to reduce its visual impact.

The proposed location of the telecommunication tower was chosen to minimize the visual impact on the surrounding area while allowing functionality in accordance with minimum standards imposed by regulations and CVTC's technical design requirements. The location is suitable to the owner. The telecommunication tower is to be painted a brown earth tone, with attached antennas; ground equipment will be surrounded by an 8ft fence required by CMC 18.60.70 (C) to minimize the visual impact and promote safety. The proposed equipment building is to be 8ft x 10ft stick built with metal roof and siding.

2. Inability to Collocate

It is not feasible to locate the applicant's telecommunication antenna and other equipment on any existing structure or tower under the control of the applicant.

There are no existing structures located nearby to collocate on. Due to the technical design requirements and significant coverage gap, Copper Valley Wireless has chosen this location for the new facility.

3. Location in a Residential Zoning District

An applicant seeking to locate a telecommunication tower in a residential zoning district must show that the area cannot be adequately served by a telecommunication tower located in a nonresidential zoning district for valid technical reasons.

CVTC is seeking the proposed telecommunications facility in an unrestricted zone.

4. Location on Public Property or Other Private Property

If the applicant proposes to acquire a site on private property for the telecommunication tower, the applicant must show that no available publicly owned site or available privately owned site occupied by a compatible use is suitable under applicable communications regulations and the applicant's technical design requirements.

There are no public locations near the proposed telecommunications facility. The surrounding properties consist of privately owned parcels. These private parcels are not applicable due to the technical design requirements and coverage needs for the surrounding CVTC customers.

5. Design for Future Use

A new telecommunication tower shall be designed to allow collocation of telecommunication antennas equal in number to the applicant's present and reasonably foreseeable future requirements.

The proposed telecommunications facility is designed to accommodate additional carriers at the same height or separated at different levels on the tower.

6. Safety Code Met

The telecommunication tower meets all applicable laws and code requirements, including without limitation health, nuisance, noise, fire, building and safety code requirements.

The proposed telecommunications facility is designed to meet the requirements set by the safety codes posed through the FCC standards in relations to telecommunication facilities to health, nuisance, noise, fire, building and safety code. The State of Alaska Fire Marshalls Department application has been submitted for the 8 x 10 (80 sq. ft) structure.

7. Distance from Existing Telecommunication Towers

A telecommunications tower shall not be approved if it is located within one-half mile (two thousand six hundred forty feet) of an existing telecommunication tower, unless the applicant certifies that the existing telecommunication tower does not meet the applicant's structural specifications and technical design requirements, or that a collocation agreement could not be obtained.

The proposed telecommunications facility is not located near any other tower within one-half mile of any existing telecommunication facility. (Exhibit Page)

8. Zoning Requirements

With the exception of requirements for setback and height, which are established in this section, the telecommunication tower must comply with all applicable zoning laws and regulations, including, without limitation, all laws governing land development, visibility, fencing, screening, landscaping, parking, access, lot size, exterior illumination, and sign, storage.

The proposed telecommunications facility is proposed to comply with the zoning laws set forth in CMC code for zoning laws and regulations. The land development and visibility impact which include the following:

Fencing: Proposed is a 8 ft fence with 2ft of 3-strand barb wire

Screening: Natural screening and tower painted earth toned color

Parking: Parking for maintenance vehicles as shown in drawing

Access: Access for maintenance is through the east entrance of the property as shown on the drawings.

Lot size: The proposed facility is within a large property known as the Rubio Property within Alaska Tide Survey 459 at the end of Sawmill Bay Road.

Exterior Illuminations: No illumination at the facility is proposed unless the FCC requires a light located at the top of the tower for safety regulations.

Sign / Storage: The proposed facility will include signage for FCC requirements with noted property contact information and licensure numbers. No storage at the facility is proposed.

9. Setbacks

In all zoning districts, a telecommunication tower must be located no less than a distance equal to the tower height from all lot lines.

Copper Valley Wireless is seeking a waiver in the separation distance to the adjacent property line to the northeast of the proposed tower where the shared property lines of the adjacent landowner meet, and the conjoined property lines of the Rubio property. The 85 ft tower (80 ft tower and 5 ft of antenna) is proposed to fit 50 ft from the northeast property line. CVTC is asking for a variance to the setbacks to the conjoined property lines owned by the same landowner, as well as a variance of the setback distance to the property to the northeast.

10. Signs

The proposed facility will include signage with owner contact information for safety and security.

11. Lighting

No lighting may be located on a telecommunication tower except as reasonably required for safety purposes or as required by the Federal Communications Commission, Federal Aviation Administration or other government agency with jurisdiction.

The telecommunications facility will comply with FCC / FAA regulations if a light is need at the top of the tower for safety.

12. Fencing

A fence with a minimum height of eight feet must be placed on the perimeter of the site of a telecommunications tower site to limit access by the public.

The telecommunications facility will be fenced around the perimeter of the site with an eight (8 ft) fence to limit access by the public.

13. Compliance with FCC

No decision regulating the placement, construction or modification of a telecommunication tower may be made on the basis of environmental or health effects of radio frequency emission if the antennas and other equipment on the telecommunication tower comply with Federal Communications Commission regulations.

The telecommunications facility will comply with all FCC regulations on the basis of environmental or health effects of radio frequency emission for the antennas and other equipment proposed.

Exhibit Table of Contents:

- 18.60.070 B 2: Specification to include tower and antenna design characteristics and materials
- 18.60.070 B 3: Site plan drawing to scale
- 18.60.070 B 4: Map showing location of applicants existing telecom towers
- 18.60.070 B 5: Report from registered structural engineer
- 18.60.070 B 7: Written authorization from property owner
- 18.60.070 B 8: Applicants FCC licensure authorizing use of tower
- 18.60.070 B 9: Line of site photos and simulation photo
- 18.60.070 B 10: Written agreement from CVTC
- 18.60.070 B 11: Cell phone coverage map
- 18.60.070 B 12: Certificate from licensed engineer for equipment installed meet FCC requirements
- 18.60.070 C 4: Map showing property (public or private)
- 18.60.070 C 7: Map showing existing telecommunication towers within in a one-half mile

18.60.070 B 2: Specification to include tower and antenna design characteristics and materials

QUAD658C0000x

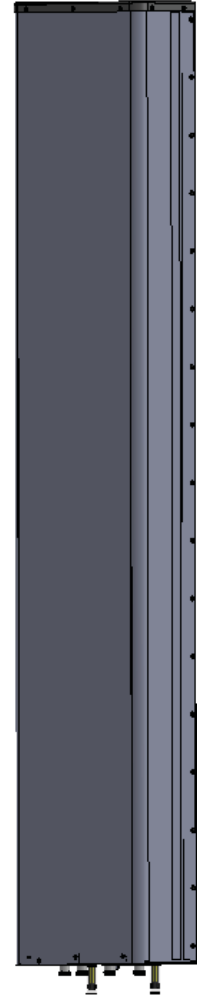
Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 16.0 / 16.0 dBi | Variable Tilt

- Twin band, quad-port panel antenna with variable electrical tilt
- 4x4 MIMO
- Patented internal RET actuator adds no additional length to the antenna

Ordering Options	Model Number
When ordering, replace "x" in the model number with one of the options listed below.	
Manual Electrical Tilt	QUAD658C0000M
Remote Electrical Tilt AISG v2.0 / 3GPP with an MDCU RET Actuator	QUAD658C0000G
Remote Electrical Tilt AISG v2.0 / 3GPP with an MDDU RET Actuator	QUAD658C0000L
Mounting bracket kits and other accessories are ordered separately.	

Electrical Characteristics	(2x) 696-900 MHz	
Frequency Bands	696-806 MHz	806-900 MHz
Polarization	(2x) ±45° (Quad-Pol)	
Horizontal Beamwidth	65°	63°
Vertical Beamwidth	9.2°	7.9°
Gain	15.5 dBi	16.0 dBi
Electrical Downtilt	0-10°	
Impedance	50Ω	
VSWR	≤ 1.5:1	
Upper Sidelobe Suppression	18 dB	18 dB
Front-to-Back Ratio	> 25 dB	> 25 dB
Inband Isolation	25 dB	
Isolation Between Bands	28 dB	
IM3 (2x20W carrier)	< -153 dBc	
Input Power	(4x) 500 W	
Total Number of Connectors	Antennas has 4 connectors located at the bottom	
Connectors Per Band	696-900 MHz	(2x) 7/16-DIN Female
	696-900 MHz	(2x) 7/16-DIN Female
Diplexed	No	
Lightning Protection	Direct Ground	
Operating Temperature	-40° to +60° C (-40° to +140° F)	


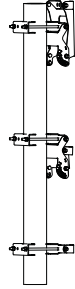
Mechanical Characteristics		
Dimensions (Length x Width x Depth)	2410 x 525 x 183 mm	94.9 x 20.7 x 7.2 in
Depth with Z-Brackets	227 mm	8.9 in
Weight without Mounting Brackets: MET	36.3 kg	80 lbs
Weight without Mounting Brackets: RET	36.7 kg	81 lbs
Survival Wind Speed	> 241 km/hr	> 150 mph
Wind Area	Front	1.25 m ² / 13.5 ft ²
	Side	0.44 m ² / 4.7 ft ²
Wind Loads (160 km/hr or 100 mph)	Front	1530 N / 344 lbf
	Side	536 N / 120 lbf



Quoted performance parameters are provided to offer typical, peak or range values only and may vary as a result of normal testing, manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to products may be made without notice.

QUAD658C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 16.0 / 16.0 dBi | Variable Tilt

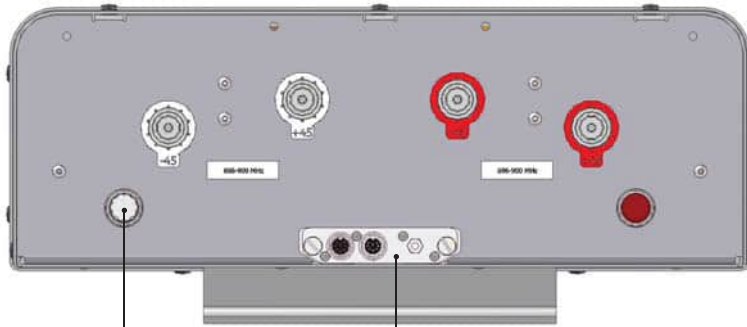
Electrical Downtilt Control				
Electrical downtilt for each band can be controlled separately. Tilt indicator(s) are covered by removable transparent cap(s).				
Manual Electrical Tilt (MET) Control	A colored knob at the end of the tilt indicator allows change of the tilt without need of a tool. The knob color is identical to the corresponding connector ring color. To access the knob, remove the cap by turning it counter-clockwise. It is re-installed by opposite rotation. Do not remove the transparent cap(s) from the antenna.			
Remote Electrical Tilt (RET) Control	The remote control of the electrical tilt is managed by either a Multi-Device Control Unit (MDCU) or a Multi-Device Dual Unit (MDDU) inserted in the bottom of the antenna. A single actuator individually controls the tilt of each band (no need for daisy chain cables between the bands). This module does not add any additional length to the antenna. For RET control, the transparent caps must be in place and locked. The tilt angle indicators always remain visible and the antenna still has manual tilt control (manual override).			
RET Actuator	Select one of the following RET actuators when ordering this antenna.			
	Multi-Device Control Unit (MDCU)	The MDCU is an electronic module that allows the remote control of the electrical downtilt (RET) in Amphenol antennas with factory embedded motors. The MDCU is factory installed. Refer to ordering options.		
	Multi-Device Dual Unit (MDDU)	The MDDU allows two separate RET Controllers to independently drive the RETs in Amphenol antennas with factory installed motors (for antenna sharing). The MDDU is factory installed. Refer to ordering options.		
Important Installation Instructions		In order to operate RET control, the transparent caps covering the tilt adjustment indicators must be engaged and locked. Do not cut them from the antenna.		
		Do not install the antenna with the connectors facing upward.		
Mounting Options	Part Number	Image	Fits Pipe Diameter	Weight
All mounting bracket kits are ordered separately unless otherwise indicated. Select from the options listed below.				
3-Point Mounting and Downtilt Bracket Kit	36210008		40-115 mm 1.6-4.5 in	6.9 kg 15.2 lbs

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QUAD658C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 16.0 / 16.0 dBi | Variable Tilt

Bottom View of Antenna



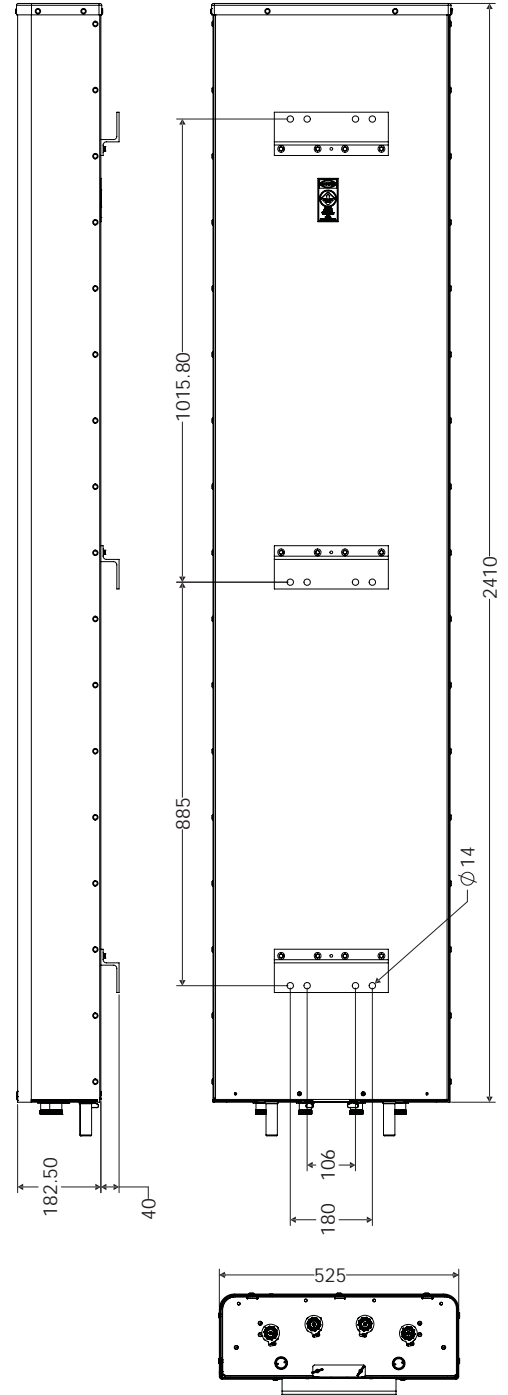
Location of the MDCU or MDDU for RET Control (MDCU shown)

Tilt indicators covered by transparent caps. Manual adjustment is accessed by removing the caps. Knob colors are the same as the connectors.



In order to operate RET control, the transparent caps covering the tilt adjustment indicators must be engaged and locked. Do not cut them from the antenna.

Dimensions

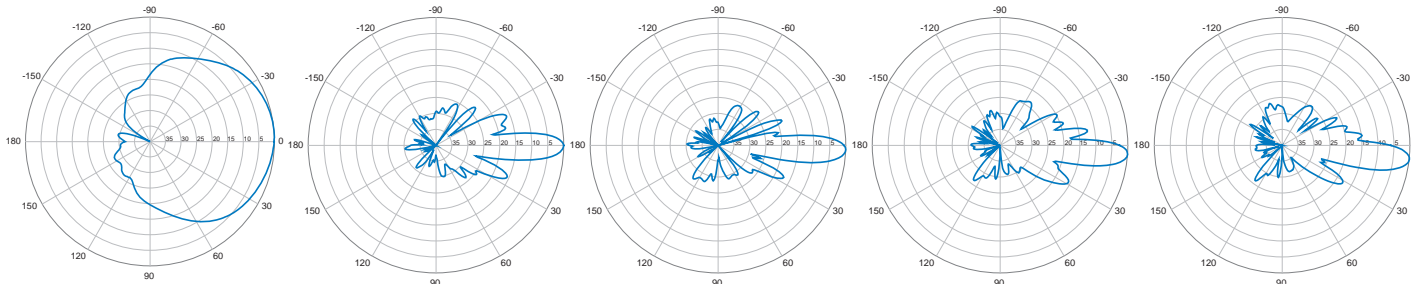


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QUAD658C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 16.0 / 16.0 dBi | Variable Tilt

696-900 MHz



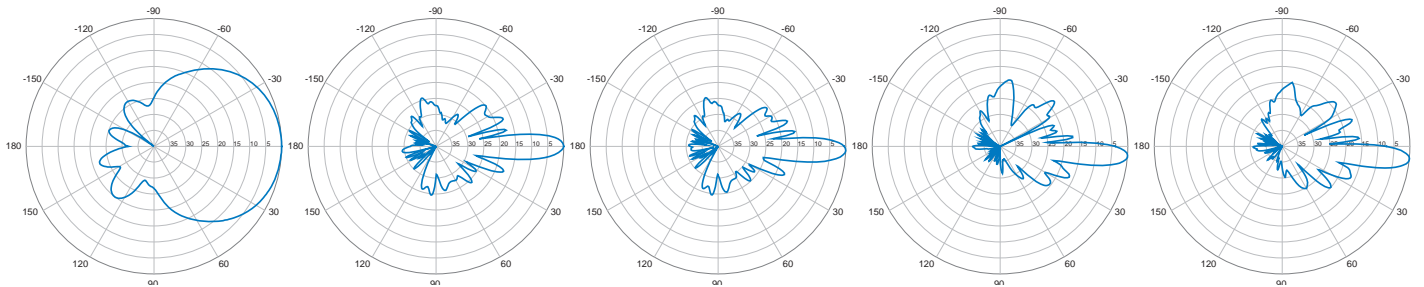
Horizontal | 750 MHz

0° | Vertical | 750 MHz

2° | Vertical | 750 MHz

4° | Vertical | 750 MHz

6° | Vertical | 750 MHz



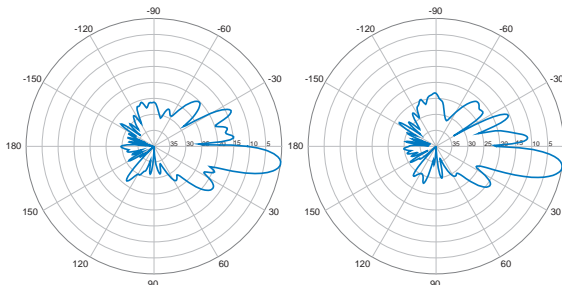
Horizontal | 850 MHz

0° | Vertical | 850 MHz

2° | Vertical | 850 MHz

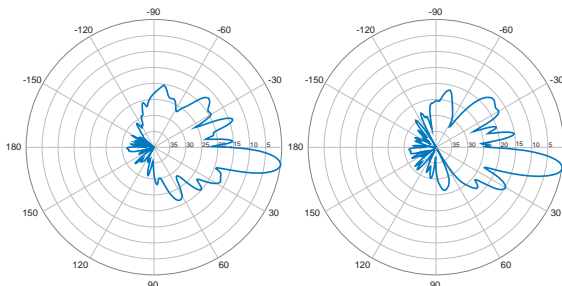
4° | Vertical | 850 MHz

6° | Vertical | 850 MHz



8° | Vertical | 750 MHz

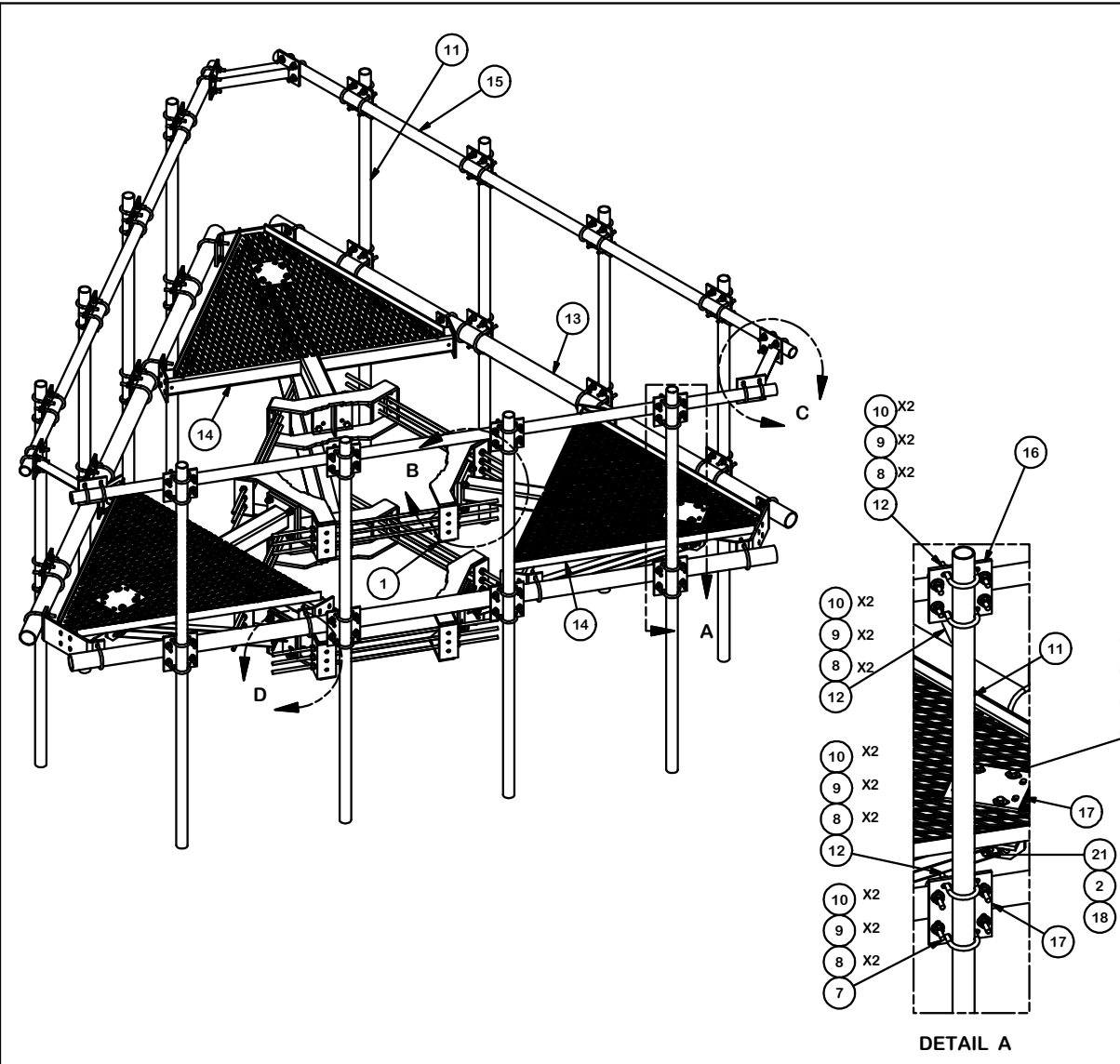
10° | Vertical | 750 MHz



8° | Vertical | 850 MHz

10° | Vertical | 850 MHz

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PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
5	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
6	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
7	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
8	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
9	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
10	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
11	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
12	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
13	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	52.51
14	3	P3150	3-1/2" X 150" (3" SCH 40) GALVANIZED PIPE	150 in	94.80	284.40
15	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
16	3	P2150	2-3/8" O.D. X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
17	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
18	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
19	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
20	6	X-253993	PLATFORM REINFORCEMENT KIT ANGLE	52 25/32 in	14.33	85.99
21	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
22	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
23	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
24	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
TOTAL WT. #						2445.81

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
B	RELOCATED MOUNT PIPE POSITIONS	4488	JET	5/23/2021
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE

REVISION HISTORY

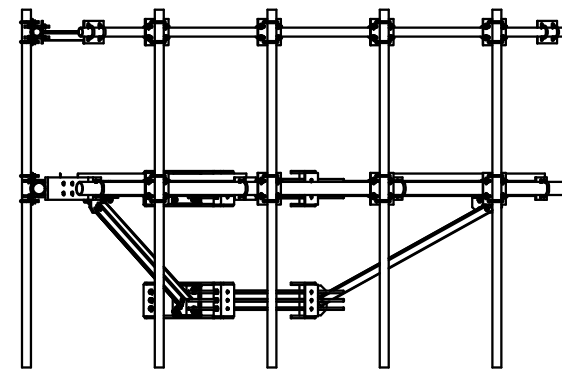
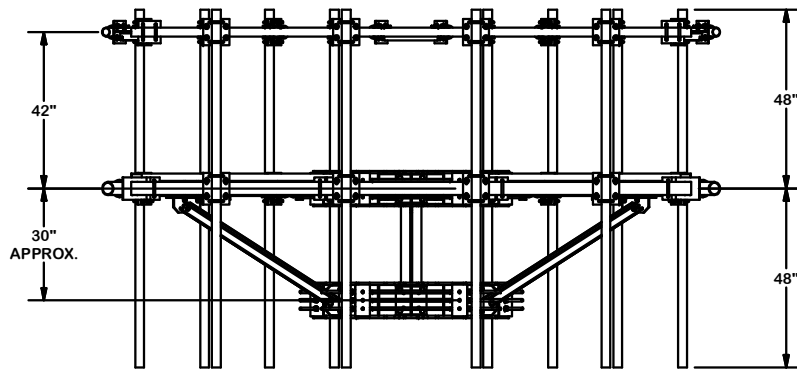
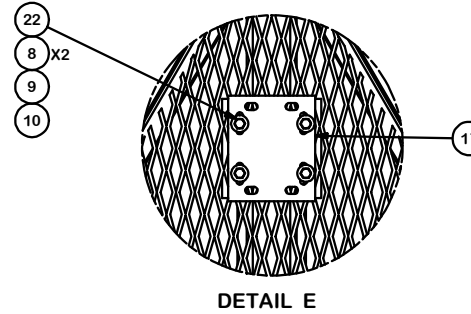
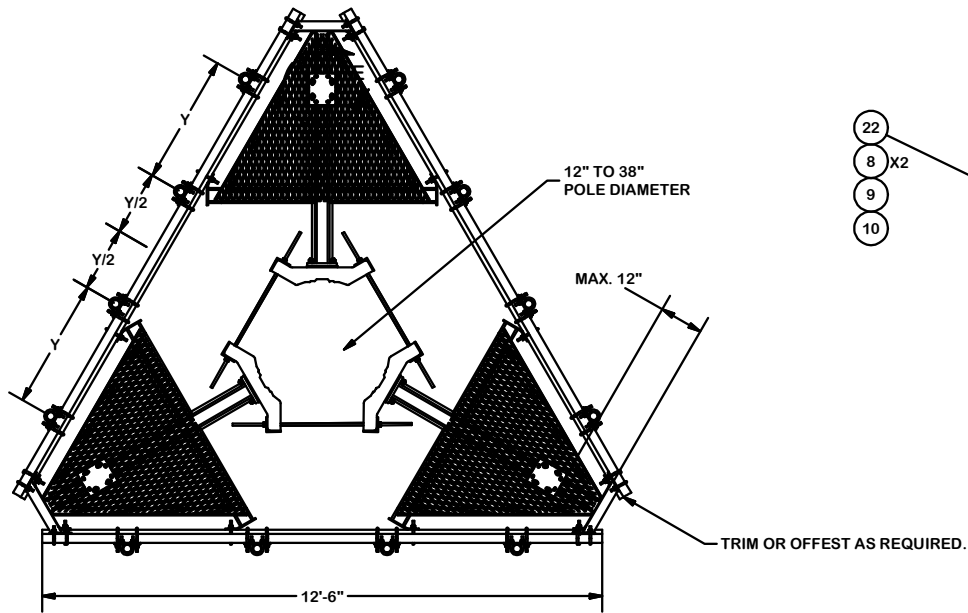
TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
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DESCRIPTION 12' 6" LOW PROFILE PLATFORM WITH TWELVE 2-3/8" ANTENNA MOUNTING PIPES, AND SUPPORT RAIL	
CPD NO. 4488	DRAWN BY CEK 7/14/2014
CLASS 81	SUB 02
DRAWING USAGE CUSTOMER	CHECKED BY BMC 7/14/2014

 A valmont COMPANY	Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
	Engineering Support Team: 1-888-753-7446
PART NO. RMQP-496-HK	DWG. NO. RMQP-496-HK



TOLERANCE NOTES

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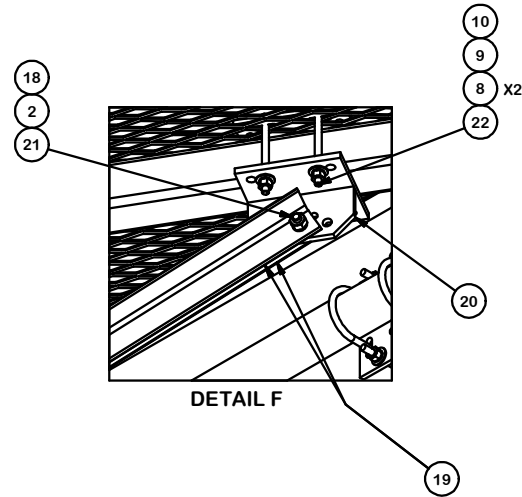
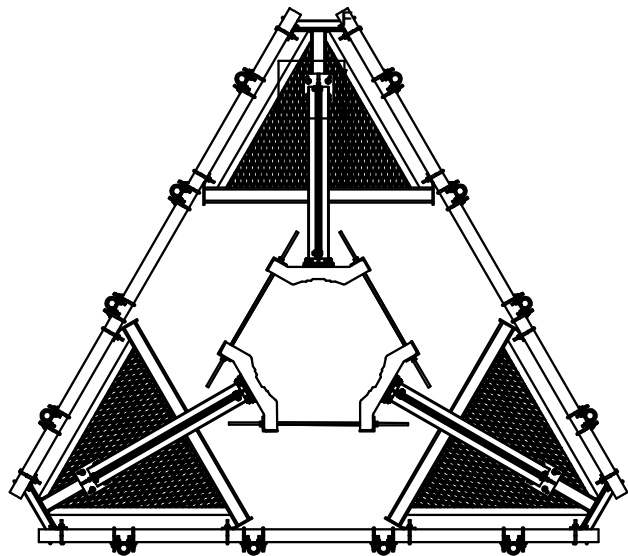
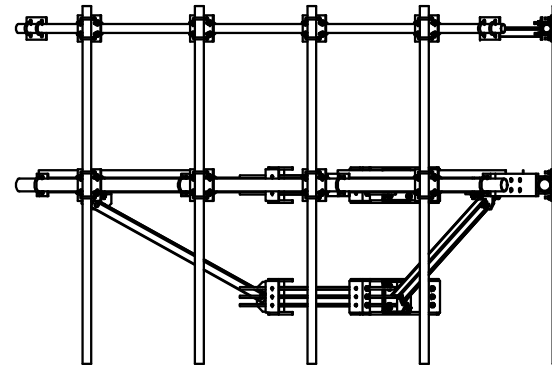
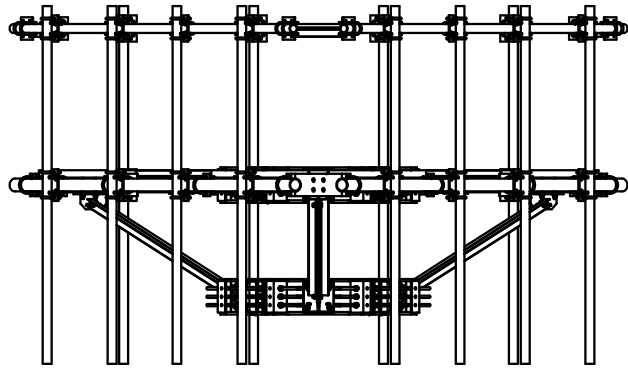
SITE PRO 1
 A valmont COMPANY
 Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX
 Engineering Support Team:
 1-888-753-7446

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
B	RELOCATED MOUNT PIPE POSITIONS	4488	JET	5/23/2021
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

CPD NO.	DRAWN BY	ENG. APPROVAL
4488	CEK	7/14/2014
CLASS	SUB	DRAWING USAGE
81	02	CUSTOMER
CHECKED BY	DATE	
BMC	7/14/2014	

PART NO.	DWG. NO.
RMQP-496-HK	RMQP-496-HK

REVISION HISTORY



DETAIL F

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
B	RELOCATED MOUNT PIPE POSITIONS	4488	JET	5/23/2021
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REVISION HISTORY				

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DESCRIPTION
 12' 6" LOW PROFILE PLATFORM
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 PIPES, AND SUPPORT RAIL

CPD NO. 4488	DRAWN BY CEK 7/14/2014	ENG. APPROVAL
CLASS 81	SUB 02	DRAWING USAGE CUSTOMER
CHECKED BY BMC 7/14/2014		

 A valmont COMPANY	Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
	Engineering Support Team: 1-888-753-7446
PART NO.	RMQP-496-HK
DWG. NO.	RMQP-496-HK

18.60.070 B 3: Site plan drawing to scale



COPPER VALLEY TELECOM WHITSHED

CONTACT INFORMATION

NEW HORIZONS TELECOM, INC.

901 COPE INDUSTRIAL WAY
PALMER, ALASKA 99645
PHONE - (907) 761-6000
LICENSE # AECC610

CIVIL/STRUCTURAL ENGINEER

DALE R. BROWNING, PE, SE
PHONE - (907) 761-6069

ELECTRICAL ENGINEER

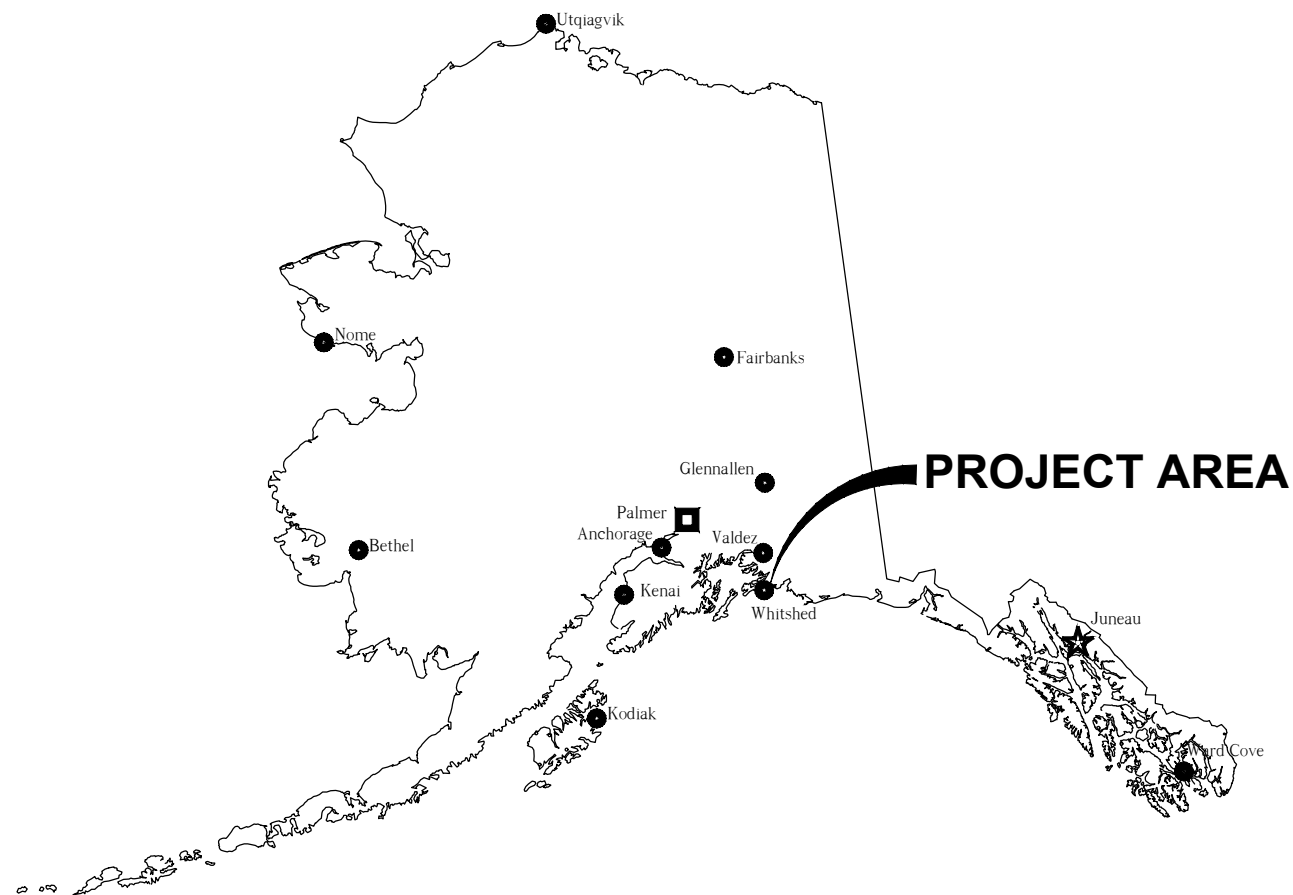
NOLAN J. WILLIS, PE
PHONE - (907) 761-6068

PROJECT INFORMATION

PROJECT LOCATION: WHITSHED, AK
NHTI PROJECT NUMBER: 22-0076-20-05

DRAWING INDEX

SHEET #	TITLE	REV #
T1.0	COVER SHEET	1
C1.0	SITE PLAN	1
C2.0	MONOPOLE ELEVATION	0
S1.0	NOTES AND ICE BRIDGE DETAILS	1
S1.1	PILE LAYOUT AND DETAIL	1
S1.2	CONCRETE PILE CAP PLAN	1
S1.3	CONCRETE PILE CAP SECTION	1
E1.0	GROUNDING PLAN	1
E1.1	GROUNDING NOTES AND DETAILS	0
E1.2	GROUNDING SECTION AND DETAILS	1



(907) 278-3121



Know what's below.
Call before you dig.

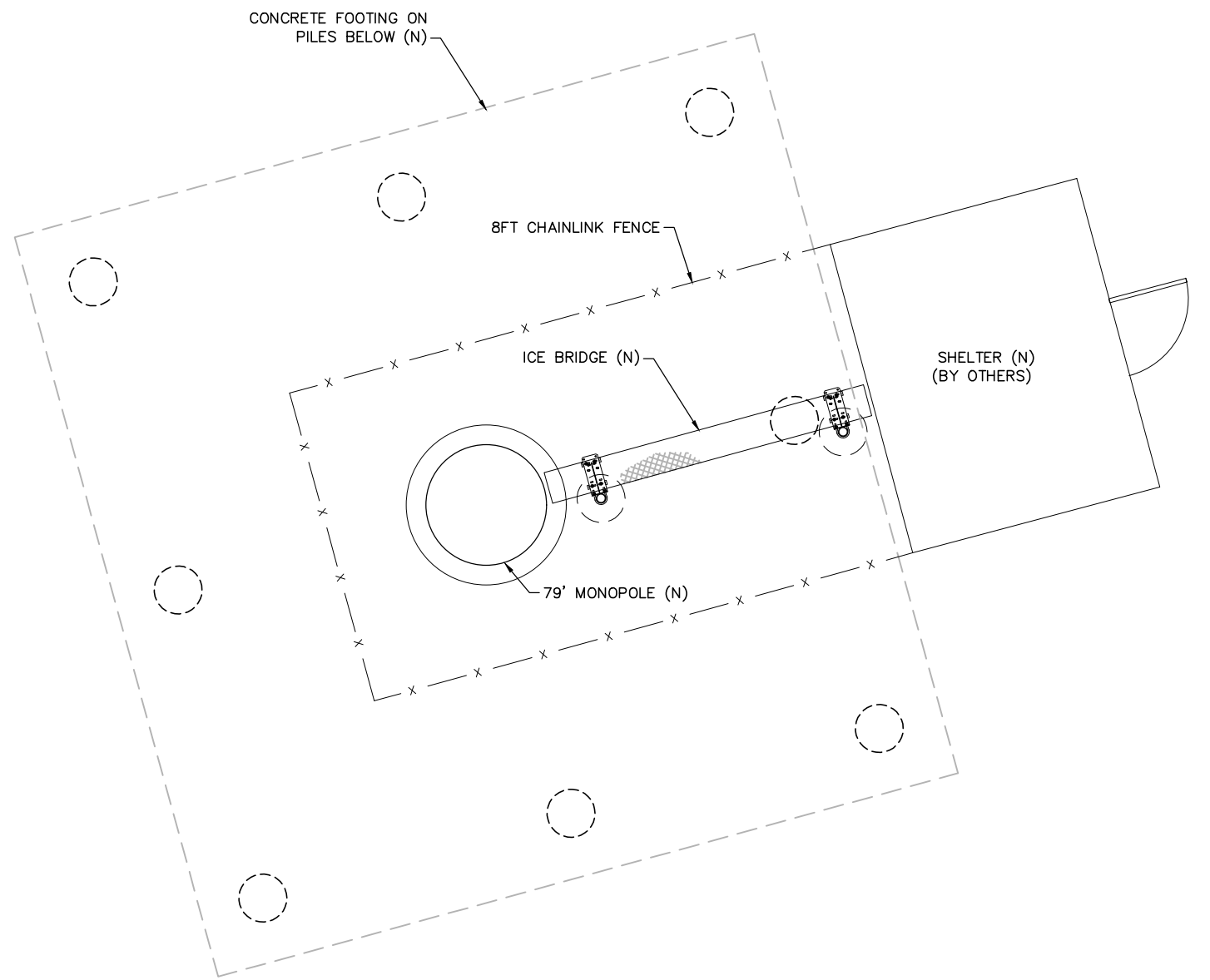


IFC

REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420
1	UPDATED PACKAGE	230421

COVER SHEET
T1.0

FILE: \\NHTI-FS02\OLD\SHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA & MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\T1.0 COVER SHEET



NOTES:

1. SITE PLAN DEVELOPED FROM SITE SKETCH PROVIDED BY CLIENT.
2. SECURE FENCE POSTS TO CONCRETE SLAB OR USE NON PENETRATING SUPPORTS.



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IFC

REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420
1	UPDATED MONOPOLE HEIGHT	230421

**CVT
WHITSHED
SITE**

DWN: JAA	DSN: DRB	APP: DRB	REV
JOB #: 22-0076-20-05			DATE: 220420
			1

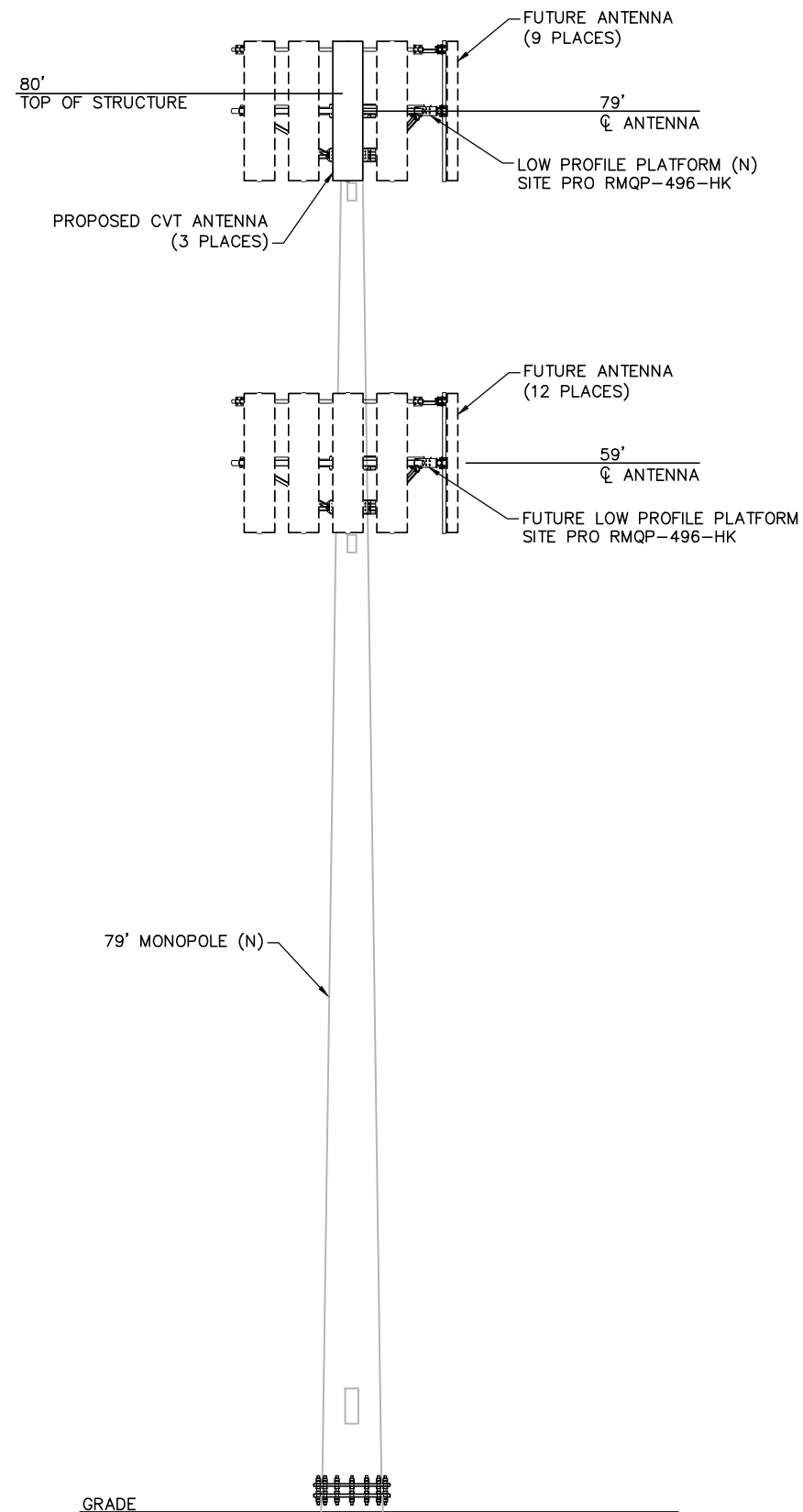
**SITE
PLAN**

C1.0

1
C1.0 **SITE PLAN**
SCALE: 1" = 5'

2
C1.0 **SITE OVERVIEW**
SCALE: NTS

FILE: \\NHIT-FS02\OLDSHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA & MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\C1.0 SITE PLAN



A
C2.0 **MONOPOLE ELEVATION**
SCALE: NTS



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0	ISSUE FOR CONSTRUCTION	230421

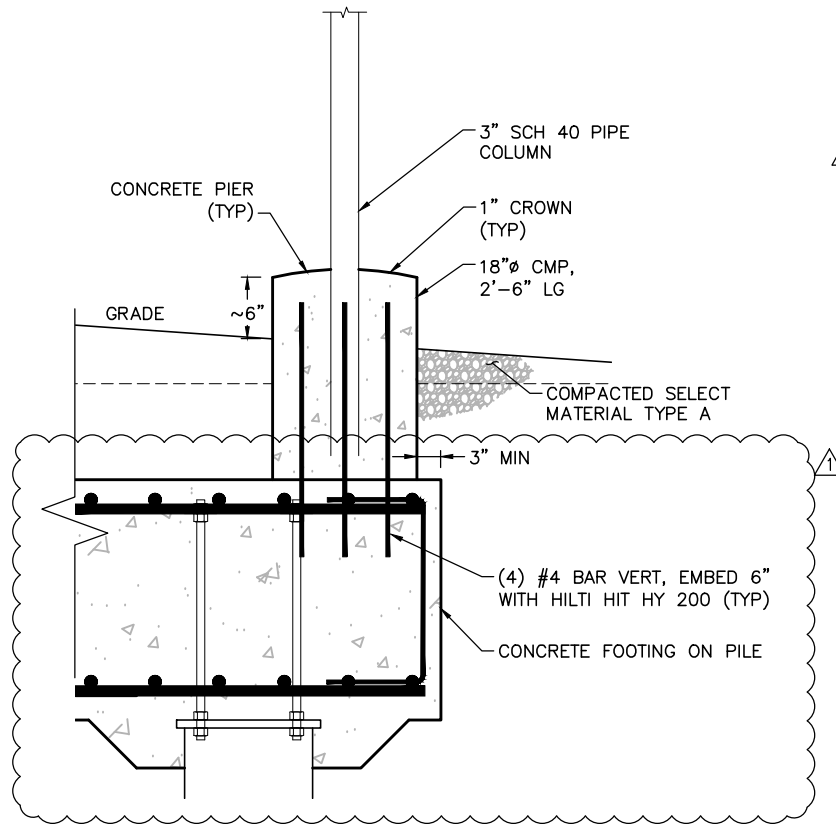
**CVT
WHITSHED
SITE**

DWN: JAA	DSN: DRB	APP: DRB	REV
JOB #: 22-0076-20-05	DATE: 220420		0

**MONOPOLE
ELEVATION**

C2.0

FILE: \\NHIT-FS02\OLD\SHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA & MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\C2.0 MONOPOLE



1 ICE BRIDGE FOUNDATION DETAIL
SCALE: NONE

DESIGN CRITERIA:

TOWER BASE REACTIONS (VALMONT #538506-P1)

AXIAL LOAD: 21 KIPS
TOTAL SHEAR: 42 KIPS
O.T. MOMENT: 2,625 FT-KIPS

ALLOWABLE SOIL BEARING: N/A

DESIGN WIND SPEED: 159 MPH
PER TIA-222-H

EXPOSURE: D
TOPO CATEGORY: I
STRUCTURE CLASS: II
IMPORTANCE FACTOR: 1.0
RADIAL ICE: 1/2 INCH

NOTES:

EARTHWORK:

1. REMOVE TOPSOIL, ORGANIC MATTER AND DELETERIOUS MATERIALS FROM THE CONCRETE PAD AREA.
2. CONSOLIDATED FILL IS REQUIRED TO ALLOW DRAINAGE SO THAT NO STANDING WATER WILL ACCUMULATE ON THE SITE AS A RESULT OF THIS WORK.
3. EXCAVATIONS SHALL BE SHORED OR SLOPED OR OTHERWISE SUPPORTED TO PROTECT PERSONNEL IN ACCORDANCE WITH OSHA, 29 CFR 1926, SUBPART P.

CONCRETE:

1. CONCRETE SHALL OBTAIN A 28-DAY COMPRESSIVE STRENGTH OF 4,500 PSI (F'c = 4,500 PSI). THE MIX SHALL CONTAIN A MINIMUM OF 6 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
2. CEMENT SHALL CONFORM TO ASTM C150 TYPE I OR II.
3. AGGREGATE SHALL CONFORM TO ASTM C33. MAXIMUM AGGREGATE SIZE SHALL BE 3/4 INCH.
4. SLUMP SHALL BE BETWEEN 3 - 5 INCHES.
5. ADMIXTURE SHALL BE PROVIDED AS REQUIRED TO PROVIDE 5% - 8% AIR ENTRAINMENT WITH A MAXIMUM WATER/CEMENT RATIO OF 0.45.
6. CONCRETE SHALL BE KEPT FROM FREEZING FOR THE FIRST SEVEN DAYS AFTER PLACING. SURFACES TO RECEIVE CONCRETE SHALL NOT BE LESS THAN 40° F. THE TEMPERATURE OF THE CONCRETE WHEN PLACED SHALL NOT BE LESS THAN 50° F OR GREATER THAN 80° F.

REINFORCING STEEL:

1. ALL REINFORCING BARS SHALL BE DEFORMED AND CONFORM TO ASTM A615, GRADE 60.
2. ALL BOTTOM MAT REINFORCING BARS SHALL BE ACCURATELY PLACED AND SUPPORTED BY GALVANIZED METAL CHAIRS OR CONCRETE BLOCKS (WOODEN STAKES SHALL NOT BE USED).
3. SUPPORT TOP MAT OF REBAR WITH BENT #4 REBAR SPACERS (STANDIES) AT 4' O.C.
4. MINIMUM CONCRETE COVER FOR REBAR WHERE CONCRETE IS PLACED IN DIRECT CONTACT WITH SOIL IS 3 INCHES CLEAR, FOR ALL OTHER FORMED SURFACES IS 2 INCHES.
5. ALL REBAR SPLICES SHALL BE LAPPED 40 BAR DIAMETERS MIN.

STEEL:

1. PLATE SHALL BE ASTM A572, GRADE 50.

WELDING:

1. ALL WELDING SHALL BE IN ACCORDANCE WITH AISC AND AWS STANDARDS AND PERFORMED BY AWS CERTIFIED WELDERS USING QUALIFIED WELD PROCEDURES.

PILES:

1. INSPECTOR SHALL OBSERVE PILE DRIVING.
2. PILE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH MAKE, MODEL AND CAPACITY OF PILE DRIVER FOR APPROVAL PRIOR TO DRIVING PILES. A HAMMER WITH A MINIMUM ENERGY RATING OF 24,000 FT-LBS (OR APPROVED EQUAL) IS RECOMMENDED.
3. PILE DRIVING TOLERANCE:
CENTER TO CENTER OF PILES: ±1"
PILE OUT OF PLUMB: 1 DEGREE
ELEVATION DIFFERENCE TOP OF PILE: 1/4"
PILE TOP OUT OF LEVEL: 1/4"
DEPTH OF EMBEDMENT BELOW GRADE: ±12"
3. PILES: 16"x1/2" WALL (MIN), ASTM A252, GRADE 3, Fy=45 KSI OR GREATER.
4. DRIVE PILES OPEN-ENDED WITH HARDENED DRIVING SHOES (FLUSH OUTSIDE). PRE DRILLING HOLES MAY BE REQUIRED.
5. REFER TO GEOTECHNICAL ENGINEERING REPORT FOR WHITSHED COMMUNICATIONS TOWER BY SHANNON & WILSON, DATED 01/24/2022.
6. PILES SHALL BE DRIVEN TO REFUSAL WHICH IS ANTICIPATED TO BE AT 17FT TO 21FT BELOW GROUND SURFACE. GREATER DEPTHS MAY BE REQUIRED. IF PILE REFUSAL IS ENCOUNTERED BEFORE 17 FT EMBEDMENT, EVALUATION BY GEOTECHNICAL ENGINEER WILL BE REQUIRED AND CHANGE TO CONTRACT DOCUMENTS MAY BE NECESSARY.

US STANDARD SIEVE SIZE		PERCENT PASSING BY WEIGHT
ENGLISH	METRIC	
NO. 4	4.75mm	20-60
NO. 200	0.075mm	6 MAX ON MINUS 3-IN PORTION

AGGREGATE CONTAINING NO MULCH, FROZEN MATERIAL, ROOTS, SOD OR OTHER DELETERIOUS MATTER AND WITH A PLASTICITY INDEX NOT GREATER THAN 6 AS TESTED BY WAQTC FOP FOR AASHTO T 89/T 90. MEET THE GRADATION AS TESTED BY WAQTC FOP FOR AASHTO T 27/T11.



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IFC

REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420
1	UPDATED NOTES AND DETAIL	230421

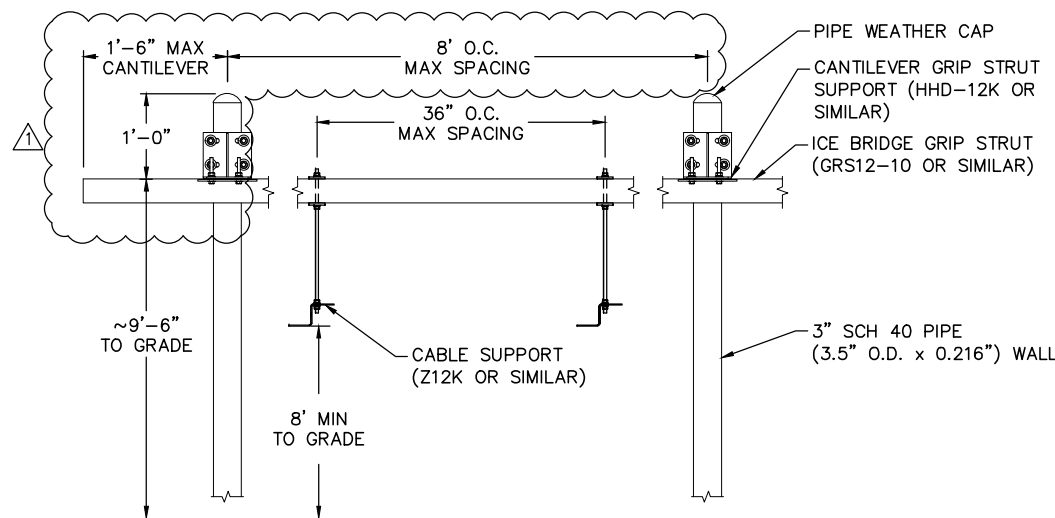
CVT
WHITSHED
SITE

DWN: JAA	DSN: DRB	APP: DRB	REV
JOB #: 22-0076-20-05			DATE: 220420
			1

NOTES AND
ICE BRIDGE
DETAILS
S1.0

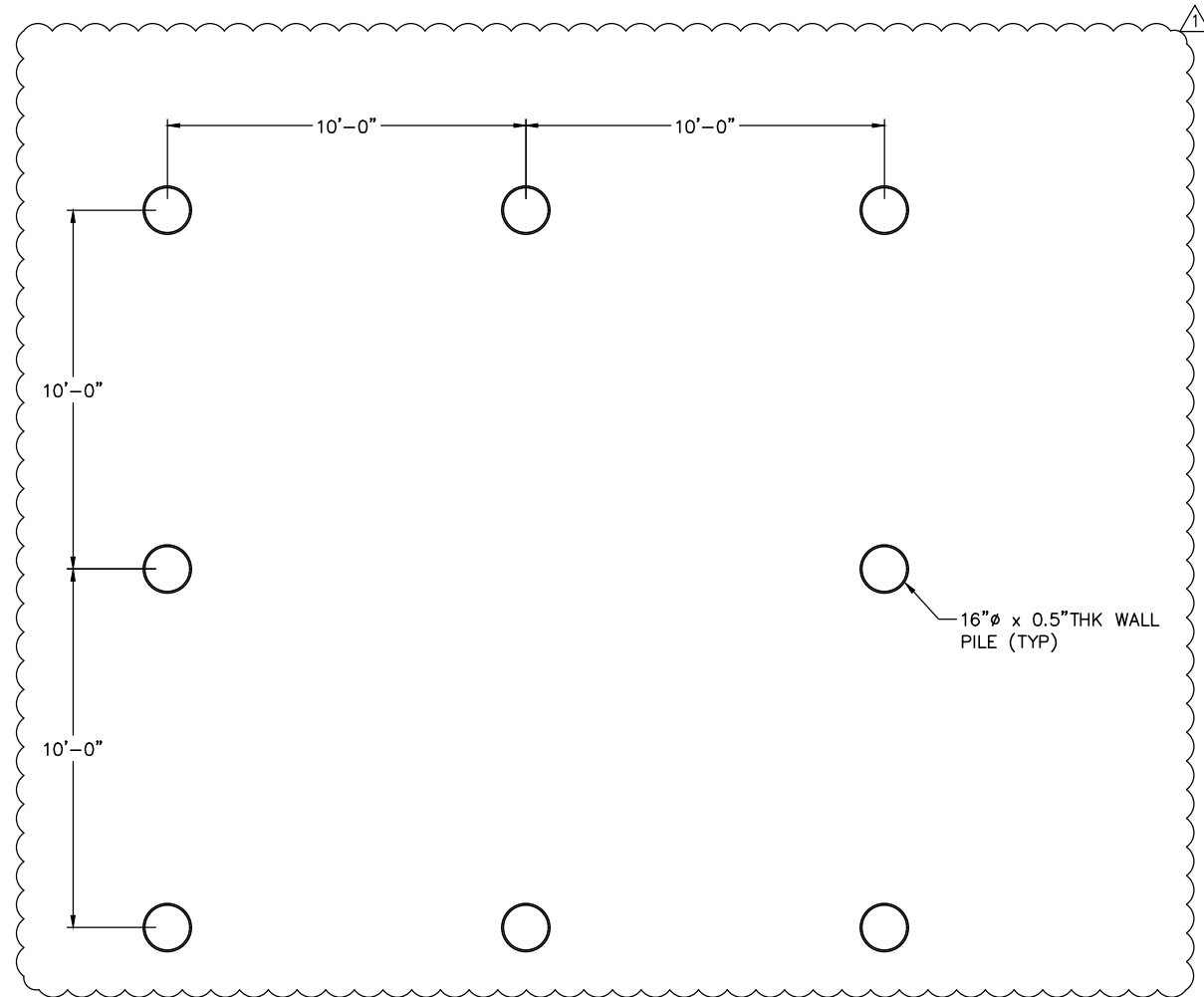
ICE BRIDGE NOTES:

1. PART NUMBERS REFERENCED IN PARENTHESIS ARE FROM VALMONT SITE PRO 1.
2. ALL STEEL COMPONENTS TO BE HOT DIPPED GALVANIZED.
3. FOUNDATION DESIGNED FOR 8' MAXIMUM SPACING BETWEEN ICE BRIDGE SUPPORTS.

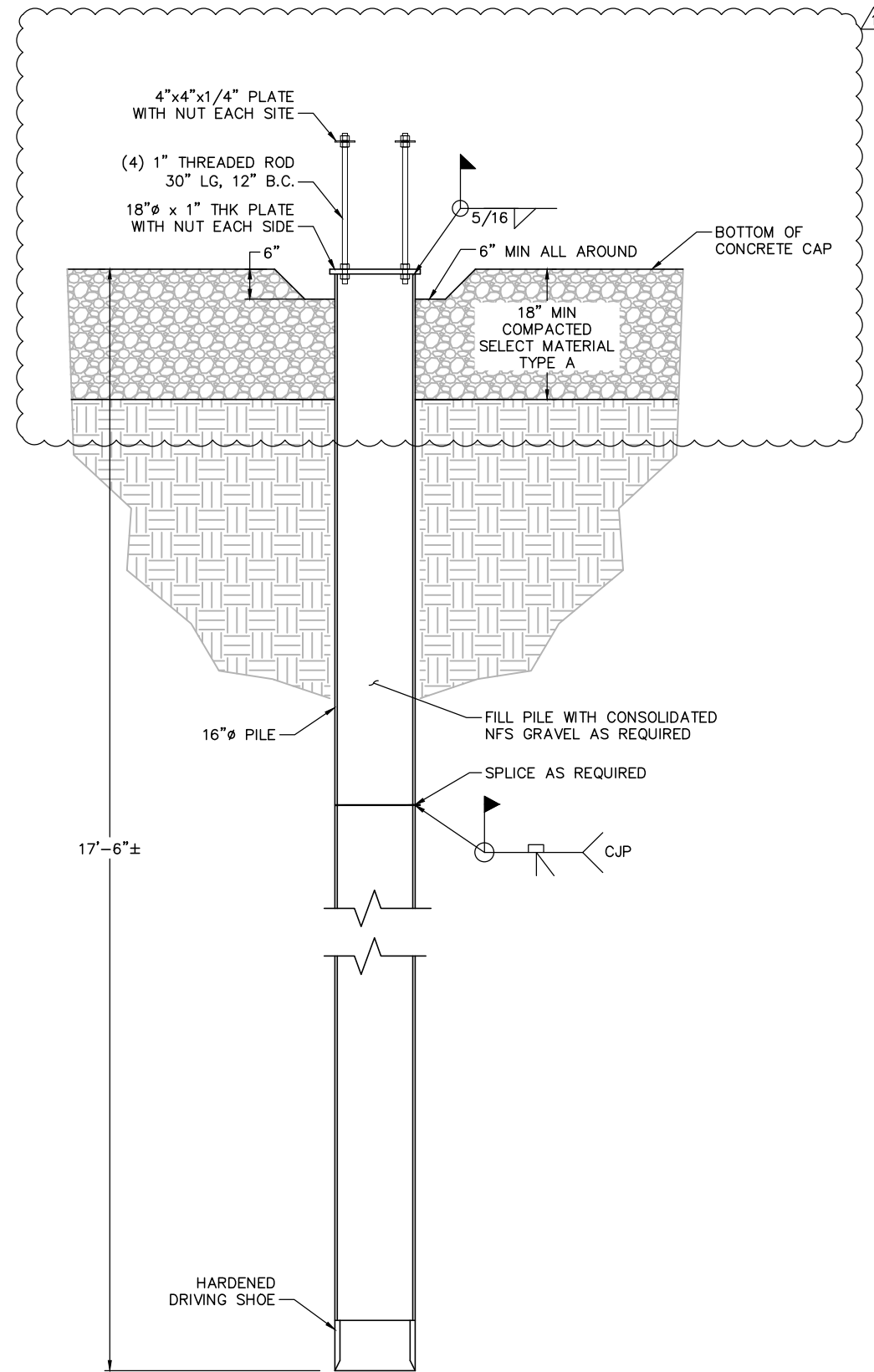


2 ICE BRIDGE DETAIL - SINGLE POST
SCALE: NONE

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1
S1.1 **PILE LAYOUT**
SCALE: 3/16" = 1'-0"



2
S1.1 **PILE DETAIL**
SCALE: 3/8" = 1'-0"



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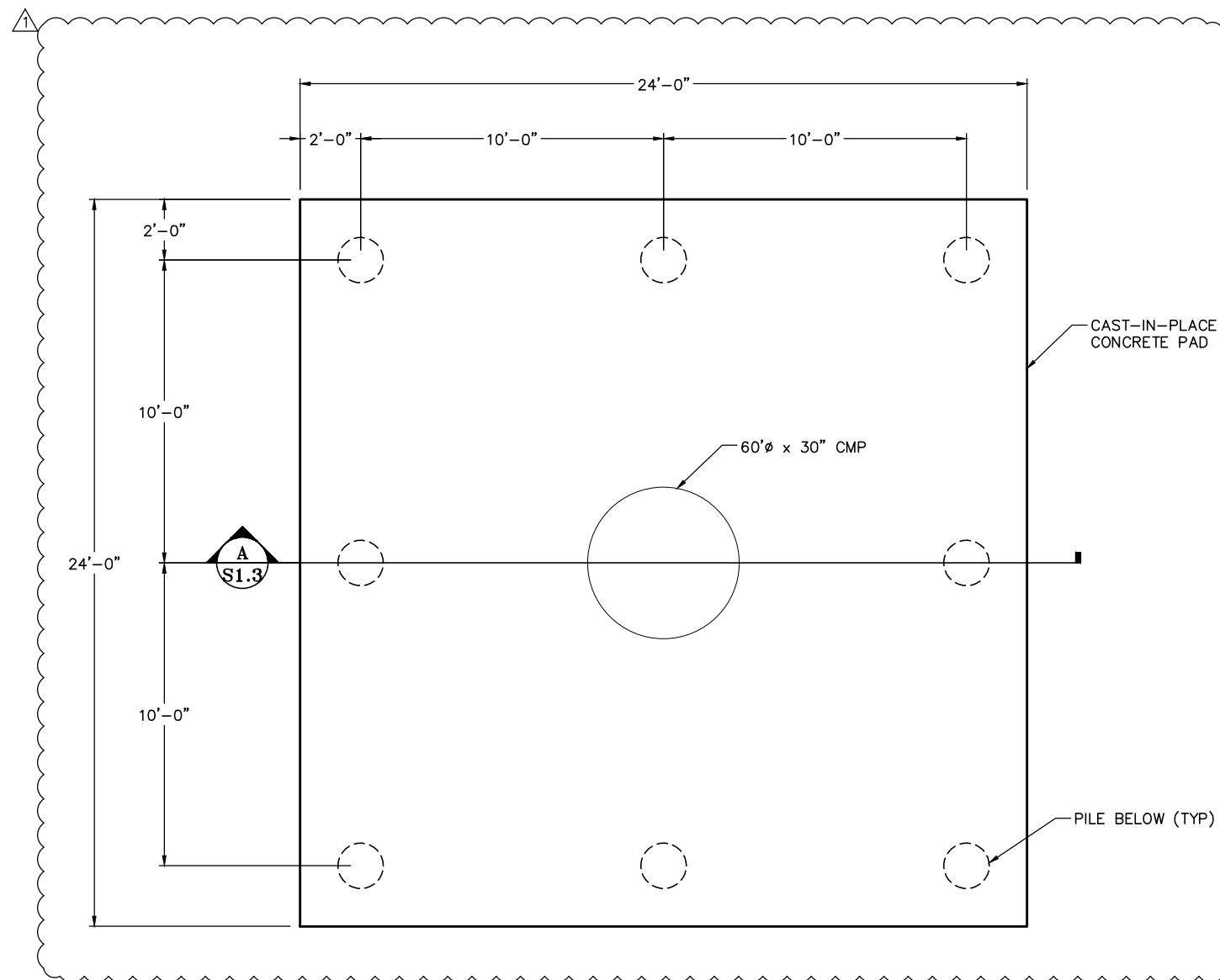
REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420
1	MODIFIED CONCRETE PILE CAP	230421

CVT
WHITSHED
SITE

DWN: JAA	DSN: DRB	APP: DRB	REV
JOB #: 22-0076-20-05			DATE: 220420
			1

PILE LAYOUT AND DETAIL
S1.1

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1
S1.2 CONCRETE PILE CAP PLAN
 SCALE: 3/16" = 1'-0"



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**CVT
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 SITE**

DWN: JAA	DSN: DRB	APP: DRB	REV
JOB #: 22-0076-20-05			DATE: 220420
			1

**CONCRETE PILE
 CAP PLAN**

S1.2

FILE: \\NHIT-FS02\OLD\SHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA & MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\S1.2 CONCRETE

ENTIRE SHEET



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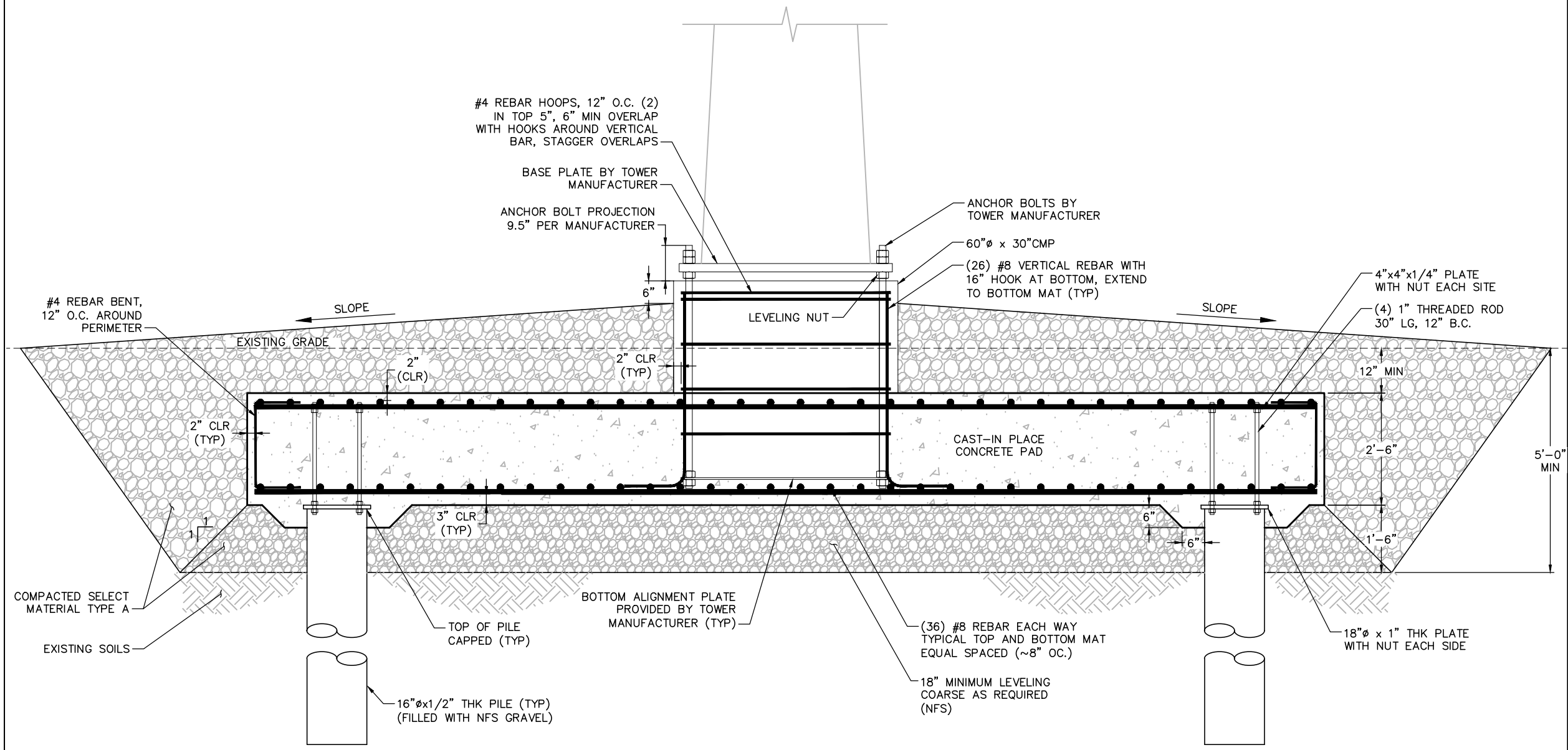
REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420
1	REVISED SECTION	230421

CVT
 WHITSHED
 SITE

DWN: JAA	DSN: DRB	APP: DRB	REV
JOB #: 22-0076-20-05			DATE: 220420
			1

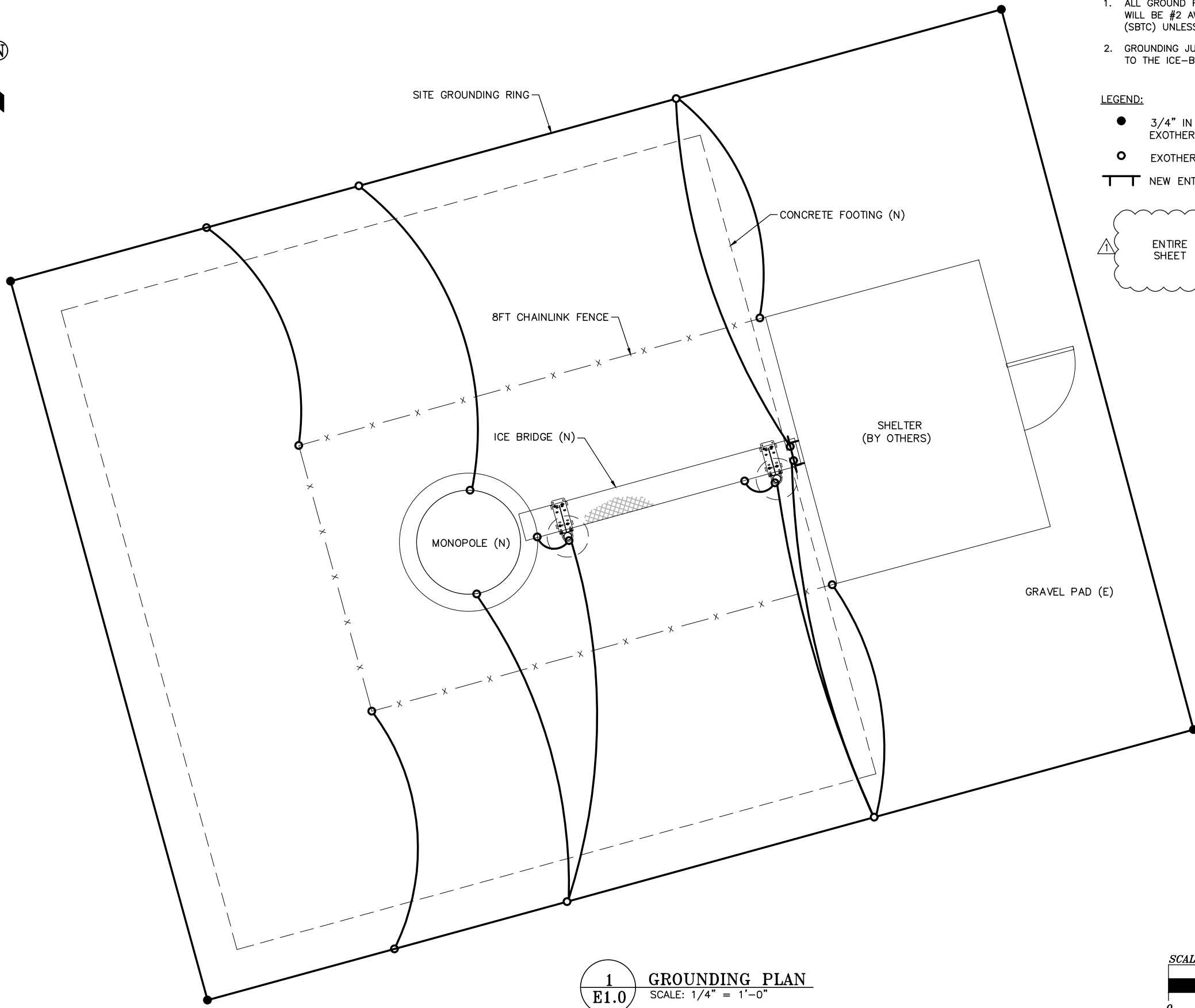
CONCRETE PILE
 CAP SECTION

S1.3



A
S1.3 CAP SECTION
 SCALE: NTS

FILE: \\NHTI-FS02\OLDSHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\S1.3 PILE CAP.SJ

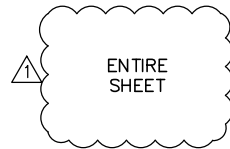


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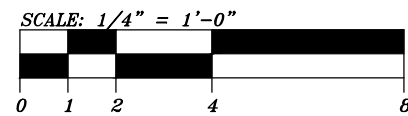
1. ALL GROUND RING AND GROUNDING CONDUCTORS WILL BE #2 AWG SOLID BARE TINNED COOPER (SBTC) UNLESS NOTED OTHERWISE.
2. GROUNDING JUMPERS FROM THE ICE-BRIDGE POSTS TO THE ICE-BRIDGE WILL BE #2 AWG CU XHHW-2.

LEGEND:

- 3/4" IN x10 FT COPPER CLAD GROUND ROD EXOTHERMICALLY WELDED TO GROUND RING
- EXOTHERMIC WELD OR COMPRESSION LUG
- ┌─┐ NEW ENTRY PORT GROUND BAR.



1
E1.0 **GROUNDING PLAN**
SCALE: 1/4" = 1'-0"



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1	MODIFIED PILE PLAN	230421

**CVT
WHITSHED
SITE**

DWN: JAA	DSN: NJW	APP: JNW	REV
JOB #: 22-0076-20-05			DATE: 220420
			1

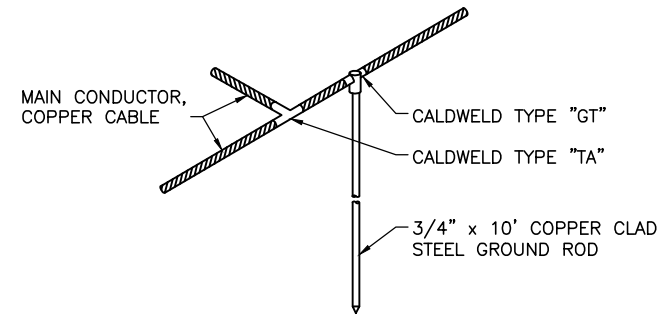
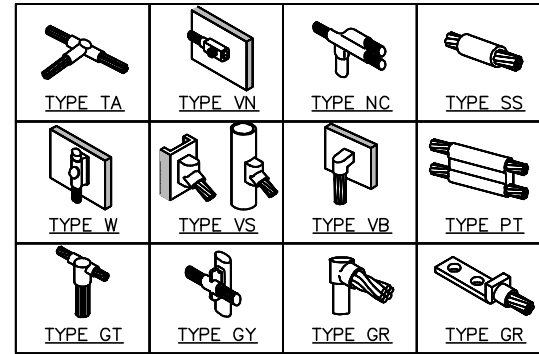
**GROUNDING
PLAN**

E1.0

FILE: \\NHIT-FS02\OLDSHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA & MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\E1.0 GROUNDING

NOTES:

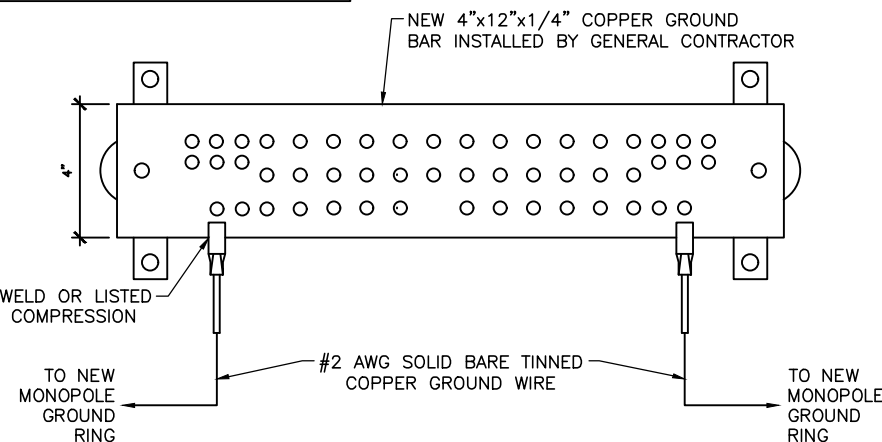
- PERFORM ALL ELECTRICAL WORK PER 2017 NEC.
- CONTRACTOR TO REPAIR ANY DAMAGED GROUND WIRE DUE TO CONSTRUCTION ACTIVITY.
- GROUND LEADS SHALL NOT BE SPLICED.
- ALL MATERIALS SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR.
- GROUND RODS TO BE 3/4"IN x 10FT COPPER CLAD AND TO BE DRIVEN VERTICALLY 30IN BELOW FINAL GRADE.
- GROUND RING TO BE BURIED A MINIMUM OF 30IN BELOW GRADE. EXOTHERMICALLY WELD GROUND RING TO GROUND RODS.
- GROUND RING GROUND RODS TO BE SPACED A MINIMUM OF 20FT APART.
- GROUND RING CONDUCTOR SHOULD BE PLACED A MINIMUM OF 6FT FROM CENTER OF MONOPOLE.
- ALL EXPOSED GROUNDING CONDUCTORS BETWEEN GRADE AND 6FT ABOVE GRADE TO BE PROTECTED FROM DAMAGE WITH NON-METALLIC LIQUID TIGHT.
- CONNECT THE MONOPOLE GROUND CONDUCTORS TO MONOPOLE USING EXOTHERMIC WELD.
- UNLESS NOTED OTHERWISE ALL GROUND CONDUCTORS INCLUDING GROUND RING SHALL BE #2 AWG SOLID BARE TINNED COPPER. MAKE ALL GROUND CONNECTIONS AS SHORT AND DIRECT AS POSSIBLE. AVOID SHARP BENDS. THE RADIUS OF ANY BEND SHALL NOT BE LESS THAN 8 INCHES AND THE INCLUSIVE ANGLE OF ANY BEND SHALL NOT EXCEED 90 DEGREES. GROUNDING CONDUCTORS SHALL BE ROUTED DOWNWARD TOWARD THE BURIED GROUND RING.
- ALL BELOW GROUND CONNECTIONS SHALL BE EXOTHERMICALLY WELDED. REPAIR ALL GALVANIZED SURFACES THAT HAVE BEEN DAMAGED BY EXOTHERMIC WELDING. USE SPRAY GALVANIZED SUCH AS HOLUB LECTROSOL #15-501 OR EQUIVALENT.
- UNLESS NOTED OTHERWISE ABOVE GROUND CONNECTIONS SHALL BE LISTED LUGS, LISTED PRESSURE CONNECTORS, LISTED CLAMPS OR OTHER LISTED MEANS REQUIRED BY THE SPECIFIC COMPONENT MANUFACTURER.
- WHERE MECHANICAL CONNECTORS (TWO-HOLE OR CLAMP) ARE USED, APPLY A LIBERAL PROTECTIVE COATING OF A CONDUCTIVE ANTI-OXIDE COMPOUND ON ALL CONNECTORS. PROVIDE LOCK WASHERS ON ALL MECHANICAL CONNECTORS. USE STAINLESS STEEL HARDWARE THROUGHOUT. THOROUGHLY REMOVE ALL PAINT AND CLEAN ALL DIRT FROM SURFACES REQUIRING GROUND CONNECTORS, REPAINT TO MATCH EXISTING AFTER CONNECTION IS MADE TO MAINTAIN CORROSION RESISTANCE. ALL GROUND CONNECTIONS SHALL BE APPROVED FOR THE TYPES OF METALS BEING ATTACHED TO.
- THE GROUND CONDUCTORS SHALL BE RUN STRAIGHT FOR MINIMUM INDUCTANCE AND VOLTAGE DROP. SINCE CABLE BENDS INCREASE INDUCTANCE, THE MINIMUM REQUIRED BENDING RADIUS IS 8 INCHES WHEN BENDS ARE UNAVOIDABLE. ALL METAL WORK WITHIN 10 FEET OF THE GROUND RING SHALL BE DIRECTLY BONDED TO THIS GROUND SYSTEM, WITHOUT USING SERIES OR DAISY CHAIN CONNECTION ARRANGEMENTS.
- PAINT, ENAMEL, LACQUER AND OTHER ELECTRICALLY NON-CONDUCTIVE COATINGS SHALL BE REMOVED FROM THREADS AND SURFACE AREAS WHERE CONNECTIONS ARE MADE TO ENSURE GOOD ELECTRICAL CONTINUITY.
- CONNECTIONS BETWEEN DISSIMILAR METALS SHALL NOT BE MADE UNLESS THE CONDUCTORS ARE SEPARATED BY A SUITABLE MATERIAL THAT IS A PART OF THE ATTACHMENT DEVICE LISTED AND APPROVED FOR USE WITH THE SPECIFIC DISSIMILAR METALS MAY BE USED FOR THE PURPOSE.



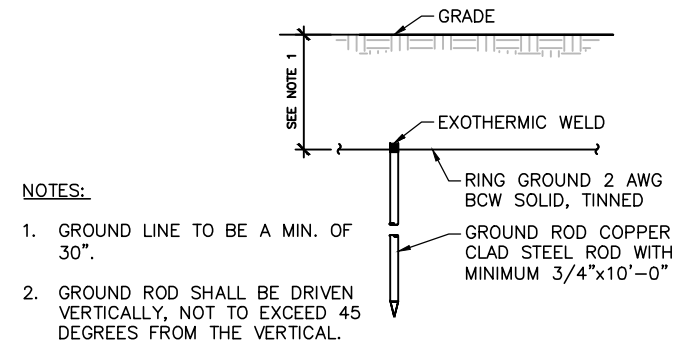
1
E1.1 **CADWELD GROUND CONNECTION DETAIL**
SCALE: NONE

2
E1.1 **GROUND RING BOND**
SCALE: NONE.

NOTE: COAT ALL MECHANICAL CONNECTION WITH "NOOX" OR APPROVED EQUAL



3
E1.1 **GROUND BAR DETAIL**
SCALE: NONE



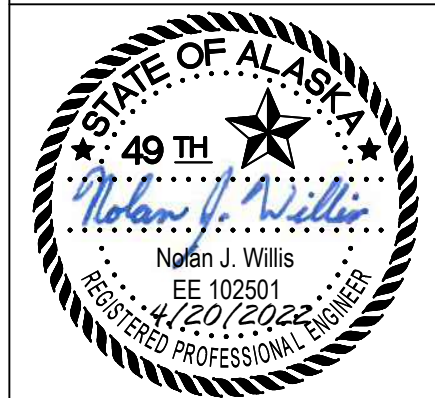
NOTES:

- GROUND LINE TO BE A MIN. OF 30".
- GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.

4
E1.1 **GROUND ROD**
SCALE: NONE



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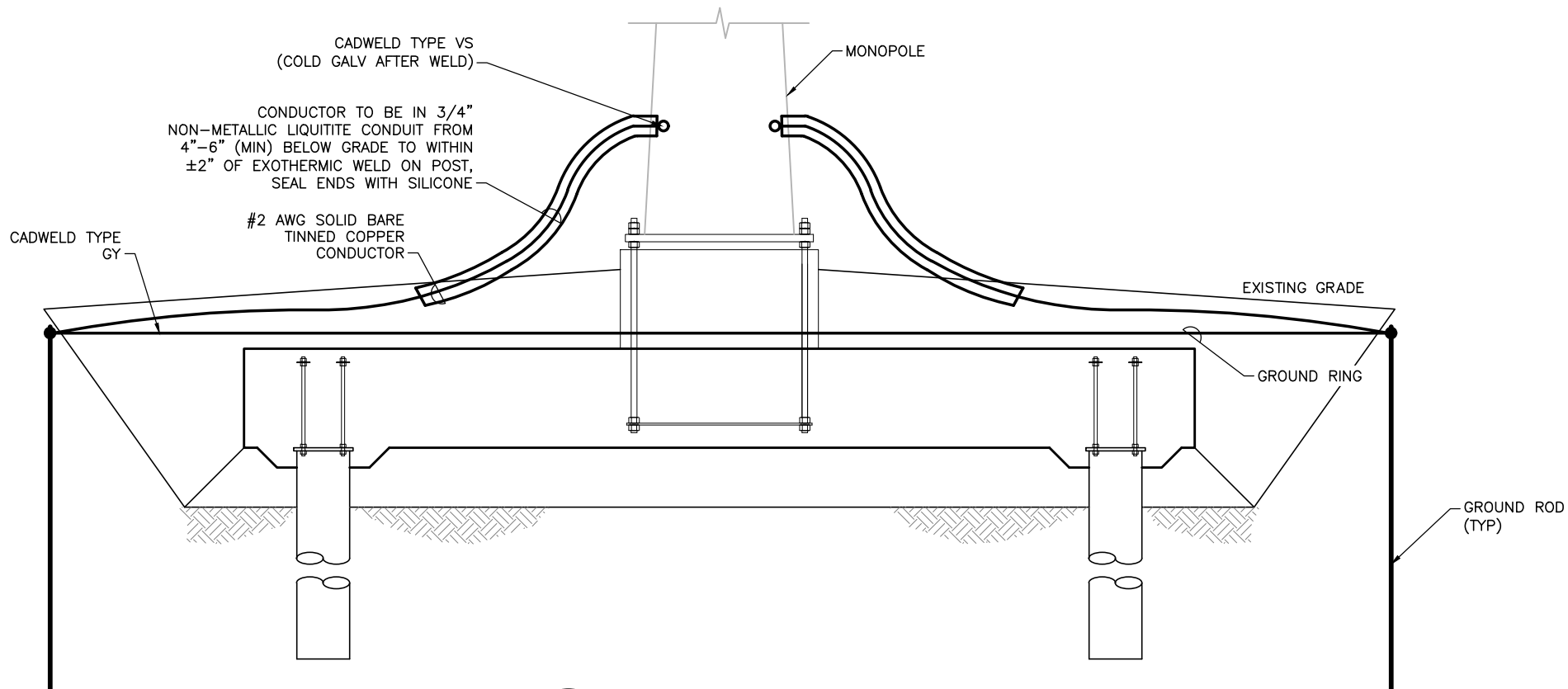
IFC

REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420

**CVT
WHITSHED
SITE**

DWN: JAA	DSN: NJW	APP: NJW	REV
JOB #: 22-0076-20-05	DATE: 220420		0

**GROUNDING
NOTES AND
DETAILS
E1.1**



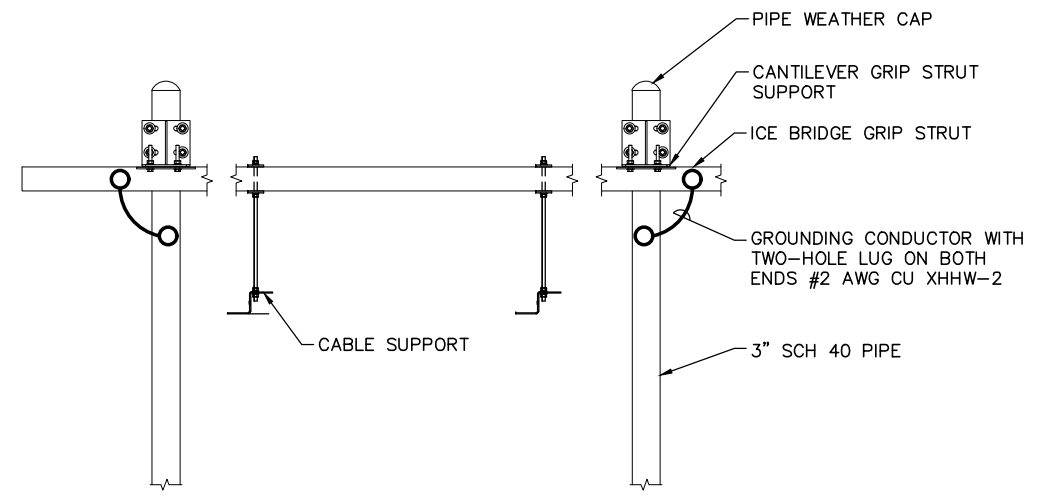
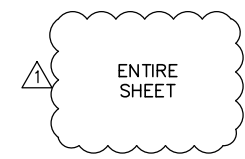
A
E1.2 **GROUNDING SECTION**
SCALE: NONE

NOTES:

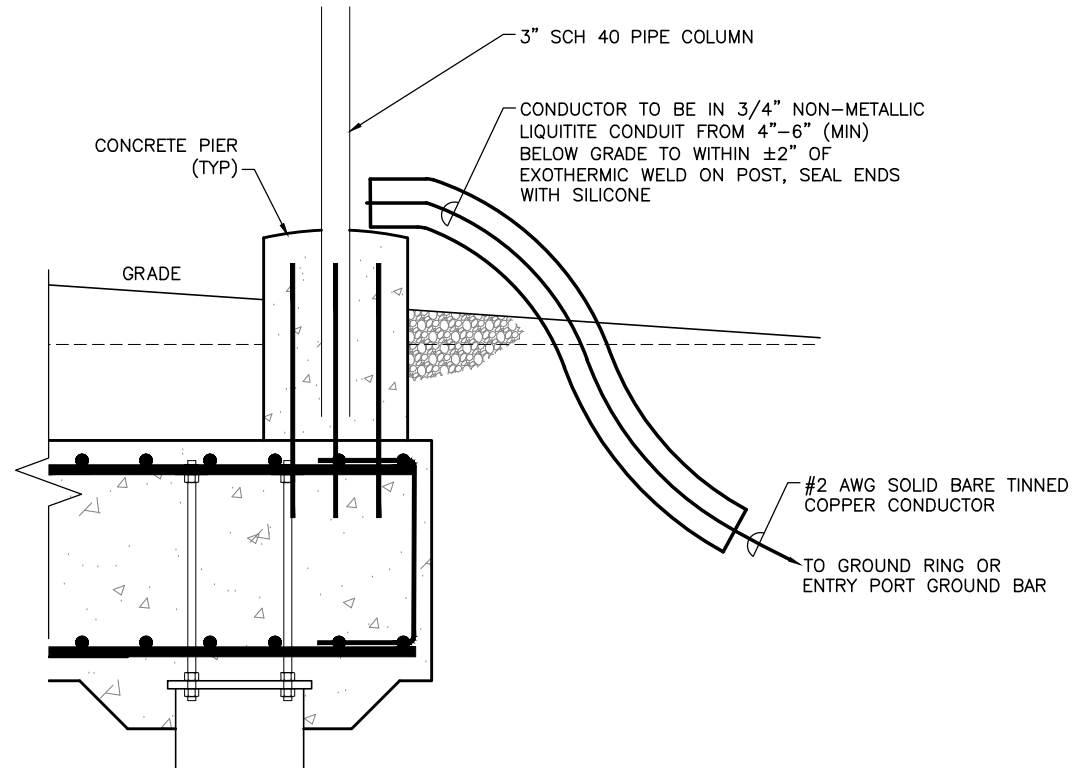
1. REVIEW ALL NOTES ON PAGE E1.1 PRIOR TO BEGINNING CONSTRUCTION.

LEGEND:

- 3/4"x10' COPPER CLAD GROUND ROD EXOTHERMICALLY WELDED TO GROUND RING
- EXOTHERMIC WELD OR COMPRESSION LUG (NOTE 6)



1
E1.2 **ICE BRIDGE DETAIL - SINGLE POST**
SCALE: NONE



2
E1.2 **ICE BRIDGE FOUNDATION DETAIL**
SCALE: NONE



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IFC

REV	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	220420
1	REVISED FOOTING	230421

**CVT
WHITSHED
SITE**

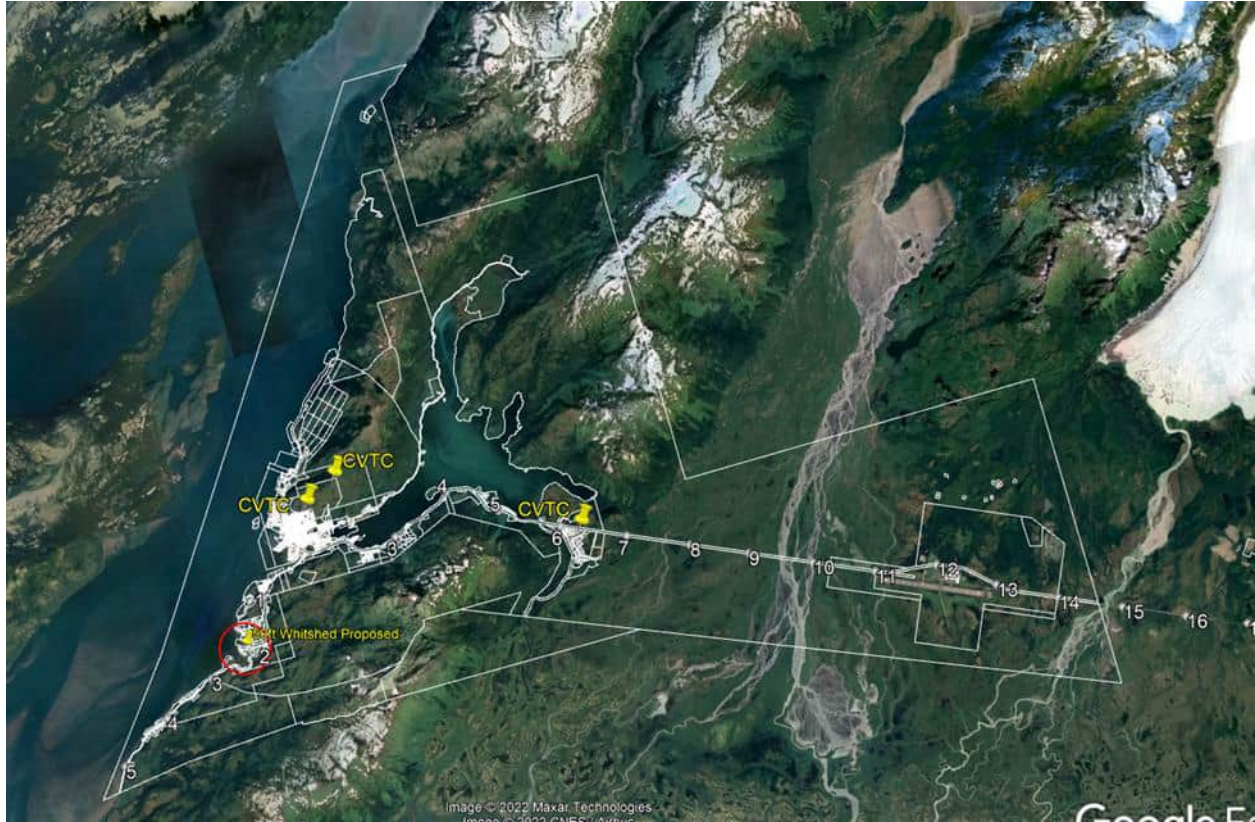
DWN: JAA	DSN: NJW	APP: NJW	REV 1
JOB #: 22-0076-20-05			DATE: 220420

**GROUNDING
SECTION AND
DETAILS
E1.2**

FILE: \\NHIT-FS02\OLDSHARES\ENGINEERING\22 JOBS\22-0076-20 CVT - ERNESTINE, EYAK LAKE, WHITSHED, MENTASTA & MENTASTA PASS CONSTRUCTION DESIGN DRAWINGS\05-ENGR\CAD\05 - WHITSHED\E1.2 GROUNDIN

18.60.070 B 4

A map showing the locations of the applicant's existing telecommunication towers that serve customers in the city and of all telecommunication towers that the applicant proposes to construct to serve customers in the city;



18.60.070 B 5: Report from registered structural engineer



April 21, 2023

City of Cordova

Copper Valley Telephone is installing an 79 ft tall monopole at their communications site known as Whitshed. Valmont Structures designed the monopole; see 538506-P1 Pole Formal Calculations Stamped 3/1/22 and 538506-P1 Pole Drawing Stamped 3/1/22. New Horizons designed the capped pile foundation for the monopole; see CVT 79 ft Whitshed Monopole Pile Cap, P.E. stamped April 20, 2023 and 230421 CVT Whitshed Const Dwgs IFC Rev 1, P.E. stamped and dated 4/21/2023. Foundation design based on Shannon & Wilson Geotechnical Engineering Report 'Whitshed' Communications Tower, Cordova, Alaska, P.E. stamped and dated 1-24-22.

The design documents show the tower and foundation have capacity to support the required type and number of antennas, antenna supports, and appurtenances. The design wind loads are developed in accordance with ANSI/TIA-222-H.



Dale Browning, P.E., S.E.
Sr. Engineer
(907) 761-6069

4/21/2023

New Horizons Telecom, Inc.
901 Cope Industrial Way
Palmer, Alaska 99645
www.nhtiusa.com

907.761.6000 (phone)
907.761.6001 (fax)

CVT

Whitshed FOUNDATION DESIGN FOR 79 FOOT MONOPOLE

Cordova, Alaska



April 20, 2023
by



SUBJECT :

Driven pipe piles and Cast-in-Place Concrete pile cap for 79 ft monopole.

REFERENCES:

- A. TIA/EIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
- B. ACI 318-14, Building Code Requirements for Structural Concrete
- C. International Building Code (IBC) 2021

DESIGN CRITERIA:

$Q_A =$ Negligible	Allowable soil bearing pressure (From Geotech Report)
$f_c :=$ 4500·psi	Concrete 28-Day compressive strength, design
$f_y :=$ 60000·psi	Concrete Reinforcement steel yield strength
$\gamma_s :=$ 120·pcf	Density of soil (Geotech Report)
$\gamma_c :=$ 150·pcf	Density of reinforced concrete

Reactions at Base of Monopole (Valmont 79.0' Pole, Whitshed, AK, Project 538506-P1, signed 3/1/22.
 TIA-222-H, Wind 159 mph, exposure D, topography category 1, $S_S = 1.51$, $S_1 = 0.80$)

$M_f :=$ 31481·in·kip	$M_f =$ 2623·ft·kip	Factored Moment at Monopole Base (LRFD)
$H_f :=$ 41828·lbf		Factored Horizontal Shear at Monopole Base (LRFD)
$V_f :=$ 20946·lbf		Factored Vertical Load at Monopole Base

ANALYSIS:

$l_g := \frac{M_f}{H_f}$	$l_g =$ 62.7·ft	Locate distance (l_g) to resultant horizontal force that is equivalent to base moment
$d_{soil} :=$ 12·in		Depth of Soil cover over footing
$D_{pi} :=$ 16·in		Diameter of Pile
$b_{pile} :=$ 10·ft		Spacing of piles
$d_{pier} :=$ 30·in		Depth of pier

$D_p := 60 \cdot \text{in}$		Diameter of Pier
$b_{\text{cft}} := 24 \cdot \text{ft}$	$w_{\text{cft}} := 24 \cdot \text{ft}$	Concrete Footing length and width
$A_f := b_{\text{cft}} \cdot w_{\text{cft}}$	$A_f = 576 \text{ ft}^2$	Footing Area
$t_{\text{cft}} := 30 \cdot \text{in}$		Thickness of concrete footing
$l_e := l_g + d_{\text{pier}} + t_{\text{cft}}$	$l_e = 67.7 \cdot \text{ft}$	Distance (l_e) to resultant horizontal force to bottom of footing
$M_{OT} := l_e \cdot H_f$	$M_{OT} = 2833 \cdot \text{ft} \cdot \text{kip}$	Overturning Moment at bottom of footing
$\text{wght}_{\text{cft}} := b_{\text{cft}} \cdot w_{\text{cft}} \cdot t_{\text{cft}} \cdot \gamma_c$	$\text{wght}_{\text{cft}} = 216 \cdot \text{kip}$	Weight of concrete footing
$\text{wght}_s := \left(b_{\text{cft}} \cdot w_{\text{cft}} - \frac{\pi}{4} \cdot D_p^2 \right) \cdot d_{\text{soil}} \cdot \gamma_s = 67 \cdot \text{kip}$		Weight of soil above footing
$\text{wght}_p := \frac{\pi}{4} \cdot D_p^2 \cdot d_{\text{pier}} \cdot \gamma_c$	$\text{wght}_p = 7 \cdot \text{kip}$	Weight of concrete pier
$\text{wght}_{\text{pile}} := 82.85 \cdot \frac{\text{lb}}{\text{ft}} \cdot 17 \cdot \text{ft} \cdot 8 = 11 \cdot \text{kip}$		Weight of piles
$\text{TFL} := \text{wght}_{\text{cft}} + \text{wght}_s + V_f + \text{wght}_p + \text{wght}_{\text{pile}} = 322 \cdot \text{kip}$		Total Footing Load
$\text{TC}_{\text{vol}} := \frac{\text{wght}_{\text{cft}} + \text{wght}_p}{\gamma_c}$	$\text{TC}_{\text{vol}} = 55 \cdot \text{yd}^3$	Total Volume of Concrete
$\text{RM}_b := 0.9 \cdot \text{TFL} \cdot b_{\text{pile}}$	$\text{RM}_b = 2901 \cdot \text{ft} \cdot \text{kip}$	Righting Moment about piles

CONCRETE DESIGN

$d := t_{\text{cft}} - 4 \cdot \text{in}$	$d = 26 \cdot \text{in}$	Average Depth of concrete to reinforcement
$V_{\text{upo}} := 1.2 \cdot \text{TFL} = 387 \cdot \text{kip}$		Factored one-way shear
$\phi V_c := 0.75 \cdot 2 \cdot \sqrt{f_c} \cdot \text{psi} \cdot d \cdot w_{\text{cft}} = 753 \cdot \text{kip}$		Allowable Concrete One-Way Shear (Ref. B, 22.5.5.1)
$V_{\text{upt}} := 1.2 \cdot \text{TFL} \cdot 0.6 = 232 \cdot \text{kip}$		Factored two-way shear (assume 60% of total load resisted by one of three perimeter piles)

$$\phi V_{cp} := 0.75 \cdot 4 \cdot \sqrt{f_c \cdot \text{psi}} \cdot \pi \cdot (D_{pi} + d) \cdot d = 690 \cdot \text{kip}$$

Allowable Concrete Punching Shear
(Ref. B, Table 22.6.5.2.(a))

$$\phi V_{cpc} := 0.75 \cdot \left[\frac{20 \cdot d}{(D_{pi} + 2 \cdot \text{ft} \cdot 2)} + 2 \right] \cdot \sqrt{f_c \cdot \text{psi}} \cdot (D_{pi} + 2 \cdot \text{ft} \cdot 2) \cdot d = 848 \cdot \text{kip}$$

Allowable Concrete Corner
Punching Shear
(Ref. B, 22.6.5.2.(c))

$$M_u := M_{OT} \cdot 0.6$$

$$M_u = 1700 \cdot \text{ft} \cdot \text{kip}$$

Factored Moment (assume 60% of
moment resisted by middle portion of
slab)

$$w_{preff} := D_p + 1.5 \cdot 2 \cdot t_{cft} = 13 \text{ ft}$$

Effective slab width at pier

$$b := w_{preff} = 13 \text{ ft}$$

$$\frac{b}{w_{cft}} = 0.52$$

Effective slab width/slab width

$$R_u := \frac{M_u}{0.9 \cdot b \cdot d^2}$$

$$R_u = 223 \cdot \text{psi}$$

Concrete design factor

$$\rho := 0.85 \cdot \frac{f_c}{f_y} \cdot \left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f_c}} \right) = 0.0038$$

Ratio of steel required in middle portion
of footing

$$A_{sr} := \rho \cdot b \cdot d$$

$$A_{sr} = 14.98 \cdot \text{in}^2$$

Area of steel required in middle portion of
footing

$$A_{smins} := 0.0018 \cdot b \cdot t_{cft} = 8.10 \cdot \text{in}^2$$

Minimum area of steel in slabs
(Ref. B, Table 8.6.1.1)

$$A_{s8} := \frac{\pi}{4} \cdot \left(\frac{8 \text{ in}}{8} \right)^2 = 0.79 \cdot \text{in}^2$$

Area of a #8 rebar

$$s_8 := \frac{b}{\left(\frac{A_{sr}}{A_{s8}} \right) - 1} = 8.30 \cdot \text{in}$$

Spacing of #8 rebar

$$n_g := \frac{w_{cft} - 5 \text{ in}}{s_8} + 1 = 35.1$$

number of #8 rebar required each way top
and bottom

$$A_{s9} := \frac{\pi}{4} \cdot \left(\frac{9 \text{ in}}{8} \right)^2 = 0.99 \cdot \text{in}^2$$

Area of a #9 rebar

$$s_9 := \frac{b}{\left(\frac{A_{sr}}{A_{s9}}\right) - 1} = 10.66 \text{ in}$$

Spacing of #9 rebar

$$n_9 := \frac{w_{cft} - 5 \text{ in}}{s_9} + 1 = 27.5$$

number of #9 rebar required each way top and bottom

Pedestal Design: By definition the pole is supported on a pedestal (height less than 3 times the diameter). Code requirements for columns are not applicable to pedestals. Design parameters for pedestals include Shear and Bearing Strength. Use factored wind loads.

$$A_g := \frac{\pi}{4} \cdot D_p^2$$

$$A_g = 2827 \cdot \text{in}^2$$

Gross cross section area of Pedestal

Provide minimal vertical reinforcement for connection between pedestal and foundation. The area of reinforcement across shall be not less than $0.005A_g$, where A_g is the gross area of the supported member.

$$\rho_{\min} := 0.005 \quad A_{s\min P} := A_g \cdot \rho_{\min} = 14.1 \cdot \text{in}^2$$

Min. vertical reinforcement in pedestal. (Ref. B, 16.3.4.1).

$$A_{s8} = 0.79 \cdot \text{in}^2$$

Area of #8 rebar

$$A_{s\text{lon}8} := 26 \cdot A_{s8} = 20.42 \cdot \text{in}^2$$

Area of #8 vertical steel in Pedestal

$$A_{AB} := (14) \cdot \frac{\pi}{4} \cdot (1.75 \cdot \text{in})^2 = 33.7 \cdot \text{in}^2$$

Area of 14 - 1.75 anchor bolts

$$A_{\text{vert}8} := A_{AB} + A_{s\text{lon}8} = 54.1 \cdot \text{in}^2$$

Area of vertical rebar and anchor bolts

$$\rho_{s8} := \frac{A_{\text{vert}8}}{A_g} = 0.02$$

Percent of vertical steel

Check adequacy of 12 inch spacing of #4 ties, lessor of 16 x long bars, 48 x tie bar, or least dimension of compression member (ACI 7.10.5.2)

$$16 \cdot \left(\frac{8 \cdot \text{in}}{8}\right) = 16 \cdot \text{in}$$

$$48 \cdot \left(\frac{4 \cdot \text{in}}{8}\right) = 24 \cdot \text{in}$$

$$D_p = 60 \cdot \text{in}$$

Check Shear capacity, for member subject to axial compression

$V_{uP} := H_f$	$V_{uP} = 41.8 \cdot \text{kip}$	Factored Shear to Pedestal
$N_{uP} := P_{ua}$	$N_{uP} = 20.9 \cdot \text{kip}$	Factored axial compression load to Pedestal

Equivalent square Pedestal for shear analysis purposes only

$b_w := 0.8 \cdot D_p$	$b_w = 48 \cdot \text{in}$	Equivalent square Pedestal width
$d_R := D_p - 8 \cdot \text{in}$	$d_R = 52 \cdot \text{in}$	Reduced cross section reinforcement diameter
$d_{sR} := d_R \cdot \frac{2}{3}$	$d_{sR} = 34.7 \cdot \text{in}$	Equivalent square steel spacing
$\phi V_{cP} := 0.85 \cdot 2 \cdot \left(1 + \frac{N_{uP}}{2000 \cdot A_g \cdot \text{psi}} \right) \cdot \sqrt{f_c \cdot \text{psi}} \cdot b_w \cdot d_{sR}$		Design Shear concrete strength per Pedestal (Ref. B, Eq. 22.5.6.1)
	$\phi V_{cP} = 190 \cdot \text{kip}$	OK, shear reinforcing not required

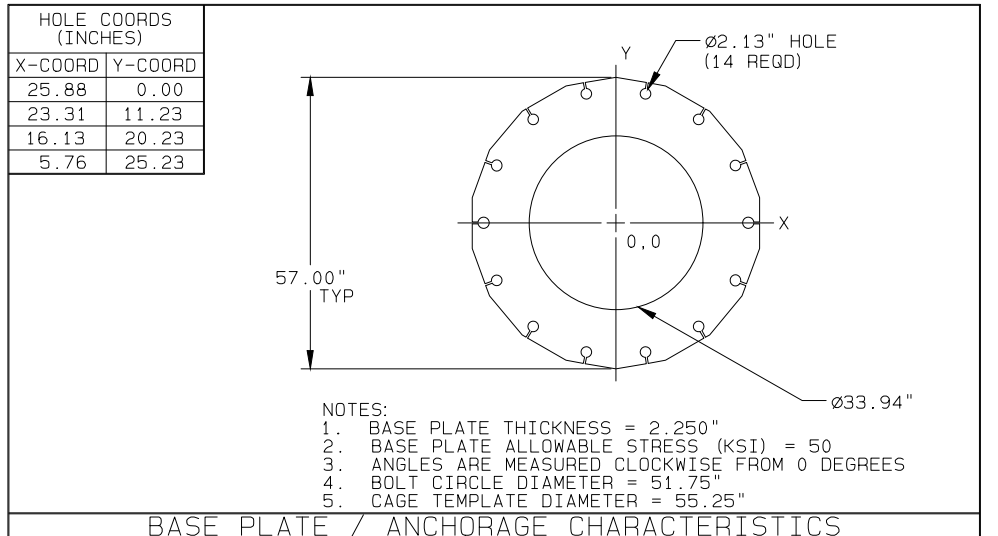
Check Shear Friction capacity at interface between pedestal and footing

$A_{vf} := A_{s1on8}$	$A_{vf} = 20.4 \cdot \text{in}^2$	Area of vertical bars in shear
$\mu := 0.6$		Coefficient of friction
$\phi V_{nsf} := 0.85 \cdot A_{vf} \cdot f_y \cdot \mu$	$\phi V_{nsf} = 625 \cdot \text{kip}$	Shear Friction Strength per Pedestal (Ref. B, Eq. 22.9.4.2)

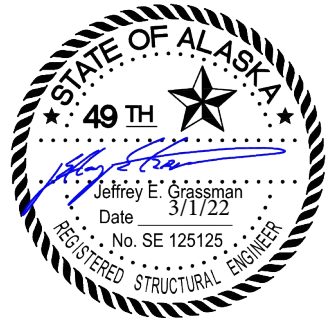
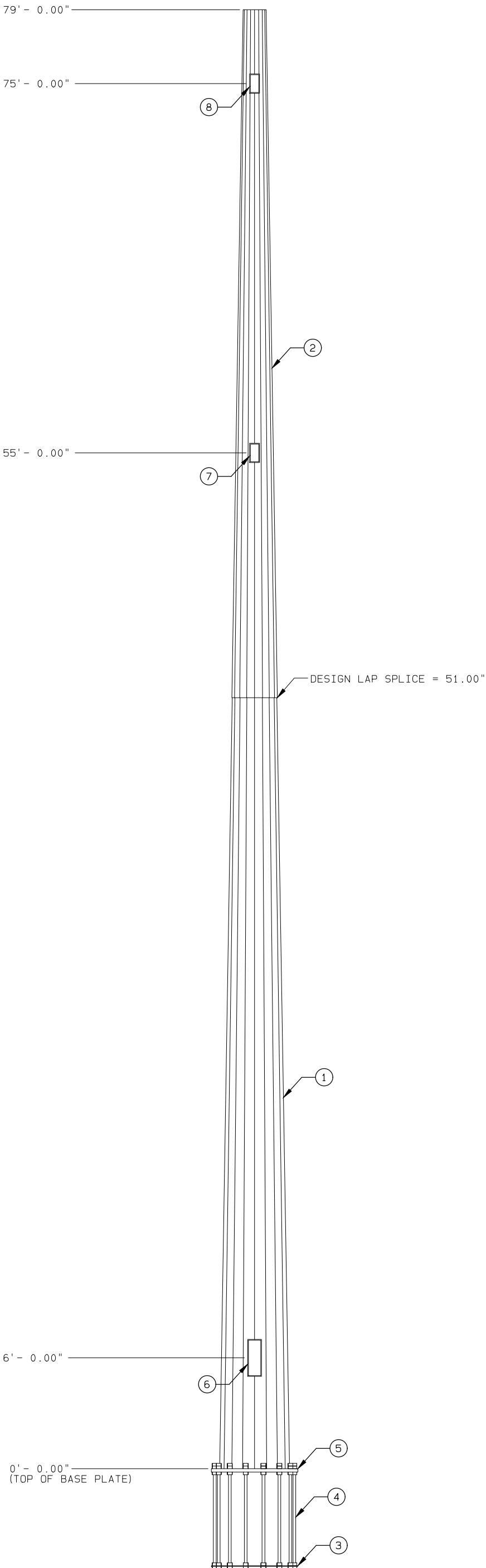
Design Hook Length

$d_{b8} := \frac{8}{8} \cdot \text{in}$		Diameter of vertical bar
$l_{dh} := \frac{f_y}{50 \cdot \sqrt{f_c \cdot \text{psi}}} \cdot d_{b8} = 17.9 \cdot \text{in}$		Development length of rebar with standard hook (Ref. B, 25.4.3.1)

ITEM ID	NO. REQD	FEATURES	UNIT WEIGHT (LBS)	WEIGHT (LBS)
1	1	SECTION A VALMONT S-22 0.313" THK (A572 GR65)	5,563	5,563
2	1	SECTION B VALMONT S-22 0.250" THK (A572 GR65)	2,199	2,199
3	1	BOTTOM CAGE PLATE	106	106
4	14	1.75" ANCHOR BOLT, LENGTH=5.50' A615 GR75	64	888
5	1	BASE PLATE VALMONT S-56 2.250" THK (A572 GR50)	1,163	1,163
	1	TOP CAGE PLATE (REMOVE BEFORE SETTING POLE)	138	138
	1	SAFETY CLIMBING CABLE (LENGTH = 69.00')	72	72
	3	GROUNDING LUG	2	6
		GALVANIZING	191	191
	81	STEP AND CLIP (VALMONT STANDARD)	1	81
6	2	HAND HOLE HVY (9" x 24")	52	104
7	2	HAND HOLE STD (6" x 12")	11	22
8	2	HAND HOLE STD (6" x 12")	11	22
	1	POLE CAP	13	13



- NOTES:
- FACTORED BASE REACTIONS
MOMENT = 31,481 IN-KIPS
SHEAR = 41,828 #
VERTICAL = 20,946 #
 - GALVANIZED PER ASTM A-123.
 - DESIGN CRITERIA: TIA-222-H
 - THIS STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING LOADING:
EXPOSURE CATEGORY = D
TOPOGRAPHY CATEGORY = 1
RISK CATEGORY = II
SITE ELEVATION = 32 FT
EARTHQUAKE SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS $S_S = 1.51$
EARTHQUAKE SPECTRAL RESPONSE ACCELERATION AT ONE SECOND $S_1 = 0.80$
EARTHQUAKE SITE CLASS = D
WIND LOAD CASES ARE BASED ON 3 SECOND GUST AND 700 YEAR MRI
A. CASE 1: WIND = 159 MPH WIND SPEED
B. CASE 2: WIND = 50 MPH ICE AND WIND SPEED
DESIGN ICE THICKNESS = 0.50 IN
C. CASE 3: WIND = 60 MPH WIND SPEED
D. CASE 4: SEISMIC
E. CASE 5: SEISMIC
F. EQUIPMENT
- | DESCRIPTION | ABP MTG HT. (FT) | ABP CENTROID HT. (FT) | WITHOUT ICE EPA (FT**2) | WITH ICE WT (LBS) | WITH ICE EPA (FT**2) | WITH ICE WT (LBS) |
|---------------------------------|------------------|-----------------------|-------------------------|-------------------|----------------------|-------------------|
| 12-QUAD658C0000X (W/PM) | 77.50 | 79.00 | 146.68 | 1323 | 161.26 | 2590 |
| 1-RMQP-496-HK | 77.50 | 79.00 | 23.14 | 1945 | 28.17 | 2335 |
| 12-QUAD658C0000X (W/PM) | 57.50 | 59.00 | 122.23 | 1323 | 134.27 | 2584 |
| 1-RMQP-496-HK | 57.50 | 59.00 | 23.14 | 1945 | 28.17 | 2335 |
| 1-1/2" X 4' LIGHTNING ROD LIGH | 79.00 | 81.00 | 0.20 | 14 | 0.63 | 17 |
| 12-ERICSSON 4449 (15" X 13.2" X | 77.50 | 79.00 | 15.19 | 840 | 16.76 | 1051 |
| 2-RAYCAP RC3DC-3315-PF-48 OVP | 77.50 | 79.00 | 5.96 | 52 | 6.37 | 120 |
| 12-ERICSSON 4449 (15" X 13.2" X | 57.50 | 59.00 | 12.66 | 840 | 13.93 | 1044 |
| 2-RAYCAP RC3DC-3315-PF-48 OVP | 57.50 | 59.00 | 4.97 | 52 | 5.30 | 118 |
- FEEDLINES ARE PLACED INTERIOR TO THE POLE SHAFT (UNLESS NOTED OTHERWISE)
 - TOTAL POLE HEIGHT IS 80 FT AGL
 - ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX. 1 FT AGL)
 - 18 SIDED SHAFT
 - ACCEPTANCE OF ANSI/TIA-222-H IS CUSTOMER'S RESPONSIBILITY
 - DESIGNED PER CUSTOMER SPECIFIED DESIGN CRITERIA
 - ALTHOUGH RARE, VIBRATIONS SEVERE ENOUGH TO CAUSE DAMAGE CAN OCCASIONALLY OCCUR IN STRUCTURES OF ALL TYPES. BECAUSE THEY ARE INFLUENCED BY MANY INTERACTING VARIABLES, VIBRATIONS ARE GENERALLY UNPREDICTABLE. THE USER'S MAINTENANCE PROGRAM SHOULD INCLUDE OBSERVATION FOR EXCESSIVE VIBRATION AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING. THE VALMONT WARRANTY SPECIFICALLY EXCLUDES FATIGUE FAILURE OR SIMILAR PHENOMENA RESULTING FROM INDUCED VIBRATION, HARMONIC OSCILLATION OR RESONANCE ASSOCIATED WITH MOVEMENT OF AIR CURRENTS AROUND THE PRODUCT.



SECTION INFORMATION						ORDER	PROJECT	FILE ID	SCALE	DATE	ENGR
ITEM ID	LENGTH	BASE OD	TOP OD	THK	MATL	538506		538506-P1	NONE	03/01/22	CR71
1	46' - 0.00"	45.25"	27.34"	0.313"	A572 65 KSI	DESCRIPTION NEW HORIZONS 79.0' POLE, SITE: WHITSHED1, AK					
2	37' - 3.00"	29.50"	15.00"	0.250"	A572 65 KSI						

SUBMITTED TO:
New Horizons Telecom, Inc.
901 Cope Industrial Way
Palmer, Alaska 99645

BY:
Shannon & Wilson
5430 Fairbanks Street, Suite 3
Anchorage, Alaska 99518

(907) 561-2120
www.shannonwilson.com
AECC 125

GEOTECHNICAL ENGINEERING REPORT
'Whitshed' Communications Tower
CORDOVA, ALASKA

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Submitted To: New Horizons Telecom, Inc.
901 Cope Industrial Way
Palmer, Alaska 99645
Attn: Mr. Dale Browning, PE

Subject: GEOTECHNICAL ENGINEERING REPORT, 'WHITSHED'
COMMUNICATIONS TOWER, CORDOVA, ALASKA

Shannon & Wilson prepared this report and participated in this project as a subconsultant to New Horizons Telecom, Inc (NHTI). Our scope of services was specified in Purchase Order (PO) Number 278585 with NHTI dated October 15, 2021. This report presents the results of subsurface explorations, laboratory testing, and geotechnical engineering studies conducted by Shannon & Wilson, Inc. for the proposed telecommunications tower at the 'Whitshed' site near Cordova, Alaska. This geotechnical engineering report was prepared by the undersigned.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON

Ryan Collins, CPG
Senior Geologist

SKD/RDC:KLB



Kyle Brennan, PE
Vice President

CONTENTS

1 Introduction1

2 Site and Project Description.....1

3 Subsurface Explorations.....2

4 Laboratory Testing.....3

5 Subsurface Conditions.....4

6 Seismic Conditions.....5

7 Engineering Recommendations5

 7.1 Foundation Embedment and Frost Considerations6

 7.2 Uplift Resistance.....6

 7.3 Excavation Slopes.....6

 7.4 Pile Foundation Elements7

 7.4.1 Soil Parameters7

 7.4.2 Axial Capacities8

 7.4.3 Lateral Capacities9

 7.4.4 Pile Settlement10

 7.4.5 Pile Driving Considerations.....10

 7.5 Drainage11

 7.6 Structural Fill12

8 Closure and Limitations.....13

Exhibits

Exhibit 7-1: Generalized Soil Parameters.....8

Exhibit 7-2: Estimated Pile Head Deflection9

Figures

- Figure 1: Vicinity Map
- Figure 2: Site Plan
- Figure 3: Soil Description and Log Key
- Figure 4: Frost Classification Legend
- Figure 5: Rock Classification System
- Figure 6: Log of Boring B-1
- Figure 7: Grain Size Classification
- Figure 8: Foundation Elements Detail
- Figure 9: Uplift Resistance vs Footing Size
- Figure 10: Estimated Pile Driving Resistance, Open-ended Steel Pipe Pile, 12.75-inch diameter, 0.5-inch wall
- Figure 11: Estimated Pile Driving Resistance, Open-ended Steel Pipe Pile, 18-inch diameter, 0.5-inch wall
- Figure 12: Lateral Resistance Analyses, 12- and 18-inch Diameter Pipe Pile
- Figure 13: Gradation Requirements

Appendices

Important Information

1 INTRODUCTION

The purpose of this geotechnical study was to explore subsurface conditions and provide geotechnical engineering recommendations needed to design and construct the proposed facilities. To accomplish this, one boring was advanced near the proposed tower location to evaluate and characterize the subsurface soil conditions at the site. Soil samples recovered from the boring were tested in our geotechnical laboratory. Presented in this report are descriptions of the site and project, subsurface explorations and laboratory test procedures, an interpretation of subsurface conditions, and conclusion and recommendations from our engineering studies. This report is intended for use by the project design engineering staff, NHTI, and their representatives.

2 SITE AND PROJECT DESCRIPTION

The project is located at the existing Copper Valley Telecom (CVT) 'Whitshed' cellular on wheels (COW) trailer site near Milepost 1.8 of Whitshed Road, approximately 2 miles southwest of Cordova, Alaska. The site is accessed from Old Sawmill Road. Current development at the site consists of gravel driveways for access to private property, a temporary power pedestal, and the COW unit. Undeveloped areas are vegetated with dense stands of spruce, hemlock, and mossy ground cover. The mouth of Heney Creek and Three Mile Bay are just north and southwest of the project area, respectively. Orca Inlet is located west of the site. Topography in the area is relatively flat with a natural knoll located immediately west and adjacent to the proposed tower site. A vicinity map showing the general project area is included as Figure 1. Figure 2 includes a site plan showing the boring location and other prominent site features.

We understand that the project will generally consist of installing an approximately 80-foot tall, steel monopole tower. Based on conditions encountered in our boring, several foundation options were considered for supporting the tower; however, after discussions with CVT and the design team, a combination concrete slab and pile foundation system was selected by the team as the preferred foundation solution for resisting lateral and vertical loading (in both uplift and compression) imparted by the tower for this project.

3 SUBSURFACE EXPLORATIONS

Subsurface explorations for the project included advancing and sampling one boring, designated Boring B-1, at the site. The boring was drilled by GeoTek Alaska, Inc. of Anchorage, Alaska on November 8, 2021 using a truck-mounted CME-75 drill rig. The boring location, shown on Figure 2, was selected by Shannon & Wilson to be as close as practicable to the proposed new tower location, which was marked at the site by CVT prior to mobilization, given the drilling equipment and site conditions, and to avoid conflicts with onsite utilities. The boring location was recorded using a handheld global positioning system (GPS) that is generally considered accurate to within 20 feet horizontally. It should be noted that GPS accuracy may be affected by tree canopies, geographic features, and other atmospheric anomalies. Therefore, the boring location shown on the site plan should be considered approximate. An experienced representative from Shannon & Wilson was present during drilling to locate the boring, observe drill action, collect samples, log subsurface conditions, and observe groundwater conditions.

The boring was advanced to a depth of approximately 30.1 feet below ground surface (bgs). The boring was advanced through soil using 3 1/4-inch inner diameter (ID), continuous flight, hollow-stem augers. As the boring was advanced, samples were generally recovered using Standard Penetration Test (SPT) methods at 2.5-foot intervals to 10 feet bgs and 5-foot intervals thereafter to bedrock. With the SPT method, samples are recovered by driving a 2-inch outer diameter (OD) split-spoon sampler into the bottom of the advancing hole with blows of a 140-pound hammer free falling 30 inches onto the drill rods. For each sample, the number of blows required to drive the sampler the final 12 inches of an 18-inch penetration into undisturbed soil is recorded. Where the sampler did not penetrate the full 18 inches, our log reports the blow count and corresponding penetration in inches. Blow counts are shown graphically on the boring log figures as “penetration resistance” and are displayed adjacent to sample depth. The penetration resistance values give a measure of the relative density (compactness) or consistency (stiffness) of cohesionless or cohesive soils, respectively.

Once auger refusal was encountered, rock samples were taken beginning at 23.6 feet bgs, using a 5-foot long, HQ3 (2 3/8-inch ID) core barrel with a diamond impregnated bit. The rock core extracted from each run was classified in the field by our representative and placed in 2-foot-long core boxes for transport. The depths of the top and bottom of each run, percent recovery, and other drilling notes were recorded. Rock Quality Designation (RQD) measurements were taken on each sample. Core specimen longer than 4 inches are

measured in each run, with RQD calculated as the ratio of the sum of the length of core fragments longer than 4 inches to the total drilled footage per run, expressed as a percentage. The value is used to estimate rock mass quality (i.e. low values are indicative of low quality while RQD values approaching 100 percent reflect high quality). The results of these measurements along with the percent recovery are included on the boring logs. Upon completion, the boring was backfilled using the auger cuttings removed during drilling.

The soils encountered during drilling were observed and described in the field in general accordance with the classification system described by ASTM International (ASTM) D2488. Selected samples were tested in our laboratory to refine our soil descriptions in general accordance with the Unified Soil Classification System (USCS) described in Figure 3. Frost classifications were also estimated for samples based on laboratory testing (sieve analyses) and are shown on the boring log. The frost classification system is presented in Figure 4. The rock classification system is presented in Figure 5. A summary log of the boring is presented in Figure 6.

4 LABORATORY TESTING

Laboratory tests were performed on soil samples recovered from the boring to confirm our field classifications and to estimate the index properties of the typical materials encountered at the site. The laboratory testing was formulated with emphasis on determining gradation properties, natural water content, and frost characteristics.

Water content tests were performed on each sample recovered from the boring. The tests were generally conducted according to procedures described in ASTM D2216. The results of the water content measurements are presented graphically on the boring log presented in Figure 6.

Grain size classification (gradation) tests were conducted on selected samples to confirm the field classification of the soils encountered. The gradation testing generally followed the procedures described in ASTM C117/C136. The grain size testing results are presented as Figure 7, and summarized on the boring log as percent gravel, percent sand, and percent fines. Note percent fines on the boring log are equal to the sum of the silt and clay fractions indicated by the percent passing the No. 200 sieve (P200). Plasticity characteristics (Atterberg Limits results) are required to differentiate between silt and clay soils under USCS.

5 SUBSURFACE CONDITIONS

The subsurface conditions encountered in our boring at the site are depicted graphically on the boring log in Figure 6. The boring generally encountered approximately 7 feet of fill overlying approximately 5 feet of organic soil, followed by approximately 5 feet of granular soil overlying bedrock.

Based on penetration resistance values ranging from 6 blows per foot (bpf) to 13 bpf and our observations of drill action, the predominantly granular fill materials encountered during drilling are considered loose to medium dense. Based on our laboratory testing, estimated fines contents in one sample of fill material was approximately 14 percent and moisture contents range from approximately 12 to 17 percent.

Native, organic soils described as interbedded peat and organics silt were encountered from below the fill to about 12.5 feet bgs. Based on penetration resistance values of 3 bpf and our observations of drill action, the predominantly organic materials encountered during drilling are considered soft. Based on our laboratory testing, moisture content in one sample of organic material was approximately 91 percent.

Predominantly granular materials consisting of sand with gravel and various amounts of fines were encountered below the organic layer to about 17 feet bgs. Based on a penetration resistance value of 27 bpf and our observations of drill action, the predominantly granular native materials encountered during drilling are considered medium dense. Based on our laboratory testing, estimated fines contents in one sample of predominantly granular, native material was approximately 10 percent and moisture content was approximately 17 percent.

Highly weathered bedrock was encountered at approximately 17.5 feet bgs and transitioned to competent bedrock at approximately 23.6 feet bgs. The competent bedrock consisted of fresh, dark gray, siltstone. The competent bedrock was interpreted as weak to medium weak strength based on field index tests with a geologic hammer (see Figure 5). RQD values in core samples ranged from 10 to 11 percent and recovery values ranged from 94 to 100 percent.

Groundwater was encountered at about 7 feet bgs during drilling. It should be noted that groundwater levels at the site may fluctuate by several feet seasonally or may be influenced by tidal fluctuations.

6 SEISMIC CONDITIONS

Based on our explorations and local experience, the site class according to the American Society of Civil Engineers (ASCE) 7-10 will be C for a very dense soil and soft rock profile based on the Blow Count (N) method with blows in the upper 17.5 feet averaging less than 15 bpf and the presence of bedrock beginning around 17.5 feet bgs in our boring. Based on the soil conditions found in our boring slope failure and surface rupture are unlikely at this site. Liquefaction of the native soils could be possible, however, foundation support for this project should not be affected by potential liquefaction because of the foundation system selected. Based on Sections 11 and 22 of the ASCE 7-10, S_s and S_1 for the Maximum Considered Earthquake were estimated at 1.507 and 0.8 times the force of gravity (g), respectively. The site-specific modifying coefficients for the spectral response accelerations are $F_a = 1.0$ and $F_v = 1.3$ for the short and long periods, respectively. The S_{MS} and S_{M1} were calculated to be 1.507 and 1.04 g respectively. The computed S_{DS} and S_{D1} are 1.004 and 0.694 g.

7 ENGINEERING RECOMMENDATIONS

We understand that a combination slab and pile foundation is preferred for supporting the new tower. A zone of soft, potentially compressible soils was encountered between 7 and 12.5 feet bgs in our boring. Because the tower loads will be carried beneath the soft soil layer by piles extending to bedrock, it is our opinion that the effect of consolidation of the soft soils on the tower foundation should be negligible. However, the foundation system should be designed such that the slab and piles can support the tower even if the organic soils do compress and result in development of a void under the slab. Design of the tower foundation should consider the strength of bedrock, overburden thickness, expected settlements, uplift forces, lateral forces due to wind and seismic loads, possible frost conditions within the subsurface soils, and constructability issues.

We understand that the slab for the combination footing will be sized to resist uplift forces (approximately 20 feet square and 2.5 to 3 feet thick). The slab will be supported by nine, driven, open-ended, steel pipe piles spaced relatively evenly across the slab footprint with the tops of the piles embedded into the slab. The slab and piles should be connected as designed by a structural engineer.

7.1 Foundation Embedment and Frost Considerations

Based on our experience in the Cordova area, seasonal frost may penetrate 4 to 6 feet below the ground surface in areas kept clear of snow. As such, at least the upper 5 feet of the soil column around the tower slab should be overexcavated and replaced with Selected Material Type A, as defined by the Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction (ADOT&PF SSHC), placed and compacted as described in Section 7.6. The excavation should extend laterally away from the bottom edge of the foundation a distance equal to the thickness of soil removed from below the bottom of the foundation. The open excavation should be protected from excess moisture prior to casting the footings or placing backfill. Assuming the zone below the footing is developed as described above, we recommend that the bottom of the tower foundation be embedded at least 2.5 feet bgs.

7.2 Uplift Resistance

We understand that a concrete slab, extending to the ground surface, will be sized to provide uplift resistance for the tower foundation system. For this configuration, the uplift resistance of the foundation can be estimated as the dead weight of the concrete slab. Additional resistance gained from friction between the foundation and embedment soils should be negligible in comparison, and in our opinion, should not be used in estimating uplift resistance for the concrete slab. Additionally, because of the relatively shallow embedment, we recommend neglecting uplift resistance from the piles.

If the concrete slab is buried so the top of the slab is below the ground surface, the uplift resistance can be estimated as the sum of the dead weight of the slab, the weight of the soil within a zone described by a vertical surface extending upward from the horizontal limits of the slab, and the shearing resistance of the soil across this surface. In this case, the ultimate uplift resistance can be estimated using Figure 8, which assumes a soil density of at least 120 pounds per cubic foot (pcf) and a soil friction angle of about 32 degrees.

7.3 Excavation Slopes

Excavations will be needed to construct the tower foundation. Groundwater data from our boring suggest that excavations shallower than about 5 feet below the existing ground surface should not encounter groundwater seepage during construction. Sumps and pumps should be sufficient to remove and discharge infiltration water (i.e., rain or melting snow), provided construction activities are planned for rapid excavation, construction, and backfill.

Soil slopes in the in-situ soils will tend to stand steeply initially, but if they are left open and allowed to saturate, they will soften and slump in time to their natural angle of repose, which for planning purposes is estimated at about 1.5 H to 1 V. If excavations are allowed to stay open to inclement weather, the soil slopes are likely to slough to shallower angles. The slope and excavation bottom conditions should be made the responsibility of the contractor who will be present on a day-to-day basis and can adjust their efforts to obtain the needed stability and meet the applicable Alaska and Federal Occupational Safety and Health Administration (OSHA) safety regulations.

7.4 Pile Foundation Elements

Steel pipe piles will be used to support the concrete slab by carrying the vertical loads below the soft soil layer encountered in our boring. Pile types and sizes must be selected based on vertical and lateral load requirements, settlement, and pile-driving considerations as addressed below. The piles will generally need to support their own weight, the weight of the structure, and potential downdrag loads due to settlement of the soils around the piles.

7.4.1 Soil Parameters

We analyzed 12.75- (12-inch nominal), and 18-inch diameter, steel pipe piles with a 0.50-inch wall thickness. Our analyses provide ultimate, single pile capacities using a generalized soil profile from the conditions encountered by our boring. The following table indicates the generalized soil properties we used for input into our lateral and axial pile models. These values are based on our drilling observations, lab testing, and examination of the soil encountered in Boring B-1. Groundwater was observed while drilling at approximately 7 feet bgs. Therefore, the effective unit weight and other parameters in the table below are adjusted for the soil units below the estimated groundwater level (7 feet bgs). Soil units indicated in the table are based on average conditions encountered in this boring. The values included in the table should be considered approximate and indicative of static (non-seismic) conditions only.

Exhibit 7-1: Generalized Soil Parameters

Soil Classification	Recommended RSPile Soil Type	Top of Layer /Bottom of layer (ft)**	Angle of Internal Friction (degrees)	Effective Unit Weight (pcf)**	Ultimate End Bearing (tsf)**	Subgrade Reaction Modulus (pci)**	Ktan $\bar{\delta}$ (unitless)**
Selected Material Type A (FILL) / Silty Gravel with Sand (GM)	API Sand	0/7	32	120	8	30	0.21
Peat and Silt with Organics (PT, OL)*	API Sand	7/12.5	24	17.6	3	10	0.14
Sand with Silt and Gravel (SP-SM)*	API Sand	12.5/17.5	35	62.6	16	65	0.25
Highly Weathered Bedrock*	API Sand	17.5/23.6	40	82.6	72	125	0.28
Siltstone	Weak Rock	23.6/?	-	97.6	-	-	-

The values in the above table are appropriate for static loading conditions. Engineering parameters for competent rock are not provided since the piles are not anticipated to be extended into bedrock.

* Denotes soils units below the static groundwater level. Total unit weight of soil is reduced by 62.4 pcf for submerged soil units to estimate effective unit weight.

** ft – foot, pcf – pounds per cubic foot, pci – pounds per square inch per inch, psf – pounds per square foot, tsf – tons per square foot.

7.4.2 Axial Capacities

Axial pile driving resistance curves for single piles are presented in Figures 10 and 11. A factor of safety was not applied to the values calculated, so please note that the pile driving resistance presented in these figures are estimated ultimate resistances for a single pile. Since the piles are intended to gain support by end bearing on competent bedrock, the pile driving resistance curves are intended to be used to estimate driving resistance during construction for hammer selection. End bearing capacities for single piles extended to competent rock are anticipated to be at least 5,000 pounds per square inch of steel in the pile section. The embedment values shown in the figures are total embedment in feet bgs assuming ground surface elevations as they currently exist at the proposed site. The piles should be driven to refusal on competent bedrock, in order to achieve sufficient axial capacity for support of the foundation and tower at the site.

The estimated pile driving resistance included in this section are intended to assist with pile driving and hammer selection for the piles at the project area described above. Therefore, these resistance values should not be used to approximate the driving resistance at other locations. The curves shown on Figures 10 and 11 are based on observations during drilling, laboratory testing of recovered soil samples, and generalized calculations as described above. As such, the resistance values should be considered approximate and

should be confirmed during driving by monitoring to ensure that the tip of the pile has been driven to and is seated on bedrock.

7.4.3 Lateral Capacities

Piles must be designed to resist lateral forces from wind and seismic loading. The resistance to lateral loading in a pile depends on the pile type, size, stiffness, the amount of deflection the pile undergoes and the degree of fixity of the head of the pile. A finite element program by Rocscience Inc. – RSPile v3.003, was used in our analysis of lateral loading of a variety of single pile configurations in encountered soil conditions. RSPile accepts soil, rock, pile, shaft, and head loading parameters as input, internally generates p-y curves at user-identified intervals along the pile length (nodes), and processes this information to generate shear, bending moment, and deflection values along the pile. Our analysis assumed the pile head is embedded sufficiently in the concrete slab such that a fixed head condition is appropriate. Results from our analyses are included in Figure 12.

The lateral load capacity was estimated by applying the provided factored base reactions provided by NHTI (see Figure 12 for reaction values) to the pile at the base of the concrete slab (assumed 3 feet bgs) and calculating the deflection of the pile at that point. Since nine piles will be used to support the tower and slab, the provided base reactions were reduced accordingly for our single pile analysis. The calculated pile head deflection under the lateral loading scenarios considered in our analysis are shown in the table below.

Exhibit 7-2: Estimated Pile Head Deflection

Pile Diameter (inches)	Deflection (inches)
12	0.04
18	0.03

Lateral stiffness may be considered to be linear between pile sizes for the purposes of this project as long as the lateral loading does not exceed the loading shown on Figure 12. Piles for this project should generally be embedded to refusal on bedrock. However, based on the conditions encountered in our boring, we also recommend that piles are embedded at least 5 feet beyond the soft, organic soil layer. If lateral loading conditions exceed those indicated on Figure 12, the actual pile head deflections may be greater than those shown in the exhibit and the piles should be reanalyzed under the new condition to verify its lateral load carrying capacity.

As with the axial capacities, the above lateral loading information is provided for the tower piles in the project area outlined above. This information should not be used to approximate lateral capacities for piles driven at other locations.

7.4.4 Pile Settlement

The foundation piles will achieve their support from skin friction of the soils and end bearing capacity on the bedrock at the site. With the exception of the soft, potentially compressible soils encountered between 7 and 12.5 feet bgs soils at the site are generally loose to medium dense and granular. Weathered rock was encountered at approximately 17.5 feet bgs and competent bedrock was encountered at approximately 23.6 feet bgs. The competent bedrock generally consisted of fresh, dark gray, siltstone. Because of the compactness of these materials and the piles being driven to rock, it is our opinion that total statically induced settlements will be small, generally on the order of 1 inch or less assuming the pile tip is embedded to a sufficient depth to achieve an adequate factor of safety on the axial and lateral capacities provided in the sections above.

7.4.5 Pile Driving Considerations

The contractor should be responsible for developing a pile driving plan that will achieve the goals of the project. This plan should include a list of the equipment that is to be used and general procedures for conducting the pile driving. We recommend that the contractor be required to develop a wave equation analysis to estimate the amount of driving effort required to advance the piles to bedrock given the pile size and the specific hammer to be used to drive the pile. The analysis should also address the driving stresses in the pile. If a thicker section is required, the recommendations for lateral capacity and target depth will need to be reviewed. Due to the presence of shallow bedrock at the site, we recommend that the pile tip be reinforced to protect the pile from damage during driving. The bedrock surface should be expected to be variable, therefore final tip elevations for the piles will vary.

Based on the subsurface conditions and our analyses, the following criteria and procedures should be established for driving production piles.

- All piles should be driven to refusal on bedrock for impact hammers as determined by appropriate load test or model (such as WEAP) with respect to the ultimate capacity required.
- Open ended diesel impact hammers should be used to finish driving piles to confirm pile refusal conditions and to confirm pile capacities if the wave equation method will be used.

- We recommend not exceeding 10 blows per inch of penetration (considered driving refusal) with an appropriately sized impact hammer. We recommend selecting a hammer that is rated to at least four times the maximum driving resistance shown on Figures 10 and 11 to ensure that the piles will be able to be driven through soils and weathered bedrock, and seated firmly on competent bedrock.
- A continuous driving record including penetration resistance (i.e. blows per foot) and hammer stroke should be taken for the entire depth of the piles. This data will be used to compare to wave equation results to establish if the piles have achieved the desired capacity and to confirm end of driving with refusal on bedrock.
- The unfactored driving resistance curves for static loading conditions are intended to be used to estimate driving resistance during construction. Driving resistance into competent bedrock will be substantially higher and is not indicated on the axial capacity curves.
- Driving criteria should be based on achieving penetration resistance and driving refusal on bedrock. We anticipate that the bedrock surface will be variable and refusal on bedrock may not be achieved at the same depth for each pile.

During driving, the contractor should be made responsible for keeping pile driving records to include pile location, penetration rates, time of driving, length of driving, length of pile, and the finish tip elevation. The records should highlight problems or difficulties encountered during driving and the methods or measures taken to overcome the issues. We recommend that a qualified geotechnical engineer be on site during pile installation to observe the construction effort on behalf of the project owner. We envision that a geotechnical engineer representing the owner on site during construction would record the information described above and would be able to verify that the construction is carried out according to plan and the actual pile design.

7.5 Drainage

Groundwater was encountered at approximately 7 feet bgs during drilling in Boring B-1. Groundwater may fluctuate seasonally by several feet or may be subject to tidal influence and the exploration results presented herein may not necessarily coincide with high water levels. If excavations more than 4 to 5 feet deep are planned, groundwater could be encountered during construction and the contractor should be prepared to use shoring and/or dewater the excavation to maintain stable slope and bottom conditions. For excavations that do not extend more than 1 to 2 feet below the water level, sumps and pumps should be sufficient for dewatering the excavations, provided excavation activities are planned for rapid excavation, utility construction, and backfill. These measures may also need to be used in tandem with temporary shoring or trench boxes to control trench

walls. Construction should also be staged so that a minimum length of trench is left open for as short a time as possible.

We also recommend that areas around the base of the tower and other appurtenances be contoured to drain away from the structure and off the site. Contouring the site for positive drainage will minimize ponding of surface waters during periods of rainfall or rapid snow melting.

7.6 Structural Fill

Imported fill may be needed under and around the tower foundation, as bedding in utility trenches, and to contour the site surface for drainage. Structural fill that is imported and used to backfill under and around foundations should be clean, granular soil free of organic material to provide drainage and frost protection. These soils should contain less than about six percent (by weight, based on the minus 3-inch portion) passing the No. 200 sieve. Selected Material Type A structural fill, as defined by the ADOT&PF SSHC, meets these requirements.

Based on our observations and laboratory testing of samples recovered during drilling, the materials encountered by our boring do not meet the gradation requirements for Selected Material Type A structural fill, as shown on Figure 13, and should not be reused as backfill under or around the tower foundation.

Structural fills or native soils placed as backfill around the foundation elements or around buried utilities should be placed in lifts not to exceed 10 to 12 inches loose thickness and compacted to 95 percent of the maximum density as determined by the Modified Proctor compaction procedure (ASTM D-1557). During fill placement, we recommend that large cobbles or boulders with dimensions in excess of 8 inches be removed from backfill used around the foundation. To avoid damage to foundation elements, fill material within 18 inches of the pedestal and/or block foundation should be placed in layers not to exceed six inches loose thickness and compacted with hand operated equipment. Heavy equipment should not be used as it could cause increased lateral pressures and possibly damage the structure.

Trench backfill should also be placed in maximum 12-inch loose lifts and compacted to at least 95 percent of the Modified Proctor maximum dry density. Bulking of backfill into the trench should be discouraged as this can cause voids and lead to large future surface settlements.

8 CLOSURE AND LIMITATIONS

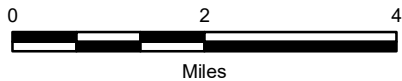
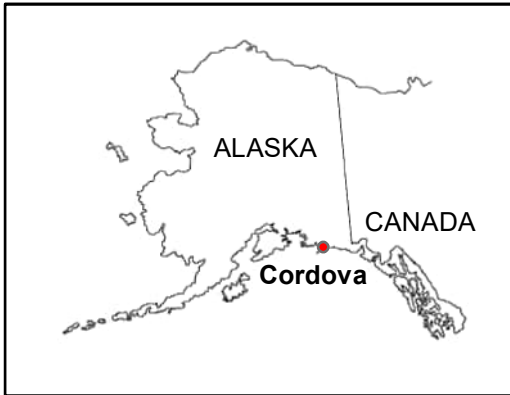
This report was prepared for the exclusive use of our client and their representatives for evaluating the site as it relates to the geotechnical aspects discussed herein. The conclusions and interpretation contained in this report are based on site conditions as they presently exist. It is assumed that the exploratory borings are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations.

If, during construction, subsurface conditions different from those encountered in these explorations are observed or appear to be present, Shannon & Wilson, Inc. should be advised at once so that these conditions can be reviewed. If there is a substantial lapse of time between the submittal of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the conclusions considering the changed conditions and time lapse.

Unanticipated soil conditions are commonly encountered and cannot fully be determined by merely taking soil samples or advancing test holes. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs. Please read the Important Information section at the back of this report to reduce your project risks.

We recommend that we be retained to review those portions of the plans and specifications pertaining to earthwork to determine if they are consistent with our recommendations. In addition, we should be retained to observe construction, particularly the installation of piles and/or site excavations, preparation of subgrade, compaction of structural fill, and also to make field measurements of ground displacements and other such field observations as may be necessary.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact us.



'Whitshed' Communications Tower
Cordova, Alaska

VICINITY MAP

January 2022


107965-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1



LEGEND

B-1  Approximate Location of Boring B-1, Advanced by Shannon & Wilson, November 2021

NOTES

- 1. Map adapted from aerial imagery provided by ArcGIS Online.

'Whitshed' Communications Tower
Cordova, Alaska

SITE PLAN

January 2022

107965-001

 SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT ²	FINE-GRAINED SOILS (50% or more fines) ¹	COARSE-GRAINED SOILS (less than 50% fines) ¹
Major	Silt, Lean Clay, Elastic Silt, or Fat Clay³	Sand or Gravel⁴
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: Sandy or Gravelly⁴	More than 12% fine-grained: Silty or Clayey³
Minor Follows major constituent	15% to 30% coarse-grained: with Sand or with Gravel⁴ 30% or more total coarse-grained and lesser coarse-grained constituent is 15% or more: with Sand or with Gravel⁵	5% to 12% fine-grained: with Silt or with Clay³ 15% or more of a second coarse-grained constituent: with Sand or with Gravel⁵

¹All percentages are by weight of total specimen passing a 3-inch sieve.
²The order of terms is: *Modifying Major with Minor*.
³Determined based on behavior.
⁴Determined based on which constituent comprises a larger percentage.
⁵Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm
	NOTE: If automatic hammers are used, blow counts shown on boring logs should be adjusted to account for efficiency of hammer.
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.
	NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.

PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND Fine Medium Coarse	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.) #40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.) #10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL Fine Coarse	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.) 3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS

	Bentonite Cement Grout		Surface Cement Seal
	Bentonite Grout		Asphalt or Cap
	Bentonite Chips		Slough
	Silica Sand		Inclinometer or Non-perforated Casing
	Perforated or Screened Casing		Vibrating Wire Piezometer

PERCENTAGES TERMS^{1,2}

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

¹Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

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









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Cordova, Alaska

SOIL DESCRIPTION AND LOG KEY

January 2022

107965-001

**UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
(Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)**

MAJOR DIVISIONS		GROUP/GRAPHIC SYMBOL	TYPICAL IDENTIFICATIONS	
COARSE-GRAINED SOILS (more than 50% retained on No. 200 sieve)	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Gravel (less than 5% fines)	GW 	Well-Graded Gravel; Well-Graded Gravel with Sand
		Silty or Clayey Gravel (more than 12% fines)	GP 	Poorly Graded Gravel; Poorly Graded Gravel with Sand
			GM 	Silty Gravel; Silty Gravel with Sand
			GC 	Clayey Gravel; Clayey Gravel with Sand
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Sand (less than 5% fines)	SW 	Well-Graded Sand; Well-Graded Sand with Gravel
			SP 	Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand (more than 12% fines)	SM 	Silty Sand; Silty Sand with Gravel
			SC 	Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS (50% or more passes the No. 200 sieve)	Silts and Clays (liquid limit less than 50)	Inorganic	ML 	Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL 	Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL 	Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Silts and Clays (liquid limit 50 or more)	Inorganic	MH 	Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH 	Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH 	Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor	PT 	Peat or other highly organic soils (see ASTM D4427)	

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

- Dual symbols (*symbols separated by a hyphen, i.e., SP-SM, Sand with Silt*) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart. Graphics shown on the logs for these soil types are a combination of the two graphic symbols (e.g., SP and SM).
- Borderline symbols (*symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand*) indicate that the soil properties are close to the defining boundary between two groups.

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**SOIL DESCRIPTION
AND LOG KEY**

January 2022

107965-001

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FIG. 3
Sheet 2 of 3

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS¹

Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

PLASTICITY²

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASTICITY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20
High	It take considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS³

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

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ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q _u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS¹

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

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SOIL DESCRIPTION AND LOG KEY

January 2022

107965-001

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FROST CLASSIFICATION
 (after Municipality of Anchorage, 2007)

GROUP		0.02 Mil.	P-200*	USC SYSTEM (based on P-200 results)
NFS	Sandy Soils	0 to 3	0 to 6	SW, SP, SW-SM, SP-SM
	Gravelly Soils	0 to 3	0 to 6	GW, GP, GW-GM, GP-GM
F1	Gravelly Soils	3 to 10	6 to 13	GM, GW-GM, GP-GM
F2	Sandy Soils	3 to 15	6 to 19	SP-SM, SW-SM, SM
	Gravelly Soils	10 to 20	13 to 25	GM
F3	Sands, except very fine silty sands**	Over 15	Over 19	SM, SC
	Gravelly Soils	Over 20	Over 25	GM, GC
	Clays, PI>12			CL, CH
F4	All Silts			ML, MH
	Very fine silty sands**	Over 15	Over 19	SM, SC
	Clays, PI<12			CL, CL-ML
	Varved clays and other fined grained, banded sediments			CL and ML CL, ML, and SM; SL, SH, and ML; CL, CH, ML, and SM

PI = Plasticity Index

P-200 = Percent passing the number 200 sieve

0.02 Mil. = Percent material below 0.02 millimeter grain size

*Approximate P-200 value equivalent for frost classification.
Value range based on typical, well-graded soil curves.

** Very fine sand : greater than 50% of sand fraction passing the number 100 sieve

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FROST CLASSIFICATION LEGEND

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FIG. 4

ROCK CLASSIFICATION SYSTEM

based on

DOT&PF Alaska Field Rock Classification and Structural Mapping Guide (October 1, 2003)

Rock Material Description:

Written descriptions of rock types in geological or engineering logs, as described below, present a uniform approach, allowing continuity of description from location to location, and project to project. The following standard sequence of systematic description is used on the boring logs.

ROCK TYPE; Weathered state, color, structure, grain size, rock material strength

Weathering:

The following terminology was used to describe degrees of weathering. These descriptions refer primarily to chemical weathering which results in discoloration of the rock and leads to eventual decomposition of silicates to clay minerals. Some materials, notably quartz, resist this action and may survive unchanged.

Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration on major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or corestones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or corestones.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to a soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Strength:

The rock strength classifications are referenced to simple field hardness tests shown below.

Grade	Description	Field Identification	Approx. Range of Uniaxial Compressive Strength (psi)
R0	Extremely Weak Rock	Indented by thumbnail.	35 - 150
R1	Very Weak Rock	Crumbles under firm blow with point of geological hammer, can be peeled by a pocket knife.	150 - 725
R2	Weak Rock	Can be peeled by a pocket knife with difficulty, shallow indentation made by firm blow with point of geological hammer.	725 - 3,500
R3	Medium Weak Rock	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	3,500 - 7,000
R4	Strong Rock	Specimen requires more than one blow of geological hammer to fracture it.	7,000 - 15,000
R5	Very Strong Rock	Specimen requires many blows of a geological hammer to fracture it.	15,000 - 36,000
R6	Extremely Strong Rock	Specimen can only be chipped with geological hammer.	> 36,000

Core Recovery:

Core recovery is determined as the ratio of core recovered to the total drilled length expressed as a percentage; the value may be recorded on a run by run basis, or over a normalized core length. The recovery percent is plotted in order to highlight weaker zones or core. From the point of view of most geotechnical drilling, it is the core that is the most difficult to recover which will indicate the most clearly the weakest parts of the rock fabric, and is usually the most important to design.

Rock Quality Designation (RQD):

RQD defines the fraction of solid core recovered greater than 100 millimeters in length as the Rock Quality Designation. It is calculated as the ratio of the sum of the length of core fragments longer than 4 inches to the total drilled footage per run, expressed as a percentage. The core is measured along the centerline from fracture to fracture. Cores containing discontinuities parallel to the core axis should be given an RQD of zero.

RQD may be used to classify the rock mass as follows:

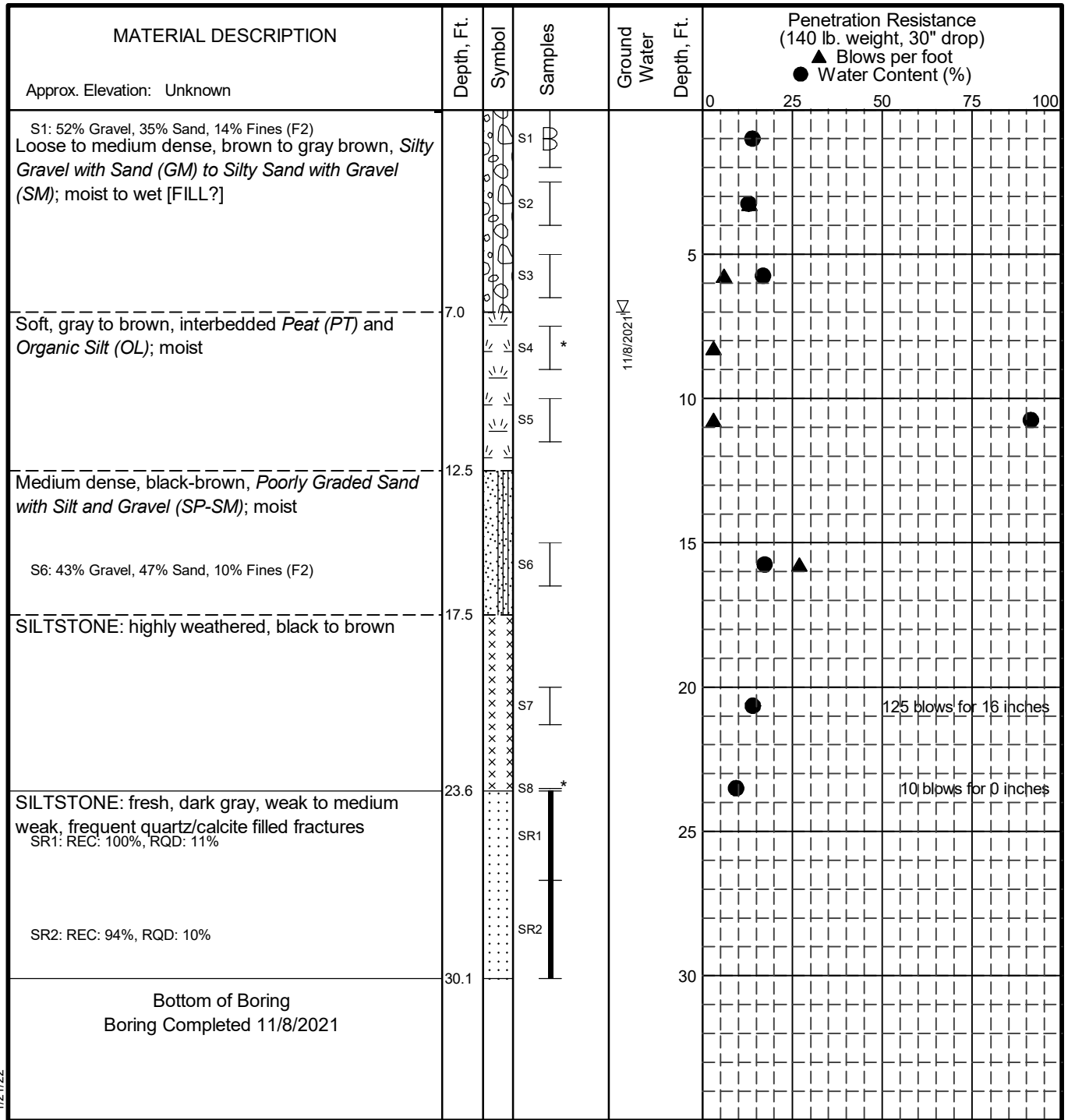
RQD	Rock Classification
0% - 25%	Very Poor
26% - 50%	Poor
51% - 75%	Fair
76% - 90%	Good
91% - 100%	Excellent

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ROCK CLASSIFICATION SYSTEM

January 2022

107965-001



LEGEND

- * Sample Not Recovered
- ⊃ Grab Sample
- ⊃ 2" O.D. Split Spoon Sample
- ⊃ Rock Core Sample
- Frozen
- ∇ Ground Water Level At Time Of Drilling

- Water Content (%)
- Plastic Limit
- Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.

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LOG OF BORING B-1

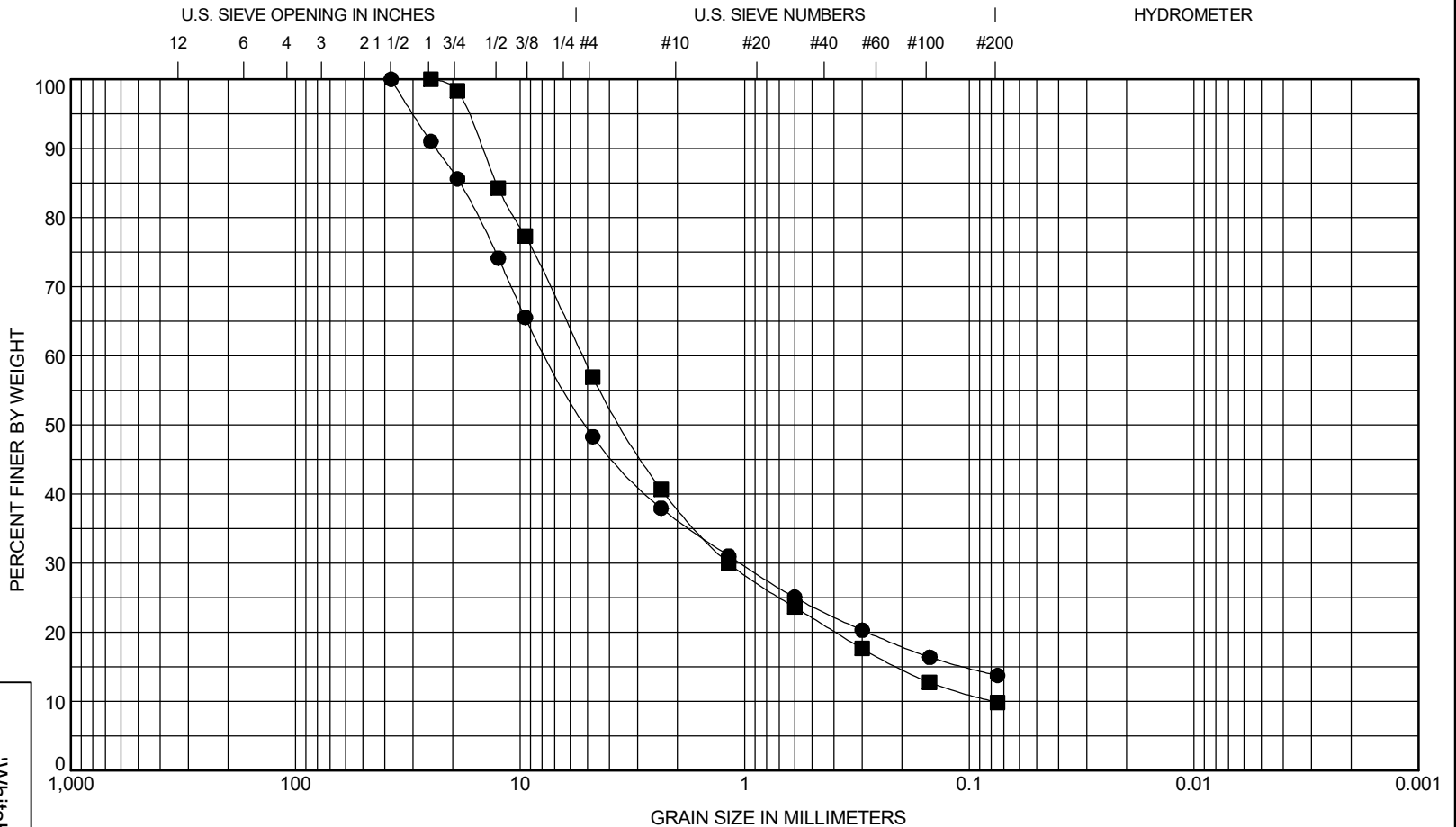
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FIG. 6

GEOTECHNICAL LOG WHITSHED TOWER.GPJ S&W GEO1.GDT 1/21/22



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample	Depth, Ft	Classification					LL	PL	PI	Cc	Cu
● B-1 S1	0.0 - 1.5	Silty Gravel with Sand (GM)									
■ B-1 S6	15.0 - 16.5	Poorly Graded Sand with Silt and Gravel (SP-SM)								3.4	67.4

Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-1 S1	0.0 - 1.5	37.5	7.61	1.05		52	35	14	
■ B-1 S6	15.0 - 16.5	25	5.28	1.18	0.08	43	47	10	

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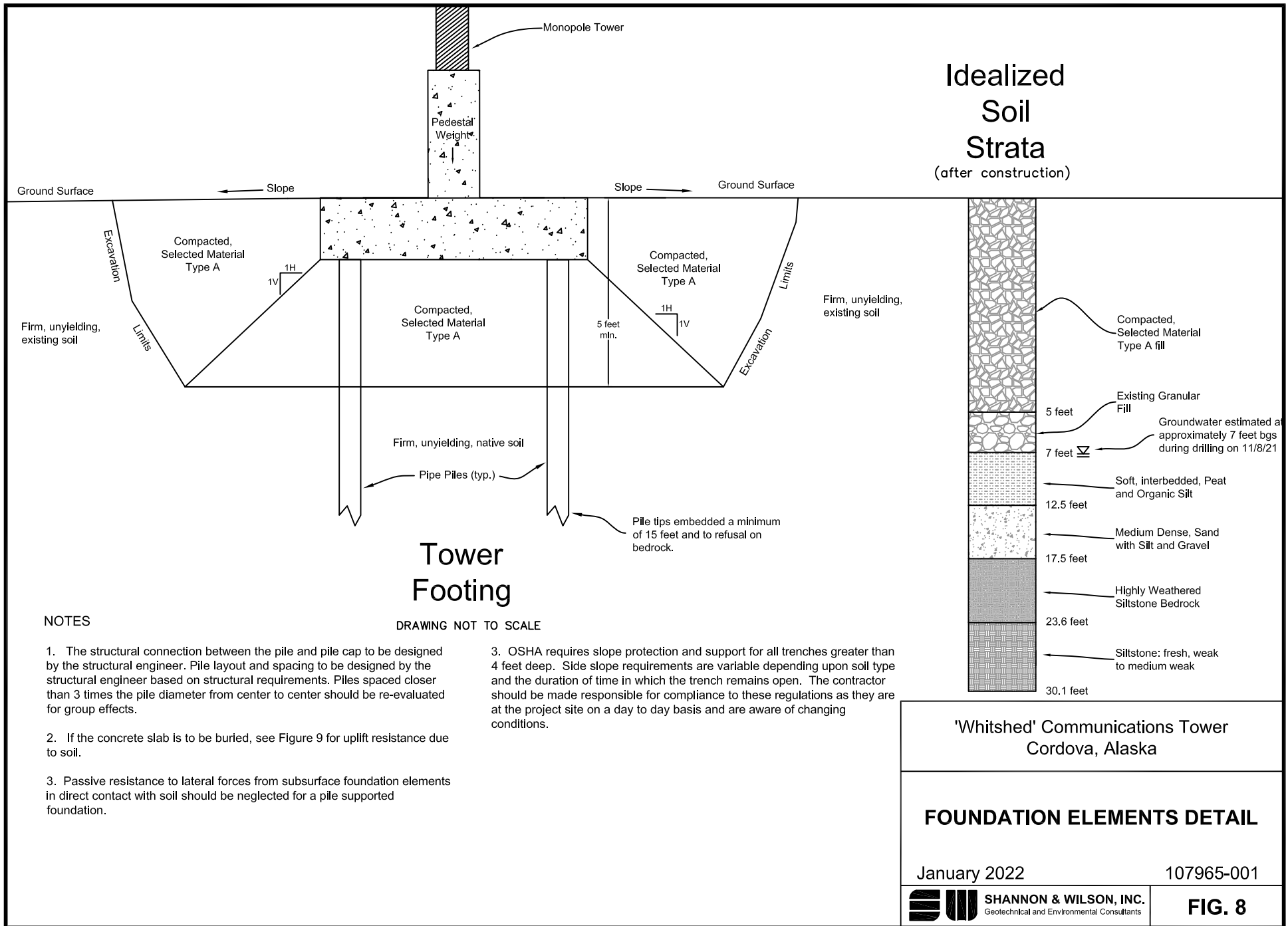
GRAIN SIZE CLASSIFICATION

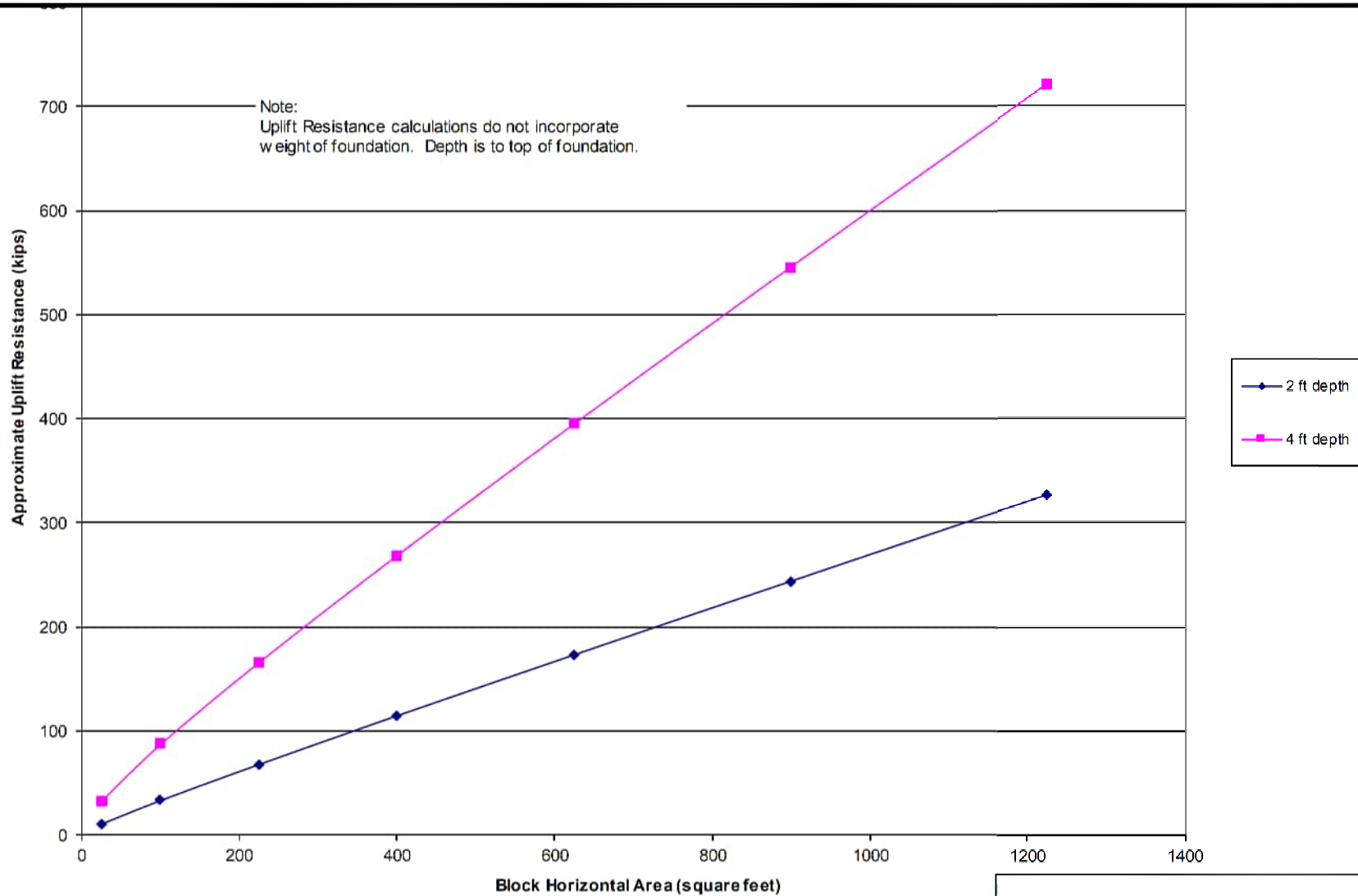
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FIG. 7





NOTES

1. No assumptions have been made as to factor of safety. Typically design values should incorporate a factor of safety (Shannon & Wilson recommends FS=3 to limit deflection). We assume the foundation element is embedded in compact granular fill (unit weight at least 120 pcf and friction angle at least 32 degrees). Foundation element length should not exceed 1.5 times width.

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**UPLIFT RESISTANCE VS.
FOOTING SIZE**

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107965-001

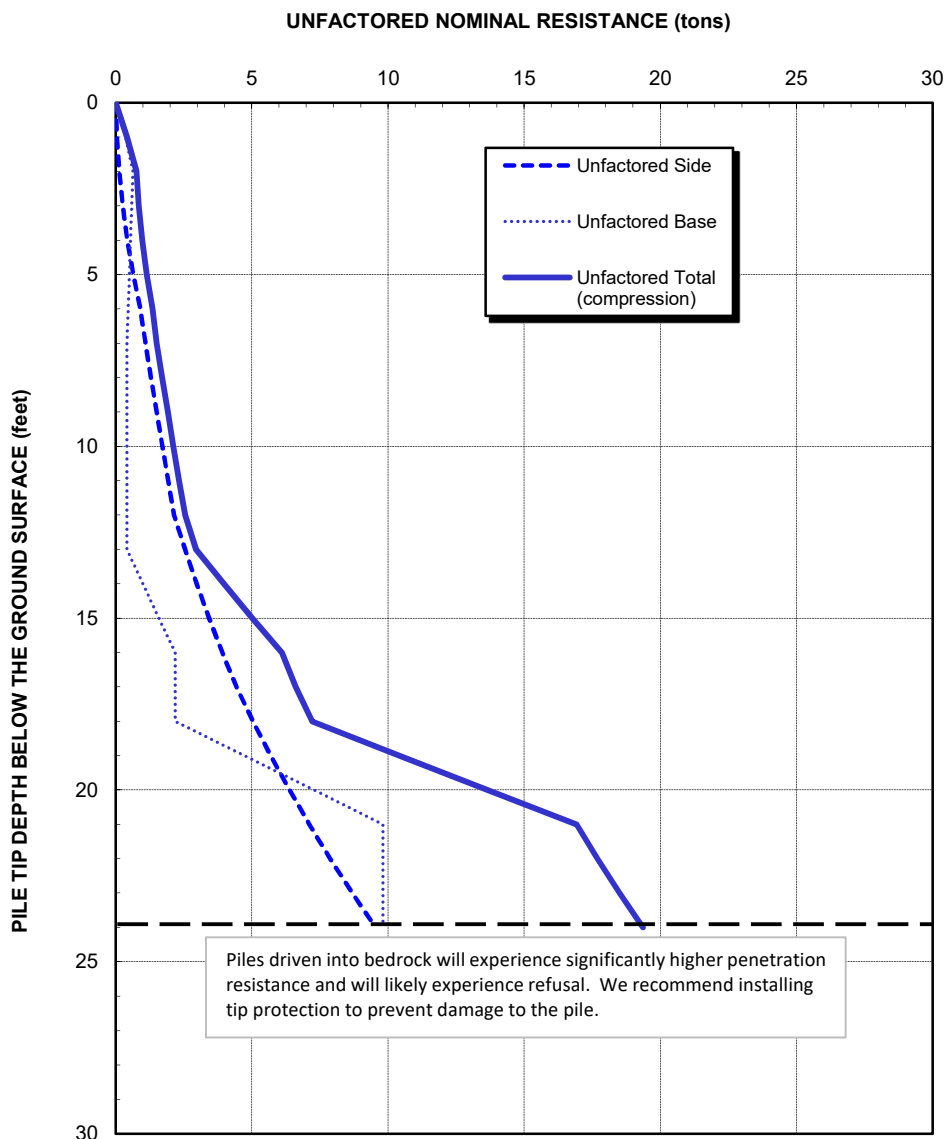
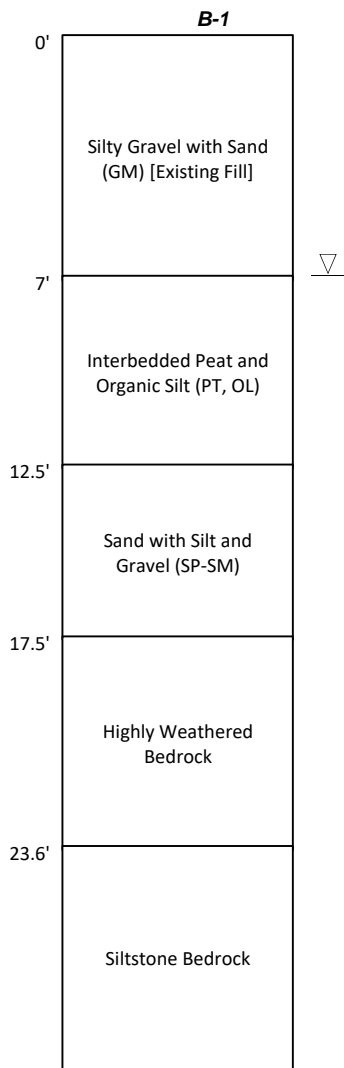


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FIG. 9

ASSUMED SUBSURFACE PROFILE

Based on Nearby Explorations:



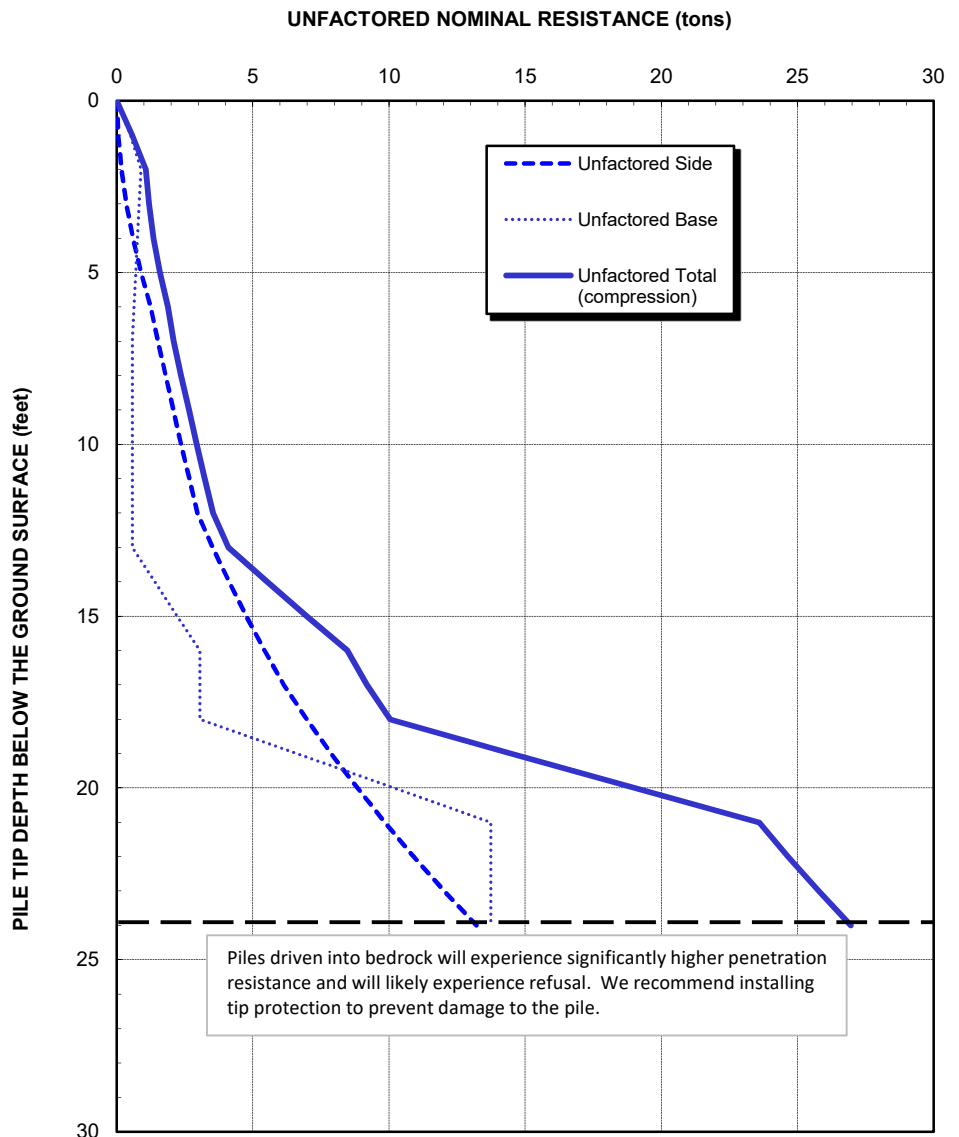
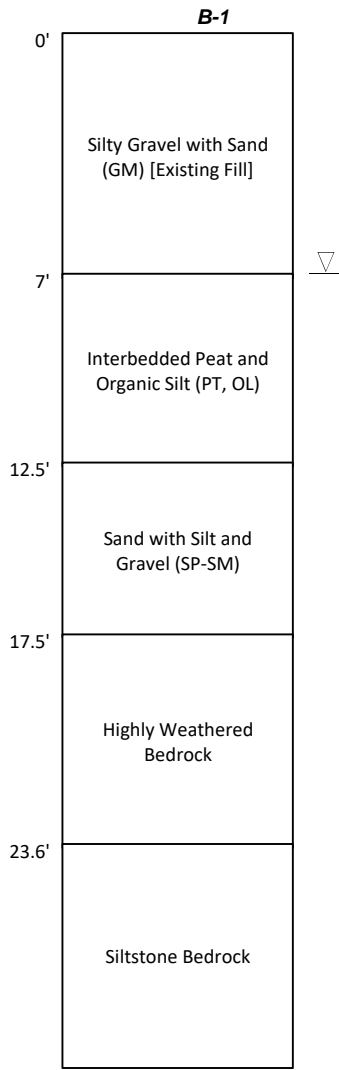
NOTES:

1. The analyses were performed based on the Shannon & Wilson design method and local experience. The analyses are based on a single pile and do not consider group action of closely spaced piles (closer than 3 diameters, center to center).
2. Ultimate pile driving resistance is a summation of its side and base resistances. Unfactored nominal resistances shown on plots above should be used to estimate resistance during driving needed to penetrate soils and seat the pile on bedrock.
3. Pile driving resistance assume pile is driven un-plugged. If a soil plug develops during driving actual resistance may be increased by 1.5 to 2 times that shown on the above curves.

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ESTIMATED PILE DRIVING RESISTANCE Open Ended, Steel Pipe Pile, 12.75-in diameter, 0.5-in wall	
January 2022	107965-001
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	FIG. 10

ASSUMED SUBSURFACE PROFILE

Based on Nearby Explorations:

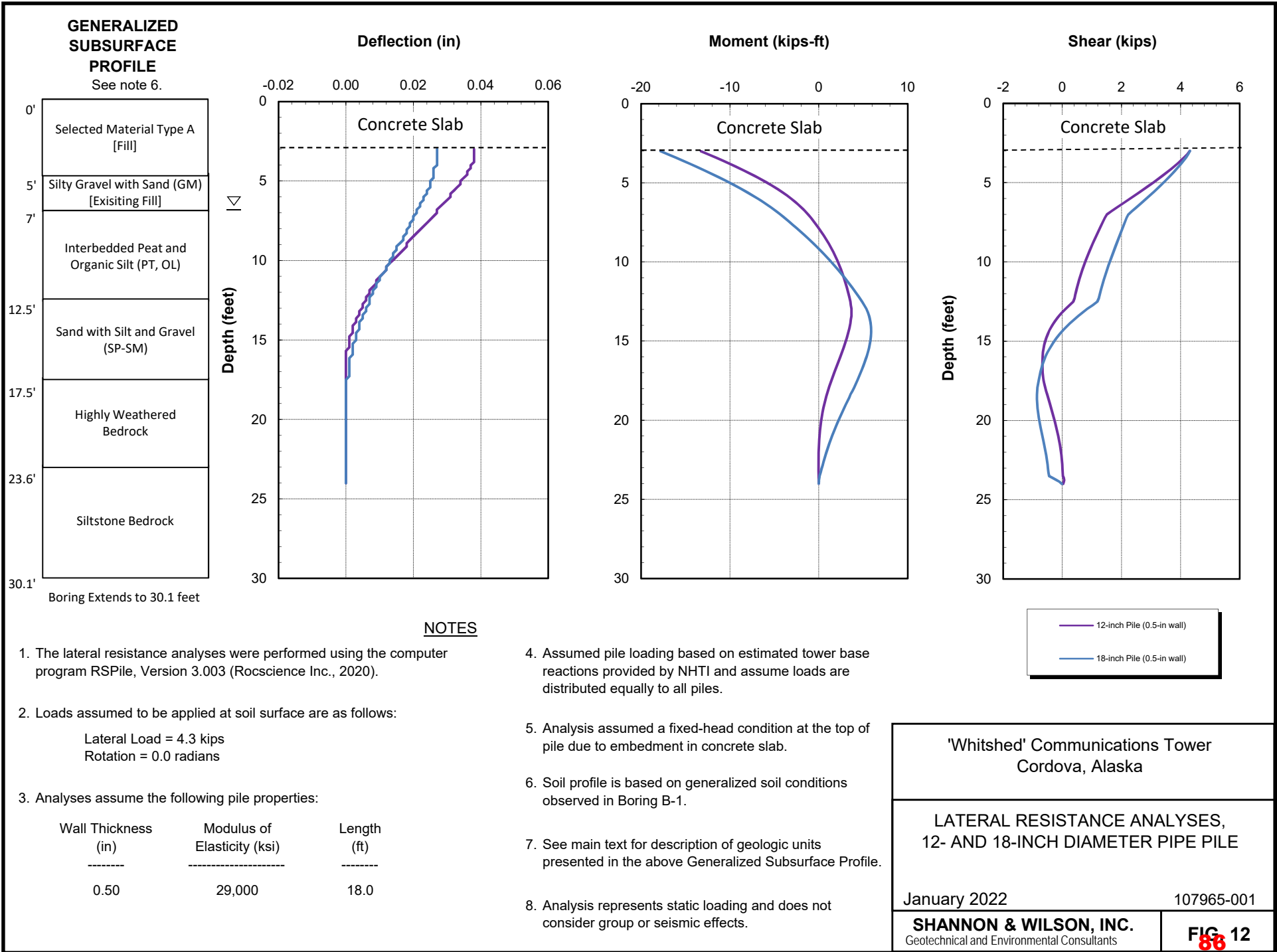


NOTES:

- The analyses were performed based on the Shannon & Wilson design method and local experience. The analyses are based on a single pile and do not consider group action of closely spaced piles (closer than 3 diameters, center to center).
- Ultimate pile driving resistance is a summation of its side and base resistances. Unfactored nominal resistances shown on plots above should be used to estimate resistance during driving needed to penetrate soils and seat the pile on bedrock.
- Pile driving resistance assume pile is driven un-plugged. If a soil plug develops during driving actual resistance may be increased by 1.5 to 2 times that shown on the above curves.

Piles driven into bedrock will experience significantly higher penetration resistance and will likely experience refusal. We recommend installing tip protection to prevent damage to the pile.

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ESTIMATED PILE DRIVING RESISTANCE Open Ended, Steel Pipe Pile, 18-in diameter, 0.5-in wall	
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GRADATION REQUIREMENTS

After: Alaska Department of Transportation Standard
Specifications for Highway Construction

U.S. STANDARD SIEVE SIZE		<u>Selected Material Type A</u>	PERCENT PASSING BY WEIGHT
English	Metric		
No. 4	4.75 mm		20 - 60
No. 200	0.075 mm		6 Max. on minus 3-in. portion

Aggregate containing no muck, frozen material, roots, sod or other deleterious matter and with a plasticity index not greater than 6 as tested by WAQTC FOP for AASHTO T 89/T 90. Meet the gradation as tested by WAQTC FOP for AASHTO T 27/T11.

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GRADATION REQUIREMENTS

January 2022

107965-001



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FIG. 13

Important Information

About Your Geotechnical/Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining

your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims

being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

IMPORTANT INFORMATION

18.60.070 B 7: Written authorization from property owner

18.60.070 B 8: Applicants FCC licensure authorizing use of tower *see inserted FCC licensure.

REFERENCE COPY

This is not an official FCC license. It is a record of public information contained in the FCC's licensing database on the date that this reference copy was generated. In cases where FCC rules require the presentation, posting, or display of an FCC license, this document may not be used in place of an official FCC license.



**Federal Communications Commission
Wireless Telecommunications Bureau**

RADIO STATION AUTHORIZATION

LICENSEE: COPPER VALLEY WIRELESS, LLC

ATTN: CHRIS MISHMASH
COPPER VALLEY WIRELESS, LLC
329 FAIRBANKS STREET
PO BOX 3329
VALDEZ, AK 99686-3329

Call Sign KNKQ401	File Number 0008747299
Radio Service CL - Cellular	
Market Numer CMA316	Channel Block B
Sub-Market Designator 0	

FCC Registration Number (FRN): 0022505283

Market Name Alaska 2 - Bethel

Grant Date 09-24-2019	Effective Date 09-24-2019	Expiration Date 10-01-2029	Five Yr Build-Out Date	Print Date 09-24-2019
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Site Information:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
1	62-06-29.3 N	146-10-32.9 W	914.1	52.7	

Address: TOLSONA RIDGE SITE, APPROX. 20 MI. W. OF GLENNALLEN ON NORTHSIDE OF HIGHWAY 1
City: GLENNALLEN **County:** VALDEZ-CORDOVA **State:** AK **Construction Deadline:**

Antenna: 1

Maximum Transmitting ERP in Watts: 140.820								
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	266.700	306.900	326.400	340.500	331.900	310.900	110.600	108.800
Transmitting ERP (watts)	110.000	110.000	110.000	110.000	110.000	110.000	110.000	110.000

Conditions:

Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
2	61-46-20.3 N	145-12-07.6 W	990.6	36.6	

Address: WILLOW MTN. SITE, APPROXIMATELY 3 MILES SOUTH OF WILLOW CREEK

City: WILLOW CREEK County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	629.700	628.800	645.900	520.300	395.000	140.500	193.500	456.900
Transmitting ERP (watts)	124.000	124.000	124.000	124.000	124.000	124.000	124.000	124.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
3	60-38-42.8 N	147-20-55.1 W	22.9		

Address: 28 miles W by SW of Ellamar

City: NAKED ISLAND County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	54.000							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	396.200	395.900	396.200	396.200	393.500	396.200	381.900	378.500
Transmitting ERP (watts)	54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
4	62-58-03.5 N	145-28-14.0 W	96.0		

Address: PAXSON CELL ISTE 59.6 MILES N OF GLENALLEN

City: PAXSON County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	218.800							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	254.500	237.500	235.600	352.700	309.100	366.100	246.600	24.100
Transmitting ERP (watts)	218.800	218.800	218.800	218.800	218.800	218.800	218.800	218.800

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
5	60-31-28.1 N	145-41-43.2 W	24.4		

Address: HENEY RIDGE CELL SITE HENEY MOUNTAIN, TWO MILE SE OF

City: CORDOVA County: State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	31.400							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	571.500	262.200	733.400	769.700	769.000	446.600	712.700	739.500
Transmitting ERP (watts)	31.400	31.400	31.400	31.400	31.400	31.400	31.400	31.400

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
6	62-43-15.6 N	144-02-24.9 W	806.2		

Address: 38.6 KILOMETERS EAST BY NORTHEAST OF CHISTOCHINA, AK

City: SLANA County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	143.200							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-432.500	-265.400	136.900	166.500	167.700	176.500	-147.500	-278.800
Transmitting ERP (watts)	143.200	143.200	143.200	143.200	143.200	143.200	143.200	143.200

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
8	62-11-01.3 N	146-31-13.9 W	919.0	40.2	

Address: MILE TWELVE ON LAKE LOUISE ROAD

City: LAKE LOUISE County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	176.500	181.700	118.600	52.700	124.100	218.000	217.000	199.400
Transmitting ERP (watts)	121.600	121.600	121.600	121.600	121.600	121.600	121.600	121.600

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
9	61-25-57.1 N	142-54-58.2 W	441.9	22.3	

Address: McCarthy Cell Site; at the corner of Regal Street and Chitty Avenue

City: McCarthy County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-294.700	-888.800	-636.400	-86.900	-29.300	39.100	-483.100	-624.800
Transmitting ERP (watts)	135.000	135.000	135.000	135.000	135.000	135.000	135.000	135.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
10	61-07-33.1 N	146-18-23.3 W	10.4	42.7	

Address: Valdez Cell Site; Valdez Grain Terminal, N. Elevation - 64 - Utility Plan - CE

City: Old Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-743.400	-694.900	-600.800	-243.800	-539.200	-301.100	-11.000	-871.400
Transmitting ERP (watts)	106.000	106.000	106.000	106.000	106.000	106.000	106.000	106.000

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
12	62-06-30.0 N	145-29-21.0 W	460.0	50.0	1004217

Address: GLENNALLEN CELL SITE; MILE 188.5 GLENN HWY

City: GLENNALLEN County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-7.000	15.000	-11.000	81.000	44.000	12.000	-9.000	-13.000
Transmitting ERP (watts)	106.000	106.000	106.000	106.000	106.000	106.000	106.000	106.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
13	60-46-35.9 N	148-42-11.7 W	9.1	19.2	

Address: Whittier Cell Site; Billings Street Lot 10

City: Whittier County: VALDEZ-CORDOVA State: AK Construction Deadline: 01-22-2003

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-692.000	-329.000	-106.000	-343.000	-415.000	-734.000	-312.000	-637.000
Transmitting ERP (watts)	500.000	500.000	500.000	500.000	500.000	500.000	500.000	500.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
14	61-05-30.0 N	146-12-04.0 W	12.0	21.3	

Address: Robe River Site; MP 6, Richardson Highway

City: Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline: 10-02-2008

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-675.000	-1012.000	-933.000	-427.000	-1103.000	-681.000	30.000	-473.000
Transmitting ERP (watts)	90.300	90.300	90.300	90.300	90.300	90.300	90.300	90.300

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
16	62-35-47.0 N	144-38-56.0 W	586.8	66.0	1034327

Address: Chistochina Site; Approx. 1 Mi. N. of Chistochina on W. Side of TOK Highway

City: Chistochina County: VALDEZ-CORDOVA State: AK Construction Deadline: 10-02-2008

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-29.000	-2.000	2.000	-46.000	13.000	75.000	3.000	-32.000
Transmitting ERP (watts)	72.400	72.400	72.400	72.400	72.400	72.400	72.400	72.400

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
17	62-00-20.5 N	145-20-34.0 W	368.0	21.3	

Address: Silver Springs Cell Site; 13.8 KM SSE of Glennallen

City: Glennallen County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-59.000	-179.000	-168.000	-31.000	-37.000	-97.000	-76.000	-10.000
Transmitting ERP (watts)	90.300	90.300	90.300	90.300	90.300	90.300	90.300	90.300

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
18	62-24-45.0 N	145-06-30.0 W	576.1	96.0	1005553

Address: Aurora Cell Site; 40.7 KM NNE of Glennallen

City: Glennallen County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	50.000	91.000	132.000	57.000	108.000	133.000	107.000	68.000
Transmitting ERP (watts)	61.800	61.800	61.800	61.800	61.800	61.800	61.800	61.800

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
19	62-17-20.0 N	145-21-16.5 W	497.1	30.0	

Address: Glennrich Cell Site; MP 129, Richardson Hwy

City: Glennallen County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-24.000	-22.000	-68.000	-72.000	36.000	21.000	-25.000	-57.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
20	62-03-50.8 N	145-25-52.6 W	360.0	21.3	

Address: Tazlina Cell Site, MP 111.5, Richardson Hwy.

City: Tazlina County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-76.000	-113.000	-145.000	6.000	-60.000	-100.000	-95.000	-66.000
Transmitting ERP (watts)	91.200	91.200	91.200	91.200	91.200	91.200	91.200	91.200

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
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22	60-25-02.0 N	146-09-15.0 W	233.0	18.3	
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Address: Boswell Bay Cell Site; Hinchinbrook Island, 27.36 KM (17 MI) SW of Town

City: Cordova County: VALDEZ-CORDOVA State: AK Construction Deadline: 12-17-2011

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	148.000	228.000	229.000	231.000	232.000	204.000	185.000	187.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
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23	61-59-23.2 N	146-47-05.9 W	732.6	30.0	
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Address: Nelchina Cell Site; KM 230 Glenn Highway

City: Glennallen County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 4

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-167.000	46.000	100.000	35.000	-192.000	68.000	-57.000	-203.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
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24	61-06-44.8 N	145-48-17.0 W	193.0	30.0	
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Address: Heidenvue Cell Site; KM 30.6/MI 19, Richardson Hwy

City: Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-1126.000	-494.000	-220.000	-993.000	-1078.000	-228.000	-689.000	-884.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
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25	61-26-29.7 N	145-06-37.6 W	552.0	30.0	
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Address: Ernestine Cell Site; KM99/MI62 Richardson Hwy.

City: Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-444.000	-714.000	-855.000	-765.000	-703.000	126.000	-751.000	-167.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
26	60-33-12.0 N	145-44-01.0 W	330.4	18.3	1274207

Address: Tripod Hill; Top of ski lift off Ski Lift Road, approx. 1 MI. NE of Cordova

City: Cordova County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	112.000	-300.000	109.000	247.000	173.000	275.000	240.000	302.000
Transmitting ERP (watts)	170.000	127.000	30.000	4.000	2.000	4.000	26.000	120.000

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	112.000	-300.000	109.000	247.000	173.000	275.000	240.000	302.000
Transmitting ERP (watts)	8.000	48.000	145.000	166.000	87.000	16.000	2.000	1.000

Antenna: 3

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	112.000	-300.000	109.000	247.000	173.000	275.000	240.000	302.000
Transmitting ERP (watts)	9.000	2.000	1.000	14.000	81.000	159.000	151.000	55.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
27	60-32-53.6 N	145-45-58.0 W	16.8	10.6	

Address: Seafood Lane Cell Site: 313 Seafood Lane

City: Cordova County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-164.000	-433.000	-149.000	-135.000	-112.000	13.000	-90.000	-75.000
Transmitting ERP (watts)	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
28	61-07-43.1 N	146-32-51.1 W	316.6	18.0	

Address: Shoup Cell Site; 10 KM West of Valdez

City: Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline: 04-26-2012

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-627.000	-653.000	323.000	-62.000	40.000	336.000	-338.000	-374.000
Transmitting ERP (watts)	125.900	125.900	125.900	125.900	125.900	125.900	125.900	125.900

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
29	62-54-28.0 N	143-39-54.7 W	746.2	30.0	

Address: Mentasta Pass Cell Site; KM 128 / MP 79.5 Tok Cutoff Highway

City: Lake Mentasta County: VALDEZ-CORDOVA State: AK Construction Deadline: 04-26-2012

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-416.000	-449.000	-189.000	-390.000	-13.000	-321.000	-109.000	-196.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
30	62-55-51.1 N	143-47-33.4 W	698.0	30.0	

Address: Mentasta Village Cell Site; KM 7.8 / MP 4.8 Mentasta Road

City: Lake Mentasta County: VALDEZ-CORDOVA State: AK Construction Deadline: 04-26-2012

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-572.000	-603.000	-2.000	-71.000	-212.000	-533.000	-317.000	-354.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
31	60-52-09.5 N	146-40-47.6 W	76.0	18.0	1267088

Address: Tatitlek Cell Site; 0.1 KM North of Tatitlek

City: Tatitlek County: VALDEZ-CORDOVA State: AK Construction Deadline: 04-26-2012

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-31.000	-120.000	-446.000	-86.000	82.000	-22.000	91.000	39.000
Transmitting ERP (watts)	125.900	125.900	125.900	125.900	125.900	125.900	125.900	125.900

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
32	61-23-42.4 N	142-47-42.3 W	1068.0	12.2	

Address: Sourdough Ridge Cell Site; T5S R15E S23, 2 Mi (3.22 Km) N of Nizina River

City: McCarthy County: VALDEZ-CORDOVA State: AK Construction Deadline: 10-19-2012

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	80.000	-218.000	317.000	498.000	479.000	600.000	603.000	494.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
33	61-26-30.5 N	143-48-44.2 W	830.0	12.2	

Address: Gilahina Butte Cell Site; T5S R9E 1 Mile (1.61 km) South of Chokosna Lake
City: Chitina County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	43.000	-192.000	157.000	458.000	131.000	451.000	380.000	350.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
34	61-31-17.0 N	144-25-55.0 W	330.1	18.3	

Address: Cannon Hill Cell Site; 1 Mile (1.61 km) NW of Chitina
City: Chitina County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	63.000	-108.000	30.000	-609.000	-84.000	-579.000	-1180.000	-721.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
35	61-07-48.0 N	146-21-49.0 W	5.0	42.7	

Address: Valdez B2 Cell Site; 500 Egan Avenue
City: Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-967.000	-915.000	-265.000	-394.000	-533.000	-132.000	-120.000	-944.000
Transmitting ERP (watts)	1.300	0.000	0.000	0.000	0.400	7.200	23.500	13.400

Antenna: 3

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-967.000	-915.000	-265.000	-394.000	-533.000	-132.000	-120.000	-944.000
Transmitting ERP (watts)	1.700	15.000	22.700	6.300	0.200	0.000	0.000	0.000

Licensee Name: COPPER VALLEY WIRELESS, LLC

Call Sign: KNKQ401

File Number: 0008747299

Print Date: 09-24-2019

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
36	60-31-38.4 N	145-37-46.6 W	4.0	27.4	

Address: Eyak Cell Site; Eyak Road, MP7, Copper River Highway

City: Cordova County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 1

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-183.000	-428.000	-14.000	24.000	25.000	24.000	-108.000	-76.000
Transmitting ERP (watts)	112.000	112.000	112.000	112.000	112.000	112.000	112.000	112.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
37	61-04-13.3 N	146-03-52.8 W	144.0	18.3	

Address: 7-Mile Cell Site, MP 7, Richardson Highway

City: Valdez County: VALDEZ-CORDOVA State: AK Construction Deadline:

Antenna: 2

Maximum Transmitting ERP in Watts:	140.820							
Azimuth(from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	-953.000	-1065.000	-406.000	-545.000	-561.000	-751.000	-105.000	-301.000
Transmitting ERP (watts)	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Control Points:

Control Pt. No. 1

Address: 329 Fairbanks Drive

City: Valdez County: VALDEZ-CORDOVA State: AK Telephone Number: (907)835-8008

Waivers/Conditions:

THIS AUTHORIZATION IS SUBJECT TO THE CONDITION THAT, IN THE EVENT THAT CELLULAR SYSTEMS USING THE SAME FREQUENCY BLOCK AS GRANTED HEREIN ARE AUTHORIZED IN ADJACENT TERRITORY IN CANADA, COORDINATION OF ANY OF THE LICENSEE'S TRANSMITTER INSTALLATIONS WHICH ARE WITHIN 45 MILES OF THE U.S. CANADA BORDER SHALL BE REQUIRED TO ELIMINATE ANY HARMFUL INTERFERENCE THAT MIGHT OTHERWISE EXIST AND TO INSURE CONTINUANCE OF EQUAL ACCESS TO THE FREQUENCY BLOCK BY BOTH COUNTRIES.

18.60.070 B. 9

A line of sight analysis showing the potential visual and aesthetic impacts of the telecommunication tower on adjacent residential districts through the use of photo simulations of the telecommunication tower, including all antennas, structures, and equipment, using the vantage points and number of photo simulations requested by the planning department;





18.60.070 B 10: Written agreement from CVTC Removal agreement

TOWER REMOVAL AGREEMENT

This Tower Removal Agreement (“Agreement”) is made and entered as of _____, 2023 (the “Effective Date”). This Agreement is entered into by **COPPER VALLEY WIRELESS, LLC**, (“CVW”), an Alaska Limited Liability Company, whose mailing address is PO Box 3329, Valdez, Alaska 99686 and **the CITY OF CORDOVA**, (the “City”), an Alaska municipality, whose mailing address is PO Box 1210, Cordova, Alaska 99574.

1. Background.

- 1.1. WHEREAS, CVW wishes to construct a monopole tower (the “Tower”) with a height of 85 feet on real property (the “Property”) owned by CVW and more fully described in the legal description attached as **Exhibit A**. CVW has applied for a conditional use permit (CUP Application # _____) in order to construct the Tower.
- 1.2. WHEREAS, pursuant to the ordinances of the City, CVW is required to obtain a conditional use permit (“CUP”) prior to construction or operation of the Tower. The application for the CUP must contain the necessary criteria set forth in the ordinances of the City.
- 1.3. WHEREAS, as a necessary and integrated provision of the CUP, CVW must enter into a contract with the City whereby CVW agrees to remove the Tower and restore the Property to its original condition prior to the construction of the Tower in the event that the Tower is substantially unused for a period of more than one hundred eighty (180) days within any period of twelve (12) consecutive months.
- 1.4. The Parties make this Agreement for the purpose of satisfy the Tower Removal provisions of the CUP.

NOW, THEREFORE, it is hereby agreed as follows:

2. Integration with Conditional Use Permit

- 2.1. This agreement is entered as a necessary and mandatory provision of the CUP and the issuance by the City and acceptance by CVW of the CUP is acknowledged as full and sufficient consideration by the Parties.

3. Term.

- 3.1. The term of this Agreement shall be the same as the duration that the Tower shall remain in place on the Property. The duties set forth herein shall run with the land and shall inure to any subsequent owner of the Property.

4. Removal Upon Discontinuation of Use.

In the event that CVW shall discontinue use of the Tower for the purposes set forth in its CUP for a period of one hundred eighty (180) days or more within any period of twelve (12) months, CVW agrees to remove the Tower and to substantially restore the Property to its original condition prior to the issuance of the CUP. Such removal and restoration of the Property shall be directed by and paid for by CVW or its successor in interest.

5. Remedies for Breach.

In the event that the CVW, or its successor in interest, shall fail to remove the Tower prior to the completion of the one hundred eighty (180) day period of discontinued use, such

TOWER REMOVAL AGREEMENT

City of Cordova: CUP Application No. _____

failure shall be deemed a violation of the CUP entitling the City to all remedies provided for in the Cordova Municipal Code. Additionally, in the event of a breach, the City may elect, at its own and sole discretion, to enter onto the Property and to remove the Tower and substantially restore the Property to its original condition prior to the issuance of the CUP. CVW, or its successor in interest, agrees to reimburse the City for any and all expenses associated with such removal by the City.

6. **Non-Liability of City for Removal.** The City shall be responsible to CVW, or any subsequent owner of the Property of the Tower for damages to any structures or other property caused by the removal of the Tower under the provisions of Section 5.
7. **Notices.** All notices and other communications required or set forth in this Agreement shall be made pursuant to the Notice provisions set forth in the CUP.
8. **Recordation.** This Agreement shall be recorded with the offices of the Cordova Recording District and the duties and obligations set forth herein shall run with the land and be binding on any successors or assigns of CVW.


9. **Miscellaneous Provisions**

- 9.1. **Survival.** If any term of this Agreement is found to be void or invalid, such invalidity will not affect the remaining terms of this Agreement, which will continue in full force and effect.
- 9.2. **Non-waiver.** Failure of party to insist on strict performance of any of the conditions or provisions of this Agreement, or failure to exercise any of a party's rights hereunder, will not waive such rights.
- 9.3. **Governing Law, Jurisdiction and Venue.** This Agreement will be governed by and construed in accordance with the laws of the State of Alaska. The Superior Court of the Third Judicial District located in Valdez shall have sole and exclusive jurisdiction over any disputes or other legal proceedings arising out of or under this Agreement. The Parties agree to venue within the Superior Court located in Valdez.
- 9.4. **Bind and Benefit.** This Agreement is binding upon and will inure to the benefit of the parties hereto and their respective heirs, legal representatives, successors and assigns.
- 9.5. **Entire Agreement.** This Agreement and exhibits, appendices or incorporated attachments hereto, constitute the entire agreement and will supersede all prior offers, negotiations and agreements with respect to the subject matter of this Agreement.

[SIGNATURES BEGIN ON NEXT PAGE]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the Effective Date (date last signed by a party hereto).

COPPER VALLEY WIRELESS

By:  _____

Print Name: Chris Mishmash

Date: 4/17/23

CITY OF CORDOVA

By: _____

Print Name: _____

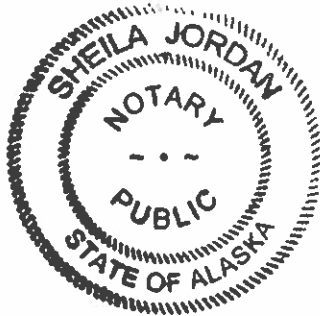
Its: _____

Date: _____

COPPER VALLEY WIRELESS ACKNOWLEDGEMENT

STATE OF ALASKA)
) ss.
THIRD JUDICIAL DISTRICT)

The foregoing instrument was acknowledged before me this 17 day of April 2023,
by Chris Mishmash, Interim COO, for and on behalf of Copper Valley Wireless.
(name) (title)



Sheila Jordan
Notary Public for State of Alaska
My Commission Expires: April 22, 2026
220422004 Com #

CITY OF CORDOVA ACKNOWLEDGMENT

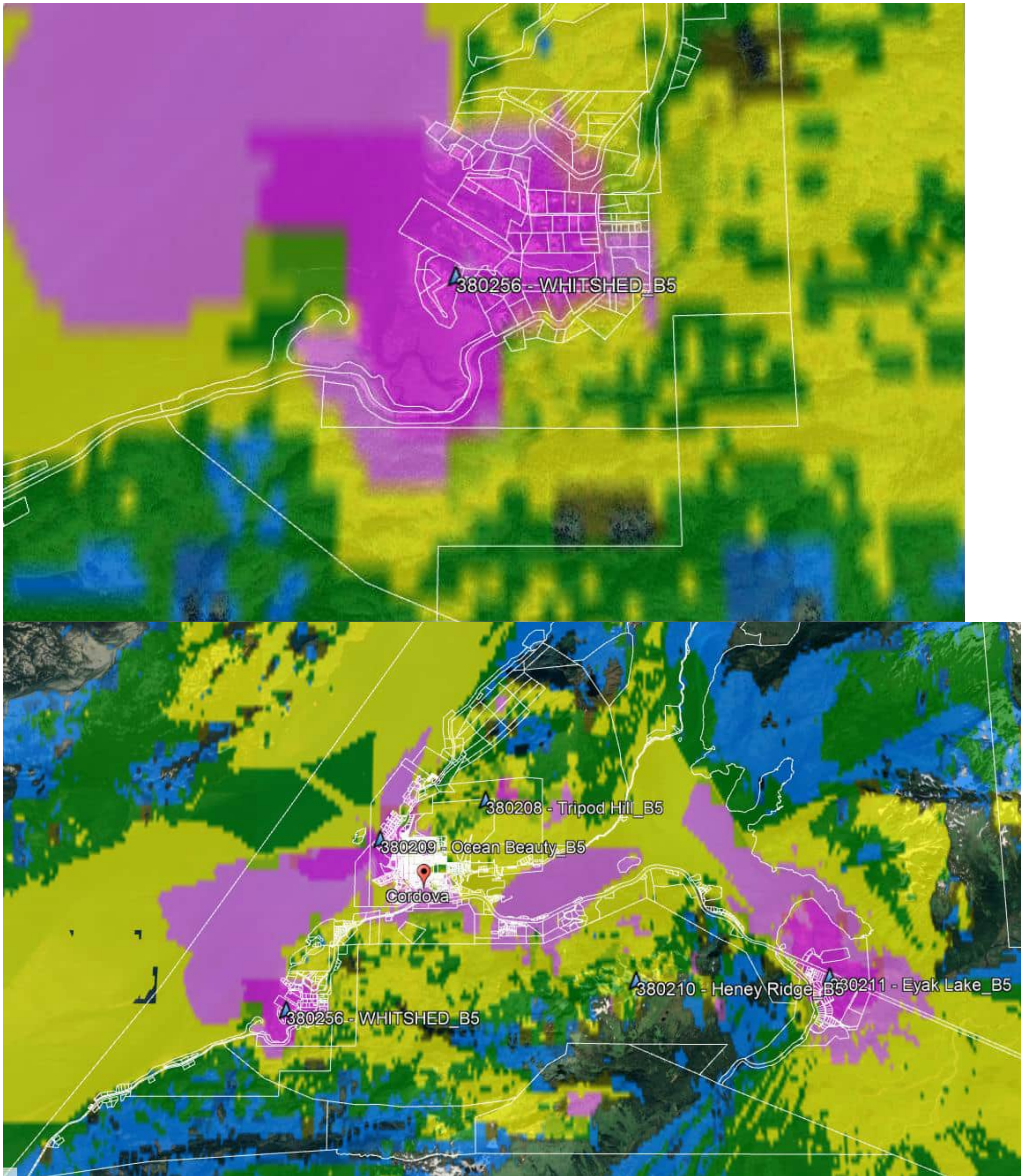
STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

The foregoing instrument was acknowledged before me this ___ day of _____ 2023,
by _____, _____, for and on behalf of the City of Cordova.
(name) (title)

Notary Public: _____
My Commission Expires: _____

18.60.070.B.11

A cell phone coverage map showing the applicant's proposed cell phone coverage within the city



18.60.070 B 12: Certificate from licensed engineer for equipment installed meet FCC requirements.



April 21, 2023

City of Cordova

Copper Valley Telephone is installing an 80 ft tall monopole at their communications site known as Whitshed.

CERTIFICATION

The telecommunications pole, antennas, antenna mounts and other appurtenances are designed and will be built and installed to approved specifications and will contain only equipment meeting applicable FCC requirements.



Dale Browning, P.E., S.E.
Sr. Engineer
(907) 761-6069

4/21/2023

New Horizons Telecom, Inc.
901 Cope Industrial Way
Palmer, Alaska 99645
www.nhtiusa.com

907.761.6000 (phone)
907.761.6001 (fax)

18.60.070 C 4

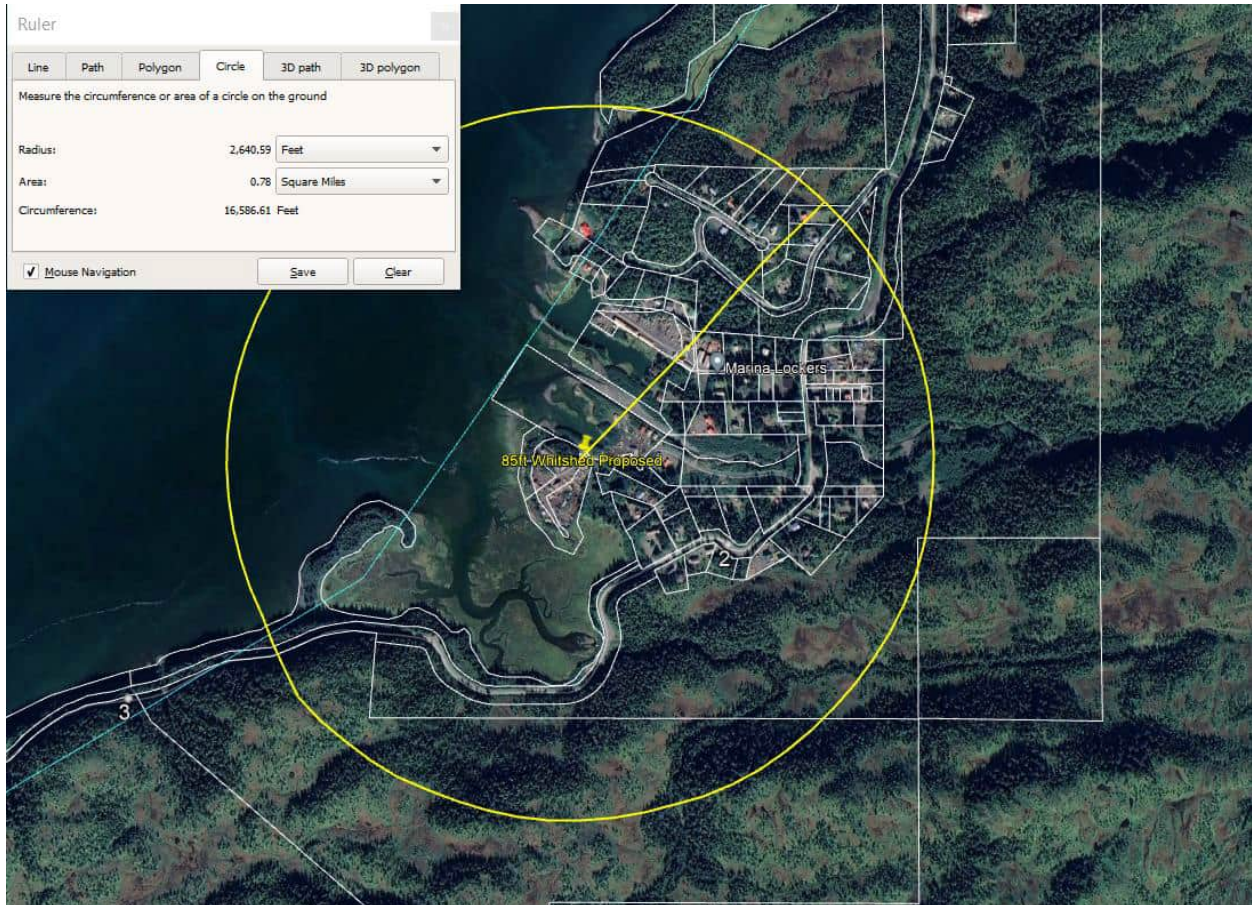
If the applicant proposes to acquire a site on private property for the telecommunication tower, the applicant must show that no available publicly owned site or available privately owned site occupied by a compatible use is suitable under applicable communications regulations and the applicant's technical design requirements.



18.60.070 C 7:

Distance from Existing Telecommunication Towers. A telecommunications tower shall not be approved if it is located within one-half mile (two thousand six hundred forty feet) of an existing telecommunication tower, unless the applicant certifies that the existing telecommunication tower does not meet the applicant's structural specifications and technical design requirements, or that a collocation agreement could not be obtained.

Half Mile Radius noted below. No other tower is located below.



CITY OF CORDOVA



VARIANCE APPLICATION

City of Cordova, Alaska

INSTRUCTIONS	PERMIT TYPE	FEE
Print or type requested information. Incomplete applications will be returned to the applicant and will delay processing of the request. Applications must be received by the Planning Department 21 days prior to the next Planning Commission Regular Meeting, which is scheduled the second Tuesday of each month.	<input checked="" type="checkbox"/> Variance	\$250

APPLICANT INFORMATION	
Name:	Copper Valley Wireless, LLC
Mailing Address:	329 Fairbanks Drive
City/State/Zip:	Valdez, AK 99686
Phone Number:	800-835-7700
Email Address:	cmishmash@cvtc.org

OWNER INFORMATION	
Name:	Diana Rubio
Mailing Address:	PO Box 1109
City/State/Zip:	Cordova, AK 99637
Phone Number:	907-424-3656
Email Address:	
Only complete this section if owner is different from applicant	

PROPERTY INFORMATION	
Address:	Sawmill Rd, Cordova AK
Legal Description:	USS 3587, Tract A & ATS 459, Plat 77-3
Tax Lot No.:	02-105-800
Zone District:	Un-Restricted
Planning Department can assist if unknown.	

REQUEST DESCRIPTION

Please describe your request in detail and identify which provision(s) of the code you are seeking a variance from.

Copper Valley Wireless is seeking a variance from Cordova Municipal Code 18.60.070 C 9 - Setbacks

With this application you must also include:

1. Plot plans showing the location of all existing and proposed buildings or alterations and the elevations of such buildings or alterations.
2. Evidence of the ability and intention to proceed in accordance with the plans within six months after the effective date of the variance.

Planning Department staff recommend that you provide any additional documents which will help the Planning Commission better understand the request, such as a cover letter, drawings, maps, or photographs.

VARIANCE CONDITIONS

The Planning Commission may only approve a variance if the commission finds that **ALL** of the following four conditions are met. You must include a statement and adequate evidence showing that each of the conditions has been met. Use additional pages if needed.

CONDITION 1: There are exceptional physical circumstances or conditions applicable to the property or to its intended use or development which do not apply generally to the other properties in the same land use district.

Please see separate attached sheet

CONDITION 2: The strict application of the provisions of this title would result in practical difficulties or unnecessary hardship.

Please see separate attached sheet

CONDITION 3: The granting of the variance will not result in material damage or prejudice to other properties in the vicinity nor be detrimental to the public health, safety or welfare.

Please see separate attached sheet

CONDITION 4: The granting of the variance will not be contrary to the objectives of the comprehensive plan.

Please see separate attached sheet

APPLICANT CERTIFICATION

By the signature attached hereto, I certify that I am the owner or duly authorized owner's agent and that the information provided within this application and accompanying documentation is correct. Furthermore, I hereby authorize the City and its representatives to enter the property associated with this application for purposes of conducting site inspections.

Applicant Signature: 

Date: 4/19/23

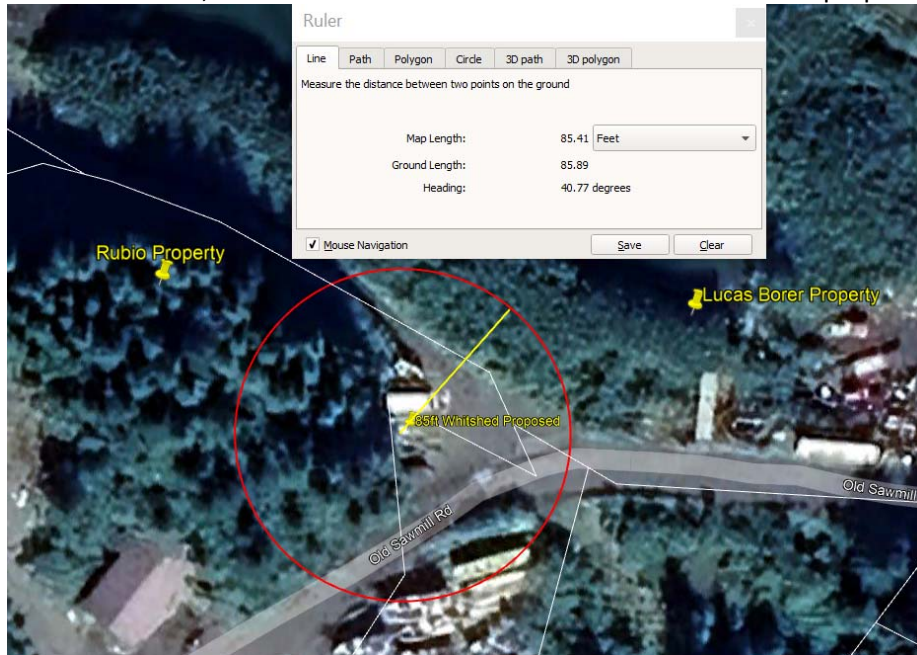
Print Name: Chris Mishmash

Code: Cordova Municipal Code 18.60.070 (C)(9)

Setbacks - In all zoning districts, a telecommunication tower must be located no less than a distance equal to the tower height from all lot lines.

Variance #1 – Request Description:

Seeking a waiver in the separation distance to the adjacent property line to the northeast of the proposed tower where the shared property lines of the adjacent landowner meet, and the conjoined property lines of the Rubio property. The 85 ft tower is proposed to fit 50 ft from the northeast property line. CVTC is asking for a variance to the setbacks to the conjoined property lines owned by the same landowner, as well as a variance of the setback distance to the property to the northeast.



Condition 1: *There are exceptional physical circumstances or conditions applicable to the property or to its intended use or development which do not apply generally to the other properties in the same use district.*

The available portion of the Rubio property contains geological conditions which are not favorable for tower construction. The rocky and heavily treed area behind the proposed location limits further movement to the southwest and would also result in objectionable tree removal. The Rubio property is two separate properties under a single ownership conjoined together near the proposed location. The proposed location is best suited for the tower because it will allow the Rubio's to use the bulk of their property for the locally important use of seasonal boat storage and the backdrop of the forested hill will effectively camouflage the tower in the viewshed of neighboring properties.

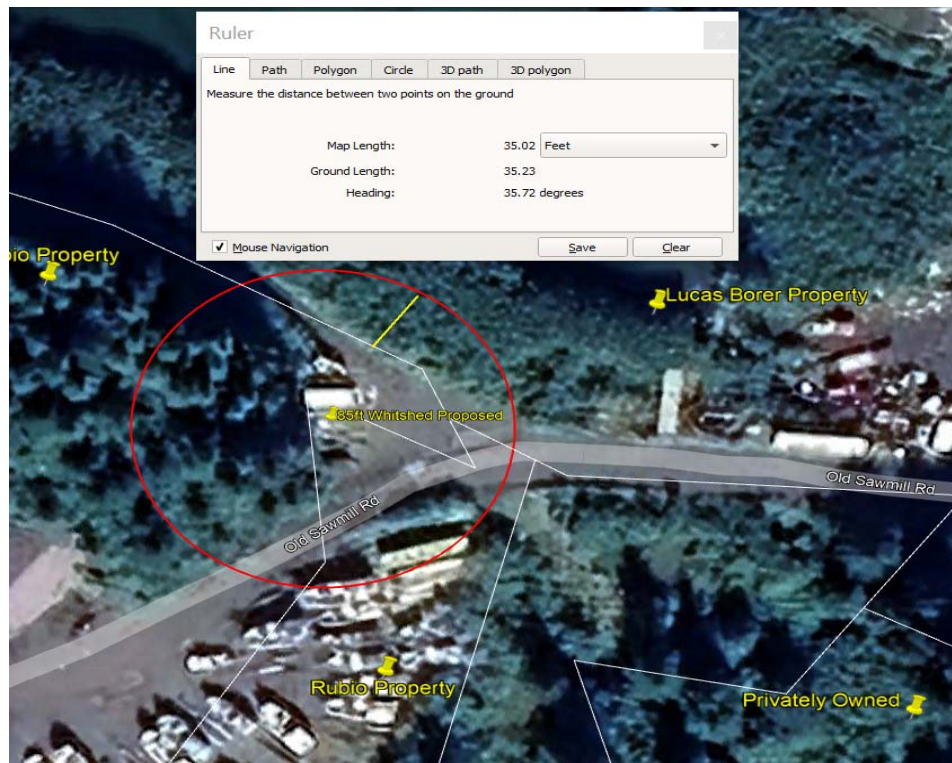
Condition 2: *The strict application of the provision of this title would result in practical difficulties or unnecessary hardship.*

The strict application of the CMC 18.60.070 C 9 zoning restrictions for the tower places hardship on the owner's future property development & future business needs. Siting the tower in other areas that strictly meet the setback requirement would significantly reduce the landowner's available property for the business use of fishing vessel storage and would reduce the height of the tower and thereby limit the coverage of cell phone signal.

Condition 3: *The granting of the variance will not result in material damage or prejudice to other properties in the vicinity nor be detrimental to the public, safety or welfare.*

The height of the tower (85ft) is proposed in an area away from potential future and current use of the property. The placement is 50 ft from the shared property line, extending 35 ft into the adjacent property as depicted in the picture below. **Property owner Lucas Borer was contacted by Copper Valley Wireless on 4.24.23. Mr. Borer provided approval of the separation distance between his northeast property line and the tower.**

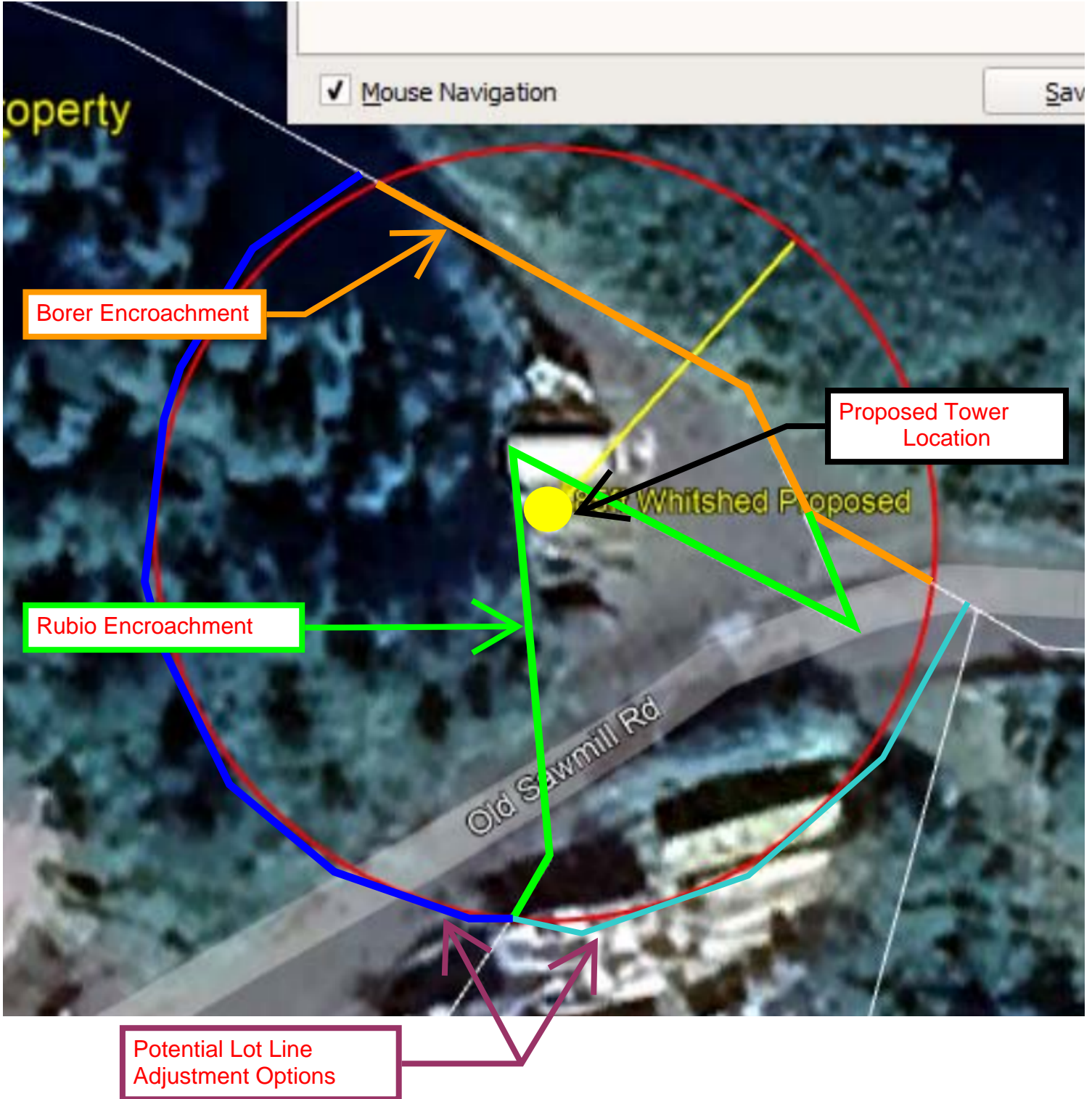
An allowance in the setback to the northeast property line poses no detrimental threat to the adjoining property, in the event of a tipover, the top of the tower would reach fill and water. This variance will provide a safe distance from residential activities and homes. The variance does not pose a risk to the public health, safety or welfare.



Condition 4: *The granting of the variance will not be contrary to the objectives of the comprehensive plan.*

CVTC supports the objectives noted in the City of Cordova Comprehensive Plan. CVTC is asking for an allowance in the separation distance to the adjacent property line to the northeast of the proposed tower, whereby allowing the property owner to develop the property for future needs, and a height allowance that is viable to the public by improving cellular coverage within the community without contrary to the objectives outlined with respect to the culture, community, values, beautiful landscapes, and small business of the City of Cordova Alaska.

Attachment D



Attachment E

