BID PACKAGE FOR:

PT MACKENZIE SUBSTATION GROUNDING UPGRADE

W.O. E2120052

JULY 8, 2025

PT MACKENZIE SUBSTATION

GROUNDING UPGRADE

W.O. E2120052

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SECTION I.

INVITATION TO BID

Chugach Electric Association, Inc. **Via e-mail**
INVITATION TO BID
July 8, 2025

TO: Chugach Electric Association, Inc., 2024-2025 Outside Electrical Line Construction Contract Contractors.

You are invited to submit a Bid for Chugach Work Order E2120052, Pt Mackenzie Substation Grounding Upgrade.

Chugach is upgrading the grounding grid at Pt. Mackenzie Substation facility to address safety concerns caused by inadequate grounding capacity. The upgrades will be to the 138kV yard and extend to 230kV yard perimeter.

Existing sections of fence fabric, barbed wire, fence posts, fence gate will be retired, and new ground rods and wire, ground wells and connectors installed.

This project is subject to the union signatory sections of Chugach's Outside or Generation Agreements contained in Exhibit N of the 2024 – 2025 Outside Electrical Line Construction Contract. Please note that bidding is open to all contractors regardless of union signatory status. Contractors are not required to be signatory to a current collective bargaining agreement with IBEW Local 1547 in order to bid on the project. The signatory requirement only becomes applicable to the successful bidder once a contract is awarded. The successful bidder can comply by either establishing that (1) it is signatory to a current collective bargaining agreement with IBEW Local 1547, (2) by executing a collective bargaining agreement with International Brotherhood Electrical Workers (IBEW) Local 1547, or (3) by executing an agreement with IBEW Local 1547 to comply with the terms and conditions set forth in the most current agreement between IBEW Local 1547 and the Alaska Chapter National Electrical Contractors Association (NECA), Inc. If the successful bidder elects the third option, the Agreement will be limited to the scope of the work and duration of the project.

Please base your bids on the following conditions:

- All Contractor bids must be valid until 5:00 PM Alaska Time on September 30, 2025. After that time, the Contractor shall have the option of retracting its bid. Projects awarded as late as and including the last day the Contractor's bids are valid are not subject to contractor claim for delay of award.

- Contractor shall begin work within six (6) months of Notice to Proceed (NTP).

- Completion date for this project is January 19, 2027.

- Clearing/grubbing is anticipated for this project.

- Contractor shall obtain all necessary permits.
- As-built drawings are required.
- Liquidated damages in the amount $1,000.00/day shall apply if the Contractor fails to meet the required completion date.
- A Bid Bond is required.
- Written releases of liens are required.

The following items must be included in the bid proposal or the Contractor will be considered unresponsive:

1. A bid bond is required. A bid bond in the amount of 10% of the bid shall be provided with the bid documents. A certified check made payable to "Chugach Electric Association, Inc." may be substituted for the bid bond.
2. Schedule in MS Projects format
3. Company organizational chart with resumes of key personnel
4. Acknowledgement of addenda
5. Bid sheet
6. Bid schedule (PDF and excel file)
7. List of subcontractors (include a description of the service that they will provide on this project)
8. List of assumptions, exceptions, and qualifications

A Pre-Bid Conference is scheduled for 10:00 AM Alaska Time, July 17, 2025 at Chugach North Campus Building N1 in the North Girdwood Conference room. Contractor representation and attendance of this Pre-Bid Conference is mandatory. A site visit is **NOT** scheduled for this project.

RFB documentation is available on Chugach's website at www.chugachelectric.com, under Inside Chugach, Bid Opportunities tab. Contractors can access the RFB documentation under the "View advertisement and associated documents" button in WO E2120052.

All bids are to be delivered either in person at Chugach's North Campus Building N1 at the front desk, 1200 E. 1st Ave, Anchorage, Alaska or submitted by email To: supat_chanonto@chugachelectric.com CC: joash_marquez@chugachelectric.com and must be received prior to 2:00 PM Alaska Time, August 12, 2025.

Notice to Proceed shall not be issued until Chugach has received (1) all bonds required by this Invitation to Bid (ITB) in the required amounts and forms and properly executed by the appropriate individuals, (2) a site specific HSE plan, (3) all documentation required in the

Bid Documents including insurance certificates, proof of builder's risk insurance, and an MS Project based schedule. The contract time allowed for completion of this contract shall not be extended or suspended by any delay by Contractor in providing these documents necessary for the Notice to Proceed to be issued. If the total amount of the winning bid should exceed $2,000,000.00, the NTP will be delayed pending Chugach Electric Association's Board Approval.

No work shall begin until the successful Bidder has been issued a written Notice to Proceed.

A Pre-Construction Conference will be required. Construction progress meetings will be held. Frequency and schedule of Construction Progress Meetings will be determined based on construction activity.

All work shall be performed in compliance with all applicable local, state and federal ordinances, orders, statutes, rules and regulations.

The Contractor shall furnish all material required for the project that is not indicated on Chugach's material issue form. Chugach must approve all Contractor-furnished material prior to installation.

The Contractor shall secure locates and assume responsibility for damage to any and all overhead and underground facilities.

Construction of this project will involve work on or around energized equipment. Outages will be granted based on the requirements contained in Section 3.3 in the Special Provisions of the Bid Documents.

Outages will be subject to advanced coordination/notification and Chugach electrical system requirements in effect for the time period the outage is requested. Outages are subject to system conditions.

Contractor shall take delivery of all available materials within six (6) months of Notice to Proceed.

Contractor's workmanship shall be warrantied for two (2) years following Chugach acceptance of the project completion documentation.

The Contractor will be responsible for all material logistics, manpower, including but not limited to equipment to and from the work site.

The Contractor will not energize new or existing primary facilities in the absence of Chugach's Site Representative unless advanced written approval is secured from Chugach.

Payment for Contractor work is accomplished through use of a Construction Completion Report (CCR) prepared by Chugach's Site Representative and signed off by the Contractor's representative. Total payment is made on actual units completed not on estimated units stated in

the Bid Documents unless otherwise stated in writing. Chugach has no obligation to subsequently reconcile or assist in reconciling the Contractor's billing records.

Chugach reserves the right to define and waive irregularities, to accept or reject any or all proposals/bids, in whole or in part, and to reissue, withdraw or cancel the solicitation/project in its entirety for any reason including its subsequent determination to perform the Work in-house without liability of any type to Bidder, including but not limited to any costs associated with Bid preparations and submittal.

Bidders shall identify any exceptions to requirements in the bid package. The nature and extent of any exceptions may influence the Bid award.

All questions regarding the bid documents are to be directed to Chugach's Site Engineer, Supat Chanonto, via email: supat_chanonto@chugachelectrical.com CC: joash_marquez@chugachelectric.com. Questions shall be submitted no later than 12:00 PM Alaska Time, July 24, 2025. Answers to Bidder's questions will be returned no later than 5:00 PM Alaska Time, July 31, 2025.

Dates:

- Invitation to Bid on July 8, 2025
- Pre-Bid Conference is scheduled on July 17, 2025 at 10:00 AM Alaska Time
- Bid Questions due by July 24, 2025 at 12:00 PM Alaska Time
- Chugach response to questions due by July 31, 2025 at 5:00 PM Alaska Time
- Bids due by August 12, 2025 at 2:00 PM Alaska Time

CHUGACH ELECTRIC ASSOCIATION, INC.

Mike Miller

Mike Miller, PE
VP Engineering

cc: Project File; W.O. E2120052

--End of Invitation to Bid--

SECTION II.

BID SHEET

Bid Sheet

WORK ORDER NUMBER: E2120052 CONTRACTOR: _____

LOCATION: Pt Mackenzie Substation DATE: _____

BIDS ARE DUE PRIOR TO 2:00 P.M: August 12, 2025

This bid is submitted subject to the terms of the 2024-2025 Outside Electrical Line Construction Contract between Chugach Electric Association, Inc. and the undersigned for the above project as set out in the Invitation to Bid.

Project Bid Quotation: _____

Quotation Expires: September 30, 2025 5 P.M.

Contractor's Alaska License No.: _____

Insurance Expires: _____

Worker's Compensation: _____

Liability: _____

Automobile: _____

Contractor Sell Rate: _____

Contractor Labor Man-Hours: _____

EXCEPTIONS AND QUALIFICATIONS

Exceptions or qualifications taken by the Bidder to any of the documents furnished with this Invitation to Bid or clarifications to the Proposal shall be stated below and, if none, Bidder shall state "NONE".

_____

_____

SUBCONTRACTORS

The Bidder shall indicate below the Work intended to be subcontracted to others.

_____

_____

By Contractor: _____
Dated: _____

BID ACCEPTED SUBJECT TO TERMS AND CONDITIONS OF THE OUTSIDE ELECTRICAL LINE CONSTRUCTION CONTRACT

By Chugach Electric Association, Inc: _____
Dated: _____

SECTION III.

BID SCHEDULE

PT. MACKENZIE SUBSTATION GROUNDING UPGRADE
BID SCHEDULE SUMMARY
W.O. E2120052

NEW CONSTRUCTION

GROUP K: CONDUIT AND CABLE	$	-
GROUP M: SITE WORK	$	-
GROUP O: GROUNDING	$	-
TOTAL NEW CONSTRUCTION	$	-

RETIREMENT

GROUP I: RETIREMENT	$	-
TOTAL RETIREMENT	$	-
TOTAL BID	**$**	**-**

PT. MACKENZIE SUBSTATION GROUNDING UPGRADE
BID SCHEDULE
W.O. E2120052

BID UNIT	DESCRIPTION	TAKEOFF QTY.	UNIT	UNIT LABOR	UNIT MATERIAL	UNIT LABOR & MATERIAL	EXTENDED COST
GROUP K: CONDUIT AND CABLE							
K1	MANHOUR	100	ea.			$ -	$ -
						Total Group K:	**$ -**
GROUP M: SITE WORK							
M1	D1 AGGREGATE	100	cu. yd.			$ -	$ -
M2	FINAL GRADE/ CLEANUP	1	lot			$ -	$ -
						Total Group M:	**$ -**
GROUP O: GROUNDING							
O1	GROUND CONNECTORS	1	lot			$ -	$ -
O2	GROUND RODS & WIRE	1	lot			$ -	$ -
O3	GROUND WELLS	4	ea			$ -	$ -
						Total Group O:	**$ -**
GROUP I: RETIREMENT							
I-N1	RETIREMENT, EXISTING FENCE	1	lot			$ -	$ -
						Total Group I:	**$ -**

SECTION IV.

BID BOND

BID BOND

KNOW ALL MEN BY THESE PRESENT, That we,_____
_____ of
_____
_____as Principal, and _____
_____a corporation organized under the laws of _____
_____ and authorized to transact surety business in the State of Alaska, of_____ _____as Surety, are held and firmly bound unto Chugach Electric Association, Inc., as Obligee in the full and just sum of _____ ($_____) dollars, lawful money of the UNITED STATES, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the said Principal is herewith submitting its proposal for
_____
_____
_____
_____

The condition of this obligation is such that if the aforesaid Principal will, within the time required, enter into a formal contract and give a good and sufficient bond to secure the performance of the terms and conditions of the contract, then this Obligation to be void; otherwise, the Principal and Surety will pay unto the Obligee the amount stated above.

Signed, sealed, and delivered _____, 20___.
WITNESS AS TO PRINCIPAL:

_____

_____
Signature

_____
Print Name

Principal
By: _____

Title _____

_____(Seal)
Corporate Surety

_____
Business Address

_____

By: _____
Attorney-in-Fact

SECTION V.

CONTRACTOR'S BOND

CONTRACTOR'S BOND **Bond Number: _____**

1. Know all men that we, _____, as Principal, and _____, as Surety, are held and firmly bound unto CHUGACH ELECTRIC ASSOCIATION, INC. (hereinafter "Chugach") and unto all persons, firms and corporations who or which may furnish materials for or perform labor on the Work for the Project known as _____ awarded to Principal by Chugach under the Outside Electrical Line Construction Contract (OELCC) executed by the parties on _____, 20_____ (date) and to its successors in the penal amount of _____ dollars ($_____), as hereinafter set forth and for the payment of which sum well and truly to be made, we bind ourselves, our executors, administrators, successors and assigns jointly and severally by these present.

2. The condition of this obligation is such that if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of the OELCC and any project(s) thereunder and any amendments thereto, whether such amendments are for additions, decreases or changes in materials, their quantity, kind of price, labor costs, mileage, routing or any other purpose whatsoever, and whether such amendments are made without notice to the Surety, and shall fully indemnify and hold harmless Chugach from all costs and damages which it shall suffer or incur by reason or any failure so to do, and shall fully reimburse and repay Chugach for all outlay and expense which Chugach shall incur in making good any such failure or performance on the part of the Principal and shall promptly make payment to all persons working on or supplying labor or materials for use in the construction of the project(s) hereunder, in respect of such labor or materials furnished and used therein, to the full extent thereof, and in respect of such labor or materials furnished but not so used, the extent of the quantities estimated in the project(s) to be required for the construction of the project(s), and shall well and truly reimburse Chugach for any excess in cost of construction of said project(s) over the cost of such construction as provided in the project(s), occasioned by a default of the Principal under the project(s), then this obligation shall be null and void but otherwise shall remain in full force effect.

3. It is expressly agreed that this bond shall be deemed automatically and immediately amended, without formal and separate amendments hereto, upon any amendment to this Contract or the project(s) hereunder so as to bind the Principal and the Surety to the full and faithful performance of the project(s) as so amended provided only that the total amount of all increases in the costs of construction shall not exceed twenty percent (20%) of the amount of maximum price set forth in the construction contract. The term "Amendment" wherever used in this bond and whether referring to this bond or the project(s) shall include any alternation, addition, extension, modification, amendment, rescission, waiver, release or annulment, or any character whatsoever.

4. It is expressly agreed that any amendment which may be made by agreement between the Principal and Chugach in the terms, provisions, and conditions of a project, or to the terms, provisions and conditions of this Contract shall not in any way release the Principal and the Surety, or either of them or their respective executors, administrators, successors or assigns, from liability hereunder. The Surety hereby acknowledges receipt of notice of any amendment, indulgence, or forbearance, made, granted, or permitted.

5. This bond is made for the benefit of all persons, firms, and corporations who or which may furnish any materials or perform any labor for or on account of the construction to be performed on any projects, and they, and each of them, are hereby made obliges hereunder with the same

force and effect as if their names were written herein as such, and they and each of them may sue hereon.

IN WITNESS WHEREOF, the undersigned have caused this instrument to be executed and their respective corporate seals to be affixed and attested by their duly authorized representative this day of _____, 20_____.

_____
Principal

By: _____

Attest: Its: _____

_____
Secretary

_____
Surety

By:_____

Attest: Its: _____

_____

_____
Address of Surety's Home Office

_____

By: _____
Resident Agent of Surety
(For service of process)

Signatures

The Contractor's bond must be signed with the full name of the Contractor. If the Contractor is a partnership, a partner must sign the Contractor's bond in the partnership name. If the Contractor is a corporation, the Contractor's bond must be signed in the corporate name by a duly authorized officer and the corporate seal affixed and attested by the secretary of the corporation. A typewritten copy of all such names and signatures shall be appended.

Power of Attorney

The Contractor's bond must be accompanied by a power of attorney authorizing execution on behalf of the Surety by a duly authorized Alaska resident agent of the Surety.

SECTION VI.

BID UNIT DESCRIPTIONS

PT. MACKENZIE SUBSTATION GROUNDING UPGRADE
BID UNIT DESCRIPTIONS
W.O. E2120052

BID UNIT	DESCRIPTION
NOTES	GENERAL NOTES APPLICABLE TO ALL BID UNITS
	1. Cost of dewatering or ground thawing is incidental to cost of affected Bid Unit. No additional compensation will be paid for dewatering or ground thawing.
	2. Cost of mobilizing and demobilizing is incidental to cost of the Contract. No additional compensation will be paid for mobilizing and demobilizing related expenses.
	3. Cost of surveying is incidental to cost of affected Bid Unit. No additional compensation will be paid for surveying or surveying related expenses.
	4. Cost of excavations, clearing, grubbing, and scarifying including but not limited to those excavations provided for general excavation of the Substation site shall include removal, from site, of excess excavated, cleared, grubbed, and scarified materials. Cost of this work is incidental to the cost of the Contract. No additional compensation shall be paid for removal of excess or unusable excavation.
	5. Cost of temporary relocation of facilities inside or adjacent to the Substation is incidental to the effected Bid Unit.
K1	MANHOUR - This unit includes all labor and miscellaneous support tools required to perform one hour of Chugach-directed work.
M1	D1 AGGREGATE - Includes furnishing, importation, placement, grading, rolling, compaction, testing services, and all miscellaneous labor, equipment, and material to provide D1 Aggregate fill and backfill as specified.
M2	FINAL GRADE/ CLEANUP - This unit includes the final grading and compaction of the Substation pad. This unit also includes removal from the Substation site and disposal of trash, debris, and excess excavated materials that are not utilized for final grading of the Substation.
O1	GROUND CONNECTORS - This unit includes installation of all ground connectors, clamps, fittings, braids, and all other connectors necessary for the Substation grounding upgrade. This unit includes installing all connectors necessary to ground the Substation ground grid mesh, ground wells, fence, gates, and posts as directed by Chugach. This unit also includes all labor equipment to provide a complete Substation connector system in accordance with drawings, specifications and manufacturer's instructions.
O2	GROUND RODS & WIRE - This unit includeS installation of all ground rods and ground wire necessary for the Substation grounding upgrade. This unit includes installing all ground wire and ground rods necessary for ground the Substation ground grid mesh, ground wells, fence, gates, and posts as directed by Chugach. This unit also includes all labor and equipment to provide a complete Substation grounding wire and rod system in accordance with drawings, specifications and manufacturer's instructions.
O3	GROUND WELLS - This unit includes furnishing and installation of one ground well necessary for the Substation grounding upgrade. This unit includes furnishing and installing all steel pipe, welding, ground tabs, pipe annulus seal material, well cap, paint, and miscellaneous material necessary to install a ground well. This unit also includes all labor and equipment to provide a complete Substation grounding well in accordance with drawings, specifications and manufacturer's instructions.

PT. MACKENZIE SUBSTATION GROUNDING UPGRADE
BID UNIT DESCRIPTIONS
W.O. E2120052

BID UNIT	DESCRIPTION
I-N1	RETIREMENT, EXISTING FENCE - This unit includes all labor, materials, and equipment required to retire the existing Substation fence in the locations designated on the drawings. This unit includes clearing and grubbing sufficient area around the fence sections to permit removal of the fence. This units also includes removal and disposal of existing fence fabric, barbed wire, fence posts, fence gates, clearing/grubbing debris, and any miscellaneous materials in accordance with the drawings and specifications.

SECTION VII.

LIST OF OWNER FURNISHED MATERIAL

LIST OF OWNER FURNISHED MATERIALS
PT MACKENZIE SUBSTATION GROUNDING UPGRADE
W.O. NO. E2120052

Item	BID UNITS	ID ON DWGS.	Description	Chugach ID No.	Manufacturer/ Part Number	Unit	Required Quantity	Quantity Ordered	Spares	Unit Price	Extended Price	Status/Delivery Date	Delivered to Site by
O: GROUND CONNECTORS													
1	O1		FENCE FABRIC GROUND CLAMP		HARGER / FGC2TP	ea.	100	100		$ 14.14	$ 1,414.00	IN STOCK	CONTRACTOR
2	O1		FENCE POST CONNECTOR, CABLE TO POST, 2" PIPE		BURNDY / GAR1829	ea.	10	10		$ 73.65	$ 736.50	IN STOCK	CONTRACTOR
3	O1		FENCE POST CONNECTOR, CABLE TO POST, 3-1/2" PIPE		BURNDY / GAR2129	ea.	10	10		$ 112.61	$ 1,126.10	IN STOCK	CONTRACTOR
4	O1		FENCE POST CONNECTOR, CABLE TO POST, 4" PIPE		BURNDY / GAR2229	ea.	10	10		$ 129.98	$ 1,299.80	IN STOCK	CONTRACTOR
5	O1		FENCE POST CONNECTOR, CABLE TO POST, 6" PIPE		BURNDY / GAR8629	ea.	5	5		$ 339.52	$ 1,697.60	IN STOCK	CONTRACTOR
6	O1		GROUND CONNECTOR, CABLE TO FLAT, SINGLE RUN, 4/0		BURNDY / GB29T4	ea.	4	4		$ 28.78	$ 115.12	IN STOCK	CONTRACTOR
7	O1		HYTAP CONNECTOR, "C", 4/0 - #2		BURNDY / YGHC29C26	ea.	20	20		$ 19.81	$ 396.20	IN STOCK	CONTRACTOR
8	O1		HYTAP CONNECTOR, "C", 4/0 - 4/0		BURNDY / YGHC29C29	ea.	10	10		$ 19.87	$ 198.70	IN STOCK	CONTRACTOR
9	O1		SWAGED SPLICE 4/0 - 3/4" SOLID		DMC POWER / GC720B004-750	ea.	4	4		$ 67.14	$ 268.56	IN STOCK	CONTRACTOR
10	O1		SWAGED SPLICE 3/4" COPPER CLAD - 3/4" COPPER CLAD		DMC POWER / GC720B682-682	ea.	60	60		$ 51.37	$ 3,082.20	IN STOCK	CONTRACTOR
11	O1		SWAGED SPLIT PARALLEL 4/0 - 4/0		DMC POWER / GC721B004-004	ea.	40	40		$ 56.76	$ 2,270.40	IN STOCK	CONTRACTOR
12	O1		SWAGED SPLIT ELBOW 4/0 - 4/0		DMC POWER / GC739B004-004	ea.	230	230		$ 84.12	$ 19,347.60	IN STOCK	CONTRACTOR
13	O1		SWAGED SPLIT ELBOW 4/0 - 3/4" COPPER CLAD		DMC POWER / GC739B004-682	ea.	61	61		$ 91.74	$ 5,596.14	IN STOCK	CONTRACTOR
14	O1		SWAGED OFFSET SPLIT CROSS 4/0 - 4/0		DMC POWER / GC759B004-004	ea.	300	300		$ 97.81	$ 29,343.00	IN STOCK	CONTRACTOR
15	O1		SWAGED TERMINAL 4/0 - 2 HOLE PAD, TINNED		DMC POWER / GC920B004T	ea.	25	25		$ 59.56	$ 1,489.00	IN STOCK	CONTRACTOR
O: GROUND RODS & WIRES													
16	O2		3/4" X 10' COPPER CLAD SECTIONAL GROUND ROD		GALVAN INDUSTRIES / 7510	ea.	120	120		$ 32.67	$ 3,920.40	IN STOCK	CONTRACTOR
17	O2		3/4" X 10' SOLID COPPER GROUND ROD		GALVAN INDUSTRIES / C7510	ea.	4	4		$ 451.77	$ 1,807.08	IN STOCK	CONTRACTOR
18	O2		4/0 STRANDED BARE COPPER	378	HOUSTON WIRE & CABLE / HW000 40101	lf	14000	14000		$ 4.31	$ 60,340.00	IN STOCK	CONTRACTOR
19	O2		#2 SOLID TINNED COPPER, FENCE WIRE GROUND		HARGER / 2TINNEDBCSDS	lf	200	200		$ 2.21	$ 442.00	IN STOCK	CONTRACTOR
20	O2		4/0 FINE STRAND INSULATED COPPER, GATE TO GATE POST FLEXIBLE GROUND		1284BC-4/0/2109-0	lf	20	20		$ 7.74	$ 154.80	IN STOCK	CONTRACTOR

MATERIAL TOTAL = $ 135,045.20

SECTION VIII.

CONSTRUCTION SPECIFICATIONS

PART 1

SPECIAL PROVISIONS

FOR

PT MACKENZIE SUBSTATION GROUNDING UPGRADE

W.O. E2120052

JULY 8, 2025

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These special provisions supplement the provisions of the 2024-2025 Chugach Electric Association, Inc. Outside Electrical Line Construction Contract and Technical Specifications.

SECTION 1

SUMMARY OF WORK

1.1 SECTION INCLUDES

- Description of Project
- Work
- Contractor use of Premises
- Permits and Licenses
- Supplementary Instructions to Contractors.

1.2 DESCRIPTION OF THE PROJECT

Chugach is upgrading the grounding grid at Pt. Mackenzie Substation facility to address safety concerns caused by inadequate grounding capacity.

This project involves:

A. Retire existing chain link fence on Westside of the 138kV yard.

B. Install four (4) ground wells.

C. Install grounding wire and rods. With connection to existing fence and ground grids.

D. Development of a Storm Water Pollution Prevention Plan (SWPPP), installation of best management practices (BMP).

E. Acquire all permits and licenses.

The work shall be completed by January 19, 2027.

1.3 WORK

A. The Work consists of all obligations, duties, and responsibilities necessary to the successful completion of the Contract assigned to or undertaken by the Contractor under the Contract Documents, including all labor, materials, equipment, and other incidental operations to provide a complete facility, and the furnishing thereof.

1.4 CONTRACTOR USE OF PREMISES

The Contractor shall:

A. Limit the use of the premises to Work, storage of project materials and equipment, and access.

B. Coordinate use of premises under direction of Chugach.

C. Obtain and pay for use of additional storage and Work areas needed for operations under this Contract.

D. Furnish all temporary utilities and sanitary facilities, temporary controls, and construction facilities at the site for construction purposes and comply with all local, state, and federal codes, regulations, and laws. No additional compensation will be made for costs associated with the foregoing.

E. Install and maintain all temporary erosion and pollution control measures and other best management practices (BMPs) as required by the SWPPP. Measures other than those specifically identified as paid for in a specific Bid Unit are considered incidental to the cost of the affected unit. No additional compensation will be paid for SWPPP related activities. The project may be subject to periodic inspection by Chugach Environmental personnel to ensure adequate measures are being utilized.

F. Install and maintain silt fence and all best management practices (BMP) required in all areas affected by any construction activity. Cost of providing all measures required for SWPPP, measures other than those specifically identified as paid for in a specific Bid Unit are considered incidental to the cost the affected unit. No additional compensation will be paid for SWPPP related activities.

1.5 PERMITS AND LICENSES

A. Except as otherwise provided in the Contract Documents (Appendix G), the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the Work. Copies of all permits related correspondence as well as the permits are to be transmitted to Chugach.

1.6 SUPPLEMENTARY INSTRUCTIONS TO CONTRACTORS

A. Substitutions and Product Options:

1. At time of bidding, unless otherwise specified in the Specifications, Contractor may, on an "approved equal" or

substitution-basis, propose other equipment that he considers comparable with or superior to the specified items. In the absence of a listing of such equipment, it will be assumed that the Contractor intends to furnish the items as specified.

2. Bidder shall provide sufficient information and data necessary for a full evaluation of any equipment proposed on an "approved equal" or substitution-basis. At a minimum, information shall include complete description, physical dimensions, manufacturer's name and model number, price, time for delivery, and a specific listing of any characteristics which differ from those specified and could require engineering changes to equipment, buildings, structures, and services. Failure to supply adequate or accurate information may result in rejection of Bidder's proposal.

3. The determination of the suitability of "approved equals" or substitutions for the service intended, and final acceptance thereof, shall be by Chugach. The successful Contractor shall be liable for the cost of any subsequent engineering changes that are clearly attributable to negligence on the part of the Contractor to furnish proper information with his proposal.

4. If any revisions to Drawings or Specifications are required to conform equipment, materials, or work to national, state, and local laws, codes, ordinances, and regulations; Contractor shall give notice when submitting its bid and include a statement listing the additions to or deductions from the bid price required by the revisions.

5. If the Bidder fails to give notice, it shall provide the equipment, materials, and Work as intended by the above without extra cost to Chugach.

B. Surveys

All surveys shall be performed as specified in Section 3 of these "Special Provisions."

END OF SECTION

SECTION 2

MEASUREMENT AND PAYMENT

2.1 SECTION INCLUDES

- Measurement Methods
- Measurement by Weight
- Lump-Sum Measurement

2.2 MEASUREMENT METHODS

A. Measurement methods specified in the Bid Schedule of the Contract shall govern if they differ from methods specified in this Section.

B. The Contractor shall compute all quantities and submit calculations for approval by Chugach. Where necessary, such computations shall be based upon surveys performed by the Contractor as specified by the Special Provisions in Section 3, part 3.4 Field Engineering.

C. All costs in connection with the Work specified herein will be considered to be included with the related item of Work in the Bid Schedule, or incidental to the Project.

D. Measurement Standards: All Work to be paid for at a Contract price per unit of measurement shall be measured by Chugach in accordance with United States Standard Measures.

2.3 MEASUREMENT BY WEIGHT

A. Material to be measured and paid for by weight and not measured by handbook weights, shall be weighed on accurate, State of Alaska approved scales, furnished by and at the expense of the Contractor. A ton is defined as 2,000 pounds avoirdupois.

2.4 LUMP-SUM MEASUREMENT

A. Lump-sum measurement shall be for the entire item, unit of Work, structure, or combination thereof, as listed in the Bid Schedule.

B. If the Contractor requests progress payments for lump-sum items or amounts in the Bid Schedule, such progress payments will be made in accordance with a well-balanced, detailed program of payment-apportioning, prepared by the Contractor and submitted to Chugach for approval.

C. Such program for each applicable lump-sum item shall show estimated quantities and unit prices therefore as allocated by the Contractor to the different features of the Work and major subdivisions thereof. The summation of extensions of quantities and unit prices and related costs shall total, in each case, the exact amount to be paid under the lump-sum Contract Price for the item.

D. Such programs will be used for computing progress payments as provided herein but will not be used to determine the amount of the final payment for the Work of this Contract. Final payment will be based on actual percentage of Work completed by the Contractor.

END OF SECTION

SECTION 3

COORDINATION, OUTAGES, FIELD ENGINEERING AND PROJECT DOCUMENTS

3.1 SECTION INCLUDES

- Coordination
- Outages
- Field Engineering – Surveys
- Project Record Documents

3.2 COORDINATION

A. Contractor shall coordinate scheduling, submittals, and Work for the various activities with Chugach to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Chugach's system operation may require other crafts to perform work at or near this project. Contractor shall coordinate activities with Chugach's site representative to avoid delays and interference.

C. After Chugach occupancy of premises, coordinate access to site with Chugach for correction of defective Work and Work not in accordance with Contract documents.

D. The Contractor is responsible for coordinating with all utilities for locates.

3.3 OUTAGES

A. All work around and near energized facilities shall be coordinated with Chugach's Power Control Center. The Contractor shall take all required measures to ensure safety of personnel and existing facilities.

B. Switching will be completed by Chugach.

C. Outages must be scheduled a minimum of five (5) Chugach working days in advance of the outage and be approved by Chugach. Outage requests shall be entered through the computerized “Integrated Transmission Outage Application (ITOA)”.

D. The Contractor shall indicate all outages in its construction schedule and work plan.

3.4 FIELD ENGINEERING - SURVEYS

A. Scope

1. The Contractor shall furnish all labor, equipment, materials and services to perform all surveying and staking for the construction survey and post-construction as-built survey for the ground well location.

2. The Contractor shall locate and protect survey control and reference points.

3. All work shall be performed under the supervision of a Land Surveyor registered in the State of Alaska and acceptable to Chugach.

4. Activities of the Surveyor are to be restricted to within the right-of-way. Obtain written permission for ingress and/or egress to the right-of–way where access to the right-of-way is across private property. Obtain written permission for use of private property by the Surveyor for parking or other work performed by the Surveyor that are not completely within the right-of-way provided for the project. Permission must be granted in a written agreement between the property owner and the Surveyor that holds Chugach Electric Association, Inc., harmless from any act of the Surveyor.

B. Accuracy of Data

1. All horizontal control surveys shall be a minimum of Third Order, Class I accuracy, (1:10,000), as defined by U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

2. All horizontal control surveys required for the Work shall be based upon NAD83 CORRS, with final coordinates in NAD83 feet and the appropriate zone.

3. Vertical coordinates shall be based on MOA vertical datum.

4. All Distances shall be recorded to the nearest hundredth of a foot. All angles shall be recorded in degrees, minutes and seconds.

5. All survey work and deliverables shall conform to Chugach CAD/GIS Spacial Data Standards (Appendix E).

C. Field Notes

1. Field notes of all horizontal and vertical control surveys shall be recorded in a clear and legible manner in notebooks and shall be fully indexed.

2. The notes must be uniform in character and interpretable and usable with ease by anyone having knowledge of surveying.

3. The notes shall contain descriptions and sketches of existing control used for origin and closure and the control monuments established by this survey.

4. All field notes shall be reduced by the Surveyor.

5. Copies of all field notes shall be provided to Chugach.

D. Construction Survey

1. Chugach will furnish Plan and Profile drawings, Staking Sheets and Right-of Way drawings that shall be used to assist in staking facility locations. The surveyor shall establish centerline for new construction using information from the aforementioned drawings. The Contractor shall immediately notify Chugach of any discrepancies that occur during the survey process. Structure centerlines shall not deviate from their design locations.

2. All survey work required to confirm alignment of direct embedment structures shall be included in the construction survey.

3. For all new structure locations, a wood stake labeled with the new structure number, station, and structure type shall be driven at the structure location on the project centerline. In addition, stakes shall be driven and labeled with the type of facility to be installed and off-set distance from the project centerline at all pole and guy anchor locations (for poles include pole length and class).

4. In the event these criteria cannot be met, the Surveyor shall immediately notify Chugach through the Contractor.

E. Post-Construction As-Built Survey

1. After the project is constructed, an as-built survey shall be completed. The as-built survey shall be directly related to the centerline established during the construction survey. All new and relocated electrical facilities shall be located.

2. Deliverable Products:

a. The basis of horizontal and vertical control shall be shown on the drawing or referenced and described in appropriate notes.

b. The as-built location survey drawings shall be produced using AutoCAD Map 3D 2023 or higher. The drawings shall be prepared in accordance with Chugach Drawing Standards provided in Appendix E.

c. The drawings shall show the centerline of the ground well and each edge of the right-of-way, stationing at the P.I.'s, bearings and distances between P.I.'s, monuments found or set, property lines and surveyed section lines that intersect the right-of-way and all improvements within the right-of-way.

d. In addition to Item c above, show the following information on drawings for each well:

   (1) Station and offset in feet from project centerline to center of each ground well.

e. The drawings shall be constructed by the Surveyor in accordance with the following requirements:

   (1) All line work and lettering must be of professional quality and all line widths and lettering sizes must be of such size that all information can be clearly shown without overlap or confusion.

   (2) When more than one (1) sheet is required, an index sheet must be added showing the entire parcel, with the sheets in numerical order, and each sheet showing the sheet number and total number. When more than one (1) sheet is submitted, only the last needs to have the approval certificates, but all sheets must be the same size.

   (3) The drawings must be in an appropriate engineering type scale of one (1) inch representing a multiple of 100 feet.

   (4) Details, as necessary, must be shown at an appropriate indicated scale.

(5) The drawings must have a vicinity map in the upper right-hand corner. The vicinity map shall be at least four (4) inches on each side with a scale of one (1) inch representing one mile, showing sections, township and ranges, boundaries such as national forest or municipal boundaries, and other prominent physical or natural features such as roads, lakes, or rivers. The source of the base map must also be indicated.

(6) Nomenclature of the survey needs appear in the block only, unless the division specifically states otherwise.

(7) The basis of bearings must be indicated. Bearings shown must be true bearing as oriented to the basis of bearing, and distances must be in the foot unit reduced to the true horizontal equivalent.

(8) Bearings and distances must be shown within the accuracy commensurate with the class of survey being represented, boundary line distances must be shown from monument to monument.

f. In addition to a signed, stamped paper copy of the drawings, an email copy will be submitted to Chugach, or file uploaded to Chugach's ShareFile folder.

E. The Contractor shall submit a certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

3.5 PROJECT RECORD DOCUMENTS

A. As-Built Drawings

1. Maintain on the Site two (2) separate sets of marked-up full-scale Contract Drawings and Staking Sheets indicating as-built conditions. These drawings shall be maintained in a current condition at all times until completion of the Work and shall be available for review by Chugach at all times. All variations from the Contract Drawings, for whatever reason, including those occasioned by modifications, optional materials, and the required coordination between trades shall be indicated. These variations shall be shown in the same general detail utilized in the Contract Drawings. Coordinate changes with Chugach's site representative.

Upon completion of the Work, the marked-up drawings shall be furnished to Chugach for incorporation into final as-built drawings.

2. Store Record Documents separate from documents used for construction.

3. Record information concurrent with construction progress.

END OF SECTION

SECTION 4

SUBMITTALS AND SCHEDULES

4.1 SECTION INCLUDES

- Submittal Procedures
- Plan of Construction
- Construction Progress Schedules
- Shop Drawings
- Product Data
- Samples
- Manufacturer’s Instructions
- Manufacturer’s Certificates

4.2 SUBMITTAL PROCEDURES

The Contractor shall submit pertinent data as required in other parts of these Contract Documents for Chugach's approval:

A. Transmit each submittal with Chugach-accepted form.

B. Sequentially number the transmittal forms. Resubmittals are to have the original submittal number with an alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or Supplier, pertinent drawing sheet and detail number(s), and Specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed, certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Chugach will not review submittals until the Contractor has reviewed them.

B. Schedule submittals to expedite the Project and deliver to Chugach. Coordinate submission of related items. Allow seven (7) calendar days for Chugach's and Engineer's review.

F. If substitutions become necessary after Contract award and initial approval of Contractor furnished materials, the contractor shall submit all information as required in the bid and include a detailed explanation as to causes for the substitution.

G. Provide space on submittals for Contractor's and Chugach's review stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittal.

I. Distribute copies of approved submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

J. No material and/or procedure requiring Chugach's approval shall be used or implemented until such approval has been given.

4.3 PLAN OF CONSTRUCTION

A. A detailed Plan of Construction shall be submitted with the bid and shall include:

1. The name of all proposed subcontractors and work to be performed.

2. A representative list of projects over the last five (5) years in which similar construction, access, and terrain conditions as this project were involved.

3. A detailed plan indicating how the contractor plans to execute the project work. At a minimum, the work plan shall indicate:

a. Where the contractor plans to stage materials for the project.

b. Access sites to be developed.

c. Planned outages and work to be accomplished during each outage.

d. Equipment intended for use on the project.

4. Chugach intends for project work to begin in latter part of 2025. Project work includes incidental clearing/grubbing activities, material staging and equipment mobilization. The work plan shall be prepared in accordance with this constraint.

4.4 CONSTRUCTION PROGRESS SCHEDULES

A. A schedule shall be submitted with the bid and include the planned duration of the following major construction groups.

1. Mobilization of Equipment and Materials to Site.
2. Surveying.

3. Pre-outage work.
4. Retirement.
5. Ground grid and rod installation.
6. Grounding well installation
7. All Outages with Duration.
8. Clean-up.
9. Demobilization of Equipment.

The schedule shall note manpower loading and cash flow. The schedule shall be submitted using a Microsoft Project format. The schedule shall be saved to a baseline and submitted electronically.

B. Contractor shall incorporate the completion dates into its schedule. All work shall be completed by January 19, 2027. Liquidated damages in the amounts noted in the Invitation to Bid will be assessed for failure to meet the completion dates due to circumstances under the control of the Contractor. Liquidated damages will be assessed for each day beyond the completion date the Work specified is incomplete.

C. Within five (5) working days of award, the Contractor shall submit an updated construction schedule for approval by Chugach. The construction schedule shall be updated to include cash flow on a weekly basis for each individual Bid Unit and planned percent complete by task and overall project.

D. The basic construction schedule (data on planned performance) shall not be changed without Chugach's concurrence.

4.5 SHOP DRAWINGS

The Contractor shall:

A. Submit shop drawings in Electronic Form.

B. After review by Chugach, distribute in accordance with Submittal Procedures above and upon completion of Project, provide copies for Record Documents described in Special Provisions, Section 8 – Contract Closeout.

4.6 PRODUCT DATA

The Contractor shall:

A. Submit product data in electronic form.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to the Project.

C. After review, distribute in accordance with Submittal Procedures above and provide copies for Record Documents described in Special Provisions, Section 8 - Contract Closeout.

4.7 SAMPLES

The Contractor shall:

A. Submit samples to illustrate functional and aesthetic characteristics of the product with integral parts and attachment devices. Coordinate sample submittals for interfacing Work.

B. Include identification on each sample with full product information.

C. Submit the number or samples specified in individual Specification sections, one of which will be retained by Chugach. Reviewed samples that may be used in the Work are indicated in individual Specification sections.

4.8 MANUFACTURER'S INSTRUCTIONS

The Contractor shall:

A. When specified in individual Specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.

B. Identify conflicts between manufacturers' instructions and Contract Documents. Notify Chugach in a timely manner to allow resolution of the conflicts without impact on the project completion.

4.9 MANUFACTURER'S CERTIFICATES

The Contractor shall:

A. When noted in individual Specification Sections, submit manufacturer's certificates in quantities specified for product data.

B. Indicate material or product as it conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Chugach.

END OF SECTION

SECTION 5

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

5.1 SECTION INCLUDES

- Temporary Utilities
- Construction Facilities

5.2 TEMPORARY UTILITIES

The Contractor shall:

A. Supply all temporary electric power required for construction of the project.

B. Provide and maintain adequate lighting for construction operations at all times.

C. Obtain potable water as needed for the Work.

D. Provide sanitary facilities at the site as required by law or regulation.

5.3 CONSTRUCTION FACILITIES

A. Protection of Installed Work

The Contractor shall:

1. Protect installed Work and provide special protection where specified in individual Specification sections.

2. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.

B. Barriers

The Contractor shall:

1. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

2. Protect stored materials, site, and structures from damage.

C. Security

1. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

D. Parking

1. All parking shall be on right-of-way or in areas that the Contractor has obtained approval to park.

E. Cleaning

1. Maintain areas free of waste materials, debris and rubbish. Maintain Site in a clean and orderly condition.

2. Remove waste materials, debris and rubbish from site weekly and dispose off-site in compliance with all local, State and Federal regulations.

3. The Contractor shall be responsible for all equipment washing required to prevent the spread of invasive species and shall provide all facilities as required. This requirement is inclusive in the cost of the contract and no further compensation shall be offered by Chugach.

4. All access point/road intersections shall be kept free from dirt and debris. Clean-up and maintenance of intersections shall be the responsibility of the Contractor and performed as directed by the Chugach representative or Project Engineer.

G. Traffic Control

1. Traffic control plans are considered incidental to the cost of the contract and no further compensation will be offered by Chugach.

H. Removal of Utilities, Facilities and Controls

1. Remove temporary above grade or buried utilities, equipment, facilities, materials prior to final inspection.

2. Clean and repair damage caused by installation or use of temporary Work.

END OF SECTION

SECTION 6

MATERIAL AND EQUIPMENT

6.1 SECTION INCLUDES

- Material and Equipment Quantities
- Products
- Transportation and Handling
- Storage and Protection

6.2 MATERIAL AND EQUIPMENT QUANTITIES

A. Material and equipment quantities shown on drawings are the engineer's best estimate and shall be verified by the Contractor. Discrepancies shall be brought to Chugach's attention and conflicts resolved in a timely manner so to not interfere with scheduled completion of the work.

6.3 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Products do not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components authorized for reuse.

B. The Contractor shall not reuse materials, except as specifically permitted by the Contract Documents.

6.4 TRANSPORTATION AND HANDLING

The Contractor shall:

A. Exercise due care in the handling of all materials. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

6.5 STORAGE AND PROTECTION

The Contractor shall:

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.

B. For exterior storage of products, put on sloped supports above ground.

C. Provide off-site storage and protection when Site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to ensure products are undamaged and are maintained under specified conditions.

H. Provide security measures to prevent the theft or vandalism of stored materials and installed facilities. Security of the Work and materials is the responsibility of the Contractor. The cost of all security measures is inclusive in the cost of the contract and no further compensation will be paid by Chugach.

END OF SECTION

SECTION 7

CHUGACH FURNISHED MATERIAL

7.1 SECTION INCLUDES

- Chugach Furnished Material
- Transfer of Material
- Damage to Chugach Furnished Material
- Installation of Chugach Furnished Material

7.2 CHUGACH FURNISHED MATERIAL

A. All owner furnished material is listed in the "List of Owner Furnished Materials." If material does not appear on this list, the Contractor shall provide it.

B. The costs associated with the Owner Furnished Material listed represent original costs to Chugach and may or may not be replacement costs.

C. The Contractor shall include the Chugach furnished materials for this project in its insurance posted for the work.

7.3 TRANSFER OF MATERIAL

A. Coordinate with Chugach for transfer and transportation of Chugach-furnished materials and equipment.

B. Chugach furnished materials, and equipment may have been previously unpackaged for inspection. The Contractor shall repackage the material and equipment as necessary for transport and storage, subject to the approval of Chugach.

C. Chugach will load Chugach furnished materials from the Chugach Warehouse weighing less than 9,000 pounds onto Contractor’s trucks. The Contractor shall be responsible for loading all Chugach furnished materials from the Chugach Warehouse weighing more than 9,000 pounds.

D. After the acceptance of Chugach furnished items, the Contractor shall place them at the point of installation or in areas provided by the Contractor. Chugach may direct that certain item be stored in heated storage buildings. The Contractor is responsible for transporting Chugach furnished material from the specified storage location to the jobsite. The Contractor is responsible for off-loading Chugach furnished material at the jobsite.

E. After acceptance, Chugach furnished items are the Contractor's responsibility. The Contractor shall appropriately store and protect all Chugach furnished items upon acceptance.

7.4 DAMAGE TO CHUGACH FURNISHED MATERIAL

A. The Contractor shall repair or replace any Chugach furnished items damaged by the Contractor's handling and storage at no additional cost to Chugach.

7.5 INSTALLATION OF CHUGACH FURNISHED MATERIAL

A. Except as otherwise specified, installation Work shall be the responsibility of the Contractor and all mistakes in installation and damage shall be corrected at no cost to Chugach.

B. The Contractor will not be held liable for faulty manufacture of Chugach furnished items or for mistakes in the manufacturer's drawings.

END OF SECTION

SECTION 8

CONTRACT CLOSEOUT

8.1 SECTION INCLUDES

- Closeout Procedures
- Closeout Documents
- Final Clean-up

8.2 CLOSEOUT PROCEDURES

A. Notify Chugach to perform a preliminary inspection for the purpose of determining the state of completion of the Work. Contractor shall notify Chugach at least seven (7) days in advance of the time this inspection is to be performed. From the information gathered from this inspection, Chugach will prepare a punch list of Work to be performed, corrected, or completed before the project will be accepted. The Contractor, prior to final inspection, shall complete all Work on the punch list.

B. Contractor shall accompany Chugach and their representatives on the final inspection tour as well as any principal subcontractors that Chugach may request to be present.

C. If the Work has been completed in accordance with the Contract Documents and no further corrective measures are required, Chugach will issue a Certificate of Completion and will accept the project.

8.3 CLOSEOUT DOCUMENTS

A. Provide and sign all documents and as-built drawings per the OELCC and as specified in the Contract Documents.

8.4 FINAL CLEAN-UP

A. The Contractor shall maintain the site in a clean and orderly condition. All equipment, packaging materials, temporary facilities, retired facilities, etc., shall be removed within 10 working days of construction completion.

END OF SECTION

TECHNICAL SPECIFICATION

FOR

PT. MACKENZIE SUBSTATION

W.O. E2120052

July 8, 2025

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SECTION 024155

MISCELLANEOUS DEMOLITION

1 GENERAL

1.1 SECTION INCLUDES

A. The Contractor shall supply all labor, materials, equipment, tools, and supervision necessary to complete miscellaneous demolition at the existing substation site, including removing and disposing of structures and debris and site restoration.

B. Items of demolition Work associated with this section include the following:

1. Remove designated and dispose of items as shown on Drawings.
2. Remove and return designated items to Chugach as shown on Drawings.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Special Provisions, apply to this Section.

1.3 CERTIFICATION REQUIREMENTS

A. Conform to applicable local, State, and Federal requirements.

B. Conform to applicable requirements for hauling and disposal of debris to Contractor furnished disposal site.

1.4 COORDINATION REQUIREMENTS

A. Traffic: Conduct demolition operations to ensure minimum interference with common access areas of facility. Do not close or obstruct common access areas without prior written permission from Chugach.

B. The Contractor and any subcontractors shall minimize ruts in common access areas of facility. All rutted common access areas shall be cleaned up at the end of each week.

C. Locate and protect all utilities.

D. Coordinate all Work with Chugach's Representative.

2 PRODUCTS - NOT USED

3 EXECUTION

3.1 PREPARATION

A. Remove improvements, or obstructions, as required, to the extent necessary for the execution of the Work.

3.2 PROTECTION

A. Protect existing shrubs and vegetation adjacent to and outside of construction limits of Work.

B. Locate, identify, and protect all existing facilities from damage.

C. Protect survey bench marks, property corners, existing structures, and improvements to remain from damage or displacement.

D. Provide continuous vehicle access and egress.

E. At no time may the Contractor or subcontractors impede access or store material on the helipad.

3.3 DEMOLITION

A. Demolish and remove existing facilities only to the extent required by new Work as indicated on the Drawings.

B. Verify all existing utilities, site conditions, information and dimensions.

C. Provide, erect, and maintain temporary barriers, security devices, and temporary support structures as necessary to protect and support existing items which are not indicated to be removed.

D. Notify Chugach's Representative immediately in the event that hazardous or contaminated material are encountered or suspected. Conform to procedures applicable to local, State, and Federal regulations when handling, transporting, and disposing of hazardous or contaminated materials.

E. Identify and indicate all utility locations on Project Record Documents.

F. Remove materials to be re-installed or returned to Chugach in a manner to prevent damage.

G. Remove demolished materials, rubbish, and debris from site as Work progresses. Upon completion of Work, leave areas of Work in clean condition. Local, State, and Federal regulations regarding hauling and disposal shall apply.

H. Do not burn or bury materials on site.

I. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.4 DISPOSAL OF WASTE MATERIAL

A. Remove waste materials and excess excavated material to a Contractor furnished disposal site in compliance with all applicable local, State, and Federal requirements.

3.5 SALVAGED MATERIAL

A. All material and equipment designated for removal, but not designated to be returned to Chugach, reused, or relocated in other Sections or on the Drawings, will become the property of the Contractor on the date that it is removed.

3.6 REMOVED AND REINSTALLED ITEMS

A. None.

3.7 EXISTING ITEMS TO REMAIN

A. Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Chugach, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.8 USE OF EXPLOSIVES

A. Use of explosives will not be permitted.

END OF SECTION 024155

SECTION 260526

GROUNDING AND BONDING

1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

B. This section covers:

1. Connectors
2. Conductors

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Special Provisions, apply to this Section.

1.3 REFERENCES

A. ANSI/IEEE C2 - National Electric Safety Code

B. IEEE 80 - Guide for Safety in AC Substation Grounding

C. IEEE 142 - Grounding of Industrial and Commercial Power Systems

1.4 SUBMITTALS

A. As required by Special Provisions and as outlined here.

B. Product Data: For each type of product indicated.

C. Approval required when materials substitutions are made.

D. Product Data: For the following:

1. Grounding connectors
2. Ground wire

E. Approval of submittals required when materials substitutions are made.

1.5 PROJECT RECORD DOCUMENTS

A. Submit As-built Drawings as specified in Special Provisions.

B. Accurately record actual locations of electrodes and connections.

1.6 QUALITY ASSURANCE

A. Follow manufacturer's instructions in transporting, handling, assembling, and installing the equipment.

B. Employ only qualified crafts for and adequate means of handling of the installation of the equipment.

C. For underground construction, comply with IEEE C2.

1.7 COORDINATION

A. Coordinate Work with site excavating, foundation installation, backfilling, and final grading.

2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Materials as shown on the Drawings or as approved by Chugach.

2.2 GROUNDING CONDUCTORS

A. Material: Copper.

B. Grounding Electrode Conductors: Stranded soft-drawn copper cable.

C. Grounding Grid Mesh Conductors: Stranded soft-drawn copper cable.

D. Equipment and Structure Grounding Jumpers: Stranded soft-drawn copper cable.

E. Underground Conductors: Bare, stranded, soft-drawn copper unless otherwise indicated.

F. Ground Rods: 3/4" x 10' solid copper or copper-bonded as indicated on the Drawings.

2.3 CONNECTOR PRODUCTS

A. Provide connections as indicated on the Drawings.

2.4 CONNECTORS

A. Material: Bronze or copper.

B. Below Grade: Swaged.

C. Above Grade: Mechanical, Compression, or Swaged as specified on the Drawings.

2.5 WIRE

A. Material: Stranded copper.

B. Horizontal electrodes: 4/0 AWG stranded copper as indicated on the Drawings.

C. Grounding conductors for equipment shall be soft drawn copper and shall be sized no smaller than the following:

1. Steel Structures & Light Poles: 4/0 AWG.

2. Ground Grid Mesh: 4/0 AWG.
3. Chain-link Gate Fabric: #2 AWG tinned copper solid, or as specified on the Drawings.
4. Barbed Wire: #2 AWG tinned copper solid, or as specified on the Drawings.
5. Fence Gate Posts: 4/0 AWG.

3 EXECUTION

3.1 EXAMINATION

A. Verify site is acceptable for installation of grounding system.

B. Commencement of Work signifies acceptance of conditions.

3.2 APPLICATION

A. Exothermic-Welded Connections: Not allowed, unless specifically approved by Chugach.

B. Equipment Grounding Conductor Terminations: Use bolted pressure connections to attach to equipment.

C. Underground connections shall be swaged type.

1. Bolted connectors shall not be utilized in below grade applications.

3.3 EQUIPMENT GROUNDING CONDUCTORS

A. None.

3.4 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Coordinate ground grid installation with foundation, conduit, and final grading.

C. Install ground rod electrodes in vertical position with bottom at least 20 feet deep.

D. Install interconnecting horizontal electrodes 24" min below final grade.

E. Paint, scale, rust, corrosion, or other foreign matter shall be removed from the points of contact on metal surfaces before ground connections are made.

F. Precautions shall be taken to assure that no damage is done to grounding conductors or connections during construction. All existing grounding conductors damaged during construction work shall be replaced or repaired to comply with Drawings.

G. Connection of grounding conductors to substation fence, barbed wire, and gate shall be made with tinned mechanical connectors as shown on the Drawings.

3.5 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Not allowed, unless specifically approved by Chugach.

C. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values.

D. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

E. Connections shall not be painted.

3.6 FIELD QUALITY CONTROL

A. Inspect all connections for tightness.

B. Any connection determined to be defective by Chugach shall be cut out and a new connection installed.

3.7 TESTS

A. None.

END OF SECTION 260526

SECTION 260550

FIELD TESTING AND COMMISSIONING

1 GENERAL

1.1 SECTION INCLUDES

A. Field testing of the substation equipment and electrical systems installed or constructed by the Contractor.

B. Commissioning of all substation equipment and systems by Chugach.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Special Provisions, apply to this Section.

1.3 REFERENCES

A. This Contract is subject to and hereby incorporates by reference the following documents as though physically contained herein:

1. ANSI/NETA ATS - “Acceptance Testing Specifications for Electrical Power Equipment & Systems”
2. ANSI/NETA ECS - “Standard for Electrical Commissioning Specifications for Electrical Power Equipment and Systems”
3. IEEE Standard 400 - “IEEE Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems Rated 5 kV and Above”

B. The incorporated reference documents are available from the following sources. Contact the listed source for current document fees.

1. InterNational Electrical Testing Association - https://www.netaworld.org
2. Techstreet - https://www.techstreet.com

C. The latest and applicable sections of the following standards are to be used in the performance of the Work:

1. NESC - National Electric Safety Code
2. NEC - National Electric Code
3. IEEE - Institute of Electrical and Electronics Engineers
4. REA Bul. 1724E-300 (Design Guide for Rural Substations)
5. REA Pub. 202-1 (List of Materials)
6. AEIC - Association of Edison Illuminating Companies
7. NEMA - National Electrical Manufacturer’s Association
8. NECA - National Electrical Contractor’s Association
9. NETA - InterNational Electrical Testing Association
10. ANSI - American National Standards Institute

1.4 SUMMARY

A. It is the intent of this specification that field testing be extensive and complete, as specified, to provide positive assurance of correct installation and operation of equipment.

B. Except where specified otherwise, substation equipment and electrical systems shall be inspected and tested in accordance with NETA ATS Section 7.

C. Contractor may submit qualifications, testing means, and testing methods they believe are equivalent to NETA for Chugach review. Chugach shall be the sole judge of the acceptability of Contractor's testing qualifications, means, and methods.

D. This specification includes, but is not limited to, the following:

1. Testing of all wire, cable, electrical equipment, and systems installed or connected by the Contractor to assure proper installation, adjustment, setting, connection, and functioning in accordance with the Drawings, these specifications, and manufacturers' recommendations.
2. Furnishing of qualified personnel and labor required for, and incidental to, testing.
3. Furnishing all test equipment required to perform all tests, including special equipment as required, and qualified operators for testing equipment.
4. This specification includes all testing required during installation and prior to energization of substation equipment and electrical systems installed or constructed by the Contractor. The scope of Work does not include testing of equipment or systems off-site. The Contractor shall cooperate with and coordinate with Chugach for testing of systems and equipment that interface with Chugach's facilities that may be required to confirm phasing, rotation, or other electrical characteristics.

1.5 SUBMITTALS

A. Submittals shall be delivered as specified in the Special Provisions.

B. Testing personnel qualifications.

C. Testing plan and schedule for all conductors, equipment, and electrical systems.

D. Certified test equipment calibration reports.

E. Test Reports:

1. The Contractor shall submit reports for all tests performed.
2. The Contractor shall maintain a written and electronic record of all tests showing date, personnel making test, equipment or material tests performed, and results. A copy of these reports shall be submitted to Chugach on a weekly basis.
3. Submit one electronic copy of the final test reports, as specified.
4. The Contractor may use his standard report forms subject to the approval of Chugach.
5. Electronic documents shall be submitted in Microsoft® Office®, or in searchable unsecured PDF.

1.6 QUALITY ASSURANCE

A. The Contractor shall furnish the services of a testing supervisor who is a graduate of electrical engineering or an approved technician, subject to approval by Chugach, and thoroughly familiar with substation systems who shall perform the following:

1. Be personally present on the job site during the testing of all wiring, controls, and systems furnished, installed, or connected by the Contractor and until they are all in complete and satisfactory operation, and the substation is ready for Chugach's personnel.
2. Conduct and direct the complete program of testing specified herein.
3. Check all wiring installed by the Contractor for proper connection according to the diagrams shown in the plans, connection diagrams, and manufacturers' shop drawings.

B. The Contractor shall submit to Chugach a proposed testing plan. This plan will detail at a minimum the following:

1. Specific tests to be performed on each piece of equipment, cable, or system.
2. Testing procedures to be followed for each type of test.
3. List references and standards which require a specified test.
4. Provide a list of manufacturers' recommended tests and procedures.
5. List of testing equipment to be used and calibration certificates for proposed testing equipment.
6. List of personnel responsible for performing tests and their qualifications. Provide certifications and proof of training applicable to the tests and equipment to be provided under this Contract. Provide resumes which show testing experience.
7. Testing schedule based on the project schedules.
8. No testing may commence prior to Chugach approval of the testing plan.

C. Follow recommendations and instructions of equipment manufacturer in addition to requirements of Drawings and specifications in testing of equipment.

D. Follow recommendations and instructions of equipment manufacturer and NETA ATS in addition to requirements of Drawings and specifications in testing of equipment.

1.7 COORDINATION

A. Coordinate tests with completion of equipment or system installation and with the completion of auxiliary or related equipment that may be effected by tests. Schedule testing and provide notification of testing to Chugach so as not to delay construction or system energization.

B. Notify Chugach two weeks prior to commencement of all testing.

1.8 EXAMINATION

A. Verify that field conditions are acceptable and are ready to be tested.

1.9 TESTS

A. The types of tests to be performed under this specification shall include, but are not be limited to, the following:

1. Ground Tests

a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.

b. Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and derived neutral points. The ground connection at one of the new ground wells shall be used as the connection to the the main grounding system.

1.10 TESTING EQUIPMENT

A. The Contractor shall provide all testing equipment required to perform tests.

B. Test Equipment Suitability and Calibration: Comply with NETA ATS Section 5 “Suitability of Test Equipment" and “Test Instrument Calibration”.

1.11 PERFORMANCE OF TESTS

A. Additional tests shall be performed, as deemed necessary by Chugach, because of field conditions or to determine that equipment material and systems meet the requirements of the Contract documents. The Contractor shall be responsible for all damage to equipment or material due to improper test procedures or test apparatus handling.

B. Test procedures, equipment, temporary circuits, etc., shall be designed and utilized to minimize danger to testing technicians and surrounding personnel.

C. Furnish and use safety devices such as rubber gloves and blankets, provide protective screens and barriers, yellow tape, and danger signs, to adequately protect and warn all personnel in the vicinity of the tests.

1.12 EQUIPMENT TESTS

A. None.

1.13 COMMISSIONING

A. Commissioning will be performed by Chugach’s personnel and coordinated through Chugach’s Representative.

END OF SECTION 260550

SECTION 311000

SITE CLEARING

1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Special Provisions, apply to this Section.

1.2 SCOPE

A. This Work includes scarifying, removing, and disposing of the top 6 inches of organic-laden material in trench locations where new ground grid components are being installed.

2 PRODUCTS - NOT USED

3 EXECUTION

3.1 LIMITS OF WORK

A. The area of scarifying surface organics shall be staked out by the Contractor and approved by Chugach prior to commencing trenching operations.

B. Only those areas designated shall be scarified and shall not exceed trench width.

C. Scarified and removed surface organic materials shall become Contractor's property and shall be removed from Project site.

D. Protect and maintain benchmarks and survey control points from disturbance during construction.

3.2 DISPOSAL

A. Disposal: Remove organic-laden and waste materials including trash and debris, and legally dispose of them off Chugach's property.

END OF SECTION 311000

SECTION 312300

EXCAVATION AND FILL

1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Special Provisions, apply to this Section.

1.2 SCOPE

A. The Work includes the performance of all operations pertaining to excavation; loading, hauling, and placement of excavated or other materials as fill and backfill; and Soil Quality Control testing.

1.3 DEFINITIONS

A. Excavation: Removal of material encountered below grade.

B. Backfill: Soil material used to fill an excavation.

C. Subgrade: Final surface or elevation after completing cut, or top surface of a fill or backfill.

D. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Submit the following data that verify the products fully conform to the specifications and plans before delivery of the product:

1. One sieve analysis (ASTM D 422) for D1 Aggregate.

B. Submit a Soil Testing - Quality Control Plan for Chugach Approval which provides:

1. Independent Testing Agency Qualifications.
2. Qualifications of Contractor Personnel engaged in on-site soil compaction testing.
3. Sieve analysis sampling location and depth record keeping methodology.
4. Compaction Testing equipment calibration certificate, testing location and depth record keeping methodology.

1.5 REFERENCED STANDARDS

A. Alaska DOT&PF Standard Specifications for Highway Construction.

1.6 QUALITY CONTROL/QUALITY ASSURANCE

A. Contractor shall provide their own quality control program for field density testing, as further specified in Section 3, of this Section and required by Special Provisions, Contractor Quality Control. Chugach may, at their option, provide additional field density testing for quality assurance.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities unless permitted in writing by Chugach and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Chugach not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Chugach's written permission.

2 PRODUCTS

2.1 MATERIALS

A. D1 Aggregate

1. D1 Aggregate shall consist of crushed stone or crushed gravel, consisting of sound tough durable pebbles or rock fragments of uniform quality, and free from clay balls, vegetable matter, or other deleterious matters. The aggregate shall meet the following washed sieve gradation as follows:

D1 Aggregate	
Sieve Size	% Passing by Weight
1 inch	100
3/4 inch	70-100
3/8 inch	50-80
#4	35-65
#8	20-50
#50	8-30
#200	0-6

3 EXECUTION

3.1 EXPLOSIVES

A. Explosives: Do not use explosives.

3.2 EXCAVATION

A. Prior to trench excavation the the top 6 inches of organic-laden material shall be scarified, removed, and disposed of.

B. The Contractor shall perform all excavation of every description and whatever substance encountered including rock and permafrost. Excavation will be to the extent necessary to install the ground grid components, and as staked in the field. All excavated materials below the top 6 inches is suitable for use as backfill and shall

be stockpiled for use during construction, unless directed otherwise by Chugach. Stockpiled material shall be placed in an orderly manner and placed at a distance from the excavation section which conforms to all local, State, and/or Federal Safety codes. Contractor shall notify Chugach if the excavated material below the top 6 inches includes organics or deleterious materials.

C. Prior to filling or covering notify Chugach when excavations have reached required depth.

D. If Chugach determines that unsatisfactory soil is present, continue excavation as directed.

E. Reconstruct grade damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Chugach.

3.3 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation with compacted D1 Aggregate material.

3.4 STORAGE OF SOIL MATERIALS

A. Stockpile excavated backfill materials and excavated soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Stockpile soil materials away from edge of excavations.

3.5 FILL AND BACKFILL

A. Place and compact backfill in excavations promptly.

B. D1 Aggregate

1. D1 Aggregate is intended to be used as fill only to replace the top 6 inches of organic-laden material scarified and removed as part of ground grid trenching operations. D1 Aggregate shall be used at the surface to re-establish the original site grade prior to trenching operations. Any other use of D1 Aggregate shall require approval by Chugach.
2. Place fill and backfill in layers not more than 9 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers. Compact D1 Aggregate materials to not less than 90% of maximum dry unit weight according to ASTM D 1557.
3. Uniformly moisten or aerate fill layer before compaction to within 2 percent of optimum moisture content. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will perform field quality control testing. Chugach may, at their option, engage a qualified independent geotechnical engineering testing agency to perform field quality-assurance testing.

B. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed on each lift of material at the following frequency:

1. Site Utility Trenches - One test every 100 feet of trench.

3.7 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions. Reshape and re-compact as directed by Chugach.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

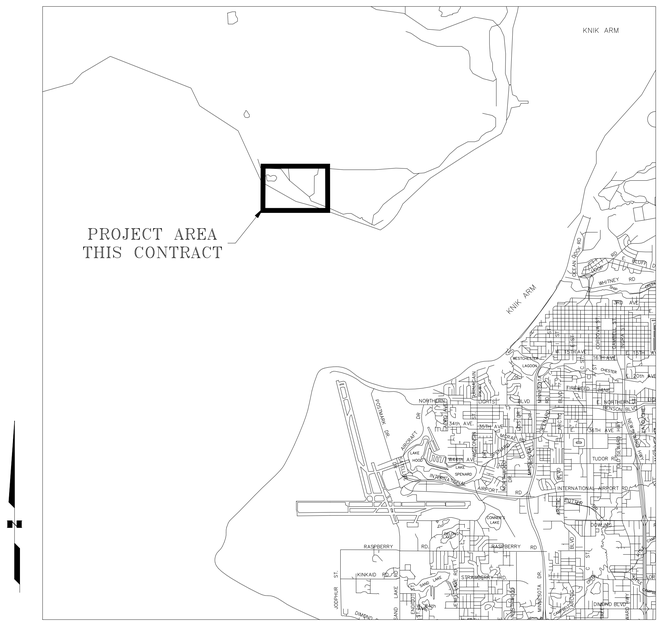
A. Disposal: Remove surplus excavated material from the substation site.

END OF SECTION 312300

APPENDIX A:

DRAWINGS

CHUGACH ELECTRIC ASSOCIATION, INC.
PT MACKENZIE SUBSTATION
PT MACKENZIE SUBSTATION GROUNDING UPGRADE
W.O. E2120052



VICINITY MAP

DRAWING INDEX

PAGE	DRAWING NUMBER	SHEET NUMBER	TITLE	NOTES
1	PMSS-MC-INDEX	1 OF 1	VICINITY MAP & DRAWING INDEX	
2	PMSS-SS-0009	1 OF 1	GROUNDING PLAN	
3	PMSS-SS-0067	1 OF 2	GROUNDING DETAILS	
4	PMSS-SS-0067	2 OF 2	GROUNDING BILL OF MATERIAL	
5	PMSS-SS-7000	1 OF 1	BUSWORK LAYOUT 138KV YARD PLAN VIEW DEMO	DEMOLITION
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

PROJECT: PT MACKENZIE SUBSTATION GROUNDING UPGRADE
ENG./DESIGN.: SUPAT CHANONTO-CEA/TIM CONRAD-EPS W.O. # E2120052

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE	ENG. STAMP
0	ISSUED FOR GROUNDING UPGRADE CONSTRUCTION	KER/05-19-2025	TCC/05-19-2025		

NO.	RECORD REVISION	CAD DRAWN BY	W.P.#	W.O. NUMBER	RECORD APPROVED	DATE

CHUGACH
POWERING ALASKA'S FUTURE
Chugach Electric Association, Inc.
5601 Electron Drive - P.O. Box 196300
Anchorage, Alaska 99519-6300

DRAWING NAME:
PT MACKENZIE SUBSTATION
MISCELLANEOUS & KEY MAPS
VICINITY MAP & DRAWING INDEX

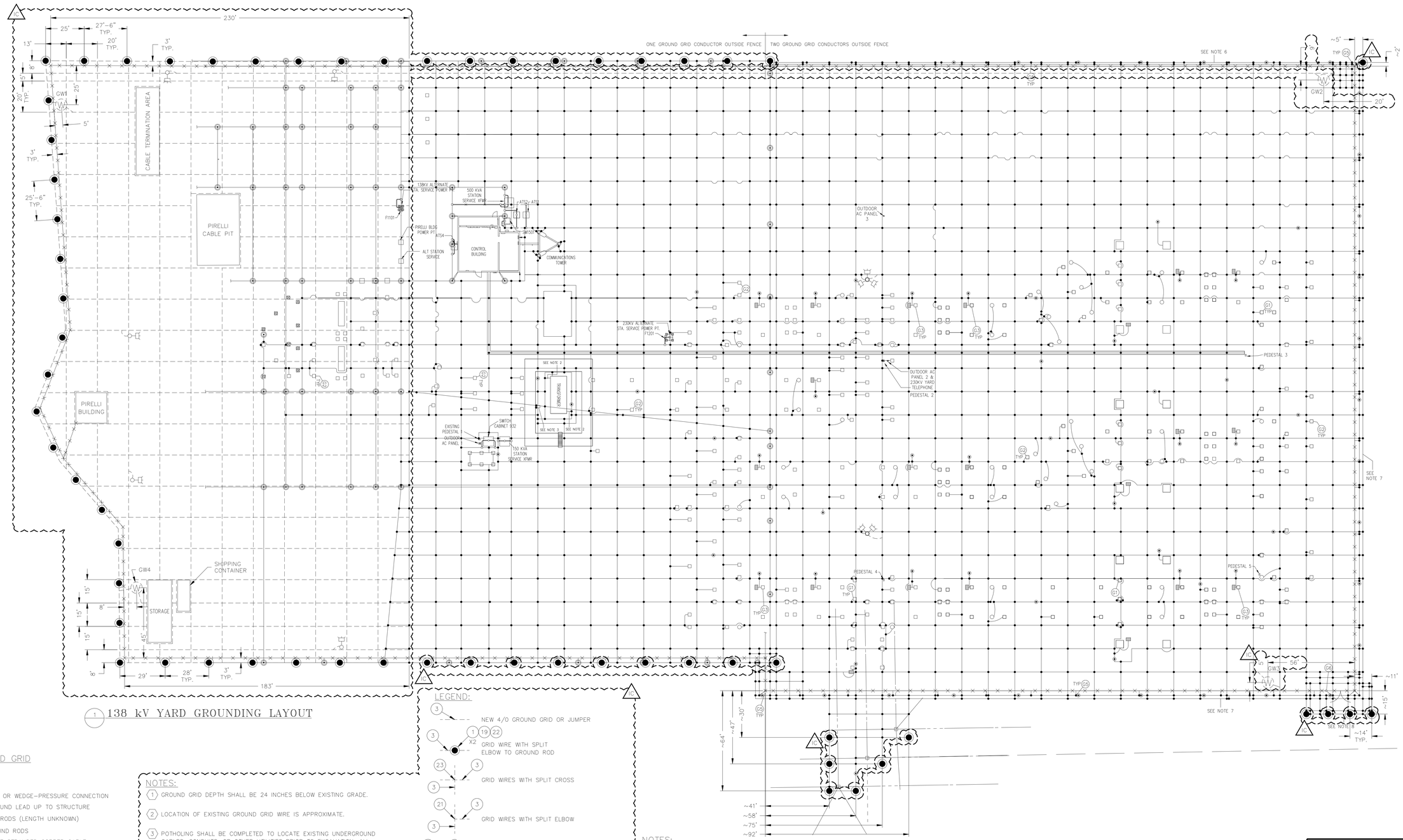
CONFIDENTIAL

pmss-mc-index_0001_1-1.dwg

DRAWING NO. - PREVIOUS/REFERENCE
NEW

DRAWING NO.: PMSS-MC-INDEX

SHEET 0001 OF 0001
PAGE _____ / _____



1 138 kV YARD GROUNDING LAYOUT

2 230 kV YARD GROUNDING LAYOUT

25 0 25 50 FEET

EXISTING GROUND GRID

LEGEND:

- CADWELD OR WEDGE-PRESSURE CONNECTION
- 2/0 GROUND LEAD UP TO STRUCTURE
- GROUND RODS (LENGTH UNKNOWN)
- 40' GROUND RODS
- 4/0 BARE STRANDED COPPER CABLE
- SWITCH OPERATING PLATFORM
- (G1) GROUNDING DETAIL NO.1 SEE DWG. PM-108, SH.1

GROUND GRID INSTALLED FOR W.O. E0720337

LEGEND:

- CADWELD CONNECTION
- 4/0 GROUND GRID OR JUMPER
- 10' COPPER GROUND ROD

NOTES:

1. GROUND GRID DEPTH SHALL BE 24 INCHES BELOW EXISTING GRADE.
2. LOCATION OF EXISTING GROUND GRID WIRE IS APPROXIMATE.
3. POTHOLING SHALL BE COMPLETED TO LOCATE EXISTING UNDERGROUND CABLES, CONDUITS, OR OTHER UTILITIES PRIOR TO EXCAVATION. ALL EXCAVATION INSIDE THE SUBSTATION SHALL BE COMPLETED BY HAND OR BY VAC-TRUCK. ANY DAMAGE TO EXISTING INFRASTRUCTURE SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO CHUGACH.
4. SEE DRAWING REFERENCE 3 FOR DETAIL ON HOW TO MAKE A SPLICE REPAIR TO DAMAGED GROUND GRID MESH WIRE.
5. THE EXISTING SUBSTATION HAS A GROUND GRID. THE EXISTING GROUND GRID SHALL BE REPAIRED ANYWHERE IT IS DAMAGED DURING CONSTRUCTION. ANY LOCATION WHERE THE EXISTING GROUND GRID IS EXPOSED, A CONNECTION FROM THE NEW TO THE EXISTING GRID MESH SHALL BE MADE USING DRAWING REFERENCE 3.
6. GROUND RODS SHALL BE 20 FEET LONG CONSISTING OF (2) 10 FT GROUND RODS ((1)) WITH SPLICE ((19)).
7. SEE DRAWING REFERENCE 4 FOR GROUNDING DETAILS.
8. SEE DRAWING REFERENCE 5 FOR BILL OF MATERIAL.

LEGEND:

- (3) NEW 4/0 GROUND GRID OR JUMPER
- (3) (1)(19)(22) X2 GRID WIRE WITH SPLIT ELBOW TO GROUND ROD
- (23)(3)(3) GRID WIRES WITH SPLIT CROSS
- (21)(3)(3) GRID WIRES WITH SPLIT ELBOW
- (6) (W) NEW GROUNDING WELL
- (21) EXISTING 4/0 GRID WIRES WITH SPLIT ELBOW TO EXISTING
- (21)(3)(3) EXISTING LIGHT POLE
- EXISTING 4/0 OR (3) NEW 4/0 GROUND GRID JUMPER TO LIGHT POLE (9)
- EXISTING 4/0 (21)(3) (1)(19)(22) X2 EXISTING GRID WIRE WITH SPLIT ELBOW TO NEW GROUND ROD

NOTES:

1. 4/0 GROUND CONDUCTOR INSTALLED IN CABLE TRENCH
2. GROUND GRID INSTALLED 30 INCHES BELOW GRADE.
3. GROUND RODS OUTSIDE OF FENCE INSTALLED AT EVERY 40 FT.
4. ALL GATE AND CORNER POSTS GROUNDED.
5. FENCE GROUNDED EVERY THIRD LINE FENCE POST OR AT EVERY 30 FT, WHICHEVER IS LESS.
6. TWO GROUND CONDUCTORS INSTALLED OUTSIDE THE WEST FENCE; ONE ON THE PROPERTY LINE AND ONE HALFWAY BETWEEN THE PROPERTY LINE AND THE FENCE.
7. TWO GROUND CONDUCTORS INSTALLED OUTSIDE THE NORTH AND EAST FENCE; ONE AT 3'-0" AND THE OTHER AT 5'-0" OUTSIDE THE FENCE.
8. OUTER GROUND CONDUCTOR INSTALLED 5'-0" OUTSIDE GATE PATH AREA.
9. 500 MCM CONDUCTOR USED FOR ALL TRANSFORMER GROUNDS.
10. 15KV CABLE SHIELDS GROUNDED AT SWITCHGEAR END ONLY

Electric Power Systems Inc.
Consulting Engineers
3305 ARCTIC BLVD, STE 201, ANCHORAGE, AK 99503
TEL: (907) 522-1953 CERTIFICATE OF AUTHORIZATION: AECC 738

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	–	138 kV YARD GROUNDING LAYOUT
2	–	230 kV YARD GROUNDING LAYOUT
3	PMSS-SS-0067/0001	GROUND GRID MESH WIRE SPLICE
4	PMSS-SS-0067/0001	GROUNDING DETAILS
5	PMSS-SS-0067/0002	GROUNDING BILL OF MATERIAL

PROJECT: POINT MACKENZIE SUBSTATION GROUNDING UPGRADE
ENG./DESIGN.: SUPAT CHANONTO-CEA/TIM CONRAD-EPS W.O. # E2120052

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE
0	ISSUED FOR GROUNDING UPGRADE CONSTRUCTION	KER/05-19-2025	TCC/05-19-2025	

ENG. STAMP: STATE OF ALASKA 49TH Timothe C. Conrad No. EE11027 5/19/2025 REGISTERED PROFESSIONAL ENGINEER

NO.	RECORD REVISION	TECH./DWN. BY	W.P.#	W.O. APPROVED	RECORD APPROVED	DATE
1	AS-BUILT STATION SERVICE UPGRADE	RF/MS		E0720337	R. FREY	05/10/11
2	AS-BUILT/SEISMIC UPGRADES & REPAIRS	KER	–	E1820056	JP	05/08/20

CHUGACH POWERING ALASKA'S FUTURE

Chugach Electric Association, Inc.
5601 Electron Drive - P.O. Box 196300
Anchorage, Alaska 99519-6300

DRAWING NAME:

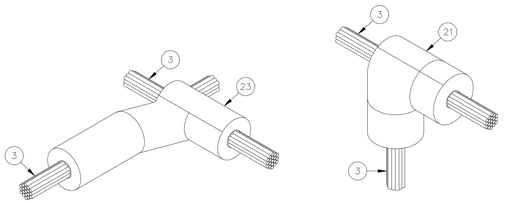
PT MACKENZIE SUBSTATION SITE & STRUCTURAL GROUNDING PLAN

pmss-ss-0009_0001_1.dwg

DRAWING NO. – PREVIOUS/REFERENCE
PM-107 SHTS. 1, 2 AND 3

DRAWING NO.: PMSS-SS-0009

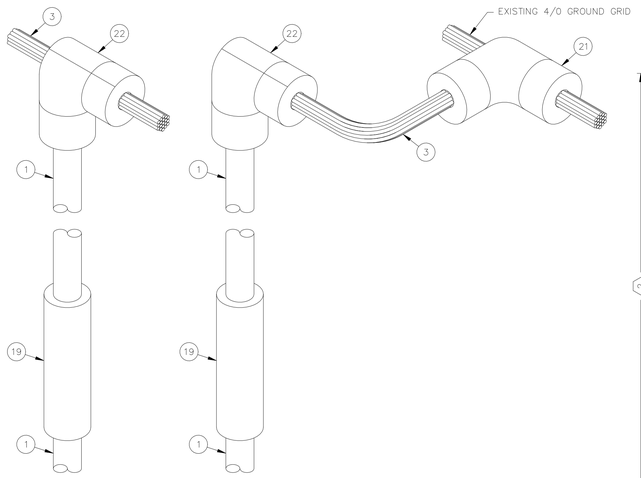
SHEET 0001 OF 0001
PAGE ____ / ____



THROUGH CONDUCTOR
OFFSET SPLIT CROSS
BOTH CONDUCTORS LAY IN

TAP TO RUN SPLIT ELBOW
SPLIT ELBOW
ONE CONDUCTOR LAYS IN
ONE CONDUCTOR DEAD ENDS

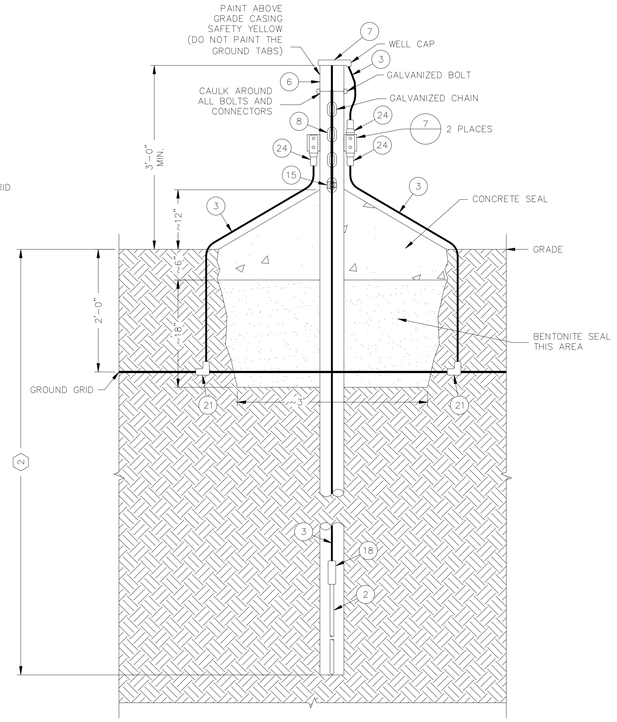
1 GROUND GRID INTERSECTION CONNECTOR
N.T.S.



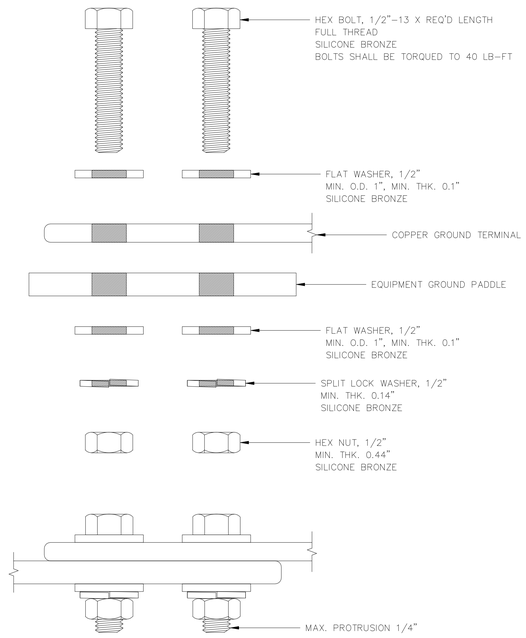
ROD TO RUN SPLIT ELBOW
WITH ROD TO ROD SPLICE
NEW GROUND ROD TO NEW
GROUND GRID WIRE CONNECTION

ROD TO RUN SPLIT ELBOW
WITH ROD TO ROD SPLICE
NEW GROUND ROD TO EXISTING
GROUND GRID WIRE CONNECTION

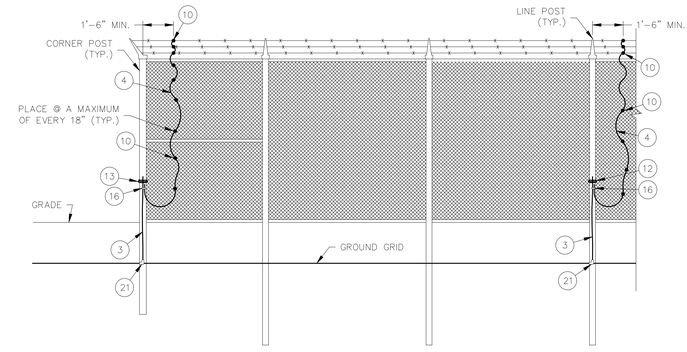
2 GROUND GRID TO ROD CONNECTOR
N.T.S.



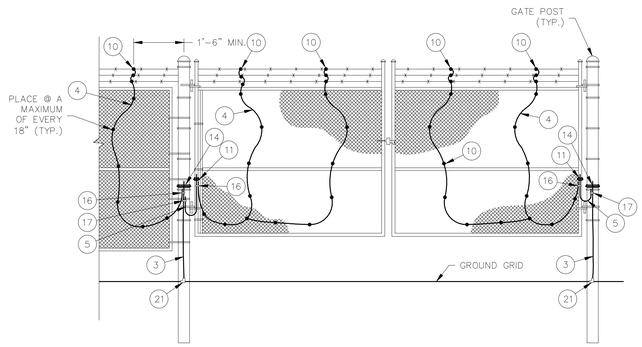
3 GROUNDING WELL GW1–GW4 (TYPICAL)
N.T.S.



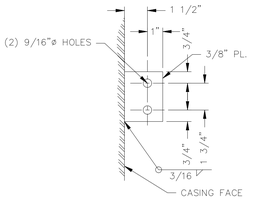
4 TYPICAL BOLTED GROUND PADDLE CONNECTION DETAIL
N.T.S.
FASTENER HARDWARE IS INCLUDED IN BILL OF MATERIAL ITEM (25)



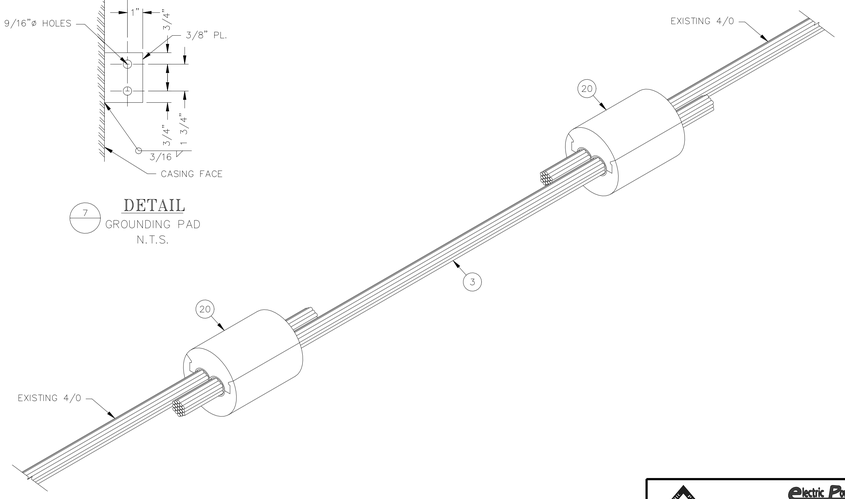
5 TYPICAL CORNER/TERMINAL AND LINE POST GROUNDING
(CONCRETE NOT SHOWN FOR CLARITY)
N.T.S.
8



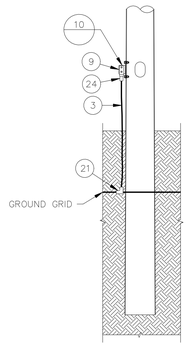
6 DOUBLE SWING GATE GROUNDING
(CONCRETE NOT SHOWN FOR CLARITY)
N.T.S.
8



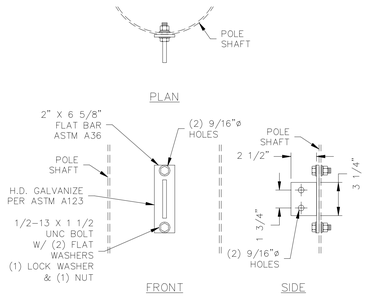
7 DETAIL
GROUNDING PAD
N.T.S.



8 GROUND GRID MESH WIRE SPLICE
N.T.S.



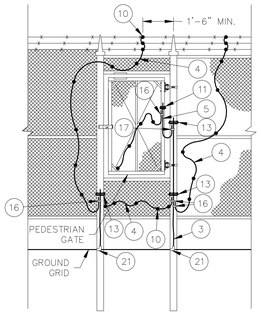
9 LIGHT GROUNDING DETAIL
N.T.S.



10 LIGHT GROUNDING PAD
N.T.S.

NOTES:

1. SEE DRAWING REFERENCE 12 FOR BILL OF MATERIAL.
2. WELL DEPTH SHALL BE 260 FEET FOR EACH NEW GROUNDING WELL. WELL SHALL BE CASED FOR THE FULL DEPTH.
3. ALL FENCE GROUND TAILS ARE CONTINUOUS 4/0 COPPER TO THE GROUND GRID.
4. ALL FENCE GATE POSTS SHALL BE BONDED TO THE GROUND GRID.
5. ALL GATES AND GATE FRAMES SHALL BE BONDED TO THE GROUND GRID WITH FLEXIBLE COPPER GROUNDING BRAID.
6. FENCE FABRIC AND BARBED WIRE SHALL BE BONDED AT EACH GATE WITH FENCE MESH/BARBED WIRE CONNECTORS PLACED AT A MAXIMUM OF 18" AND AT EACH STRAND OF BARBED WIRE.
7. ALL FENCE GROUND WIRES AND CONNECTORS SHALL BE INSTALLED ON THE SECURE SIDE OF THE FENCE.
8. MOST OF THE EXISTING SITE FENCE IS GROUNDED. THERE ARE SOME SECTIONS OF THE FENCE AND/OR GATES WHICH NEED ADDITIONAL GROUNDING. THIS DETAIL PROVIDES GENERAL GUIDANCE ON HOW TO GROUND DIFFERENT AREAS OF FENCE. SPECIFIC LOCATIONS TO ADD GROUNDING TO WILL BE PERFORMED AT CHUGACH'S DIRECTION.



11 PEDESTRIAN GATE GROUNDING
(CONCRETE NOT SHOWN FOR CLARITY)
N.T.S.
8

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	–	GROUND GRID INTERSECTION CONNECTOR
2	–	GROUND GRID TO ROD CONNECTOR
3	–	GROUNDING WELL GW1–GW4 (TYPICAL)
4	–	TYPICAL BOLTED GROUND PADDLE CONNECTION DETAIL
5	–	TYPICAL CORNER/TERMINAL AND LINE POST GROUNDING
6	–	DOUBLE SWING GATE GROUNDING
7	–	DETAIL – GROUNDING PAD
8	–	GROUND GRID MESH WIRE SPLICE
9	–	LIGHT GROUNDING DETAIL
10	–	LIGHT GROUNDING PAD

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
11	–	PEDESTRIAN GATE GROUNDING
12	PMSS–SS–0067/0002	GROUNDING BILL OF MATERIAL

Electric Power Systems Inc.
Consulting Engineers
3305 ARCTIC BLVD, STE 201, ANCHORAGE, AK 99503
TEL: (907) 522–1953 CERTIFICATE OF AUTHORIZATION: AECC 738

PROJECT: PT MACKENZIE SUBSTATION GROUNDING UPGRADE
ENG./DESIGN.: SUPAT CHANONTO–CEA/TIM CONRAD–EPS W.O. # E2120052

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE
0	ISSUED FOR GROUNDING UPGRADE CONSTRUCTION	KER/05–19–2025	TCC/05–19–2025	

ENG. STAMP
STATE OF ALASKA
49 TH
Timothe C. Conrad
No. EE11927
05/19/2025
REGISTERED PROFESSIONAL ENGINEER

NO.	RECORD REVISION	CAD DRAWN BY	W.P.#	W.O. NUMBER	RECORD APPROVED	DATE

CHUGACH
POWERING ALASKA'S FUTURE
Chugach Electric Association, Inc.
5601 Electron Drive - P.O. Box 196300
Anchorage, Alaska 99519-6300

DRAWING NAME:
PT MACKENZIE SUBSTATION
SITE & STRUCTURAL
GROUNDING DETAILS

CONFIDENTIAL
pmss-ss-0067_0001_1-1.dwg

DRAWING NO. – PREVIOUS/REFERENCE
NEW
DRAWING NO.: PMSS–SS–0067
SHEET 0001 OF 0002
PAGE

BILL OF MATERIAL

REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	120	3/4" X 10' COPPER CLAD SECTIONAL GROUND ROD	GALVAN INDUSTRIES/7510	O
2	EA	4	3/4" X 10' SOLID COPPER GROUND ROD	GALVAN INDUSTRIES/C7510	O
3	LF	14,000	4/0 STRANDED BARE COPPER	HOUSTON WIRE & CABLE/ HW000 40101	O
4	LF	200	#2 SOLID TINNED COPPER, FENCE WIRE GROUND	HARGER/2T	O
5	LF	20	4/0 FINE STRAND INSULATED COPPER, GATE TO GATE POST FLEXIBLE GROUND	ANIXTER/1284BC-4/0/2109-0	O
6	EA	4	GROUNDING WELL, 6" X 260 FT	COMMODITY (2)	C
7	EA	4	WATERTIGHT WELL CAP, 6"	BAKER MFG/6WE1	C
8	FT	20	HOT DIPPED GALVANIZED CHAIN, 1/2"	COMMODITY	C
9	EA	10	NEMA 2-HOLE GROUNDING PAD	KW INDUSTRIES/ NEMA GROUND PROVISION (OAE)	C
10	EA	100	FENCE FABRIC GROUND CLAMP	HARGER/FGC2TP	O
11	EA	10	FENCE POST CONNECTOR, CABLE TO POST, 2 INCH PIPE	BURNDY/GAR1829	O
12	EA	10	FENCE POST CONNECTOR, CABLE TO POST, 3-1/2 INCH PIPE	BURNDY/GAR2129	O
13	EA	10	FENCE POST CONNECTOR, CABLE TO POST, 4 INCH PIPE	BURNDY/GAR2229	O
14	EA	5	FENCE POST CONNECTOR, CABLE TO POST, 6 INCH PIPE	BURNDY/GAR8629	O
15	EA	4	GROUND CONNECTOR, CABLE TO FLAT, SINGLE RUN, 4/0	BURNDY/GB29T4	O
16	EA	20	HYTAP CONNECTOR, "C", 4/0 - #2	BURNDY/YGHC29C26	O
17	EA	10	HYTAP CONNECTOR, "C", 4/0 - 4/0	BURNDY/YGHC29C29	O
18	EA	4	SWAGED SPLICE 4/0 - 3/4" SOLID	DMC POWER/GC720B004-750	O
19	EA	60	SWAGED SPLICE 3/4" COPPER CLAD - 3/4" COPPER CLAD	DMC POWER/GC720B682-682	O
20	EA	40	SWAGED SPLIT PARALLEL 4/0 - 4/0	DMC POWER/GC721B004-004	O
21	EA	230	SWAGED SPLIT ELBOW 4/0 - 4/0	DMC POWER/GC739B004-004	O
22	EA	61	SWAGED SPLIT ELBOW 4/0 - 3/4" COPPER CLAD	DMC POWER/GC739B004-682	O
23	EA	300	SWAGED OFFSET SPLIT CROSS 4/0 - 4/0	DMC POWER/GC759B004-004	O
24	EA	25	SWAGED TERMINAL 4/0 - 2 HOLE PAD, TINNED	DMC POWER/GC920B004T	O
25	LOT	1	HEX BOLT/HEX NUT/SPLIT LOCK WASHER/FLAT WASHER, SILICONE BRONZE, FOR COPPER TO COPPER OR COPPER TO GALVANIZED STEEL CONNECTIONS. SIZE AS REQ'D.	COMMODITY	C
26			NOT USED		
27			NOT USED		
28			NOT USED		
29			NOT USED		
30			NOT USED		
31			NOT USED		
32			NOT USED		

C = CONTRACTOR. O = OWNER. NIC = NOT IN CONTRACT.

NOTES:

(1) BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

(2) EACH WELL SHALL BE CASED FOR THE FULL DEPTH.

Electric Power Systems Inc.
Consulting Engineers
3305 ARCTIC BLVD, STE 201, ANCHORAGE, AK 99503
TEL: (907) 522-1953 CERTIFICATE OF AUTHORIZATION: AECC 738

PROJECT: PT MACKENZIE SUBSTATION GROUNDING UPGRADE
ENG./DESIGN.: SUPAT CHANONTO-CEA/TIM CONRAD-EPS W.O. # E2120052

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE	ENG. STAMP
0	ISSUED FOR GROUNDING UPGRADE CONSTRUCTION	KER/05-19-2025	TCC/05-19-2025		STATE OF ALASKA 49TH Timothe C. Conrad No. EE15027 5/19/2025 REGISTERED PROFESSIONAL ENGINEER

NO.	RECORD REVISION	CAD DRAWN BY	W.P.#	W.O. NUMBER	RECORD APPROVED	DATE

CHUGACH POWERING ALASKA'S FUTURE
Chugach Electric Association, Inc.
5601 Electron Drive - P.O. Box 196300
Anchorage, Alaska 99519-6300

DRAWING NAME:
PT MACKENZIE SUBSTATION
SITE & STRUCTURAL
GROUNDING BILL OF MATERIAL

CONFIDENTIAL

pmss-ss-0067_0002_1-1.dwg

DRAWING NO. - PREVIOUS/REFERENCE
NEW

DRAWING NO.: PMSS-SS-0067

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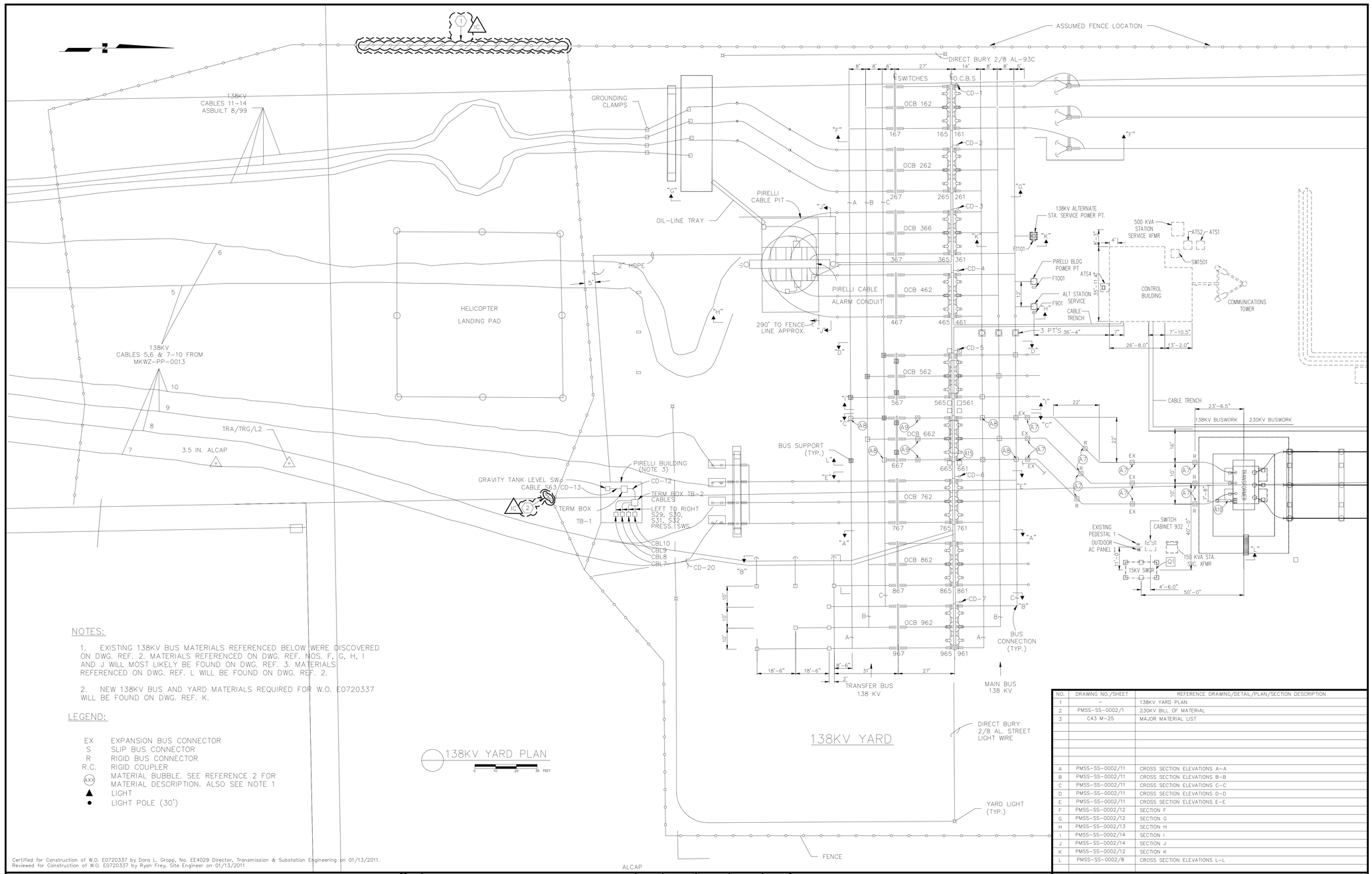
PAGE ____ / ____



138KV YARD PLAN

NOTES:

1. EXISTING 138KV BUS MATERIALS REFERENCED BELOW WERE DISCOVERED ON DWG. REF. 2. MATERIALS REFERENCED ON DWG. REF. NOS. F, G, H, I AND J WILL MOST LIKELY BE FOUND ON DWG. REF. 3. MATERIALS REFERENCED ON DWG. REF. L WILL BE FOUND ON DWG. REF. 2.
2. NEW 138KV BUS AND YARD MATERIALS REQUIRED FOR W.O. E0720337 WILL BE FOUND ON DWG. REF. K.

LEGEND:

EX	EXPANSION BUS CONNECTOR
S	SLIP BUS CONNECTOR
R	RIGID BUS CONNECTOR
R.C.	RIGID COUPLER
(XXX)	MATERIAL BUBBLE. SEE REFERENCE 2 FOR MATERIAL DESCRIPTION. ALSO SEE NOTE 1
▲	LIGHT
●	LIGHT POLE (30')

Certified for Construction of W.O. E0720337 by Dora L. Gropp, No. EE4029 Director, Transmission & Substation Engineering on 01/13/2011.
Reviewed for Construction of W.O. E0720337 by Ryan Frey, Site Engineer on 01/13/2011

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	–	138KV YARD PLAN
2	PMSS-SS-0002/1	230KV BILL OF MATERIAL
3	C43 M-25	MAJOR MATERIAL LIST
A	PMSS-SS-0002/11	CROSS SECTION ELEVATIONS A-A
B	PMSS-SS-0002/11	CROSS SECTION ELEVATIONS B-B
C	PMSS-SS-0002/11	CROSS SECTION ELEVATIONS C-C
D	PMSS-SS-0002/11	CROSS SECTION ELEVATIONS D-D
E	PMSS-SS-0002/11	CROSS SECTION ELEVATIONS E-E
F	PMSS-SS-0002/12	SECTION F
G	PMSS-SS-0002/12	SECTION G
H	PMSS-SS-0002/13	SECTION H
I	PMSS-SS-0002/14	SECTION I
J	PMSS-SS-0002/14	SECTION J
K	PMSS-SS-0002/12	SECTION K
L	PMSS-SS-0002/8	CROSS SECTION ELEVATIONS L-L

PROJECT:
ENG./DESIGN.: W.O. #

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE	ENG. STAMP

NO.	RECORD REVISION	TECH./ DWN. BY	W.P.#	W.O. APPROVED	RECORD APPROVED	DATE
0	NEW DRAWING CREATED FROM REFERENCE DRAWING	MS		E0720337	R. FREY	01/26/10
1	AS-BUILT STATION SERVICE UPGRADE	RF/MS		E0720337	R. FREY	05/04/11

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Chugach Electric Association, Inc.
5601 Electron Drive - P.O. Box 196300
Anchorage, Alaska 99519-6300

DRAWING NAME:
PT. MACKENZIE SUBSTATION
BUSWORK LAYOUT
138KV YARD PLAN VIEW

PMSS-SS-0002_0008
DRAWING NO. – PREVIOUS/REFERENCE
PMSS-SS-0020
DRAWING NO.: PMSS-SS-0002
SHEET 0008 OF 0053
PAGE ____ / ____

DEMOLITION NOTES:
1. RETIRE 100 FEET OF FENCE FROM CORNER.
2. RETIRE FENCE FROM CORNER, APPROXIMATELY SIX FEET.

Electric Power Systems, Inc.
Consulting Engineers
3305 ARCTIC BLVD, STE 201, ANCHORAGE, AK 99503
TEL: (907) 522-1953 CERTIFICATE OF AUTHORIZATION: AECC 738

DEMOLITION LEGEND:

DEMOLITION

PROJECT: PT MACKENZIE SUBSTATION GROUNDING UPGRADE
ENG./DESIGN.: SUPAT CHANONTO-CEA/TIM CONRAD-EPS W.O. # E2120052

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE	ENG. STAMP
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NO.	RECORD REVISION	CAD DRAWN BY	W.P.#	W.O. NUMBER	RECORD APPROVED	DATE

CHUGACH
POWERING ALASKA'S FUTURE
Chugach Electric Association, Inc.
5601 Electron Drive - P.O. Box 196300
Anchorage, Alaska 99519-6300

DRAWING NAME:
PT MACKENZIE SUBSTATION
BUSWORK LAYOUT
138KV YARD PLAN VIEW DEMO

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pmss-ss-7000_0001_1.dwg
DRAWING NO. – PREVIOUS/REFERENCE
NEW
DRAWING NO.: PMSS-SS-7000
SHEET 1 OF 1
PAGE ____ / ____

APPENDIX B:

HSE WORKSHEET AND CHECKLIST

SUGGESTED CONTRACTOR HSE PLAN WORK SHEET AND CHECKLIST

WORK HAZARD ASSESSMENT AND MITIGATION PLAN

1. _____ Have you reviewed the project Work scope and analyzed it for potential hazards such as confined space entry, excavations, falls, electrical safety, and other OSHA recognized hazards?

2. _____ Have you included a written assessment of the hazards from question 1 that includes a list of them and discusses how you will handle each of them**? (Your response for handling them can be to list your existing appropriate procedure.)**

3. _____ Have you reviewed Chugach Electric Association Procedure 10.5, Confined Space Entry?

MSDS INFORMATION

1. _____ Will you be using or creating chemicals that must have Material Safety Data Sheets (MSDSs) or Safety Data Sheets (SDSs) on them?

2. _____ If you answered "yes" to question 1, have you provided a separate list of those chemicals with your bid?

3. _____ Have you reviewed the requirements of Chugach Electric Association Safety Procedure 7.3, Hazard Communications?

ENERGY ISOLATION PROCEDURE/PLAN

1. _____ Have you reviewed the project Work scope to determine from the scope the need for energy isolation (lockout/tagout)?

2. _____ If you answered "yes" to question 1, do you have a written energy isolation procedure?

3. _____ Have you attached a copy of the procedure?

PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. _____ Have you reviewed the project Work scope to determine the type of PPE you are required to provide for your crew, and included a list of it with your HSE?

2. _____ If the project Work is located at Chugach's Beluga generating plant, have you reviewed Chugach Electric Association Procedure 11.7, Visitor Checklist?

EMERGENCY RESPONSE PLAN

1. _____ Have you reviewed the project Work scope to determine from the scope the types of emergencies that may be reasonably anticipated due to the work tasks or work location**? (This can include such topics as First Aid, emergency evacuation, fire hazard, etc.)**

2. _____ Based on your review, have you included a list or discussion of your response plan for those emergencies? **(Make sure you consider existing conditions such as weather, remote location, and existing resources in developing your plans.)**

HAZARDOUS MATERIAL/HAZARDOUS WASTE MITIGATION and RESPONSE PLAN

1. _____ Have you reviewed the project Work scope to determine the type of hazardous material you may be handling, and the type of hazardous waste your operation may generate?

2. _____ Have you included a discussion of your plan for safely handling and disposing of these materials and wastes?

3. _____ Have you included a discussion of your response plan in case of a release?

APPENDIX C:

CAD / GIS SPATIAL DATA STANDARDS

CAD / GIS
Spatial Data Standards

Last Revision Date: May 21, 2014

Vision: *Establish collection standards that affirm GIS as the visualization tool to integrate corporate information assets and facilitate data visualization and analysis.*

Chugach Electric Association, Inc.
5601 Electron Drive
P.O. Box 196300
Anchorage, AK 99519-6300

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Table of Contents

1. Introduction

The following document describes the spatial data standards of Chugach Electric Associations, Inc. (Chugach). The intent is to describe the:

- Coordinate System and Map Projection standard for delivered electronic data,
- Format of GPS and electronic survey data delivered in AutoCAD,
- Format of delivered electronic GIS data, project files, maps, and metadata.

This document is a reference guide for Chugach and Contractor employees working on behalf of Chugach; it specifies the standards for CAD/GIS spatial data deliverables. Any deviation from these specifications set forth in this document MUST BE APPROVED PRIOR TO DATA COLLECTION. This requirement ensures that the data collected will be viable when it enters Chugach's GIS records. When you request a deviation it enables us to evaluate and update this standards document as necessary. This document is intended to be a "living document" which will be updated as technology changes or as the standards adopted by Chugach change. In either case, we welcome your comments and specific feedback upon the Spatial Data Standards that follow.

2. Coordinate System, Datum & Map Projection

The standard coordinate system, datum and map projection currently used in Chugach's GIS is Alaska State Plane Zone 4 NAD 83 (2002) also known as the (CORS96) realization.

NOTE: The term 'realization' is the National Geodetic Service's official name for revisions to the NAD83 system; however, 'epoch' is more commonly used in its place throughout the industry with the occasional use of 'revision' and 'datum tag'. Chugach has elected to use the term 'epoch' when referring to NGS realizations.

a. ***Map Projection***

The map projection that best serves Chugach facilities is Transverse Mercator. The specified coordinate system, datum and map projection is used by all of Chugach's GIS-based Transmission and Distribution Design and Mapping products.

Maps may be delivered to Chugach in other projections, with advance approval by the CAD/GIS manager.

b. ***Datum, Coordinate System & Projection Information***

Name: NAD 1983 Alaska State Plane Zone 4 FIPS (Federal Information Processing Standards) 5004 (US Survey Feet)
Projection: Transverse_Mercator

i. Map Projection Parameters

Projection: Transverse_Mercator
False_Easting: 1640416.666667
False_Northing: 0.000000
Central_Meridian: -150.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000
Linear Unit: Foot_US (0.304800609601219)

ii. Geographic Coordinate System

Name: GCS_North_American_1983
Angular Unit: Degree (0.0174532925199433295)
Prime Meridian: Greenwich (0.000000000000000000)

iii. Datum

Name: D_North_American_1983
Spheroid: GRS_1980
Semimajor Axis: 6378137.000000000000000000
Semiminor Axis: 6356752.314140356100000000
Inverse Flattening: 298.257222101000020000

c. ***NAD 27 to NAD 83 Conversion***

The State Plane grid coordinates is a mathematical conversion that translates latitude and longitude into a Cartesian (or map) Northing (Y) and Easting (X) coordinate system, and this transformation must maintain the same datum tag (NAD83, NAD27, etc...) as the origin latitude and longitude coordinates. Following the conversion into State Plane (NAD27) a Lat-Long (NAD27) can be converted into State Plane (NAD83), using the NADCON conversion for Alaska.

Chugach's original ArcINFO coverages were stored in Alaska State Plane Zone 4 NAD27. These coverages were converted in June 2003 to Alaska State Plane Zone 4 FIPS 5004 (US Survey Feet), NAD83 (CORS96) (2002) using ESRI's ArcToolbox, and the **NAD_1927_to_NAD_1983_Alaska** algorithm, to avoid the 400ft errors that the standard NAD_1927_to_NAD_1983_NADCON creates. Chugach stores our Spatial Database in an Oracle GeoDatabase. The Municipality of Anchorage's GIS data is also stored in the Alaska State Plane Zone 4 (it is Chugach's understanding that the Datum is NAD83 (CORS96) (2002).

NOTE: Some State and Federal data may still be stored in the NAD27 Datum. If you utilize NAD27 data it will be necessary to convert your deliverable information into Chugach's standard datum. The NADCON datum conversion algorithm specific for Alaska will be used.

NADCON is a very common algorithm, which is included in projection software such as ESRI ArcCatalog, Intergraph Projection Manager, Tralaine and others. NADCON works very well for transforming data which spans a large geographic area such as Chugach's distribution and transmission network.

GIS Data Deliverable Standards

The following standard is a guide for delivering GIS data to Chugach. These standards are designed to allow Chugach to easily import GIS data into their Oracle/SDE database.

d. ***Data Format***

GIS Data delivered to Chugach will be submitted in the currently installed version of ArcGIS in a personal or file geodatabase format. The use of feature datasets is encouraged within the personal or file geodatabase. Requests to deliver data in formats other than personal or file geodatabase must be approved by the GIS manager.

e. ***Map Production***

All GIS map products shall be completed using the currently installed version of ArcMap. Maps must be delivered to Chugach in MXD format. All data used to create maps must be contained within a personal or file geodatabase and delivered to Chugach. MXD's must be able to locate all data and attached files when transferred to Chugach. Maps must contain the following information:

- Chugach Logo
- All GIS map products shall display the copyright (©) symbol as follows: Copyright Chugach Electric Association, Inc. ©
- Chugach Disclaimer –
  "Chugach does not warrant the accuracy or completeness of the information contained on this map. The map may not be suitable for user's particular purpose. When accuracy is necessary for any purpose, it is the responsibility of the user to request locates of **Chugach** facilities. This map was produced for Chugach by [insert Engineering/Survey Firm Name]."

f. ***Metadata***

Complete ESRI metadata in the personal or file geodatabase will be required for each feature dataset or feature class. All fields listed as required in the metadata are to be filled out and detail the data acquisition and transformation processes utilized with the data being submitted to Chugach. In addition to populating, the Description Tab as shown in the sample of FGDC metadata below with the **REQUIRED** sections in bold, (which is important to Chugach long-term; it is vital that the Attributes Tab be populated, as it will allow us to know the meaning of the data represented in a given feature class.

NOTE: If you are editing metadata in ArcCatalog this can be found on the Attribute Tab inside the Entity Attribute Tab. It is imperative that column definitions be input and should include all value defaults and named domains. This information is the most important information for long term maintenance of the collected data being handed over to Chugach.

Identification_Information:
  Citation:
    Citation_Information:
      Originator: **REQUIRED: The name of an organization or individual that developed the data set.**
      Publication_Date: **REQUIRED: The date when the data set is published or otherwise made available for release.**
      Title:
      Geospatial_Data_Presentation_Form: vector digital data
      Online_Linkage:
  Description:
    Abstract: **REQUIRED: A brief narrative summary of the data set.**

Purpose: **REQUIRED: A summary of the intentions with which the data set was developed.**
Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: **REQUIRED: The year (and optionally month, or month and day) for which the data set corresponds to the ground.**
Currentness_Reference: **REQUIRED: The basis on which the time period of content information is determined.**
Status:
Progress: **REQUIRED: The state of the data set.**
Maintenance_and_Update_Frequency: **REQUIRED: The frequency with which changes and additions are made to the data set after the initial data set is completed.**
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: **REQUIRED: Western-most coordinate of the limit of coverage expressed in longitude.**
East_Bounding_Coordinate: **REQUIRED: Eastern-most coordinate of the limit of coverage expressed in longitude.**
North_Bounding_Coordinate: **REQUIRED: Northern-most coordinate of the limit of coverage expressed in latitude.**
South_Bounding_Coordinate: **REQUIRED: Southern-most coordinate of the limit of coverage expressed in latitude.**
Keywords:
Theme:
Theme_Keyword_Thesaurus: **REQUIRED: Reference to a formally registered thesaurus or a similar authoritative source of theme keywords.**
Theme_Keyword: **REQUIRED: Common-use word or phrase used to describe the subject of the data set.**
Access_Constraints: **REQUIRED: Restrictions and legal prerequisites for accessing the data set.**
Use_Constraints: **REQUIRED: Restrictions and legal prerequisites for using the data set after access is granted.**
Native_Data_Set_Environment: Microsoft Windows 2000 Version 5.0 (Build 2195) Service Pack 3; ESRI ArcCatalog 8.2.0.700
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Vector
Distribution_Information:
Resource_Description: Downloadable Data
Metadata_Reference_Information:
Metadata_Date: 20030425
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: REQUIRED: The organization responsible for the metadata information.
Contact_Person: **REQUIRED: The person responsible for the metadata information.**
Contact_Address:
Address_Type: **REQUIRED: The mailing and/or physical address for the organization or individual.**
City: **REQUIRED: The city of the address.**
State_or_Province: **REQUIRED: The state or province of the address.**
Postal_Code: **REQUIRED: The ZIP or other postal code of the address.**
Contact_Voice_Telephone: **REQUIRED: The telephone number by which individuals can speak to the organization or individual.**
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: local time
Metadata_Extensions:
Online_Linkage: http://www.esri.com/metadata/esriprof80.html
Profile_Name: ESRI Metadata Profile

3. Survey (AutoCAD) Deliverable Standards

The following standards are a guide to use when submitting survey data stored in an AutoCAD drawing file.

a. *Format*

The AutoCAD format is a (.dwg) file that is no more than two (2) previous platforms release behind the most current version of AutoCAD.

NOTE: A platform release is defined as a change to the .dwg file format and not necessarily the incremental release of updated AutoCAD software.

b. *Block and Data Dictionary*

With the submittal of AutoCAD mapping to Chugach, a data dictionary describing the layer naming convention and a copy of blocks used will be required. The data dictionary should list all layers in the drawing and describe what is present on the layer, list all blocks in the file, and include a title or description of the block. If the block is per a certain industry standard (i.e., ANSI, etc.), indicate the standard used. Any inserted blocks or XREF files should be listed in data dictionary.

c. *Projection Information*

c.1 *Horizontal Projection Information*

The map projection will be required to be documented for the data set. If a plant (or local) grid is used, tie coordinates to NAD 1983 (2003) (CORS96) epoch Alaska State Plane Zone 4 FIPS 5004 (US Survey Feet) will be required.

c.2 *Vertical Projection Information*

All vertical data shall be based on the most current geoid, unless otherwise specified.

d. *Plant Grid*

Chugach also uses a "plant grid" for construction projects. Plant Grid may also be referred to as a construction grid or a local coordinate system. When using the plant grid it will be necessary to establish at a minimum 3 control points at opposite sides of the Plant Grid which have both plant grid coordinates and Alaska State Plane Zone 4 NAD83 (2003) (CORS96) epoch coordinates established. This will allow Chugach to scale and rotate the data used in the plant grid so that it can be incorporated with Chugach's existing GIS data.

d.1 *Linear Projects*

Linear Projects, such as transmission lines, shall incorporate the requirements noted above in 3.d and shall require an additional control point for every line-mile included in the scope of the project.

e. *Survey Datum*

The datum used for survey purposes will be NAD83 (2003) (CORS96) epoch; this level of precision is specified to ensure that the coordinates referenced will be re-creatable when the NGS CORS Multi-Year Solution is implemented, by Chugach.

4. Conventional and GPS (RTK) Survey Standards

The following standards are a guide to use when using GPS survey techniques on Chugach projects. All surveying must meet the minimum requirements set out in the ASPLS; Standards of Practice for Professional Land Surveyors.

a. *Electronic Data Collection*

Chugach recognizes that some of the field data may be electronically collected and printed out on supplemental sheets rather than being written by hand in the field book. If used, these supplemental sheets must be initialed by the Party Chief or GPS Operator, referenced in the field book, kept with the field book, and are considered part of the field book.

b. *Minimum Standards and Limitation of Use for GPS Technology*

We require the use of Bureau of Land Management standards as set forth in their publication: Standards for the Positional Accuracy of Cadastral Surveys When Using Global Navigation Satellites Systems (GNSS), February 23, 2009. See Attachment 1.

c. *GPS Deliverables*

The following are required:

- Station Observation Logs (and Field Notes for conventional surveying)
- Digital Raw GPS Data (for Trimble that would be a .dat file)
- Copies of all processing reports produced by GPS processing software (like Trimble Geomatics Office and OPUS)
- Survey Report containing the following:
    - Equipment used
    - Methodology used
    - Control used
    - Datum used
    - Issues with the survey

d. *Emerging GPS Technologies*

Chugach recognizes the dynamic nature of GPS surveying in the areas of real time positioning, quick ambiguity determination and "on the fly" initializing. Chugach's specifications are not intended to hinder the integration of advancements which may be beneficial, efficient, and accurate to our program, but rather, to guarantee the degree of confidence, reliability, and repeatability for verification that Chugach considers necessary in the performance of Cadastral Surveys.

Chugach encourages the presentation and discussion of these emerging technologies when considered a viable option in the performance of specific projects or portions of projects. In these instances the Chugach GPS standards must guide the formulation of procedures that maintain the degree of confidence, reliability, and repeatability in the final product that Chugach attains in the current standards. These procedures must closely reflect the approach that follows the professional standards and accepted procedures of the established surveying community.

APPENDIX D:

CAD STANDARD AND DRAFTING CONVENTIONS

CAD Standard and Drafting Conventions for Outside Design Contractor

CAD Services

Revision: 1.0

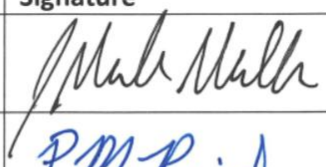
Status: Draft

Last Update: 5/22/2024

Revision History

Rev. No.	Date	Primary Author	Summary
1.0	05/20/24	Aubrey Campbell	Updates to structure and content; revisions to allow for audience-specific child versions

Approval History

Role	Name	Signature	Date	Rev #
VP Engineering	Mike Miller		5/22/2024	
Manager, Transmission Engineering	Peyton Reid		5/20/2024	1.0
Sr. CAD Specialist	Gayle Christensen		5/20/2024	1.0
CAD Specialist	Brian Armagost		5/20/24	1.0

Sections to Include by Audience

Audience	Sections to Include	Notes
All Transmittals	All	Includes Chugach CAD Staff
Outside Design Contractor	Meridian: Chugach Record Dwg Database Project Design Dwg Set Organization Misc & Key Maps Index Misc & Key Maps Information Project Design Demolition Drawings Sheet Layout Project Design Outside Contractors Drafting Conventions Symbols & Notations Glossary Indices Appendix A – Layer Name Format Appendix B – Meridian Database Codes	
Transmission & Substation Engineer, Operations	Meridian: Chugach Record Dwg Database Project Design Dwg Set Organization Misc & Key Maps Index Misc & Key Maps Information Project Design Demolition Drawings Sheet Layout Project Design Outside Contractors Drafting Conventions Symbols & Notations Glossary Indices Appendix A – Layer Name Format Appendix B – Meridian Database Codes	
Materials/Equipment Manufacturer	Drafting Conventions Symbols & Notation	
Distribution Designer	Designer Section Under Development	Chugach Distribution Design
Distribution Outside Contractor	Distribution Outside Contractor Under Development	
Surveyor	Surveyor Section Under Development	Chugach Survey
Surveyor Outside Contractor	Surveyor Outside Contractor Under Development	
Power Plant	Power Plant Section Under Development	
Headquarters Bldgs.	Headquarters Buildings Under Development	

Contents

Reference the current version of the U.S. National CAD Standard (NCS) for Architecture, Engineering, and Construction for any standards not specifically addressed within this document.

1. Meridian: Chugach Electric Record Drawing Database

Meridian is the single-source master repository for all drawings and revisions to drawings at Chugach Electric ("Chugach") for transmission and sub transmission lines (34.5kV and higher), substations, power systems, power plants, headquarters buildings, communication lines, and communication sites. The exception is distribution drawings, which are maintained in the Chugach GIS system.

1.1 Meridian Recognized Title Block

Meridian controls attribute fields within the Meridian recognized title block; simply put, Meridian "owns" the field. Meridian is a *field-path* drawing database, meaning that what is in the field dictates the path to where the drawing resides within the database. Meridian generates drawing numbers by using the codes assigned to specific fields.

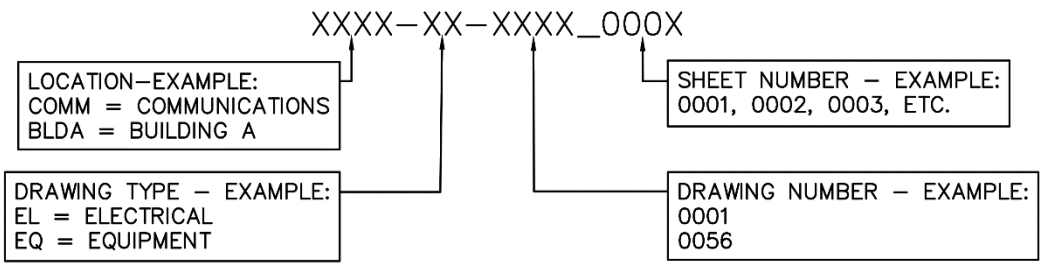
1.2 Meridian Drawing Number Format Defined

Chugach's CAD Services staff issue drawing numbers for substations, transmission lines, sub transmission lines, power plants, communication lines, communication sites, and headquarter buildings via the responsible Chugach project engineer, using the format described below. The format of Meridian drawing numbers, title blocks, and attributes dictate functions within Meridian and the drawing file location.

Chugach's CAD Services is the **sole source** provider of drawing numbers. There are **no exceptions** to this numbering process. All drawing numbers in the initial set up for the project (the "start-up package") shall be distributed by Chugach's CAD Services staff.

Examples of drawing numbers are COMM-EL-0001_0001 and BLDA-EQ-0002_0001.

Figure 1 CAD Meridian Drawing Number Format



Meridian generates both drawing numbers and CAD numbers.

1. Meridian Drawing number: LOCATION CODE-DWG TYPE CODE-NUMBER
   Example COMM-EL-0001
2. Meridian CAD number: LOCATION CODE-DWG TYPE CODE-NUMBER _Sheet number
   Example COMM-EL-0001_0001

1.3 Meridian Drawing Title Block Lines 1 to 5

A. Lines 1 and 2 of the Title Block are part of the Meridian drawing database attributes populated by Meridian and must meet the required Meridian *field-path* format. Lines 1 and 2 of the Title Block are exactly the same as the Meridian database attribute.

B. Chugach's CAD Services staff can provide the correct Meridian information format for the first two lines, which are dependent on the Meridian Database requirements.
C. Lines 3–5 describe the contents of the drawing as determined by the Engineer, except for transmission and sub transmission drawings, where Line 3 provides the Meridian folder name.

Figure 2 Meridian Drawing Title Block for Substations

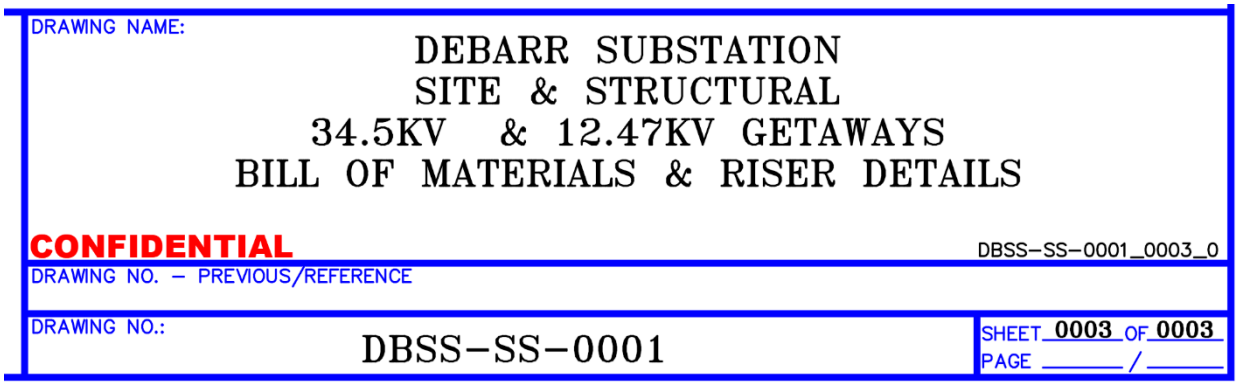
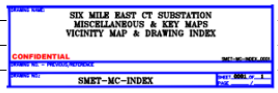


Figure 3 Meridian Title Block Detail for Substations

LINE 1: MERIDIAN GENERATED FACILITY NAME CAD STAFF WILL PROVIDE THE NAME
LINE 2: MERIDIAN FOLDER NAME CAD STAFF WILL PROVIDE THE NAME
LINE 3, 4 & 5: USER DEFINED



TITLE BLOCK LINE 1 (LOCATION & FACILITY TYPE)	**SUBSTATION CODE FOR DWG #**	**TITLE BLOCK LINE 2** (DRAWING TYPE)	**DWG TYPE CODE**	**DESCRIPTION OF CONTENT**	**MERIDIAN DRAWING NUMBER**	**MERIDIAN CADD NAME**
EXAMPLE MERIDIAN GENERATED FACILITY NAME (CAD Staff will provide exact name)	**EXAMPLE** (CAD Staff will provide exact code)	**MERIDIAN DRAWING TYPE** (CAD Staff will provide exact name)	**DWG # CODE**	**GENERAL INFORMATION**	**EXAMPLE**	**DRAWING NUMBER WITH SHEET # EXAMPLE**
DEBARR SUBSTATION	**DBSS**	SITE & STRUCTURAL	**SS**	Site drawings, Conduit Detail;	DBSS-SS-2005	DBSS-SS-2005_0001
EKLUTNA GENERATION STATION	**EGSS**	1 & 3 LINE	**OL**	One Line & Three Line drawings (Also see ELECTRICAL folders)	EGSS-OL-0001	EGSS-OL-0001_0001
DEBARR SUBSTATION	**DBSS**	ELECTRICAL	**EL**	SUB FOLDERS: INSIDE SCHEMATIC; INSIDE WIRING DIAGRAM; ONE LINE DIAGRAM - NETWORK TOPOLOGY; OTHER STATION AUXILLIARY DRAWINGS; OTHERS; OUTSIDE SCHEMATIC; OUTSIDE WIRING DIAGRAM; PANEL ELEVATIONS (INSIDE); SWITCHING DIAGRAMS; THREE LINE DIAGRAMS;	DBSS-EL-SI-0001	DBSS-EL-SI-0001_0001
HOPE SUBSTATION	**HPSS**	ENVIRONMENTAL	**EN**	Environmental drawings; Spill Plan drawings; Contaminated soils drawings;	HPSS-EN-SP01	HPSS-EN-SP01_0001
HUFFMAN SUBSTATION	**HFSS**	EQUIPMENT	**EQ**	Manufacture drawings wrapped with CEA Title Block;	HFSS-EQ-0003	HFSS-EQ-0003_0001
BELUGA SUBSTATION	**BGSS**	TRANSPORT	**TP**		BGSS-TP-0002	BGSS-TP-0002_0001
BELUGA SUBSTATION	**BGSS**	MISCELLANEOUS & KEY MAPS INDEX	**MC**	**INDEX:** Cover Sheet with Vicinity Map on the left and drawing index on the right; Vicinity Map is only on sheet _0001; Limit to (2) index per sheet;	BGSS-MC-INDEX	BGSS-MC-INDEX_0001
BELUGA SUBSTATION	**BGSS**	MISCELLANEOUS & KEY MAPS INFORMAITON	**MC**	**INFO:** (Information) General Information; Legend, Cable & Wire Standard; Terminal Block Standard;	BGSS-MC-INFO	BGSS-MC-INFO_0001
BELUGA SUBSTATION	**BGSS**	SURVEY & TOPO	**SV**	Survey drawings; Survey with aerial photo in pdf format;	BGSS-SV-0001	BGSS-SV-0001_0001
		SWITCHING	**SW**			
		PBX	**PX**			
		RADIO	**RO**			
		SCADA	**SC**			

Figure 4 Meridian Drawing Title Block for Transmission and Sub Transmission

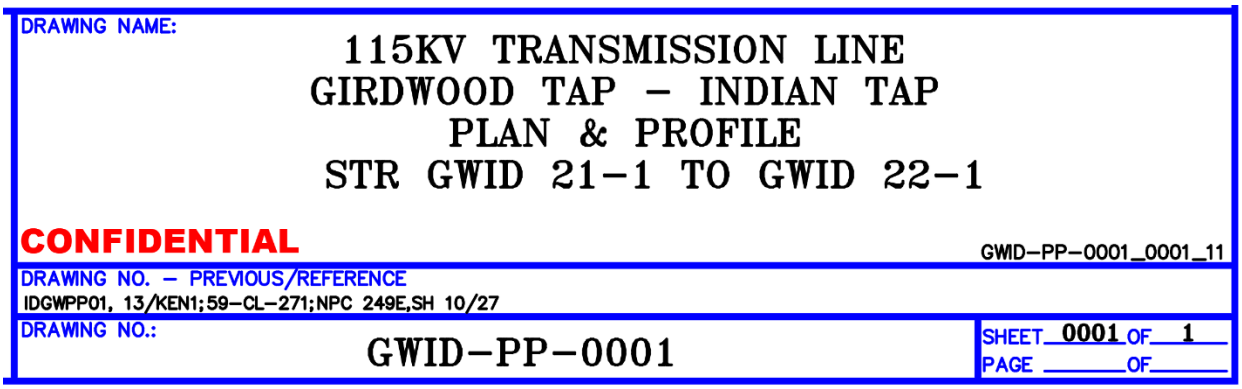


Figure 5 Meridian Title Block Detail for Transmission and Sub Transmission

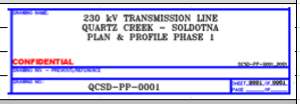
MERIDIAN DETAIL - TRANSMISSION AND SUBTRANSMISSION

LINE 1: CAD STAFF WILL PROVIDE THE NAME EXAMPLE: 230kV TRANSMISSION LINE

LINE 2: CAD STAFF WILL PROVIDE THE NAME EXAMPLE: QUARTZ CREEK - SOLDOTNA

LINE 3: DRAWING TYPE

LINE 4 & 5: USER DEFINED NOTE: Transmission Strucutures require line code before number. Examples: QCSD 1-1 QCSD 1-2



TITLE BLOCK LINE 1 (FACILITY TYPE)	TITLE BLOCK LINE 2 (LOCATION)	LINE CODE FOR DWG #	TITLE BLOCK LINE 3	DWG TYPE CODE	DESCRIPTION	MERIDIAN DRAWING NUMBER	MERIDIAN CADD NAME
kV and FOLDER NAME (CAD Staff will provide exact name)	**LINE Location Name EXAMPLE** (CAD Staff will provide exact name)	**LINE LOC EXAMPLE**	**DRAWING TYPE**	**DWG # CODE**	**GENERAL INFORMATION**	**DRAWING NUMBER EXAMPLE**	**EXAMPLE DRAWING NUMBER WITH SHEET # EXAMPLE**
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	AERIAL PHOTOS	**AP**	Most photos are kept in the Engineering project file but a photo in a Meridian title block could be imported.	QCSD-AP-0001	QCSD-AP-0001_0001
115kV TRANSMISSION LINE	HOPE TAP - PORTAGE TAP	**HPPT**	CATENARY CURVE & STRINGING TABLES	**CS**	SAG Table; Chart;	QCSD-CS-0001	QCSD-CS-0001_0001
138kV TRANSMISSION LINE	GRAVEL JCT - 100TH JCT	**GJHJ**	ENVIRONMENTAL	**EN**	Environmental drawings; Contaminated soils drawings;	QCSD-EN-0001	QCSD-EN-0001_0001
69kV TRANSMISSION LINE	COOPER LAKE - QUARTZ CREEK	**CPQC**	EQUIPMENT	**EQ**	Manufacture drawings; Steel drawings;	QCSD-EQ-0001	QCSD-EQ-0001_0001
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	FIBER OPTIC	**FO**	Telecom/Communication fiber optic drawings	QCSD-FO-0001	QCSD-FO-0001_0001
34.5kV SUBTRANSMISSION LINE	KLATT - 94TH JCT	**KLSJ**	GEOTECHNICAL & SOILS	**GS**	Geotechnical & Soils drawings	QCSD-GS-0001	QCSD-GS-0001_0001
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	MISCELLANEOUS & KEY MAPS INDEX	**MC**	**INDEX:** Cover Sheet with Vicinity Map on the left and drawing index on the right; Vicinity Map is only on sheet _0001; On additional sheets limit to (2) index tables per sheet;	QCSD-MC-INDEX	QCSD-MC-INDEX_0001 QCSD-MC-INDEX_0002
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	MISCELLANEOUS & KEY MAPS	**MC**	**INFO:** (Information) General Information; Legend, Cable & Wire Standard; Terminal Block Standard;	QCSD-MC-INFO	QCSD-MC-INFO_0001 QCSD-MC-INFO_0002
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	PLAN & PROFILE	**PP**	Plan & profile; Staking Sheet;	QCSD-PP-0001	QCSD-PP-0001_0001
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	RIGHT OF WAY & PERMITS	**RW**	Right of Way drawings; Ownership Maps;	QCSD-RW-0001	QCSD-RW-0001_0001
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	STRUCTURAL & ASSEMBLY	**SS**	Structure Description Table; Structure Drawings; Structure Material List; Loading Tables;	QCSD-SS-0001	QCSD-SS-0001_0001
230kV TRANSMISSION LINE	QUARTZ CREEK - SOLDOTNA	**QCSD**	SURVEY & TOPO	**SV**	Survey drawings; Survey with aerial photo in pdf format;	QCSD-SV-0001	QCSD-SV-0001_0001

1.4 Meridian Drawing Number (New and Existing)

New drawings will conform to these drafting standards and existing Meridian drawings will be updated to these drafting standards as directed by Engineering and/or appropriate Chugach representative.

1.4.1 Drawing Number – New Drawing

A. CAD staff will create Meridian Title Blocks in MASTERS, drawing numbers will be assigned, drawings will be sent to Meridian projects, and CAD staff will provide the drawing to Chugach's Engineer to forward to the design contractor when applicable.
B. The provided drawing template is recognized by our drawing database (Meridian) and will contain standard Chugach layers, line types, colors, etc.

1.4.2 Drawing Number - Existing Drawings

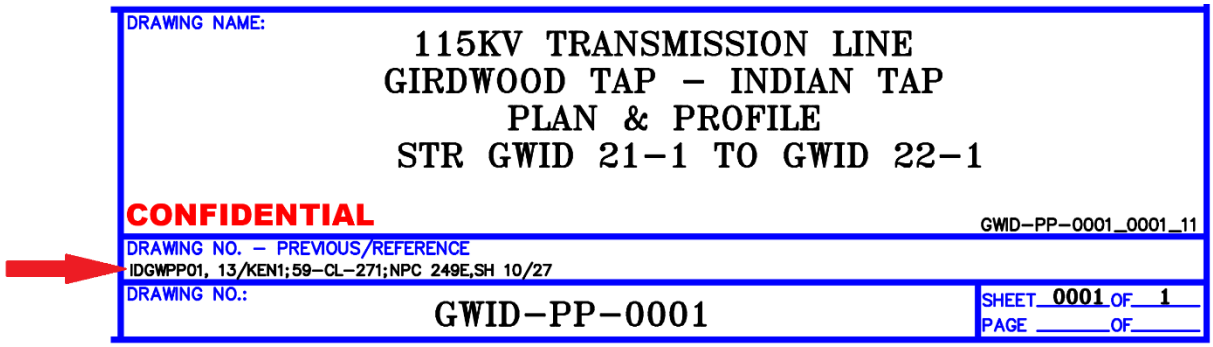
CAD staff will check out and send existing Meridian drawings to Meridian PROJECTS as directed by the Engineer and provide the drawing to Chugach's Engineer to forward to the design contractor when applicable.

1.4.3 Drawing Number – Previous/Reference field

The Drawing Number – Previous/Reference area of the drawing's title block is to be completed for each drawing. The following choices are available:

A. **New drawing**: Include the word "NEW" and date when the drawing is new.
B. **Existing drawing number change:** Add the old number if the drawing is being re-numbered.
C. **Manufacturer drawing number:** Often a manufacturer's number or an A/E firm's project numbers.
D. **Separate Numbers** with a comma, then space.

Figure 6 Example of Existing drawing number



1.5 Meridian Drawing Title Block General Notes

Meridian recognized title block resides in LAYOUT (Title block in Layout Space, not in Model Space).

1.5.1 Paper Size

A. Use Meridian recognized Title Blocks 30"x42" (outside design contractors will be provided the correct title blocks and drawing numbers).
B. Half Size plot at 15"x21"; outside design contractors will also use 15"x21" for half size.
C. MANUFACTURER Drawings are 22"x 34" (D Size) so they easily fit within Chugach 30"x42" title block.

1.5.2 Sheet Number and Page Number Attribute

A. Meridian Sheet Number: “SHEET___OF___” at the bottom right of the Title Block is the sheet number attribute in Meridian MASTERS.
B. Project Page Number: “PAGE____/____” at the bottom right of the Title Block is the page number of the project design set of drawings (this will be removed in the as-built process).

1.5.3 Table and Note Location

In general, tables and notes will be on the right of the layout, similar to the National CAD Standards (NCS):

A. Vertically aligned on the right side of Layout
B. Tables at the top right corner and notes below

2. Project Design Drawing Set Organization

2.1 Overview Notes

A. Project drawing organization will be similar to the Chugach Meridian Drawing Database file folder organization and used by both outside design contractors and in house design.
B. DEMOLITION drawings will be at the end of the package, organized the same and using 7000 numbers (e.g., 7001, 7002, 7003, etc.). Each Demolition drawing will be "Sheet 1 of 1". *(See Project Design Demolition Drawings)*
C. Temporary drawings (e.g., SHOO-FLY drawings that will be archived) will start with 7500, 7501, etc. and will be "Sheet 1 of 1".

2.2 Organization

2.2.1 Organization For Project Design of Substations

1) MC INDEX
2) MC INFO (with subsets)
3) EL ELECTRICAL (with subsets)
4) EQ EQUIPMENT ("Sheet _ of _" rather than new drawing numbers)
5) SS SITE & STRUCTURAL
6) SV SURVEY ("Sheet _ of _" rather than new drawing numbers)
7) DEMOLITION at end of package (use 7000 numbers)
8) Temporary Drawings at end of package (use 7500 numbers)

2.2.2 Organization For Project Design of Transmission/Sub Transmission Lines

If more than one Junction Line Section Location is in the project, keep drawings together by Junction Line. For example, if HNSH and HNMJ PLAN & PROFILE drawings are in the project design and the drawings are PLAN & PROFILE, both Junction Line Sections are organized in Plan & Profile (PP) Organization.

1) MC INDEX
2) MC INFO (with subsets)
3) PP PLAN & PROFILE
4) SS STRUCTURAL & ASSEMBLY
5) EQ EQUIPMENT ("Sheet _ of _" rather than new drawing numbers)
6) RW RIGHT OF WAY
7) SV SURVEY ("Sheet _ of _" rather than new drawing numbers)
8) DEMOLITION DRAWINGS at end of package (use 7000 numbers)
9) Temporary Drawings at end of package (use 7500 numbers)

2.2.3 Meridian Title Block Wrap for Manufacturer and Survey Drawings

A. When wrapping Chugach title block around a Manufacturer title block drawing or Survey title block drawing, the manufacturer and surveyor title block will remain in the drawing.
B. If edits on the original drawing are needed, the manufacturer title block will be removed and the drawing will be changed to the correct category. In general, Chugach doesn't edit a survey drawing.

EXAMPLES:

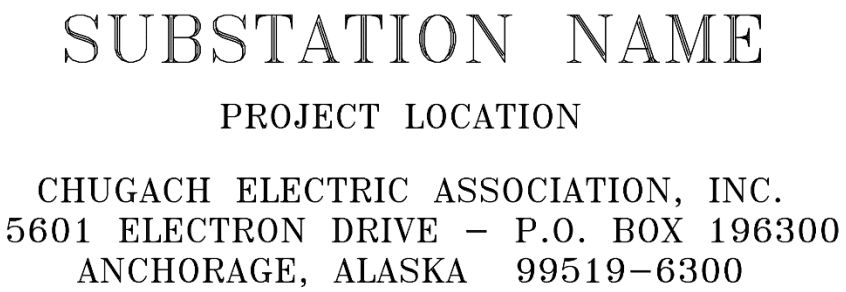
- EQUIPMENT (EQ) Chugach keeps the manufacturer title block wrapped in Chugach title block as Chugach will not change the original equipment record drawing. In general, any required changes are accomplished via copying the original and pasting to an ELECTRICAL (EL) title block or a SITE & STRUCTURAL (SS) title block.
- ELECTRICAL (EL) Chugach does not keep the manufacturer vendor's title block because Chugach has copied with the intention to change the drawing, making it a new drawing.
- SURVEY (SV) Chugach keeps the surveyor's title block because Chugach does not change a signed survey record drawing.

3. Miscellaneous & Key Maps INDEX

3.1 MC Index Sheet 1 Title Format for Substation Projects

A. Center TOP – Text ROMANT – ALL CAPS
B. Line 1: CHUGACH ELECTRIC ASSOCIATION, INC.
C. Line 2: SUBSTATION NAME
D. Line 3: SUBSTATION ADDRESS
E. Line 4: OFFICIAL PROJECT NAME
F. Line 5: WORK ORDER NUMBER
G. Sheet INDEX note: TITLES are only on Sheet 1

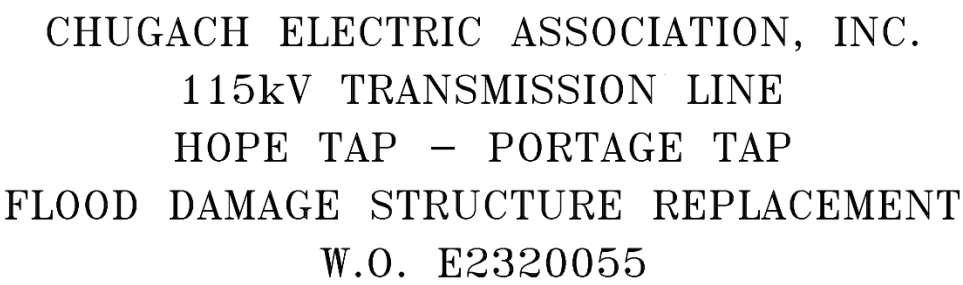
Figure 7 Example of MC Index Sheet 1 for a Substation Project



3.2 MC Index Sheet 1 Title Format for Transmission / Sub Transmission Projects

A. Center TOP – Text ROMANT – ALL CAPS (except kV)
B. Line 1: CHUGACH ELECTRIC ASSOCIATION, INC.
C. Line 2: ###kV TRANSMISSION LINE
   - Example 115kV TRANSMISSION LINE
   - Example 34.5kV SUBTRANSMISSION LINE
D. Line 3: JUNCTION NAME FROM MERIDIAN (exactly as in Meridian)
   - Example HOPE TAP – PORTAGE TAP
E. Line 4: OFFICIAL PROJECT NAME
F. Line 5: WORK ORDER NUMBER

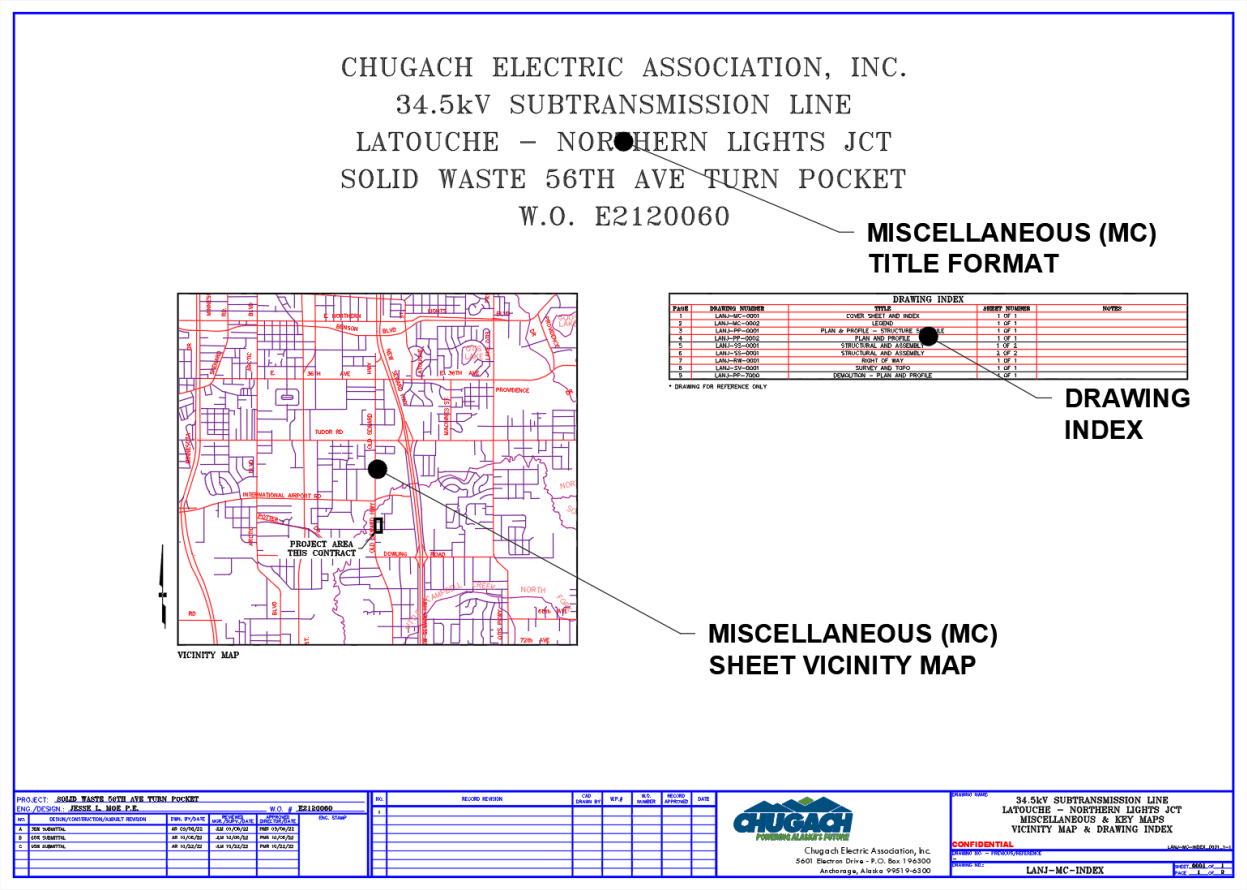
Figure 8 Example of MC Index Sheet 1 for a Transmission/Sub Transmission Project



3.3 MC Index Sheet 1 Layout Vicinity Map and Drawing Index

A. Example PWSS-MC-INDEX_0001 is used for Vicinity Map and Drawing Index
B. Vicinity Map is on the left and Drawing Index is on the right
C. Vicinity Map is only on Sheet 1.
D. If there is more than one Index table, continue the Index table on the second sheet (without a Vicinity Map).
E. Up to 2 Index blocks per sheet starting at Sheet 2.
F. Index will include *Page of Page* and *Notes*.
G. Titles only on Sheet 1 (no Titles on additional sheets)

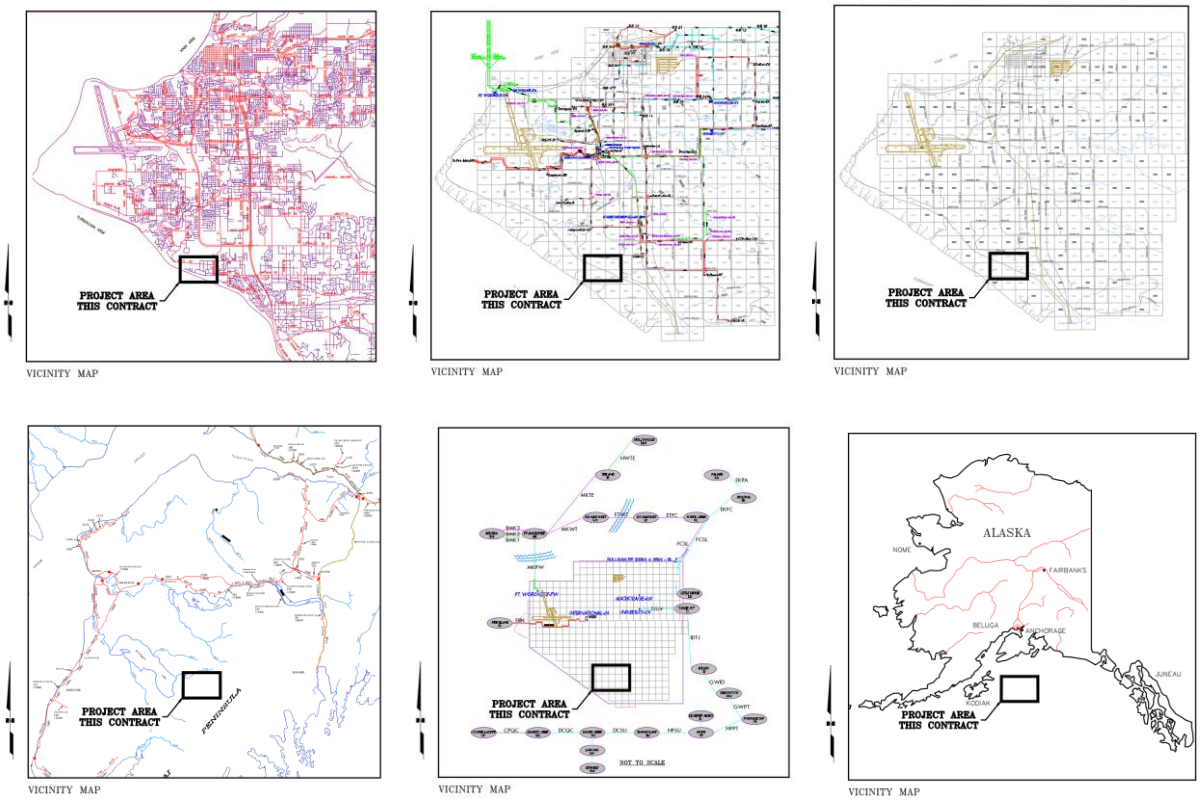
Figure 9 Example Miscellaneous & Key Maps (MC) Index



3.4 MC Index Vicinity Map Images

A. Vicinity Map is on the left, Drawing Index is on the right.
B. Pick a Vicinity Map (six are available: 3 for the Anchorage Bowl and 3 outside of Anchorage) and set the scale per the Engineer's/Manager's direction.

Figure 10 Examples of Vicinity Maps



A. In the Vicinity Map, use North Arrow color black.
B. Put a black border around the Vicinity Map.
C. Add a black box on the Vicinity Map showing the Project site location.
D. Note "PROJECT AREA THIS CONTRACT" with an arrow pointing to same using the preferred format.
E. A Vicinity Map for transmission and sub transmission lines should show both Junction Points.

Figure 11 Approved Vicinity map format.

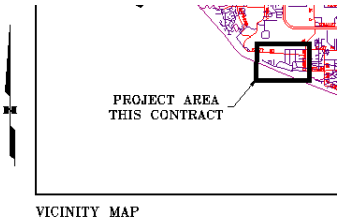


Figure 12 MC Index Drawing Table

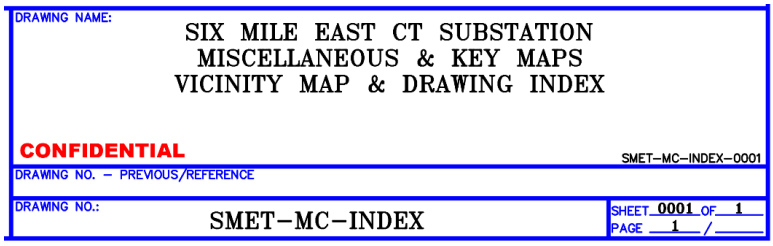
DRAWING INDEX				
PAGE	**DRAWING NUMBER**	**SHEET NUMBER**	**TITLE**	**NOTES**
1	XXXX-MC-0001	1 OF 1	VICINITY MAP & DRAWING INDEX	
2	XXXX-0L-0001	1 OF 1		
3	XXXX-EL-0001	1 OF 1		
4	XXXX-ET-0001	1 OF 1		
5	XXXX-EQ-0001	1 OF 1		
6	XXXX-FO-0001	1 OF 1		
7	XXXX-PX-0001	1 OF 1		
8	XXXX-PP-0001	1 OF 1		
9	XXXX-RO-0001			
10	XXXX-SC-0001			
11	XXXX-SS-0001			
12	XXXX-SK-0001			
13	XXXX-SV-0001			
14	XXXX-SW-0001			
15	XXXX-TP-0001			
16				
17				
18				
19				
20				

*** DRAWING FOR REFERENCE ONLY**

3.5 MC Index Meridian Title Block Example for Substations Line 1 To 5

A. SUBSTATION Title Block Line 1: MERIDIAN GENERATED SUBSTATION NAME
B. SUBSTATION Title Block Line 2: MISCELLANEOUS & KEY MAPS
C. SUBSTATION Title Block Line 3: VICINITY MAP & DRAWING INDEX
D. Lines 4 and 5 are available for additional information.

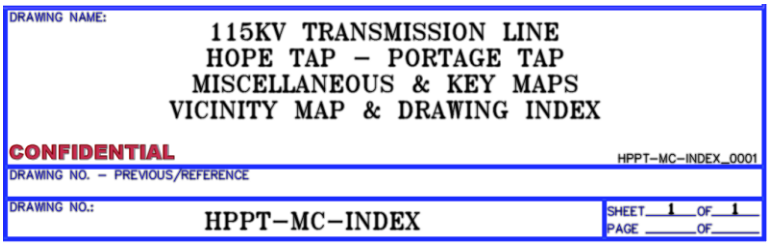
Figure 13 Example of MC Index Meridian Title Block for a Substation Project



3.6 MC Index Title Block Example for Transmission/Sub Transmission Projects

A. TRANS/SUB TRANS Title Block Line 1: XXXKV TRANSMISSION LINE
B. TRANS/SUB TRANS Title Block Line 2: MERIDIAN JUCTION NAMES (exact Meridian format)
C. TRANS/SUB TRANS Title Block Line 3: MISCELLANEOUS & KEY MAPS
D. TRANS/SUB TRANS Title Block Line 4: VICINITY MAP & DRAWING INDEX
E. Line 5 is available for additional information.

Figure 14 Example of MC Index Title Block for a Transmission/Sub Transmission Project



4. Miscellaneous & Key Maps INFORMATION (INFO)

Figure 15 Example of MC Info XXSS-MC-INFO_0001 Sheet 1 Title Format (top center of sheet)

SUBSTATION NAME

PROJECT LOCATION

CHUGACH ELECTRIC ASSOCIATION, INC.
5601 ELECTRON DRIVE – P.O. BOX 196300
ANCHORAGE, ALASKA 99519-6300

Figure 16 Example of MC Info XXSS-MC-INFO_0002 Sheet 2 Title Format (top center of sheet)

SUBSTATION NAME

CABLE AND WIRE STANDARD

4.1 MC Information (Info) Title Block Example for Substation Projects

A. SUBSTATION Title Block Line 1: MERIDIAN GENERATED SUBSTATION NAME
B. SUBSTATION Title Block Line 2: MISCELLANEOUS & KEY MAPS
C. SUBSTATION Title Block Line 3: GENERAL INFORMATION
D. SUBSTATION Title Block Line 4: Specific Subset Information:
    1. LEGEND
    2. CABLE AND WIRE STANDARD
    3. TERMINAL BLOCK STANDARD
E. Line 5 is available for further information.

Figure 17 MC Info Title Block Example for a Substation Project

DRAWING NAME:
SIX MILE EAST CT SUBSTATION
MISCELLANEOUS & KEY MAPS
GENERAL INFORMATION
CABLE AND WIRE STANDARD

CONFIDENTIAL

SMET-MC-INFO_0002

DRAWING NO. – PREVIOUS/REFERENCE

DRAWING NO.: SMET-MC-INFO

SHEET 0002 OF 2
PAGE 3 /

4.2 MC Information (Info) Title Block Example for Transmission/Sub Transmission Projects (Under Development)

5. Project Design Demolition Drawings

5.1 Demolition Drawing Organization and Numbers

A. Demolition drawings go at the end of the Design drawing package.
B. Demolition drawings use 7000 numbers.
C. Examples: GJHJ-SS-7000, GJHJ-SS-7001, GJHJ-SS-7002 etc.
D. Each drawing will be "Sheet 1 of 1”.

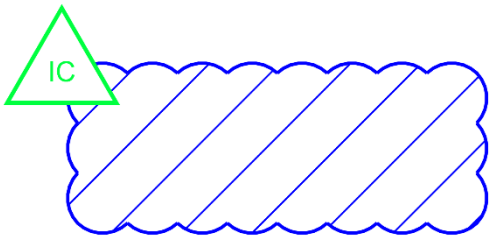
5.2 Demolition Drawing Title Block Attributes

A. The title block will contain the word DEMOLITION in Line 3, 4 or 5.
B. New Demolition title blocks are generated in Meridian Masters, sent to Meridian Projects, and drawn in Meridian Projects.

5.3 Demolition Drawing Cloud and Hatch

A. Clouds and revision numbers are not removed from Demolition drawings during the as-built process. The cloud and revision number will remain on the drawing in Meridian Archives.
B. Adjust the cloud tight to demolition objects.
C. Text may or may not be included in cloud.
D. The demolition cloud and hatch will be blue and Revision Triangle and number will be green 80.

Figure 18 Example of Demolition cloud and Revision triangle.



E. The demolition block will be green 80 and reside in the lower right of the layout.

Figure 19 Example of Demolition block

6. Sheet Layout

6.1 Sheet Layout Default Example

Figure 20 Example and Detail of Chugach Meridian Title Block

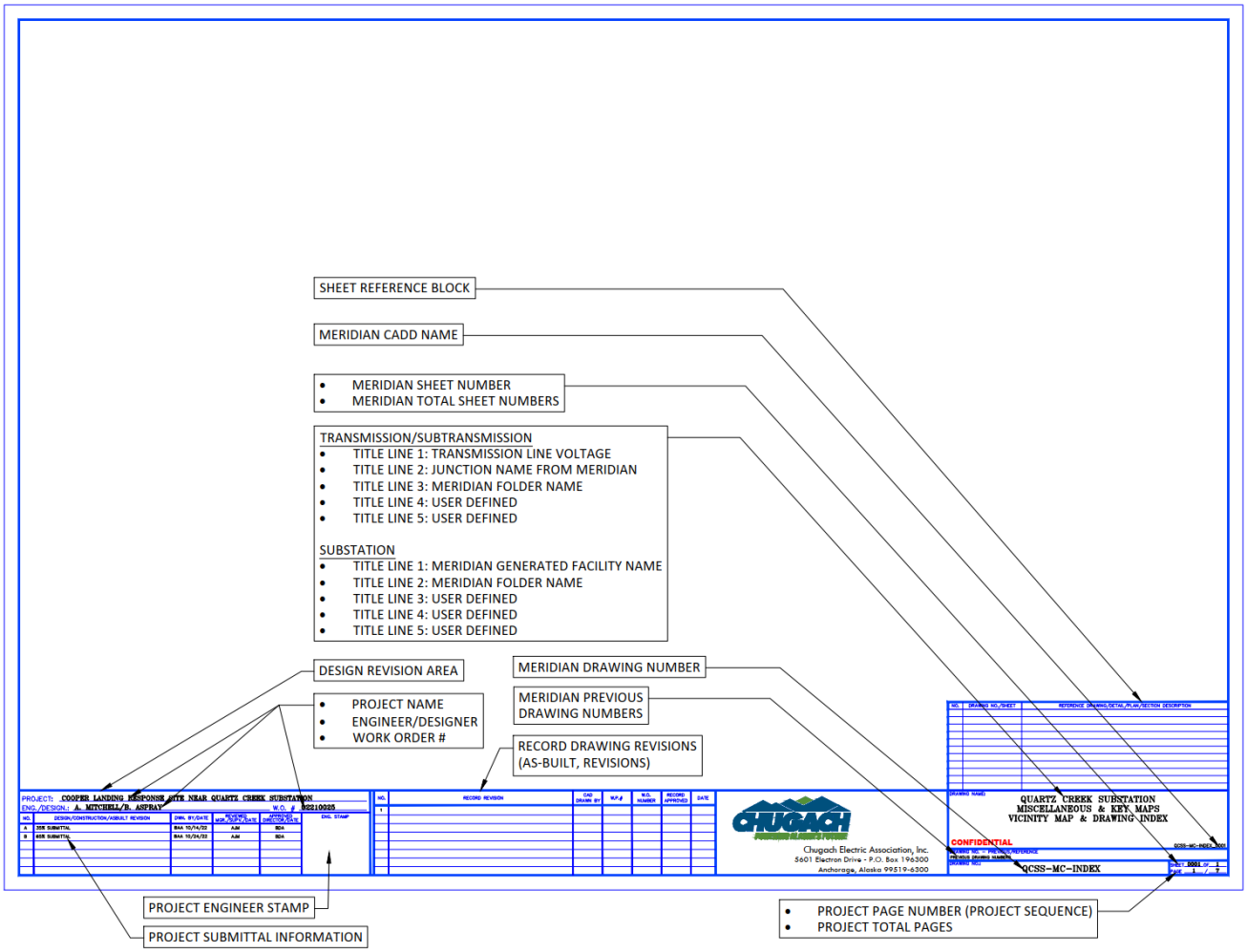
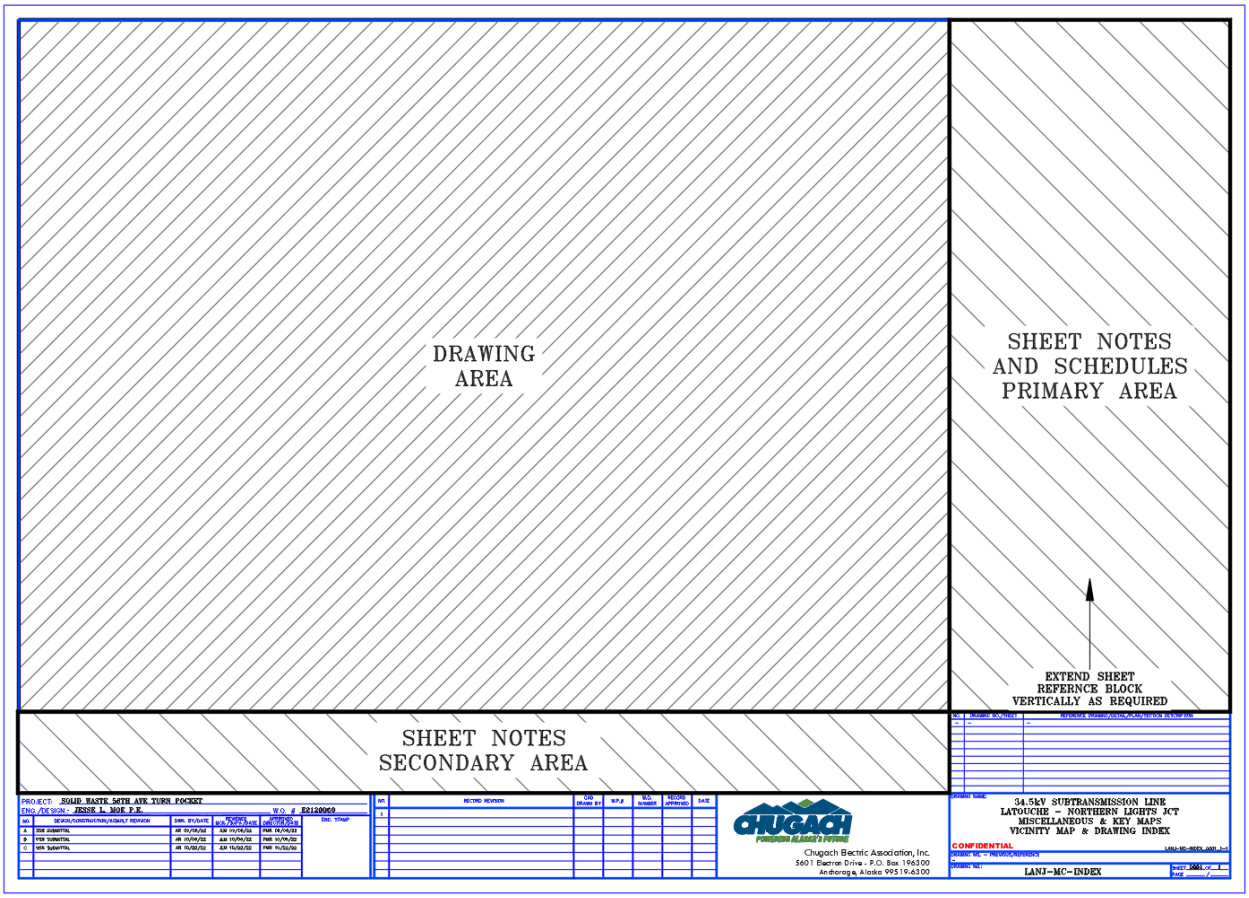


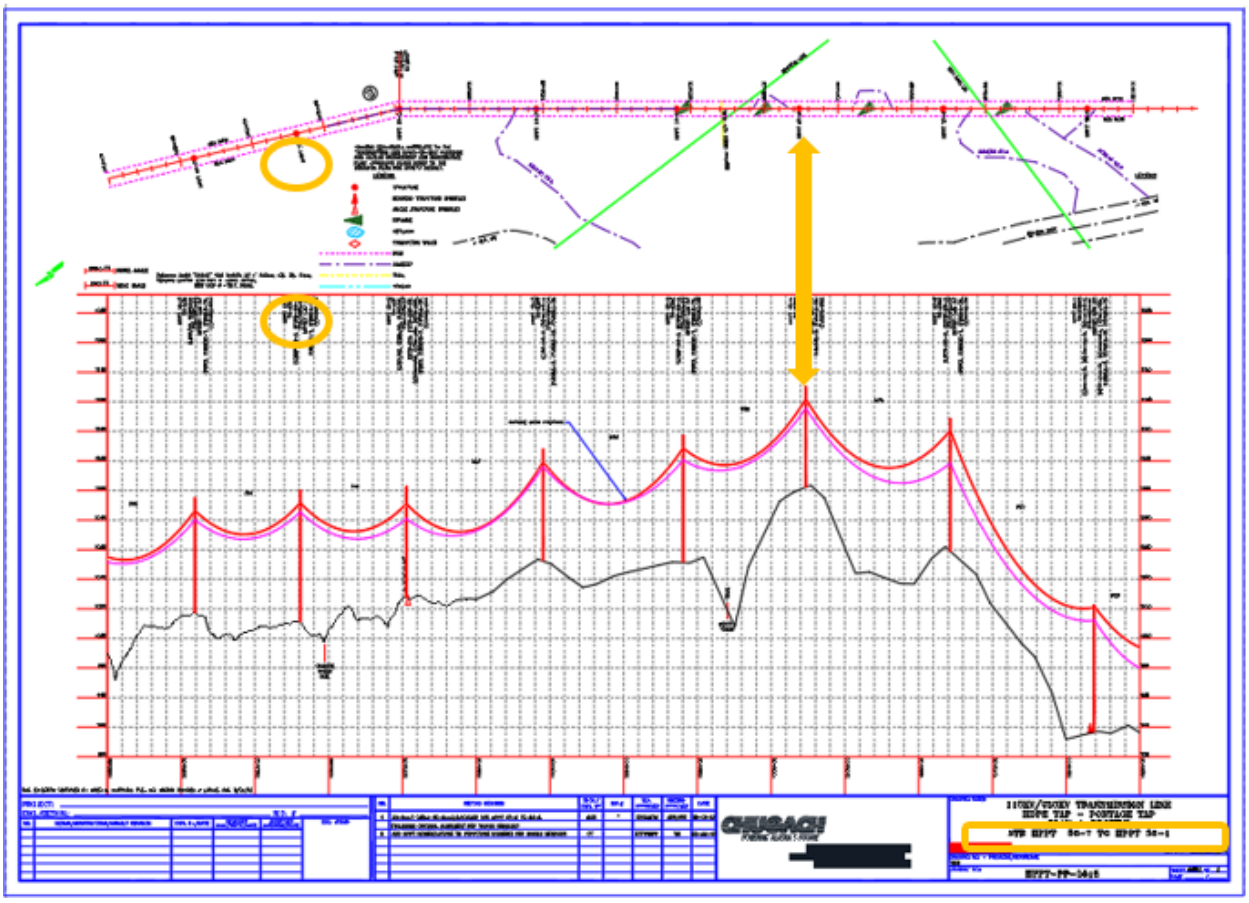
Figure 21 Example of Sheet Layout



6.2 Sheet Layout for Plan and Profile Drawings

A. Plan and Profile pole structures will line up on all sheets.
B. Chugach transmission and sub transmission four-digit alpha code will be added to each structure number on the Plan and the Profile (e.g., HPPT 56-7).
C. From and To structure note(s) will be added to the title block Line 4 or Line 5 (e.g., STR HPPT 56-7 TO HPPT 58-1).

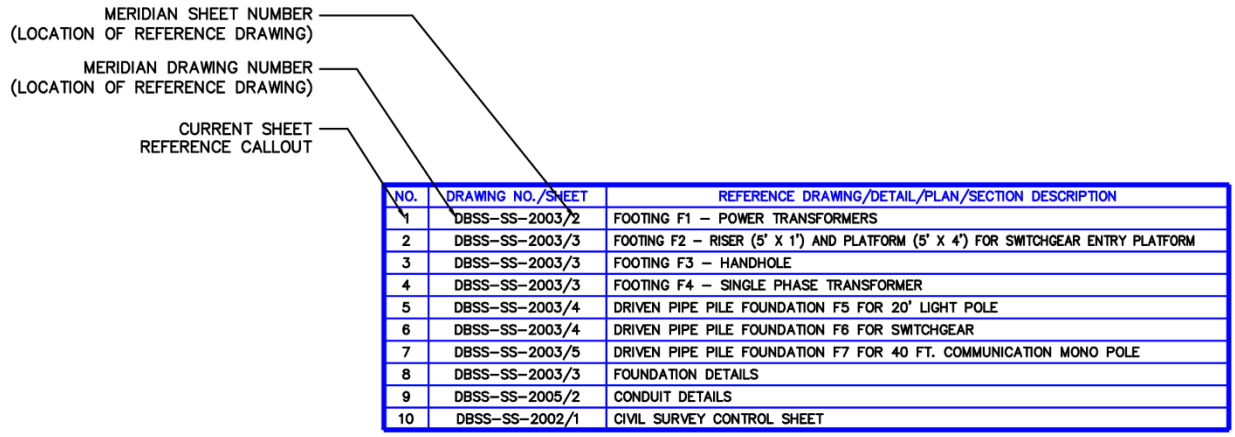
Figure 22 Example of Plan and Profile Drawing Layout



6.3 Sheet Layout for Reference Block

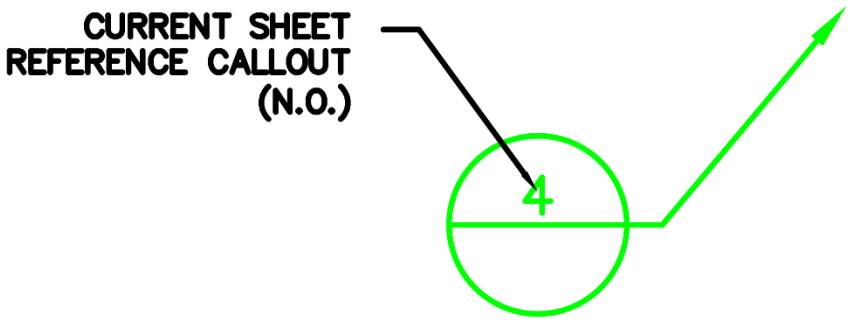
The Reference Block is located on the bottom right (above the Title block attributes) and is used to define drawings or sheet reference callouts. Drawing number for this reference and additional information are listed here.

Figure 23 Example of Sheet Reference Block



NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	DBSS-SS-2003/2	FOOTING F1 – POWER TRANSFORMERS
2	DBSS-SS-2003/3	FOOTING F2 – RISER (5' X 1') AND PLATFORM (5' X 4') FOR SWITCHGEAR ENTRY PLATFORM
3	DBSS-SS-2003/3	FOOTING F3 – HANDHOLE
4	DBSS-SS-2003/3	FOOTING F4 – SINGLE PHASE TRANSFORMER
5	DBSS-SS-2003/4	DRIVEN PIPE PILE FOUNDATION F5 FOR 20' LIGHT POLE
6	DBSS-SS-2003/4	DRIVEN PIPE PILE FOUNDATION F6 FOR SWITCHGEAR
7	DBSS-SS-2003/5	DRIVEN PIPE PILE FOUNDATION F7 FOR 40 FT. COMMUNICATION MONO POLE
8	DBSS-SS-2003/3	FOUNDATION DETAILS
9	DBSS-SS-2005/2	CONDUIT DETAILS
10	DBSS-SS-2002/1	CIVIL SURVEY CONTROL SHEET

Figure 24 Example of Current Reference Sheet Callout



6.3.1 Sheet Layout Reference Detail

Meridian recognized title blocks include the Sheet Reference Block in the title block. For additional space in the *Reference* block drawing list, extend the *REFERENCE* table toward the top of the layout.

6.4 Sheet Layout Design Revision Area

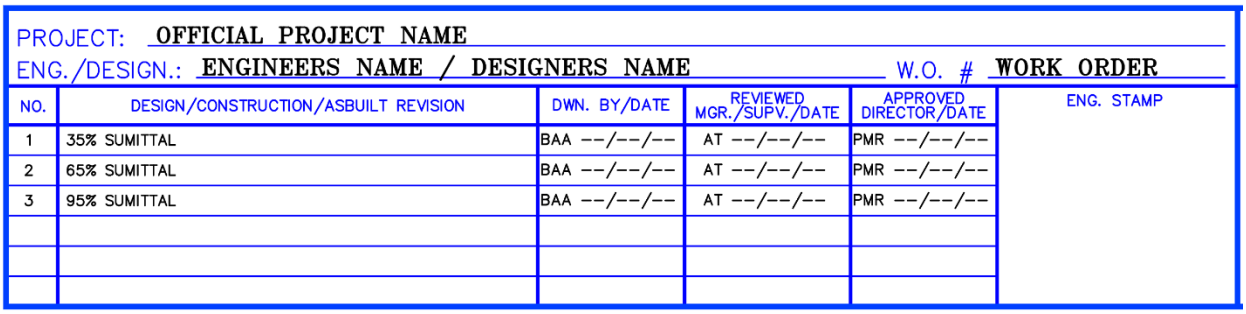
6.4.1 Overview

The DESIGN REVISION area is located at the bottom left of the Chugach Title Block. The information is project-specific and used during the design process. During the as-built of the project, the design information is removed and a revision note is added to the main revision area in the bottom center of the Chugach title block, along with the Project Work Order number.

6.4.2 Design Revision Area Notes and Examples

Project Official Name and Work Order Number is in the PROJECT DESIGN REVISION AREA on the bottom left of the title block. The project area of the title block lists official submittals (i.e., 35%, 65%, 95%, IFC etc.). When design is Issued for Construction, the 35%, 65%, and 95% notes will be replaced by "ISSUED FOR CONSTRUCTION" and dates.

Figure 25 Example of Design Revision Area showing Percent Complete



PROJECT: OFFICIAL PROJECT NAME
ENG./DESIGN.: ENGINEERS NAME / DESIGNERS NAME W.O. # WORK ORDER

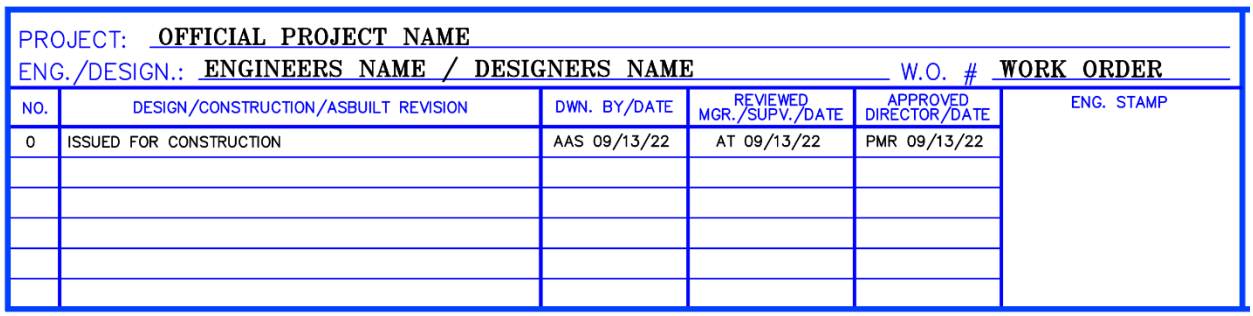
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE	ENG. STAMP
1	35% SUMITTAL	BAA --/--/--	AT --/--/--	PMR --/--/--	
2	65% SUMITTAL	BAA --/--/--	AT --/--/--	PMR --/--/--	
3	95% SUMITTAL	BAA --/--/--	AT --/--/--	PMR --/--/--	

A. Date formats: INITIALS DATE WITH SLASH AND LAST TWO DIGITS OF YEAR.
    a. Examples: XXX MM/DD/YY — AAS 09/13/22
B. PROJECT REVISION DESIGN AREA DWN BY / DATE is for CAD staff initials or outside contractor's initials and date sent to Chugach Engineer (update the date with every revision).
C. When drawings are sent to an outside contractor, CAD Staff will leave placeholders in the Design Revision area of the title blocks.

Table 1 Design Revision Area Design Project Signing Authority

Design Project Signing Authority		
Design Block Column	**Chugach In House Design**	**Outside Contractor**
Drawn By/Date	Chugach CAD Drafter	Outside Contractor CAD Drafter
Reviewed Mgr/Supv/Date	Chugach Design Engineer	Outside Contractor Engineer
Approved Director/Date	Chugach Manager of Design Engineer	Outside Contractor Engineer's Supervisor or None

Figure 26 Example of Design Revision Area showing Issued for Construction



PROJECT: OFFICIAL PROJECT NAME
ENG./DESIGN.: ENGINEERS NAME / DESIGNERS NAME W.O. # WORK ORDER

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN. BY/DATE	REVIEWED MGR./SUPV./DATE	APPROVED DIRECTOR/DATE	ENG. STAMP
0	ISSUED FOR CONSTRUCTION	AAS 09/13/22	AT 09/13/22	PMR 09/13/22	

6.4.3 Design / Issued for Construction

A. The Design Revision area is used during Design and Issued for Construction process only. When changes are made to the drawing during the DESIGN phase, capitalized alpha revisions are entered into the Revision Area.
B. When the design is Issued for Construction, all alpha revisions are removed. Revision 0 is for Issued for Construction and placed in the Revision Area. Any addenda shall be numbered 1, 2, 3, etc., with a brief description in the comments area.
C. If there is a handwritten signature or initials in the various columns of the revision block on the marked up original, the drafter shall add them to the electronic file (i.e., the name or initials and the date).
D. If a signed and dated Issued For Construction certification stamp is placed on the drawing, a note should be added that describes the certification to the notes area within the body of the drawing above the Design Revision area if possible. Examples:
    - Certified for construction of W/O# by (first name, middle initial, last name), (license number), (firm worked for), (date on stamp).
    - Design certified for mfg./fabrication of W/O# by (first name, middle initial, last name), (license number), (firm worked for), (date on stamp).
    - "As-built" of W/O# certified by (first name, middle initial, last name), (license number), (firm worked for), (date on stamp).
E. When the construction and as-built phases are complete, **only** the Certification notes from a PE will remain on the drawing and all others will be removed.
F. Clouds and Issued for Construction: When a drawing is Issued for Construction (Revision 0), all clouds where changes occurred shall remain visible. All capitalized alpha characters within triangles shall be changed to a 0 (zero).
G. Clouds used during Design process: During the Design phase all revisions shall be clouded on the drawing with a triangle and corresponding capitalized alpha revision on the correct cloud and revision layer.
H. When the Construction and As-Built phases are complete, all design revisions are deleted from the bottom left revision area and a summary revision shall be placed in the bottom center "Record Revision" area.

6.5 Sheet Layout General Notes

A. CAD Staff and outside contractors will balance the drawing at time of creation. "Balancing the drawing" is defined as balancing the paper space viewports within the title block layout. Not all viewports will reside on the left or right side, leaving a large empty space. They will be balanced in the paper space. The headings under the features will be lined up, use the same text size, underlined, and visually balanced.
B. Line up the callouts and titles within the layout horizontally and vertically.
C. Size text accordingly in layout.
D. Text is black.
E. If centered in Layout, use a measured center for the horizontal and a balanced vertical center.

7. Project Design Process by Outside Contractors

7.1 Communication with Chugach Engineer, Outside Contractors

A. The Chugach Engineer is the point of contact for an outside contractor.
B. CAD staff's point of contact is also the Chugach engineer, who will forward CAD-related documents to the outside contractor. CAD staff may interact with the outside contractor per special request from the Chugach Engineer, but this is not the standard procedure.

7.2 Project Design Meridian Title Block and Drawing Numbers

A. Chugach CAD staff will create Meridian recognized 30" X 42" title blocks in MASTERS to generate and secure Meridian recognized title blocks and drawing numbers for the project.
B. Chugach CAD staff will immediately assign the title blocks to the Meridian Projects folder.
C. A Project Start Up Package will be created by CAD staff and provided to the Chugach Engineer to forward to the outside contractor. A blank title block and starting drawing number for each Drawing Type that is used in the design of the project will be included in the Project Start Up Package. The provided drawing template is recognized by our Meridian drawing database and will contain standard Chugach layers, line types, colors, etc.
D. The title blocks will be used when beginning a new drawing by all departments, consulting firms and outside contractors (except for Distribution drawings).

7.3 Deliverables from Outside Contractor

7.3.1 Required CAD Software for Deliverables

A. Chugach Meridian currently uses AutoCAD MAP 3D 2023. All drawings delivered to Chugach will be in CAD MAP 3D 2023 for import into our Meridian drawing database.
B. Chugach will not be responsible to provide existing AutoCAD drawings in a release newer than AutoCAD MAP 3D 2023.
C. Chugach will only accept drawings in formats that are compatible with the Chugach Meridian Drawing database.

7.3.2 Deliverables General Requirements for the CAD drawing file

A. When work is delivered to Chugach, the CAD drawing file, X-References, images, excel files, blocks, .ctb plot style files, etc. shall be included in the drawing package.
B. All X-References shall be bound to the drawing when appropriate.
C. The Title Block shall reside in the Layout tab (not in Model space).
D. When appropriate, Model Space scale will be 1:1.
E. The mask portion of any text masking shall be on its own layer so it can be turned off, color yellow. No yellow shall be used in the drawing except for masking.
F. Projects that use a single electronic CAD file with multiple layout tabs as sheets in the set of drawings shall be limited to those that require match-lines, i.e., transmission line PLAN & PROFILE sheets.
G. Documentation shall be provided to Chugach listing new layers and blocks created during the project with a brief description of each.

7.3.3 Use Of Existing Rasterized Record Drawings within Projects

A. Existing rasterized record drawings are .pdf, .tiff, CALS Group IV format with a .gp4 file extension, or .gp4, etc. and usually have the Chugach title block wrapped around them.
B. All standards within this document that can be used with raster files shall be applied.
C. When edits are made to these raster record drawings, all files will be provided to Chugach.
D. When possible, rasterized drawings should be converted to CAD.

7.3.4 Blocks (Under Development)

7.3.5 Design Approval and IFC

A. At the time of the first submittal from an outside contractor to the Chugach Engineer (generally the 35% drawings), the CAD files will be included in the package. The CAD files will be provided by the Chugach Engineer to the CAD staff for review to verify compliance with this document.
B. Design Approval Initials, Date Initials, and date at 35%, 65%, 95% and IFC will be included in the design Revision Area for the CAD Tech and the Engineer. (See Sheet Layout Design Revision Area)
C. Outside Contractors will electronically transmit the approved IFC CAD drawing package and signed .pdf to the Chugach Engineer, who will add it to the Chugach Engineering Work Order files. IFC drawings will not be imported into Meridian.
D. When the project is complete, as-built CAD files, signed .pdf, and redlines will be provided to CAD Staff to import drawings into Meridian Projects, flash in Masters, then as-built and release the final Chugach Engineer-approved document from Meridian Projects to Meridian Masters.
E. Chugach CAD staff will provide support as needed for the project.

7.3.6 Completion of a Drawing

All drawings provided to Chugach shall end with the following parameters saved:

A. Purge all unnecessary items, including the removal of x-references that are not in use.
B. Verify all x-references and images are bound and included in package.
C. Before ending the drawing, 'ZOOM EXTENTS'.
D. Send Plot Style (.ctb file) with package.
E. Verify that **no yellow** is used in the drawing.

7.3.7 Chugach Spatial Standards for GIS

A. Drawings that show field facilities shall comply with the *CAD Spatial Data Standards* as appropriate.
B. The Datum and Coordinate System used by Chugach Electric is NAD 1983 Alaska State Plane Zone 4 FIPS (Federal Information Processing Standards) 5004 (US Survey Feet).
C. Select “AK83-4F” from the Coordinate System dialog box in CAD.
D. Please refer to the Survey Section of the *CAD/GIS Spatial Data Standards* for best practice when utilizing locations that can be surveyed.

8. Reserved

9. Reserved

10. Reserved

11. Reserved

12. Reserved

13. Reserved

14. Reserved

15. Reserved

16. Reserved

17. Drafting Conventions

17.1 Standard Redline Colors

The standard redline colors will be used:

RED ADD

GREEN DELETE

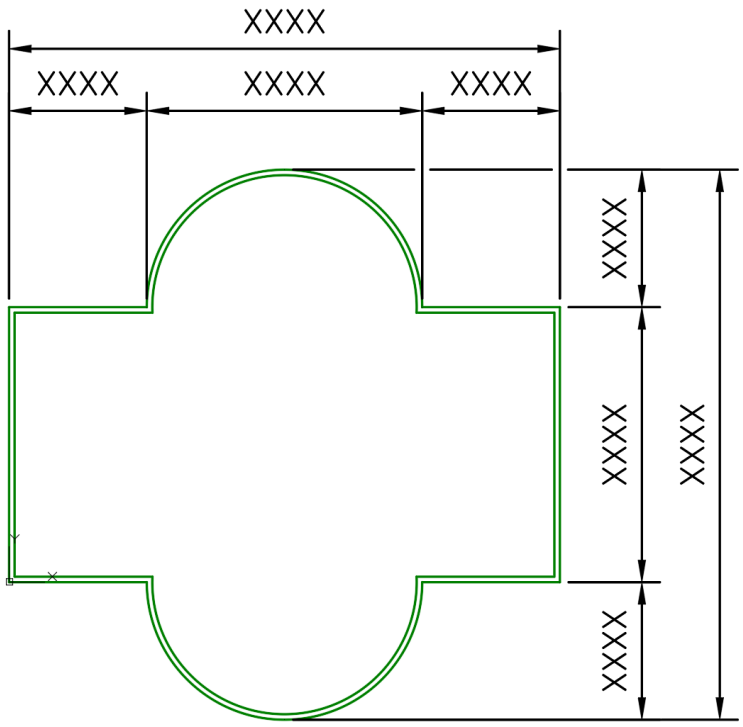
BLUE NOTES NOT TO BE INCLUDED IN DOCUMENT

17.2 Dimensions

Follow Chugach's general dimension standards:

A. Line up dimensions (when possible)
B. Size all dimension text the same.
C. Use properly sized arrows and leaders.
A. Use filled arrows. (Chugach uses the NCS Standard for dimensions with filled arrows).
B. Use equal spacing between dimension lines.
C. Show dimensions at the top of the line and/or right-side top of the line.

Figure 27 Example of Dimensions



17.3 Dimstyle Guidelines

Table 2 Chugach-Decimal Civil Dimstyle Guidelines

See Template Dimstyle: CEA-Decimal Civil	Guideline
DIM Arrow	Closed Filled
DIM Arrow Size	0.120
DIM Line Color, Linetype, Lineweight	By Layer
DIM EX Line Color, Linetype, Lineweight	By Layer
DIM Line Extension	0.1
DIM Offset from Origin	0.05
DIM Primary Units	Decimal
DIM Precision	0.0
DIM Scale	Annotative
DIM Text Color	By Layer
DIM Text Height	0.120
DIM Text Style	CEA-Standard

Table 3 Chugach Architectural Dimstyle Guidelines

See Template Dimstyle: CEA-Architectural	Guideline
DIM Arrow	Closed Filled
DIM Arrow Size	0.120
DIM Line Color, Linetype, Lineweight	By Layer
DIM EX Line Color, Linetype, Lineweight	By Layer
DIM Line Extension	0.1
DIM Offset from Origin	0.05
DIM Primary Units	Architectural
DIM Precision	1/8”
DIM Scale	Annotative
DIM Text Color	By Layer
DIM Text Height	0.120
DIM Text Style	CEA-Standard

17.4 Unit Of Measurement Guideline

A. Site plans and details: units shall be set to feet and decimal.
   1. Command: -DWGUNITS
   2. Drawing units <2> Feet
   3. Drawing unit display <2> Decimal
B. Building plans and details: units shall be set to inches and architectural.
   1. Command: -DWGUNITS
   2. Drawing units <1> Inches
   3. Drawing unit display <4> Architectural

17.5 Text

A. Text in general is black.
B. Titles are ROMANT color black.
C. Dates use a slash and the last two digits of the year (e.g., MM/DD/YY — 09/13/22)
D. Text Fonts: Use AutoCAD provided fonts (aka out of the box) or Windows-based fonts (aka out of the box). **Do not use** specialty fonts, specialty true type fonts, or specialty shape file fonts.
E. See the template for all default settings. The table below captures the prominent elements.

Table 4 Text Style Conventions

Text Styles	Font	Paper Text Height	Annotative	Oblique Angle
CE-Standard	SIMPLEX.SHX	-	NO	0
CE-Standard-Anno	SIMPLEX.SHX	.12	YES	0
CE-Standard-Anno-Bold	ROMANT.SHX	.12	YES	0
CE-Standard-Anno-Italic	SIMPLEX.SHX	.12	YES	15
CE-Standard-Bold	ROMANT.SHX	-	NO	0

17.6 Multi-Leader Style

A. All multi-leaders default to annotative scaling by default.
B. All multi-leaders default to a closed filled arrow at size of .12 head by default.
C. All multi-leaders default to color, linetype, and lineweight as controlled by “By Layer”.
D. See the template for all default settings. The table below captures the prominent elements.

Table 5 Multi Leader Style

Multi Leader Styles	Multileader Type	Source Block/Text Style	Maximum Leader Points	Color
CE-NOTE_KEYNOTE	Block	KEYIND	2	By Layer
CE-NOTE_MATERIAL	Block	NOTE_MATERIAL	-	By Layer
CE-NOTE_STANDARD	Mtext	CEA-Standard	2	By Layer

17.7 Table Styles

A. All Data fields are set to text style CEA-Standard by default.
B. All Data fields are set to 0.12 height.
C. Title and header are set to text style CEA-Standard-Bold.
D. Headers are set to 0.12 height.
E. Titles are set to .1875 height.

Figure 28 Example of Chugach-Standard Table Style

BILL OF MATERIAL					
REF NO.	ESTIMATED QUANTITY	UNIT	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	1	EA	XXXXXX	XXXXX	C
2	1	EA	XXXXXX	XXXXX	C

Figure 29 Example of Chugach-KeyNotes Table Style

SHEET KEYNOTES:

1 XXX

2 XXX

3 XXX

17.8 CAD Layers Draft

A. Default layers are provided in templates: CEA-Civil Site, CEA-Sheet-File, CEA-Sheet-File-Ref, CEA-Substation-Electrical-Details-Diagrams, CEA-Substation-Electrical-Plan, CEA-Substation-Structural-Details, CEA-Substation-Structural-Plan, CEA-Transmission.

B. Additional layers can be created using "*APPENDIX A – Layer Name Format*".

17.9 CAD Linetypes

Linetypes shown are custom. Linetypes are stored in "CEA-Linetypes.lin".

Table 6 CAD Linetypes

Linetypes	Description	Image
UG_SECONDARY	Under Ground Secondary Conductor	
UG_ST_LIGHT	Under Ground Street Light	
1_PRIMARY	Overhead Single-Phase Conductor	
2_PRIMARY	Overhead Two-Phase Conductor	
3_PRIMARY	Overhead Three Phase Conductor	
DUPLEX	Overhead Secondary (2)	
TRIPLEX	Overhead Secondary (3)	
QUADRUPLEX	Overhead Secondary (4)	
TRI_SERVICE	Overhead Service (3)	
QUAD_SERVICE	Overhead Service (4)	
OHTRANSMISSION	Overhead Transmission Conductor	
UGTRANSMISSION	Under Ground Transmission Line	
1_PH_UG	Under Ground Primary Single Phase	
3_PH_UG	Under Ground Primary Three Phase	
1_SPANGUY	Single Span Guy	
2_SPANGUY	Double Span Guy	
3_SPANGUY	Triple Span Guy	
1_FENCE	Fence Line	

Table 7 Transmission Line Legend

Linetypes	Color	Description	Image
Continuous	Magenta - #6	230kV Overhead	
Dashed	Magenta - #6	230kV Underground	
Continuous	Blue - #152	69kV Overhead	
Continuous	Green - #3	138kV Overhead	
Dashed	Green - #3	138kV Underground	
Continuous	Cyan - #4	115kV Overhead	
Continuous	Red - #1	34.5kV Overhead	
Dashed	Red - #1	34.5kV Underground	

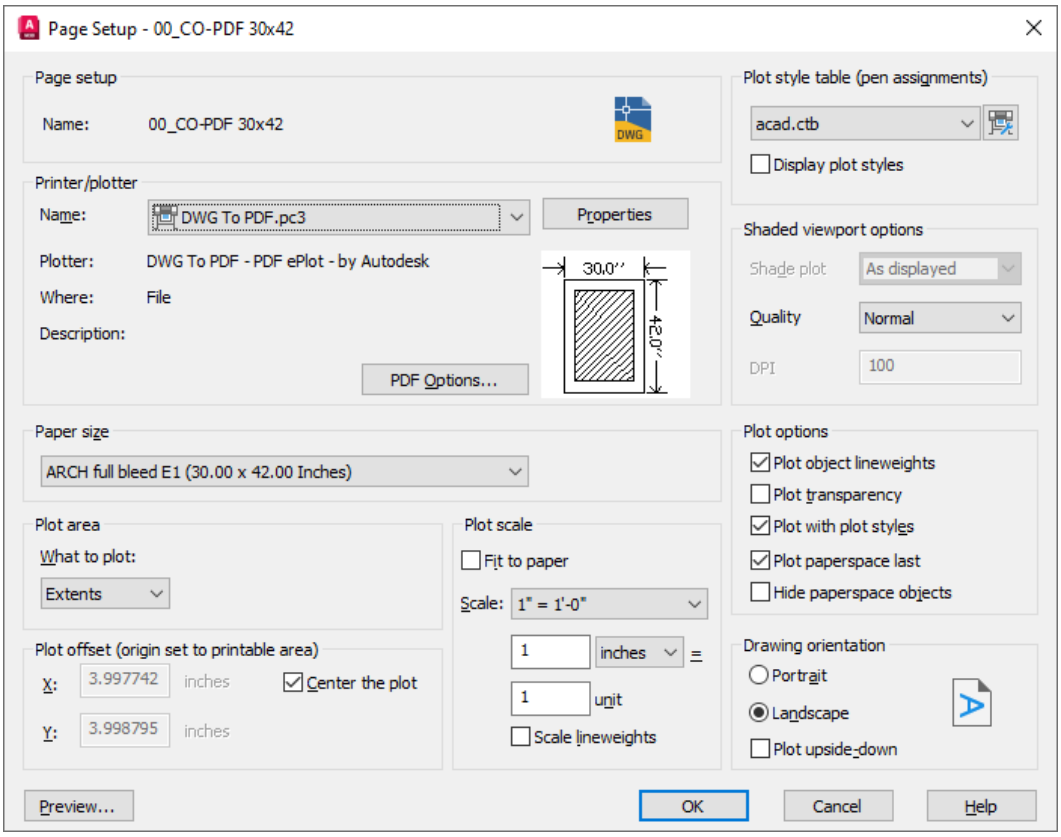
17.10 Color

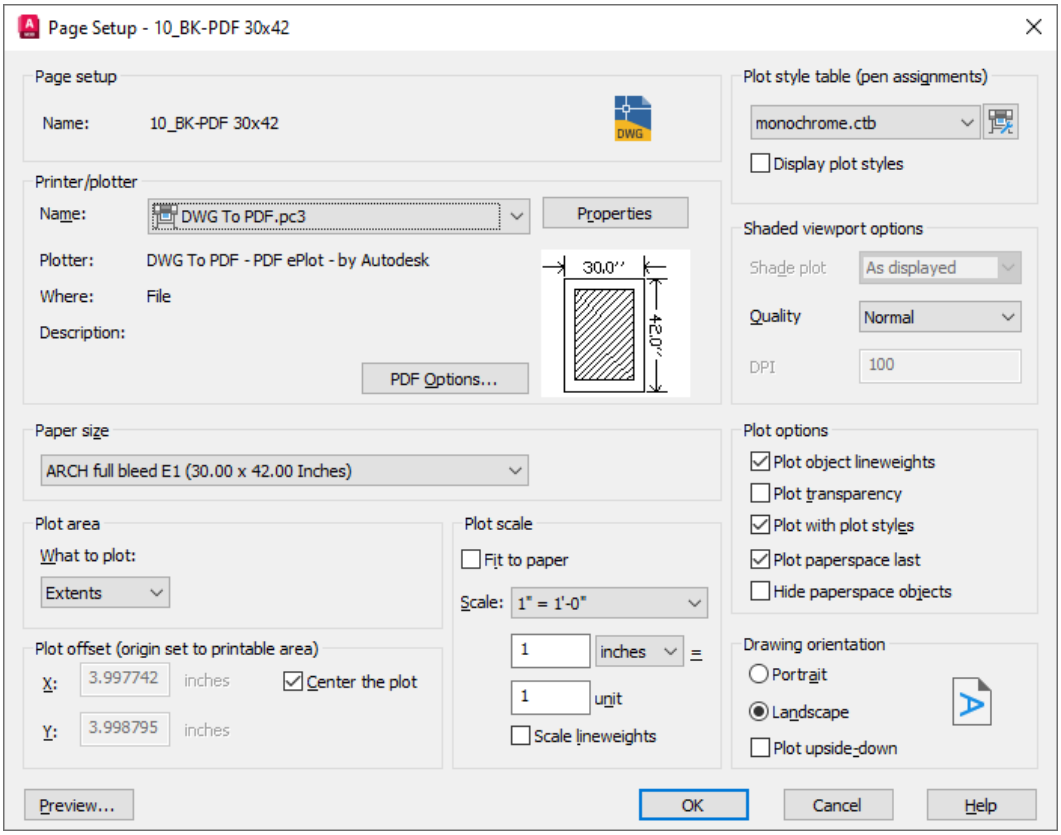
A. **Do not use yellow.**
B. Pole symbol will be a circle, black, hatched solid and sized appropriately.
C. Drawing will plot black/white and in color. Colors will be correct and legible.

17.11 Plotting Guidelines

A. Ability to plot color and black/white per Engineer's and/or Supervisor's preference.
B. Drawings will be reviewed by CAD Staff in black/white and color, prior to delivering to Engineer, to provide a proper product in black/white and color to meet the Engineer's and/or Supervisor's preference.
C. Chugach Standard size is 30" x 42" and half size is 15" x 21". Page Set Up Manager is to be set accordingly.
D. Chugach uses default acad.ctb for color and monochrome.ctb for black & white.

Figure 30 Example of Page Setups found in Chugach-Page Setup Overrides.dwt





18. Symbols And Notations

18.1 North Arrow

A. North Arrow lower right (Layout and/or view).
B. North Arrow will be black.

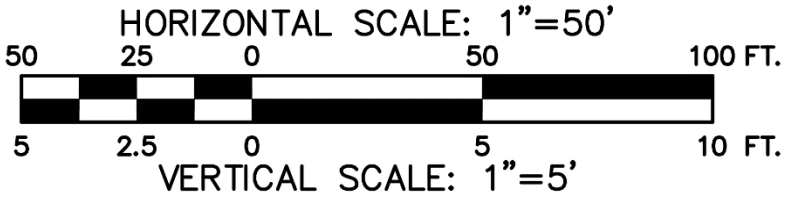
Figure 31 Typical North Arrow

18.2 Scale Bar

A. Scale Bar in lower center, or alternatively lower right.
B. Scale Bar will be black.

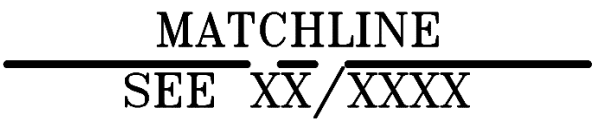
Figure 32 Typical Scale Bar

Figure 33 Typical Scale Bar for Plan & Profile drawings (Transmission/Sub Transmission)



18.3 Matchline

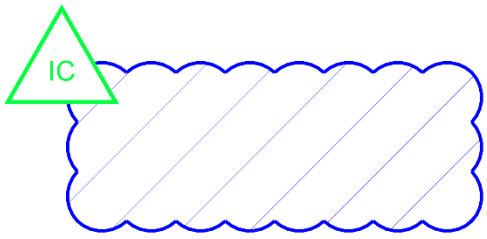
Figure 34 Matchline



18.4 Demolition Cloud and Hatch

Cloud and hatch will be blue, and Revision Triangle and number will be green 80.

Figure 35 Demolition cloud and Revision Triangle



18.5 Demolition Block

The Demolition block will be green 80 and reside in the lower right of the layout.

Figure 36 Demolition Block

18.6 Issued For Reference Only Block

ISSUED FOR REFERENCE ONLY (DO NOT EDIT) block will be green 80 and reside in the lower right of the layout if possible.

Figure 37 Issued for Reference Only Block

18.7 Hold Tag

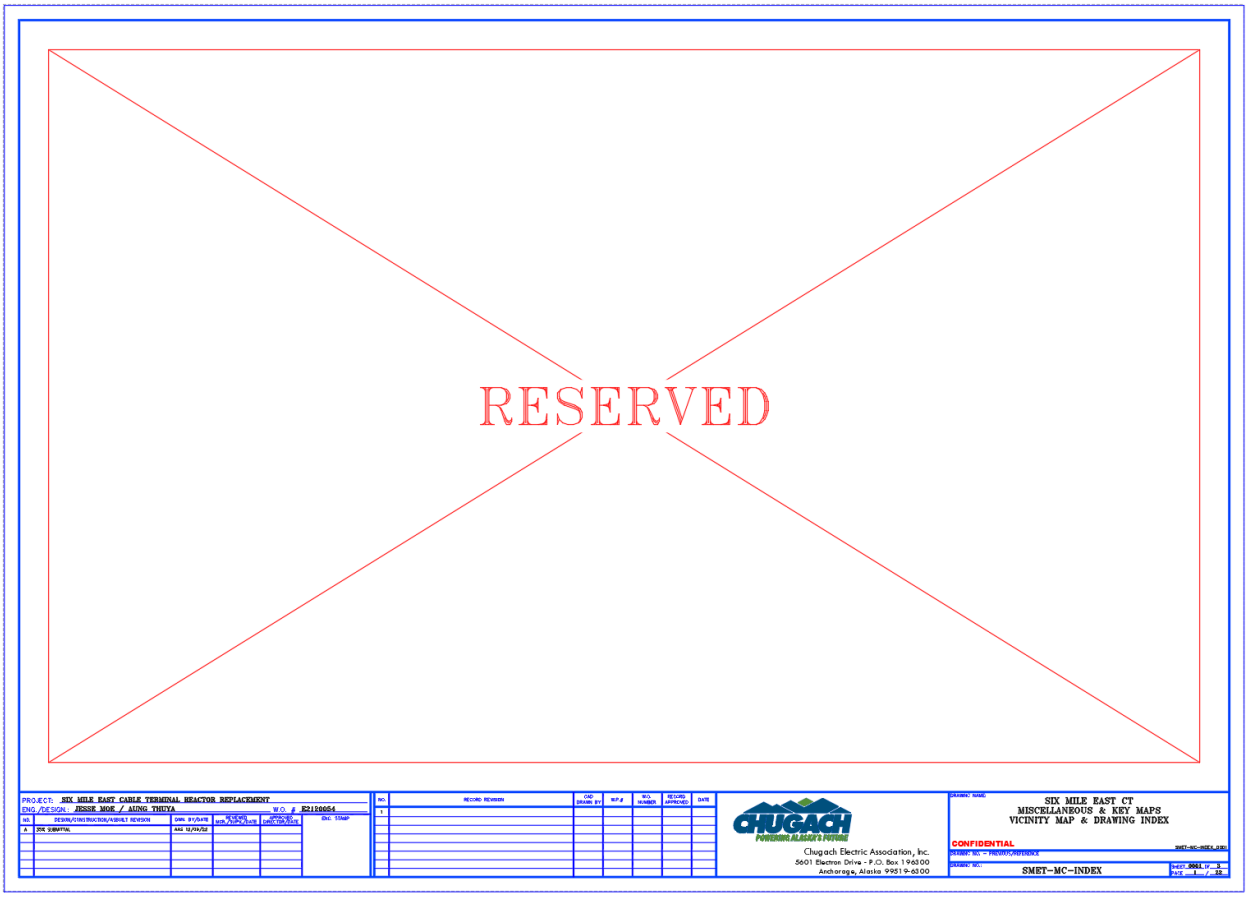
HOLD tag is used when an object in the drawing is not complete, awaiting further information, and not in a state to be reviewed until further information has been received. If all objects in the drawing are on HOLD, use the RESERVED stamp. (Drafter will not print the individual objects on hold if the full sheet is RESERVED.)

Figure 38 Hold Tag Block

18.8 Reserved Drawings

If a drawing title block has been created for future use, add red RESERVED designation.

Figure 39 Reserved Drawing Designation



18.9 Archived Stamp

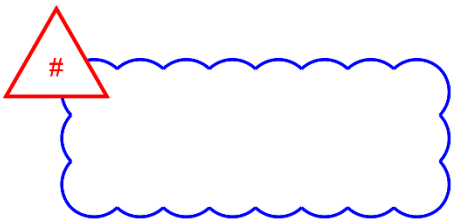
The ARCHIVED Stamp is used on all drawings that are retired or archived in Meridian. Place the stamp on the drawing in MASTERS prior to sending the drawing to the Archive folder. The ARCHIVED Stamp is placed where the title block resides. If the title block is in Layout paper space, then place the stamp in the Layout space; if the title block is in Model space, place the ARCHIVED stamp in Model space. The first preferred location is near the title block attributes, bottom right. The second preferred location is the best fit near the title block attributes.

Figure 40 Archived Stamp

18.10 Revision Number Format

A. Revision number triangle on the TOP LEFT of the cloud. Alternatively, use other corners going clockwise.
B. REV Numbers RED / Cloud Blue.

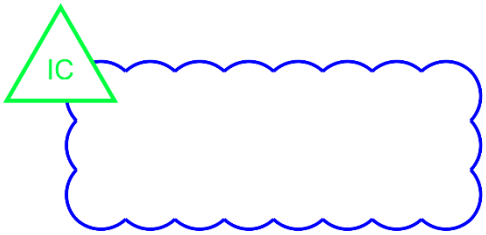
Figure 41 Revision Number Cloud Format



18.11 New and Existing/IC and NIC Clouds

A. EXISTING and NEW are determined by IC/NIC revision number and blue cloud.
B. IC and NIC REV Numbers Green / Cloud Blue

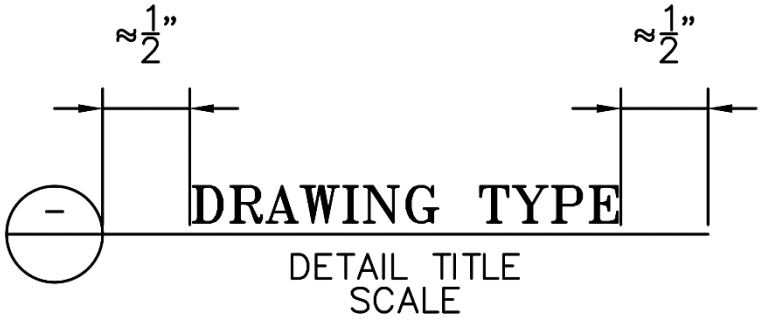
Figure 42 New and Existing/IC and NIC Cloud



18.12 Callouts

Use Chugach typical callout format including all text centered. The blank space between the widest text and the end of the line should be approximately 0.5 inch. Callout will be centered under object.

Figure 43 Typical Callout

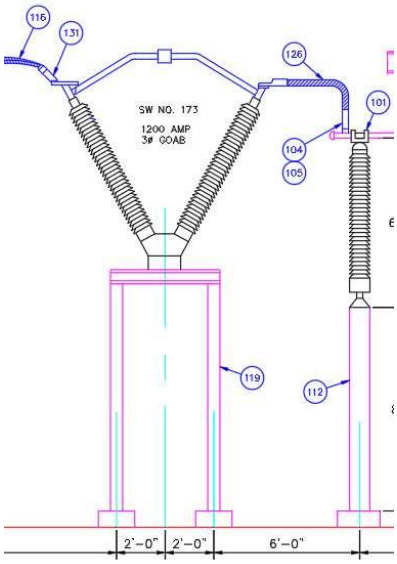


18.13 Bill Of Materials (BOM)

A. For substation drawings, typically the Bill of Materials will be the last sheet of the group. Preferred method is PLAN, DETAILS, then BOM.

B. For transmission and sub transmission line drawings, typically the Bill of Materials will be on the same sheet as the drawing object, for example a steel structure.

Figure 44 Example of Callout and Table



BILL OF MATERIAL

REF NO.	ESTIMATED QUANTITY	UNIT	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
100	13		STATION POST INSULATOR LAPP TR 304		O
101	10		BUS SUPPORT – " AL. BUS ANIXTER G-30-5		C
102	3		BUS SUPPORT – 1590 ACSR CABLE ALCOA 13804		C
103	6		STUD CONNECTOR 2"-12/1590 MCM-ANIXTER 17016		C
104	16		TERMINAL CONNECTOR 1590 MCM-4 HOLE PAD ALCOA 5640.162		C
105	10		WELDED T – ANIXTER 56346		C
106	3		STUD CONNECTOR 1-½"-12 TO 1590 MCM ANIXTER 17011		C
107	1		3ø 230 KV GOAB-SIEMENS-ALLIS		O
108	1		230KV GCB MITSUBISHI MODEL 20-SFMT-40HE		O
109	1		230 KV, 30 MVAR SHUNT REACTOR		O
110	4		BUS SUPPORT STRUCTURE – TYPE 1		O
111	1		SWITCH SUPPORT STRUCTURE		O
112	6		BUS SUPPORT STRUCTURE TYPE 2		O
113	4		LIGHTNING ARRESTOR STAND		O
114	1		LIFT STRUCTURE		O
115			3" AL BUS		O
116	AS REQD		795 ACSR		O
117	3		795 ACSR RUN-795 ACSR TAP, ANIXTER CMCR-1311		C
118	1600'		4/0 CU-GROUNDING CONDUCTOR		C
119	50'		250 MCM CU REACTOR GROUND WIRE		C

Glossary

AIA – American Institute of Architects. The AIA layer guidelines designate AutoCAD layer name formatting according to level of detailed information.

CAD Services - Computer Aided Drafting and Design services provided by Chugach. Subset of the CAD/GIS department.

Chugach - Chugach Electric Association

Distribution Drawings - Design drawings for equipment less than 34.5kV in Chugach territory.

IFC – Issued for Construction. Final submittal for design drawings. All modifications to the design drawings from IFC forward shall be design revisions and documented as such.

Layer – The primary method for organizing the objects in a drawing by function or purpose.

Meridian – Chugach Electrics Record Drawing Storage database software.

Meridian Recognized Title block – A title block that the Meridian database uses for generating new sheets and populating properties between sheet and database. A "recognized" title block performs tasks within Meridian, for example, Synchronization in the database.

NCS – National CAD Standard. The NCS is a consensus standard incorporating industry publications. It is comprised of interrelated standards, guidelines and tools for uniformly organizing and presenting facility drawing information. It is the only comprehensive standard for facility planning, design, construction, and operation drawings.

OCE Dillingham - Wide format plotter using the Chugach designation *"Dillingham".*

Outside design contractors - External Engineering or specialty firms contracted for specific work with Chugach.

Sheet Reference – Text or symbology that directs the reader to another sheet for additional information.

SSM-Sheet Set manager - Autodesk file management tool stored in a .dst file extension. Used to manage files for design projects.

Submittal – Official project progress reviews at specified intervals, with defined design expectations. (i.e., 35%, 65%, 95% etc.)

Title block – A block that contains data about a drawing sheets specific information.

Indices

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Appendix A – Layer Name Format

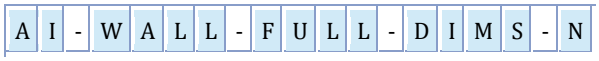
Hierarchy Of Data Fields

Layer names consist of distinct data fields separated from one another by dashes. A detailed list of abbreviations (field codes) is prescribed to define the content of layers. Most field codes are mnemonic English abbreviations of construction terminology that are easy to remember.

There are four defined layer name data fields: Discipline Designator, Major Group, two Minor Groups, and Status. The Discipline Designator and Major Group fields are mandatory. The Minor Group and Status fields are optional. Each data field is separated from adjacent fields by a hyphen ("-") for clarity.

See the example below, showing the Discipline Designator, the Major Group, two Minor Groups, and the Status fields.

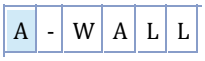
Figure 45 Example of Complete NCS Layer Name Format



Discipline Designator, Level 1

Only the mandatory discipline character is shown in the Figure 46, creating a Level 1 Discipline Designator.

Figure 46 Example of Typical Layer Name with Level 1 Designator highlighted.



The Discipline Designator denotes the category of subject matter contained on the specified layer. The Discipline Designator is a two-character field. The first character is the discipline character, and the second character is an optional modifier.

Table 8 Level 1 Discipline Designators

Designator	Discipline
A	Architectural
B	Geotechnical
C	Civil
D	Process
E	Electrical
F	Fire Protection
H	Hazardous Materials
I	Interiors
L	Landscape
M	Mechanical

Designator	Discipline
O	Operations
P	Plumbing
Q	Equipment
R	Resource
S	Structural
T	Telecommunications
V	Survey/Mapping
W	Distributed Energy
Z	Other Disciplines
Z	Contractor/Shop Drawings

Discipline Designator, Level 2

The optional second character is used to further define the discipline character. The Level 2 Discipline Designators for Architectural are shown in the example below.

Note that the mandatory Level 1 discipline character is supplemented by the optional discipline modifier to create a Level 2 Discipline Designator.

Figure 47 Example of a Typical Layer Name with Level 2 Designator highlighted.

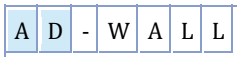


Table 9 Level 2 Discipline Designators

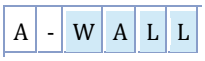
Designator	Description
A	Architectural
AD	Architectural Demolition
AE	Architectural Elements
AF	Architectural Finishes
AG	Architectural Graphics
AI	Architectural Interiors
AS	Architectural Site
AJ	User Defined
AK	User Defined

Major Group

The major group is a four-character field that identifies a major building system. The prescribed Major Group field codes (four-character abbreviations) shown on the Layer List are logically grouped with specific discipline designators. However, any Major Group may be combined with any prescribed Discipline Designator, provided that the definition of the Major Group remains unchanged. Therefore, any reasonable combination of the prescribed Discipline Designators and Major Groups is permitted.

There will be instances when project-specific Major Groups will need to be created. Additions are allowed in these Major Group field codes; however, they must contain four alphabetic and/or numeric characters and/or "~" (tilde).

Figure 48 Example of a Typical Layer Name with Major Group highlighted.



Minor Group

This is an optional, four-character field to further define the Major Groups. For example, *A-WALL-FULL* denotes a full height architectural wall. A second minor group may be used further.

The prescribed Minor Group field codes (four-character abbreviations) shown on the Layer List are logically grouped with specific Major Groups. However, any Minor Group may be used to modify any Major Group, provided that the definition of the Minor Group remains unchanged. Therefore, any reasonable combination of the prescribed Major and Minor Groups is permitted.

NOTE: User-defined Minor Group field codes are permitted. They must contain four alphabetic and/or numeric characters and/or "~", "_" (underscore).

Figure 49 Typical Layer Name with an optional Minor Group field highlighted

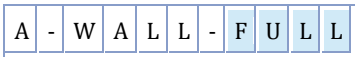


Figure 50 Typical Layer Name with two optional Minor Groups highlighted.

Status (Phase)

The status field is an optional single-character field that distinguishes the data contained on the layer according to the status of the work or the construction phase. The prescribed field codes for this field are as follows:

Table 10 Layer Status (Phase) codes

Code	Description
A	Abandoned
D	Existing to demolish
E	Existing to remain
F	Future work
M	Items to be moved
N	New work
T	Temporary work
X	Not in contract
1–9	Phase numbers

Figure 51 Typical Layer Name with the optional Status field highlighted

Appendix B – Meridian Database Codes

Table 11 Transmission and Sub Transmission Junction Line Segment Codes and Meridian Folders

Code	Transmission/Sub-Transmission Junction Line Segment	Meridian Folder
	Revision Date: 10/20/2023	
AJAJ	ANCHORAGE JCT JUNCTION STRUCTURE	JCT STR
AJAN	ANCHORAGE JCT - ANCHORAGE	34.5
AJKJ	ANCHORAGE JCT - KNIK JCT	34.5
AJNJ	ANCHORAGE JCT - NORTHERN LIGHTS JCT	34.5
ANBX	ANCHORAGE - BAXTER	34.5-230
ANCP	ANCHORAGE - COOPER LAKE	115
ANUV	ANCHORAGE - UNIVERSITY	115
APIJ	AIRPORT - INTERNATIONAL JCT	34.5
ARAR	ABBOTT ROAD JCT JUNCTION STRUCTURE	JCT STR
ARFH	ABBOTT ROAD JCT - 104TH AVE JCT (DE-ENERGIZED - ROW FOR 34.5 ONLY)	138
ATTP	ARCTIC TAP	34.5
BFBX	BONIFACE - BAXTER (UG)	34.5
BFUV	BONIFACE - UNIVERSITY (UG)	34.5
BLQC	BERNICE LAKE - QUARTZ CREEK (HEA)	HEA
BLSD	BERNICE LAKE - SOLDOTNA (HEA)	HEA
BMK1	BELUGA - PT MACKENZIE LINE 1	138
BMK2	BELUGA - PT MACKENZIE LINE 2	230
BMK3	BELUGA - PT MACKENZIE LINE 3	230
BRSD	BRADLEY LAKE - SOLDOTNA (HEA)	115
BXDB	BAXTER - DEBARR (UG)	34.5
BXLD	BAXTER - LITTLE DIPPER JCT	115
CLHJ	CAMPBELL LAKE - 100TH JCT	34.5
CLVJ	CAMPBELL LAKE - VICTOR JCT	34.5-138
CPQC	COOPER LAKE - QUARTZ CREEK	69
DBKJ	DEBARR - KNIK JCT	34.5
DCLW	DAVES CREEK - LAWING (TO CITY OF SEWARD)	115
DCQC	DAVES CREEK - QUARTZ CREEK	115
DCSU	DAVES CREEK - SUMMIT LAKE TAP	115
DJDJ	DOWLING JCT JUNCTION STRUCTURE	JCT STR
DJMJ	DOWLING JCT - O'MALLEY JCT	138
DJOJ	DOWLING JCT - OLD SEWARD JCT	34.5 & 138
DJUV	DOWLING JCT - UNIVERSITY	138

Code	Transmission/Sub-Transmission Junction Line Segment	Meridian Folder
EKFC	EKLUTNA - FOSSIL CREEK JCT	115-230
EKPL	EKLUTNA - PALMER (MEA)	115
ETFC	SIX MILE EAST CT - FOSSIL CREEK JCT CT=CABLE TERMINAL	230
ETWT	SIX MILE EAST CT - SIX MILE WEST CT CT=CABLE TERMINAL	230
FCFC	FOSSIL CREEK JCT JUNCTION STRUCTURE	JCT STR
FCML	FOSSIL CREEK JCT - ML&P	230
FHFH	104TH AVE JCT JUNCTION STRUCTURE	JCT STR
FIIN	FIRE ISLAND - INTERNATIONAL ((2) 34.5 LINES UG & OH)	34.5
FJFJ	104TH & RR JCT JUNCTION STRUCTURE	JCT STR
FJFK	104TH & RR JCT - 104TH & OLD SEWARD JCT	34.5
FKFK	104TH & OLD SEWARD JCT JUNCTION STRUCTURE	JCT STR
GJGJ	GRAVEL JCT JUNCTION STRUCTURE	JCT STR
GJHJ	GRAVEL JCT - 100TH JCT	138
GJKL	GRAVEL JCT - KLATT	34.5-138
GJSH	GRAVEL JCT - NEW SEWARD HWY JCT	138
GWID	GIRDWOOD TAP - INDIAN TAP	115
GWPT	GIRDWOOD TAP - PORTAGE TAP	115-138
GWTP	GIRDWOOD TAP	115
HFHL	HUFFMAN - HILLSIDE (UG)	34.5
HFKL	HUFFMAN - KLATT	34.5
HFMJ	HUFFMAN - O'MALLEY JCT	34.5
HJHJ	100TH JCT JUNCTION STRUCTURE	JCT STR
HJRR	100TH JCT- ROBERT RETHERFORD	138
HNMJ	HANE SUB - O'MALLEY JCT	138
HNSH	HANE SUB - NEW SEWARD HWY JCT	138
HPPT	HOPE TAP - PORTAGE TAP	115
HPSU	HOPE TAP - SUMMIT LAKE TAP	115
HPTP	HOPE TAP	115
HWTE	HOLLYWOOD - TEELAND	138
IDTJ	INDIAN TAP - TUDOR JCT	115
IDTP	INDIAN TAP	115
IJIJ	INTERNATIONAL JCT JUNCTION STRUCTURE	JCT STR
IJIN	INTERNATIONAL JCT - INTERNATIONAL	34.5
IJIT	INTERNATIONAL JCT - INTL TRANSMISSION (TO PT MAC 1)	138
IJYJ	INTERNATIONAL JCT - 36TH JCT	138
INIT	INTERNATIONAL - INTL TRANSMISSION ((2) LINES BETWEEN INSS & ITSS)	138
INSN	INTERNATIONAL - SOUTH NODE JCT	34.5

Code	Transmission/Sub-Transmission Junction Line Segment	Meridian Folder
INWJ	INTERNATIONAL - NORTHWOOD JCT	34.5
ITML	INTL TRANSMISSION - ML&P	115
ITOJ	INTL TRANSMISSION - OLD SEWARD JCT	34.5 &138
ITRR	INTL TRANSMISSION - ROBERT RETHERFORD	138
ITSC	INTL TRANSMISSION - SOUTHCENTRAL	138
ITWJ	INTL TRANSMISSION - NORTHWOOD JCT (TO PT MAC 2)	138
JLVJ	JEWEL LAKE - VICTOR JCT	34.5
KAQC	KASILOF - QUARTZ CREEK (HEA)	HEA
KJKJ	KNIK JCT JUNCTION STRUCTURE	JCT STR
KLSJ	KLATT - 94TH JCT	34.5
LANJ	LATOUCHE - NORTHERN LIGHTS JCT	34.5
LAOJ	LATOUCHE - OLD SEWARD JCT	34.5
LDLD	LITTLE DIPPER JCT JUNCTION STRUCTURE	JCT STR
LDML	LITTLE DIPPER JCT - ML&P	115 & 230
LDTJ	LITTLE DIPPER JCT - TUDOR JCT	230
LWSW	LAWING - SEWARD	115
MJMJ	O'MALLEY JCT JUNCTION STRUCTURE	JCT STR
MJOM	O'MALLEY JCT - O'MALLEY	34.5
MJSH	O'MALLEY JCT - NEW SEWARD HWY JCT (UG)	34.5
MKPW	PT MACKENZIE - PT WORONZOF	138
MKTE	PT MACKENZIE - TEELAND	230
MKWT	PT MACKENZIE - SIX MILE WEST CT CT=CABLE TERMINAL	230
MLJ1	ML&P JCT 1 (230KV)	230
MLM1	230 KV INTO ML&P JUNCTION STRUCTURE	JCT STR
MLJ2	ML&P JCT 2 (115KV)	115
MLM2	115 KV INTO ML&P JUNCTION STRUCTURE	JCT STR
MLML	ML&P 115KV - ML&P 230KV LINES BETWEEN YARDS AT SULLIVAN PLANT	115 & 230
NJNJ	NORTHERN LIGHTS JCT JUNCTION STRUCTURE	JCT STR
NJRJ	NORTHERN LIGHTS JCT - 32ND JCT	34.5
OJOJ	OLD SEWARD JCT JUNCTION STRUCTURE	JCT STR
OJSL	OLD SEWARD JCT - SAND LAKE	34.5
PAPJ	POSTMARK - POSTMARK JCT	138
PAPW	POSTMARK - PT WORONZOF	138
PJPJ	POSTMARK JCT JUNCTION STRUCTURE	JCT STR
PJWJ	POSTMARK JCT - NORTHWOOD JCT	138
PJYJ	POSTMARK JCT - 36TH JCT	138
PTTP	PORTAGE TAP	115

Code	Transmission/Sub-Transmission Junction Line Segment	Meridian Folder
RBWJ	RASPBERRY - NORTHWOOD JCT	34.5-138
RJRJ	32ND JCT JUNCTION STRUCTURE	JCT STR
RJTN	32ND JCT - TURNAGAIN	34.5
RJYJ	32ND JCT - 36TH JCT	34.5
RRSJ	ROBERT RETHERFORD - 94TH JCT	34.5
SHSH	NEW SEWARD HWY JCT JUNCTION STRUCTURE	JCT STR
SJSJ	94TH JCT JUNCTION STRUCTURE	JCT STR
SJSL	94TH JCT - SAND LAKE	34.5
SNSN	SOUTH NODE JCT JUNCTION STRUCTURE	JCT STR
SNVJ	SOUTH NODE JCT - VICTOR JCT	34.5
SPTP	SPENARD TAP	34.5
SUTP	SUMMIT LAKE TAP	115
TJTJ	TUDOR JCT JUNCTION STRUCTURE	JCT STR
TJUV	TUDOR JCT - UNIVERSITY	115 & 230
VJVJ	VICTOR JCT JUNCTION STRUCTURE	JCT STR
WJWJ	NORTHWOOD JCT JUNCTION STRUCTURE	JCT STR
WPTP	WOODLAND PARK TAP	34.5
YJYJ	36TH JCT JUNCTION STRUCTURE	JCT STR
03NK	SUB 03 - NIKKELS PP	34.5
0306	SUB 03 - SUB 06	34.5
06NK	SUB 06 - NIKKELS PP	34.5
13NK	SUB 13 - NIKKELS PP	34.5
1321	SUB 13 - SUB 21	34.5
21NK	SUB 21 - NIKKELS	34.5
06NK	SUB 06 - NIKKELS PP	115
0607	SUB 06 - SUB 07	115
0722	SUB 07 - SUB 22	115
08AN	SUB 08 - ANCHORAGE	115
0816	SUB 08 - SUB 16	115
10NK	SUB 10 - NIKKELS PP	115
1014	SUB 10 - SUB 14	115
12NK	SUB 12 - NIKKELS PP	115
1220	SUB 12 - SUB 20	115
1415	SUB 14 - SUB 15	115
14SL	SUB 14 - SULLIVAN PP	115
15AN	SUB 15 - ANCHORAGE SUB	115
1622	SUB 16 - SUB 22	115

Code	Transmission/Sub-Transmission Junction Line Segment	Meridian Folder
20SL	SUB 20 - SULLIVAN PP	115
22IJ	SUB 22 - INTERNATIONAL JUNCTION	115
22IT	SUB 22 - INTL TRANSMISSION	115

Table 12 Meridian Substation Facility Type Codes and Locations

MERIDIAN CODE Revision Date 10/20/2023			
SUBSTATION		SUBSTATION	
CODE	LOCATION	CODE	LOCATION
APSS	AIRPORT	RBSS	RASPBERRY
AECT	AIRPORT EAST CT	RRSS	ROBERT RETHERFORD
ANSS	ANCHORAGE	SLSS	SAND LAKE
ATSS	ARCTIC	SWSS	SEWARD - CITY OF
BXSS	BAXTER LAKE	SMET	SIX MILE EAST CT
BGSS	BELUGA	SMWT	SIX MILE WEST CT
BNSS	BERNICE LAKE	SDSS	SOLDOTNA
BNSS	BERNICE LAKE - HEA	SDSS	SOLDOTNA - HEA
BFSS	BONIFACE	SDSV	SOLDOTNA SVC
CLSS	CAMPBELL LAKE	SDSV	SOLDOTNA SVC - AEA
CPSS	COOPER LAKE	SPSS	SPENARD
DCSS	DAVES CREEK	STSS	STEVENS - MEA
DCSV	DAVES CREEK SVC	SUSS	SUMMIT LAKE
DCSV	DAVES CREEK SVC - AEA	TAEA	TEELAND - AEA
DBSS	DEBARR	TLSS	TEELAND - CEA
DGSS	DOUGLAS - MEA	TDSS	TUDOR
DLSS	DOWLING	TNSS	TURNAGAIN
EKSS	EKLUTNA	TTSS	TYONEK TIMBER
FISS	FIRE ISLAND	TTSS	TYONEK TIMBER - RETIRED
FRSS	FORT RICHARDSON	TYSS	TYONEK VILLAGE
GWSS	GIRDWOOD	UVSS	UNIVERSITY
HNSS	HANE	WPSS	WOODLAND PARK
HLSS	HILLSIDE	YDSS	YARD MAIN CAMPUS
HPSS	HOPE	01SS	SUB 01 PLANT 1 SWITCHYARD
HFSS	HUFFMAN	02SS	SUB 02 PLANT 2 SWITCHYARD
IDSS	INDIAN	2ASS	SUB 2A PLANT 2A GIS GAS INSULATED
INSS	INTERNATIONAL	03SS	SUB 03 201 EAST 2ND AVENUE
ITSS	INTERNATIONAL TRANSMISSION	06SS	SUB 06 1042 E STREET
JLSS	JEWEL LAKE	07SS	SUB 07 2235 ARCTIC BLVD
KLSS	KLATT	08SS	SUB 08 2801 CAREER CENTER DRIVE
LASS	LATOUCHE	9ASS	SUB 9A 811 WEST 2ND AVE - ARR (DEMO 2023)
LWSS	LAWING - SEWARD	10SS	SUB 10 101 NORTH SITKA STREET
ML&P	ML&P	12SS	SUB 12 3818 PROVIDER DR - EAFB
MBSS	MOBILE	13SS	SUB 13 151 WEST BLUFF ROAD - POA
NKSS	NIKISKI - HEA	14SS	SUB 14 3092 MOUNTAIN VIEW DRIVE
OMSS	OMALLEY	15SS	SUB 15 4700 NORTHERN LIGHTS BLVD
PTSS	PORTAGE	16SS	SUB 16 720 TELEPHONE AVENUE
PASS	POSTMARK	20SS	SUB 20 1198 NORTH MULDOON ROAD
PMSS	PT MACKENZIE	21SS	SUB 21 3290 2ND & KENNY - EAFB
PWSS	PT WORONZOF	22SS	SUB 22 2970 BERING STREET
QCSS	QUARTZ CREEK		

Table 13 Power Plant, Communications Site, and Headquarters Codes

MERIDIAN CODE	
Revision Date 10/20/2023	
POWER PLANT	
CODE	**FACILITY TYPE POWER PLANT**
BPPP	BELUGA
BLPP	BERNICE LAKE
BDPP	BRADLEY LAKE
CLPP	COOPER LAKE
EKPP	EKLUTNA LAKE
IGPP	INTERNATIONAL
SCPP	SOUTHCENTRAL
SLPP	GEORGE M SULLIVAN
NKPP	HANK NIKKELS
COMMUNICATION SITE	
CODE	**LOCATION**
BRCS	BERNICE LAKE REPEATER
BTCS	BIRD POINT
CRCS	COOPER MOUNTAIN REPEATER
EKCS	EKLUTNA
FICS	FIRE ISLAND
GACS	GLENN ALPS MICROWAVE SITE
HSCS	HOPE - STATE
QCCS	QUARTZ CREEK
SCWT	SHIP CREEK WATER TREATMENT FACILITY
SICS	SILVERTIP MICROWAVE SITE
SMCS	SUMMIT LAKE
SRCS	SUN RISE

HEADQUARTERS FACILITY	
CODE	**LOCATION**
BLDA	Building A Main Offices
BLDB	Building B Substation Shop
BLDC	Building C Line Operations
BLDD	Building D IGT Office
BLDE	Building E Transformer Shop
BLDF	Building F Relay & Garage
BLDG	Building G Telecom, Scada, EMS
BLDH	Building H Cold Storage
HQEN	Environmental
HQOS	Operations Storage
HQSA	South Area (Clown Tent Parcel)
HQSE	Security
HQSP	Site Plans
CN01	N1 Engineering
CN02	N2 Dispatch and Line OPS Warehouse
CN03	N3 Line OPS & Vehicle Maintenance Shop
CN04	N4 Generation Warehouse
CN05	N5 Substation Department
CN06	N6 Member Services & Relay
CN07	N7 Transformer Shop
CN08	N8 Radio Shop
CN09	N9 Facilities Maintenance Shop
CN10	N10 Meter Shop