

# TULUKSAK, ALASKA

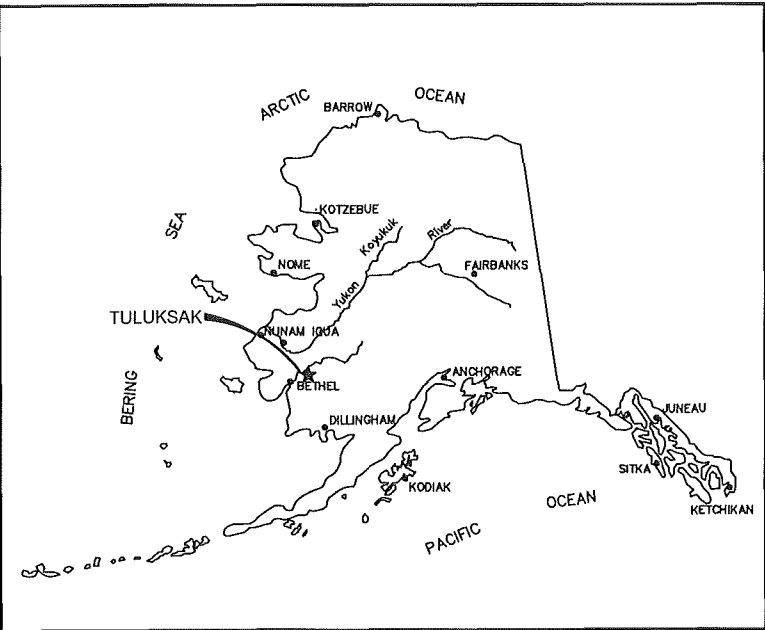
## WASTEWATER SYSTEM

### IMPROVEMENTS PHASE I & II

- COMMUNITY HONEYBUCKET DUMPSITE IMPROVEMENTS
- WASTEWATER TREATMENT AND DISPOSAL AREA
- COMMUNITY LIFT STATION
- GRAVITY SEWER AND FORCEMAIN PIPING

Prepared for the Tuluksak Native Community  
In Cooperation with the State of Alaska  
Department of Environmental Conservation  
Village Safe Water Program

*REISSUED FOR CONSTRUCTION - MAY 2014*



LOCATION MAP



#### RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION.  
INFORMATION PROVIDED HEREIN IS  
ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

#### SCOPE OF THE PROJECT

THIS PLAN SET COVERS PHASE I & II OF THE TULUKSAK WASTEWATER SYSTEM IMPROVEMENTS PROJECT. WHEN FULLY IMPLEMENTED, THIS PROJECT WILL PROVIDE BURIED PIPED GRAVITY SEWER SERVING THE CORE AREA (WASHETERIA, TEEN CENTER, CLINIC, CONSTRUCTION CAMP, STORE AND SCHOOL). THE PROJECT WILL CONSTRUCT A SEWER LIFT STATION, SEWER FORCEMAIN AND WASTEWATER LAGOON WITH A HONEY BUCKET DUMP.

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5/7/14

G:\ACAD\TULUKSAK\TLT0901 2008 Waste water disposal area\IFC Rev Apr 2014\G1.1 GENERAL NOTES LEGEND & DESIGN CRITERIA.dwg, 5/6/2014 5:42:56 PM, cmerz, \\c2main\LANIER MP C2050\LD520C PCL 6

GENERAL NOTES

A. GENERAL:

- THE PROJECT SUPERINTENDENT SHALL MAINTAIN A CLEAN SET OF "AS BUILT" RECORD DRAWINGS SHOWING THE LOCATIONS AND SWNG TIES TO ALL APPURTENANCES. ALL ELEVATIONS SHALL BE MARKED ASB (AS-BUILT) WITH THE CORRECT VALUE INSERTED. DRAWINGS SHALL BE KEPT CURRENT IN RED PENCIL ON A DAILY BASIS IN A NEAT, LEGIBLE FASHION. COPIES OF THE AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE TULUKSAK NATIVE COMMUNITY AND VSW UPON COMPLETION OF CONSTRUCTION.
- THE BASIS OF BEARINGS FOR HORIZONTAL CONTROL IS SHOWN ON SHEET G2.0.
- THE BASIS OF VERTICAL CONTROL IS SHOWN ON SHEET G2.0.
- EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS TO THE BEST KNOWLEDGE OF THE ENGINEER AT THE TIME OF DESIGN. RECORDS MAY NOT BE COMPLETELY ACCURATE. THE PROJECT SUPERINTENDENT SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES WITHIN EACH CONSTRUCTION REACH PRIOR TO BEGINNING WORK.
- THE RECOMMENDED FINISHED FLOOR ELEVATION OF STRUCTURES IS 2.0 FEET ABOVE THE CORPS OF ENGINEERS 100-YEAR FLOOD ELEVATION. FOR THIS PROJECT THE 100-YEAR FLOOD STAGE IS ELEV. 30.3 FEET AND MINIMUM FINISHED FLOOR ELEVATION IS 32.3 FEET.

B. ARCTIC PIPE:

- CARRIER PIPE:  
FORCEMAINS SHALL BE 4" AND 6" HDPE, SDR 11. GRAVITY MAINS SHALL BE 8" HDPE, SDR 17. ALL HDPE PIPING SHALL BE LISTED BY THE PPI WITH A DESIGNATION OF PE3408 AND A CELL CLASSIFICATION OF 345434C OR BETTER AS PER ASTM D3350.
- INSULATION:  
ARCTIC PIPE INSULATION SHALL BE CLOSED CELL (ASTM D2341 CELL CLASSIFICATION 550674970034) URETHANE FOAM WITH A MAXIMUM K FACTOR OF 0.155 BTU/IN/HR-SF-DEG F. THE INSULATION CORE DENSITY SHALL BE BETWEEN 3.0 AND 4.0 LBS/CF. VOIDS GREATER THAN 0.05 CUBIC INCHES BEYOND 24 INCHES OF EITHER END OF THE PIPE SECTION WILL BE CAUSE FOR REJECTION OF THE PIPE. SEE TECHNICAL SPECIFICATION FOR FURTHER REQUIREMENTS.
- OUTER JACKET MATERIAL:  
THE OUTER JACKET MATERIAL FOR ALL ARCTIC PIPE AND FITTINGS SHALL BE 16 GAUGE HELICAL CORRUGATED ALUMINUM PIPE WITH SEAMS THAT WILL WITHSTAND A HYDROSTATIC PRESSURE OF 5 FEET OF WATER WITH NO LEAKAGE.
- HYDRONIC HEAT TRACE:  
HYDRONIC HEAT TRACE (WHERE SPECIFIED) SHALL BE A MINIMUM OF 2" DIA. HDPE, SDR 11 AND LISTED BY THE PPI WITH A DESIGNATION OF PE3408 AND A CELL CLASSIFICATION OF 345434C OR BETTER AS PER ASTM D3350.

C. CLEARING AND GRUBBING:

- THE CONSTRUCTION CREW SHALL REMOVE ALL TREES, BRUSH, VEGETATIVE MAT, AND OTHER OBJECTIONABLE MATERIAL WITHIN THE ROAD FOOTPRINT. WHERE DIKE FILL IS TO BE PLACED OVER SOFT, SATURATED TUNDRA, THE GROUND SURFACE MAY BE PREPARED BY CUTTING BRUSH AND TREES WITHIN THE DIKE FOOTPRINT AND GRUBBING AN 8-FOOT WIDE KEYWAY ALONG THE CENTER OF THE DIKE.
- ALL GRUBBED MATERIAL SHALL BE DISPOSED OF IN THE DESIGNATED SPOILS DEPOSITION AREA OR THE BORROW AREA EAST OF THE LAGOON AND WITHIN THE PROJECT PROPERTY. A PORTION OF THE GRUBBED ORGANIC TOPSOIL SHALL BE STOCKPILED AND LATER USED TO COVER AND REVEGETATE THE DIKE SIDESLOPES, BORROW AREA, AND OTHER AREAS DISTURBED BY CONSTRUCTION.
- 
- WHERE EXCAVATIONS ENCOUNTER GROUNDWATER, DEWATERING SHALL BE IMPLEMENTED AND TEMPORARY SHORING MAY BE REQUIRED TO STABILIZE THE WALLS WHILE EXCESS WATER IS ALLOWED TO DRAIN OR PUMPED OUT OF THE EXCAVATION.

E. PIPELINE TESTING:

- GENERAL:  
ALL TESTING SHALL BE IN CONFORMANCE WITH THE FOLLOWING REQUIREMENTS:  
ALL TESTS SHALL BE WITNESSED BY A REPRESENTATIVE DESIGNATED BY THE COMMUNITY. UPON SUCCESSFUL COMPLETION OF A TEST THE RESULTS OF THE TEST SHALL BE DOCUMENTED ON A TEST FORM AND ACKNOWLEDGED BY SIGNATURE OF THE COMMUNITY'S REPRESENTATIVE WITNESSING THE TEST AND BY THE PROJECT SUPERINTENDENT. THE SUPERINTENDENT'S RED LINED AS-BUILT DRAWINGS SHALL ALSO NOTE THE TIME AND DATE OF THE TEST, AS WELL AS THE NAME OF THE COMMUNITY'S WITNESS, FOR EACH PIPE SEGMENT TESTED.
- FORCEMAIN TESTING:  
PERFORM HYDROSTATIC TESTING OF ALL FORCEMAIN PIPING. FILL THE LINES WITH POTABLE WATER AND REMOVE AIR POCKETS PRIOR TO STARTING THE TEST. PRESSURIZE TO 100 PSI AND LEAVE FOR A MINIMUM OF 1 HOUR. AFTER THIS INITIAL PERIOD, ADD WATER TO BRING THE PRESSURE UP TO 100 PSI AND BEGIN A ONE HOUR TEST. THERE SHALL BE NO LOSS IN PRESSURE DURING THE 1 HOUR TEST FOR THE PIPING TO BE ACCEPTED.
- GRAVITY SEWER MAIN TESTING:  
THE CONSTRUCTION CREW SHALL CLEAN AND FLUSH ALL SANITARY SEWER MAINS PRIOR TO VISUAL INSPECTION (LAMPING) AND PRESSURE TESTING.  
EACH REACH OF SEWER MAIN SHALL BE LAMPED, MANHOLE TO MANHOLE, WITH A HIGH INTENSITY LIGHT AND LARGE MIRROR. SEGMENTS NOT LAMPING TO 7/8 OF A FULL MOON SHALL BE REALIGNED AND/OR REGRADED AS NECESSARY TO MEET THE 7/8 MOON REQUIREMENT.  
ALL SEGMENTS OF COMPLETED SEWER MAIN AND OUTFALL SHALL BE PRESSURE TESTED FROM MANHOLE TO MANHOLE OR TERMINUS TO TERMINUS WITH AIR AT THE END OF CONSTRUCTION (PRIOR TO CONNECTING SEWER SERVICE LINES). AIR SHALL BE SLOWLY SUPPLIED TO THE PLUGGED PIPE INSTALLATION UNTIL THE INTERNAL AIR PRESSURE REACHES 4.0 POUNDS PER SQUARE INCH (PSI) GREATER THAN THE AVERAGE BACK PRESSURE OF ANY GROUNDWATER THAT MAY SUBMERGE THE PIPE. AT LEAST TWO (2) MINUTES SHALL BE ALLOWED FOR TEMPERATURE STABILIZATION BEFORE PROCEEDING WITH THE TEST. AT THE END OF THE STABILIZATION PERIOD THE AIR PRESSURE SHALL BE ADJUSTED TO THE TEST PRESSURE AND THE 10 MINUTE TEST PERIOD SHALL BEGIN. THE MAXIMUM ALLOWABLE PRESSURE DROP FOR ANY SEWER MAIN SEGMENT DURING THE 10 MINUTE TEST PERIOD SHALL BE 2.7 PSI.

- SEWER MANHOLE TESTING:

F. REVEGETATION SPECIFICATION:

- THE ENTIRE AREA DISTURBED BY CONSTRUCTION SHALL BE REVEGETATED AS QUICKLY AS GOOD CONSTRUCTION PRACTICE ALLOWS. AREAS TO BE REVEGETATED SHALL FIRST BE COVERED WITH A MINIMUM 6-INCH LAYER OF FRIABLE, LOOSELY PLACED TOPSOIL, FREE OF DEBRIS. THE FOLLOWING SEED MIXTURE AND FERTILIZER APPLICATION RATES SHALL BE APPLIED:

| SEED             | NAME/TYPE  | RATE         | METHOD    |
|------------------|------------|--------------|-----------|
| Red Fescue       | Arctic Red | 14 lbs/acre  | Broadcast |
| Bering Hairgrass | Norcoast   | 16 lbs/acre  | Broadcast |
| Rye Grass        | Annual     | 2 lbs/acre   | Broadcast |
| FERTILIZER       | 20-20-20   | 180 lbs/acre | Broadcast |
- EROSION CONTROL FABRIC:  
USE BIODEGRADABLE JUTE MESH WITH A LIFE OF 1-2 YEARS. INSTALL ON SLOPES AFTER SEEDING AND ANCHOR SECURELY WITH GROUND STAPLES.

G. HONEYBUCKET DUMPSITE CLOSURE

- THE DUMPSITE CLOSURE WILL OCCUR ONCE THE NEW LAGOON IS OPERATIONAL.

PROJECT DESCRIPTION

THIS PROJECT CONSTRUCTS A TWO-CELL FACULTATIVE PERCOLATION LAGOON, A LIFT STATION, AND A SEWAGE FORCE MAIN BETWEEN THE LAGOON AND LIFT STATION.

THE LAGOON SYSTEM WILL PROVIDE WASTEWATER TREATMENT OF DOMESTIC WASTEWATER. TREATMENT INVOLVES A COMBINATION OF PROCESSES THAT REMOVE SOLIDS, BIODEGRADABLE ORGANICS, AND PATHOGENS FROM THE WATER PRIOR TO ITS RELEASE INTO THE PERCOLATION CELL.

THE FIRST CELL WILL RECEIVE RAW WASTEWATER VIA A FORCE MAIN FROM A LIFT STATION LOCATED WITHIN THE VILLAGE. CELL 1 IS DESIGNED TO PROVIDE A QUIESCENT ZONE FOR DIGESTION OF ORGANIC MATTER AND BIODEGRADABLE CONTAMINANTS BY BOTH AEROBIC AND ANAEROBIC MICROBES AND STORAGE FOR NON-DIGESTABLE SOLIDS. A MAX. LOADING RATE OF 38#/ACRE-DAY. CELL 1 IS HYDRAULICALLY CONNECTED TO CELL 2 WITH AN INTERCONNECTING DUAL PIPE CONTROL STRUCTURE DESIGNED TO MAINTAIN A LIQUID DEPTH OF NO MORE THAN 7.0 FEET IN CELL 1. CELL 2 IS DESIGNED TO PERCOLATE WITH A MAXIMUM HYDRAULIC APPLICATION RATE OF 0.9 GAL/SF-DAY.

WORK SUMMARY

CONSTRUCT A DUAL-CELL, LINED WASTEWATER TREATMENT LAGOON AND ASSOCIATED HYDRAULIC CONTROL FEATURES.

INSTALL A FORCEMAIN AND GRAVITY SEWER MAIN FROM THE CORE PART OF THE COMMUNITY TO THE PROPOSED FACULTATIVE LAGOON SITE.

INSTALL A CENTRAL COMMUNITY LIFT STATION AND HONEYBUCKET DUMPING FACILITY.

INSTALL A HYDRONIC HEAT TRACE AND WASTE HEAT RECOVER SYSTEM TO PROVIDE FREEZE PROTECTION OF THE LAGOON FORCEMAIN AND HONEYBUCKET DUMPING STATION.

SYSTEM STARTUP

LIFT STATION STARTUP

AFTER INSTALLATION OF ALL NEW LIFT STATION EQUIPMENT, THE PROJECT SUPERINTENDENT SHALL START AND FIELD TEST EACH PUMP UNIT TO DEMONSTRATE ITS ABILITY TO PUMP WITHOUT EXCESSIVE VIBRATION, MOTOR OVERLOADING OR OVERHEATING. EACH PUMP SHALL BE OPERATED FOR A SUFFICIENT PERIOD OF TIME TO PERMIT THOROUGH OBSERVATION OF ALL PUMP COMPONENTS. THE PROJECT SUPERINTENDENT SHALL VERIFY THE PROPER SEQUENCING AND OPERATION OF ALL CONTROLS.

AFTER THE LIFT STATION INSTALLATION IS COMPLETE BUT PRIOR TO DRAWING WASTEWATER INTO THE WET WELL, THE SUPERINTENDENT SHALL DETERMINE THE DISCHARGE RATE OF EACH OF THE SUBMERSIBLE WASTEWATER PUMPS, INDEPENDENTLY AND IN TANDEM. THESE MEASUREMENTS SHALL BE RECORDED ON THE RECORD DRAWINGS FOR FUTURE REFERENCE.

THE DISCHARGE PUMPING RATE SHALL BE DETERMINED BY MEASURING DRAWDOWN OF POTABLE WATER PLACED IN THE WET WELL. ALL LIFT STATION TESTING SHALL BE PERFORMED WITH POTABLE WATER.

LAGOON STARTUP

SAMPLING WELLS SHOULD BE USED TO DETERMINE THE INITIAL NITRATE LEVELS PRIOR TO USE OF THE LAGOON SYSTEM.

STORM WATER MANAGEMENT PLAN

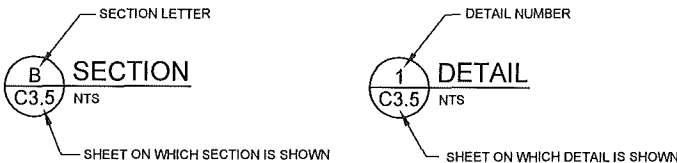
CONSTRUCTION SHALL BE PLANNED AND EXECUTED TO EXPEDITIOUSLY COMPLETE THE PROJECT WHILE MAINTAINING THE CONSTRUCTION SITE IN A MANNER THAT REDUCES THE POTENTIAL FOR CONTAMINATED STORM RUNOFF. SPECIFIC STEPS ARE TO INCLUDE THE FOLLOWING:

- PRIOR TO CONSTRUCTION DEVELOP A STORMWATER POLLUTION PREVENTION PLAN (SWPPP), WHICH UTILIZES THE BEST MANAGEMENT PRACTICES (BMPs) AND IS IN COMPLIANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) AND THE ALASKA CONSTRUCTION GENERAL PERMIT NO. AKR10000. THIS PLAN MUST BE APPROVED BY THE STATE OF ALASKA ADEC.
- FILE A NOTICE OF INTENT (NOI) WITH THE EPA A MINIMUM OF 7-DAYS PRIOR TO THE START OF CONSTRUCTION.
- CONSTRUCTOR SHALL BE VIGILANT WITH IMPLEMENTATION OF THE PLAN.

LEGEND

| EXISTING  |              | PROPOSED  |              | DESCRIPTION                                                      |
|-----------|--------------|-----------|--------------|------------------------------------------------------------------|
| PLAN VIEW | PROFILE VIEW | PLAN VIEW | PROFILE VIEW |                                                                  |
|           |              |           |              | GROUND SURFACE                                                   |
|           |              |           |              | DRAINAGE/WATER FEATURE                                           |
|           |              |           |              | SEWER FORCE MAIN, LIFT STATION, REDUCER, AND DOUBLE WYE CLEANOUT |
|           |              |           |              | SEWER SERVICE LINE                                               |
|           |              |           |              | CULVERT                                                          |
|           |              |           |              | BURIED ELECTRICAL LINE                                           |
|           |              |           |              | BURIED FUEL OIL LINE                                             |
|           |              |           |              | BURIED TELEPHONE LINE                                            |
|           |              |           |              | OVERHEAD ELECTRIC                                                |
|           |              |           |              | EASEMENT                                                         |
|           |              |           |              | UTILITY POLE                                                     |
|           |              |           |              | FENCE                                                            |
|           |              |           |              | ROADS AND TRAVELED WAYS                                          |
|           |              |           |              | CONTOUR LINE                                                     |
|           |              |           |              | R.O.W. (RIGHT-OF-WAY)                                            |
|           |              |           |              | SHORELINE                                                        |
|           |              |           |              | TREES AND/OR BRUSH                                               |
|           |              |           |              | STRUCTURE                                                        |
|           |              |           |              | GROUND PROFILE                                                   |
|           |              |           |              | DIRECTION OF DRAINAGE                                            |
|           |              |           |              | PROPERTY LINE                                                    |
|           |              |           |              | SECTION LINE                                                     |
|           |              |           |              | BLM BRASS CAPPED MONUMENT                                        |
|           |              |           |              | BENCH MARK                                                       |
|           |              |           |              | SPOT ELEVATION                                                   |
|           |              |           |              | REBAR - ABILITY SURVEY POINT NO.                                 |
|           |              |           |              | YELLOW PLASTIC CAP (REBAR)                                       |
|           |              |           |              | TRACT NUMBER                                                     |
|           |              |           |              | LOT NUMBER                                                       |
|           |              |           |              | HEAT TRACE POWER SUPPLY                                          |

SECTION AND DETAIL DESIGNATIONS



MATERIAL QUANTITIES

| ITEM                         | ESTIMATED QUANTITY |
|------------------------------|--------------------|
| LAGOON OVERBURDEN            | 7,500 CU. YDS.     |
| LAGOON CUT/FILL VOLUME       | 40,000 CU. YDS.    |
| 6" ARCTIC FORCEMAIN          | 3,740 L.F.         |
| 4" ARCTIC FORCEMAIN          | 511 L.F.           |
| 8" ARCTIC SEWER MAIN         | 1,351 L.F.         |
| FORCEMAIN CLEAN OUT ASSEMBLY | 8 EACH             |

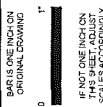
ABBREVIATIONS

|        |                                                          |
|--------|----------------------------------------------------------|
| A.P.   | ANGLE POINT (HORIZONTAL)                                 |
| CMP    | CORRUGATED METAL PIPE                                    |
| C.O.E. | CORPS OF ENGINEERS                                       |
| CULV.  | CULVERT                                                  |
| FF     | FINISHED FLOOR ELEVATION                                 |
| G.B.   | GRADE BREAK (VERTICAL)                                   |
| G.V.   | GATE VALVE                                               |
| HDPE   | HIGH DENSITY POLYETHYLENE PIPE                           |
| INV.   | INVERT                                                   |
| IPS    | IRON PIPE SIZE (INDUSTRY STANDARD OUTSIDE PIPE DIAMETER) |
| LF     | LINEAR FEET                                              |
| MFR    | MANUFACTURER                                             |
| MH     | MANHOLE                                                  |
| SDR    | SIDE DIMENSION RATIO                                     |
| SHT.   | SHEET                                                    |
| SS     | STAINLESS STEEL                                          |
| STA.   | STATION                                                  |
| TOJ    | TOP OF PIPE JACKET                                       |
| V.B.   | VALVE BOX                                                |
| WS     | WATER SURFACE                                            |

RECORD DRAWING CERTIFICATE

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SCALE:  
AS SHOWN



2010-11 WASTEWATER SYSTEM IMPROVEMENTS

GENERAL NOTES  
DESIGN CRITERIA  
AND LEGEND  
TULUKSAK, ALASKA

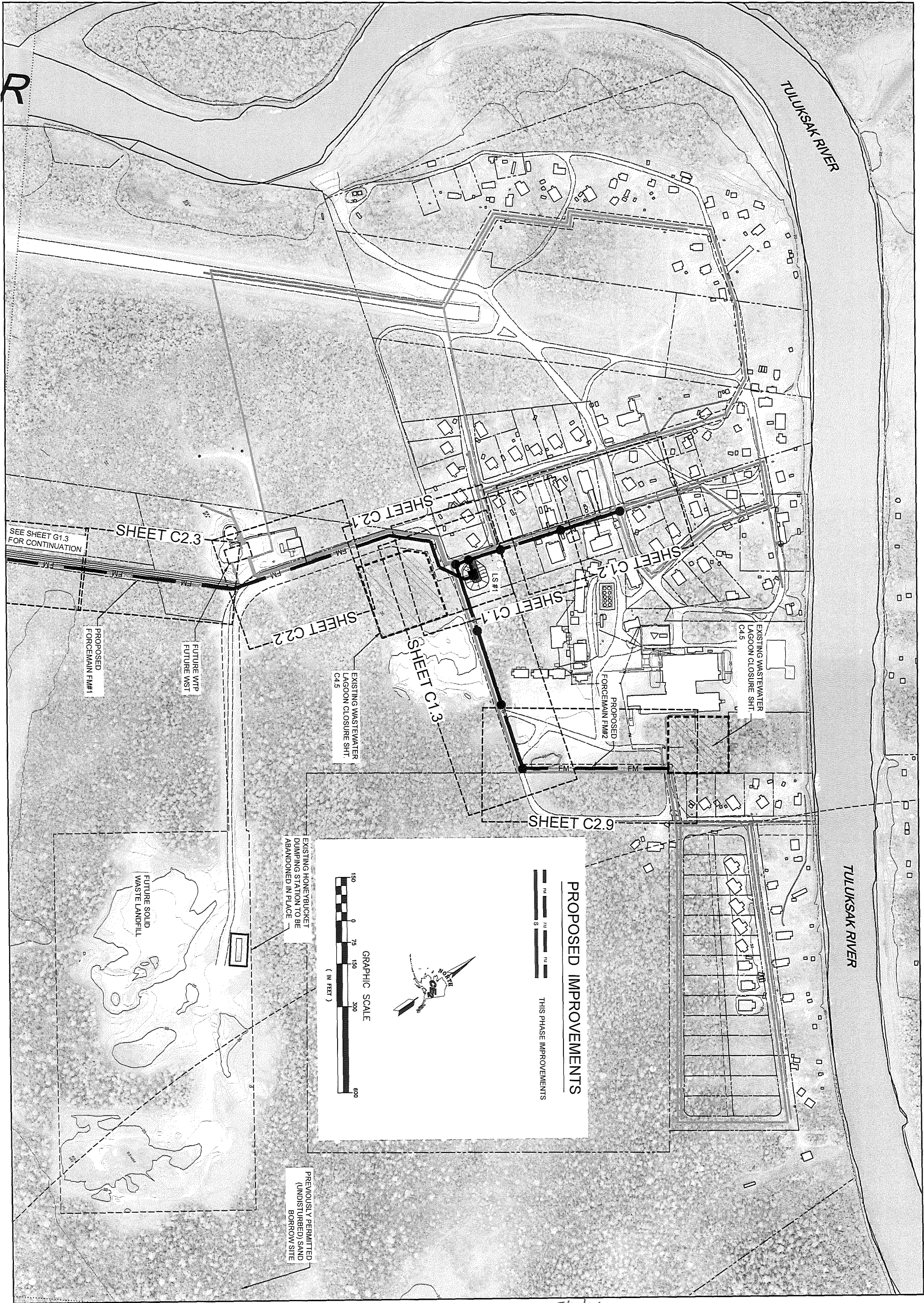


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|-------------|------------|-------|----------|-----|
| Project No. | APRIL 2014 | LAP   | DDR      | LAP |
| Date        | Designed   | Drawn | Approved |     |

Sheet No. G1.1





Sheet No.  
**G1.2**

Project No. \_\_\_\_\_

Date **APRIL 2014**

Designed **LAP**

Drawn **CMLAW**

Approved **LAP**

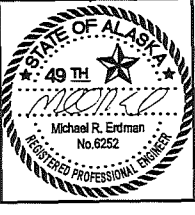
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**CE<sub>2</sub>**  
**ENGINEERS, INC.**  
PO BOX 222946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

2010 AND 2011  
IMPROVEMENTS  
SHEET INDEX

TULUKSAK, ALASKA

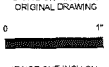


49<sup>TH</sup>  
Michael R. Erdman  
No. 6252  
REGISTERED PROFESSIONAL ENGINEER



SCALE:  
AS SHOWN

BAS IS ONE INCH ON  
ORIGINAL DRAWING



IF NOT ONE INCH ON  
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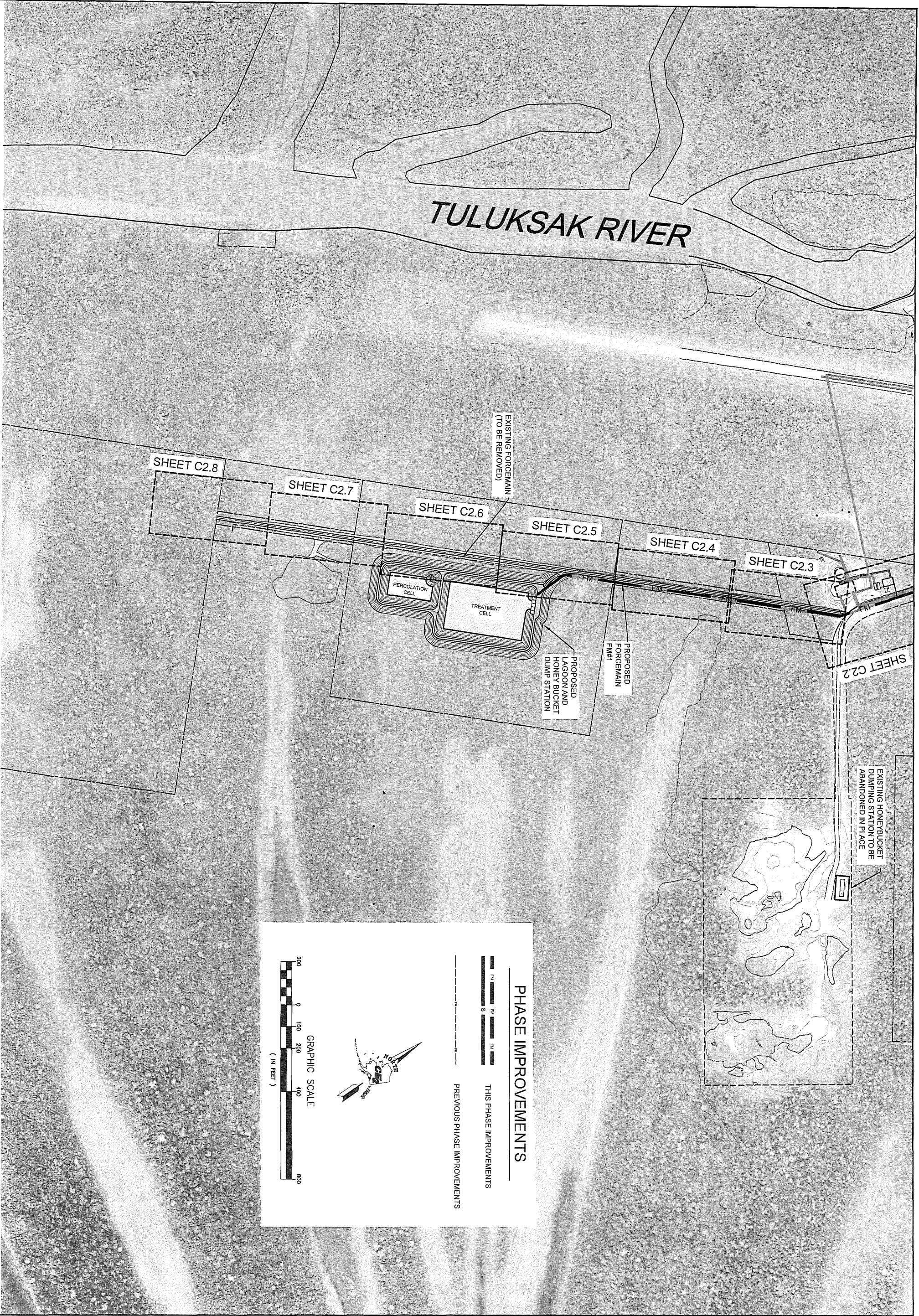
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NAME \_\_\_\_\_ DATE \_\_\_\_\_

5/7/14











PROJECT CONTROL (GROUND) COORDINATE TABLE

| Number | Northing    | Easting     | Elevation | Raw Desc                                           |
|--------|-------------|-------------|-----------|----------------------------------------------------|
| 3000   | 2594455.041 | 1824590.109 | 23.63     | 3AVE BLN BRASS CAP COR, 2, USS 875, (1960)         |
| 3001   | 2595445.568 | 1824701.089 | 27.22     | BLN BRASS CAP LOT 3, COR, 2 USS 4435 (1991)        |
| 3002   | 2594347.493 | 1823027.080 | 25.04     | 2" ALUMINUM CAP (1975) TSH LT-136714 (1997)        |
| 3003   | 2590693.676 | 1818857.680 | 27.33     | BLN BRASS CAP LOT 1, COR, 1 USS 3797 (1960 & 1991) |
| 3004   | 2589887.470 | 1819682.122 | 26.52     | BLN BRASS CAP LOT 1, COR, 3 USS 3797 (1960 & 1991) |
| 3005   | 2594343.463 | 1826409.100 | 26.20     | RED PLASTIC CAP (KELINTOCK)                        |
| 3006   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3007   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3008   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3009   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3010   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3011   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3012   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3013   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3014   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3015   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3016   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3017   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3018   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3019   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3020   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3021   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3022   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3023   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |
| 3024   | 2594258.753 | 1826560.781 | 27.97     | SET SPIKE                                          |

LEGEND

- 3015 TYPICAL CONTROL POINT IDENTIFIER
- 3015 TYPICAL CONTROL POINT IDENTIFIER WITH CONVENTIONAL DIFFERENTIAL ELEVATION

SURVEY NOTES

THIS SURVEY WAS PERFORMED WITH TRIMBLE MODEL 4700 RECEIVERS AND TRIMBLE GEOMATICS OFFICE VERSION 1.5 PROCESSING SOFTWARE. THE HORIZONTAL POSITIONS WERE DETERMINED WITH REAL TIME KINETIC METHODS BASED UPON POINT NUMBER 3000, THE BASE STATION POINT. SEE LOCAL PROJECT COORDINATE TABLE FOR POINT 3000 LOCAL PROJECT COORDINATES. POINT 3000 ALSO HAD "AD 83 AK STATE PLANE ZONE 7 COORDINATES OF N=2594539.293 USFT, E=1824246.230 USFT, OR N=790417.158 M, E=558031.363 M, DETERMINED BY POST PROCESSING 3 STATIC SESSIONS WITH 5 OTHER CORRS STATIONS.

THIS SURVEY'S COORDINATES ARE US SURVEY FEET BASED ON ALASKA DATAPF PROJECT AKASAS 51745, TULUKSAK AIRPORT, 1997 SURVEY CONTROL, SUBMITTED BY STANLEY E. PONDRECH, 13-6714. THIS SURVEY WAS CALIBRATED OR LOCALIZED TO SAID SURVEY BY A LEAST SQUARES BEST FIT USING SIX OF THE FORMER SURVEY CONTROL POINTS SPREAD AROUND THIS PROJECT. ALL SIX POINTS OF THIS SURVEY FIT WITHIN 0.1 USFT OF THE FORMER SURVEY PUBLISHED VALUES. THIS SURVEY THEREFORE MAINTAINS THE FORMER SURVEY HORIZONTAL GROUND DISTANCES AND LOCAL PLANE BEARINGS AS ORIGINATED TO THE MEAN HAD 83 GEODETIC BEARING OF N 34°04'42"E BETWEEN MONUMENTS SET TO DEFINE THE CENTERLINE OF A PLANNED FUTURE RUNWAY CENTERLINE. SAID BEARINGS WERE REPORTED TO BE DETERMINED FROM GPS SURVEY METHODS ORIGINATING AT NGS 8 ORDER GPS STATION "CARH" LOCATED NEAR BETHEL.

VERTICAL DATUM IS HAYWARD BASED UPON THIS SURVEY'S AFOREMENTIONED POST PROCESSING. THE ELLIPSOIDAL HEIGHT OF POINT NO. 3000 WAS DETERMINED TO BE 67.010 USFT, AND THE ORTHOMETRIC HEIGHT (ABOVE GEOID OR APPROXIMATE MEAN SEA LEVEL) WAS HELD AS 23.634 USFT. CONVENTIONAL DIFFERENTIAL LEVEL LOOPS WERE USED TO CONTROL THE VERTICAL POSITIONING, USING THE ELEVATION OF 23.634 USFT OF POINT NO. 3000 AS THE BASIS OF ELEVATION.

US ARMY CORP. OF ENGINEERS FLOOD WATER GAUGE ELEVATION 0.0 IS ELEVATION 28.33 (THIS SURVEY) AS DETERMINED AT THE GAUGE SIGN ON THE CLASSROOM BUILDING IN FRONT OF THE HIGH SCHOOL. THE FLOOD WATER GAUGE SIGN LISTS THE HIGH WATER MARK AT 3.9 FEET AND THE RECOMMENDED BUILDING ELEVATION AT 5.9 FEET.

TBM 7 EL=30.40'  
HIGHEST PART OF 30"x30" CONC.  
WIND SOCK BASE (TIPPED OVER)

USS 3797  
LOT 1

TBM SPIKE EL=25.43'  
NORTH SIDE OF POWER POLE  
1' ABOVE GROUND

TBM FINISH FLOOR  
TULUKSAK NATIVE STORE  
EL=28.74'

REQUIRE EASEMENT

USS 4435  
LOT 2

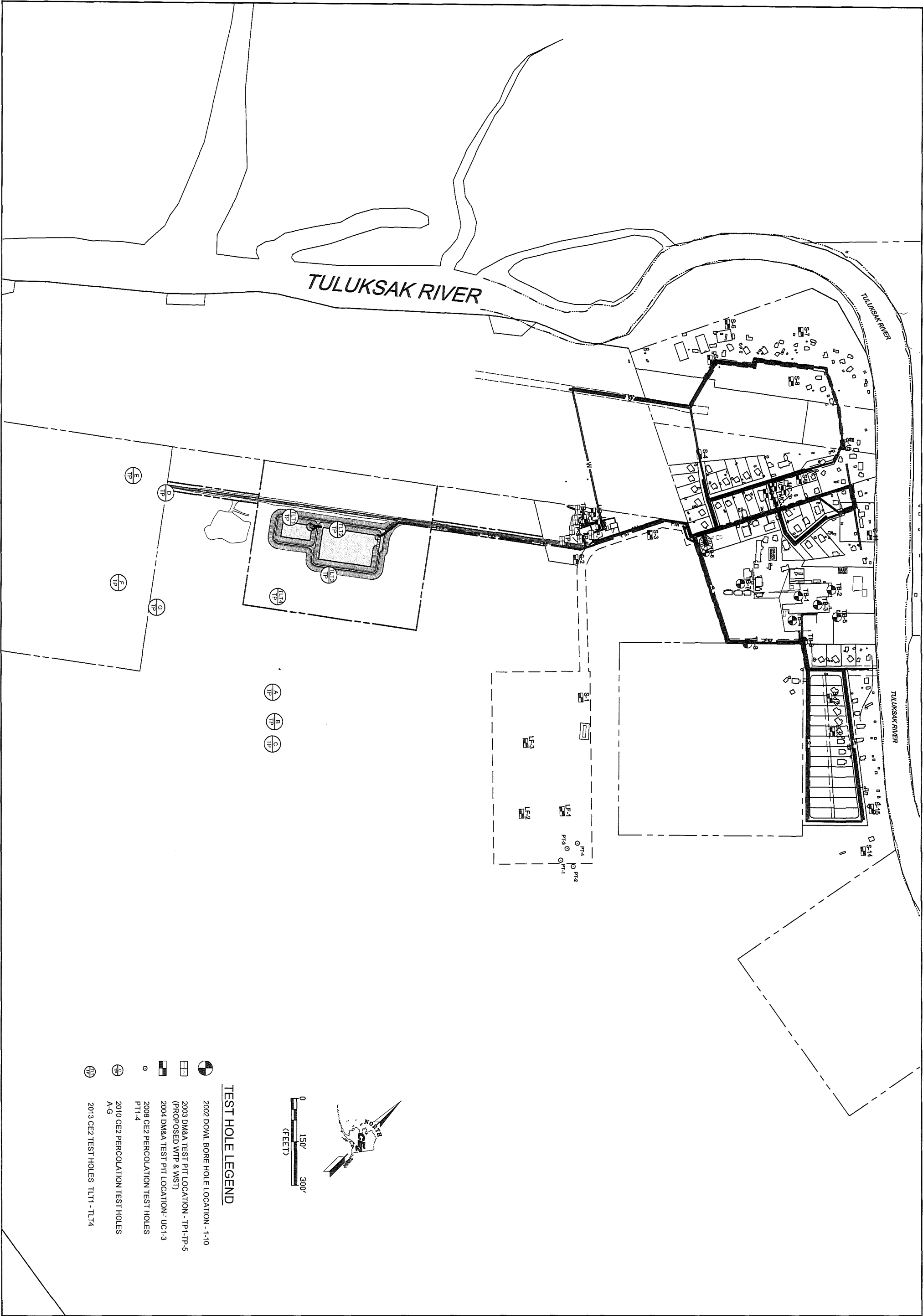
LONG TERM LEASE FROM  
TULUKSAMUIT CORP  
19--

DATE 10-20-03  
SCALE 1"=100'  
SHEET 1 OF 1  
JOB No. 3698  
DRAWING: 3698TULUKSAK

TULUKSAK  
SURVEY CONTROL DIAGRAM  
ABILITY SURVEYS  
GARY D. NELSON, P.L.S.  
(907)235-8440  
152 DEHEL AVE., HOMER, ALASKA

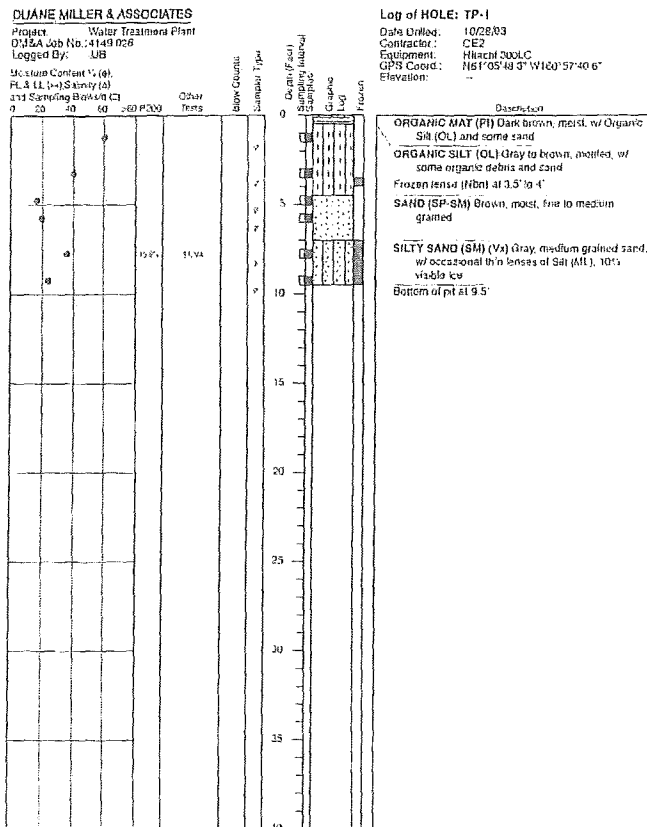
|                                                                                                                                                |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| RECORD DRAWING CERTIFICATE                                                                                                                     |                       |
| THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE. |                       |
| SCALE: AS SHOWN                                                                                                                                | NAME _____ DATE _____ |
| TULUKSAK, ALASKA                                                                                                                               |                       |
| 2010-11 WASTEWATER SYSTEM IMPROVEMENTS                                                                                                         |                       |
| HORIZONTAL AND VERTICAL CONTROL                                                                                                                |                       |
| CE2 ENGINEERS, INC.<br>PO BOX 22046 ANCHORAGE, AK 99502 PH 907-546-0001 FAX 907-546-0055                                                       |                       |
| BY DATE                                                                                                                                        | REVISION              |
| Project No. _____                                                                                                                              | Designed _____        |
| Date _____                                                                                                                                     | Drawn _____           |
| LAP _____                                                                                                                                      | Approved _____        |
| Ability _____                                                                                                                                  | LAP _____             |
| Sheet No. _____                                                                                                                                | G2.0                  |



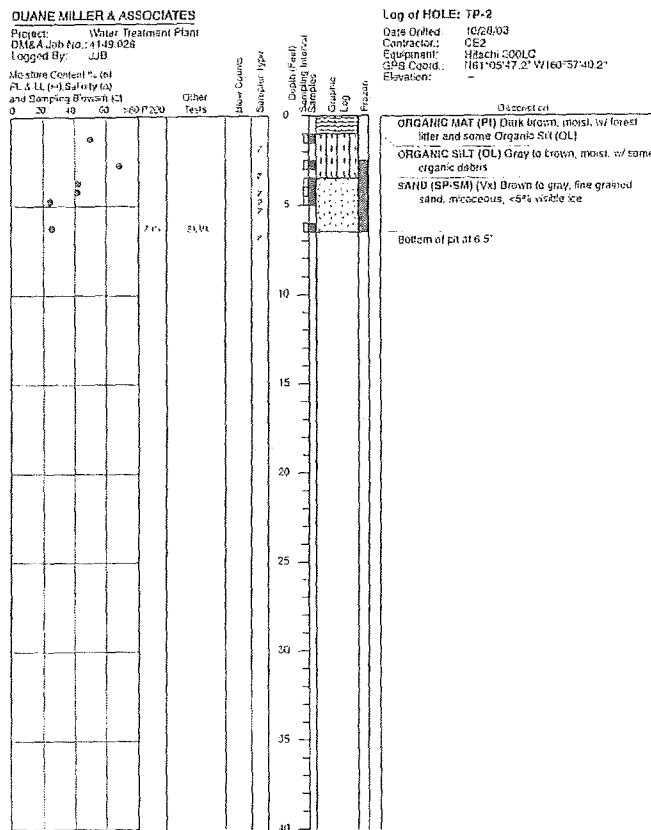


|                              |                        |                   |    |      |                                                                          |                                           |                                |                  |            |  |                                                          |                                                                                                                                                                                  |
|------------------------------|------------------------|-------------------|----|------|--------------------------------------------------------------------------|-------------------------------------------|--------------------------------|------------------|------------|--|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sheet No.<br><br><b>G3.0</b> | Project No. _____      | REVISION          | BY | DATE | <br>PO BOX 220946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015 | 2010-11 WASTEWATER<br>SYSTEM IMPROVEMENTS | TEST HOLE SITE<br>LOCATION MAP | TULUKSAK, ALASKA | <br>5/7/14 |  | SCALE:<br>AS SHOWN                                       | RECORD DRAWING CERTIFICATE<br><br>THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE. |
|                              | Date <u>APRIL 2014</u> | LAGOON RELOCATION | CM | 4/14 |                                                                          |                                           |                                |                  |            |  | BAR IS ONE INCH ON ORIGINAL DRAWING                      |                                                                                                                                                                                  |
|                              | Designed <u>MRE</u>    |                   |    |      |                                                                          |                                           |                                |                  |            |  | 0 1'                                                     |                                                                                                                                                                                  |
|                              | Drawn <u>CM</u>        |                   |    |      |                                                                          |                                           |                                |                  |            |  | IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY |                                                                                                                                                                                  |
|                              | Approved <u>MRE</u>    |                   |    |      |                                                                          |                                           |                                |                  |            |  | NAME _____ DATE _____                                    |                                                                                                                                                                                  |

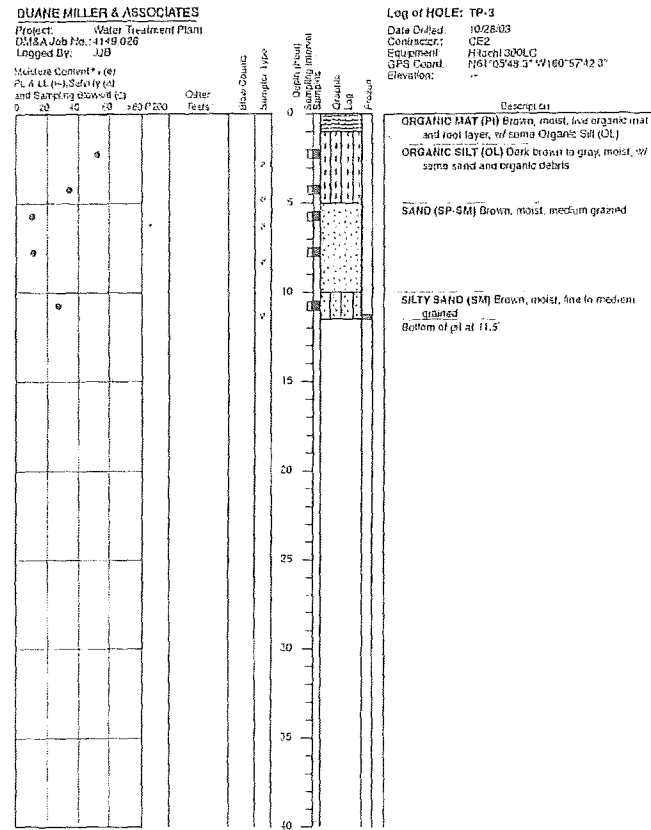




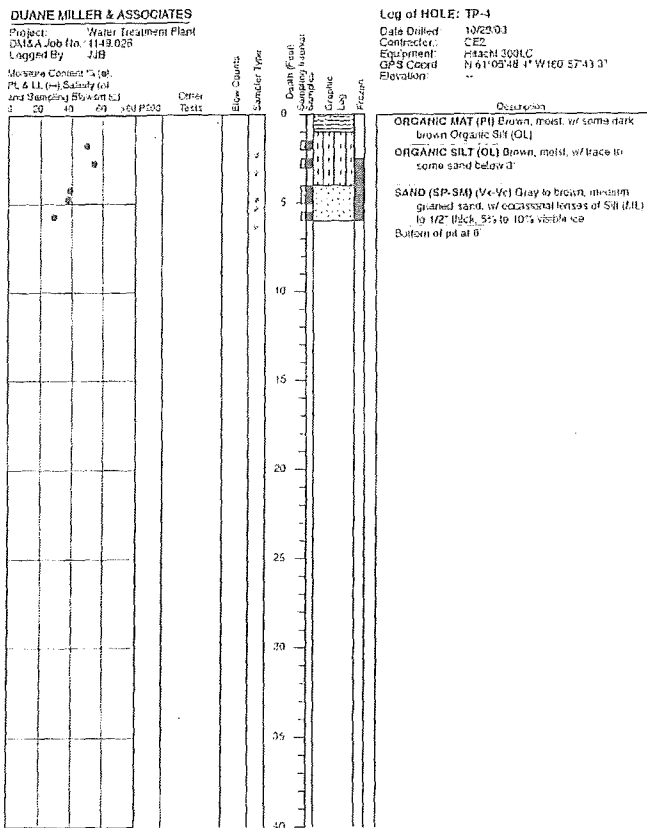
**LOG of TEST PIT TP-1**  
Water & Sewer  
Tulukak, Alaska  
Plate 2



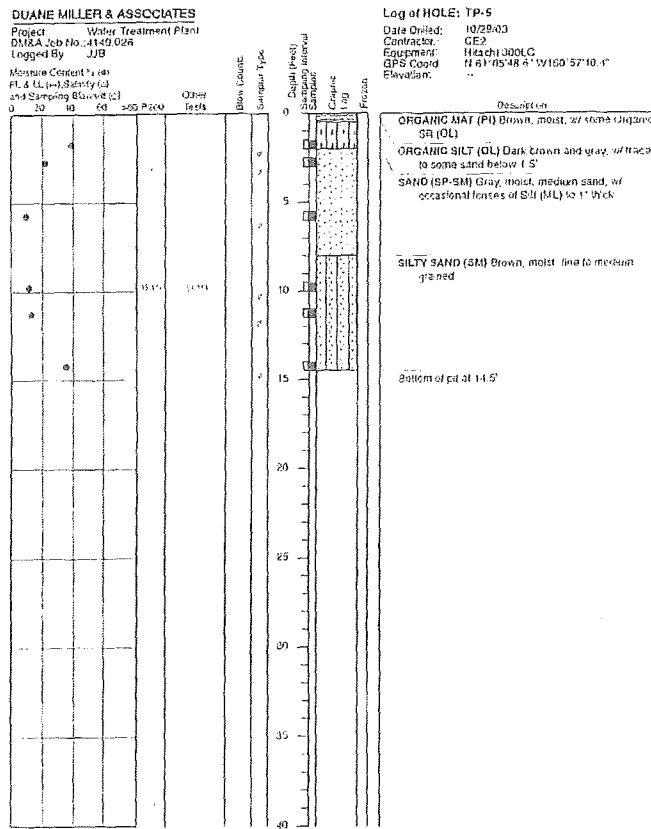
**LOG of TEST PIT TP-2**  
Water & Sewer  
Tulukak, Alaska  
Plate 3



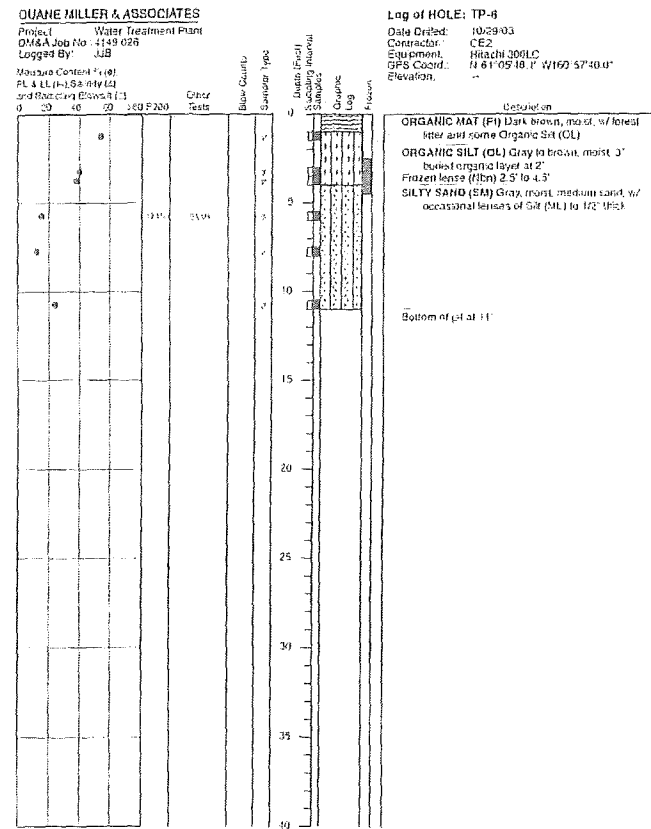
**LOG of TEST PIT TP-3**  
Water & Sewer  
Tulukak, Alaska  
Plate 4



**LOG of TEST PIT TP-4**  
Water & Sewer  
Tulukak, Alaska  
Plate 5



**LOG of TEST PIT TP-5**  
Water & Sewer  
Tulukak, Alaska  
Plate 6



**LOG of TEST PIT TP-6**  
Water & Sewer  
Tulukak, Alaska  
Plate 7

**RECORD DRAWING CERTIFICATE**  
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: 1" = 10'-0" (VERTICAL)  
1" = 10'-0" (HORIZONTAL)

**2010-11 WASTEWATER SYSTEM IMPROVEMENTS**  
**TEST HOLE BORING LOGS**  
TULUKAK, ALASKA

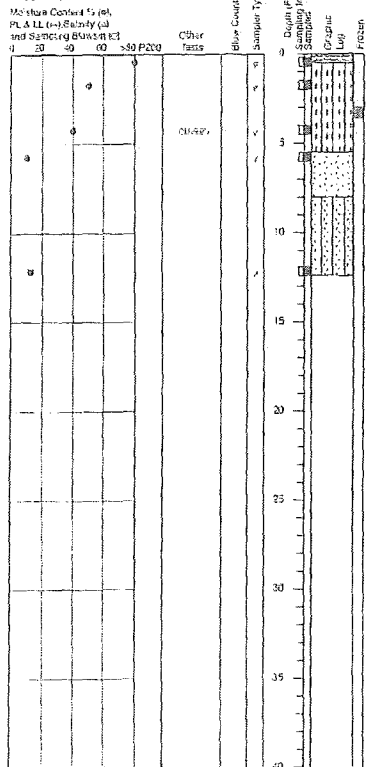
**CE2 ENGINEERS, INC.**  
PO BOX 2200, NOME, AK 99567  
TEL: 907-566-9018 FAX: 907-566-9016

| REVISION | BY | DATE |
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| Project No. | Date | Designed | Drawn | Approved |
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Sheet No. **G3.1**

**DUANE MILLER & ASSOCIATES**  
Project: Water & Sewer  
DMAA Job No.: 4149.026  
Logged By: N. Lunny



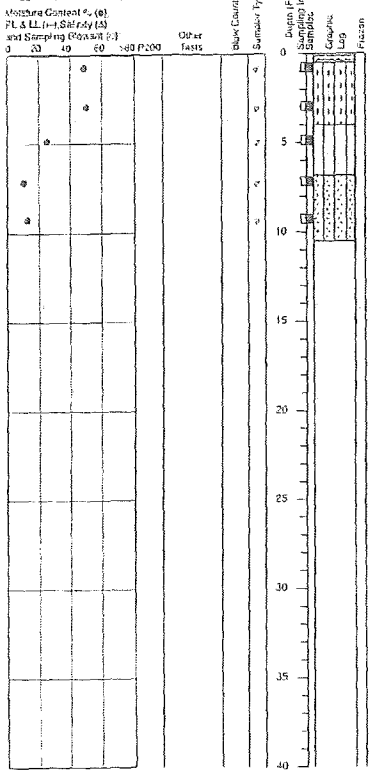
**Log of HOLE: UC-1**  
Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hitachi EX300LC  
GPS Coord.: N 61°05'51.7\"/>

ORGANIC MAT (P) Dark brown, moist, fibrous, w/ some organic silt (OL)  
ORGANIC SILT (OL) Dark brown, moist, w/ fibrous organics, broken fibers (fib) at 3' to 3.9'  
SAND (SP-SM) Brown, moist, medium grained  
SILTY SAND (SM) Brown, moist, medium grained

**LOG of TEST PIT UC-1**  
Water & Sewer  
Tulukak, Alaska

Plate 8

**DUANE MILLER & ASSOCIATES**  
Project: Water & Sewer  
DMAA Job No.: 4149.026  
Logged By: N. Lunny



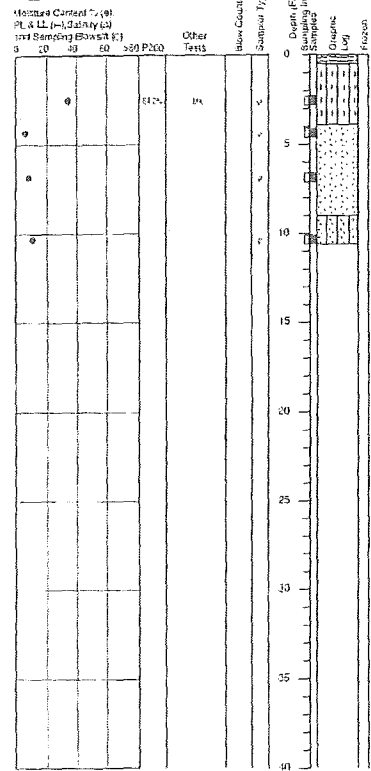
**Log of HOLE: UC-2**  
Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hitachi EX300LC  
GPS Coord.: N 61°05'51.7\"/>

ORGANIC MAT (P) Brown, moist  
ORGANIC SILT (OL) Dark brown, moist, w/ trace sand and some organic debris  
SILT (ML) Gray to brown, moist, w/ trace fine sand  
SILTY SAND (SM) Brown, moist, medium grained

**LOG of TEST PIT UC-2**  
Water & Sewer  
Tulukak, Alaska

Plate 9

**DUANE MILLER & ASSOCIATES**  
Project: Water & Sewer  
DMAA Job No.: 4149.026  
Logged By: N. Lunny



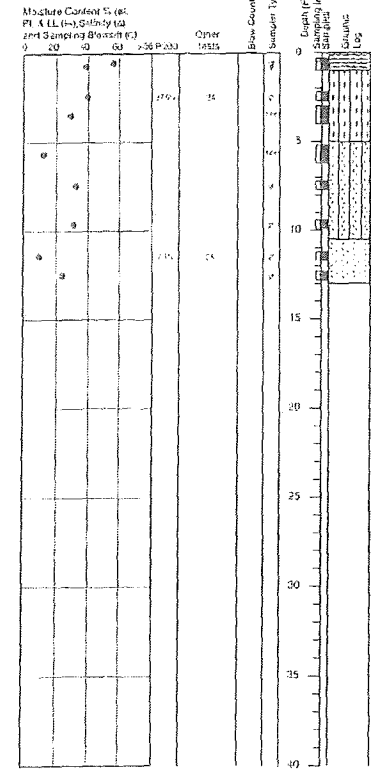
**Log of HOLE: UC-3**  
Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hitachi EX300LC  
GPS Coord.: N 61°05'51.7\"/>

ORGANIC MAT (P) Brown, moist  
ORGANIC SILT (OL) Dark brown, moist, w/ trace sand and some organic debris  
SAND (SP-SM) Brown, moist, w/ trace fine gravel  
SILTY SAND (SM) Brown, moist, medium grained

**LOG of TEST PIT UC-3**  
Water & Sewer  
Tulukak, Alaska

Plate 10

**DUANE MILLER & ASSOCIATES**  
Project: Water & Sewer  
DMAA Job No.: 4149.026  
Logged By: N. Lunny



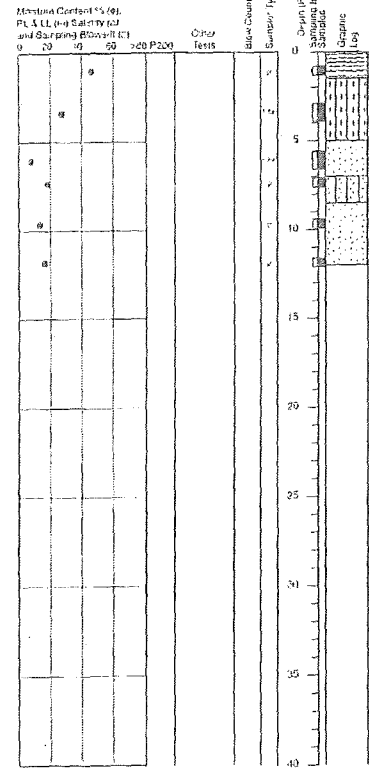
**Log of HOLE: LF-1**  
Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hitachi EX300LC  
GPS Coord.: N 61°05'51.7\"/>

ORGANIC MAT (P) (M) Dark brown, fibrous, w/ some organic silt (OL)  
ORGANIC SILT (OL) Dark brown, w/ some organic debris, unbroken below 1.5'  
SILTY SAND (SM) Brown, moist, fine to medium grained  
SAND (SP-SM) Brown, moist, fine grained

**LOG of TEST PIT LF-1**  
Water & Sewer  
Tulukak, Alaska

Plate 11

**DUANE MILLER & ASSOCIATES**  
Project: Water & Sewer  
DMAA Job No.: 4149.026  
Logged By: N. Lunny



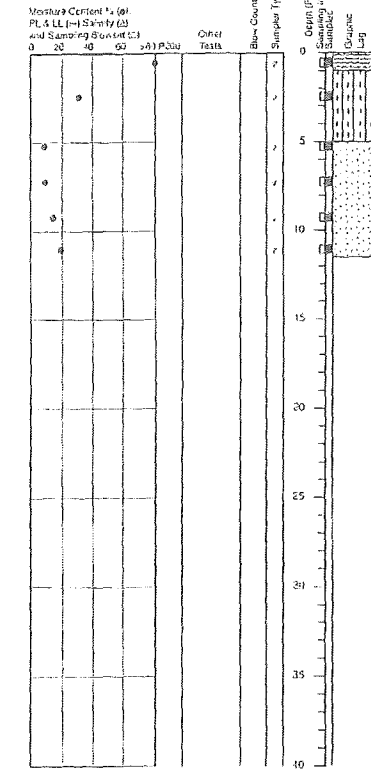
**Log of HOLE: LF-2**  
Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hitachi EX300LC  
GPS Coord.: N 61°05'51.7\"/>

ORGANIC MAT (P) (M) Dark brown, fibrous, w/ some organic silt (OL)  
ORGANIC SILT (OL) Brown, moist  
SAND (SP-SM) Brown, moist, fine to medium grained  
SILTY SAND (SM) Brown, moist, fine grained, w/ trace organics  
SAND (SP) Brown, moist, medium grained

**LOG of TEST PIT LF-2**  
Water & Sewer  
Tulukak, Alaska

Plate 12

**DUANE MILLER & ASSOCIATES**  
Project: Water & Sewer  
DMAA Job No.: 4149.026  
Logged By: N. Lunny



**Log of HOLE: LF-3**  
Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hitachi EX300LC  
GPS Coord.: N 61°05'51.7\"/>

ORGANIC MAT (P) (M) Dark brown, moist, fibrous, w/ some organic silt (OL)  
ORGANIC SILT (OL) Brown, moist, w/ some organic debris  
SAND (SP) Brown, moist, w/ occasional interbeds of Silty Sand (SM)

**LOG of TEST PIT LF-3**  
Water & Sewer  
Tulukak, Alaska

Plate 13

**RECORD DRAWING CERTIFICATE**  
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION INSPECTION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: 1" = 10'-0" (VERTICAL)  
1" = 10'-0" (HORIZONTAL)

2010-11 WASTEWATER SYSTEM IMPROVEMENTS  
TEST HOLE BORING LOGS  
TULUKAK, ALASKA

**CE2 ENGINEERS, INC.**  
PO BOX 25244 ANCHORAGE, AK 99525 PH: 505-464-0011 FAX: 505-464-0013

| REVISION | BY | DATE |
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Project No. \_\_\_\_\_  
Date: JUNE 2009  
Designed: LAF  
Drawn: SH  
Approved: LAF

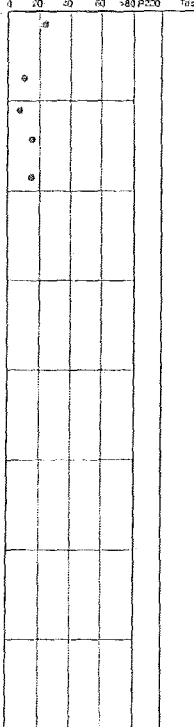
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DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No.: 4149.026  
Logged By: N Lunny

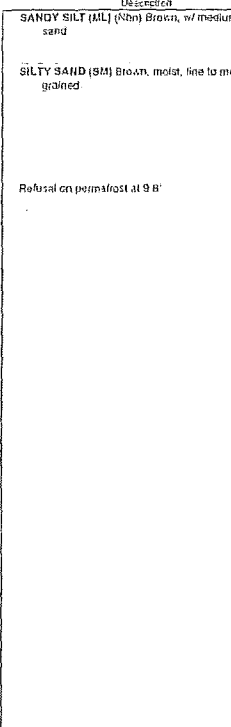
Moisture Content % (at  
PL & LL (w/ Sampling Box) (C)  
and Sampling Box) (C)



Log of HOLE: S-1

Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hachi EX300LC  
GPS Coord.: N 81°05.625' W 160°57.333'

Elevation:  
Refusal on penitlast at 9.8'



DUANE MILLER & ASSOCIATES  
Job No.: 4149.026  
Date: February 2005

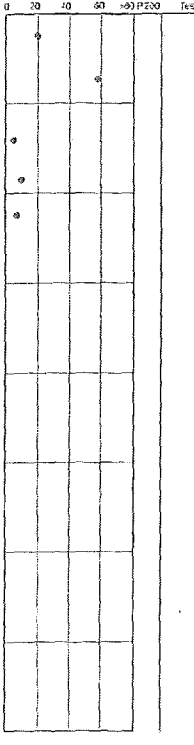
LOG of TEST PIT S-1  
Water & Sewer  
Tulukak, Alaska

Plate  
14

DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No.: 4149.026  
Logged By: N Lunny

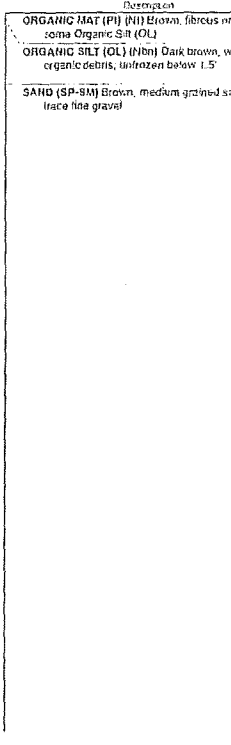
Moisture Content % (at  
PL & LL (w/ Sampling Box) (C)  
and Sampling Box) (C)



Log of HOLE: S-2

Date Drilled: 12/16/04  
Contractor: CE2  
Equipment: Hachi EX300LC  
GPS Coord.: N 81°05.793' W 160°57.841'

Elevation:  
Refusal on penitlast at 9.8'



DUANE MILLER & ASSOCIATES  
Job No.: 4149.026  
Date: February 2005

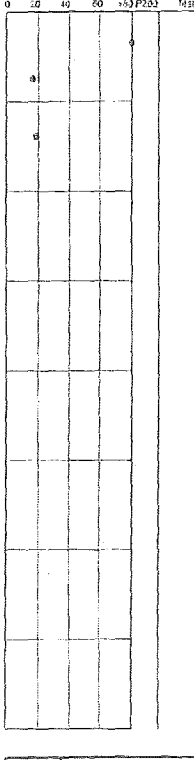
LOG of TEST PIT S-2  
Water & Sewer  
Tulukak, Alaska

Plate  
15

DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No.: 4149.026  
Logged By: N Lunny

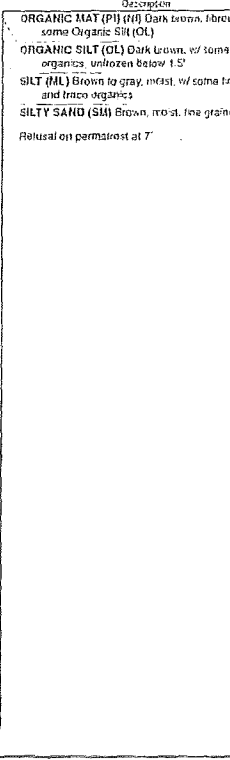
Moisture Content % (at  
PL & LL (w/ Sampling Box) (C)  
and Sampling Box) (C)



Log of HOLE: S-3

Date Drilled: 12/17/04  
Contractor: CE2  
Equipment: Hachi EX300LC  
GPS Coord.: N 81°05.785' W 160°57.550'

Elevation:  
Refusal on penitlast at 7'



DUANE MILLER & ASSOCIATES  
Job No.: 4149.026  
Date: February 2005

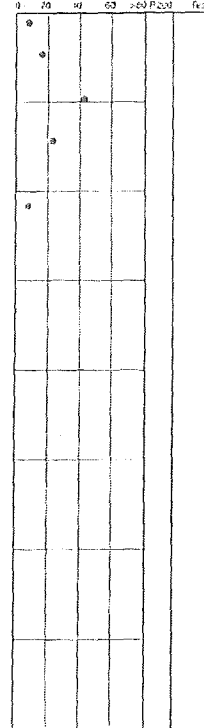
LOG of TEST PIT S-3  
Water & Sewer  
Tulukak, Alaska

Plate  
16

DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No.: 4149.026  
Logged By: N Lunny

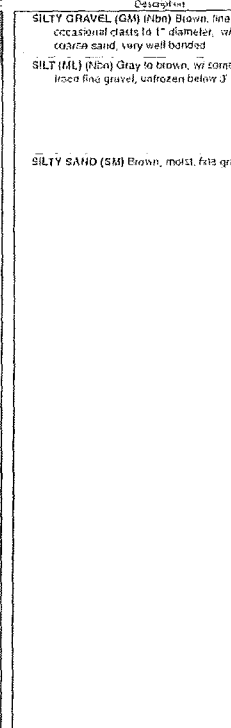
Moisture Content % (at  
PL & LL (w/ Sampling Box) (C)  
and Sampling Box) (C)



Log of HOLE: S-4

Date Drilled: 12/17/04  
Contractor: CE2  
Equipment: Hachi EX300LC  
GPS Coord.: N 81°05.959' W 160°57.678'

Elevation:  
Refusal on penitlast at 9.8'



DUANE MILLER & ASSOCIATES  
Job No.: 4149.026  
Date: February 2005

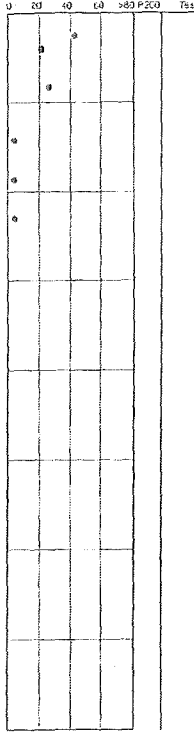
LOG of TEST PIT S-4  
Water & Sewer  
Tulukak, Alaska

Plate  
17

DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No.: 4149.026  
Logged By: N Lunny

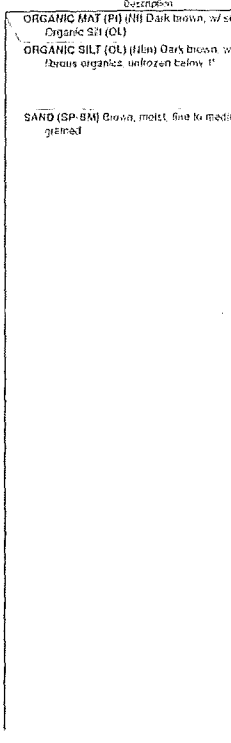
Moisture Content % (at  
PL & LL (w/ Sampling Box) (C)  
and Sampling Box) (C)



Log of HOLE: S-5

Date Drilled: 12/17/04  
Contractor: CE2  
Equipment: Hachi EX300LC  
GPS Coord.: N 81°05.024' W 160°57.817'

Elevation:  
Refusal on penitlast at 9.8'



DUANE MILLER & ASSOCIATES  
Job No.: 4149.026  
Date: February 2005

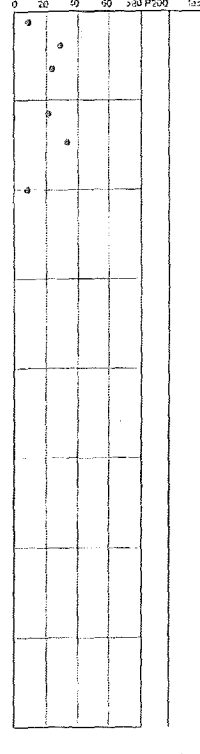
LOG of TEST PIT S-5  
Water & Sewer  
Tulukak, Alaska

Plate  
18

DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No.: 4149.026  
Logged By: N Lunny

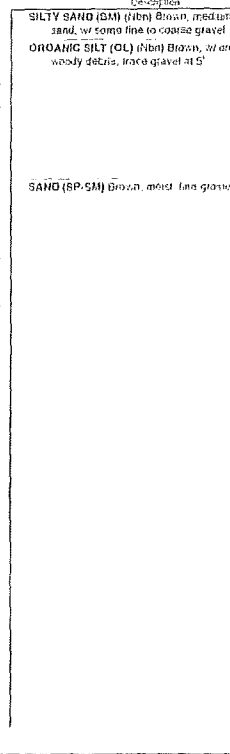
Moisture Content % (at  
PL & LL (w/ Sampling Box) (C)  
and Sampling Box) (C)



Log of HOLE: S-6

Date Drilled: 12/17/04  
Contractor: CE2  
Equipment: Hachi EX300LC  
GPS Coord.: N 81°05.035' W 160°57.835'

Elevation:  
Refusal on penitlast at 9.8'



DUANE MILLER & ASSOCIATES  
Job No.: 4149.026  
Date: February 2005

LOG of TEST PIT S-6  
Water & Sewer  
Tulukak, Alaska

Plate  
19

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
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CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

SCALE: 1" = 10' (VERTICAL)  
1" = 10' (HORIZONTAL)

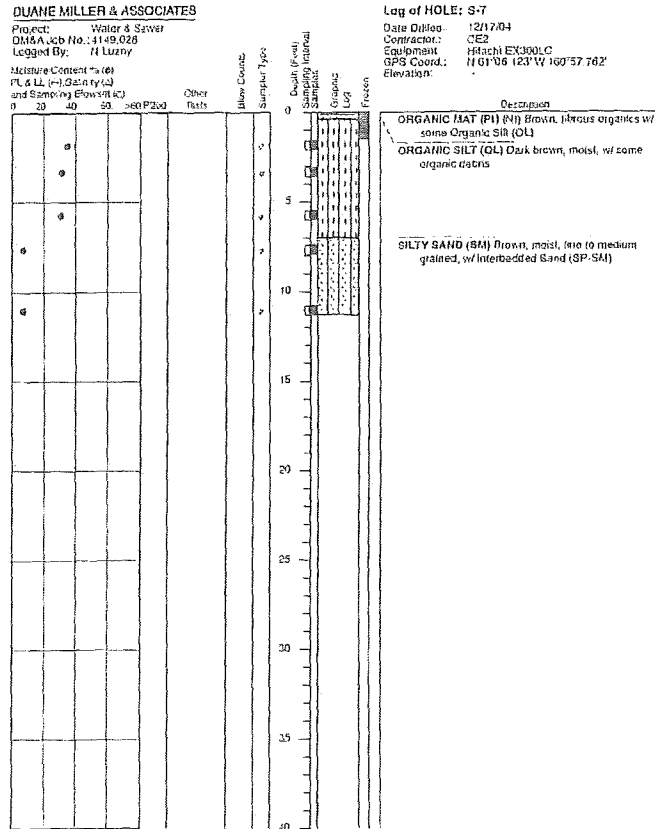
DATE: \_\_\_\_\_  
NAME: \_\_\_\_\_

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
TEST HOLE  
BORING LOGS  
TULUKSAK, ALASKA

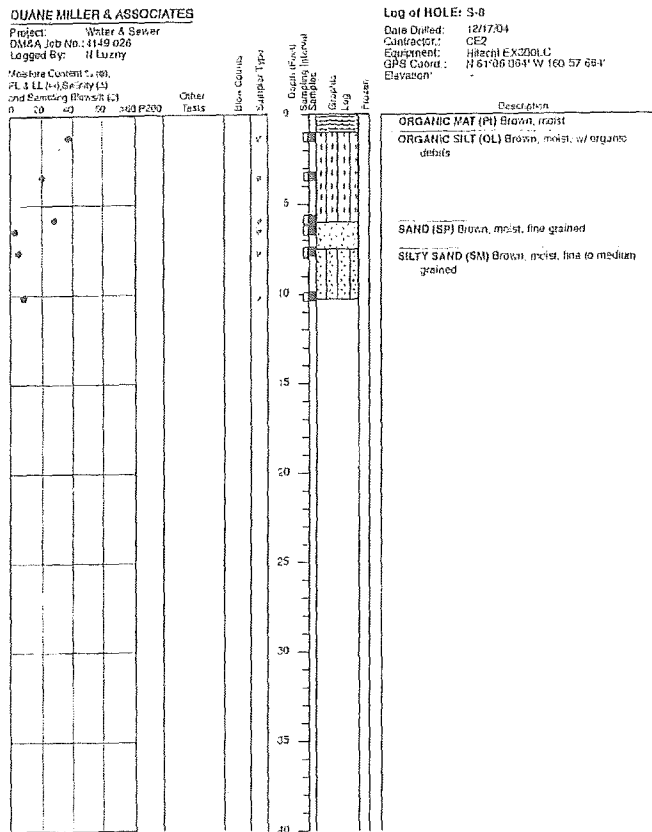
CE2  
ENGINEERS, INC.  
PO BOX 22040 ANCHORAGE, AK 99502 PH: 847-343-0118 FAX: 847-343-0115

Project No.: \_\_\_\_\_  
Date: JUNE 2009  
Designed: LAP  
Drawn: CML  
Approved: LAP

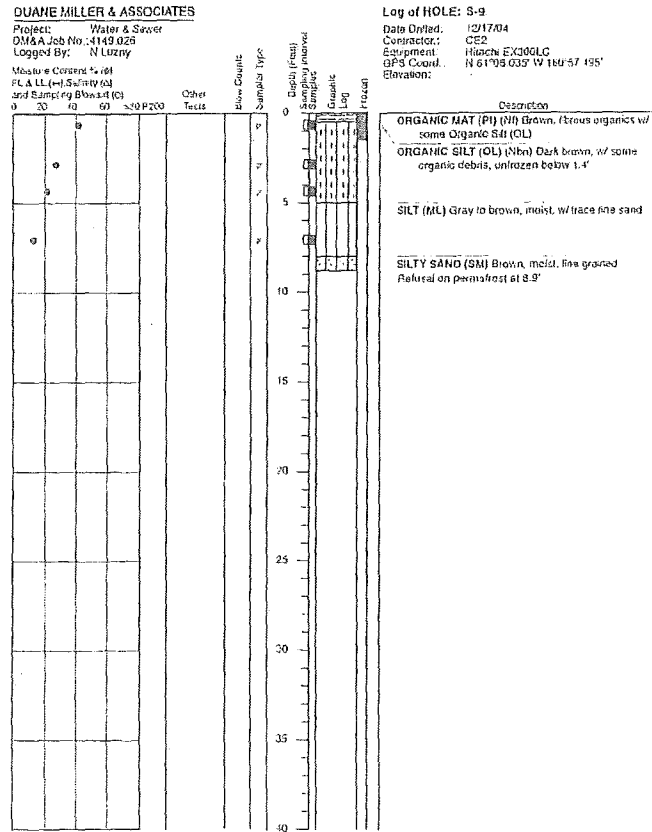
Sheet No.: G3.3



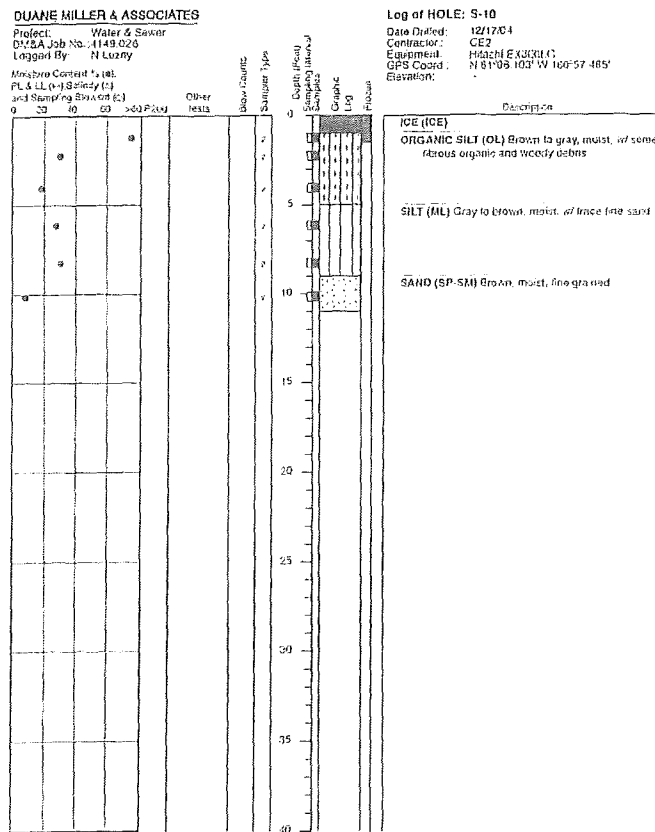
**LOG of TEST PIT S-7**  
Water & Sewer  
Tulukak, Alaska  
Plate 20



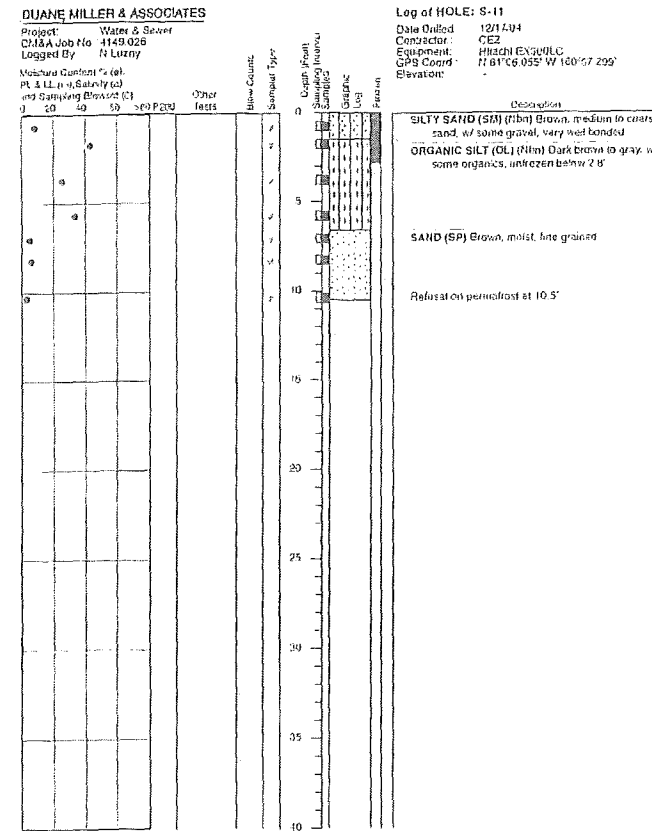
**LOG of TEST PIT S-8**  
Water & Sewer  
Tulukak, Alaska  
Plate 21



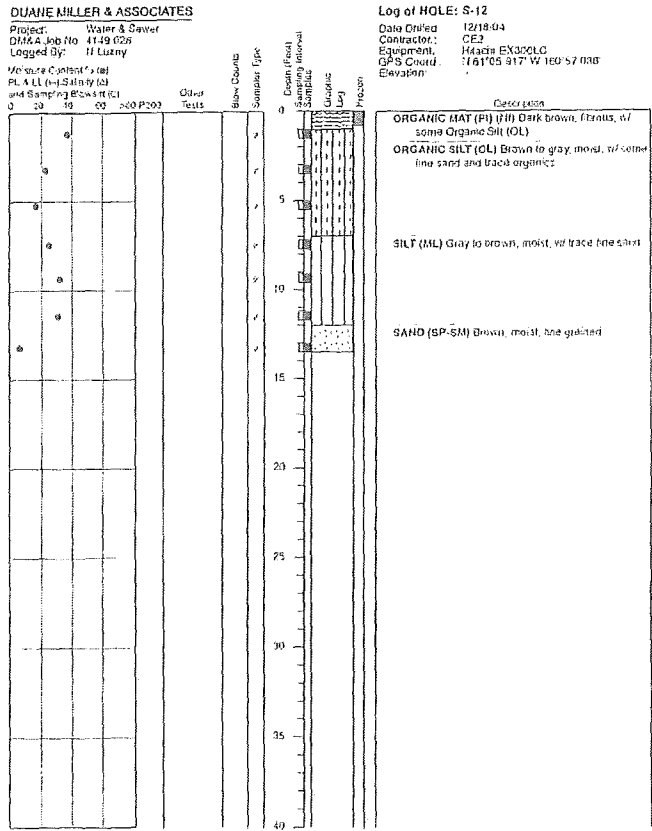
**LOG of TEST PIT S-9**  
Water & Sewer  
Tulukak, Alaska  
Plate 22



**LOG of TEST PIT S-10**  
Water & Sewer  
Tulukak, Alaska  
Plate 23



**LOG of TEST PIT S-11**  
Water & Sewer  
Tulukak, Alaska  
Plate 24



**LOG of TEST PIT S-12**  
Water & Sewer  
Tulukak, Alaska  
Plate 25

**RECORD DRAWING CERTIFICATE**  
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: 1" = 10' (VERTICAL)  
1" = 10' (HORIZONTAL)

DATE: \_\_\_\_\_ NAME: \_\_\_\_\_

**2010-11 WASTEWATER SYSTEM IMPROVEMENTS**  
**TEST HOLE BORING LOGS**  
TULUKSAK, ALASKA

**CE2 ENGINEERS, INC.**  
PO BOX 22044 ANCHORAGE, AK 99529 TEL: 907-546-1015 FAX: 907-546-1015

| REVISION | BY | DATE |
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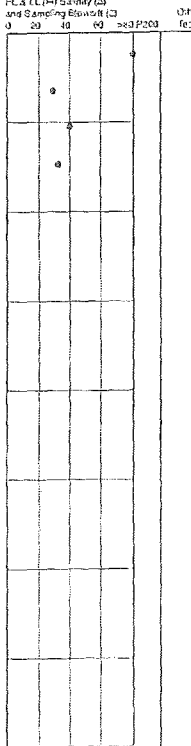
Project No. \_\_\_\_\_ Date: JUNE 2009  
Designed by: LAP  
Drawn by: CM  
Approved by: LAP

Sheet No. **G3.4**



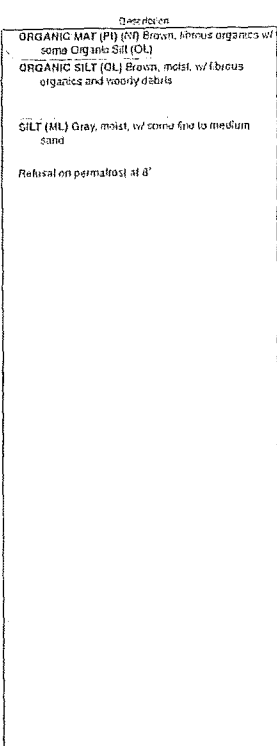
DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No. 1149.026  
Logged By: N. Lutzny  
Machine Control # (a)  
FL & LL (b) Sandy (a)  
and Sampling Elevations (c)  
0 20 40 60 80 P200



Log of HOLE: S-13

Date Drilled: 12/18/04  
Contractor: C&E  
Equipment: Hocht EX300LC  
GPS Coord: N 61°05' 88.5" W 160°58' 91.4"  
Elevation:



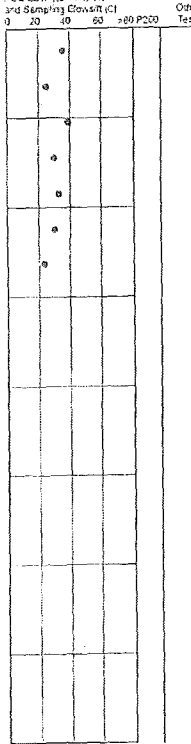
Duane Miller & Associates  
Job No. 1149.026  
Date: February 2005

LOG of TEST PIT S-13  
Water & Sewer  
Tuluksoak, Alaska

Plate 26

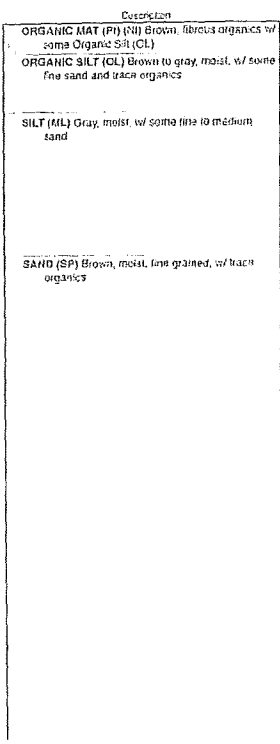
DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No. 1149.026  
Logged By: N. Lutzny  
Machine Control # (a)  
FL & LL (b) Sandy (a)  
and Sampling Elevations (c)  
0 20 40 60 80 P200



Log of HOLE: S-14

Date Drilled: 12/18/04  
Contractor: C&E  
Equipment: Hocht EX300LC  
GPS Coord: N 61°05' 83.9" W 160°58' 72.2"  
Elevation:



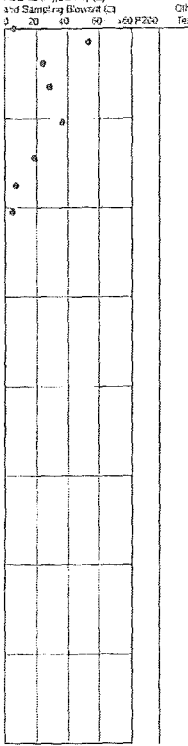
Duane Miller & Associates  
Job No. 1149.026  
Date: February 2005

LOG of TEST PIT S-14  
Water & Sewer  
Tuluksoak, Alaska

Plate 27

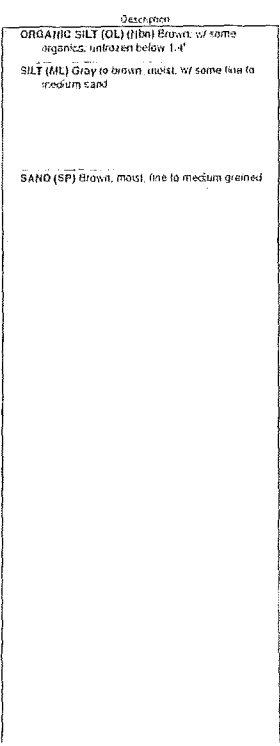
DUANE MILLER & ASSOCIATES

Project: Water & Sewer  
DMA Job No. 1149.026  
Logged By: N. Lutzny  
Machine Control # (a)  
FL & LL (b) Sandy (a)  
and Sampling Elevations (c)  
0 20 40 60 80 P200



Log of HOLE: S-15

Date Drilled: 12/18/04  
Contractor: C&E  
Equipment: Hocht EX300LC  
GPS Coord: N 61°05' 87.0" W 160°58' 78.0"  
Elevation:



Duane Miller & Associates  
Job No. 1149.026  
Date: February 2005

LOG of TEST PIT S-15  
Water & Sewer  
Tuluksoak, Alaska

Plate 28

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.  
NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:  
1" = 10'  
1" = 20'  
1" = 40'  
1" = 80'  
1" = 160'

KLEIN SAFE WATER  
TULUKSAK, ALASKA

TULUKSAK, ALASKA

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
TEST HOLE  
BORING LOGS  
TULUKSAK, ALASKA

C&E ENGINEERS, INC.  
PO BOX 1294 ANCHORAGE, AK 99511 PH 907-546-0101 FAX 907-546-0105

Project No. \_\_\_\_\_  
Date: JUNE 2009  
Designed: LAP  
Drawn: CL  
Approved: LAP

Sheet No. G3.5

TULUKSAK, AK

TEST PIT "A"

N 61° 05' 21.8"

W 160° 57' 57.1"

VEGETATION: ALDER, SOME BIRCH & SPRUCE

0.5' SURFACE ORGANICS

3.5' FROZEN BROWN SILT

5.75' THAWED BROWN SILT

12' CLEAN GRAY SAND

14' GRAY SANDY CLAY - WET (some sloughing of sides)

Bottom of Pit

34° F, 1" SNOW COVER

CLEAR

D. HARVEY (CE2)

LOCAL OPERATOR: MIKE NAROKA

TULUKSAK, AK

TEST PIT "B"

N 61° 05' 20.6"

W 160° 57' 53.7"

VEGETATION: ALDER WITH SPARSE BIRCH & SPRUCE

0.5' SURFACE ORGANICS

3.5' FROZEN BROWN SILT

4.5' THAWED BROWN SILT

6.25' BROWN SILTY SAND

7.7' FINE BROWN GRAY SILTY SAND

9.8' REDDISH CLAYEY SILT (MUDSTICK)

12' BROWN WET FINE SAND

14.7' GRAY SANDY CLAY / SOME ORGANICS (HOLE SLUGHING NO BOTTOM IS FILLING WITH WATER)

14.5' BROWN SILTY SAND

14.5' GRAY SAND / SOME ORGANICS

Bottom of Pit

30° F, 1" SNOW COVER

CLOUDY

R. ZEITLER

LOCAL OPERATOR: MIKE NAROKA

TULUKSAK, AK

TEST PIT "C"

N 61° 05' 19.8"

W 160° 57' 50.1"

VEGETATION: ALDER / SPARSE BIRCH & SPRUCE

0.5' SURFACE ORGANICS

3.0' FROZEN GRAYISH BROWN SILT

6.9' THAWED BROWN SILT

8.9' BROWN SILTY SAND

11.0' DARK BROWN WET SAND (WATER STARTED SEEPING IN @ 10.5')

12.4' GRAY SANDY CLAY

12.7' BROWN (CLAYEY) SAND

14.5' GRAY SILTY SAND

Bottom of Pit

35° F, CLOUDY

1" SNOW COVER

R. ZEITLER

LOCAL OPERATOR: MIKE NAROKA

TULUKSAK - Alternate Lagoon Site Investigation

Test Hole Logs, 29 July 2013

M. Erdman, CE2 Engineers

TH - TLT1

0-2' Organics

2-6' Silty SAND

6-10' SAND (Frozen @ 8')

Seeps @ 6-8'

TH - TLT2

0-1' Organics

1-6' Silty SAND

6-8.5' SAND (Frozen)

TH - TLT3

0-1' Organics

1-5' Silty SAND

5-10' (Discontinuously Frozen)

TH - TLT4

0-1.5' Organics

1.5-10' Silty SAND

(Frozen @ 5')

TULUKSAK, AK

TEST PIT "D"

N 61° 5' 24.0"

W 160° 58' 28.3"

VEGETATION: ALDER, SPARSE SPRUCE

0.4' SURFACE ORGANICS

3.8' FROZEN BROWN GRAY SILT

5.0' THAWED SILT

11.4' FINE BROWN SAND (DRY)

14.0' DAMP SAND - DARK BROWN

Bottom of Pit (Sides sloughing in too fast)

30° F, CLOUDY, LIGHT SNOW

1" SNOW COVER

R. ZEITLER (CE2 ENGINEER)

LOCAL OPERATOR: MIKE NAROKA

TULUKSAK, AK

TEST PIT "E"

N 61° 5' 21.1"

W 160° 58' 35.1"

VEGETATION: ALDER, BIRCH, & SPRUCE

0.4' SURFACE ORGANICS

3.0' FROZEN BROWN SILT

4.0' BROWN SANDY SILT (THAWED)

13.5' BROWN FINE SAND

14.2' SAND / SAND CLAY

Bottom of Pit - TOO FROZEN TO DIG (PERMAFROST)

30° F, CLOUDY

1" SNOW COVER

R. ZEITLER (CE2 ENGINEER)

LOCAL OPERATOR: MIKE NAROKA

TULUKSAK, AK

TEST PIT "F"

N 61° 5' 16.4"

W 160° 58' 23.4"

VEGETATION: BIRCH, ALDER, & SPRUCE

0.4' SURFACE ORGANICS

3.2' FROZEN BROWN SILT

4.1' THAWED SANDY SILT

6.4' BROWN SILTY SAND

BROWN SAND

12.5' DAMP CLAYEY SAND - WATER SEEPING IN

13.0' WET SILTY SAND

Bottom of Pit - HOLE SLUGHING IN WATER SEEPING IN BOTTOM

34° F, CLOUDY, 1" SNOW COVER

R. ZEITLER (CE2)

LOCAL OPERATOR: MIKE NAROKA

TULUKSAK, AK

TEST PIT "G"

N 61° 5' 18.9"

W 160° 58' 16.1"

VEGETATION: SPARSE BIRCH & ALDER

0.4' SURFACE ORGANICS

2.8' FROZEN BROWN SILT

4.7' THAWED BROWN SILTY SAND

FINE BROWN SAND

10.5' WET SILTY SAND

PERMAFROST - HARDENED SILT

Bottom of Pit (PERMAFROST)

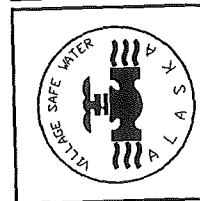
33° F, CLOUDY, 1" SNOW COVER

R. ZEITLER (CE2)

LOCAL OPERATOR: MIKE NAROKA

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
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NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:  
1" = 10'  
THIS SCALE IS FOR THE ORIGINAL DRAWING  
IF NOT ONE INCH ON THE SHEET, THE SCALE IS AS SHOWN



2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
TEST HOLE  
BORING LOGS  
TULUKSAK, ALASKA

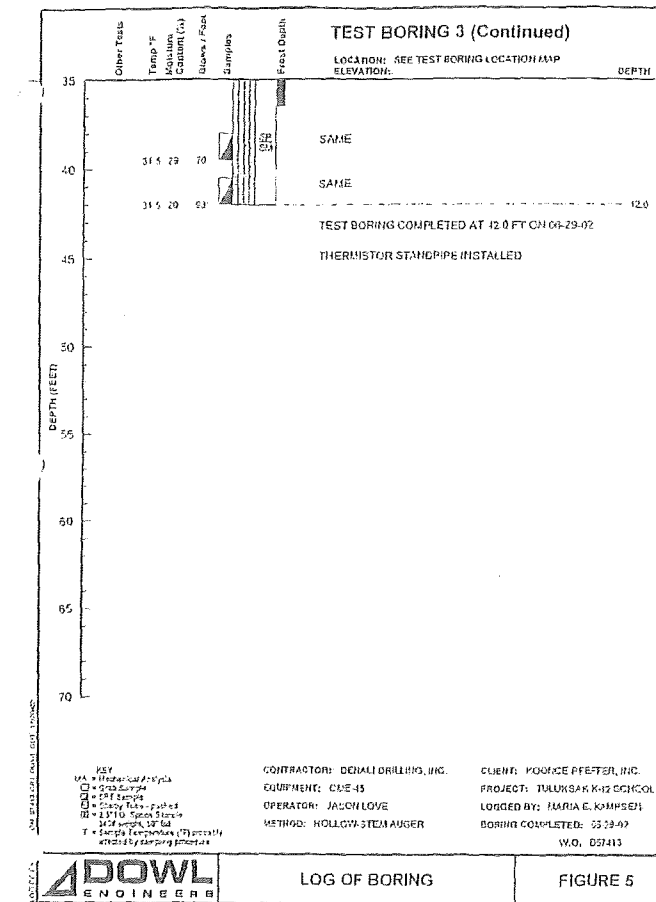
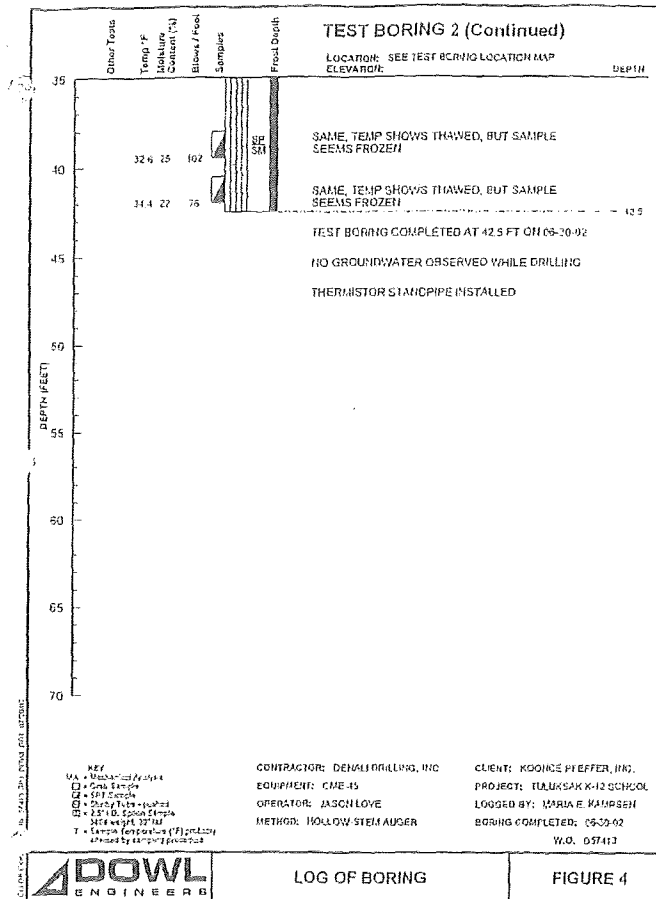
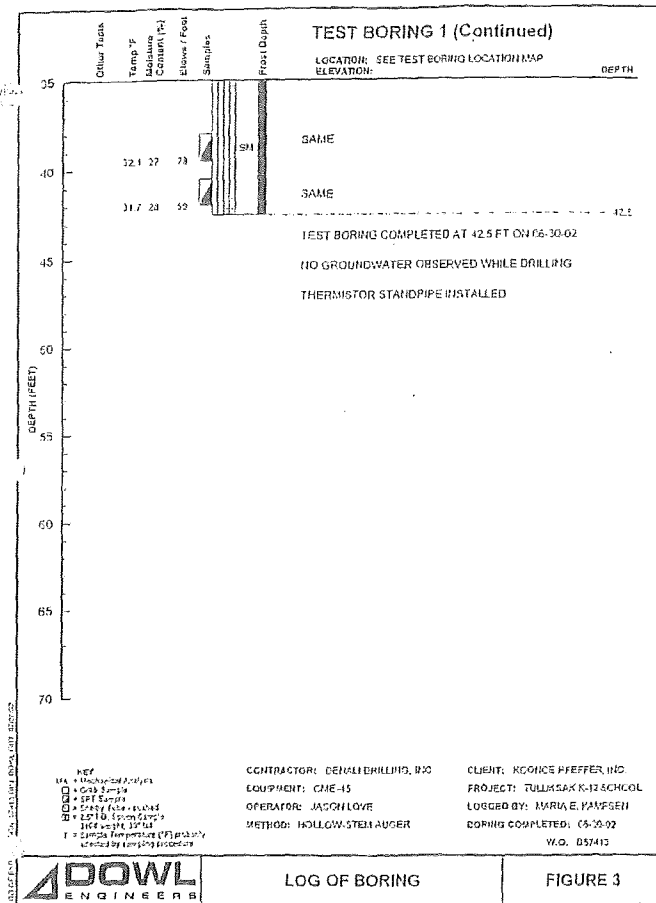
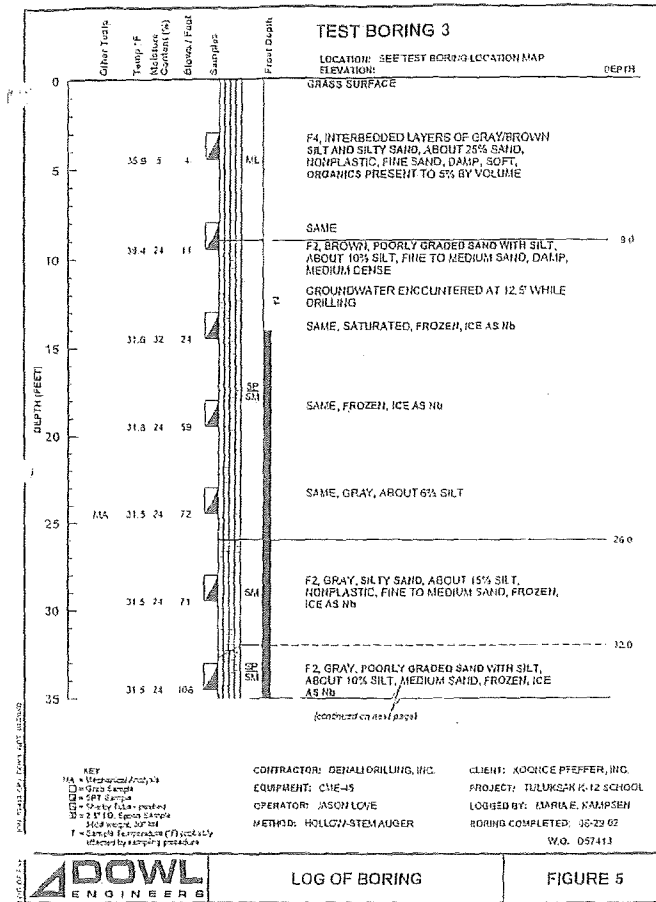
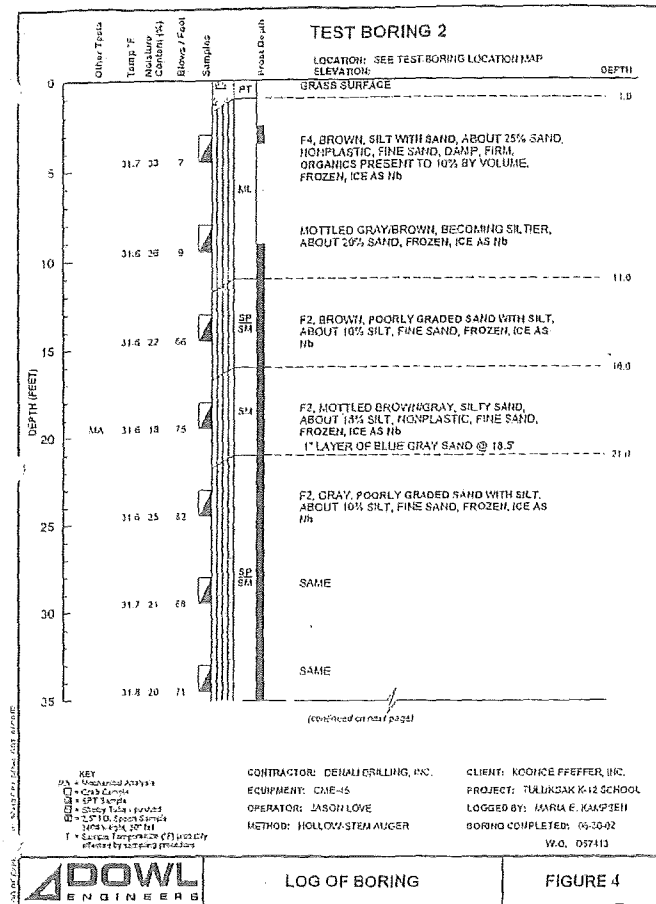
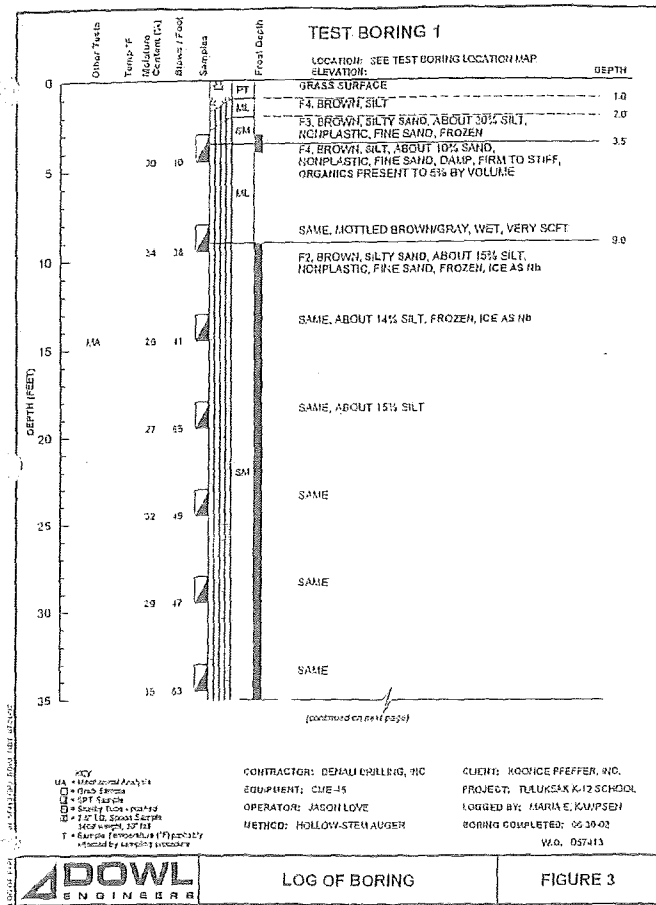
CE2  
ENGINEERS, INC.  
PO BOX 22846 ANCHORAGE, AK 99522 PH: 907-546-0110 FAX: 907-546-0106

| REVISION | BY | DATE |
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Project No. \_\_\_\_\_  
Date APRIL 2014  
Designed LAP  
Drawn CM  
Approved LAP

Sheet No.  
G3.6





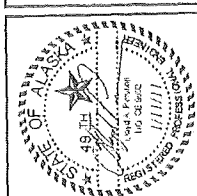
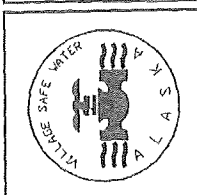
RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORD INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: 1" = 10'-0"

1" = 10'-0"

1" = 10'-0"



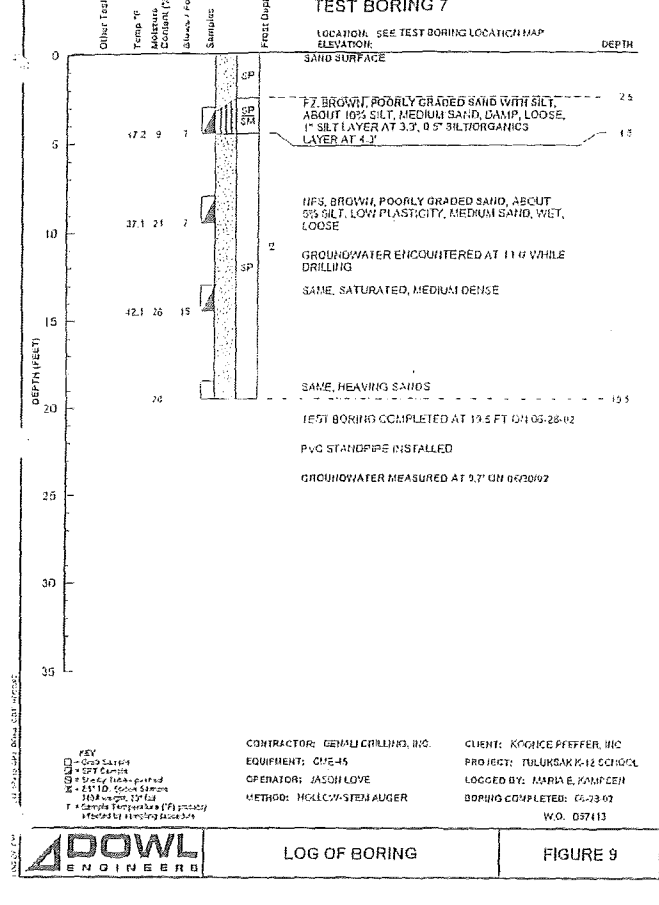
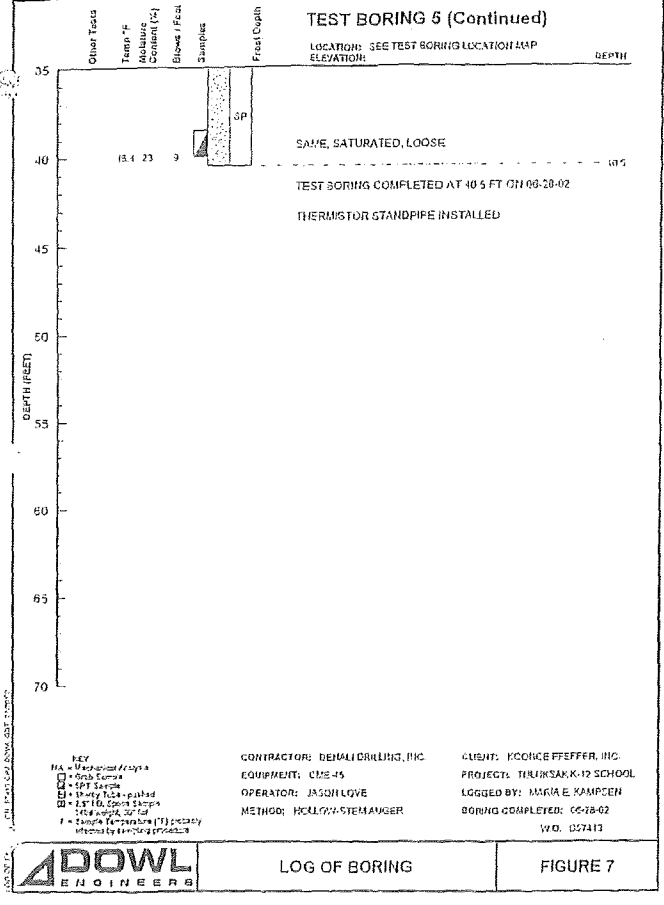
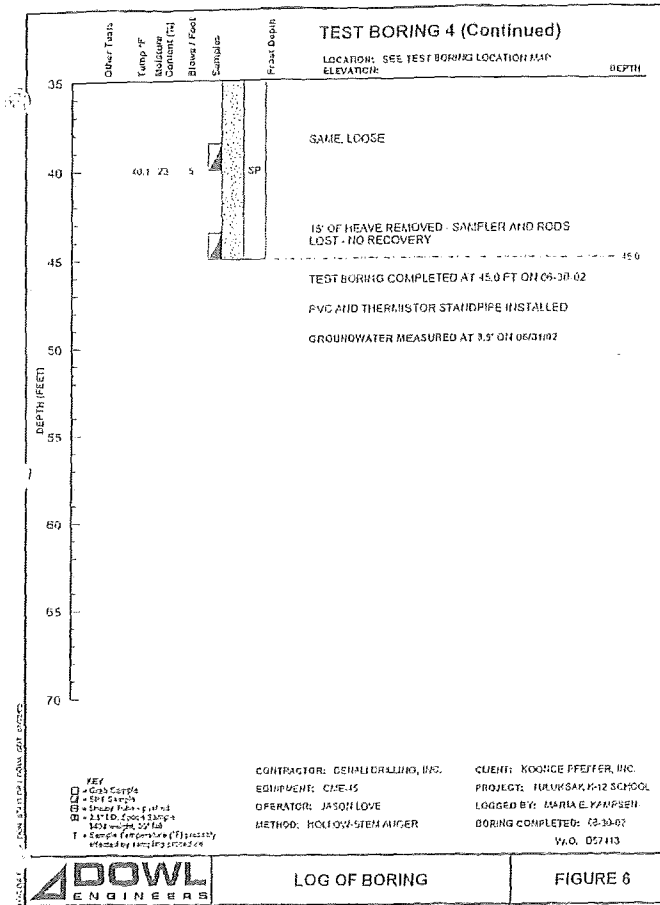
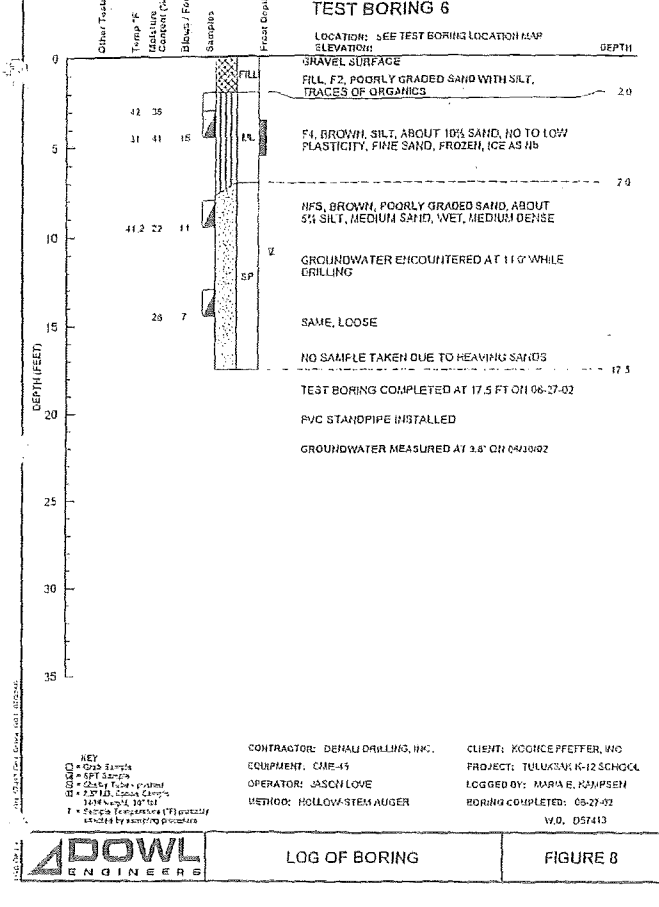
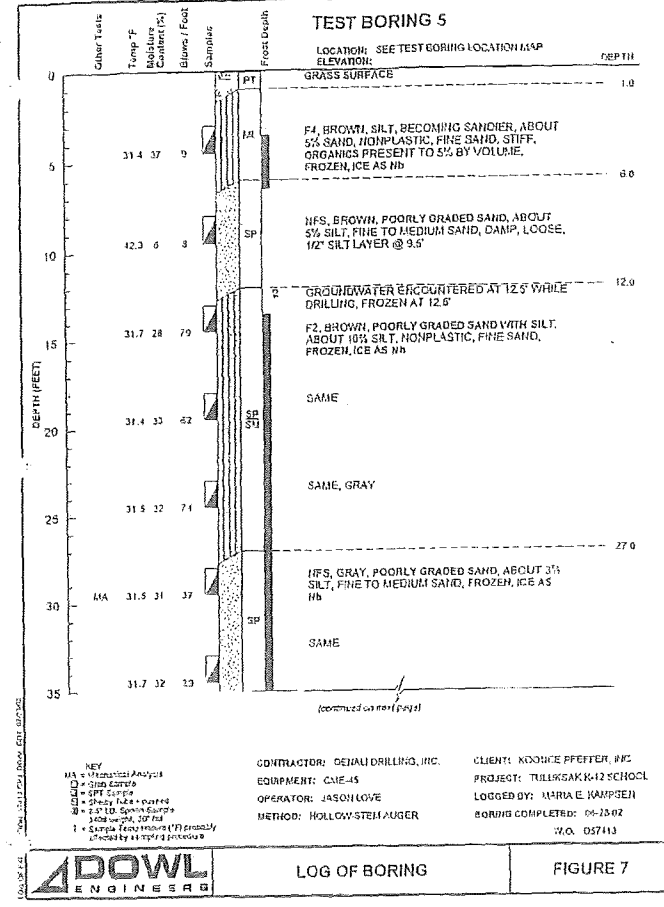
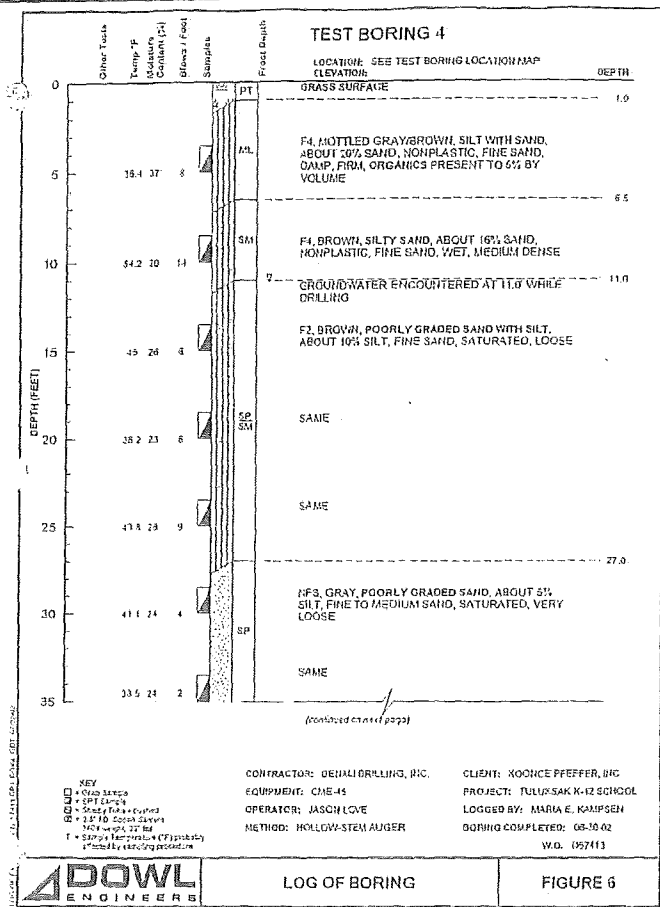
2010-11 WASTEWATER SYSTEM IMPROVEMENTS  
TEST HOLE BORING LOGS  
TULUKSAK, ALASKA

**CME2 ENGINEERS, INC.**  
PO BOX 23046 ANCHORAGE, AK 99521 PH 907-343-1100 FAX 907-343-0115

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Project No. \_\_\_\_\_  
Date: JUNE 2009  
Designed: LAP  
Drawn: C11  
Approval: LAP

Sheet No. G3.7



**RECORD DRAWING CERTIFICATE**  
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: 1" = 10' (VERTICAL)  
1" = 10' (HORIZONTAL)

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

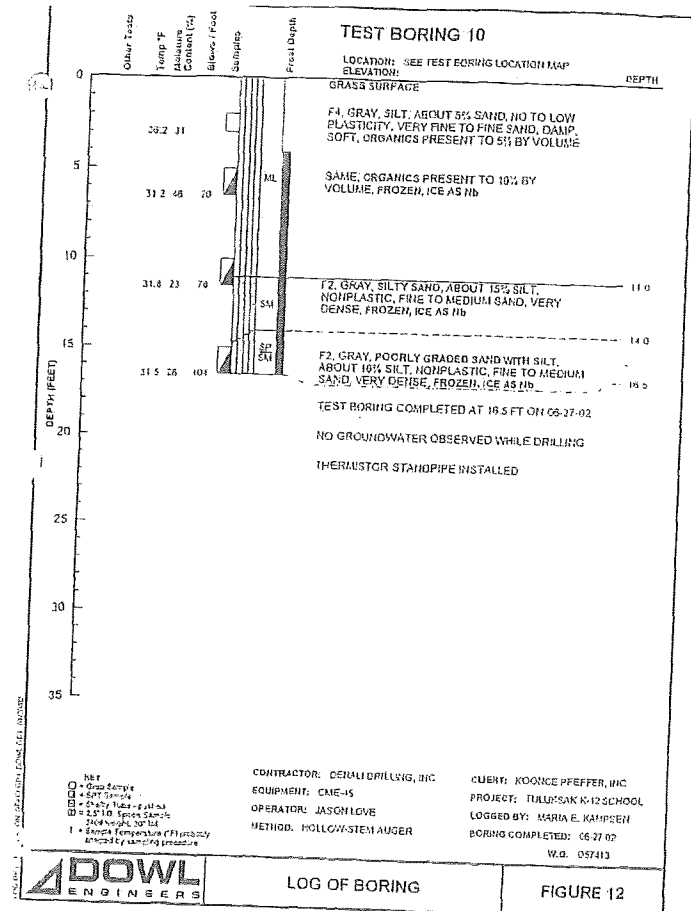
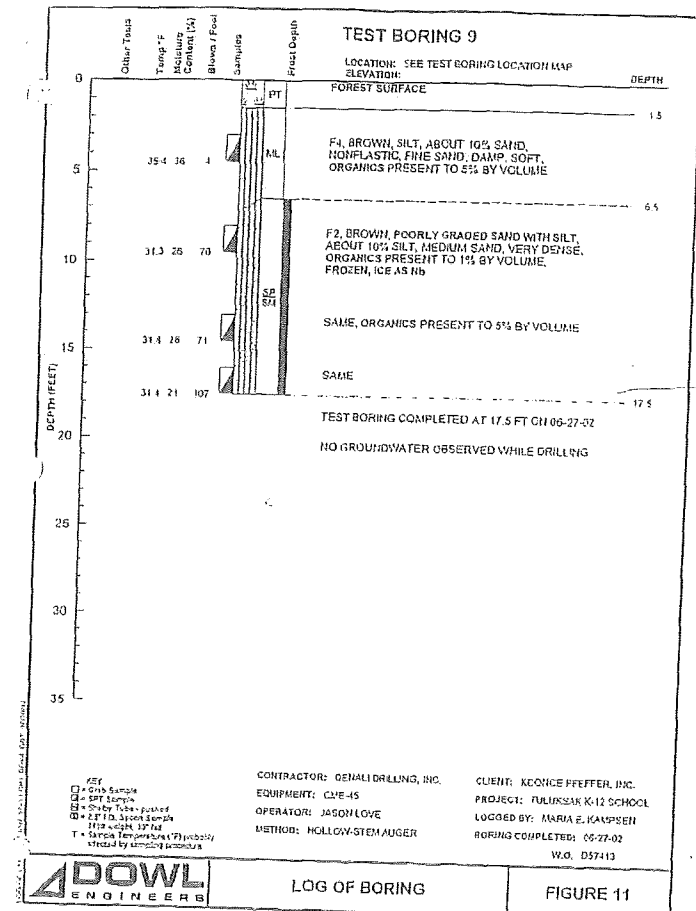
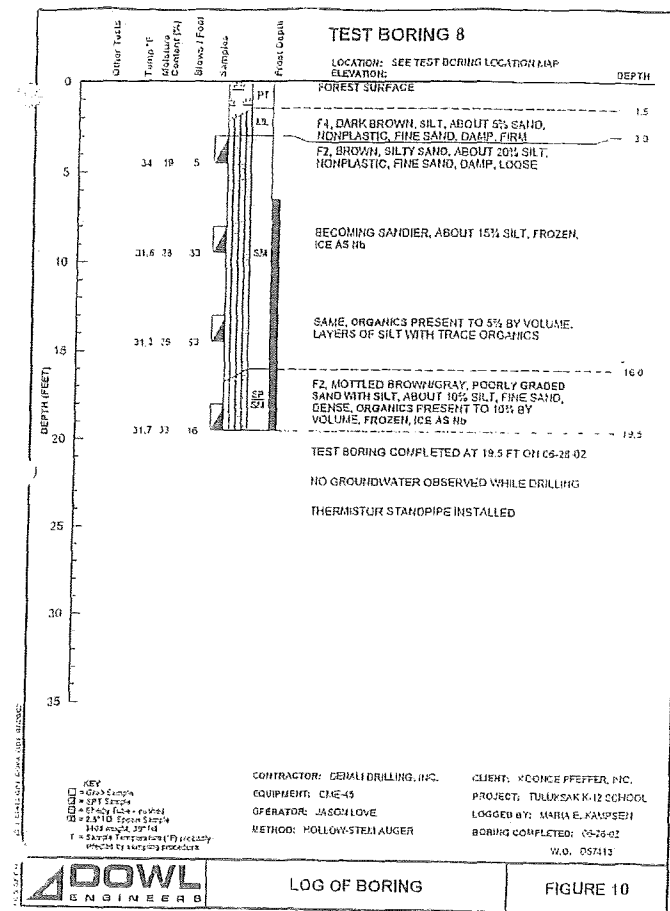
**2010-11 WASTEWATER SYSTEM IMPROVEMENTS**  
**TEST HOLE BORING LOGS**  
TULUKSAK, ALASKA

**CE2 ENGINEERS, INC.**  
PO BOX 2008, ANCHORAGE, AK 99501-2008 TEL: 907-348-0095 FAX: 907-348-0095

| REVISION | BY | DATE |
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Project No. \_\_\_\_\_ Date: JUNE 2009  
Designed: LJP  
Drawn: CML  
Approved: LJP

Sheet No. **G3.8**



**PT-1**

**SOIL PROFILE/PERCOLATION TEST DATA FORM**

Property Location: Tuluksak Wastewater Lagoon Site - Percolation/Storage Cell

Test Pit Number and Location: Test Pit No. 1, N 61°05'31.3", W 160°57'13.9", excavated and monitoring tube set 10/20/2007

Elevations: Existing Ground 18.93'  
Bottom/Top of Sand 13.25'  
3/6/08 No water noted in test hole to Elev. 7' (12' below existing ground)

Soil Profile: Depth (inches) Soil Texture  
0 - 12" Organic Overburden (PO), fibrous  
12" - 68" Organic silt (OL) and Silty Sand (SM) Mixture, dry  
68" - Poorly graded clean fine sand (SP)

No groundwater encountered

| Time | Time Interval (Minutes) | End of Period Measurement (Feet) | Start of Period Measurement (Feet) | Drop in Water Level (Feet) | Percolation Rate (Hrs/Feet) | Remarks                                                       |
|------|-------------------------|----------------------------------|------------------------------------|----------------------------|-----------------------------|---------------------------------------------------------------|
| 6:48 |                         | 6.30                             | 6.30                               |                            |                             | Start soaking period.                                         |
| 7:04 | 0:16                    | 6.37                             | 6.37                               | 0.07                       | 3.48                        | Start percolation test. Water level 12" above bottom of hole. |
| 7:19 | 0:15                    | 6.62                             | 6.30                               | 0.25                       | 1.09                        |                                                               |
| 7:34 | 0:15                    | 6.50                             | 6.32                               | 0.20                       | 1.15                        |                                                               |
| 7:49 | 0:15                    | 6.54                             | 6.23                               | 0.22                       | 1.08                        |                                                               |
| 8:04 | 0:15                    | 6.46                             | 6.46                               | 0.24                       | 1.02                        |                                                               |
| 8:20 | 0:16                    | 6.63                             | 6.37                               | 0.23                       | 1.09                        |                                                               |
| 8:35 | 0:15                    | 6.61                             | 6.41                               | 0.24                       | 1.02                        |                                                               |
| 8:50 | 0:15                    | 6.63                             | 6.38                               | 0.22                       | 1.08                        |                                                               |
| 9:05 | 0:15                    | 6.62                             |                                    | 0.24                       | 1.02                        | End of Test.                                                  |

Percolation rate = 5.2 minutes per inch

Date of test March 6, 2008 Percolation test by: Lloyd Persson, P.E.

\*\* 6/10/08 Water Elev. measured above sand at 14.59' (seasonal high groundwater).

**PT-2**

**SOIL PROFILE/PERCOLATION TEST DATA FORM**

Property Location: Tuluksak Wastewater Lagoon Site - Percolation/Storage Cell

Test Pit Number and Location: Test Pit No. 2, N 61°05'31.7", W 160°57'12.2", excavated and monitoring tube set 10/20/2007

Elevations: Existing Ground 22.41'  
Bottom/Top of Sand 15.95'  
3/6/08 No water noted in test hole to Elev. 10.4' (12' below existing ground)

Soil Profile: Depth (inches) Soil Texture  
0 - 12" Organic Overburden (PO), fibrous  
12" - 82" Organic silt (OL) and Silty Sand (SM) Mixture, dry  
82" - Poorly graded clean fine sand (SP)

No groundwater encountered

| Time | Time Interval (Minutes) | End of Period Measurement (Feet) | Start of Period Measurement (Feet) | Drop in Water Level (Feet) | Percolation Rate (Hrs/Feet) | Remarks                                                       |
|------|-------------------------|----------------------------------|------------------------------------|----------------------------|-----------------------------|---------------------------------------------------------------|
| 6:55 |                         | 6.03                             | 6.03                               |                            |                             | Start soaking period.                                         |
| 7:10 | 0:15                    | 6.40                             | 5.76                               | 0.25                       | 1.00                        | Start percolation test. Water level 12" above bottom of hole. |
| 7:25 | 0:15                    | 5.85                             | 5.85                               | 0.15                       | 1.40                        |                                                               |
| 7:41 | 0:18                    | 6.05                             | 6.05                               | 0.20                       | 1.30                        |                                                               |
| 7:58 | 0:15                    | 6.18                             | 5.95                               | 0.13                       | 1.55                        |                                                               |
| 8:13 | 0:15                    | 6.07                             | 6.07                               | 0.12                       | 2.05                        |                                                               |
| 8:28 | 0:15                    | 6.20                             | 6.16                               | 0.12                       | 1.55                        |                                                               |
| 8:43 | 0:15                    | 6.21                             | 5.92                               | 0.11                       | 2.16                        |                                                               |
| 8:58 | 0:15                    | 6.06                             |                                    | 0.14                       | 1.47                        | End of Test.                                                  |

Percolation rate = 10 minutes per inch

Date of test March 6, 2008 Percolation test by: Lloyd Persson, P.E.

**PT-3**

**SOIL PROFILE/PERCOLATION TEST DATA FORM**

Property Location: Tuluksak Wastewater Lagoon Site - Percolation/Storage Cell

Test Pit Number and Location: Test Pit No. 3, N 61°05'32.2", W 160°57'14.7", excavated and monitoring tube set 10/20/2007

Elevations: Existing Ground 21.81'  
Bottom/Top of Sand 14.95'  
3/6/08 No water noted in test hole to Elev. 7'-3" (Excavated to 11' below existing ground and found no water.)

Soil Profile: Depth (inches) Soil Texture  
0 - 12" Organic Overburden (PO), fibrous  
12" - 64" Organic silt (OL) and Silty Sand (SM) Mixture, dry  
64" - Poorly graded clean fine sand (SP)

No groundwater encountered

| Time | Time Interval (Minutes) | End of Period Measurement (Feet) | Start of Period Measurement (Feet) | Drop in Water Level (Feet) | Percolation Rate (Hrs/Feet) | Remarks                                                       |
|------|-------------------------|----------------------------------|------------------------------------|----------------------------|-----------------------------|---------------------------------------------------------------|
| 7:01 |                         | 6.65                             | 6.65                               |                            |                             | Start soaking period.                                         |
| 7:16 | 0:15                    | 7.65                             | 6.65                               | 1.00                       | 0.15                        | Start percolation test. Water level 12" above bottom of hole. |
| 7:31 | 0:15                    | 7.70                             | 6.50                               | 1.05                       | 0.14                        |                                                               |
| 7:46 | 0:15                    | 7.55                             | 6.38                               | 1.05                       | 0.14                        |                                                               |
| 8:01 | 0:15                    | 7.52                             | 6.62                               | 0.94                       | 0.15                        |                                                               |
| 8:16 | 0:15                    | 7.50                             | 6.55                               | 0.85                       | 0.17                        |                                                               |
| 8:31 | 0:15                    | 7.43                             | 6.66                               | 0.86                       | 0.17                        |                                                               |
| 8:46 | 0:15                    | 7.33                             | 6.55                               | 0.74                       | 0.20                        |                                                               |
| 9:01 | 0:15                    | 7.36                             |                                    | 0.81                       | 0.18                        | End of Test.                                                  |

Percolation rate = 1.5 minutes per inch

Date of test March 6, 2008 Percolation test by: Lloyd Persson, P.E.

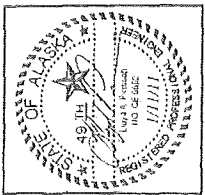
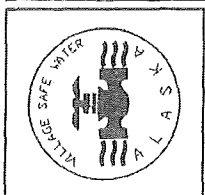
\*\* 6/10/08 Water Elev. measured above sand at 14.95' (seasonal high groundwater).

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: 1" = 10' (VERTICAL)  
1" = 10' (HORIZONTAL)

DATE \_\_\_\_\_

NAME \_\_\_\_\_



2010-11 WASTEWATER SYSTEM IMPROVEMENTS  
TEST HOLE BORING LOGS  
TULUKSAK, ALASKA

**GE2 ENGINEERS, INC.**  
PO BOX 22344 ANCHORAGE, AK 99502 PH 907-564-0000 FAX 907-564-0005

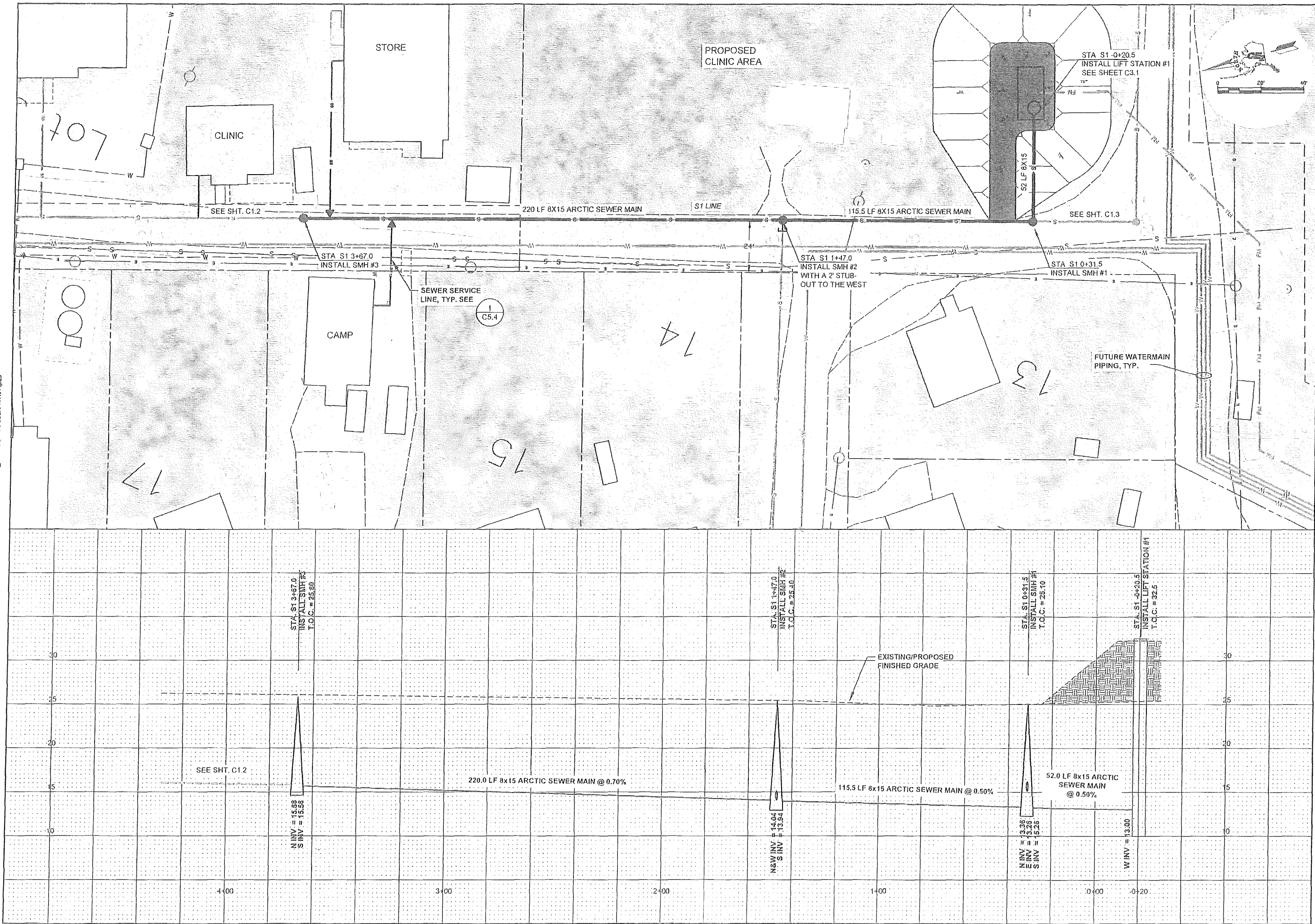
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Project No. \_\_\_\_\_  
Date: JUNE 2009  
Designed: LAP  
Drawn: OMA  
Approved: LAP

Sheet No.  
G3.9



G:\ACAD\TULUKSAK\TUL0901\_2008 Waste water disposal area\C1.1 thru C1.4 and C2.9.dwg, 1/11/2011 1:11:26 PM, Fish, LAMIER MP C2050\_L0520C PCL 6BLK WHIT.dwg



RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:  
PLAN: 1"=20'  
PROFILE: 1"=5'  
VERTICAL CURVES: 100' MINIMUM  
IF NOT SHOWN, SEE LOCAL ORDINANCES

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
S1 GRAVITY SEWER  
PLAN AND PROFILE  
TULUKSAK, ALASKA

Project No. \_\_\_\_\_  
Date: JUNE 2009  
Designed: LAP  
Drawn: LAW  
Approved: LAP

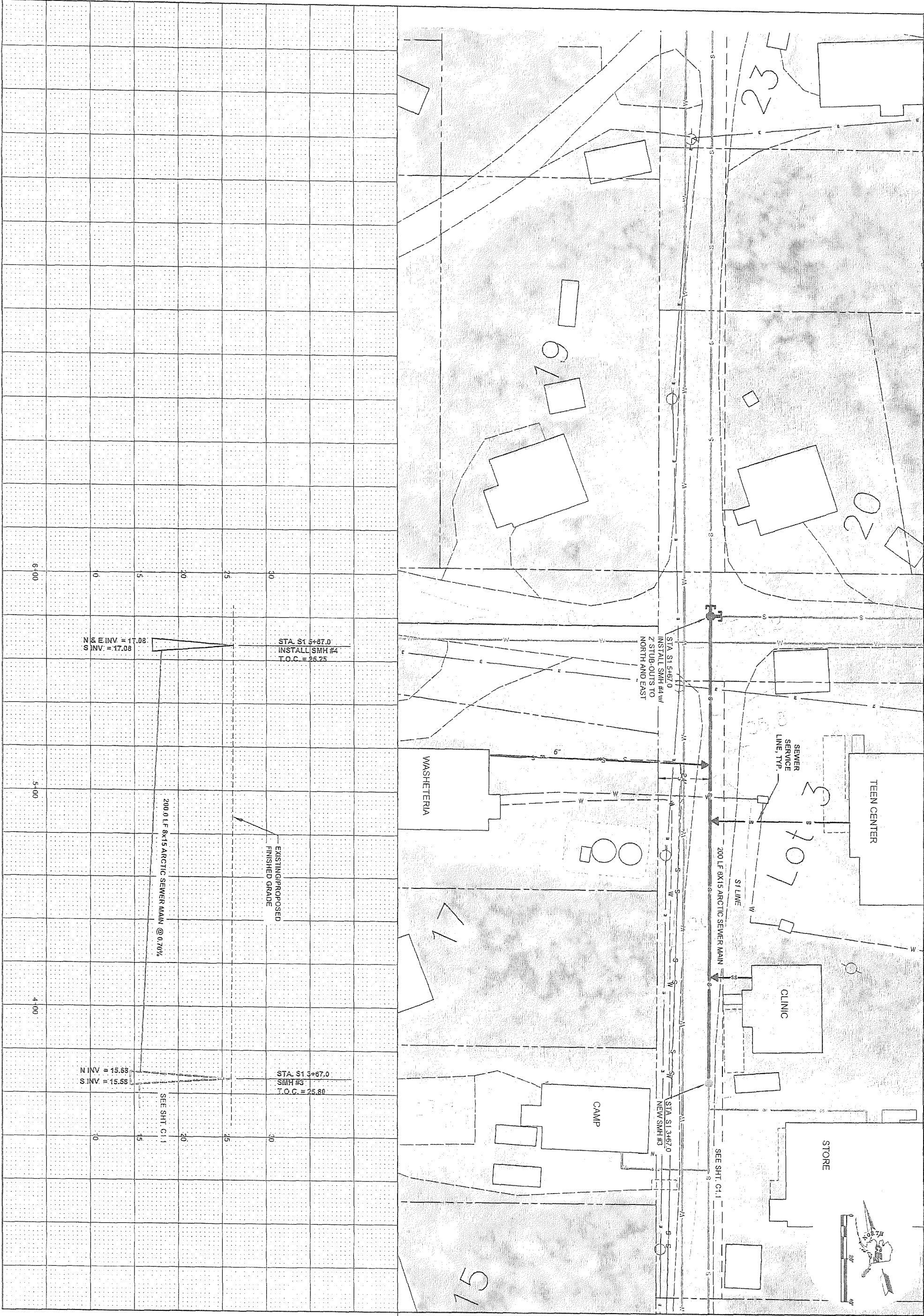
REVISION

BY

DATE

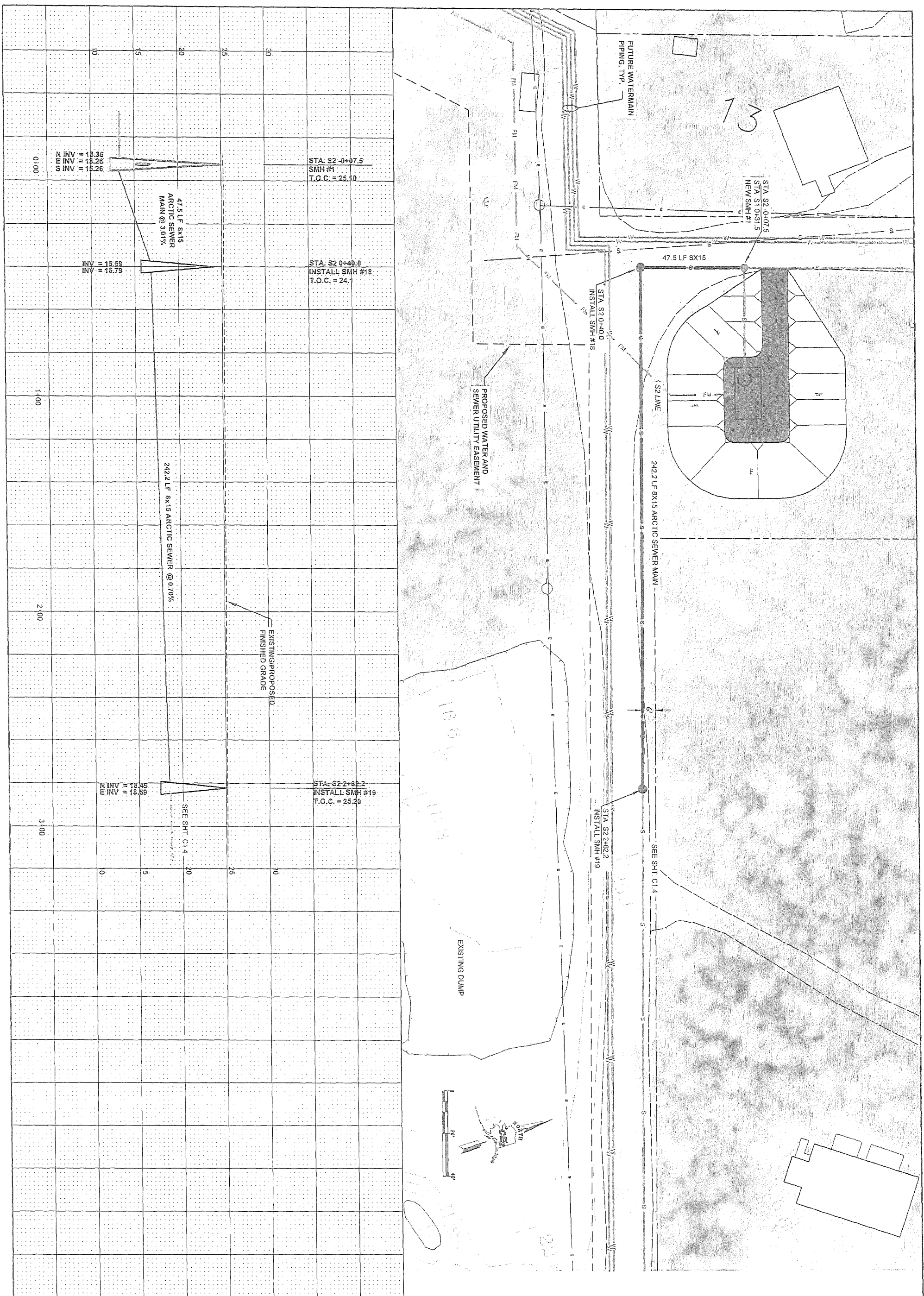
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Sheet No. C1.1



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|-----------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Project<br>No.<br>Date <u>JUNE 2009</u><br>Designed <u>LAP</u><br>Drawn <u>LAV</u><br>Approved <u>LAP</u> | REVISION<br>BY<br>DATE | <br>PO BOX 23249 ANCHORAGE, AK 99523 PH: 907-348-1010 FAX: 907-348-1015 | 2010-11 WASTEWATER<br>SYSTEM IMPROVEMENTS<br><br>S1 GRAVITY SEWER<br>PLAN AND PROFILE<br><br>TULUKSAK, ALASKA |  |  | SCALE:<br>PLAN: 1"=20'<br>PROF(H): 1"=20'<br>PROF(V): 1"=5'                                                                                                | RECORD DRAWING CERTIFICATE |
|                                                                                                           |                        |                                                                         |                                                                                                               |  |  | DATE: 12/10/2010                                                                                                                                           | NAME                       |
|                                                                                                           |                        |                                                                         |                                                                                                               |  |  | IF NOT USED WITHIN<br>THIS SHEET, REPLY<br>SCALE ACCORDINGLY                                                                                               | DATE                       |
|                                                                                                           |                        |                                                                         |                                                                                                               |  |  | THESE DRAWINGS REFLECT RECORDED<br>INFORMATION OBTAINED DURING<br>CONSTRUCTION. INFORMATION PROVIDED<br>HEREIN IS ACCURATE TO THE BEST OF MY<br>KNOWLEDGE. |                            |





Sheet No. **C1.3**

|                       |
|-----------------------|
| Project No. _____     |
| Date <u>JUNE 2009</u> |
| Designed <u>LAP</u>   |
| Drawn <u>LAW</u>      |
| Approved <u>LAP</u>   |

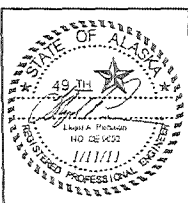
[illegible]

**CE<sub>2</sub>**  
ENGINEERS, INC.  
PO BOX 223943 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-340-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

S2 GRAVITY SEWER  
PLAN AND PROFILE

TULUKSAK, ALASKA



SCALE:  
PLAN: 1"=20'  
PROF(H): 1"=20'  
PROF(V): 1"=5'

DATE: 08/11/2010  
DRAWN: J. J. J.

D 1"

1"=20'

IF NOT ON SHEET, AGAINST  
THIS SHEET, AGAINST  
SCALE: AS SHOWN

|                                                                                                                                                            |            |
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| <b><u>RECORD DRAWING CERTIFICATE</u></b>                                                                                                                   |            |
| THESE DRAWINGS REFLECT RECORDED<br>INFORMATION OBTAINED DURING<br>CONSTRUCTION. INFORMATION PROVIDED<br>HEREIN IS ACCURATE TO THE BEST OF MY<br>KNOWLEDGE. |            |
| NAME _____                                                                                                                                                 | DATE _____ |



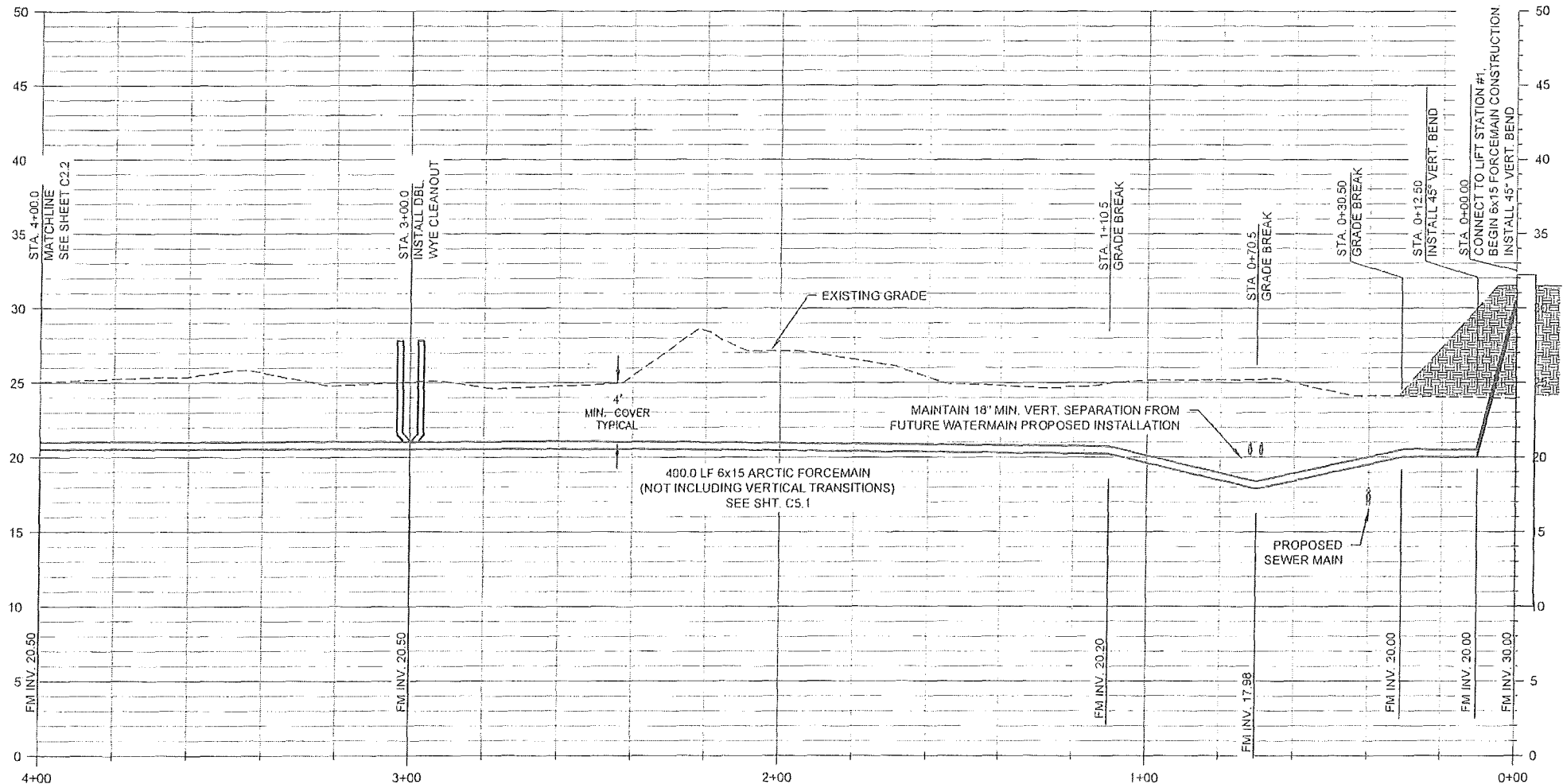
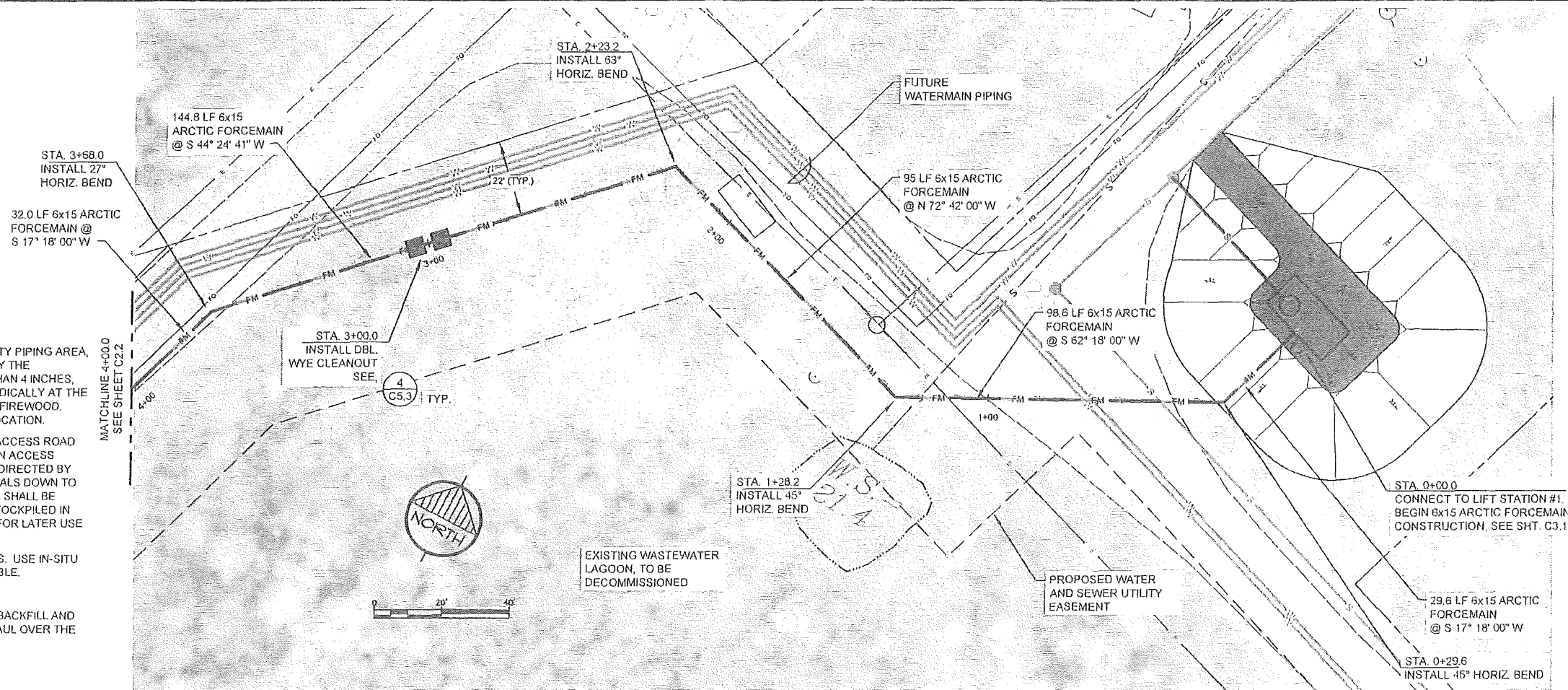


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|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|---------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project<br>No. _____<br>Date JUNE 2009<br>Designed LAP<br>Drawn LAW<br>Approved LAP | REVISION                                                                                                                                                   | BY | DATE |                                                                                                               |  |                                                                                       |                                                                                       |                                                                                                                                                                                                |                                                                                                                                                                                                                           |
|                                                                                     |                                                                                                                                                            |    |      |                                                                                                               |  |                                                                                       |                                                                                       |                                                                                                                                                                                                |                                                                                                                                                                                                                           |
|                                                                                     |                                                                                                                                                            |    |      |                                                                                                               |  |                                                                                       |                                                                                       |                                                                                                                                                                                                |                                                                                                                                                                                                                           |
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|                                                                                     |                                                                                                                                                            |    |      |                                                                                                               |  |                                                                                       |                                                                                       |                                                                                                                                                                                                |                                                                                                                                                                                                                           |
| Sheet No.<br><br>C1.4                                                               | <br>PO BOX 22294 ANCHORAGE, AK 99523 PH: 907-349-1018 FAX: 907-349-1015 |    |      | 2010-11 WASTEWATER<br>SYSTEM IMPROVEMENTS<br><br>S2 GRAVITY SEWER<br>PLAN AND PROFILE<br><br>TULUKSAK, ALASKA |  |  |  | SCALE:<br>PLAN: 1"=20'<br>PROF (H): 1"=20'<br>PROF (V): 1"=5'<br><br>SHEET ONE OF ONE<br>ORIGINAL DRAWING<br>0<br>1'<br><br>IF ANY CHANGES<br>TO THIS SHEET, CONTACT<br>CONTRACTOR IMMEDIATELY | RECORD DRAWING CERTIFICATE<br><br>THESE DRAWINGS REFLECT RECORDED<br>INFORMATION OBTAINED DURING<br>CONSTRUCTION. INFORMATION PROVIDED<br>HEREIN IS ACCURATE TO THE BEST OF MY<br>KNOWLEDGE.<br><br>NAME _____ DATE _____ |

G:\ACAD\TULUKSAK\T110901\_2008 Waste water disposal area\C2.1\_C2.8 ROAD AND FORCEMAIN P&P.dwg, 1/11/2011 1:22:38 PM, Flash, LANIER MP C2050\_L0520C PCL 6BLK WHIT, pc3

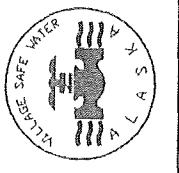
SEQUENCE OF CONSTRUCTION

1. CLEAR CUT ALL BRUSH AND TREES WITHIN THE PROPOSED UTILITY PIPING AREA, LAGOON AND BORROW PIT AREAS AS REQUIRED OR DIRECTED BY THE ENGINEER. LIMB ALL TREES WITH A TRUNK DIAMETER LARGER THAN 4 INCHES, CUT TRUNK INTO 8 FT LENGTHS AND STACK THE LENGTHS PERIODICALLY AT THE EDGE OF THE RIGHT OF WAY FOR HAUL OFF BY THOSE NEEDING FIREWOOD. DISPOSE OF REMAINING CLEAR CUT DEBRIS AT AN APPROVED LOCATION.
2. GRUB ALL AREAS BENEATH THE FOOTPRINT OF THE PROPOSED ACCESS ROAD CONSTRUCTION. IN ADDITION, GRUB THE BORROW SITE(S) AND AN ACCESS CORRIDOR BETWEEN THE BORROW SOURCE AND THE WORK AS DIRECTED BY THE ENGINEER. GRUBBING SHALL REMOVE ALL ORGANIC MATERIALS DOWN TO IN-SITU SANDY SOILS (AVERAGE ORGANIC DEPTH 1.5'). GRUBBING SHALL BE HAULED OFF TO AN APPROVED LOCATION. TOPSOIL SHALL BE STOCKPILED IN THE BORROW SITE OR ALONG THE EDGE OF THE RIGHT OF WAY FOR LATER USE IN RE-VEGETATION.
3. INSTALL LIFT STATION AND FORCEMAIN AS SHOWN ON THE PLANS. USE IN-SITU SANDS FOR TRENCH BACKFILL TO THE GREATEST EXTENT POSSIBLE.
4. OPEN THE BORROW PIT AS DIRECTED BY THE ENGINEER.
5. COVER THE FORCEMAIN WITH A MINIMUM OF 3 FEET OF TRENCH BACKFILL AND EMBANKMENT FILL BEFORE ALLOWING FULL DUMP TRUCKS TO HAUL OVER THE PIPELINE.

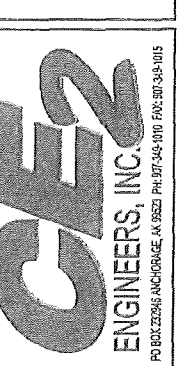


RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

SCALE:  
AS SHOWN



2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
FM1 FORCE MAIN  
PLAN AND PROFILE  
TULUKSAK, ALASKA

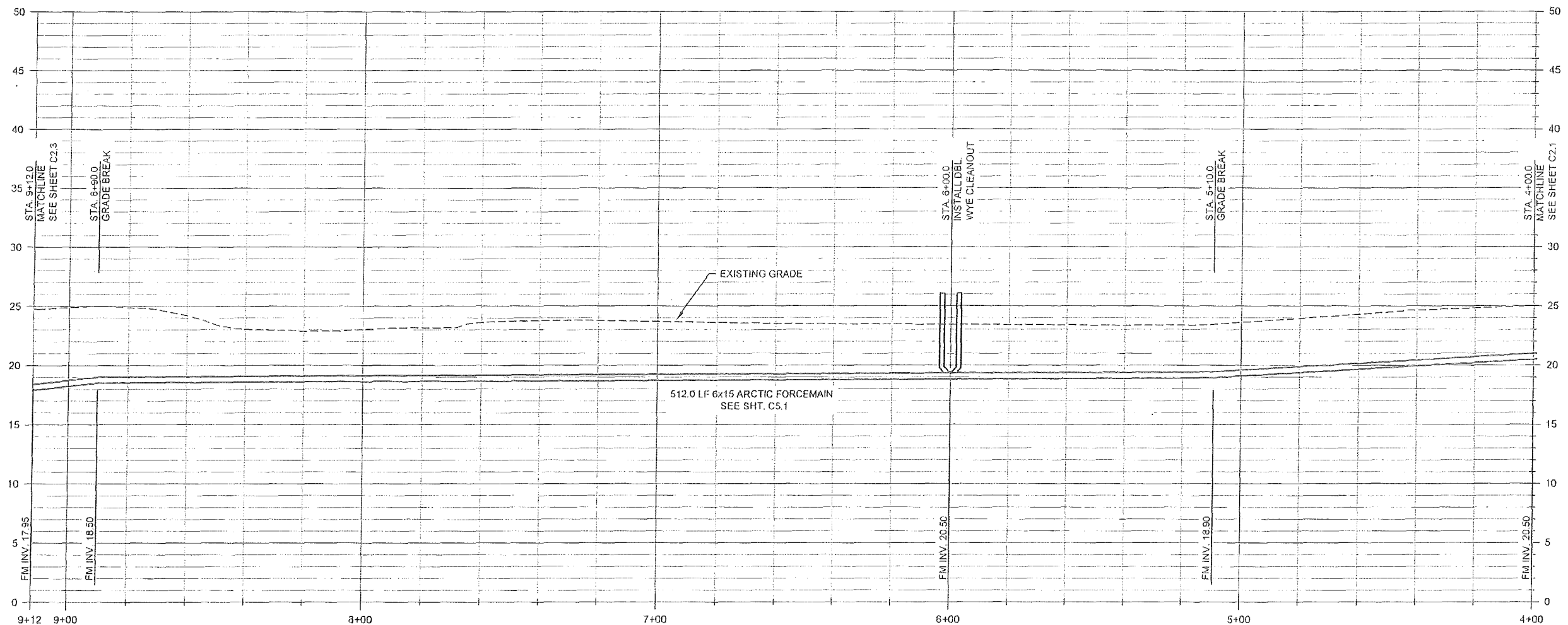
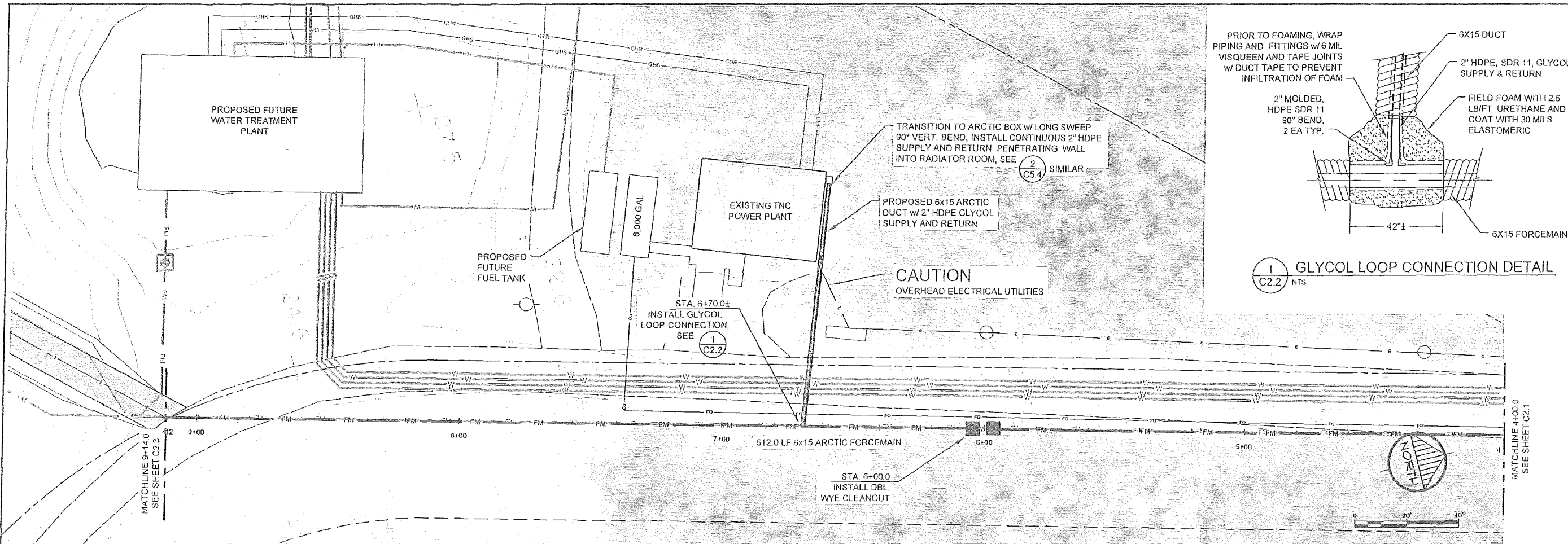


| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON/RELOCATION | CM | 8/10 |
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|             |           |
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| Project No. |           |
| Date        | JUNE 2009 |
| Designed    | LAP       |
| Drawn       | CM        |
| Approved    | LAP       |

Sheet No.  
C2.1

G:\ACAD\TULUKSAK\T10901\_2008 Waste water disposal area\c2.1\_c2.8 ROAD AND FORCEMAIN p&p.dwg, 1/11/2011 1:12:56 PM, Flash, LAMIER MP C2050\_LD520C PCL 6BLK WHIT.DC3



RECORD DRAWING CERTIFICATE

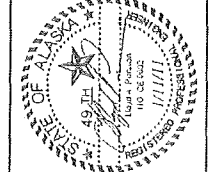
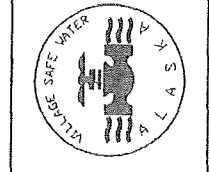
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: AS SHOWN

1" = 40' HORIZONTAL

1" = 10' VERTICAL



2010-11 WASTEWATER SYSTEM IMPROVEMENTS

FM1 FORCE MAIN PLAN AND PROFILE

TULUKSAK, ALASKA

**CE2** ENGINEERS, INC.

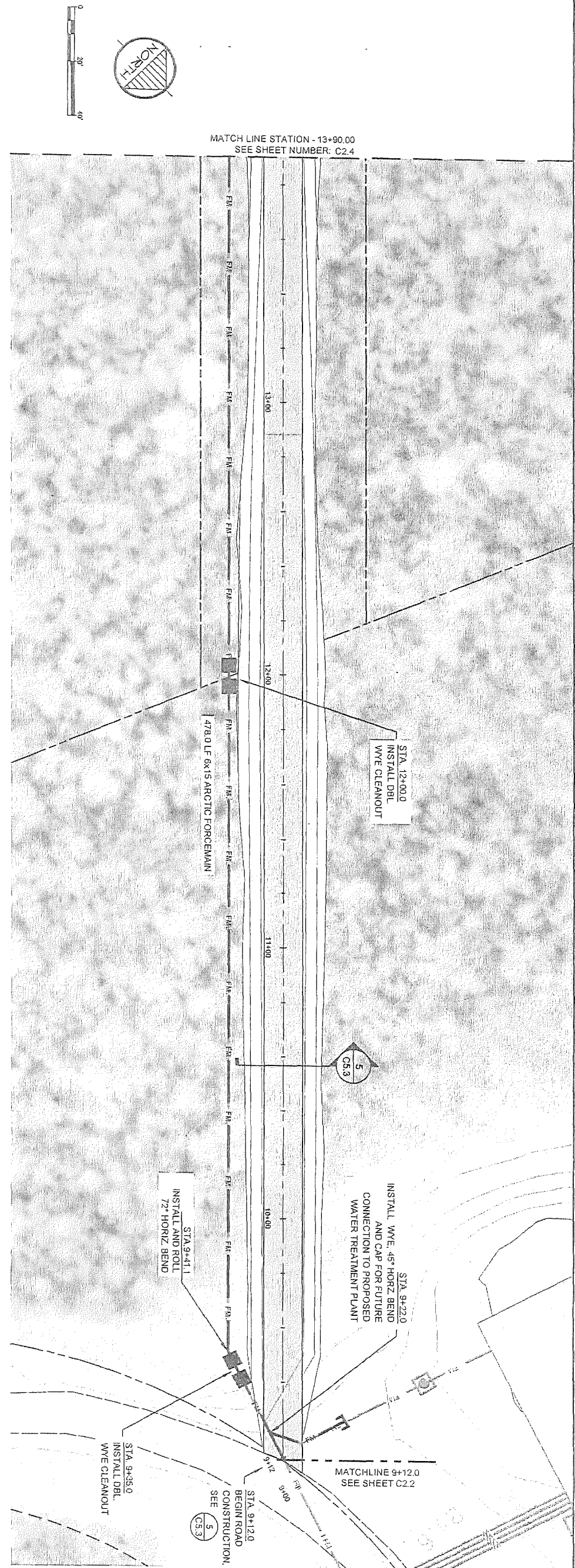
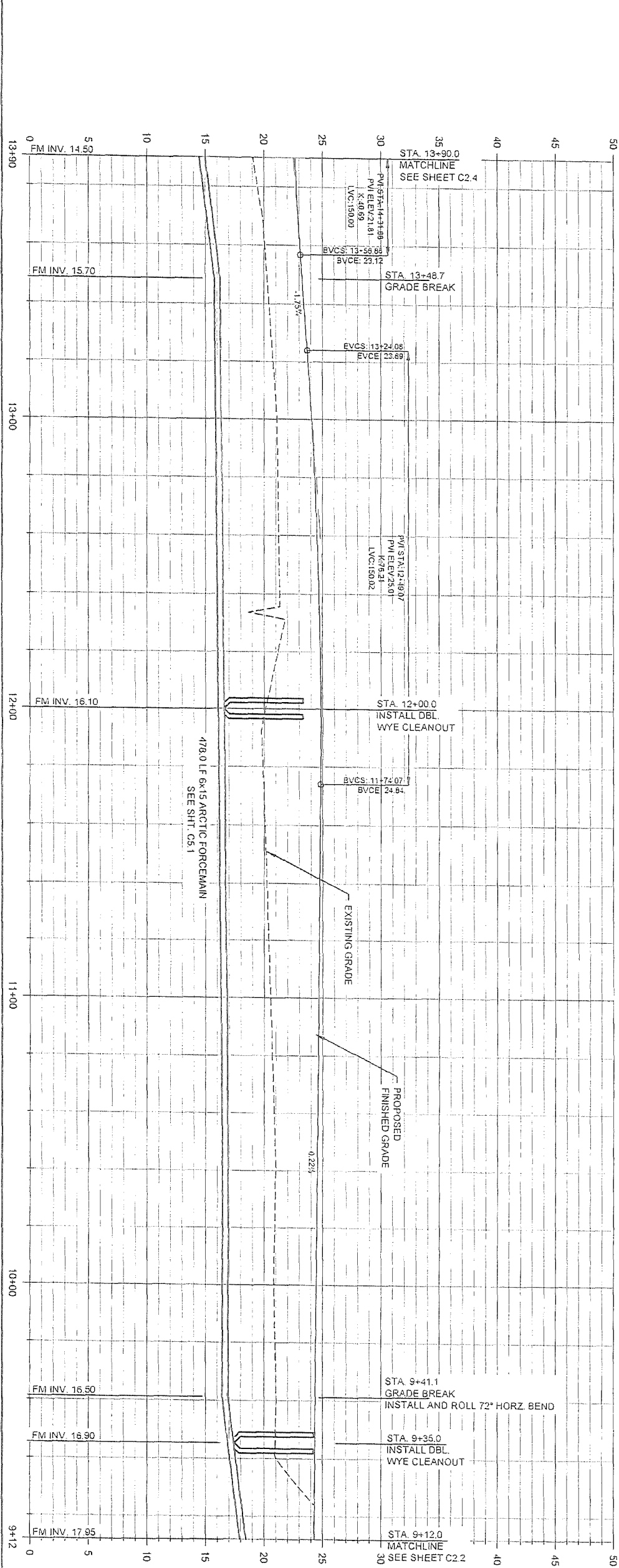
PO BOX 2254 ANCHORAGE, AK 99501 PH: 907-548-1010 FAX: 907-548-1015

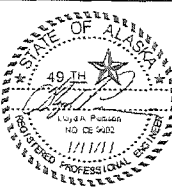
| REVISION           | BY | DATE |
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| LASCOON RELOCATION | CM | 8/10 |
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|---------------|------------|-------|----------|
| Project No.   | Designated | Drawn | Approved |
| FM1 JUNE 2009 | LAP        | CM    | LAP      |

Sheet No. C2.2





|                          |                                                                                                                |                                                     |                                                                                                                 |                                                                                                                         |                                                                                       |                                                                                       |                                                                                           |                                                                                                                                                                                                                       |
|--------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sheet No.<br><b>C2.3</b> | Project<br>No. _____<br>Date <b>JUNE 2009</b><br>Designed <b>LAP</b><br>Drawn <b>CM</b><br>Approved <b>LAP</b> | REVISION<br>LAGOON RELOCATION<br>BY CM<br>DATE 8/10 | <b>CE<sub>2</sub></b><br>ENGINEERS, INC.<br>PO BOX 23246 ANCHORAGE, AK 99523 PH: 907-345-1010 FAX: 907-345-1015 | 2010-11 WASTEWATER<br>SYSTEM IMPROVEMENTS<br><br>ROAD AND<br>FM1 FORCE MAIN<br>PLAN AND PROFILE<br><br>TULUKSAK, ALASKA |  |  | SCALE:<br>AS SHOWN<br><br>IF NOT ONE INCH ON<br>THIS SHEET, ADJUST<br>SCALE'S ACCORDINGLY | RECORD DRAWING CERTIFICATE<br>THESE DRAWINGS REFLECT RECORDED<br>INFORMATION OBTAINED DURING<br>CONSTRUCTION. INFORMATION PROVIDED<br>HEREIN IS ACCURATE TO THE BEST OF MY<br>KNOWLEDGE.<br><br>NAME _____ DATE _____ |
|                          |                                                                                                                |                                                     |                                                                                                                 |                                                                                                                         |                                                                                       |                                                                                       |                                                                                           |                                                                                                                                                                                                                       |

Sheet No.

C2.4

| Project No. | REVISION          | BY | DATE |
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|             | LAGOON RELOCATION | CM | 8/10 |
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Date   JUNE 2009    
Designed   LAP    
Drawn   CM    
Approved   LAP



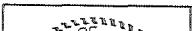
**CE<sub>2</sub>**  
ENGINEERS, INC.

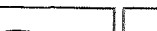
PO BOX 232946 ANCHORAGE, AK 99523 PH: 907-346-1010 FAX: 907-346-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

ROAD AND  
FM1 FORCE MAIN  
PLAN AND PROFILE

TULUKSAK, ALASKA





|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                            |
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| SCALE:<br>AS SHOWN<br><br><small>ONLY USE THIS FOR<br/>ORIGINAL DRAWING</small><br><div style="display: flex; align-items: center;"> <div style="border-bottom: 1px solid black; width: 50px; margin-right: 5px;"></div> <div style="margin-right: 5px;">=</div> <div style="border-bottom: 1px solid black; width: 50px; margin-right: 5px;"></div> <div style="margin-right: 5px;">1"</div> </div><br><small>IF NOT USED FROM ON<br/>THIS SHEET, ADJUST<br/>SCALE - PROBABLY</small> | <p><u>RECORD DRAWING CERTIFICATE</u></p> <p>THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> NAME _____ DATE _____ </div> |
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Sheet No.  
**C2.5**

Project No. \_\_\_\_\_

Date APRIL 2014

Designed MRE

Drawn CM

Approved MRE

| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | CM | 8/10 |
| LAGOON RELOCATION | CM | 4/14 |
|                   |    |      |
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|                   |    |      |
|                   |    |      |

**CE<sub>2</sub>**  
ENGINEERS, INC.  
PO BOX 222946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

ROAD AND  
FM1 FORCE MAIN  
PLAN AND PROFILE

TULUKSAK, ALASKA

5/7/14

**STATE OF ALASKA**  
49<sup>TH</sup>  
*Michael R. Erdman*  
No. 6252  
REGISTERED PROFESSIONAL ENGINEER

**VILLAGE SAFE WATER**  
ALASKA

SCALE:  
AS SHOWN

SAR IS ONE INCH ON  
ORIGINAL DRAWING

IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
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KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_





Sheet No.  
**C2.6**

Project No. \_\_\_\_\_

Date APRIL 2014

Designed MRE

Drawn CM

Approved MRE

| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | CM | 8/10 |
| LAGOON RELOCATION | CM | 4/14 |
|                   |    |      |
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**CE<sub>2</sub>**  
ENGINEERS, INC.  
PO BOX 22246 ANCHORAGE, AK 99523 PH: 907-348-1010 FAX: 907-348-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

ROAD AND  
FM1 FORCE MAIN  
PLAN AND PROFILE

TULUKSAK, ALASKA

5/7/14

STATE OF ALASKA  
49 TH  
Michael R. Erdman  
No. 6252  
REGISTERED PROFESSIONAL ENGINEER

VILLAGE SAFE WATER  
ALASKA

SCALE:  
AS SHOWN

BAR IS ONE INCH ON  
ORIGINAL DRAWING

0 1'

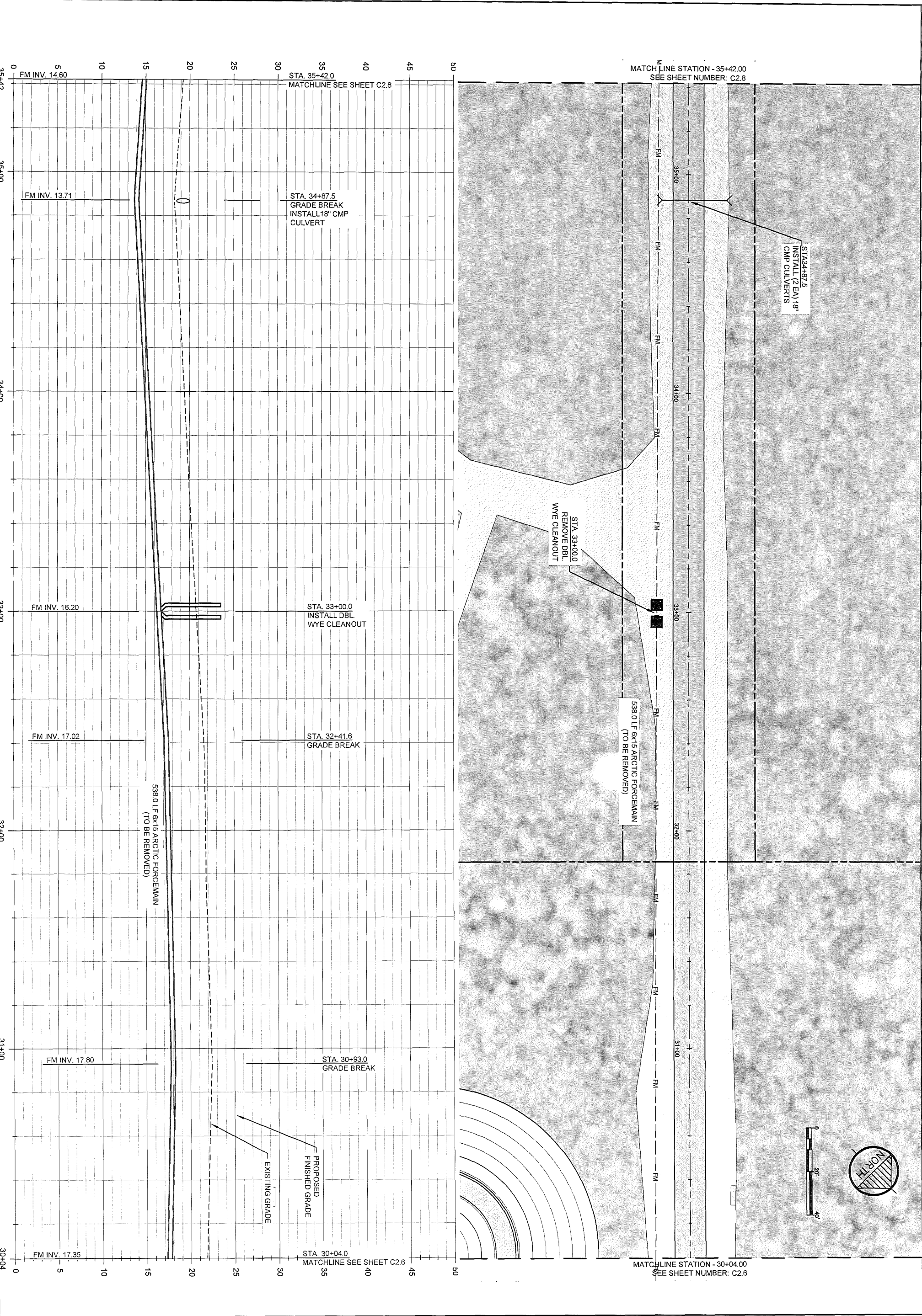
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED  
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NAME \_\_\_\_\_ DATE \_\_\_\_\_





Sheet No.  
**C2.7**

Project No. \_\_\_\_\_

Date APRIL 2014

Designed MRE

Drawn MRE

Approved LAP

| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | CM | 8/10 |
| LAGOON RELOCATION | CM | 4/14 |
|                   |    |      |
|                   |    |      |
|                   |    |      |
|                   |    |      |

**CE<sub>2</sub>**  
**ENGINEERS, INC.**  
PO BOX 222948 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

ROAD AND  
FM1 FORCE MAIN  
PLAN AND PROFILE

TULUKSAK, ALASKA

5/7/14

**STATE OF ALASKA**  
**49<sup>TH</sup>**  
*Michael R. Erdman*  
No. 8252  
REGISTERED PROFESSIONAL ENGINEER

**VILLAGE SAFE WATER**  
**ALASKA**

SCALE:  
AS SHOWN

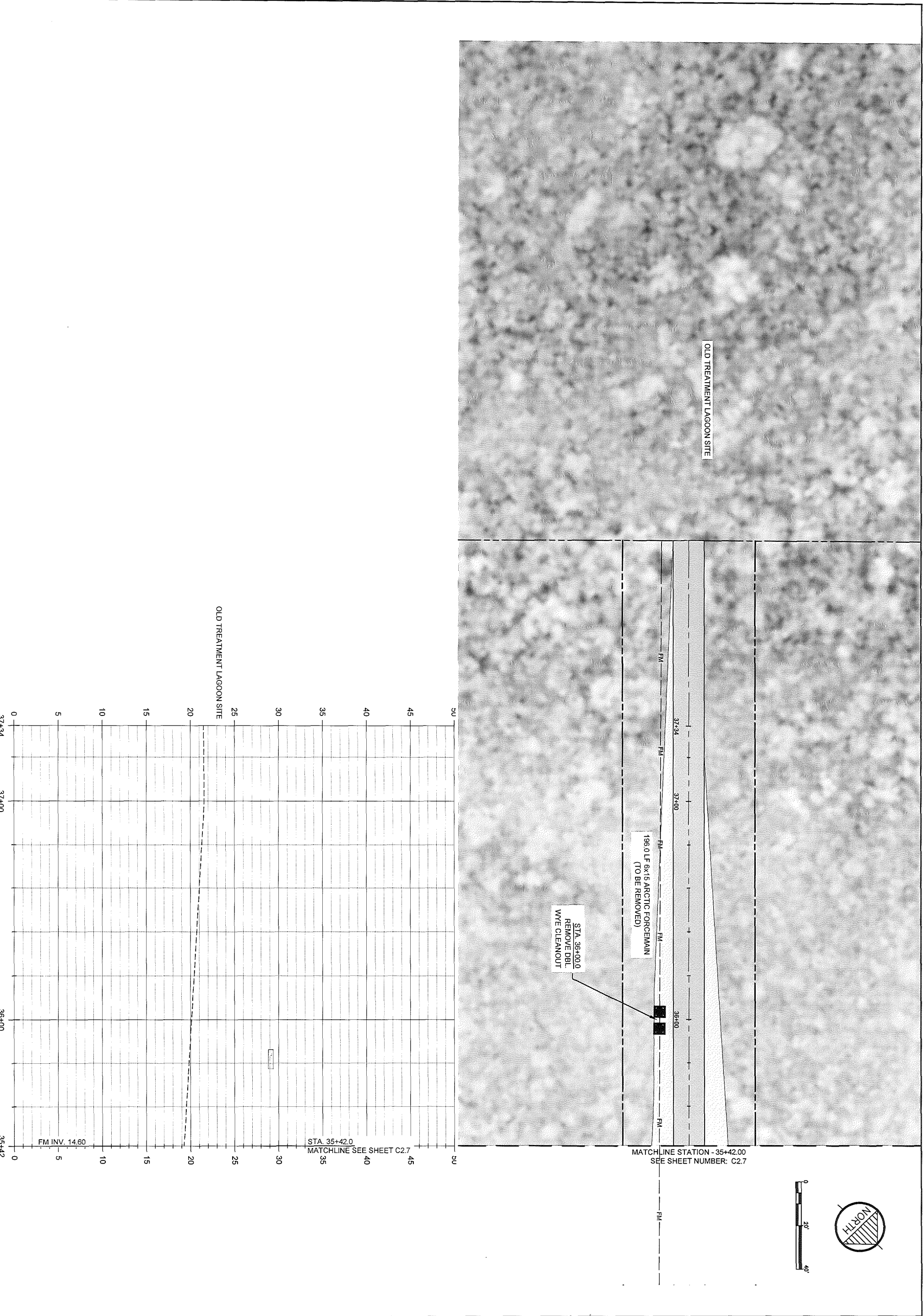
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

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Sheet No.  
**C2.8**

Project No. \_\_\_\_\_

Date APRIL 2014

Designed MRE

Drawn CM

Approved MRE

| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | CM | 8/10 |
| LAGOON RELOCATION | CM | 4/14 |
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**CE<sub>2</sub>**  
**ENGINEERS, INC.**  
PO BOX 232946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

ROAD AND  
FM1 FORCE MAIN  
PLAN AND PROFILE

TULUKSAK, ALASKA

5/7/14

STATE OF ALASKA

49<sup>TH</sup>

*Michael R. Erdman*

No. 62532

REGISTERED PROFESSIONAL ENGINEER

VILLAGE SAFE WATER

ALASKA

SCALE:  
AS SHOWN

BAR IS ONE INCH ON  
ORIGINAL DRAWING

0 1"

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SCALES ACCORDINGLY

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NAME \_\_\_\_\_ DATE \_\_\_\_\_



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|-----------------------|-----------------------|
| Sheet No.<br><br>C2.9 | Project No. _____     |
|                       | Date <u>JUNE 2009</u> |
|                       | Designed <u>LAP</u>   |
|                       | Drawn <u>LAW</u>      |
|                       | Approved <u>LAP</u>   |

| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | CM | 8/10 |
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**CE<sub>2</sub>**  
ENGINEERS, INC.  
PO BOX 232946 ANCHORAGE, AK 99523 PH: 807-349-1010 FAX: 807-349-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

FM2 FORCEMAIN  
PLAN AND PROFILE

TULUKSAK, ALASKA



SCALE:  
PLAN: 1"=20'  
PROF(H): 1"=20'  
PROF(V): 1"=5'

DATE: 01/11/2011  
DRAWN: J. J. J.

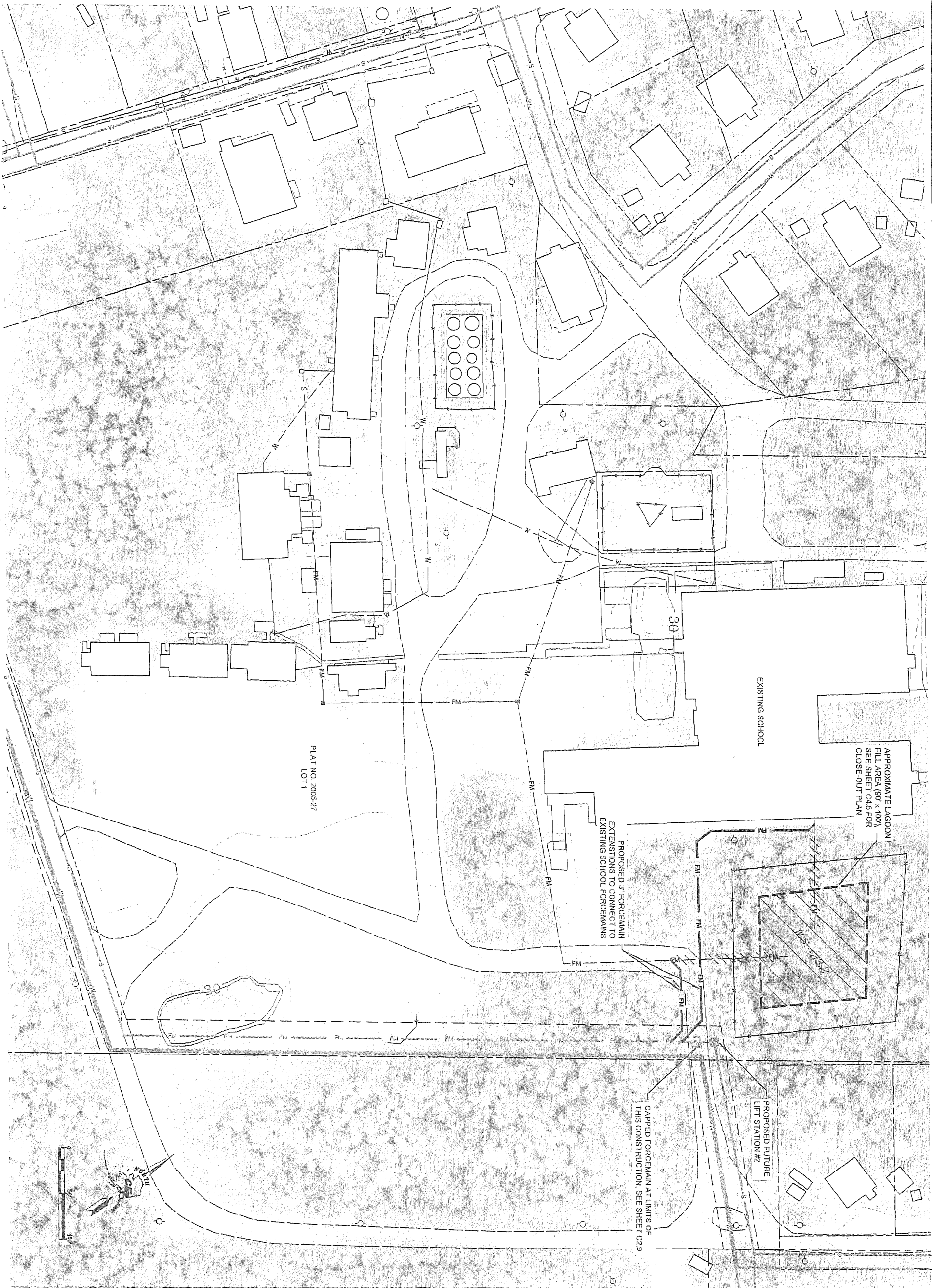
IF NOT ON BLUE PRINT, ADJUST  
SCALE TO MATCH DRAWING

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NAME \_\_\_\_\_ DATE \_\_\_\_\_

1  
C2.10 CONNECTION TO SCHOOL UTILITIES



|                        |                       |
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| Sheet No.<br><br>C2.10 | Project No. _____     |
|                        | Date <u>SEPT 2010</u> |
|                        | Designed <u>LAP</u>   |
|                        | Drawn <u>CM</u>       |
|                        | Approved <u>LAP</u>   |

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**CE2**  
ENGINEERS, INC.

PO BOX 232946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

CONNECTION TO  
SCHOOL UTILITIES

TULUKSAK, ALASKA

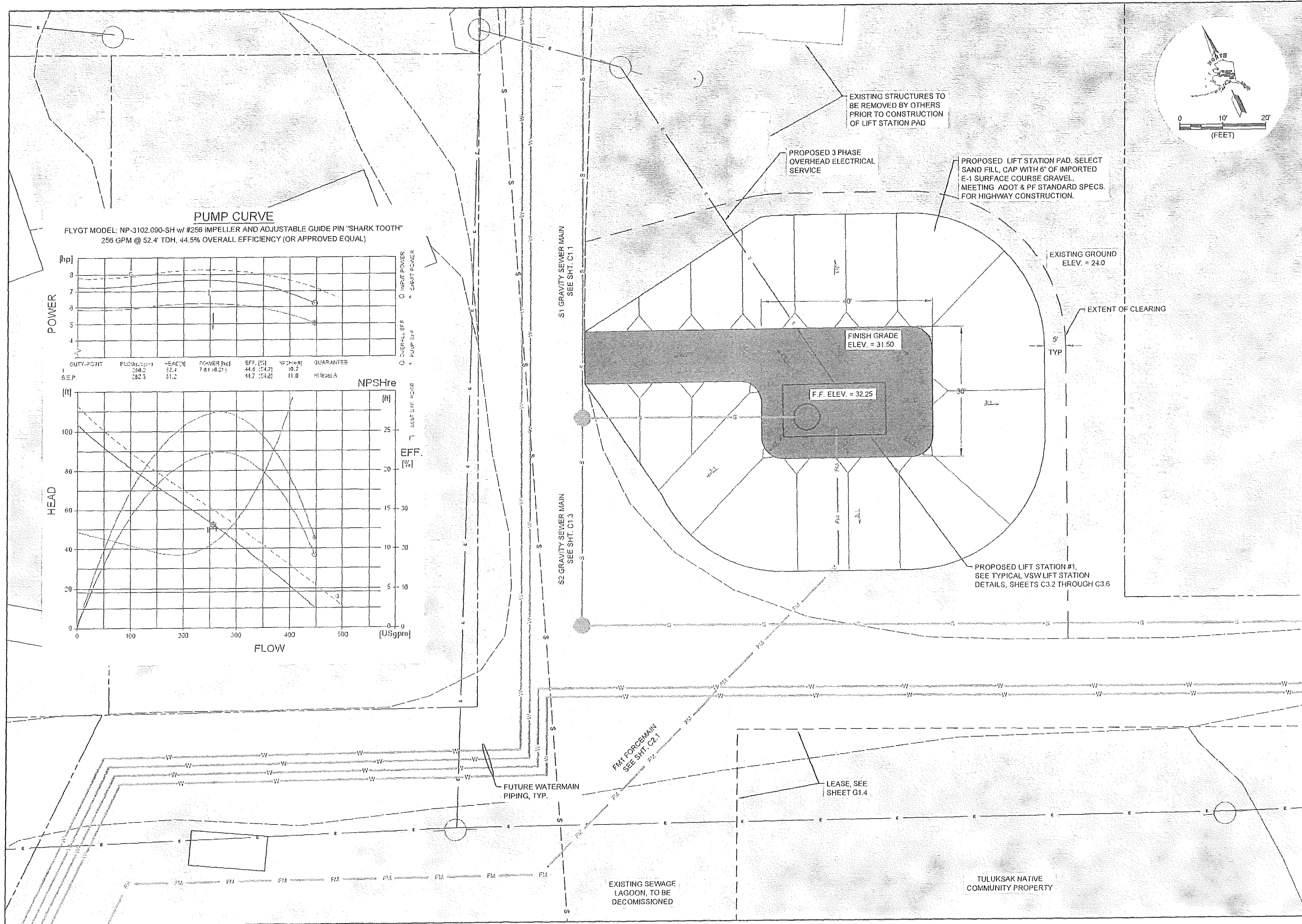


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| SCALE:<br>AS SHOWN                                             |
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| RECORD DRAWING CERTIFICATE                                                                                                                     |            |
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| NAME _____                                                                                                                                     | DATE _____ |



G:\ACAD\TULUKSAK\T10901\_2008 Waste water disposal area\C3.1 LIFT STATION SITE PLAN.dwg, 1/11/2011 1:30:13 PM, Fish, LANIER MP C2050\_LD520C PCL 6BLK WHT.d3



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DATE: \_\_\_\_\_

2010-11 WASTEWATER SYSTEM IMPROVEMENTS

LIFT STATION #1 SITE PLAN AND PUMP CURVE

TULUKSAK, ALASKA

**CER ENGINEERS, INC.**  
PO BOX 22394 ANCHORAGE, AK 99502 PH: 907-548-4000 FAX: 907-545-0015

| REVISION | BY | DATE |
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| Project No. | Date | Drawn | Approved |
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Sheet No. **C3.1**

G:\ACAD\TULUKSAK\T10901 2003 Waste water disposal area (C3.2)\_THRU\_3.6 revised format.dwg, 1/11/2011 12:57:46 PM, cmtier, LANTIER MP C2050\_LD520C PCL 6, p03

GENERAL CONSTRUCTION NOTES:

1. INSTALL 6 MIL VISQUEEN UNDER SLAB.

FOUNDATION CONSTRUCTION NOTES:

1. INSTALL BOARD STOCK INSULATION TO 18" BELOW TOP OF SLAB. BOARD STOCK CAN BE USED AS FORM MATERIAL WITH PROPER SUPPORT.
2. NFS SAND FILL TO 12" BELOW BOTTOM OF SLAB. COMPACT SUB GRADE PRIOR TO PLACEMENT. GRAVEL PLACED IN 6" LIFTS.
3. THE WET WELL WILL BE A PRE-CAST MANHOLE A SPECIFIED IN THE DRAWINGS.
4. CAST-IN-PLACE CONCRETE MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. EACH YARD OF CONCRETE MUST CONTAIN NOT LESS THAN 5-1/2 SACKS OF CEMENT AND NOT MORE THAN 6.5 GALLONS OF WATER PER SACK OF CEMENT.
5. DEFORMED REINFORCING STEEL MUST CONFORM TO ASTM SPECIFICATION A615 AND HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI. LAP BARS MUST BE A MINIMUM OF 30 DIAMETERS. REINFORCING STEEL LAYOUT AND PLACING WILL CONFORM TO THE STANDARD BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318-83).
6. WELDED WIRE FABRIC FOR ENTRY SLAB WILL CONFORM TO ASTM A185. LAPS TO BE ONE CROSSWISE SPACING PLUS 1-1/2".
7. CONCRETE COVER FOR THE REINFORCING STEEL MUST BE 3 INCHES FOR THE FOOTINGS AND TWO INCHES FOR THE WALLS AND SLAB.
8. METAL ROOFING WILL CONSIST OF 1-1/2" TWIN RIB ALUMINUM.
9. THE SEALS ON THE PRE-CAST MANHOLE SECTIONS WILL BE RAMNEK.
10. THE INTERIOR OF THE LIFT STATION WET WELL, INCLUDING METAL PIPING, WILL BE PAINTED WITH 46H-413 HI-BUILD TNEDEC TAR, 13 DRY FILM MILLS.
11. THE LIFT STATION WILL BE FILLED AND PRESSURE TESTED FOR LEAKS BEFORE ANY EFFLUENT ENTERS THE STATION.
12. ALL CONSTRUCTION SHALL BE DONE IN A SAFE, WORKMANLIKE MANNER TO INDUSTRY STANDARDS AND IN CONFORMANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL CODES AND REGULATIONS.
13. HANGERS AND ANCHORS USED FOR SUPPORTING HORIZONTAL PIPING SHALL BE OF MATERIAL OF SUFFICIENT STRENGTH AND ADEQUATELY ANCHORED TO MAINTAIN EACH SUPPORT'S PROPORTIONAL SHARE OF THE WEIGHT OF THE PIPE AND CONTENTS.
14. SUPPORTS FOR HORIZONTAL IRON PIPE SHALL BE PROVIDED AT INTERVALS OF NOT MORE THAN 10 FEET OR AS SHOWN ON THE PLANS. SUPPORTS SHALL BE ADEQUATE TO PREVENT STRESS AT JOINTS DUE TO SAGGING. SUPPORTS SHALL BE PROVIDED AT EACH HORIZONTAL BRANCH CONNECTION. SUSPENDED LINES SHALL BE SUITABLY BRACED TO PREVENT HORIZONTAL MOVEMENT.

SEWAGE LIFT STATION  
ELECTRICAL CODE REVIEW

1999 NFPA 820 STANDARD FOR FIRE PROTECTION IN WASTEWATER TREATMENT AND COLLECTION FACILITIES CHAPTER 2 TABLE 2-2 OUTLINES THE REQUIREMENTS AND AREA CLASSIFICATIONS FOR THE INSTALLATION CONFIGURATIONS TYPICALLY USED. THIS INSTALLATION IS AN ABOVE GRADE WASTEWATER PUMPING STATION WHERE THE CONTROL ROOM IS PHYSICALLY SEPARATED WITH NO PERSONNEL ACCESS TO THE WET WELL. THE REQUIREMENTS CAN BE FOUND IN TABLE 2-2.

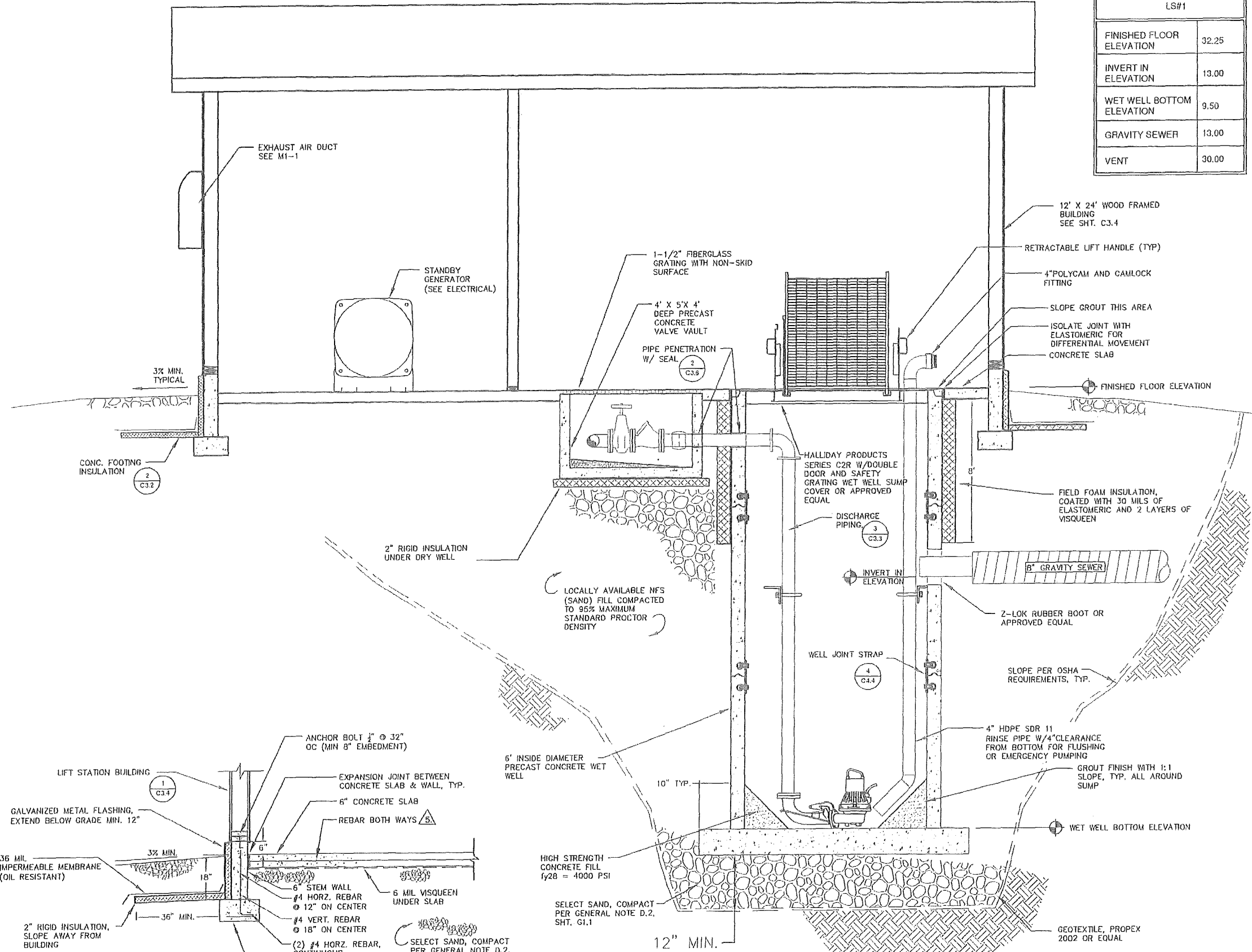
THE TABLE STATES THE FOLLOWING FOR THE CONTROL ROOM (TABLE 2.2 ITEM 18):

FIRE AND EXPLOSION HAZARD: NOT APPLICABLE  
VENTILATION: NOT REQUIRED  
EXTENT OF CLASSIFIED AREA: NOT APPLICABLE  
NEC-AREA ELECTRICAL CLASSIFICATION: UNCLASSIFIED

THE TABLE STATES THE FOLLOWING FOR THE WET WELL SIDE (TABLE 2.2 ITEM 19):

FIRE AND EXPLOSION HAZARD: POSSIBLE IGNITION OF FLAMMABLE GASES  
VENTILATION: NONE (CLASS 1, DIV. 1); 12 AIR CHANGES OR MORE (CLASS 1, DIV. 2)  
EXTENT OF CLASSIFIED AREA: ENTIRE SPACE OR ROOM  
NEC-AREA ELECTRICAL CLASSIFICATION: DIVISION 1 OR 2 DEPENDING ON VENTILATION

THE INSTALLATION WILL ALLOW THE USE OF UNCLASSIFIED EQUIPMENT AND WIRING METHODS IN THE CONTROL ROOM. HOWEVER, THE SENSING TRANSDUCER MUST HAVE THE RACEWAY SEALED AT THE BOUNDARY INTO THE CLASS 1, DIVISION 1 WET WELL.



2 TYPICAL WALL CONNECT/SLAB DETAIL  
C3.2 NTS

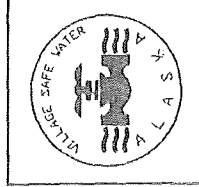
3 WET WELL FOUNDATION DETAIL  
C3.2 NTS

ELEVATION TABLE  
LS#1

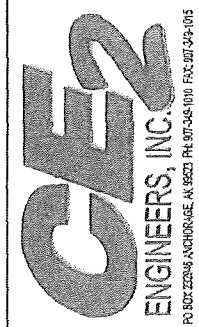
|                           |       |
|---------------------------|-------|
| FINISHED FLOOR ELEVATION  | 32.25 |
| INVERT IN ELEVATION       | 13.00 |
| WET WELL BOTTOM ELEVATION | 9.50  |
| GRAVITY SEWER             | 13.00 |
| VENT                      | 30.00 |

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SCALE:  
1" = 1'-0"



2010-11 WASTEWATER SYSTEM IMPROVEMENTS  
LIFT STATION DETAILS  
TULUKSAK, ALASKA



| REVISION | BY | DATE |
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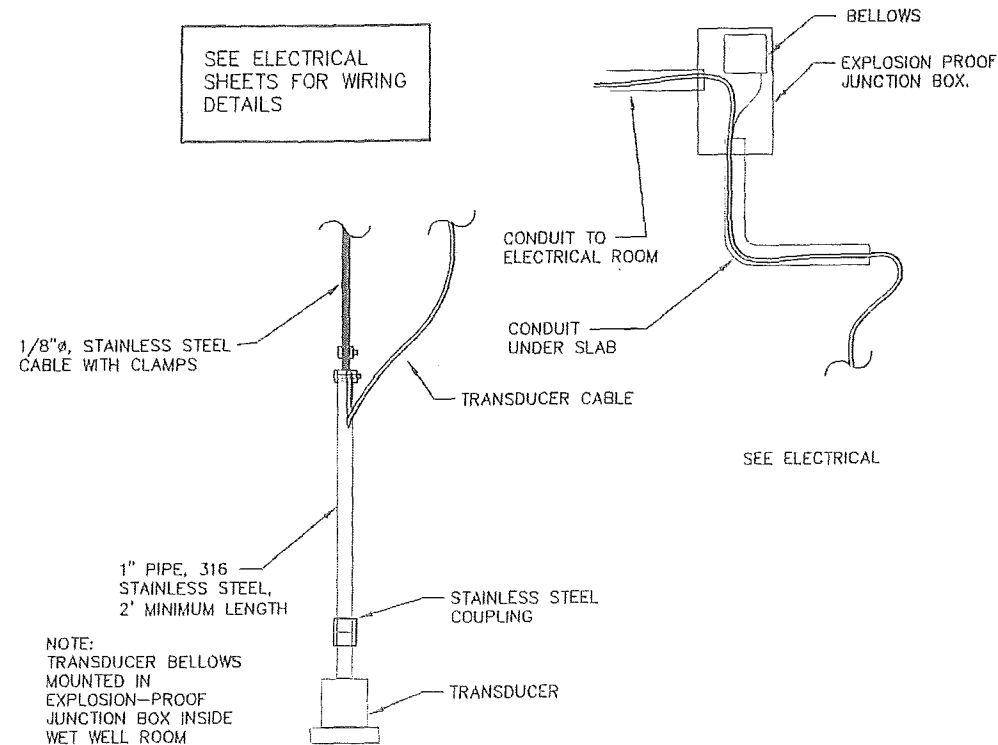
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| Project No. | Date      | Designed | Drawn | Approved |
|             | JUNE 2009 | LAP      | VSW   | LAP      |

Sheet No. C3.2

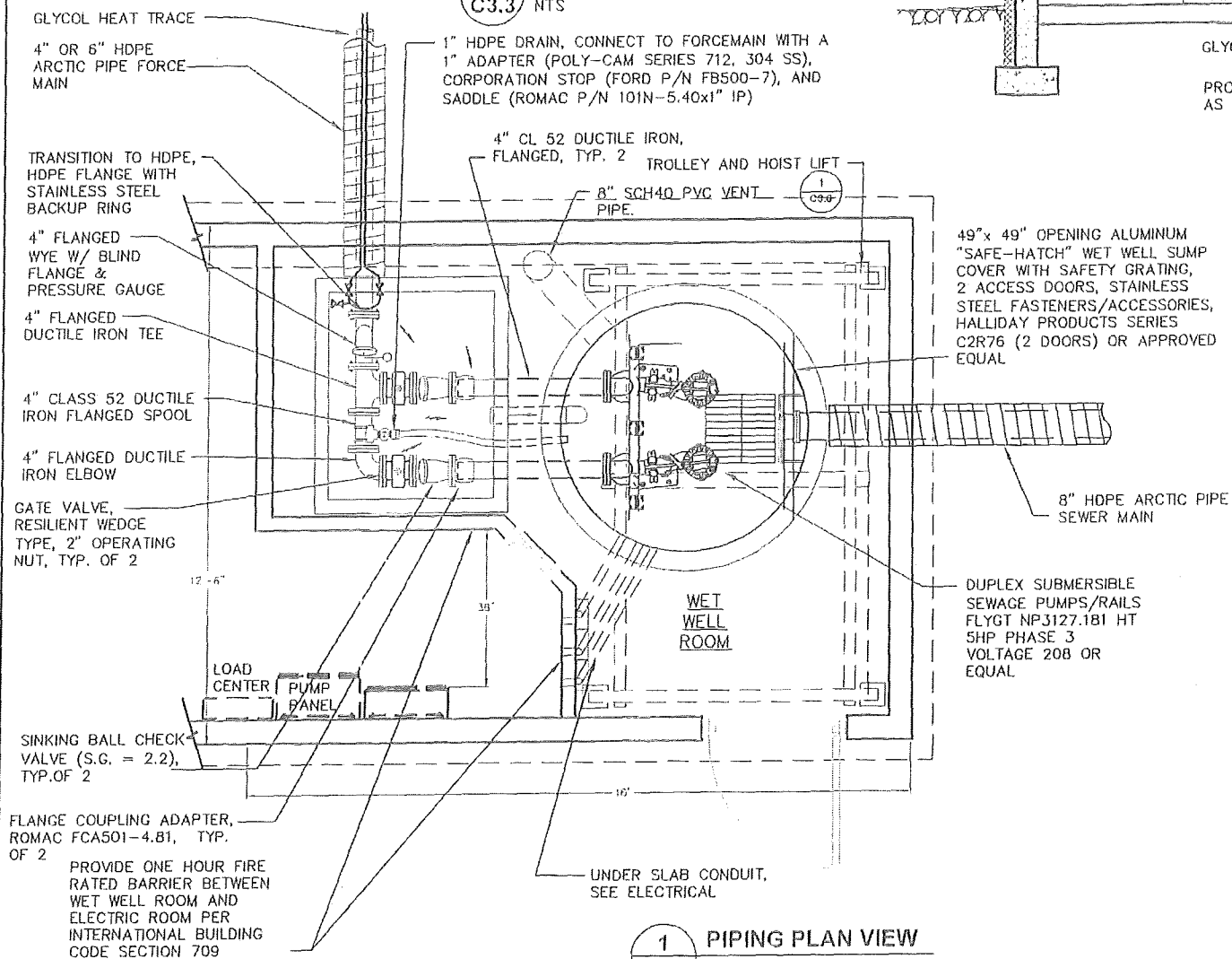


GA:CAO/TULULSAK/TLT0901 2008 Waste water disposal area (C3.2\_THRU\_3.6 revised formatting, 1/11/2011 1:00:13 PM) cmerz, LANIER HP C2050\_L0520C PCL 6.pcl

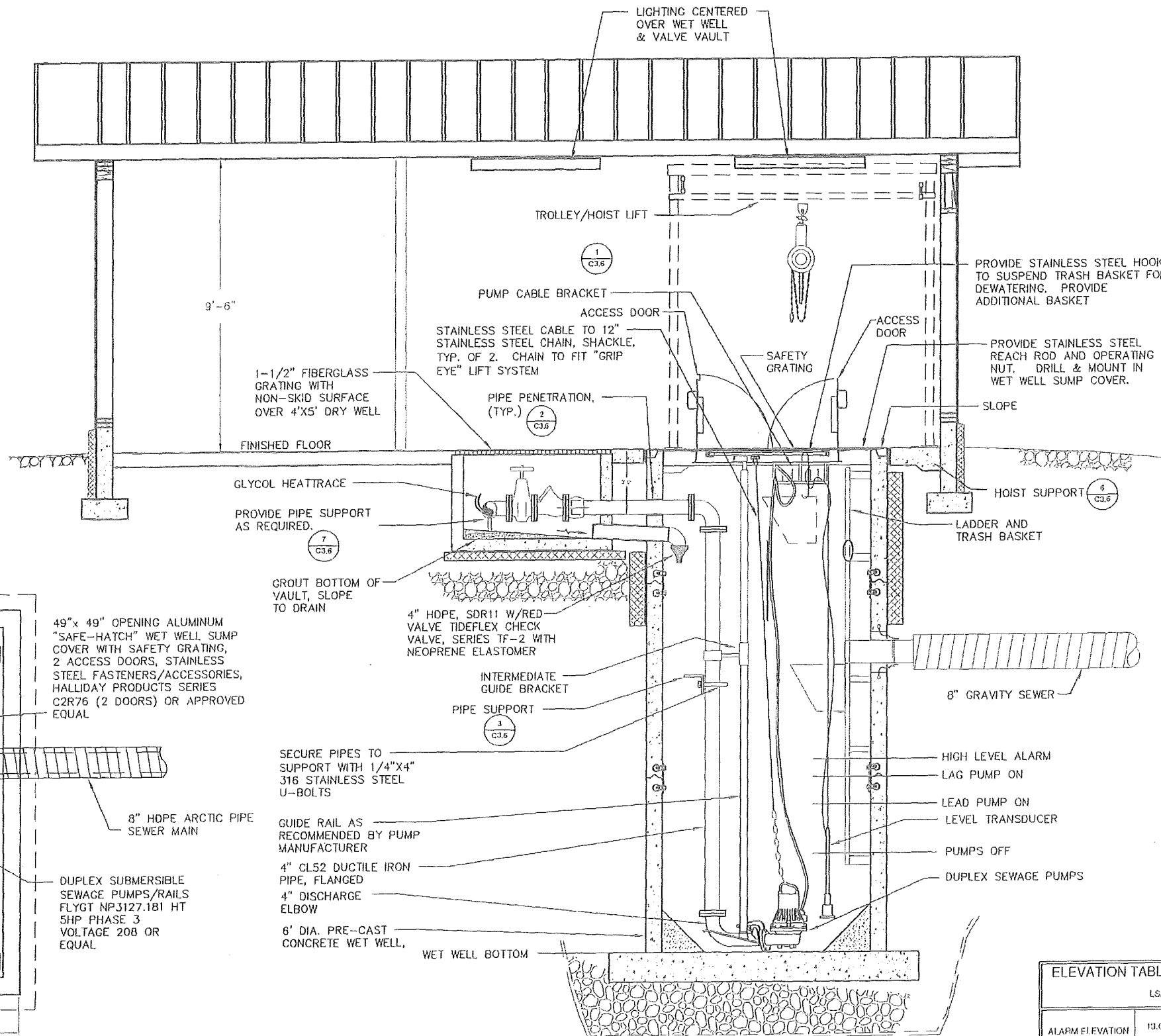
SEE ELECTRICAL  
SHEETS FOR WIRING  
DETAILS



2 TRANSDUCER DETAIL  
C3.3 NTS



1 PIPING PLAN VIEW  
C3.3 NTS



NOTE: ATTACH 1/8" DIA. SS CABLE TO THE ATTACHED PUMP CHAIN  
TO FACILITATE LIFTING PUMPS FOR REMOVAL/REPLACEMENT OR MAINTENANCE.

3 PIPING PROFILE VIEW  
C3.3 NTS

| ELEVATION TABLE        |       |
|------------------------|-------|
| LS#1                   |       |
| ALARM ELEVATION        | 13.00 |
| LAG PUMP ON ELEVATION  | 12.75 |
| LEAD PUMP ON ELEVATION | 12.50 |
| PUMPS OFF ELEVATION    | 11.50 |

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SCALE: 1" = 10'-0"

DATE: 1/11/2011

NAME: C3.3

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

ENGINEERS, INC.

PO BOX 2204 ANCHORAGE, AL 99501-0204 TEL 907-545-0100 FAX 907-545-0105

BY: DATE:

REVISION:

Project No. 2010-11 WASTEWATER SYSTEM IMPROVEMENTS

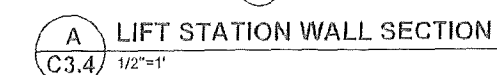
Date: JUNE 2010

Designed: LAP

Drawn: VSW

Approved: LAP

Sheet No. C3.3



1. INSULATION OF THIS BUILDING IS REQUIRED AS SHOWN ON THE PLANS.
2. SLOPE FLOOR AREAS TO DRAIN TOWARD PUMP ACCESS DOORS.
3. CONSTRUCT CONCRETE SLAB W/ 1/2" REBAR @ 12" ON CENTER, BOTH WAYS. ALLOW FOR 2" COVER ON ALL SIDES.
4. SEE MECHANICAL SHEET M1-1 FOR VENTILATION DUCT SIZE AND DETAILS

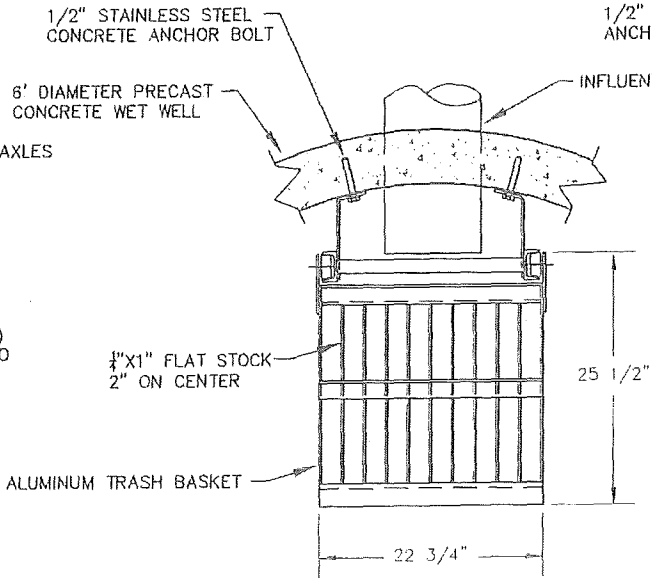
Wheel No. C3.4



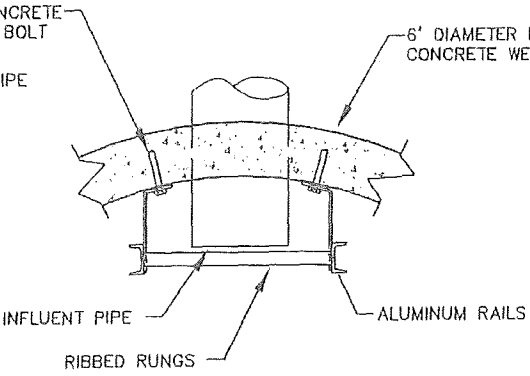
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NOTES:

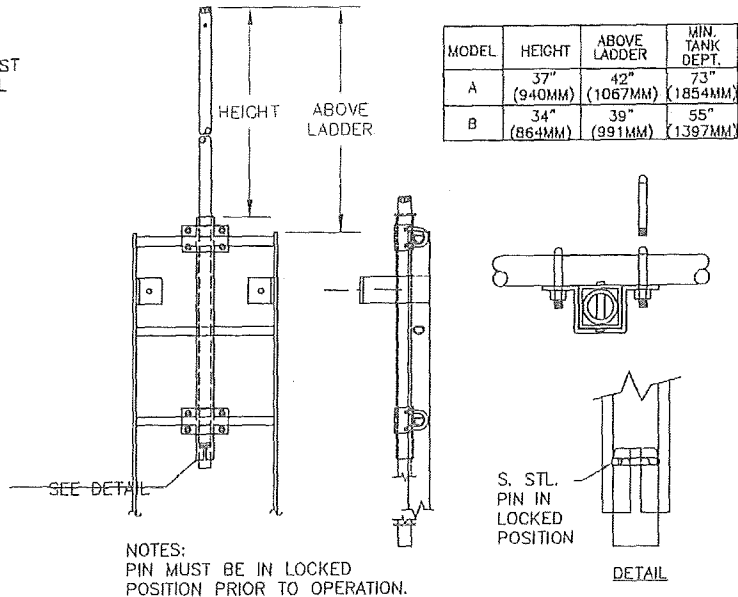
- PREMANUFACTURED LADDER AND BASKET WITH VERTICAL BAR SCREEN. SIMILAR TO HALLIDAY PRODUCTS, LADDER L1B & TRASH BASKET 81B, OR APPROVED EQUAL. STANDARD FEATURES SHALL INCLUDE:
  - ALL ALUMINUM BASKET AND RAILS
  - SOLID ALUMINUM WHEELS AND STAINLESS STEEL AXLES
  - HEAVY DUTY LADDER/GUIDERAIL COMBINATION
  - SLIP RESISTANT RUNGS
  - BAR SCREEN STYLE BASKET
- REQUIRED INFORMATION
  - WET WELL DIAMETER
  - RAIL/LADDER LENGTH
  - STANDOFF LENGTH (10" MIN FOR LADDER COMBO)
  - FIELD VERIFY DISTANCE REQUIRED FOR BASKET TO CLEAR THE FINISH ACCESS OPENING.



1 PLAN VIEW  
C3.5 NTS

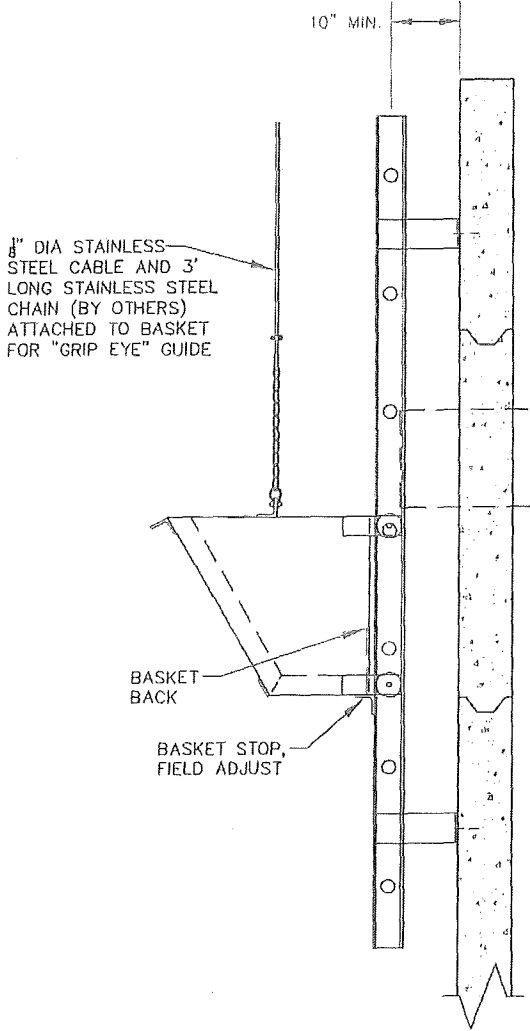


2 LADDER SUPPORT DETAIL  
C3.5 NTS

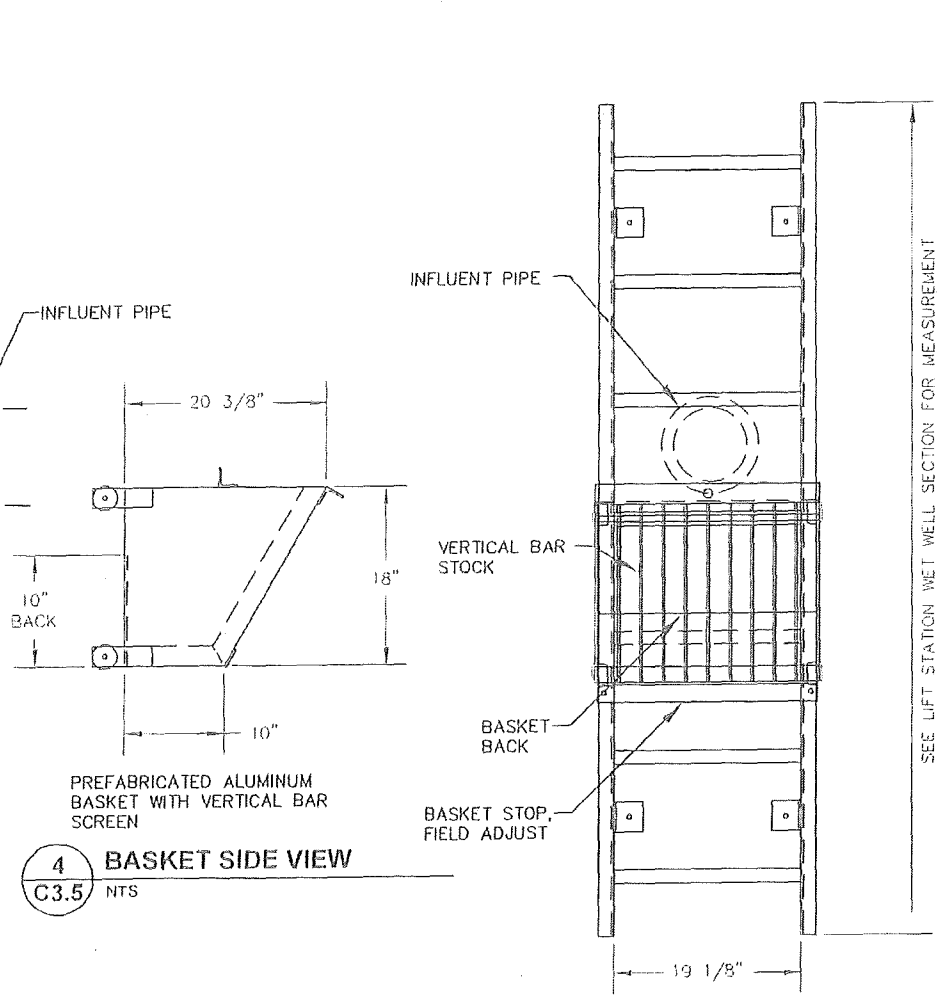


8 LADDER EXTENSION DETAIL  
C3.5 NTS

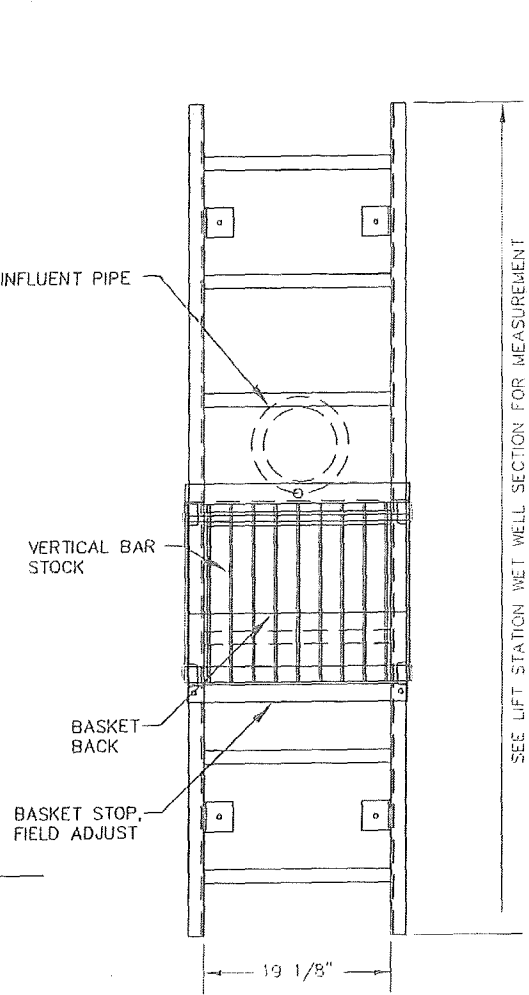
| MODEL | HEIGHT      | ABOVE LADDER | MIN. TANK DEPT. |
|-------|-------------|--------------|-----------------|
| A     | 37" (940MM) | 42" (1067MM) | 73" (1854MM)    |
| B     | 34" (864MM) | 39" (991MM)  | 55" (1397MM)    |



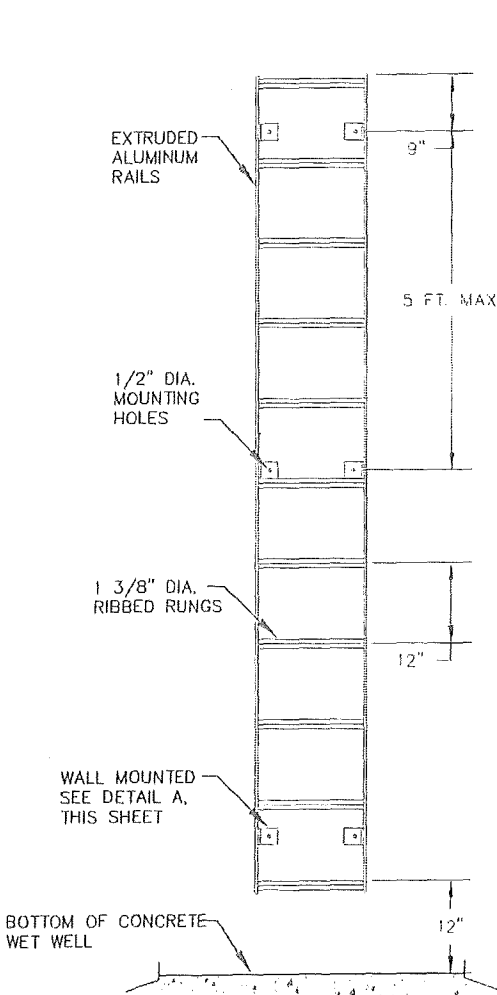
3 LADDER/BASKET SIDE VIEW  
C3.5 NTS



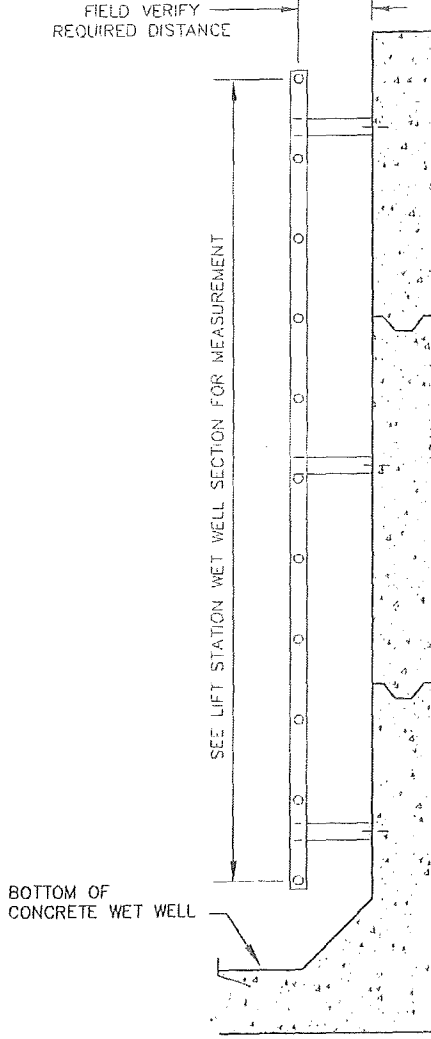
4 BASKET SIDE VIEW  
C3.5 NTS



5 LADDER/BASKET FRONT VIEW  
C3.5 NTS



6 LADDER FRONT VIEW  
C3.5 NTS



7 LADDER SIDE VIEW  
C3.5 NTS

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NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:

1" = 10'-0" (AS SHOWN)

1" = 10'-0" (AS SHOWN)

2010-11 WASTEWATER SYSTEM IMPROVEMENTS

LIFT STATION LADDER DETAILS

TULUUSAK, ALASKA

CER ENGINEERS, INC.

PO BOX 22240 ANCHORAGE, AK 99502 TEL: 907-504-1010 FAX: 907-504-1015

Project No. \_\_\_\_\_

Date: JUNE 2009

Designed: LAP

Drawn: VSW

Approved: LAP

Revision

BY

DATE

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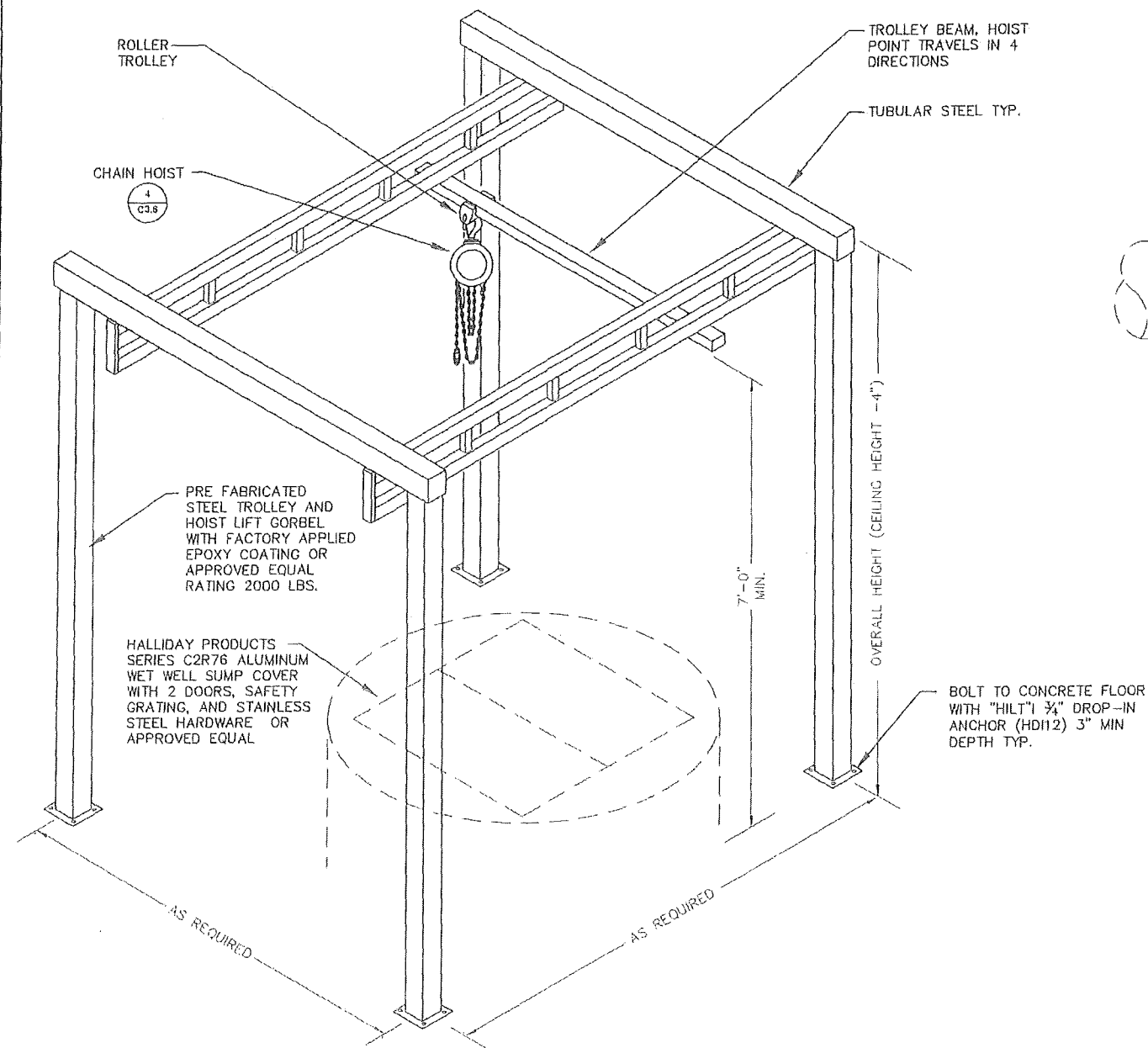
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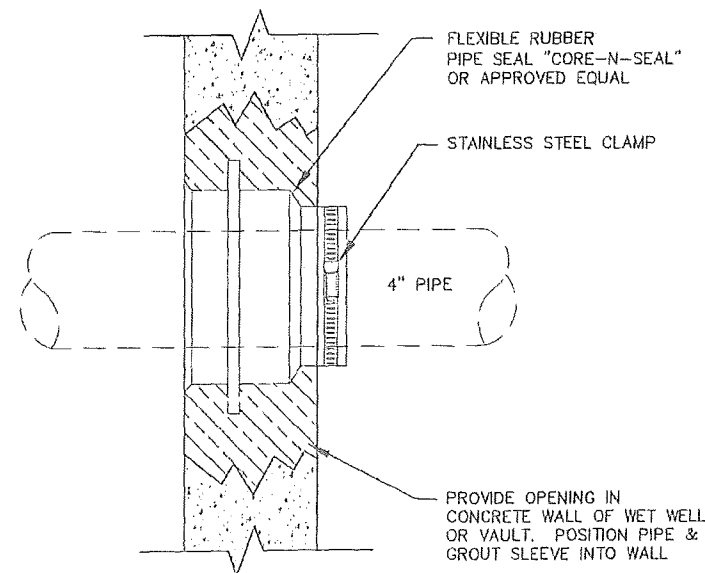
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C3.5

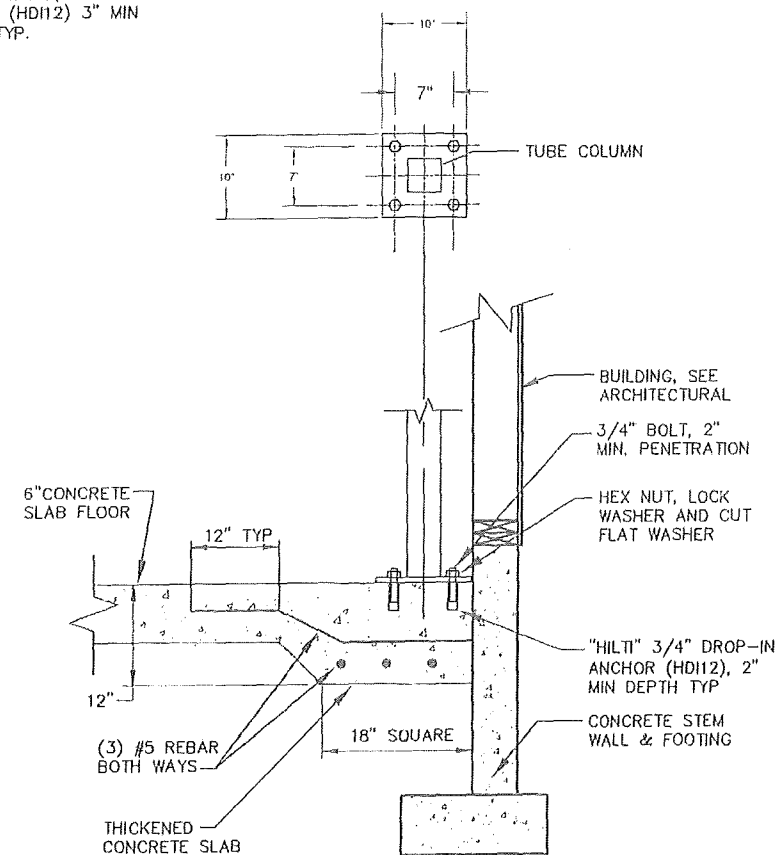
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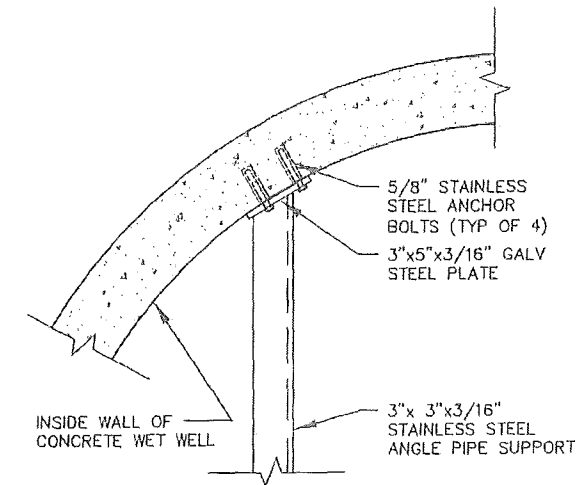
1 TROLLEY FRAME DETAIL  
C3.6 NTS



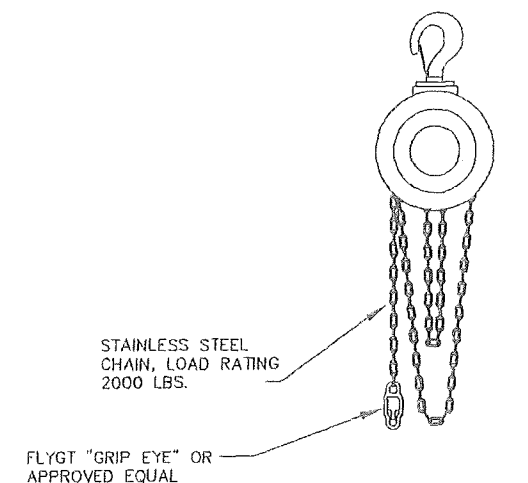
2 PIPE SLEEVE DETAIL  
C3.6 NTS



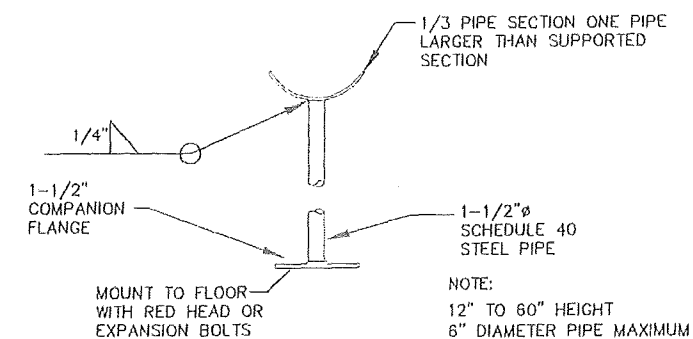
6 HOIST SUPPORT DETAIL  
C3.6 NTS



3 PIPE SUPPORT DETAIL  
C3.6 NTS



4 CHAIN HOIST  
C3.6 NTS



7 FLOOR MOUNT PIPE SUPPORT DETAIL  
C3.6 NTS

|                                                                                                                                                                              |             |          |       |
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| TULUUSAK WATER                                                                                                                                                               |             |          |       |
| 2010-11 WASTEWATER SYSTEM IMPROVEMENTS                                                                                                                                       |             |          |       |
| LIFT STATION HOIST AND PIPE SUPPORT DETAILS                                                                                                                                  |             |          |       |
| TULUUSAK, ALASKA                                                                                                                                                             |             |          |       |
| CER ENGINEERS, INC.                                                                                                                                                          |             |          |       |
| PO BOX 22394 ANCHORAGE, AK 99522 PH 907-545-1000 FAX 907-545-1015                                                                                                            |             |          |       |
| Project No.                                                                                                                                                                  | Date        | Designed | Drawn |
| JUNE 2009                                                                                                                                                                    | JUNE 2009   | LAP      | VSJ   |
| Sheet No.                                                                                                                                                                    | Sheet Title | Approved | LAP   |
| C3.6                                                                                                                                                                         | C3.6        |          |       |



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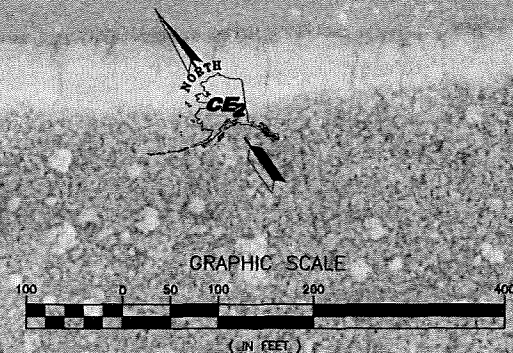


PROPOSED  
FORCEMAIN #1  
(PHASE II)

PROPOSED  
WASTEWATER LAGOON  
(PHASE I)

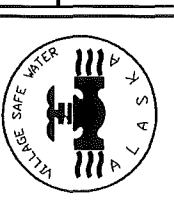
## WASTEWATER LAGOON DESIGN CRITERIA

| Assumptions                                                                                                                                                                                                                                                                        |           |                |                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------|-------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                    | Qty.      | Unit           | Notes                                                                                                                         |
| 2010 Design Population                                                                                                                                                                                                                                                             | 497       | People         |                                                                                                                               |
| 2033 Design Population                                                                                                                                                                                                                                                             | 421       | People         | Population is Declining                                                                                                       |
| Design Flow Rate:<br>School Population: 170 persons x 15 Gal/Cap-Day = 2,550 gpd<br>School Staff: 15 persons x 70 Gal/Cap-Day = 1,050 gpd<br>Remaining Population: 236 persons x 5 Gal/Cap-Day = 1,180 gpd<br>Washeteria: 5,000 gpd<br>Total: 9,780 gpd<br>Round up to: 10,000 gpd | 10000     | Gpd            | Calculated                                                                                                                    |
| BOD per person                                                                                                                                                                                                                                                                     | 0.17      | lbs/Cap-Day    | Minimum loading suggested by Ten States Standards (referred to by ADEC).                                                      |
| Treatment Cell BOD Loading (Maximum)                                                                                                                                                                                                                                               | 30        | lbs/acre       | ADEC Lagoon Construction Guidelines for percolation lagoons.                                                                  |
| Treatment Cell Hydraulic Retention Time (HRT)                                                                                                                                                                                                                                      | 60        | Days           | Assumed                                                                                                                       |
| Treatment Cell Maximum Depth                                                                                                                                                                                                                                                       | 10        | Feet           | ADEC Lagoon Construction Guidelines for percolation lagoons.                                                                  |
| Percolation Days Per Year                                                                                                                                                                                                                                                          | 365       | Days           | Assumed                                                                                                                       |
| 2033 Design Conditions                                                                                                                                                                                                                                                             |           |                |                                                                                                                               |
| Average Daily Flow                                                                                                                                                                                                                                                                 | 10,000    | Gallons        | Calculated                                                                                                                    |
| BOD/day production                                                                                                                                                                                                                                                                 | 71.6      | lbs            | Calculated                                                                                                                    |
| Treatment Cell Size (based on BOD Loading)                                                                                                                                                                                                                                         | 2.4       | Acres          | Calculated                                                                                                                    |
| Treatment Cell Volume                                                                                                                                                                                                                                                              | 750,000   | Gallons        | Min. HRT plus 25% Sludge Holding Cap.                                                                                         |
| Treatment Cell Average Depth                                                                                                                                                                                                                                                       | 7.00      | Feet           | Use 7 Foot min. depth for freeze protection.                                                                                  |
| Required Percolation Cell Holding Volume (non-perk Days)                                                                                                                                                                                                                           | -         | Gallons        |                                                                                                                               |
| Percolation Calculations                                                                                                                                                                                                                                                           |           |                |                                                                                                                               |
| Average Perc Rate                                                                                                                                                                                                                                                                  | 5.6       | min./in.       | Measured average of 3 perc tests                                                                                              |
| Saturation Test Loading                                                                                                                                                                                                                                                            | 40        | min./in.       | Measured                                                                                                                      |
| Daily Loading Rate                                                                                                                                                                                                                                                                 | 0.90      | Gal/Sq.Ft.-Day | Seepage Pit Loading Rate from the 10-States Standard for Individual Sewage Systems, 1980 Edition, for Perc Rate 6-10 min./in. |
| Required Holding Cell Floor Area                                                                                                                                                                                                                                                   | 11,111    | Sq. Feet       |                                                                                                                               |
| Calculated Average Winter Holding Depth                                                                                                                                                                                                                                            | 8.00      | Feet           |                                                                                                                               |
| Proposed Lagoon Sizing                                                                                                                                                                                                                                                             |           |                |                                                                                                                               |
| Treatment Cell Size                                                                                                                                                                                                                                                                | 2.4       | Acres          |                                                                                                                               |
| Treatment Cell Volume                                                                                                                                                                                                                                                              | 4,778,182 | Gallons        |                                                                                                                               |
| Treatment Cell Calculated HRT                                                                                                                                                                                                                                                      | 478       | Days           |                                                                                                                               |
| Percolation Bed Size                                                                                                                                                                                                                                                               | 0.47      | Acres          | 0.26 Acres min. required                                                                                                      |
| Percolation Cell Winter Storage Volume                                                                                                                                                                                                                                             | 2,521,370 | Gallons        | OK. > Req. Holding Cell Volume. 8 Foot Max. Depth                                                                             |



RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
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HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

SCALE:  
BASED ON ONE INCH ON  
ORIGINAL DRAWING  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALE ACCORDINGLY



2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
LAGOON SITE PLAN  
AND DESIGN CRITERIA  
TULUKSAK, ALASKA

**CEE**  
ENGINEERS, INC.  
PO BOX 22046 ANCHORAGE, AK 99521 PH: 907-348-1010 FAX: 907-348-0115

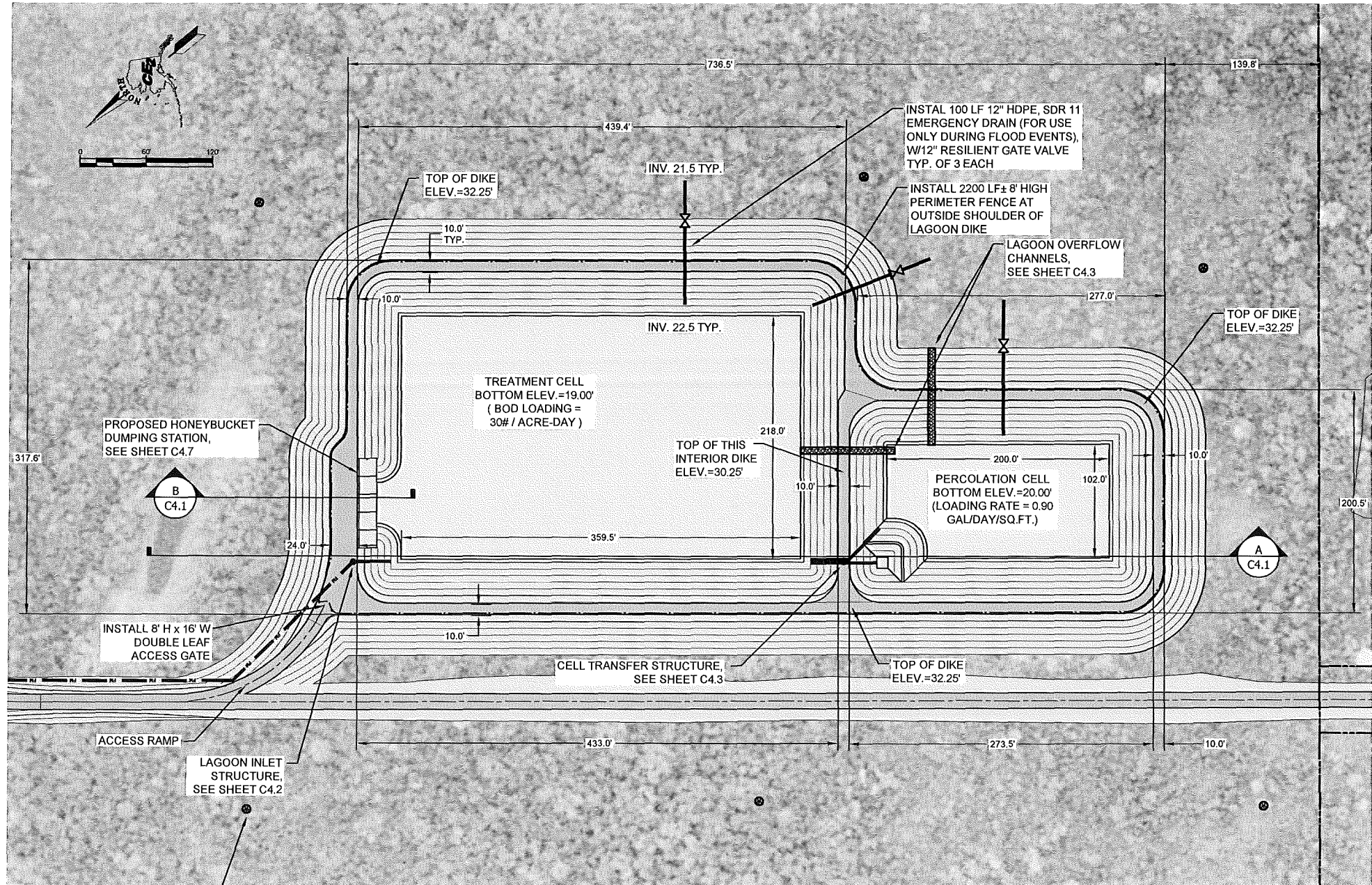
| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | CM | 4/14 |
| LAGOON RELOCATION | CM | 4/14 |
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| Project No. | APRIL 2014 | MRE | CM/LAW | MRE |
| Date        |            |     |        |     |
| Designed    |            |     |        |     |
| Drawn       |            |     |        |     |
| Approved    |            |     |        |     |

Sheet No.  
C4.0

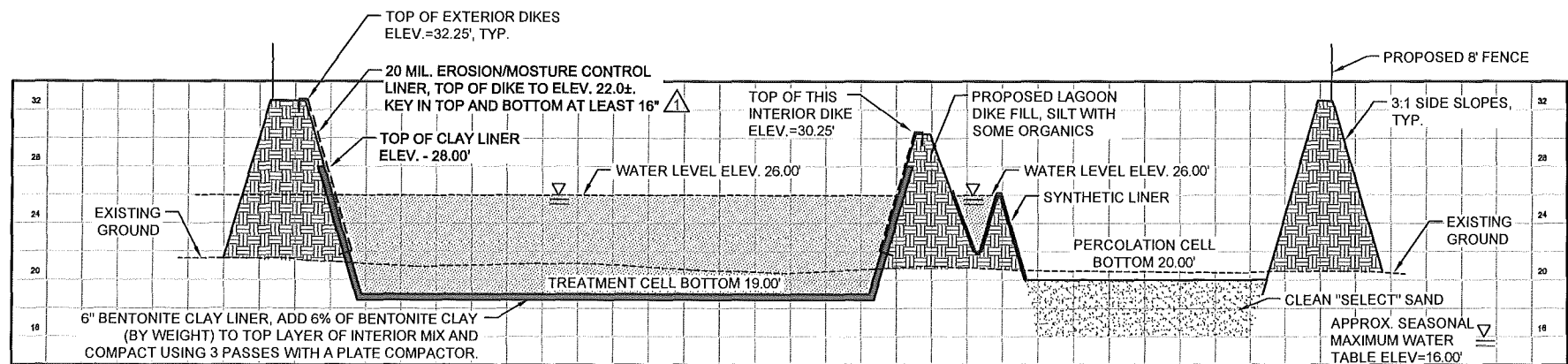


G:\ACAD\TULUKSAK\TLT0901 2008 Waste water disposal area\lfc Rev Apr 2014\C4.1 LAGOON PLAN AND PROFILE.dwg, 5/6/2014 6:41:34 PM, cmerz, \\c2main\LANIER MP C2050\LD520C PCL 6



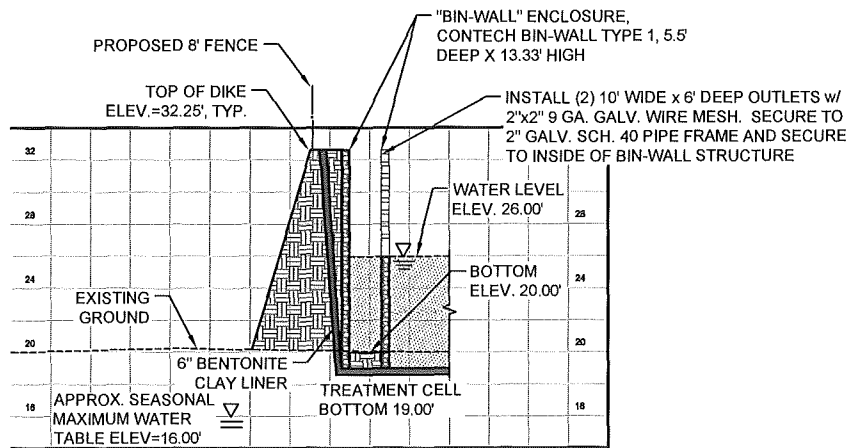
2" DRIVEN MONITORING WELL, TYP. OF 6 EA, 5' TYP. INSIDE PROPERTY, EVALUATE FINAL PLACEMENT OF WELLS PRIOR TO INSTALLATION TO TARGET AREAS DOWN-GRADIENT FROM THE PERCOLATION CELL, SEE

1 WASTEWATER TREATMENT LAGOON PLAN  
SCALE: 1"=60'

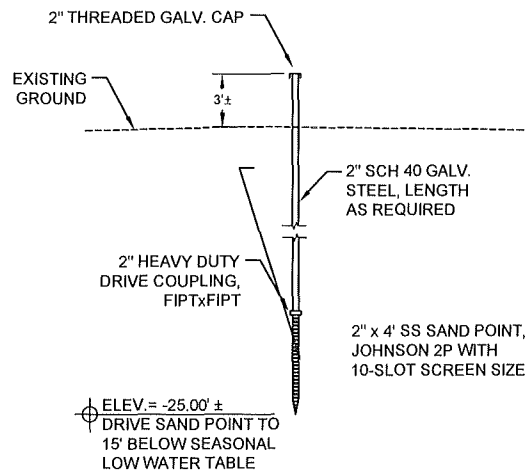


LAGOON - SECTION A  
SCALE: HOR. 1"=60' , VERT. 1"=6'

REF IND. PERMALON 20 MIL OR APPROVED EQUAL



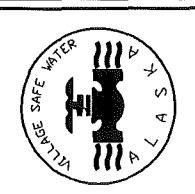
HONEYBUCKET DUMP STATION - SECTION B  
SCALE: HOR. 1"=60' , VERT. 1"=6'



2 DRIVEN MONITORING WELL DETAIL  
SCALE: NTS

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NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: AS SHOWN  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY



2010-11 WASTEWATER SYSTEM IMPROVEMENTS  
LAGOON PLAN AND PROFILE  
TULUKSAK, ALASKA

CE2 ENGINEERS, INC.  
PO BOX 2296 ANCHORAGE, AK 99513 PH: 907-546-1010 FAX: 907-546-1015

BY DATE  
NOTES ADDED 2/10  
LAGOON RELOCATION CM 8/10  
LAGOON RELOCATION CM 4/14

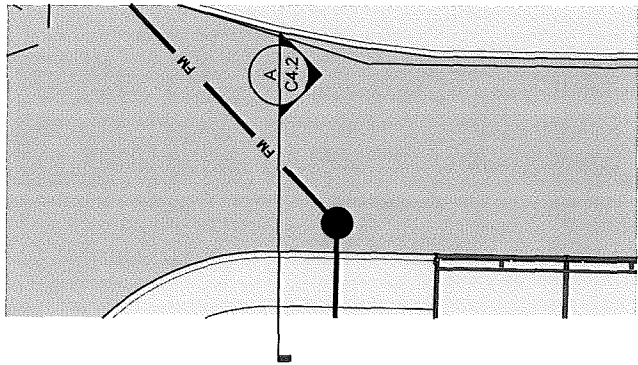
REVISION  
NOTES ADDED 2/10  
LAGOON RELOCATION CM 8/10  
LAGOON RELOCATION CM 4/14

Project No. APRIL 2014  
Date APRIL 2014  
Designed MRE  
Drawn CM  
Approved MRE

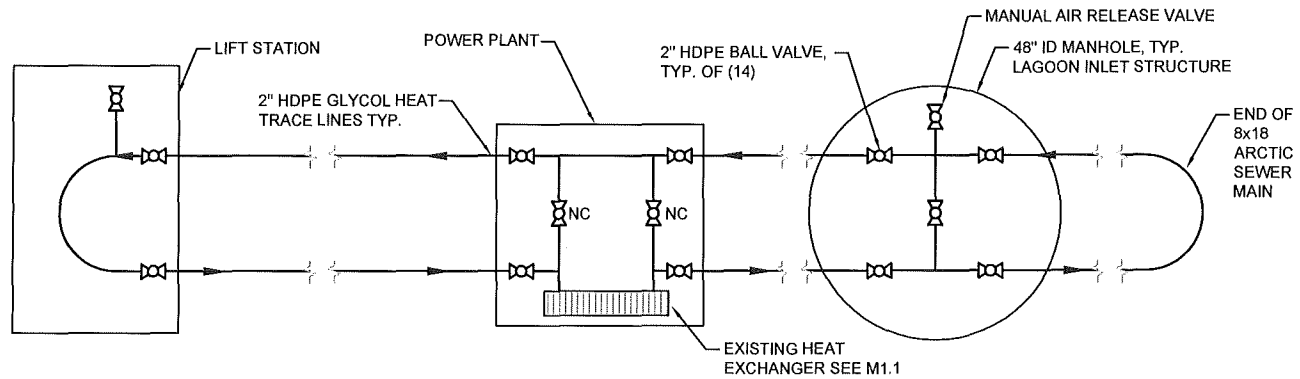
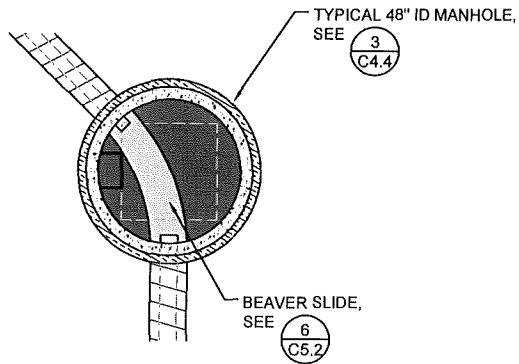
Sheet No. C4.1



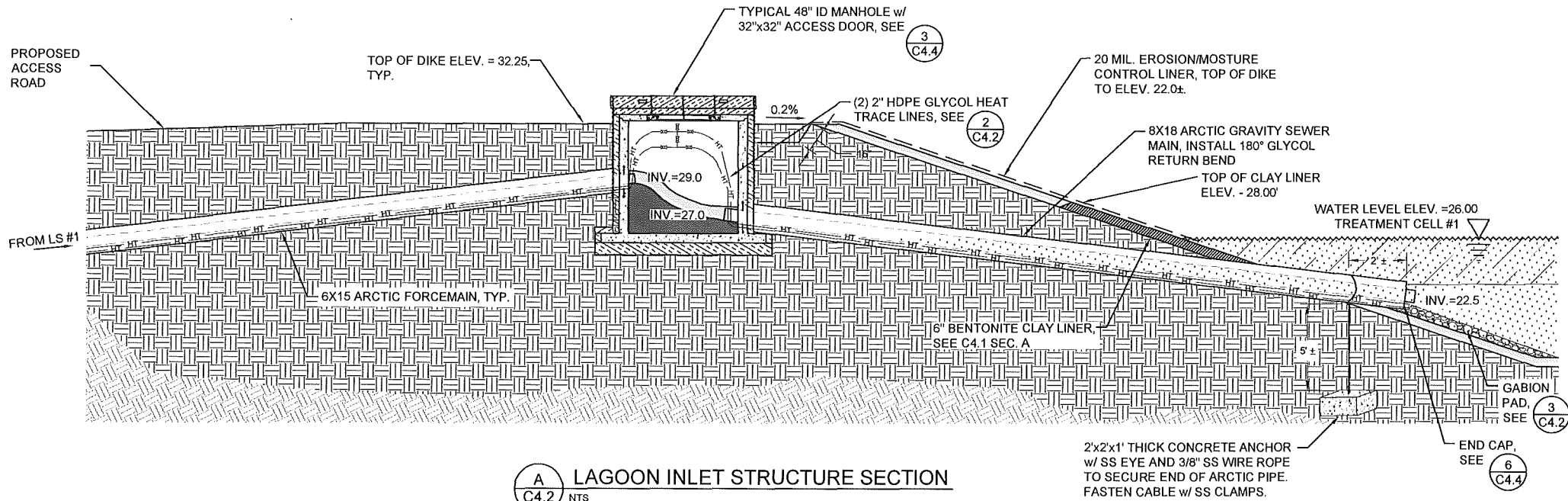
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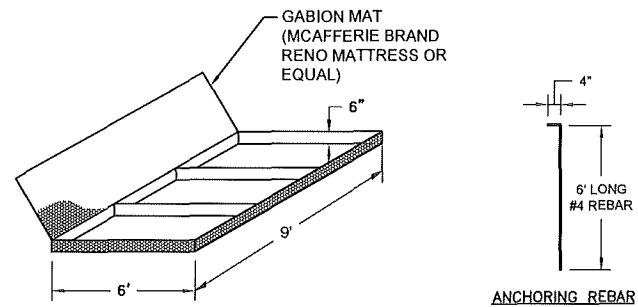
1 LAGOON INLET STRUCTURE PLAN  
C4.2 NTS



2 GLYCOL HEAT TRACE SCHEMATIC  
C4.2 NTS



A LAGOON INLET STRUCTURE SECTION  
C4.2 NTS



- NOTES:
- GABIONS SHALL BE LINED WITH A U.V. RESISTANT, WOVEN GEOTEXTILE AMOCO 2016 OR EQUAL, PRIOR TO BEING FILLED. AFTER LINING, GABIONS SHALL BE FILLED, PER MANUFACTURER'S RECOMMENDED PROCEDURES, WITH IMPORTED ROCK OR BROKEN CONCRETE (3"-4" PARTICLE SIZE).
  - ANCHOR GABIONS INSTALLED ON SLOPES USING 6' LONG, HOOKED #4 REBAR, AS NECESSARY.
  - INTERLOCK GABION "MATTRESSES" USING HOG RINGS AT 1' O.C.

3 GABION MAT DETAILS  
C4.2 NTS

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NAME \_\_\_\_\_ DATE \_\_\_\_\_

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AS SHOWN  
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IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
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2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
LAGOON INLET  
STRUCTURE  
TULUKSAK, ALASKA

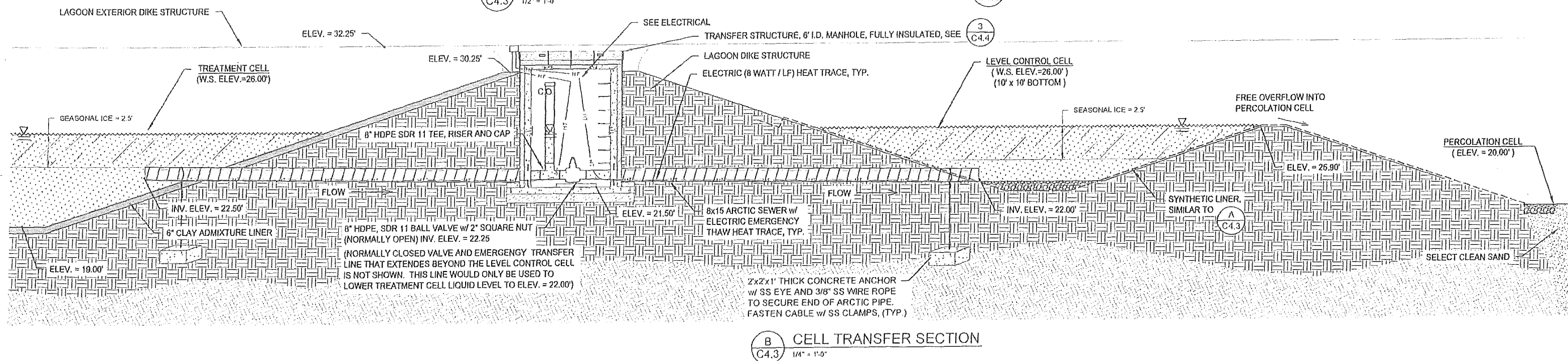
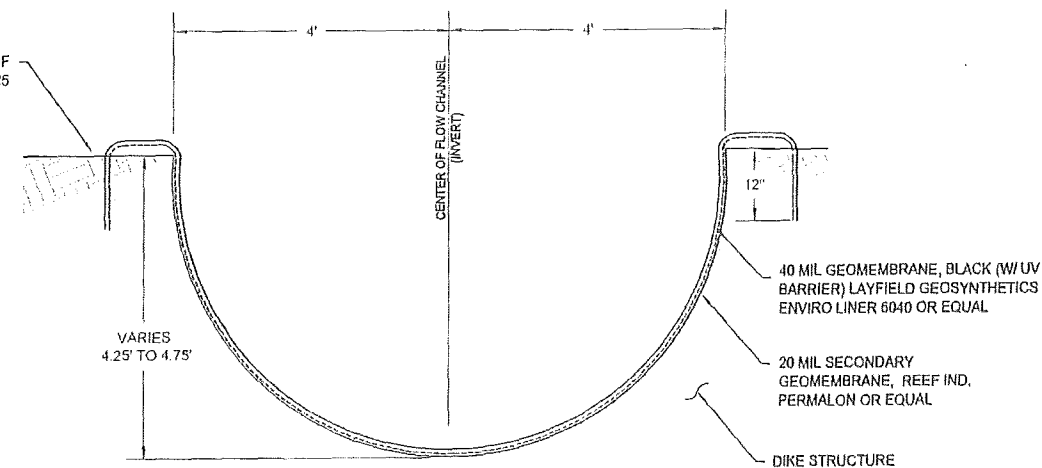
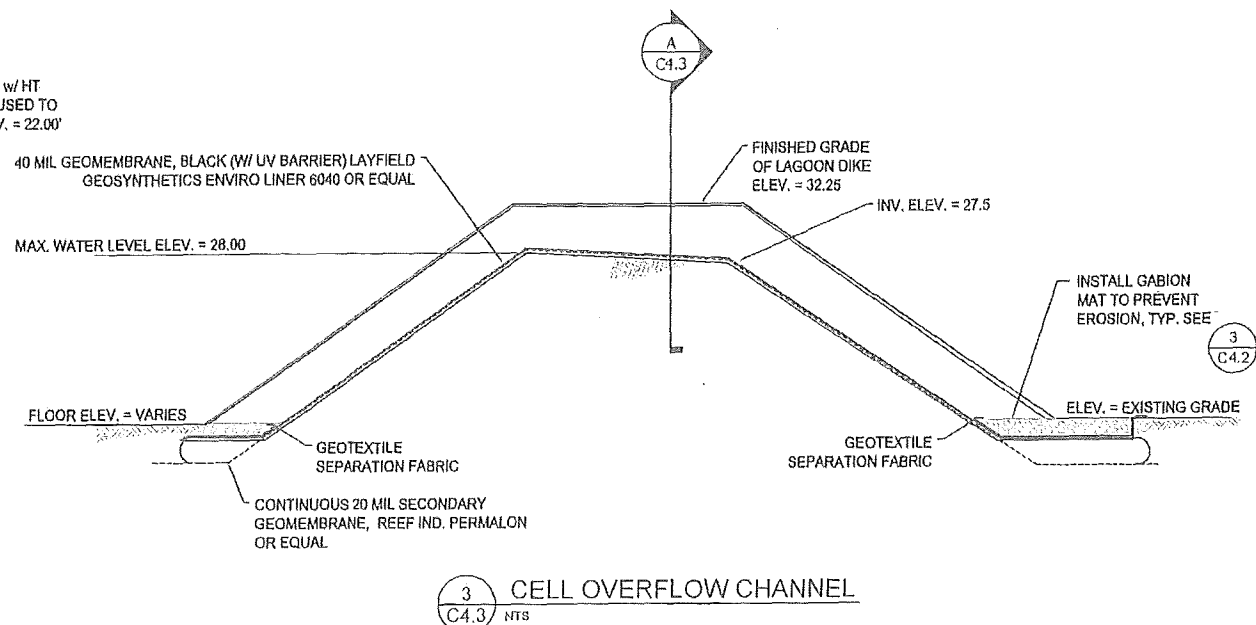
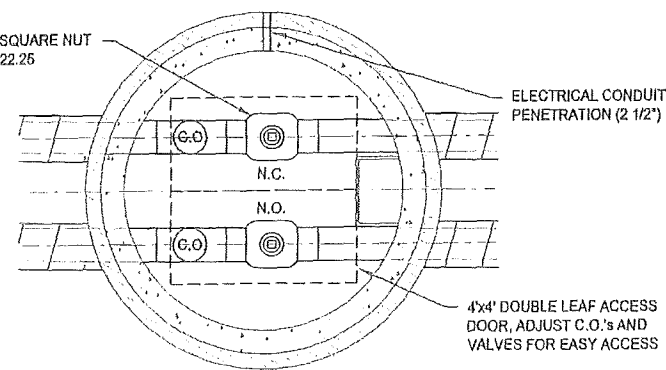
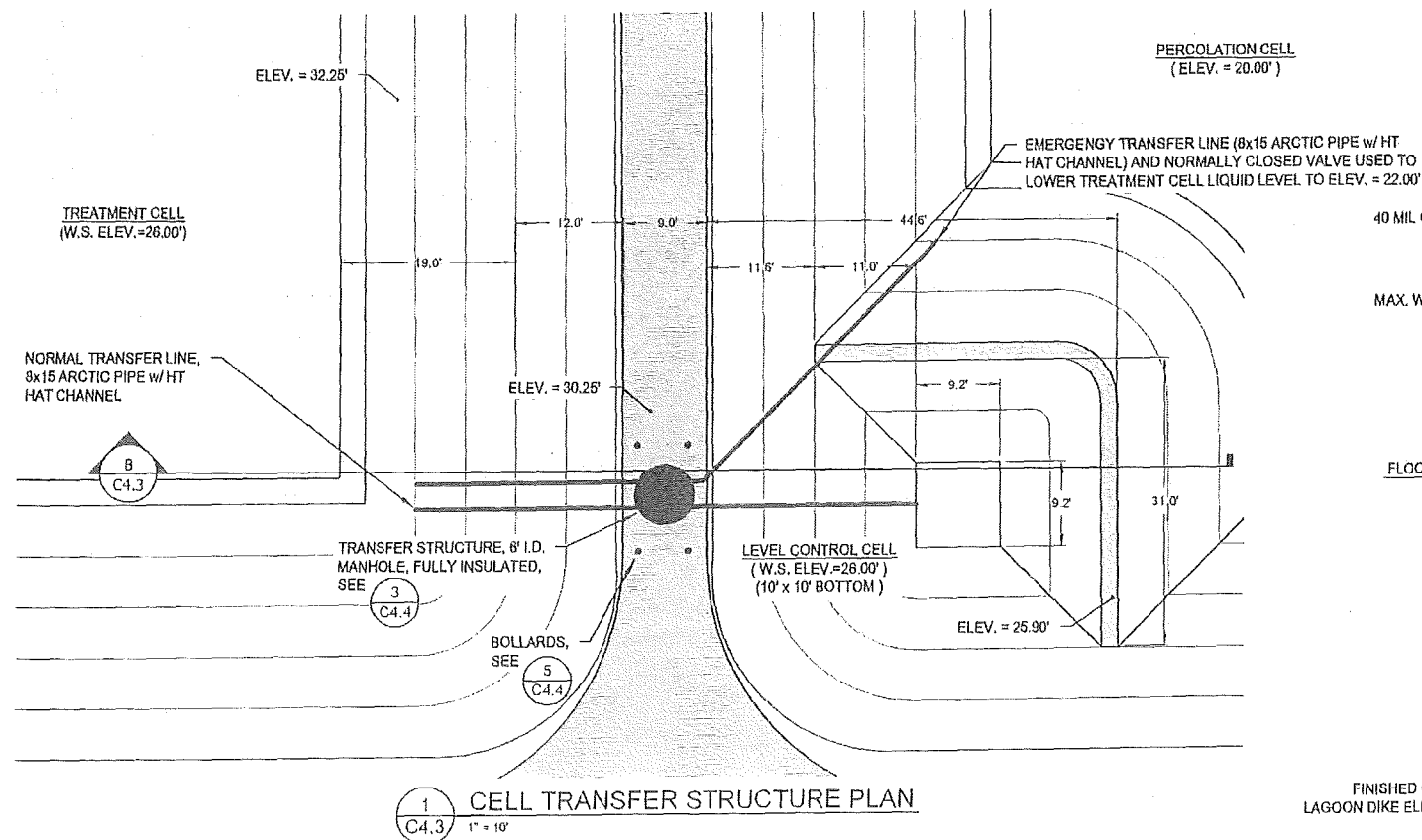
ENGINEERS, INC.  
PO BOX 22046 ANCHORAGE, AK 99502 PH: 907-348-0110 FAX: 907-348-0115

| REVISION          | BY  | DATE |
|-------------------|-----|------|
| NOTES             | LAW | 2/10 |
| LAGOON RELOCATION | CM  | 4/14 |
|                   |     |      |
|                   |     |      |
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Project No. \_\_\_\_\_  
Date APRIL 2014  
Designed MRE  
Drawn CM  
Approved MRE

Sheet No. C4.2

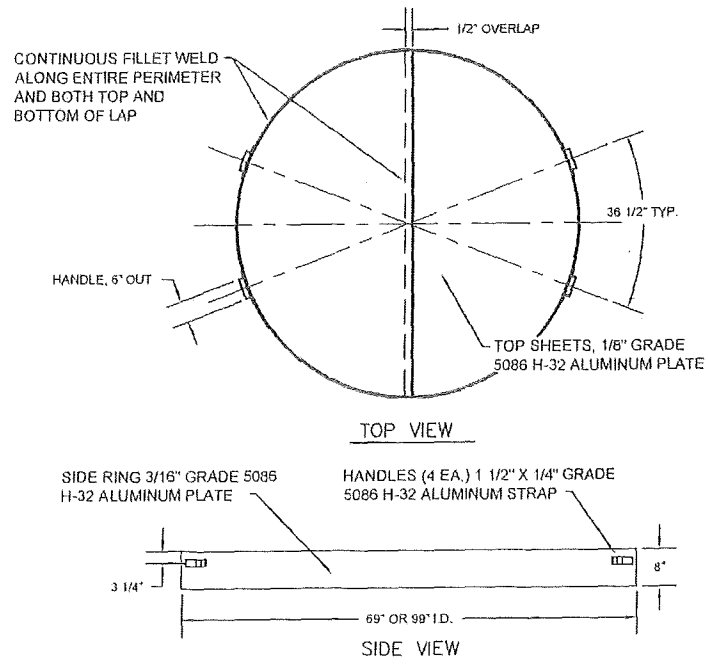
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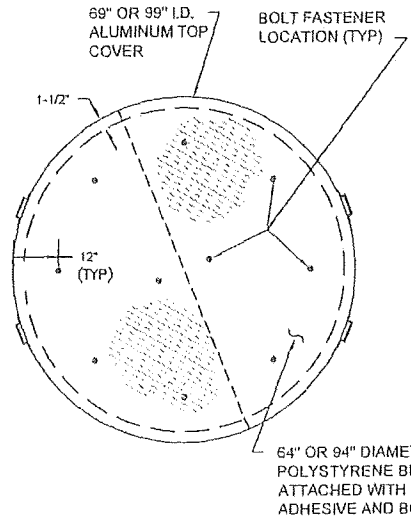
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| THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE. |           |
| SCALE:<br>AS SHOWN                                                                                                                             | DATE      |
| NAME                                                                                                                                           |           |
| TULUKSAK, ALASKA                                                                                                                               |           |
| 2010-11 WASTEWATER SYSTEM IMPROVEMENTS                                                                                                         |           |
| CELL TRANSFER STRUCTURE AND OVERFLOW CHANNELS                                                                                                  |           |
| TULUKSAK, ALASKA                                                                                                                               |           |
| CE2 ENGINEERS, INC.                                                                                                                            |           |
| PO BOX 22204 ANCHORAGE, ALASKA 99502 TEL: 907-346-0100 FAX: 907-346-0105                                                                       |           |
| DATE                                                                                                                                           | 2/10      |
| BY                                                                                                                                             | LAW       |
| REVISION                                                                                                                                       |           |
| NOTES                                                                                                                                          |           |
| DATE                                                                                                                                           | JUNE 2008 |
| DESIGNED                                                                                                                                       | LAP       |
| DRAWN                                                                                                                                          | LAP       |
| APPROVED                                                                                                                                       | LAP       |
| Sheet No.                                                                                                                                      |           |
| C4.3                                                                                                                                           |           |



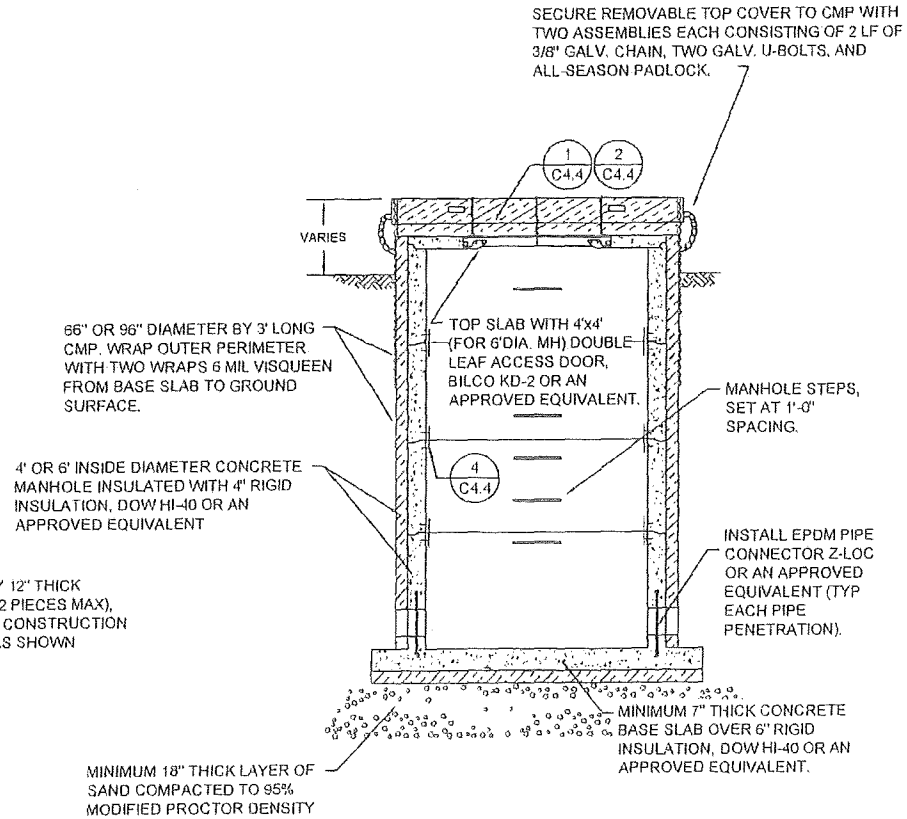
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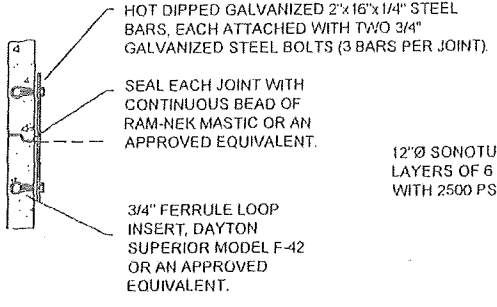
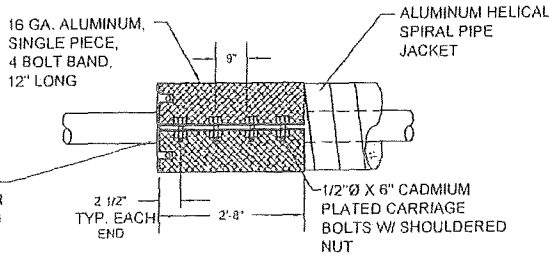
1 REMOVABLE TOP COVER  
C4.4 NTS



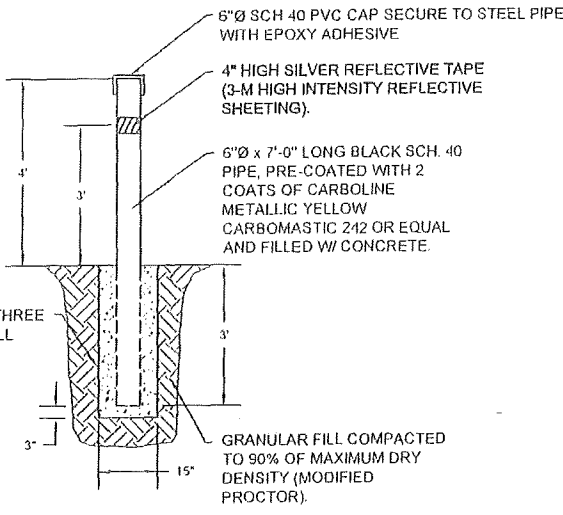
2 INSULATION FASTENERS  
C4.4 NTS



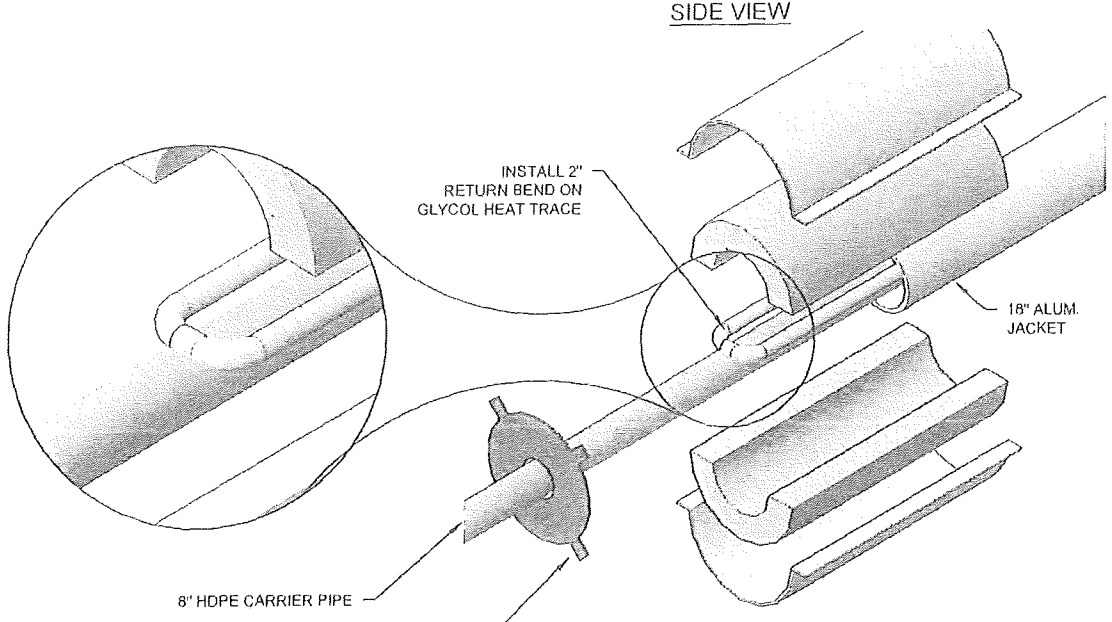
3 MANHOLE STRUCTURE  
C4.4 NTS



4 JOINT STRAPPING  
C4.4 NTS



5 BOLLARD  
C4.4 NTS



6 END CAP  
C4.4 NTS

CONTROL STRUCTURE INSTALLATION NOTES

1. PRECAST MANHOLE SECTIONS SHALL BE REINFORCED CONCRETE CONFORMING TO ASTM C-478.
2. THE MANHOLE BASE SHALL BE INTEGRALLY CAST WITH THE BOTTOM BARREL SECTION. FIELD GROUT FILLETS, AS REQUIRED.
3. RAM-NEK SEALANT OR AN ENGINEER APPROVED RUBBER GASKET SUPPLIED BY THE MANHOLE MANUFACTURER SHALL BE INSTALLED TO PROVIDE A COMPLETE, CONTINUOUS SEAL AT ALL PRECAST JOINTS.
4. FERRULE LOOP INSERTS AND JOINT STRAPS SHALL BE PROVIDED AS SHOWN.
5. EPDM PIPE CONNECTORS (Z-LOCK OR EQUAL) SHALL BE INSTALLED AT ALL PIPE PENETRATIONS.
6. MANHOLE COVER SHALL MEET ALASKA DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS (IFCO 740 OR EQUAL.) MANHOLE STEPS SHALL BE CAST IN PLACE AND SHALL BE 1/2" GRADE 60 STEEL REINFORCEMENT DIPPED IN COPOLYMER POLYPROPYLENE PLASTIC.
7. ALL PREFABRICATED ARCTIC PIPE FITTINGS SHALL BE FACTORY ASSEMBLED IN ACCORDANCE WITH THE DRAWINGS AND DELIVERED TO THE JOB SITE READY TO INSTALL.

RECORD DRAWING CERTIFICATE  
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NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: AS SHOWN  
1" = 1'-0" (SEE NOTE ON SHEET C4.4)  
1" = 1'-0" (SEE NOTE ON SHEET C4.4)

ALASKA DEPARTMENT OF HIGHWAYS  
DIVISION OF HIGHWAYS  
TULUUSAK, ALASKA

2010-11 WASTEWATER SYSTEM IMPROVEMENTS  
TYPICAL CONTROL STRUCTURE DETAILS  
TULUUSAK, ALASKA

**CEE**  
ENGINEERS, INC.  
PO BOX 25346 ANCHORAGE, AK 99521 PH: 907/543-1000 FAX: 907/543-0105

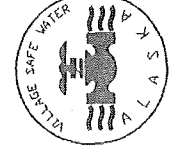
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Project No. \_\_\_\_\_ Date: JUNE 2008  
Designed: GWF Drawn: DOR Approved: LAP  
Sheet No. C4.4

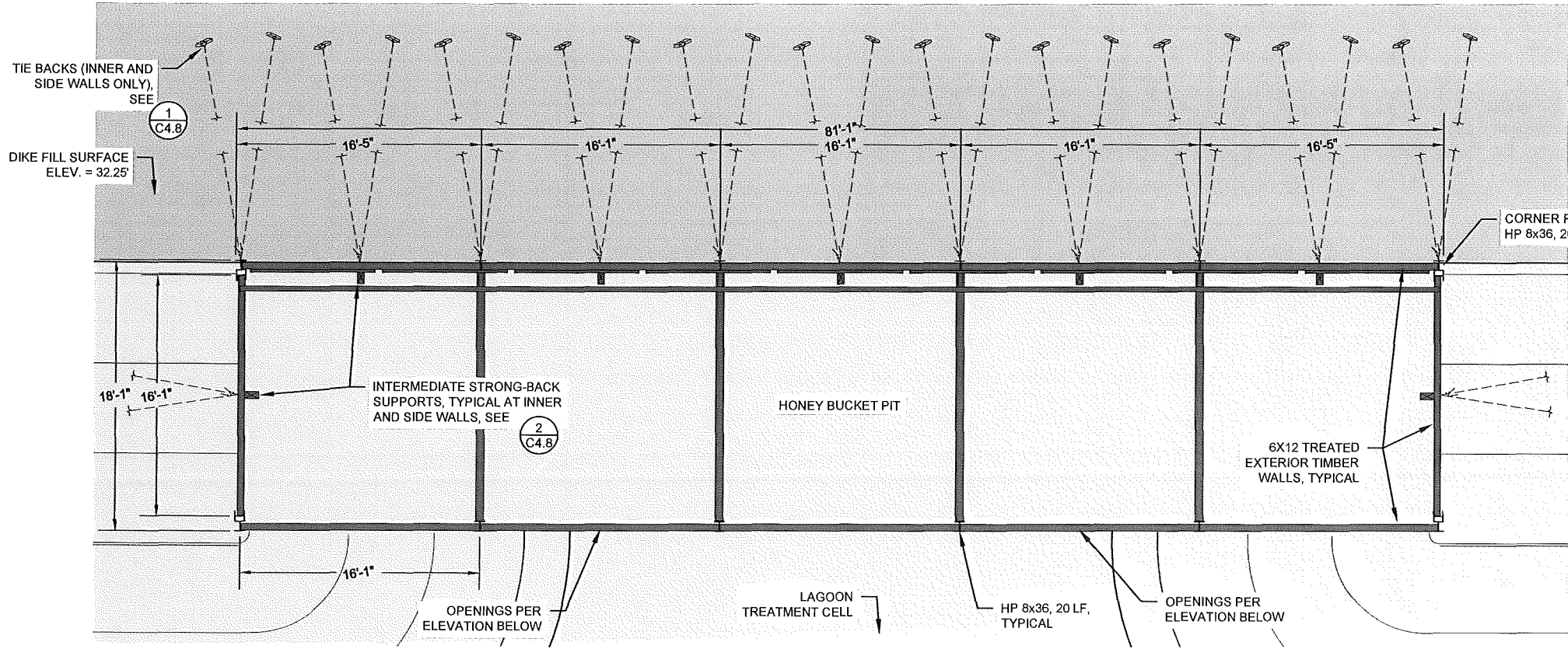




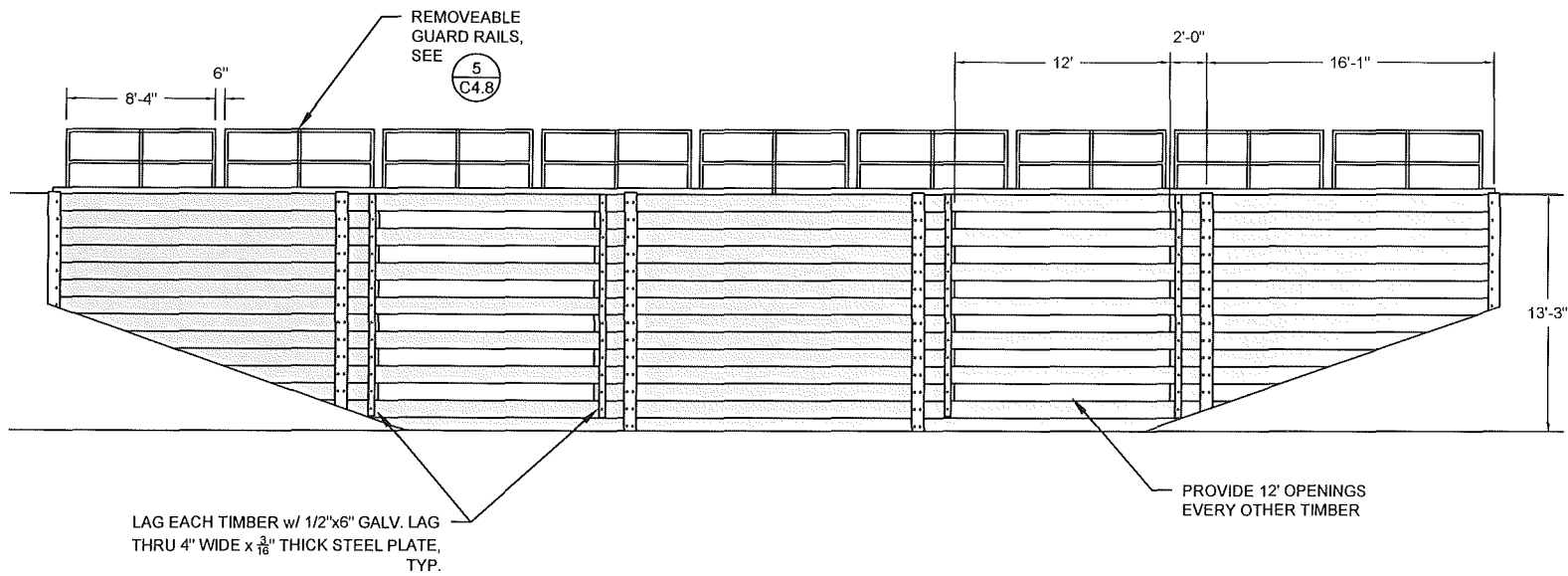


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| RECORD DRAWING CERTIFICATE<br>THESE DRAWINGS REFLECT RECORDED<br>INFORMATION OBTAINED DURING<br>CONSTRUCTION. INFORMATION PROVIDED<br>HEREIN IS ACCURATE TO THE BEST OF MY<br>KNOWLEDGE. |                                                            | NAME _____<br>DATE _____                                          |
| SCALE:<br>AS SHOWN                                                                                                                                                                       | AS SHOWN<br>ORIGINAL DRAWING<br>1" = 40'                   | IF NOT AS SHOWN, CO.<br>THIS SET IS NOT VALID<br>SALES & PURCHASE |
|                                                                                                       |                                                            |                                                                   |
|                                                                                                       |                                                            |                                                                   |
| 2010-11 WASTEWATER<br>SYSTEM IMPROVEMENTS<br><br>FIVE AREA<br>SERVICE LINES<br><br>TULUKSAK, ALASKA                                                                                      |                                                            |                                                                   |
| <br>PO BOX 22548 ANCHORAGE, AK 99502 PH 807-348-8100 FAX 807-348-0815                               |                                                            |                                                                   |
| Project No. _____                                                                                                                                                                        | BY DATE<br>DESIGNED _____<br>DRAWN _____<br>APPROVED _____ | DATE<br>1/11/2011                                                 |
| Sheet No. C4.6                                                                                                                                                                           |                                                            |                                                                   |

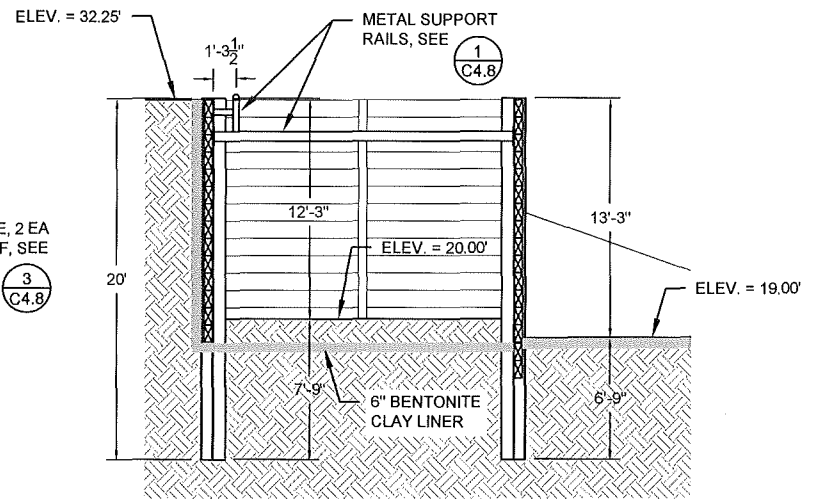
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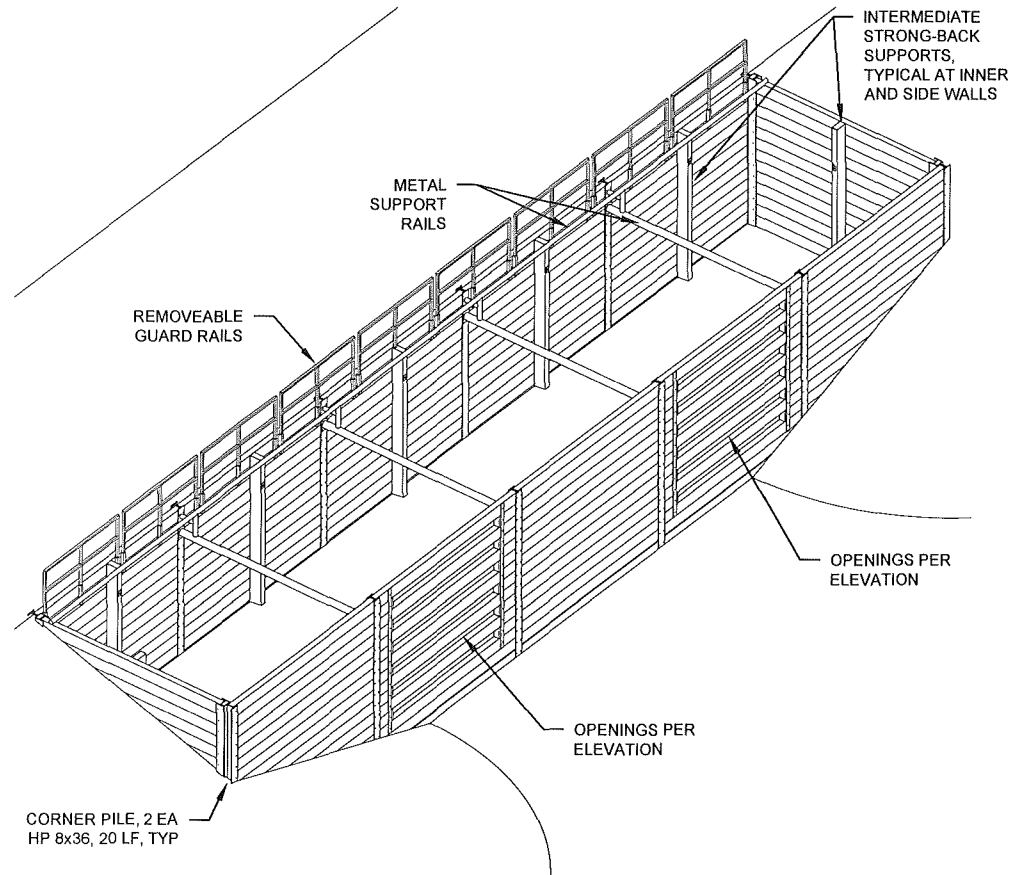
1 HONEY BUCKET DUMP STATION PLAN  
1"=5'



2 HONEY BUCKET DUMP STATION ELEVATION  
3/16" = 1'-0"



3 HONEY BUCKET DUMP STATION SECTION  
3/16" = 1'-0"



4 HONEY BUCKET DUMP STATION ISOMETRIC  
N.T.S.

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KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:  
AS SHOWN

1" = 1'-0"  
IF NOT ONE INCH ON  
SCALE, ACCORDINGLY

ALASKA  
SAFE WATER  
DESIGN

STATE OF ALASKA  
40 TH  
Michael R. Edman  
No. 6252  
REGISTERED PROFESSIONAL

2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS

HONEY BUCKET  
DISPOSAL AREA PLAN

TULUKSAK, ALASKA

**CE2**  
ENGINEERS, INC.

PO BOX 22046 ANCHORAGE, AK 99523 PH: 907-346-0100 FAX: 907-346-0105

| BY | DATE |
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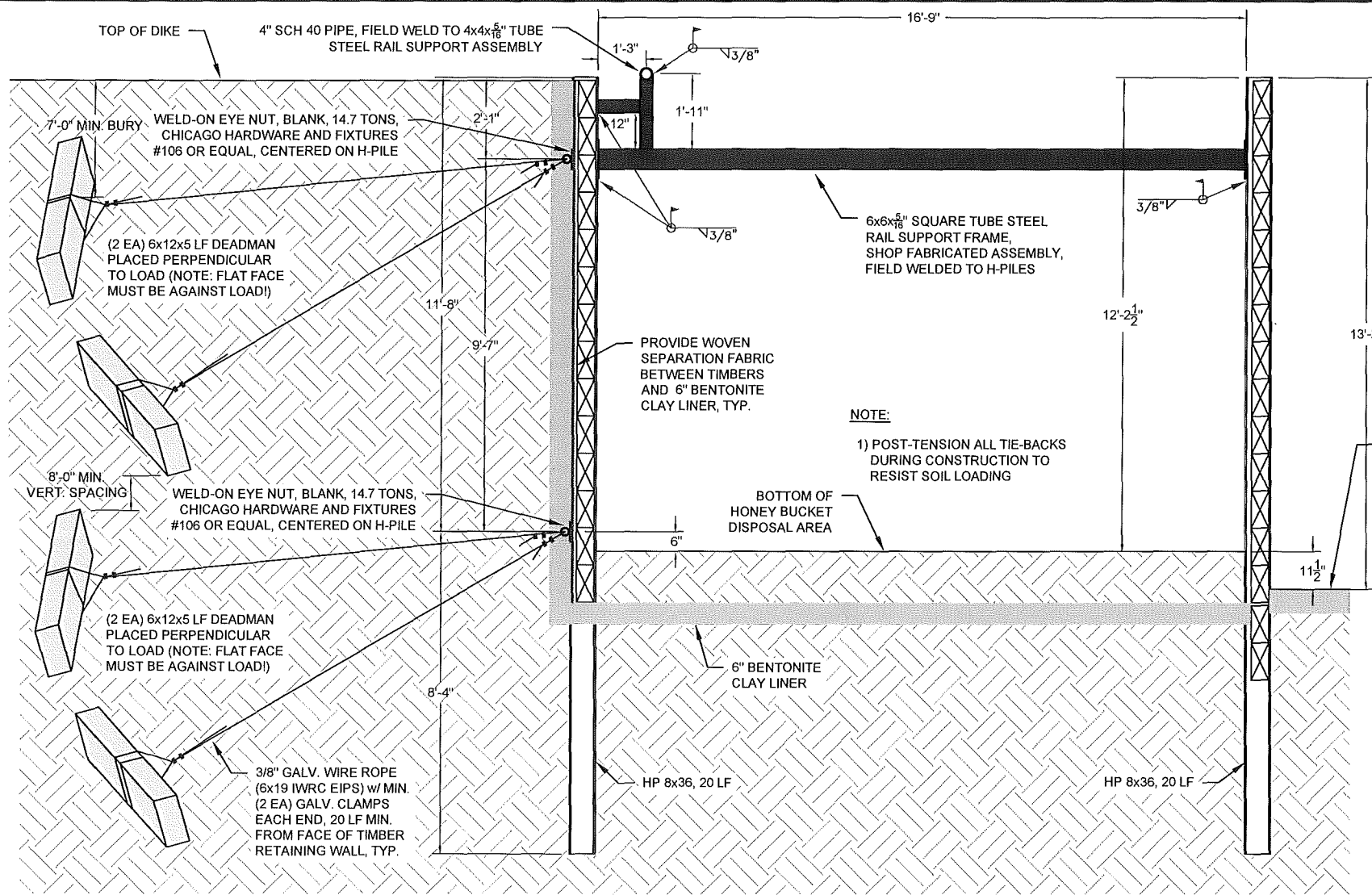
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| Project No. | Date       | Designed | Drawn | Approved |
|-------------|------------|----------|-------|----------|
|             | APRIL 2014 | LAP      | CM    | MFE      |

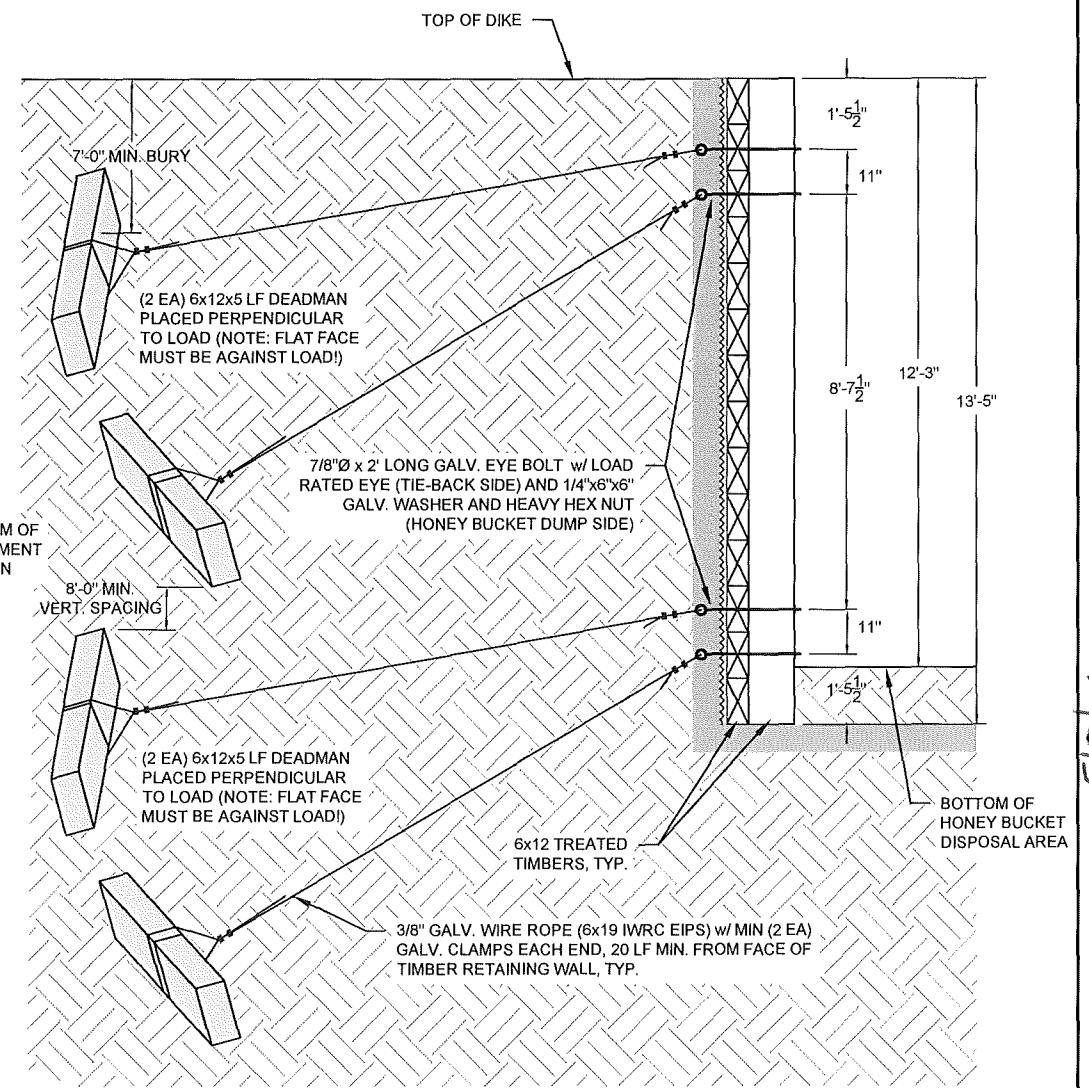
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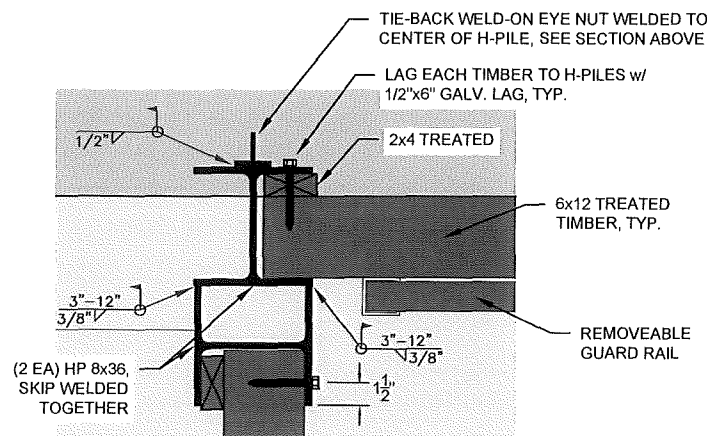
G:\ACAD\TULUKSAK\TLT0901 2008 Waste water disposal area\JFC Rev Apr 2014\C4.7\_8 Honey bucket dump station.dwg, 5/6/2014 5:28:33 PM, cmerz, \\Ce2main\LANIER MP C2050\LD520C PCL 6



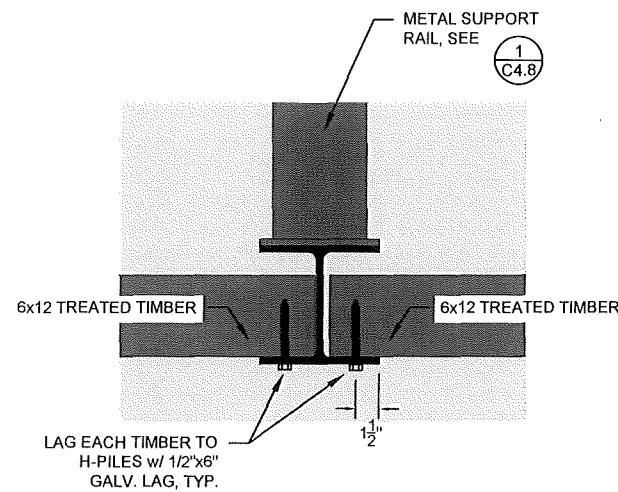
1 H-PILE SECTION VIEW  
C4.8 1/2" = 1'-0"



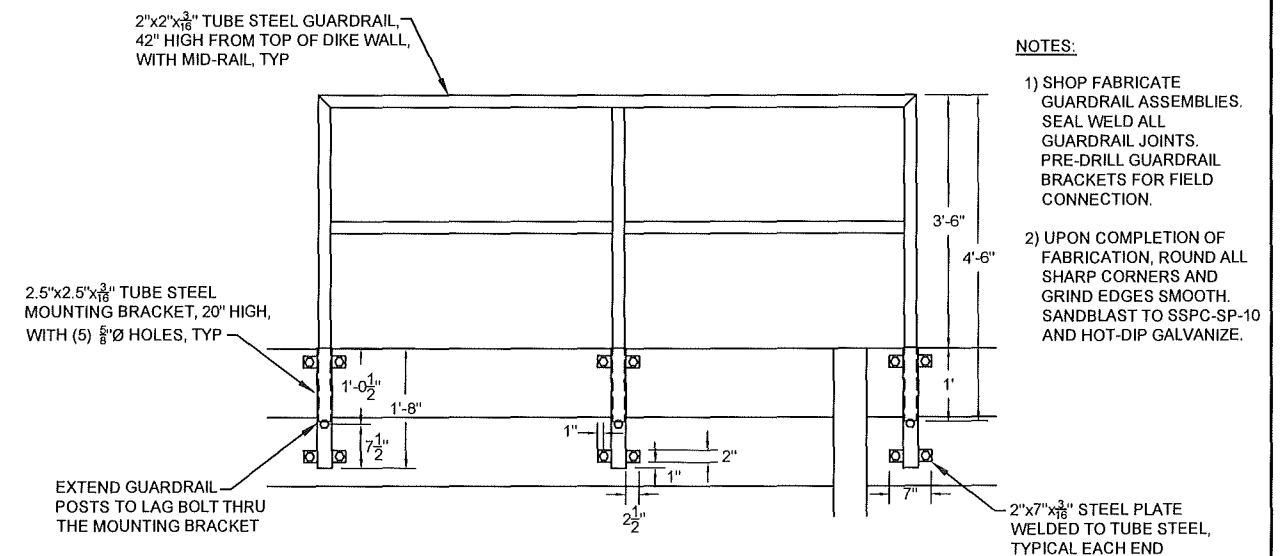
2 STRONG-BACK SECTION VIEW  
C4.8 1/2" = 1'-0"



3 CORNER H-PILE PLAN VIEW  
C4.8 N.T.S.



3 TYPICAL H-PILE PLAN VIEW  
C4.8 N.T.S.

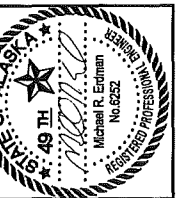
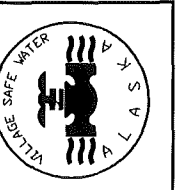


5 REMOVEABLE GUARDRAIL CONNECTION  
C4.8 3/4" = 1'-0"

- NOTES:
- 1) SHOP FABRICATE GUARDRAIL ASSEMBLIES. SEAL WELD ALL GUARDRAIL JOINTS. PRE-DRILL GUARDRAIL BRACKETS FOR FIELD CONNECTION.
  - 2) UPON COMPLETION OF FABRICATION, ROUND ALL SHARP CORNERS AND GRIND EDGES SMOOTH. SANDBLAST TO SSPC-SP-10 AND HOT-DIP GALVANIZE.

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE:  
AS SHOWN  
1" = 10'-0"



2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
HONEY BUCKET  
DISPOSAL AREA DETAILS  
TULUKSAK, ALASKA

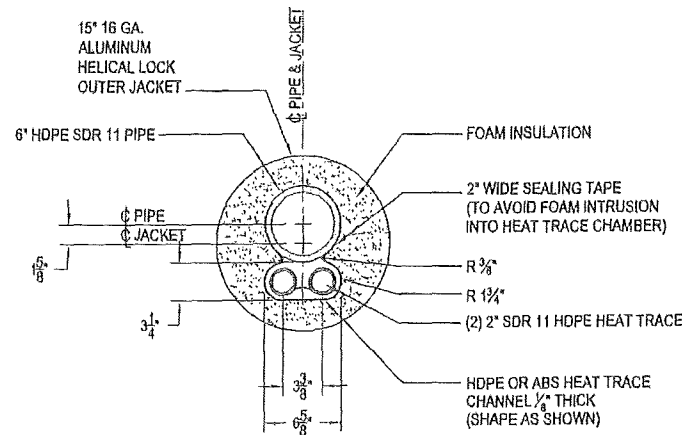
CE2  
ENGINEERS, INC.  
PO BOX 22949 ANCHORAGE AK 99501 PH: 907-349-1010 FAX: 907-349-0115

| BY       | DATE |
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| REVISION |      |
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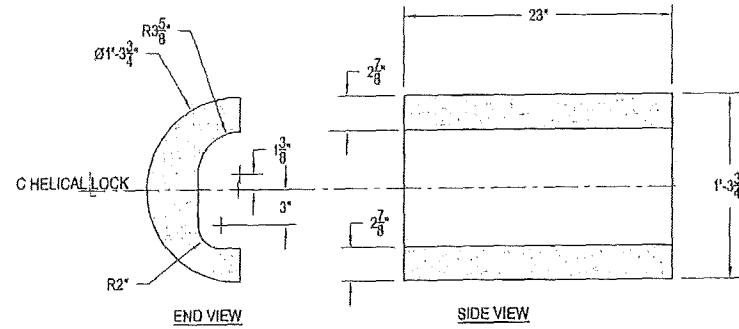
Project No. APRIL 2014  
Date APRIL 2014  
Designed LAP  
Drawn CVL  
Approved MRE

Sheet No. C4.8

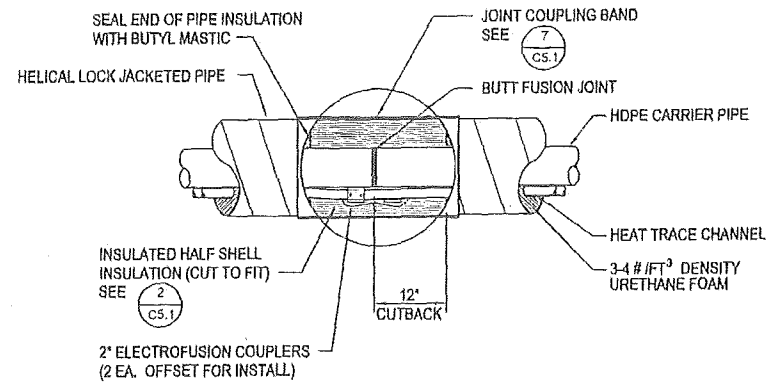
G:\ACAD\TULUAKSA\T10901 2008 Waste water disposal area\CS.1 ARCTIC PIPE DETAILS.dwg, 1/17/2011 1:44:01 PM, Rash, LANIER MP C2050\_L0520C PCL 6BLK WHIT q3



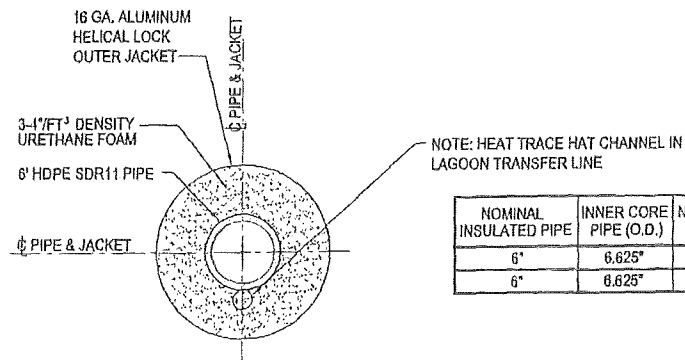
1  
C5.1  
6" X 15" HDPE ARCTIC PIPE  
CROSS SECTION - GLYCOL TRACED  
1 1/2" = 1'-0"



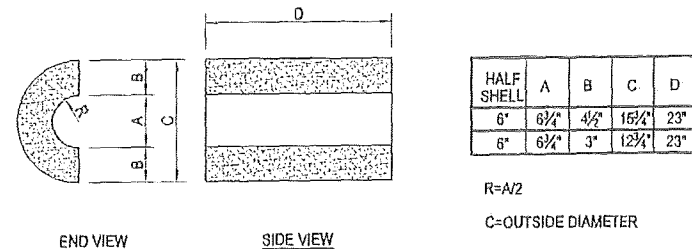
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C5.1  
6" X 15" HDPE ARCTIC PIPE  
HALF SHELL - GLYCOL TRACED  
1 1/2" = 1'-0"



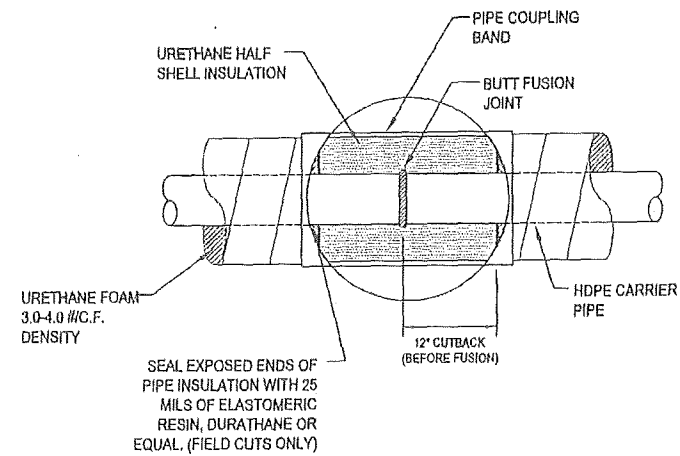
3  
C5.1  
BUTT FUSION JOINT w/ HEAT  
TRACE ELECTROFUSION COUPLERS  
NTS (FORCEMAIN ONLY)



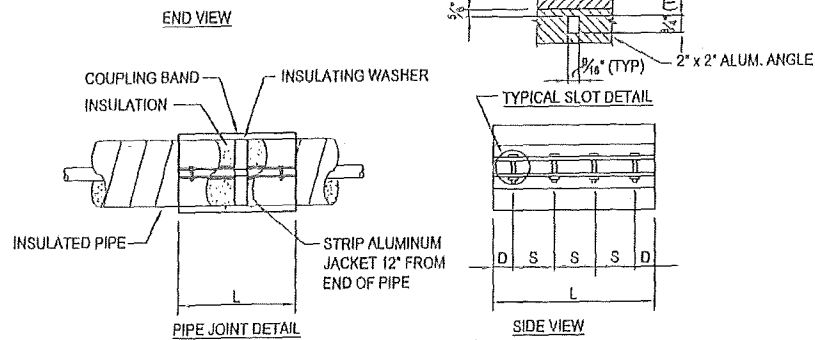
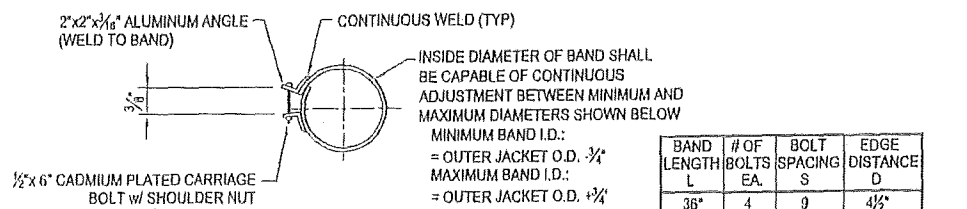
4  
C5.1  
HDPE ARCTIC PIPE CROSS  
SECTION LAGOON TRANSFER LINE  
NTS



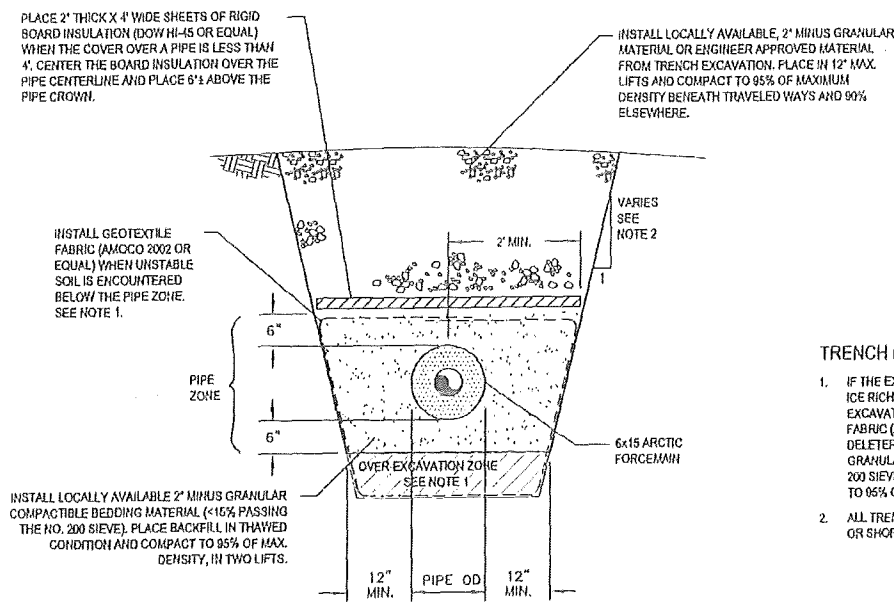
5  
C5.1  
INSULATION HALF SHELL DETAIL  
NTS



6  
C5.1  
BUTT FUSED JOINT DETAIL  
NTS (WATERMAIN AND SERVICE DUCT)



7  
C5.1  
ARCTIC PIPE COUPLING BAND  
NTS



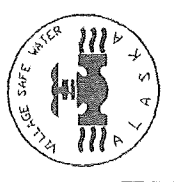
A  
C5.1  
TYPICAL TRENCH SECTION FOR PIPE  
INSTALLED BENEATH PROPOSED ACCESS ROAD  
NTS

#### TRENCH NOTES:

- IF THE EXCAVATION ENCOUNTERS ORGANICS, SILTS AND/OR ICE RICH PERMAFROST BENEATH THE PIPE ZONE, OVER EXCAVATE A MINIMUM OF 12" AND INSTALL GEOTEXTILE FABRIC (AMOCO 2002 OR EQUAL) AS SHOWN. REPLACE THE DELETED MATERIAL WITH LOCALLY AVAILABLE 2" MINUS GRANULAR COMPACTIBLE FILL WITH <15% PASSING THE NO. 200 SIEVE. PLACE FILL IN THAWED CONDITION AND COMPACT TO 95% OF MAXIMUM MODIFIED PROCTOR DRY DENSITY.
- ALL TRENCHES AND OTHER EXCAVATIONS SHALL BE SLOPED OR SHORED IN ACCORDANCE WITH OSHA STANDARDS.

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.  
NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:  
AS SHOWN  
1" = 10'-0"  
1" = 20'-0"  
1" = 30'-0"  
1" = 40'-0"  
1" = 50'-0"  
1" = 60'-0"  
1" = 70'-0"  
1" = 80'-0"  
1" = 90'-0"  
1" = 100'-0"



2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
ARTIC PIPE DETAILS  
TULUKSAK, ALASKA

**CEE**  
ENGINEERS, INC.  
PO BOX 22044 ANCHORAGE, AK 99522 PH 907-546-1046 FAX 907-546-1015

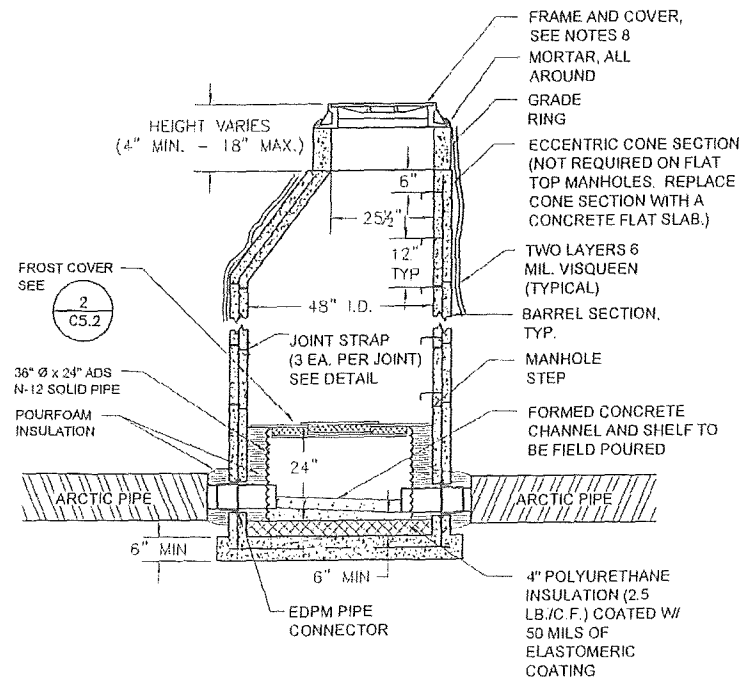
| REVISION | DATE | BY |
|----------|------|----|
|          |      |    |
|          |      |    |
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|          |      |    |

Project No. \_\_\_\_\_ Date \_\_\_\_\_  
Designed \_\_\_\_\_ L.A.P.  
Drawn \_\_\_\_\_ D.D.R.  
Approved \_\_\_\_\_ L.A.P.

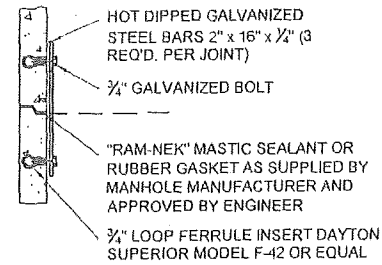
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C5.1



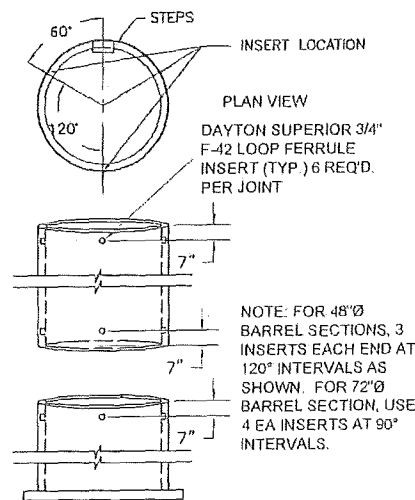
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1 MANHOLE DETAILS  
SCALE: NTS



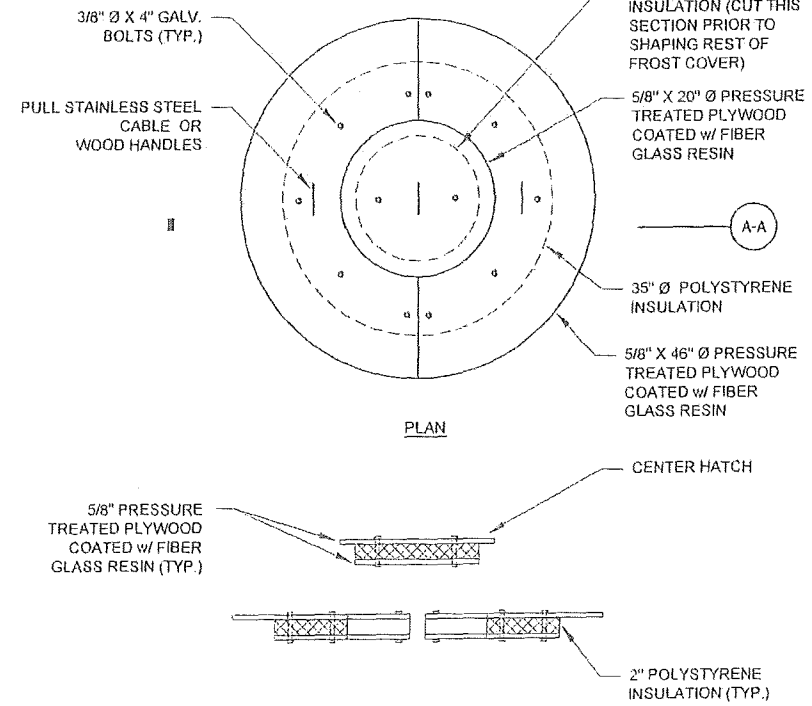
JOINT STRAPPING DETAIL



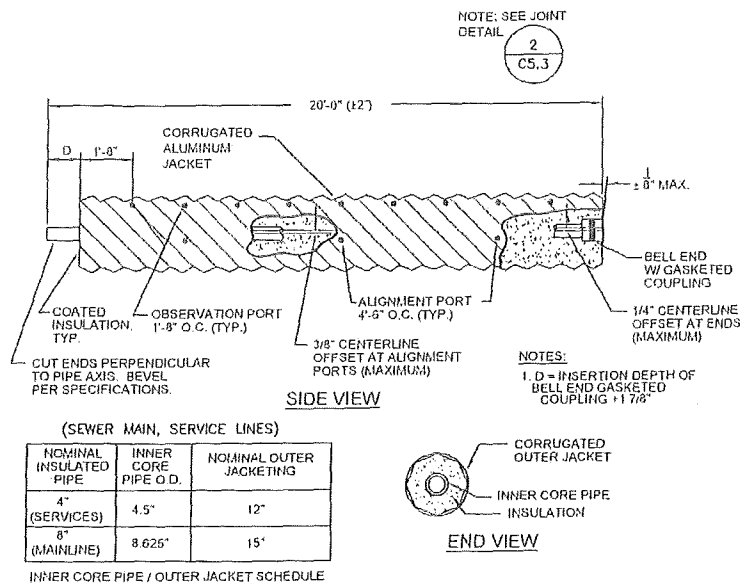
FERRULE INSERT LOCATIONS

SANITARY MANHOLE NOTES:

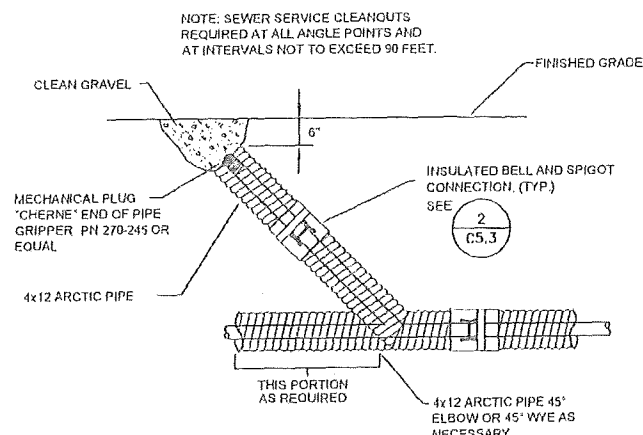
1. PRECAST MANHOLE SECTIONS SHALL BE REINFORCED CONCRETE CONFORMING TO ASTM C-478.
2. THE MANHOLE BASE SHALL BE INTEGRALLY CAST WITH THE BOTTOM BARREL SECTION.
3. RAM-NEK SEALANT OR ENGINEER APPROVED RUBBER GASKET AS SUPPLIED FROM MANHOLE MANUFACTURER SHALL BE INSTALLED AT ALL PRECAST JOINTS.
4. LOOP FERRULE INSERTS AND JOINT STRAPS SHALL BE PROVIDED AS SHOWN ON THE DETAIL.
5. EDPM PIPE CONNECTORS (Z-LOCK OR EQUAL) SHALL BE INSTALLED AT ALL PIPE PENETRATIONS.
6. PIPES PENETRATING THE MANHOLE SHALL EXTEND 3 INCHES INTO THE MANHOLE.
7. FOR MANHOLE HEIGHTS LESS THAN 6 FEET, SUBSTITUTE A PRECAST REINFORCED CONCRETE FLAT SLAB TOP FOR THE ECCENTRIC CONE SECTION.
8. MANHOLE RING, CATCH PAN AND SOLID COVER MARKED "SEWER" SHALL MEET ALASKA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION (IFCO 740 OR EQUAL).
9. MANHOLE STEPS SHALL BE CAST IN PLACE, AND SHALL BE 1/2" GRADE 60 STEEL REINFORCEMENT DIPPED IN COPOLYMER POLYPROPYLENE PLASTIC.
10. MANHOLE SHALL BE WRAPPED WITH 2 LAYERS OF 6 MIL VISQUEEN PRIOR TO BACKFILL.
11. TOP OF CASTING (T.O.C.) ELEVATION:  
(a) GRAVEL ROAD SURFACE - 6" BELOW FINAL GRADE.  
(b) PAVED ROAD SURFACE - INSTALL TOP OF COVER 1/2" BELOW SURFACE OF ASPHALT.  
(c) OFF ROADS AND TRAVELED WAY - INSTALL TOP 6" ABOVE FINAL GRADE.



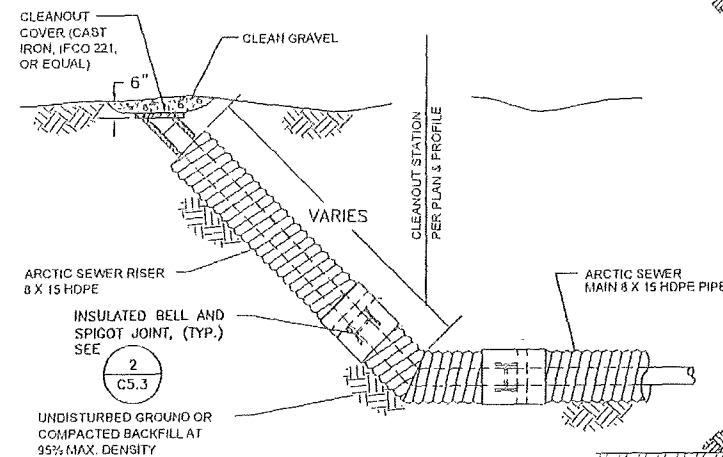
2 MANHOLE FROST COVER DETAILS  
SCALE: NTS



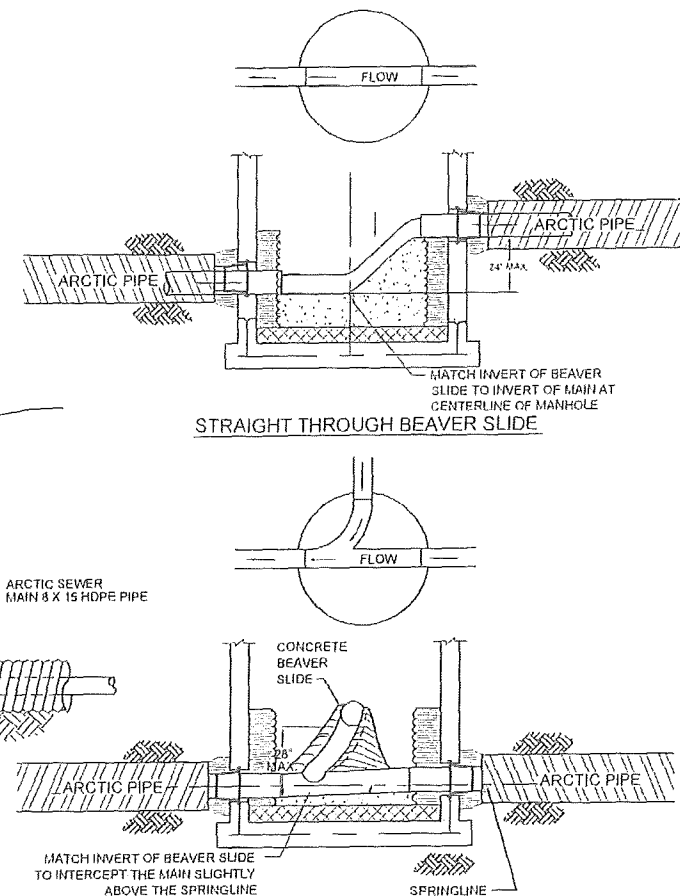
3 HDPE SEWER MAIN ALUMINUM JACKET  
SCALE: NTS



4 SEWER SERVICE CLEANOUT  
SCALE: NTS



5 SEWER MAIN CLEANOUT  
SCALE: NTS



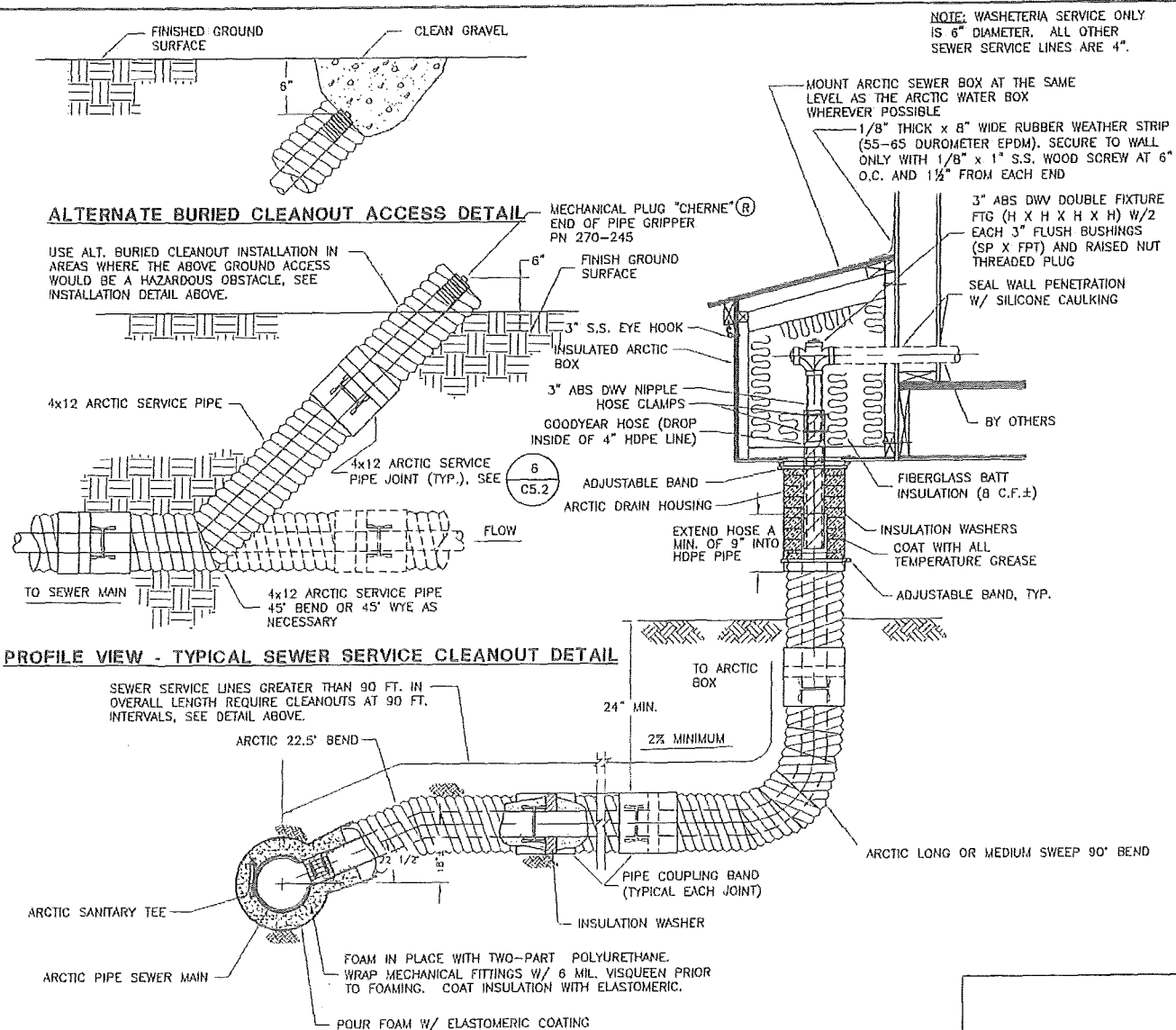
6 BEAVER SLIDE  
SCALE: NTS

|                                                                                                                                                |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| RECORD DRAWING CERTIFICATE                                                                                                                     |                         |
| THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE. |                         |
| SCALE: AS SHOWN                                                                                                                                | NAME: _____ DATE: _____ |
|                                                                                                                                                |                         |
| 2010-11 WASTEWATER SYSTEM IMPROVEMENTS                                                                                                         |                         |
| SEWER MAIN AND MANHOLE DETAILS                                                                                                                 |                         |
| TULUAK, ALASKA                                                                                                                                 |                         |
|                                                                                                                                                |                         |
| BY: _____                                                                                                                                      | DATE: _____             |
| REVISION: _____                                                                                                                                | DATE: _____             |
| Project No: _____                                                                                                                              | Date: JUNE 2008         |
| Designed: JPK                                                                                                                                  | Drawn: LAM              |
| Approved: LAP                                                                                                                                  |                         |
| Sheet No: C5.2                                                                                                                                 |                         |





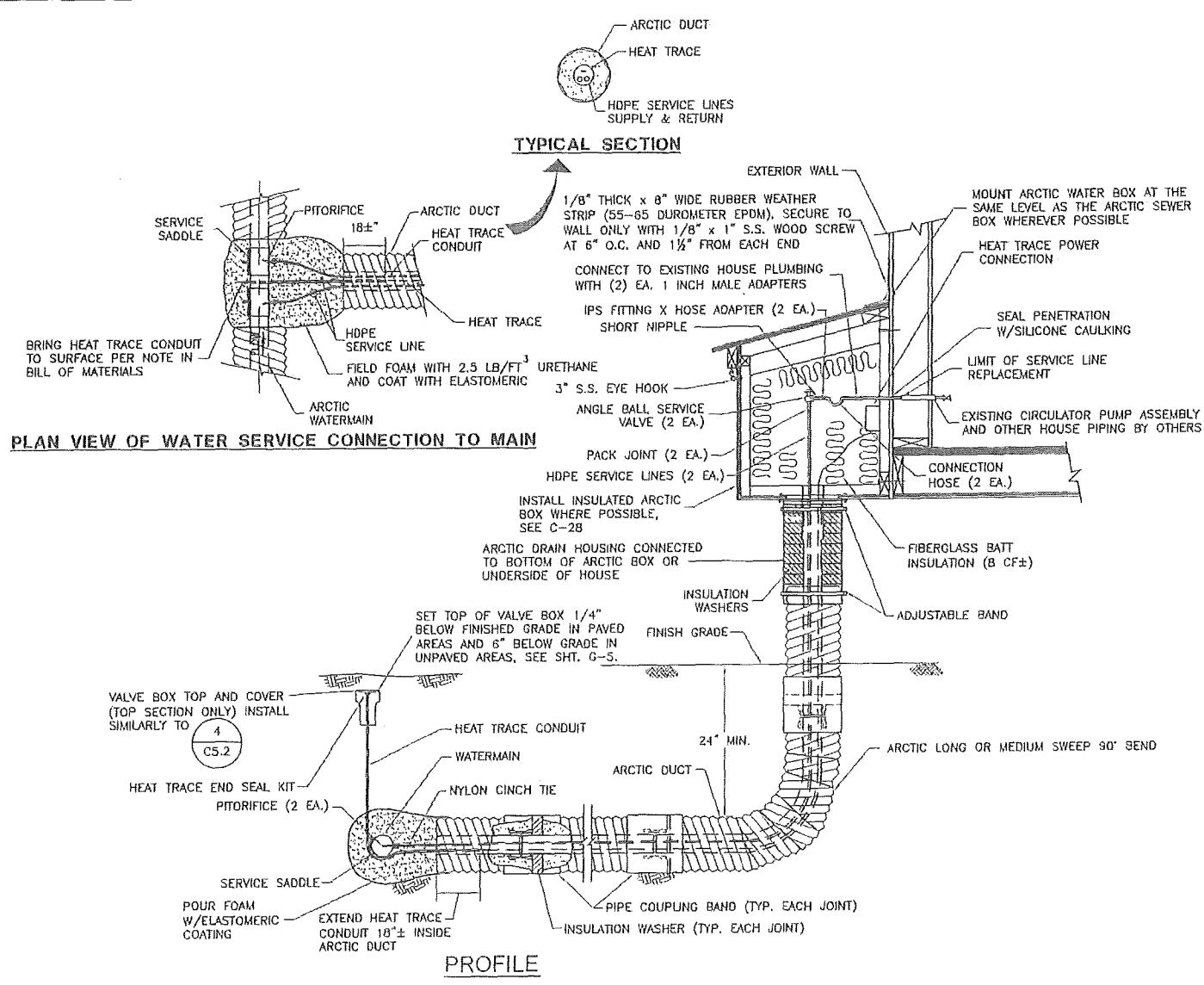
G:\ACAD\TULUAKSANTL\T0901\_2008 Waste water disposal area\C5.4 WATER AND SEWER SERVICE DETAILS.dwg, 1/11/2011 1:49:47 PM, Flash, LAMIER MP C2050\_L0520C PCL 6BLK WHIT, p03



BILL OF MATERIALS (SEWER SERVICE)

|                                       |                                                                                                                                                                                                                                                |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ARCTIC 11 1/4" OR ARCTIC 22 1/2" BEND | NOMINAL 4 X 12 OR 6 X 12 PRE-INSULATED HDPE 22 1/2" OR 11 1/2" BEND, IPS, SDR 17, 16 GA. CORRUGATED ALUMINUM JACKET, PUSH ON COUPLING X BEVELED END.                                                                                           |
| ARCTIC SERVICE LINE                   | NOMINAL 4 X 12 OR 6 X 12 PRE-INSULATED HDPE, IPS, SDR 17, 16 GA. CORRUGATED ALUMINUM JACKET, 20 FT. LENGTHS, PUSH ON COUPLING X BEVELED END.                                                                                                   |
| INSULATION WASHER                     | NOMINAL 4 X 12 OR 6 X 12 RUBBER WASHER, 4.75" I.D. X 12" O.D. X 2" THICK (SPEC. ASTM-D-1056-85 GRADE 2A1 BLACK EPT/PE/BUTYL BLEND).                                                                                                            |
| PIPE COUPLING BAND                    | NOMINAL 12", 16 GA. ALUMINUM, SINGLE PIECE, 3 BOLT BAND X 12" LONG.                                                                                                                                                                            |
| ARCTIC LONG SWEEP 90° BEND            | NOMINAL 4 X 12 OR 6 X 12 PRE-INSULATED HDPE, SDR 17, 90° LONG SWEEP (30" BEND RADIUS), 16 GA. CORRUGATED ALUMINUM JACKET, PUSH ON COUPLING X BEVELED END.                                                                                      |
| ARCTIC DRAIN HOUSING                  | FERNCO ADH-13, 13" DIAMETER X 29" LONG ARCTIC DRAIN HOUSING WITH 8 BOLT UPPER RING 7/16" HOLES; FERNCO INC., DAVISON, MI (800-521-1283).                                                                                                       |
| GOODYEAR HOSE                         | GOODYEAR "HI-MILER" STR RADIATOR HOSE, P/N 57256, FLEXITEN SAE 20 RI DI, 3.50" I.D.; 3.90" O.D. FITS INSIDE 4" HDPE, SDR 17. FOR 6" SERVICE TO THE WATER TREATMENT PLANT/WASHETERIA USE A STRAIGHT MISSION PN MR56 66 ARC REINFORCED COUPLING. |
| INSULATED ARCTIC BOX                  | INSULATED PLYWOOD ARCTIC BOX WITH HINGED LID AND REMOVABLE FRONT PANEL. FABRICATE TO CE2 ENGINEERS STANDARD DETAIL. APPROXIMATE SIZE = 8 C.F..                                                                                                 |
| PLUMBING                              | 3" OR 6" ABS - DWV PIPE ASTM D1788 & D2661.                                                                                                                                                                                                    |
| HOSE CLAMPS AND ADJUSTABLE BAND       | STAINLESS STEEL, 1/2" WIDE, ADJUSTABLE.                                                                                                                                                                                                        |
| POUR FOAM                             | 2 COMPONENT URETHANE FOAM, 2.5 LB./C.F. DENSITY.                                                                                                                                                                                               |
| ELASTOMERIC COATING                   | APPLY 50 MILS. DURATHANE ELASTOMERIC RESIN COATING AS FURNISHED BY URETHANE CONTRACTORS SUPPLY CORP., ANCHORAGE.                                                                                                                               |

1 TYPICAL SEWER SERVICE CONNECTION TO MAIN  
C5.4 NTS



BILL OF MATERIALS (WATER SERVICE)

|                                  |                                                                                                                                                                                                                                                                                                                                         |                                              |                                                                                                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SERVICE SADDLE                   | ROMAC SS1-H (ACTUAL WATER MAIN ODO X LENGTH X TAP SIZE (NORMALLY 1" IP), STAINLESS STEEL, 2 BOLT (MIN.) SERVICE SADDLE. PROVIDE 4 EA. SS SPRING WASHERS PER BOLT.                                                                                                                                                                       | ADJUSTABLE BANDS                             | STAINLESS STEEL, 1/2" WIDE, ADJUSTABLE.                                                                                                                                                   |
| PITORIFICE                       | 1" FORD PITORIFICE CORPORATION STOP F1102-4-P WITH 1" IP THREAD X 1" PACK JOINT FOR PVC SIZE HDPE (1" SDR 11 MEETING ASTM D-3035). PROVIDE SS INSERT STIFFENER (FORD INSERT NO. 53-72 OR MUELLER NO. 504-385) AND PITORIFICE STINGER FOR INSERTION IN 8" MAINLINE.                                                                      | POUR FOAM                                    | 2 COMPONENT, 2.5 LBS/FT POLYURETHANE FOAM.                                                                                                                                                |
| HDPE SERVICE LINE                | 1" HDPE (PE 3408), SDR 11, 160 PSI MIN., NSF 61 APPROVED, MEETING ID ASTM D-3035                                                                                                                                                                                                                                                        | ELASTOMERIC COATING                          | APPLY 50 MILS DURATHANE ELASTOMERIC RESIN COATING AS FURNISHED BY URETHANE CONTRACTORS SUPPLY CORP., ANCHORAGE (907-276-7932).                                                            |
| ARCTIC DUCT                      | NOMINAL 4" X 12" PRE-INSULATED HDPE, IPS, SDR 17, 16 GA. CORRUGATED ALUMINUM JACKET, PUSH ON COUPLING X BEVELED END.                                                                                                                                                                                                                    | HEAT TRACE                                   | 5 W/FT, SELF LIMITING HEAT TRACE.                                                                                                                                                         |
| INSULATION WASHER                | NOMINAL 4 X 12 RUBBER WASHER, 4.75" I.D. X 12" O.D. X 2" THICK (SPEC. ASTM-D-1056-85 GRADE 2A1 BLACK EPT/PE/BUTYL BLEND).                                                                                                                                                                                                               | HEAT TRACE CONNECTION KIT AND END SEAL KIT   | USE MANUFACTURER'S RECOMMENDED HEAT TRACE END SEAL FOR BELOW GROUND CONDITIONS.                                                                                                           |
| PIPE COUPLING BAND               | NOMINAL 12", 16 GA. ALUMINUM, SINGLE PIECE, 3 BOLT BAND                                                                                                                                                                                                                                                                                 | HEAT TRACE CONDUIT AND TERMINATION ENCLOSURE | 1" HDPE, SDR 11 CONDUIT, ROUTE FROM 18" INSIDE OF SERVICE LINE DUCT, BENEATH SERVICE SADDLE TO BOTTOM OF VALVE BOX COVER. USE 1" GALVANIZED "KING NIPPLE" W/ PIPE CAP & 1" SS HOSE CLAMP. |
| ARCTIC LONG SWEEP 90° BEND       | NOMINAL 4" X 12" PRE-INSULATED HDPE, SDR 17, 90° LONG SWEEP (30" BEND RADIUS), 16 GA. CORRUGATED ALUMINUM JACKET, PUSH ON COUPLING X BEVELED END.                                                                                                                                                                                       | VALVE BOX AND COVER                          | 5" I.D. X 9" LONG VALVE BOX. ADJUSTING SLEEVE AND COVER MARKED "H.T.", IFCD PN 2051 OR EQUAL.                                                                                             |
| ARCTIC DRAIN HOUSING             | FERNCO ADH-13, 13" DIAMETER X 29" LONG ARCTIC DRAIN HOUSING WITH 8 BOLT UPPER RING 7/16" HOLES; FERNCO INC., DAVISON, MI (800-521-1283).                                                                                                                                                                                                | INSULATED ARCTIC BOX                         | INSULATED PLYWOOD ARCTIC BOX WITH HINGED LID AND REMOVABLE FRONT PANEL. FABRICATE TO CE2 STANDARD DETAIL. APPROXIMATE SIZE = 8 C.F.                                                       |
| PACK JOINT COMPRESSION CONNECTOR | 1" PVC PACK JOINT X 1" MIP (FORD C87-44) WITH INSERT STIFFENER (FORD NO. 53-72).                                                                                                                                                                                                                                                        | RUBBER WEATHER STRIP                         | 1/8" THICK X 8" WIDE RUBBER WEATHER STRIP (55-65 DUROMETER EPDM), SECURE TO WALL ONLY WITH 1/8" X 1" S.S. WOOD SCREW AT 6" O.C. AND 1 1/2" FROM EACH END                                  |
| ANGLE BALL SERVICE VALVE         | 1" FORD ANGLE BALL VALVE. BA11-344W, W/PADLOCK WINGS, 1" FIPT X FIPT.                                                                                                                                                                                                                                                                   |                                              |                                                                                                                                                                                           |
| SHORT NIPPLE                     | 1" DIAMETER CLOSE BRASS NIPPLE                                                                                                                                                                                                                                                                                                          |                                              |                                                                                                                                                                                           |
| CONNECTION HOSE                  | 1" I.D. NSF APPROVED POTABLE WATER HOSE X 12'± LONG (FIELD CUT TO FIT) BOTH ENDS. SHALL BE FITTED W/ BRASS LONG SHANK RIBBED INSERT (DIXON BLS 848 OR EQUAL) X 1" FIPT SWIVEL FITTINGS W/ GASKETS. INSERT FITTINGS SHALL BE SECURED W/ 2 EA. STAINLESS STEEL ADJUSTABLE CLAMPS PER FITTING. ASSEMBLY SHALL BE RATED AT 150 PSI MINIMUM. |                                              |                                                                                                                                                                                           |

2 TYPICAL WATER SERVICE CONNECTION TO MAIN  
C5.4 NTS

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: AS SHOWN

DATE: JUNE 2008

DESIGNED: LAMIER

DRAWN: JDL

APPROVED: LAMIER

PROJECT NO. C5.4

SHEET NO. C5.4

2010-11 WASTEWATER SYSTEM IMPROVEMENTS

SEWER SERVICE LINE DETAILS

TULUAKS, ALASKA

CE2 ENGINEERS, INC.

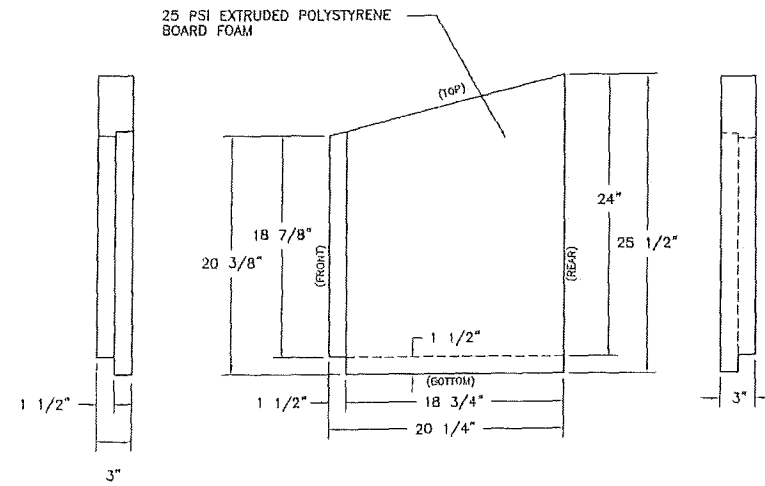
PO BOX 22546 ANCHORAGE, AK 99522 PH: 907-345-1000 FAX: 907-345-1005



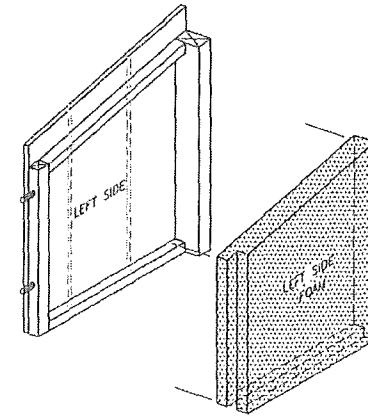


G:\ACAD\TULUKSAK\T110901 2008 Waste water disposal area\C5.6 ARCTIC BOX DETAILS.dwg, 1/11/2011 1:31:41 PM, cmwz, LANIER NP C2050\_LD520C PCL 6.p3

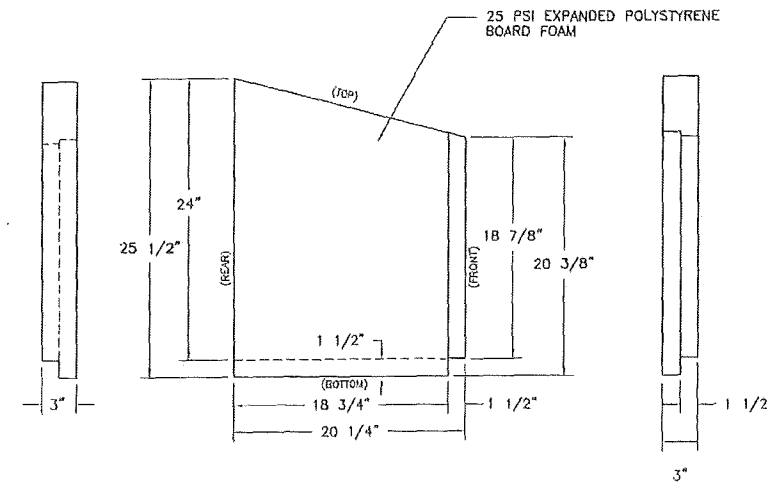
NOTE:  
ALL FOAM INSULATION SHALL BE SECURELY GLUED TO THE  
INSIDE FACE OF THE T1-11 ARCTIC BOX WITH FOAM-PLYWOOD  
ADHESIVE (LIQUID NAILS LN 603) TYPICAL.



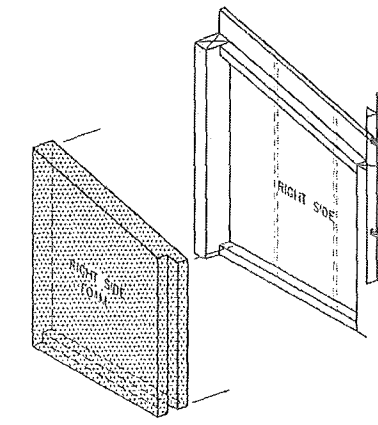
LEFT SIDE FOAM  
(VIEW FROM INSIDE ARCTIC BOX)  
SCALE: 1 1/2" = 1'



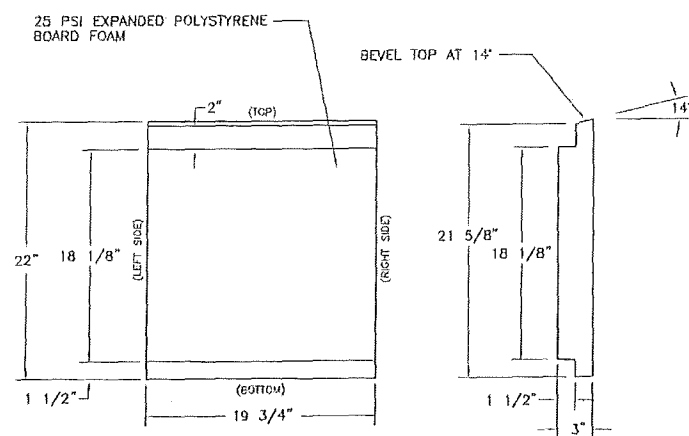
LEFT SIDE ASSEMBLY  
NOT TO SCALE



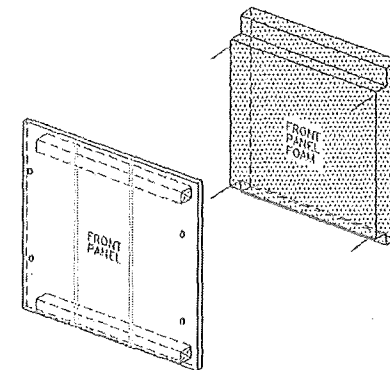
RIGHT SIDE FOAM  
(VIEW FROM INSIDE ARCTIC BOX)  
SCALE: 1 1/2" = 1'



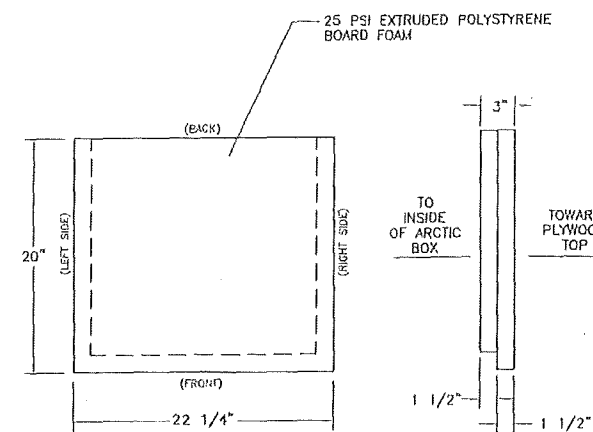
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NOT TO SCALE



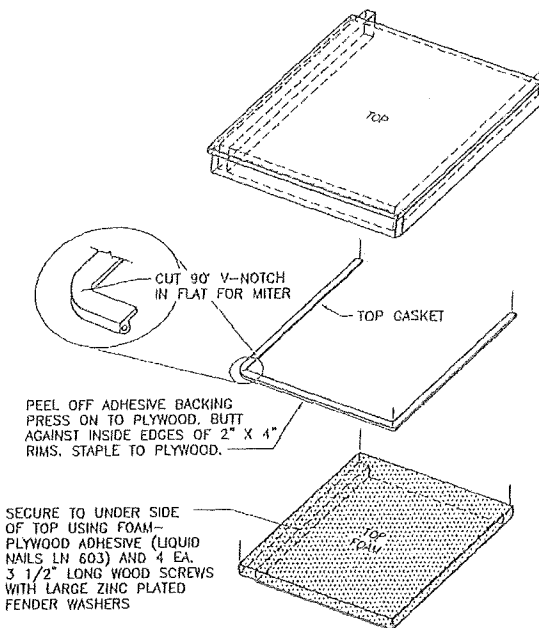
FRONT PANEL FOAM  
SCALE: 1 1/2" = 1'



FRONT PANEL ASSEMBLY  
NOT TO SCALE



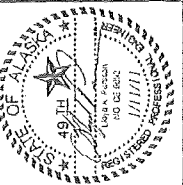
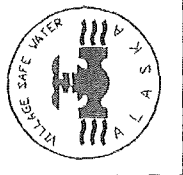
TOP FOAM  
(VIEW FROM ABOVE)  
SCALE: 1 1/2" = 1'



TOP ASSEMBLY  
NOT TO SCALE

RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

SCALE:  
AS SHOWN



2010-11 WASTEWATER  
SYSTEM IMPROVEMENTS  
ARCTIC BOX DETAILS  
TULUKSAK, ALASKA

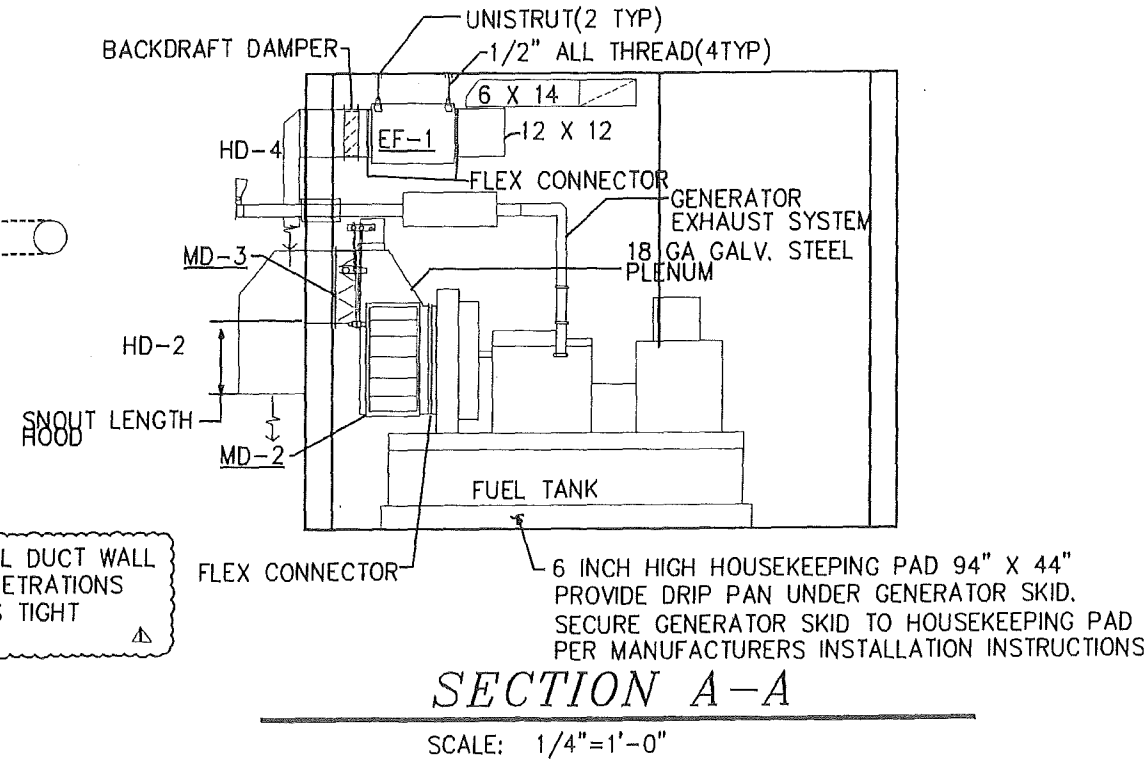
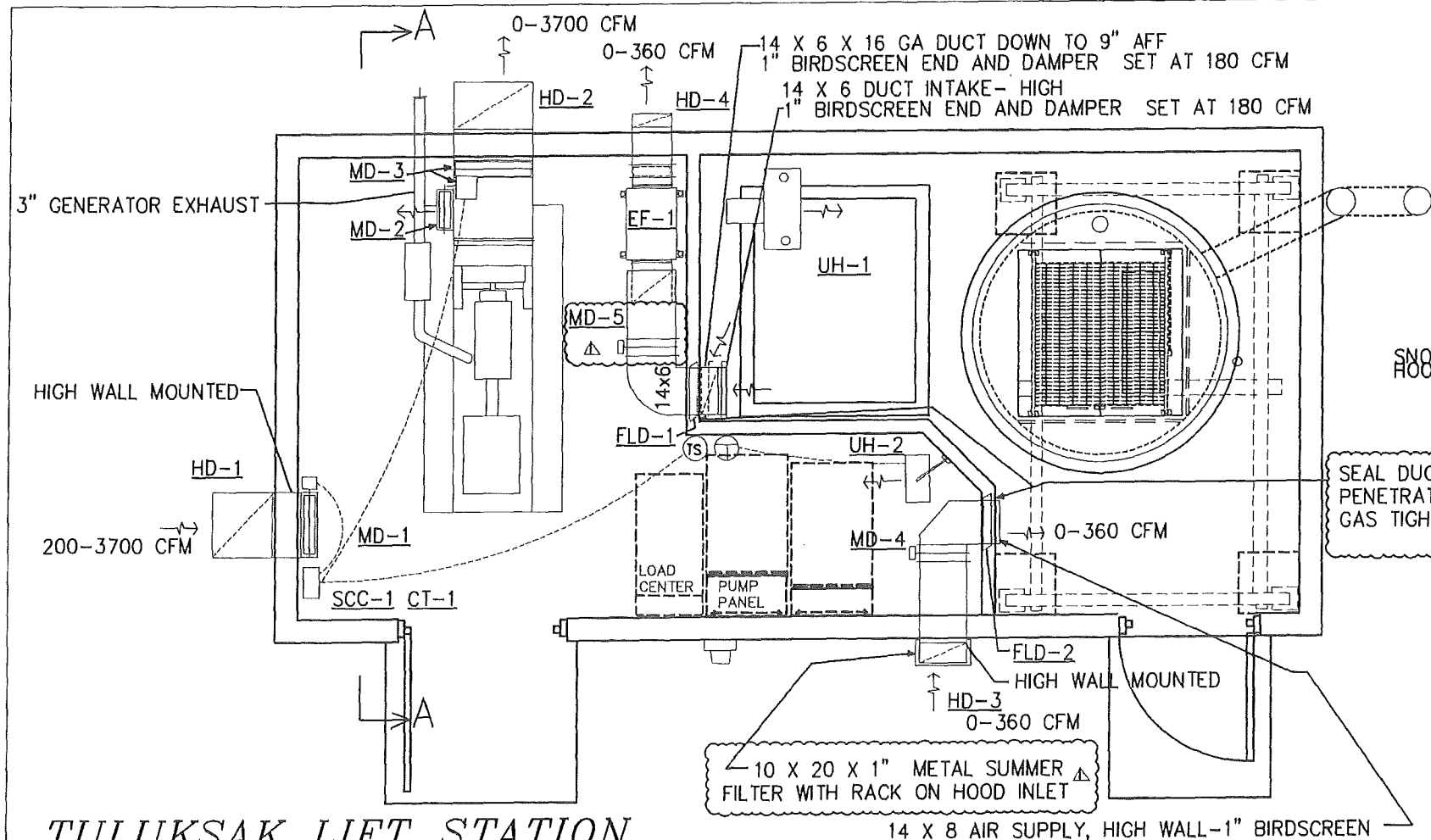


| REVISION          | BY | DATE |
|-------------------|----|------|
| LAGOON RELOCATION | LP | 8/10 |

|             |           |          |       |          |
|-------------|-----------|----------|-------|----------|
| Project No. | Date      | Designed | Drawn | Approved |
|             | JUNE 2008 | JDL      | JDL   | LAP      |

Sheet No  
C5.6

G:\ACAD\TULUKSAK\T10901. 2008 Waste water disposal area\TFC Rev Jan 2011\W1-1 Mechanical Fred Beltz.dwg, 10/14/2011 4:37:21 PM, cmezz, \\Cedmain\LANIER MP C3050\LD520C PCL 6



SCC-1 CONTROLLER FOR MD-1 DAMPER MOTOR, MD-2, MD-3 DAMPER MOTOR:  
2 INPUTS: START-STOP CONTROL, ANALOG ROOM TEMPERATURE  
2 OUTPUTS: RELAY CONTROL OPEN CLOSE MD-1 MODULATE 4-20 MA MD-2,3  
DAMPER CONTROL SIGNAL  
MFG: HONEYWELL T775M2006 WITH C7130B1009 ROOM SENSOR

## TULUKSAK LIFT STATION

MD-1 MOTORIZED DAMPER 24 WIDE X 16 HIGH. LOW LEAKAGE, 3 POSITION DAMPER SCALE: 1/4"=1'-0"  
MFG: RUSKIN CD-50 DAMPER WITH BELIMO AF24 W/ZDB-AF2 SPRING RETURN ACTUATOR 24 VAC 5 VA  
SUMMER FILTER: 16 X 25 X 1 AAF 316-001-600 OR EQUAL  
MD-2 MOTORIZED DAMPER 12" WIDE X 26" HIGH. LOW LEAKAGE, VARIABLE POSITION DAMPER  
MFG: DAMPER: RUSKIN CD-50 WITH COMMON OPERATOR WITH MD-3  
MD-3 MOTORIZED DAMPER 24" WIDE X 18" HIGH. LOW LEAKAGE, VARIABLE POSITION DAMPER  
MFG: RUSKIN CD-50 DAMPER WITH HONEYWELL M9185E MOTOR W/4074 EDC MODULE 24 VAC 24 VA  
PROVIDE CRANK ARMS, RODS, AND FITTINGS TO EFFECT 2 DAMPER CONTROL  
MD-4 MOTORIZED DAMPER 14" WIDE X 8" HIGH. LOW LEAKAGE, TWO POSITION DAMPER  
MFG: RUSKIN CD-50 DAMPER WITH BELIMO AF24 W/ZDB-AF2 SPRING RETURN ACTUATOR 24 VAC 5 VA  
MD-5 MOTORIZED DAMPER 14" WIDE X 6" HIGH. LOW LEAKAGE, TWO POSITION DAMPER  
MFG: RUSKIN CD-50 DAMPER WITH BELIMO AF24 W/ZDB-AF2 SPRING RETURN ACTUATOR 24 VAC 5 VA  
SUMMER FILTER: 10 X 20 X 1 AAF 316-001-200 OR EQUAL

HD-1 INTAKE HOOD: 24" WIDE X 18" DEEP WITH 36 INCH SNOOT. 16 GA. GALVANIZED  
STEEL, 1" BIRDSCREEN, SEE DETAIL SHEET M1-2  
HD-2 EXHAUST HOOD: 24" WIDE X 16" DEEP WITH 9 INCH SNOOT. 16 GA. GALVANIZED  
STEEL, 1" BIRDSCREEN, SEE DETAIL SHEET M1-2  
HD-3 INTAKE HOOD: 14" WIDE X 8" DEEP WITH 18 INCH SNOOT. 16 GA. GALVANIZED  
STEEL, 1" BIRDSCREEN, SEE DETAIL SHEET M1-2  
FLARE INTAKE OF HD-3 FOR 10x20 METAL FILTER w/ RACK FOR SUMMER FILTER  
HD-4 EXHAUST HOOD: 12" WIDE X 5" DEEP WITH 16 INCH SNOOT. 16 GA. GALVANIZED  
STEEL, 1" BIRDSCREEN, SEE DETAIL SHEET M1-2  
FLD-1 DYNAMIC FIRE DAMPER 14 X 6 MFG: RUSKIN DIBD2 OR EQUAL  
FLD-2 DYNAMIC FIRE DAMPER 14 X 8 MFG: RUSKIN DIBD2 OR EQUAL

### SEQUENCE OF OPERATION: LIFT STATION AREA

EF-1, MD-4, MD-5 OPERATION: EF-1, MD-4, MD-5 ARE INTERLOCKED. WHEN WALL SWITCH OUTSIDE  
LIFT STATION DOOR IS SET TO "ON" EF-1 STARTS, MD-4 OPENS, MD-5 OPENS TO FULL OPEN. SWITCH ACTIVATES  
FLASHING RED LIGHT (LABELED "UNSAFE TO ENTER"). LIGHT IS ON FOR 5 MINUTES TO PURGE AREA AND AT  
THE END OF THE 5 MINUTE TIME A GREEN LIGHT (LABELED "MONITOR WET WELL ROOM WITH COMBUSTIBLE GAS  
DETECTOR PRIOR TO ENTRY"). WHEN OPERATOR LEAVES WORK AREA THE SWITCH IS SET TO "OFF" AND  
EF-1 STOPS & MD-5, MD-5 DAMPERS CLOSE.

CT-1 CONTROL TRANSFORMER: 120 V PRIMARY/ 24 VAC SECONDARY 60 VA MFG: HONEYWELL OR EQUAL  
EF-1 EXHAUST FAN: INLINE TYPE, BELT DRIVE. 360 CFM @ 0.4 INCHES W.C., ALUMINUM HOUSING AND WHEEL  
STAINLESS STEEL FASTENERS, PERMATECTOR COATING, TOGGLE SWITCH, DUAL DRIVES, GRIP NOTCH BELTS  
SPRING HANGER ISOLATORS, GREASABLE BEARINGS WITH EXTENDED LUBE LINES, TEFC MOTOR, BACKDRAFT  
DAMPER, MOTOR COVER. MFG: GREENHECK BSQ 90-4 1/4 HP/115V/1 PH OR APPROVED EQUAL

GENERATOR: NOMINAL 40 KW 208/3 PH/60 HZ SEE ELECTRICAL FOR CONFIG: MFG: KOHLER 40RE0ZJC (VERIFY)  
WIDE SKID CONFIG, DIESEL ENGINE, 1530 LB, 113 GALLON INTEGRAL SKID FUEL TANK (14 HIGH X 90.5 L X 41 WIDE,  
GENERATOR EXHAUST: 355 CFM, GENERATOR RADIATOR AIR 3400 CFM, COMBUSTION AIR-130 CFM

### GENERATOR EXHAUST SYSTEM:

PROVIDE 3 INCH STAINLESS STEEL EXHAUST SYSTEM WITH PIPE, FLEX CONNECTOR, WALL THIMBLE FOR WOOD  
FRAME WALL, CLAMPS, FITTINGS, FASTENERS, HANGERS, RESIDENTIAL MUFFLER, FLAPPER,  
WRAP EXHAUST WITH APPROVED BLANKET INSULATION. 3M 615-(1 WRAP) OR EQUAL

HOUSEKEEPING PAD: PROVIDE CONCRETE PAD AND DRIP PAN UNDER SKID.

UH-1: UNIT HEATER. 10 KW, 208 V, 3 PH. HANGING UNIT HEATER WITH PROPELLOR FAN  
EXPLOSION PROOF UNIT WITH BUILT IN SPACE THERMOSTAT. PROVIDE CEILING MOUNTING KIT  
MFG: Q MARK GUX1000832 WITH SPACE T STAT. 29.2 AMPS, 840 CFM

UH-2: UNIT HEATER. 3 KW, 208/240 V, 1 PH. HANGING UNIT HEATER WITH PROPELLOR FAN  
PROVIDE WALL MOUNTING KIT, AND LOW VOLTAGE WALL THERMOSTAT.  
MFG: Q MARK MUH 0321 11/12.5 AMPS, 350 CFM

### SEQUENCE OF OPERATION: GENERATOR OPERATION

MD-1, MD-2, MD-3 OPERATION: OFF POSITION: MD-1 IS CLOSED, MD-2 IS FULL OPEN, MD-3 IS FULL CLOSED  
GENERATOR IS STARTED: MD-1 OPENS, MD-2 BYPASSES AIR TO ROOM AND BEGINS TO MODULATE CLOSED  
WHILE MD-3 BEGINS TO OPEN. DAMPER MOTOR MODULATES TO ALLOW GENERATOR RADIATOR AIR TO HEAT ROOM  
ROOM SET POINT: 75 F. ON GENERATOR SHUT DOWN SYSTEM RETURNS TO OFF POSITION

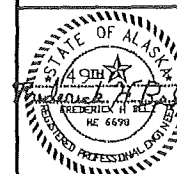
### SEQUENCE OF OPERATION: UNIT HEATERS UH-1, UH-2

UH-1 CYCLES ON BUILT IN THERMOSTAT: SET 50 F  
UH-2 CYCLES ON ROOM THERMOSTAT: SET 55 F

03-23-2011 REVISE DUCT  
WORK, MD-4, SEQUENCE OF  
OPERATION

CAPSTONE ENGINEERING LLC  
MECHANICAL ENGINEERS

12110 BUSINESS BLVD. STE. 6, PHB 169  
EAGLE RIVER, ALASKA 99577  
TELEPHONE & FAX 541-884-8063



JAN 10, 2011

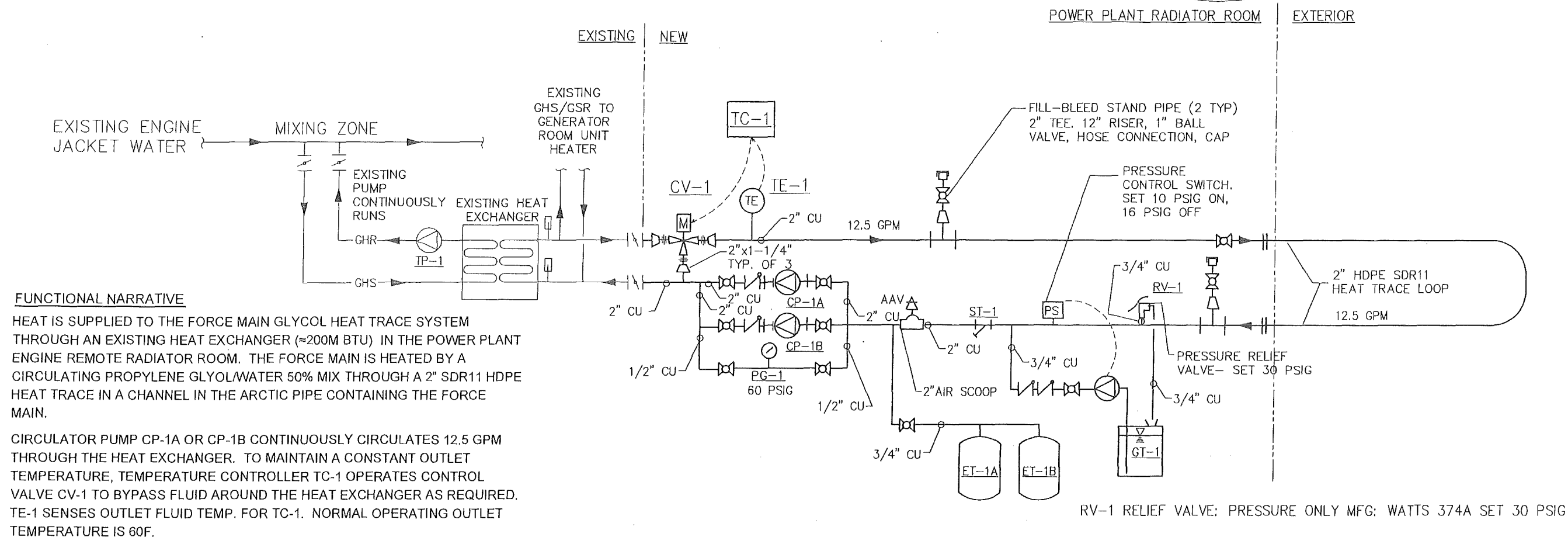
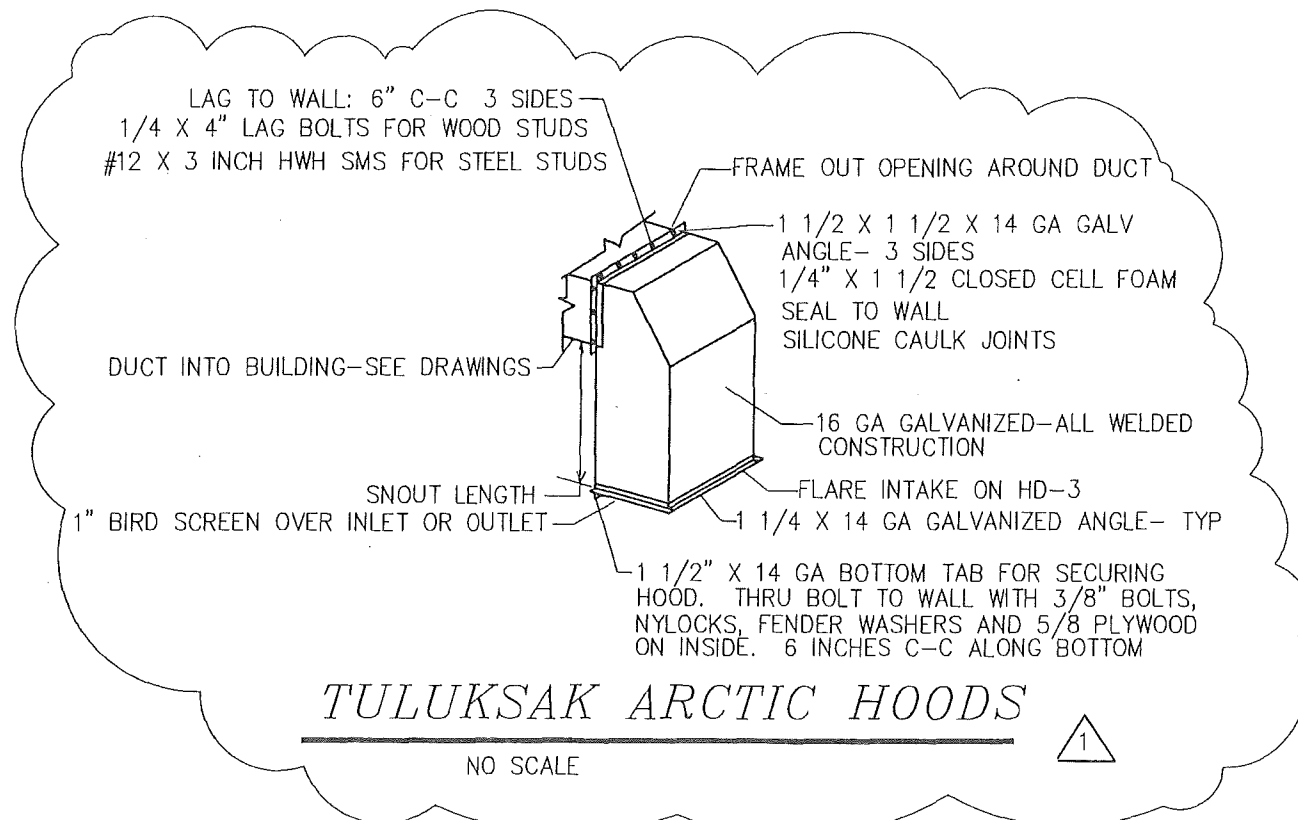
MECHANICAL DETAILS AND INSERTS  
TULUKSAK LIFT STATION  
TULAKSAK, ALASKA

DATE: JAN 10, 2011  
DRAWN: F.H. BELZ  
CHKD: AS NOTED  
SCALE: AS NOTED  
REVISED: MARCH 23, 2011  
JOB NO. C378

SHEET NO. 1 OF 3

G:\ACAD\TULUKSAK\T0901 2008 Waste water disposal area\JFC Rev Jan 2011\MI-2 Mechanical Fred Beltz.dwg, 10/14/2011 4:37:10 PM, cmerz, \\c2main\LANIER MP C2050\LD520C PCL 6

| EQUIPMENT LIST HYDRONIC HEAT TRACE PIPING FOR SEWAGE FORCE MAIN |                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AAV                                                             | AUTOMATIC AIR VENT, 2" FIPT CONNECTIONS, SPIROVENT JUNIOR MODEL 200TM                                                                                                                                                                                        |
| CP-1A, CP-1B                                                    | 2-STAGE CENTRIFUGAL CIRCULATING PUMP, TYPE 304 STAINLESS STEEL CONSTRUCTION, 0.5 HP TEFC 3450 RPM MOTOR, 208-230/460 VOLT 3-PHASE, GRUNDFOS 1SVB1C9B0                                                                                                        |
| CV-1                                                            | THREE WAY CONTROL VALVE, 1-1/4" FIPT, CV 18.7, B TO AB PORT OPEN ON STEM RISE. HONEYWELL V5013N1071 WITH ML7424B3012 SPRING DIRECT COUPLED GLOBE VALVE ACTUATOR (PULLS STEM UP TO FULL BYPASS ON POWER FAILURE.                                              |
| ET-1A, ET-1B                                                    | THERMAL EXPANSION TANKS, VERTICAL WITH STAND, BLADDER TYPE, ASME SECTION VIII, DIV 1 CONSTRUCTION, MAX ACCEPTANCE VOLUME 34.0 GALLONS, 1" FIPT BOTTOM CONNECTION, AMTROL AX-200(V).                                                                          |
| GT-1                                                            | GLYCOL SOLUTION MIXING TANK, 100 GAL CAPACITY, WITH INTEGRAL PUMP AND PRESSURE REGULATOR, AXIOM SF100-L                                                                                                                                                      |
| PG-1                                                            | PROCESS PRESSURE GAUGE, SILICONE FILLED CASE, POCAN CASE, 1/2" MIPT BOTTOM PORT, 0-60 PSIG, WIKA TYPE 213.34, PART # 9834354                                                                                                                                 |
| RV-1                                                            | PRESSURE RELIEF VALVE, 3/4" x 3/4" FIPT, SET 30 PSIG, RATED 650,000 BTU/HR RELIEF, BRONZE BODY CONSTRUCTION, NONMETALLIC DISC TO METAL SEATING.                                                                                                              |
| ST-1                                                            | WYE-TYPE STRAINER, 2" BRONZE SWEAT TYPE, 20 MESH SS SCREEN, METRAFLEX STYLE BSJC 2" OR EQUAL                                                                                                                                                                 |
| TC-1                                                            | ELECTRONIC STAND-ALONE TEMPERATURE CONTROLLER, WITH REMOTE RESISTANCE SENSOR, NEMA 4X ENCLOSURE, 120 VAC OR 24 VAC POWER INPUT, 2-10 VDC, 0-10 VDC, 4-20 MA DC OUTPUT, HONEYWELL T775M2022 WITH INCLUDED SENSOR, C7031D2003 5 IN IMMERSION SENSOR WITH WELL. |
| TE-1                                                            | PART OF TC-1 ASSEMBLY (C7031D2003 5 IN IMMERSION SENSOR WITH WELL).                                                                                                                                                                                          |



#### FUNCTIONAL NARRATIVE

HEAT IS SUPPLIED TO THE FORCE MAIN GLYCOL HEAT TRACE SYSTEM THROUGH AN EXISTING HEAT EXCHANGER (≈200M BTU) IN THE POWER PLANT ENGINE REMOTE RADIATOR ROOM. THE FORCE MAIN IS HEATED BY A CIRCULATING PROPYLENE GLYOL/WATER 50% MIX THROUGH A 2" SDR11 HDPE HEAT TRACE IN A CHANNEL IN THE ARCTIC PIPE CONTAINING THE FORCE MAIN.

CIRCULATOR PUMP CP-1A OR CP-1B CONTINUOUSLY CIRCULATES 12.5 GPM THROUGH THE HEAT EXCHANGER. TO MAINTAIN A CONSTANT OUTLET TEMPERATURE, TEMPERATURE CONTROLLER TC-1 OPERATES CONTROL VALVE CV-1 TO BYPASS FLUID AROUND THE HEAT EXCHANGER AS REQUIRED. TE-1 SENSES OUTLET FLUID TEMP. FOR TC-1. NORMAL OPERATING OUTLET TEMPERATURE IS 60F.

PRESSURE RELIEF VALVE RV-1 PROTECTS THE SYSTEM FROM OVER PRESSURE, AND IS SET AT 30 PSIG. GLYCOL TANK GT-1 SERVES AS A MAKE-UP UNIT FOR GLYCOL MIX REPLACEMENT IN THE HEAT TRACE LOOP. EXPANSION TANKS ET-1A AND ET-1B SERVE TO ALLOW ROOM FOR EXPANSION OF HEAT TRANSFER FLUID OVER THE EXPECTED RANGE OF TEMPERATURE OF THE SYSTEM.

## TULUKSAK HYDRONIC PIPING HEAT TRACE PIPING SCHEMATIC

NO SCALE

1 03-23-2011 REVISE HOOD DETAIL

CAPSTONE ENGINEERING LLC  
MECHANICAL ENGINEERS  
12110 BUSINESS BLVD. STE. 5 PHB 169  
EAGLE RIVER, ALASKA 99577  
TELEPHONE 1 FAX 541-884-8065



MECHANICAL DETAILS AND INSERTS  
TULUKSAK LIFT STATION  
TULAKSAK, ALASKA

DATE: JAN 10, 2011  
DRAWN: FM BELZ  
CHKD:  
SCALE: AS NOTED  
REVISED:  
JOB NO. C378

SHEET NO. 2 OF 3  
M1-2 3





## ELECTRICAL LEGEND

(NOTE: THIS IS A STANDARD LEGEND AND NOT ALL SYMBOLS ARE NECESSARILY USED.)

|  |                                                                                              |
|--|----------------------------------------------------------------------------------------------|
|  | EXTERIOR LIGHT FIXTURE, POLE MOUNTED, HEADS AS SHOWN                                         |
|  | HAND HOLE                                                                                    |
|  | ELECTRIC VAULT                                                                               |
|  | PHOTOCELL CONTROL                                                                            |
|  | LUMINAIRE - TYPE AS NOTED ON PLAN                                                            |
|  | LUMINAIRE - WALL MOUNTED, TYPE AS NOTED ON PLAN                                              |
|  | LUMINAIRE - EMERGENCY LIGHT                                                                  |
|  | TRACK LIGHTING - TRACK LENGTH AS SCALED, TYPE AS NOTED ON PLAN                               |
|  | EMERGENCY LIGHTING UNIT (WALL, CEILING, REMOTE HEAD); TYPE "E", UON                          |
|  | EMERGENCY BATTERY TO POWER REMOTE HEAD(S); TYPE "ERB", UON                                   |
|  | EXIT SIGN (CEILING, WALL); SHADE DENOTES FACE, ARROWS AS INDICATED; TYPE "X", UON            |
|  | SWITCH - SINGLE POLE, SINGLE THROW, UON                                                      |
|  | SWITCH - THREE WAY                                                                           |
|  | SWITCH - FOUR WAY                                                                            |
|  | SWITCH CONTROL FOR FIXTURES DENOTED WITH "a" APPENDED TO CIRCUIT NUMBER                      |
|  | SWITCH - LOW VOLTAGE                                                                         |
|  | SWITCH - ELECTRONIC DRIVER SWITCH COMPATIBLE WITH LIGHT FIXTURE                              |
|  | SWITCH - KEYED                                                                               |
|  | SWITCH - PILOT LIGHT                                                                         |
|  | SWITCH - INTEGRAL MOTOR OVERLOAD                                                             |
|  | SWITCH - VARIABLE SPEED CONTROL                                                              |
|  | LIGHT CONTROL OCCUPANCY SENSOR - WALL SWITCH BOX MOUNTED                                     |
|  | LIGHT CONTROL OCCUPANCY SENSOR - CEILING MOUNTED                                             |
|  | POWER DISTRIBUTION PANELBOARD                                                                |
|  | METERING DEVICE                                                                              |
|  | CURRENT TRANSFORMER ENCLOSURE                                                                |
|  | POWER PANELBOARD (NEW - SURFACE, RECESSED), (EXISTING - SURFACE, RECESSED)                   |
|  | TRANSFORMER, APPROX. PHYSICAL SIZE AS SCALED, ACTUAL RATING AS NOTED ON ONE-LINE DIAGRAMS    |
|  | MOTOR CONNECTION                                                                             |
|  | COMBINATION BATHROOM FAN/LIGHT, TYPE AS NOTED ON PLAN                                        |
|  | NON-FUSED SAFETY SWITCH                                                                      |
|  | FUSED SAFETY SWITCH                                                                          |
|  | ENCLOSED CIRCUIT BREAKER SWITCH                                                              |
|  | MOTOR STARTER                                                                                |
|  | COMBINATION MOTOR STARTER SAFETY SWITCH                                                      |
|  | PUSH BUTTON CONTROL STATION                                                                  |
|  | JUNCTION BOX OR EQUIPMENT CONNECTION - FLEX OR RECEPTACLE AS REQUIRED (CEILING, WALL, FLOOR) |
|  | POWER CONNECTION TO FSD CONTROLLED BY FIRE ALARM SYSTEM                                      |
|  | SIMPLEX RECEPTACLE                                                                           |
|  | DUPLEX RECEPTACLE                                                                            |
|  | DOUBLE DUPLEX RECEPTACLE                                                                     |
|  | DUPLEX RECEPTACLE - SPLIT WIRED FOR SWITCH CONTROL OF LOWER OUTLET                           |
|  | DUPLEX RECEPTACLE - GFCI PROTECTED                                                           |
|  | DUPLEX RECEPTACLE - GFCI PROTECTED MOUNTED +18" AFF                                          |
|  | DUPLEX RECEPTACLE - GFCI PROTECTED MOUNTED ABOVE COUNTERTOP                                  |
|  | DUPLEX RECEPTACLE - MOUNTED ABOVE COUNTERTOP                                                 |
|  | DUPLEX RECEPTACLE - FLOOR MOUNTED FIRE RATED POKE THROUGH, UON                               |
|  | DOUBLE DUPLEX RECEPTACLE - FLOOR MOUNTED FIRE RATED POKE THROUGH, UON                        |
|  | RECEPTACLE - PENDANT MOUNTED FROM CEILING                                                    |
|  | RECEPTACLE - FLUSH MOUNTED IN CEILING                                                        |
|  | DRYER RECEPTACLE - 30A, 3 POLE, 4 WIRE, NEMA 14-30R                                          |
|  | ELECTRIC RANGE RECEPTACLE - 50A, 3 POLE, 4 WIRE, NEMA 14-50R                                 |
|  | SPECIAL PURPOSE RECEPTACLE - NEMA CONFIGURATION AS NOTED (SURFACE, WALL)                     |
|  | GROUND CONNECTION POINT                                                                      |
|  | DUAL CHANNEL SURFACE MOUNTED RACEWAY - LENGTH AS SCALED                                      |
|  | SINGLE CHANNEL SURFACE MOUNTED RACEWAY - LENGTH AS SCALED                                    |
|  | TELECOMMUNICATION OUTLET (WALL, FLOOR)                                                       |
|  | TELEPHONE OUTLET                                                                             |
|  | TELEVISION OUTLET (WALL, CEILING)                                                            |
|  | DUAL CHANNEL SERVICE POLE                                                                    |
|  | TELECOMMUNICATION FLOOR STANDING RACK                                                        |
|  | TELECOMMUNICATION WALL MOUNTED RACK                                                          |
|  | TELECOMMUNICATION MAIN GROUNDING BUS                                                         |
|  | TELECOMMUNICATION GROUNDING BUS                                                              |
|  | CONTROL PANEL - TYPE AS NOTED (SURFACE, RECESSED)                                            |

|  |                                                        |
|--|--------------------------------------------------------|
|  | FIRE ALARM CONTROLLED MAGNETIC DOOR HOLDER / RELEASE   |
|  | ABORT STATION                                          |
|  | CARBON MONOXIDE DETECTOR                               |
|  | HEAT DETECTOR - RATE OF RISE                           |
|  | HEAT DETECTOR - FIXED TEMPERATURE AS NOTED             |
|  | SMOKE DETECTOR - PHOTOELECTRIC TYPE                    |
|  | SMOKE DETECTOR - MULTI-SENSOR TECHNOLOGY TYPE          |
|  | SMOKE DETECTOR - DUCT MOUNTED                          |
|  | SMOKE DETECTOR - BEAM RECEIVER                         |
|  | SMOKE DETECTOR - BEAM TRANSMITTER                      |
|  | FLAME DETECTOR                                         |
|  | LINE TYPE HEAT SENSITIVE CABLE DETECTOR                |
|  | FIRE ALARM HORN                                        |
|  | FIRE ALARM STROBE                                      |
|  | FIRE ALARM COMBINATION HORN/STROBE                     |
|  | FIRE ALARM PULL STATION                                |
|  | FIRE ALARM CONTROL PANEL                               |
|  | FIRE SYSTEM ANNUNCIATOR PANEL                          |
|  | HALON CONTROL PANEL                                    |
|  | FIRE ALARM SPEAKER STROBE                              |
|  | WATER FLOW BELL - 120V CONTROLLED BY FLOW SWITCH       |
|  | FIRE ALARM FLOW SWITCH                                 |
|  | FIRE ALARM TAMPER SWITCH                               |
|  | MICROPHONE INPUT JACK                                  |
|  | MICROPHONE INPUT JACK - FLOOR MOUNTED                  |
|  | INTERCOM CALL BUTTON                                   |
|  | INTERCOM ADMINISTRATION PHONE                          |
|  | SPEAKER (WALL, CEILING)                                |
|  | CLOCK SPEAKER COMBINATION WALL MOUNT UNIT              |
|  | CLOCK - WALL MOUNTED                                   |
|  | SECURITY ACCESS CARD READER                            |
|  | DOOR CONTROL SOLENOID                                  |
|  | DOOR MAGNETIC CONTACT                                  |
|  | SECURITY SYSTEM - GLASS BREAK SENSOR                   |
|  | SECURITY SYSTEM - MOTION SENSOR                        |
|  | SECURITY SYSTEM - DOOR POSITION SENSOR                 |
|  | SECURITY SYSTEM - REQUEST TO EXIT MOTION DETECTOR      |
|  | SECURITY SYSTEM - ACCESS KEY PAD                       |
|  | SECURITY SYSTEM - MOTION SENSOR - NARROW PATTERN       |
|  | SECURITY SYSTEM - CAMERA                               |
|  | ACCESS PANEL                                           |
|  | LINE TYPE DENOTING CABLE TRAY                          |
|  | LINE TYPE/LINE WEIGHT DENOTING FUTURE WORK             |
|  | LINE TYPE/LINE WEIGHT DENOTING EXISTING WORK TO REMAIN |
|  | LINE TYPE/LINE WEIGHT DENOTING NEW WORK                |
|  | LINE TYPE/LINE WEIGHT DENOTING DEMO WORK               |
|  | DENOTES AVAILABLE FAULT CURRENT                        |

## EQUIPMENT TAG LEGEND

|                       |                                                                                                                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LUMINAIRES            | <br>LUMINAIRE TYPE (UNDERLINED)<br>THE NUMBER IN BRACKETS INDICATES HOW MANY TYPICAL LUMINAIRES OF THIS TYPE ARE IN THIS AREA<br>CIRCUIT AND SWITCH LEG<br>PANEL<br>TYPICAL LUMINAIRE |
| CONTROL SWITCHES      | <br>LOWER CASE LETTER DENOTES SWITCH LEG FOR CORRESPONDING LUMINAIRE CONTROL<br>UPPERCASE LETTER OR NUMBER DENOTES SWITCH CONFIGURATION                                               |
| EQUIPMENT CONNECTIONS | <br>EQUIPMENT ID (UNDERLINED)<br>REFER TO EQUIPMENT CONNECTION SCHEDULE FOR REQUIREMENTS<br>TYPICAL EQUIPMENT (MOTOR STARTER SHOWN)<br>CIRCUIT NUMBER(S)<br>PANEL                     |
| RECEPTACLES           | <br>MOUNTING HEIGHT AFF PANEL<br>CIRCUIT NUMBER(S)<br>NEMA CONFIGURATION FOR SPECIAL RECEPTACLES (UNDERLINED)                                                                         |

## ABBREVIATIONS

|         |                                         |
|---------|-----------------------------------------|
| (E)     | EXISTING                                |
| A       | AMPERES                                 |
| AC      | ABOVE COUNTER                           |
| AF      | ABOVE FINISHED FLOOR                    |
| AFCL    | ARC FAULT CIRCUIT INTERRUPTER           |
| AFG     | ABOVE FINISHED GRADE                    |
| AHJ     | AUTHORITY HAVING JURISDICTION           |
| MC      | AMPS INTERRUPTING CAPACITY              |
| C       | CONDUIT OR CABLE                        |
| CAT     | CATEGORY                                |
| CB      | CIRCUIT BREAKER                         |
| CO      | CONDUIT ONLY                            |
| CT      | CURRENT TRANSFORMER                     |
| (D)     | DEMOLISH                                |
| DISC    | DISCONNECT                              |
| EGC     | EQUIPMENT GROUNDING CONDUCTOR           |
| F       | FAHRENHEIT                              |
| FAA     | FIRE ALARM ANNUNCIATOR                  |
| FACP    | FIRE ALARM CONTROL PANEL                |
| FHP     | FRACTIONAL HORSEPOWER                   |
| FLA     | FULL LOAD AMPS                          |
| FSD     | FIRE SMOKE DAMPER                       |
| FT      | FEET                                    |
| FV      | FUSE                                    |
| G       | GROUND FAULT CIRCUIT INTERRUPTER        |
| GEC     | GROUNDING ELECTRODE CONDUCTOR           |
| HP      | HORSEPOWER                              |
| ID      | IDENTIFICATION                          |
| IN      | INCHES                                  |
| KVA     | KILOVOLT-AMPERE                         |
| KW      | KILOWATT                                |
| LRA     | LOCKED ROTOR AMPS                       |
| LIG     | LIGHTING                                |
| MCA     | MINIMUM CIRCUIT AMPCACITY               |
| MOP     | MAIN DISTRIBUTION PANEL                 |
| MDS     | MAIN DISTRIBUTION SWITCHBOARD           |
| MFS     | MAXIMUM FUSE SIZE                       |
| (N)     | NEW                                     |
| NC      | NORMALLY CLOSED                         |
| NO      | NORMALLY OPEN                           |
| P       | POLES                                   |
| PC      | PHOTO CELL                              |
| PH, #   | PHASE                                   |
| PHL     | PANEL                                   |
| PN      | PRIMARY                                 |
| REC     | RECEPTACLE                              |
| (R)     | RELOCATED                               |
| RD      | RELAY IN A BOX (MOTOR RATED)            |
| SCCR    | SHORT CIRCUIT CURRENT RATING            |
| SE      | SERVICE ENTRANCE RATED                  |
| SEC     | SECONDARY                               |
| SSEBU   | SUPPLY SIDE EQUIPMENT BONDING JUMPER    |
| SVC     | SERVICE                                 |
| TELECOM | TELECOMMUNICATION                       |
| TGD     | TELECOMMUNICATION GROUNDING BUSBAR      |
| TAGB    | TELECOMMUNICATION MAIN GROUNDING BUSBAR |
| TYP     | TYPICAL                                 |
| UON     | UNLESS OTHERWISE NOTED                  |
| V       | VOLTS                                   |
| VA      | VOLT-AMPERES                            |
| VFD     | VARIABLE FREQUENCY DRIVE                |
| W       | WATTS OR WIRE                           |
| WG      | WIRE GUARD                              |
| WP      | WEATHERPROOF (NEMA 4 RATED)             |
| TRMR    | TRANSFORMER                             |

## MOUNTING HEIGHT SCHEDULE

|                                                       |                |
|-------------------------------------------------------|----------------|
| PANELBOARDS (TOP)                                     | +70"           |
| SPECIAL SYSTEM PANELS (TOP)                           | +66"           |
| POWER METER BASE (CENTER LINE OF SOCKET)              | +66"           |
| CONTACTORS, MOTOR STARTERS, DISCONNECT SWITCHES (TOP) | +66"           |
| RECEPTACLES IN OFFICE AREAS                           | +18"           |
| RECEPTACLES IN NON-FINISHED AND MECHANICAL SPACES     | +16"           |
| ABOVE COUNTER DEVICES (DENOTED "AC" OR BY SYMBOL)     | SEE NOTES      |
| WALL MOUNTED SWITCHES                                 | +46"           |
| TELECOMMUNICATION OUTLETS                             | +10"           |
| WALL MOUNTED TELEPHONE OUTLET (DENOTED "W")           | +54"           |
| CLOCK OUTLETS                                         | +60" TO BOTTOM |
| HORNS/STROBES/HORN STROBES/DOORBELL RINGER            | +60" TO BOTTOM |
| PULL STATIONS, PUSH BUTTONS, DOORBELL PUSHBUTTON      | +46"           |

### NOTES:

- COORDINATE AND INSTALL ALL EQUIPMENT AND DEVICES WITH THE ARCHITECTURAL PLANS AND ANY SPECIFICALLY DENOTED REQUIREMENTS.
- MOUNTING HEIGHTS SHALL PREVAIL UNLESS OTHERWISE NOTED OR FIELD CONDITIONS REQUIRE DEVIATION.
- MOUNTING HEIGHTS ARE FROM FINISHED FLOOR TO THE CENTERLINE OF THE DEVICE UNLESS OTHERWISE NOTED.
- COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF OUTLETS DENOTED AS ABOVE COUNTER TO BE INSTALLED 6" ABOVE COUNTERS OR BACKSPASHES, WHICHEVER IS HIGHER.

## GENERAL REQUIREMENTS

- ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE, STATE, MUNICIPAL, AND FEDERAL LAWS, AMENDMENTS AND/OR ORDINANCES GOVERNING THE PROJECT. IF IN ANY INSTANCE THE PLANS AND SPECIFICATIONS ARE IN DIRECT CONFLICT WITH SUCH CODES, LAWS, AND/OR ORDINANCES, THE CODE, LAWS, AND/OR ORDINANCES SHALL HAVE JURISDICTION AND THE WORK IN QUESTION SHALL BE INSTALLED ACCORDING TO THE CODES, LAWS, AND/OR ORDINANCES. ALL WORK SHALL BE PERFORMED UNDER THE SUPERVISION OF A CERTIFIED ELECTRICIAN.
- THE CONTRACTOR SHALL OBTAIN ALL REQUIRED CONSTRUCTION PERMITS AND PAY ALL ASSOCIATED FEES.
- MATERIALS AND EQUIPMENT SHALL BE COMMERCIAL GRADE AND ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED. ALL ELECTRICAL EQUIPMENT SHALL INCLUDE THE SEAL OF A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE PURPOSE FOR WHICH IT IS INSTALLED. WHENEVER POSSIBLE, SIMILAR ITEMS SHALL BE SUPPLIED BY THE SAME MANUFACTURER THROUGHOUT THE PROJECT.
- COORDINATE AND PROVIDE THE EQUIPMENT WITH THE SHORT CIRCUIT CURRENT RATING (SCCR) FOR THE AVAILABLE FAULT CURRENT AT THE POINT OF THE SYSTEM WHERE INSTALLED. SERIES RATING OF EQUIPMENT IS ACCEPTABLE. PROVIDE ARC FAULT WARNING LABELS ON ALL PANELBOARDS, MCC UNITS AND SIMILAR EQUIPMENT PER NEC REQUIREMENTS.
- THE FOLLOWING WIRING METHODS SHALL BE ACCEPTABLE FOR INSTALLATION OF ELECTRICAL CIRCUITS: TYPE MC CABLE, INTERMEDIATE METAL CONDUIT, RIGID METAL CONDUIT, RIGID NONMETALLIC CONDUIT (FOR UNDERGROUND USE ONLY), ELECTRICAL METALLIC TUBING, FLEXIBLE METALLIC TUBING, FLEXIBLE METAL CONDUIT, AND LIQUID TIGHT FLEXIBLE CONDUIT. ALL WIRING METHODS SHALL INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR TO BE INSTALLED THEREIN AND SIZED FOR THE CIRCUITS SERVED.
- ALL CONDUCTORS SHALL BE COPPER. ALL CONDUCTORS IN UNHATED SPACES OF THE BUILDING OR LOCATED OUTSIDE OF THE BUILDING ARE REQUIRED TO HAVE TYPE XHHW 90 DEGREE C INSULATION. ALL CONDUCTORS LOCATED IN HEATED SPACES CAN BE XHHW OR THHN 90 DEGREE C INSULATION UNLESS NOTED OTHERWISE. CONDUCTOR AMPACITY SHALL BE BASED ON TABLE 310-16 OF THE NEC. USE 60-DEGREE C RATING FOR CIRCUITS TERMINATING ON DEVICES RATED BELOW 100A. USE 75-DEGREE C RATING FOR CIRCUITS TERMINATING ON DEVICES AND IN ENCLOSURES RATED 100A AND OVER. DERATE CONDUCTORS PER NEC REQUIREMENTS.
- CONCEAL ALL ELECTRICAL RACEWAYS, BOXES, CABLES, CONDUCTORS AND THE LIKE IN WALLS, BELOW FLOORS, SLABS OR ABOVE FINISHED CEILING SPACES. ELECTRICAL EQUIPMENT AND WIRING CAN BE EXPOSED IN MECHANICAL ROOMS, TELECOMMUNICATION ROOMS OR WHERE SPECIFICALLY NOTED.
- DO NOT ROUTE RACEWAYS ON THE EXTERIOR SURFACE OF THE BUILDING OR THE ROOF UNLESS SPECIFICALLY NOTED OTHERWISE.
- PROVIDE ALL WIRING AND EQUIPMENT IN WET AND EXTERIOR LOCATIONS USING EQUIPMENT AND WIRING METHODS RATED FOR WET ENVIRONMENTS.
- ALL CABLES LOCATED IN CEILING SPACES THAT ARE PLENUMS SHALL BE PLENUM RATED.
- PROVIDE ACCESS PANELS FOR ALL LOCATION NECESSARY TO ACCESS ELECTRICAL EQUIPMENT AND JUNCTION BOXES. ACCESS PANELS SHALL BE FIRE RATED EQUAL TO OR EXCEEDING THE ADJACENT WALL OR CEILING CONSTRUCTION AND PAINTED TO MATCH.
- CONNECT ALL EMERGENCY LIGHTING UNITS AND MODULES TO THE LOCAL AREA LIGHTING CIRCUITS AHEAD OF ANY SWITCHES OR RELAYS. LOCATE REMOTE TEST SWITCHES AND INDICATOR LIGHTS AS NECESSARY FOR TEST SWITCHES ON EMERGENCY MODULES.
- SEAL ALL PENETRATIONS. SEAL PENETRATIONS AT ALL FIRE WALLS WITH APPROVED FIRE STOPPING COMPOUND.
- OUTLET BOXES LOCATED BACK TO BACK IN FIRE RATED WALLS SHALL BE SPACED A MINIMUM OF 2 FEET HORIZONTALLY OR PROVIDE AN APPROVED FIRE PROTECTIVE MATERIAL PLACED ON OR AROUND THEM LISTED FOR THE FIRE RATING OF THE WALL.
- CONTRACTOR SHALL SUBMIT REQUEST FOR SUBSTITUTION IN WRITING TO THE ENGINEER.
- PROVIDE SEISMIC SUPPORT AND DESIGN PER IBC REQUIREMENTS.
- THE ELECTRICAL CONTRACTOR SHALL CONTACT EACH SERVING UTILITY CO. AND VERIFY EXACT SERVICE REQUIREMENTS FOR POWER AND TELEPHONE. THE CONTRACTOR SHALL COORDINATE AND PROVIDE ALL REQUIREMENTS OF EACH SERVING UTILITY AND ALL EQUIPMENT SHALL CONFORM TO THE SERVING UTILITY STANDARDS AND REQUIREMENTS.

## ELECTRICAL SHEET LIST

|      |                                                    |
|------|----------------------------------------------------|
| E1.1 | ELECTRICAL LEGEND & SCHEDULES                      |
| E2.1 | ELECTRICAL SITE PLAN                               |
| E3.1 | ELECTRICAL NEC CLASSIFIED BOUNDARY DETAILS         |
| E4.1 | ELECTRICAL CELL TRANSFER HATHOLE PLANS             |
| E4.2 | ELECTRICAL POWER PLANT PLANS                       |
| E5.1 | ELECTRICAL LIFT STATION PLANS                      |
| E5.2 | ELECTRICAL LIFT STATION PLANS                      |
| E6.1 | ELECTRICAL LIFT STATION DIAGRAMS & PANEL SCHEDULES |
| E6.2 | ELECTRICAL LIFT STATION CONTROLS                   |
| E6.3 | ELECTRICAL POWER PLANT CONTROLS & DIAGRAMS         |

## EIC ENGINEERS, INC. ELECTRICAL ENGINEERS

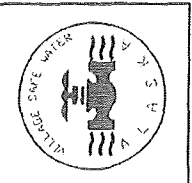


BC, CS #E16-1323

6937 OLD SEWARD HWY, SUITE 203  
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T 907.342.0712  
F 907.342.9713  
www.eiceng.com

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SCALE:



2009 WASTEWATER  
SYSTEM IMPROVEMENTS  
ELECTRICAL  
LEGEND & SCHEDULES  
TULUAK, ALASKA

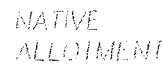
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ENGINEERS, INC.

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|             | JAN 2011 |          |       |          |

Sheet No.

E1.1



SCALE: 1" = 200'-0"

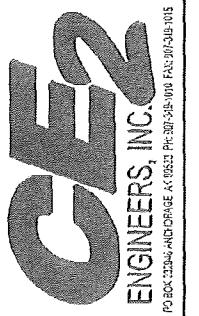


- ① CONTRACTOR TO PROVIDE PORTABLE GENERATOR POWER CONNECTION AND SEWER PIPE HEAT TRACE AT NEW CELL TRAVELER HATCH LOCATION. SEE E4.1 FOR DETAIL.
- ② CONTRACTOR TO PROVIDE NEW BRANCH CIRCUITS IN EXISTING POWER PLANT FOR HEAT LOOP PUMP CONTROL PANEL AND CIRCULATION PUMPS. SEE 1/E4.2 FOR DETAIL.
- ③ CONTRACTOR TO PROVIDE ELECTRICAL INSTALLATIONS IN NEW LIFT STATION. SEE ES-1, ES-2, AND E6.1 FOR DETAIL.

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ORIGINAL DRAWING

ELECTRICAL  
SITE PLAN

IULIUS, ADASNA

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| Project No. | Date | JAN 2011 |
| Designed    | BLS  |          |
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| Approved    | EDD  |          |

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E2.1

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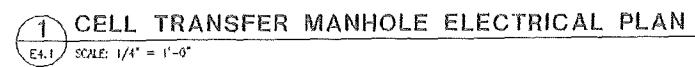
 4927 OLD SEWARD HWY, SUITE 204  
MICHIGAN, MI 49518  
T 907.349.9712  
F 907.349.9713  
[www.eiceng.com](http://www.eiceng.com)

DEC 103 5410-1323



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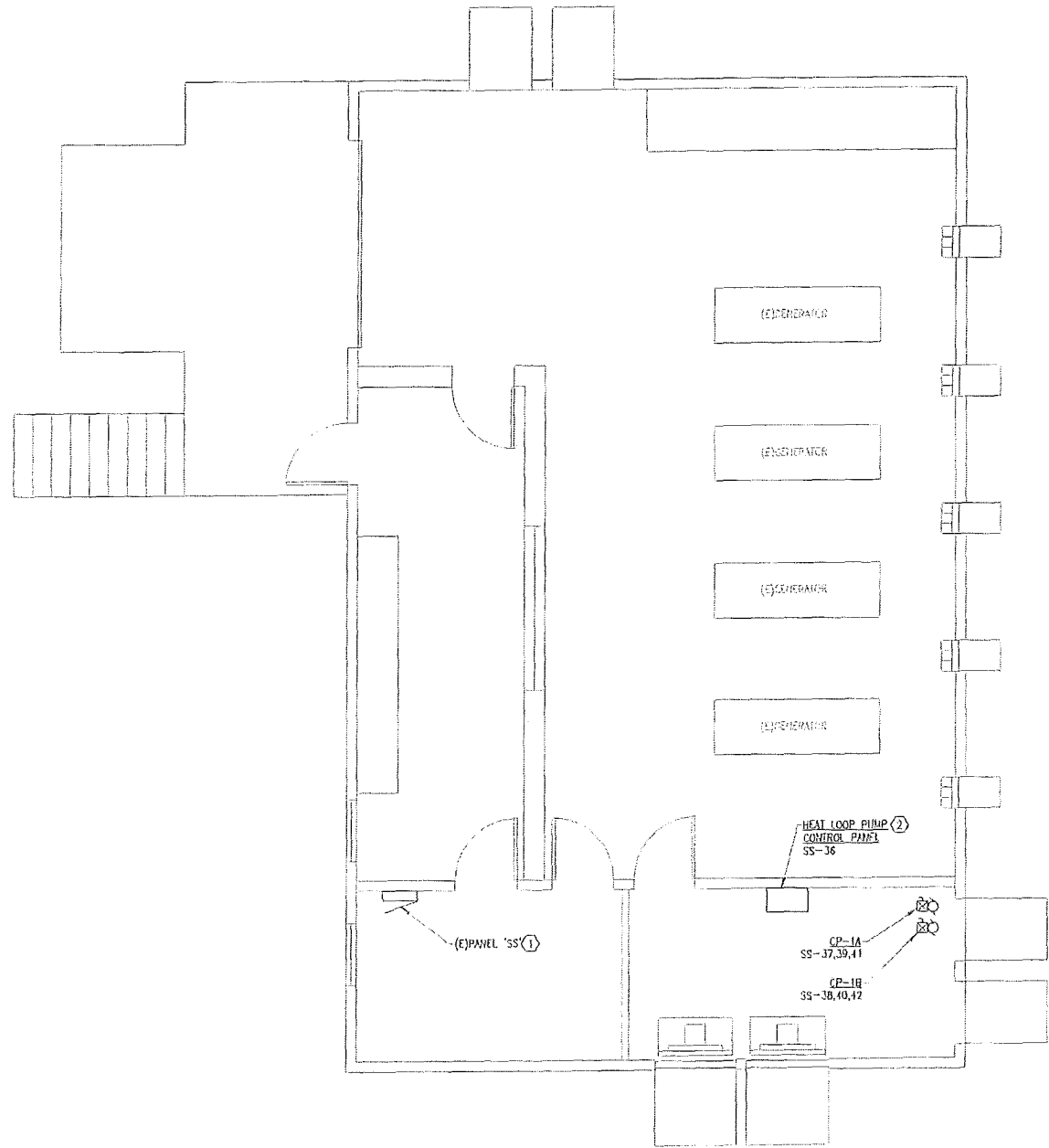


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E4.1 SCALE: NONE

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T 907.349.9717  
F 907.349.9713  
[www.eiceng.com](http://www.eiceng.com)

DEC 03 JF010-1333



1 EXISTING POWER PLANT PLAN  
E4.2 SCALE: 1/4" = 1'-0"

### SHEET NOTES

- 1 PROVIDE BRANCH CIRCUITS IN EXISTING PANEL 'SS' (208Y/120V, 150A, 3A, 4W) FOR FEED TO NEW HEAT LOOP CONTROL PANEL AND CIRCULATION PUMPS. SEE 3/E6.3 FOR DETAIL.
- 2 PROVIDE HEAT LOOP PUMP CONTROL PANEL. SEE 1/E6.3 AND 2/E6.3 FOR DETAIL.



EIC ENGINEERS, INC.

ELECTRICAL ENGINEERS

6977 OLD SEAVARD HWY., SUITE 200  
NICKOSAGE, AK 99618  
T 907.349.9212  
F 907.349.9213  
www.eiceng.com

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|             | JAN 2011 | BLS      | BLS   | EDC      |

Sheet No. E4.2

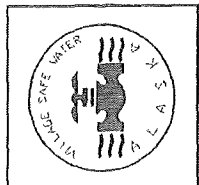
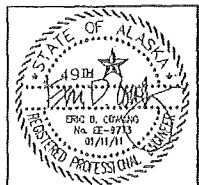
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ENGINEERS, INC.

PO BOX 2384 ANCHORAGE, AL 99502 PH: 307-340-0101 FAX: 307-340-8815

2009 WASTEWATER  
SYSTEM IMPROVEMENTS  
ELECTRICAL  
POWER PLANT PLANS  
TULUKSAK, ALASKA

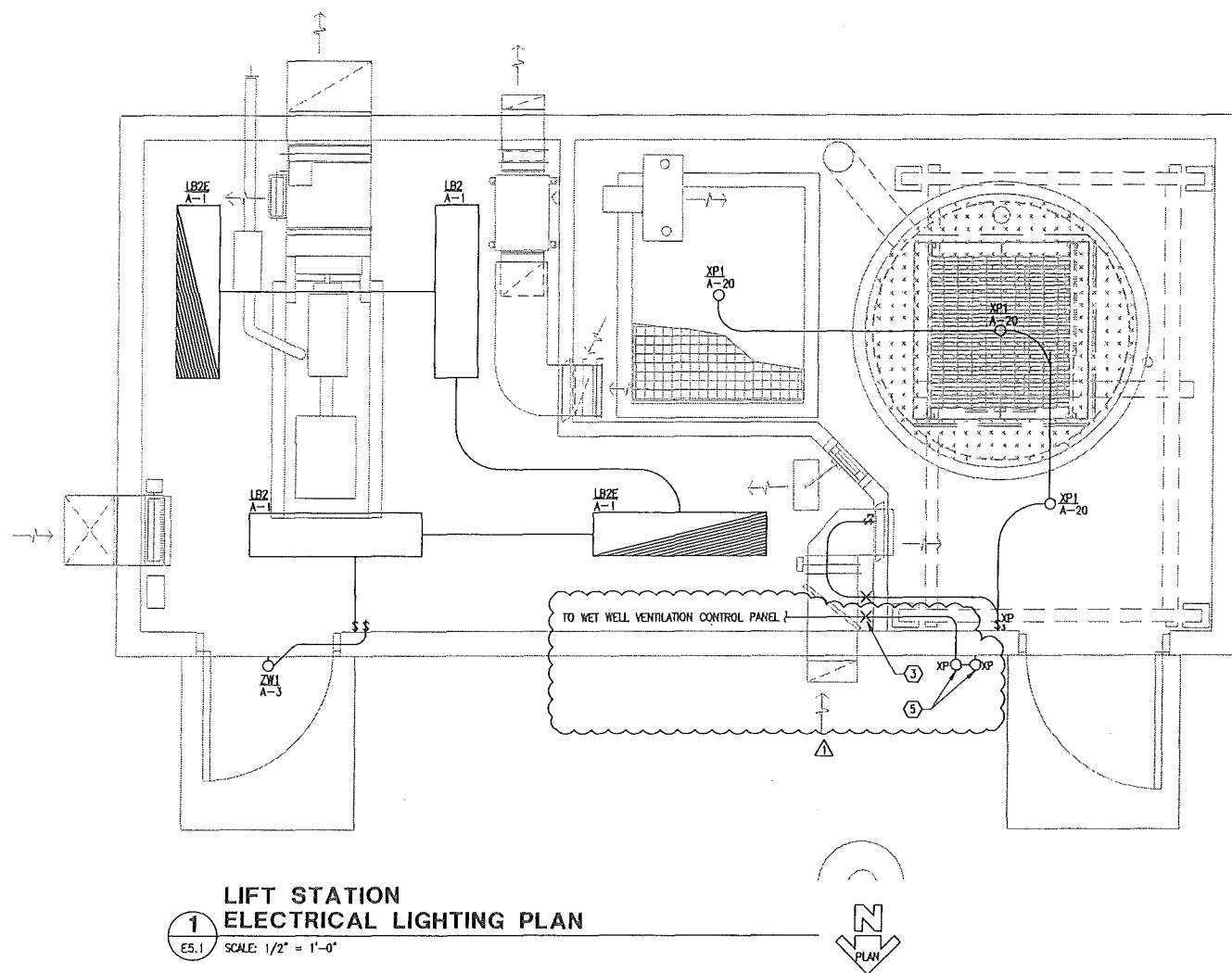


SCALE:  
1" = 1'-0"

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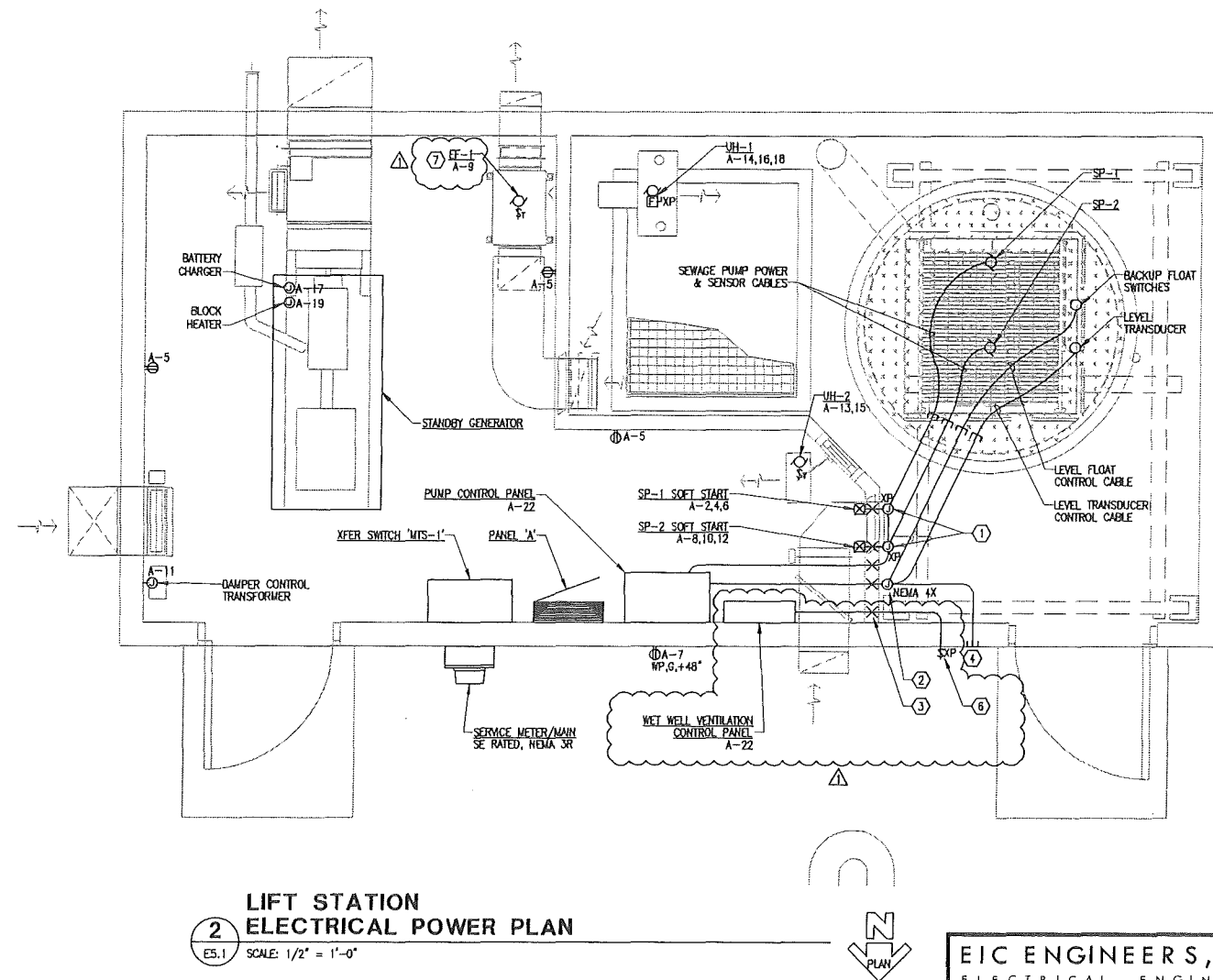


| TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DESCRIPTION                                                   | LAMPS          | MOUNTING        | MANUFACTURER/MODEL                  | NOTES |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------|-----------------|-------------------------------------|-------|
| LB2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LOW PROFILE ARCHITECTURAL WRAP W/ PRISMATIC LENS              | (2) 32W TB     | CEILING SURFACE | LITHONIA #LB-2-32-1VOLT-GB10IS      |       |
| LB2E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | IDENTICAL TO TYPE 'LB2' EXCEPT W/ 1400 LUMEN BATTERY UNIT     | (2) 32W TB     | CEILING SURFACE | LITHONIA #LB-2-32-1VOLT-GB10IS-EL14 |       |
| XP1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CLASS 1 DIVISION 1 INCANDESCENT GLOBE & GUARD                 | (1) 150W INCAN | CEILING SURFACE | HUBBELL #HLE-M-1-15-120-X2-G-HLEMG1 |       |
| ZW1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | WALL MOUNTED AREA LIGHT W/ CUTOFF OPTICS & INTEGRAL PHOTOCELL | (1) 35W HPS    | EXTERIOR WALL   | LITHONIA #1WAC-3SS-120-PE           |       |
| <p>A) CATALOG NUMBERS ARE FOR GENERAL REFERENCE AND ARE NOT INCLUSIVE OF ALL OPTIONS OR REQUIREMENTS DENOTED ON PLANS AND SPECIFICATIONS.</p> <p>B) REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND PROVIDE MOUNTING HARDWARE/FLANGES ETC FOR ALL LUMINAIRES FOR CEILING TYPES SHOWN.</p> <p>C) LUMINAIRES NOTED ON THE FLOOR PLANS AS 'ML' (NIGHTLIGHT) SHALL BE CONNECTED TO UNSWITCHED POWER CIRCUIT NOTED ON DRAWINGS.</p> <p>D) ALL FLUORESCENT BALLASTS TO BE ELECTRONIC WITH LESS THAN OR EQUAL 10% TOTAL HARMONIC DISTORTION.</p> <p>E) ALL FLUORESCENT LAMPS TO BE 3500K.</p> <p>F) PROVIDE ROUGH SERVICE LAMPS FOR ALL INCANDESCENT LUMINAIRES.</p> |                                                               |                |                 |                                     |       |
| REFERENCED NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                               |                |                 |                                     |       |
| 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NONE.                                                         |                |                 |                                     |       |



**LIFT STATION  
ELECTRICAL LIGHTING PLAN**

| MECHANICAL EQUIPMENT CONNECTION SCHEDULE                                                                   |                                         |              |     |     |     |     |     |    |                                   |       |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------|-----|-----|-----|-----|-----|----|-----------------------------------|-------|
| UNIT ID                                                                                                    | LOCATION OR FUNCTION                    | LOAD RATINGS |     |     |     |     |     |    | CONDUCTORS & CONDUIT              | NOTES |
|                                                                                                            |                                         | KVA          | HP  | FLA | MCA | MFS | V   | PH |                                   |       |
| EF-1                                                                                                       | CLASS 1 DIVISION 1 EXHAUST FAN          |              | 1/4 |     |     |     | 120 | 1  | (2)12 AWG, (1)12 AWG EGC, 1/2" C. |       |
| SP-1                                                                                                       | SEWAGE PUMP                             |              | 10  |     |     |     | 208 | 3  | SEE ONE-LINE DIAGRAM              |       |
| SP-2                                                                                                       | SEWAGE PUMP                             |              | 10  |     |     |     | 208 | 3  | SEE ONE-LINE DIAGRAM              |       |
| UH-1                                                                                                       | CLASS 1 DIVISION 1 ELECTRIC UNIT HEATER | 10           |     |     |     |     | 208 | 3  | (3)8 AWG, (1)10 AWG EGC, 3/4" C.  |       |
| UH-2                                                                                                       | ELECTRIC UNIT HEATER                    | 3            |     |     |     |     | 208 | 1  | (2)12 AWG, (1)12 AWG EGC, 1/2" C. |       |
| STANDARD NOTES                                                                                             |                                         |              |     |     |     |     |     |    |                                   |       |
| A) REFER TO FLOOR PLAN DRAWINGS FOR EQUIPMENT TYPE REQUIREMENTS, LOCATIONS AND QUANTITIES.                 |                                         |              |     |     |     |     |     |    |                                   |       |
| B) COORDINATE ALL CONNECTION REQUIREMENTS WITH MECHANICAL AND ACTUAL EQUIPMENT SUPPLIED PRIOR TO ROUGH-IN. |                                         |              |     |     |     |     |     |    |                                   |       |
| REFERENCED NOTES                                                                                           |                                         |              |     |     |     |     |     |    |                                   |       |
| 1) PUMP PROVIDED WITH SOFT START. COORDINATE WITH MECHANICAL.                                              |                                         |              |     |     |     |     |     |    |                                   |       |
| 2) EF-1 CONTROLLED THRU WET WELL VENTILATION CONTROL PANEL.                                                |                                         |              |     |     |     |     |     |    |                                   |       |



**LIFT STATION  
ELECTRICAL POWER PLAN**

### SHEET NOTES

- ① PROVIDE EXPLOSION PROOF JUNCTION BOXES FOR WET WELL PUMP CABLE TERMINATIONS. SEE 2/ES.2 FOR DETAIL.
- ② PROVIDE NEMA 4X JUNCTION FOR FLOAT SWITCH, AND LEVEL TRANSDUCER CABLE TERMINATIONS. SEE 2/ES.2 FOR DETAIL.
- ③ PROVIDE CONDUIT SEAL-OFF AT HAZARDOUS BOUNDARY, TYPICAL.
- ④ PROVIDE CONDUIT FROM CONTROL J-BOX TO BUILDING EXTERIOR FOR LEVEL TRANSDUCER BELLOW'S VENTILATION.
- ⑤ PROVIDE EXPLOSION PROOF STATUS LIGHTS TO BUILDING EXTERIOR, CONTROL FROM WET WELL VENTILATION CONTROL PANEL. SEE MECHANICAL AND 1/ES.4 FOR DETAIL.
- ⑥ PROVIDE EXPLOSION PROOF SELECTOR SWITCH TO BUILDING EXTERIOR, CONTROL FROM WET WELL VENTILATION CONTROL PANEL. SEE MECHANICAL AND 1/ES.4 FOR DETAIL.
- ⑦ EF-1 CONTROLLED THRU WET WELL VENTILATION CONTROL PANEL. SEE MECHANICAL AND 1/ES.4 FOR DETAIL.

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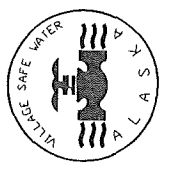
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SCALE:  
AS SHOWN

0 1" 2"

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**2009 WASTEWATER SYSTEM  
IMPROVEMENTS  
ELECTRICAL  
LIFT STATION PLANS**

**CE2**  
**ENGINEERS, INC.**  
PO BOX 222946 INDIANAPOLIS, IN 46223 PH: 317-348-1910 FAX: 317-348-1015

[illegible]

|          |      |          |
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| No.      | Date | JAN 2011 |
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| Approved | EDC  |          |

Sheet No. E5.1

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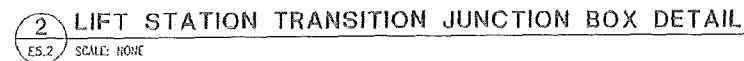
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T 907.349.9712  
F 907.349.9713  
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BC JOB #E10-1322



1. JUNCTION BOXES SHALL BE SIZED AS REQUIRED TO HOUSE TERMINATION COMPONENTS AND WIRING PER NEC.
2. ALL WIRING ROUTED THROUGH THE NEMA 4X CONTROL JUNCTION BOX SHALL BE INTRINSICALLY SAFE.



- ① **SERVICE WATER/MAIN-  
SE RATED, NEMA 3P, 200A MAIN CB, 208Y/120V, 3P, 4W.  
SQUARE D OR EQUIVALENT.**
- ② **MAIN/ TRANSFER SWITCH "MITS-I"  
NEMA 1, J-POLE, 200A, 208/120V, 3P, 4W, ASCO OR  
EQUIVALENT.**
- ③ **PANEL 1-  
NEMA 1, 25A, 208Y/120V, 3P, 4W, 12 SPACE. SQUARE D  
TYPE ICH OR EQUIVALENT. PROVIDE WITH TRANSIENT  
VOLTAGE SURGE SUPPRESSION (TVSS).**
- ④ **PUMP CONTROL PANEL-  
DUPLIX PUMP CONTROL PANEL  
(SEE SHEET E62)**
- ⑤ **SEWAGE PUMP SFC START MOTOR STARTER-  
10HP, 200V 3P, IP20 ENCLOSURE  
PROGRAMMABLE PUMP CURVES  
DANFOSS OR EQUIVALENT  
(SEE SHEET E62)**
- ⑥ **STANDBY GENERATORS-  
40KW/50KVA, 208Y/120V, 3P, 4 WIRE  
IEEE1, WITH BASIC TANK  
KOHLER OR EQUIVALENT**

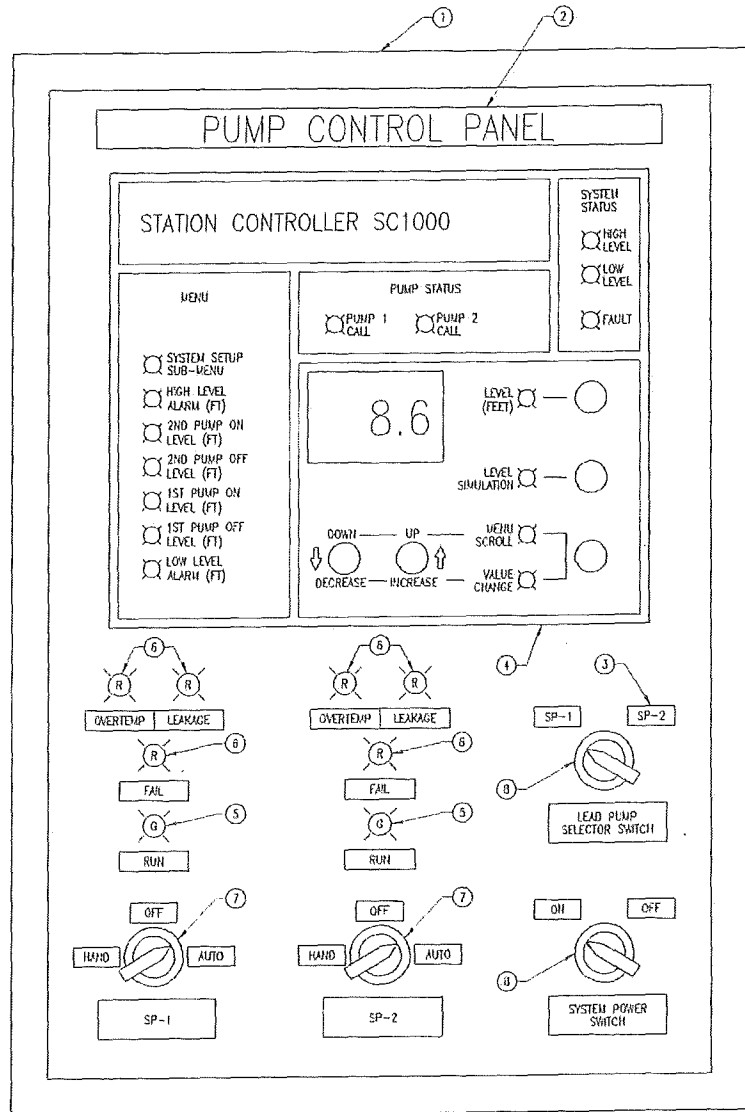
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| STANDARD NOTES                                                         |  |  |  |
| A) ALL CONDUCTOR SIZES SHOWN ARE COPPER.                               |  |  |  |
| REFERENCED NOTES                                                       |  |  |  |
| 1) CONDUIT STRIP WITH WEATHER HEAD FOR OVERHEAD UTILITY CONNECTION.    |  |  |  |
| 2) CONTRACTOR TO VERIFY CONTROL WIRING WITH ACTUAL EQUIPMENT SUPPLIED. |  |  |  |



| SUMMARY BY LOAD TYPE | CONDUCTED AIA |       |       | TOTAL AIA | NEC AIA | NEC TOTAL | NOTES                                                         |
|----------------------|---------------|-------|-------|-----------|---------|-----------|---------------------------------------------------------------|
|                      | PH A          | PH B  | PH C  |           |         |           |                                                               |
| 1. SCRAMBLERS        |               |       |       |           |         |           | 1. PROVIDE PWRL BHN TRANSDUC VOLTAGE SENSE SUPPRESSION (PASS) |
| A. 1. SCRAMBLERS     |               |       |       |           |         |           |                                                               |
| B. ELECTRIC RANGE    |               |       |       |           |         |           |                                                               |
| C. COFFINER          | 3.5           | 0.1   |       | 0.6       | 1.25    | 3.7       |                                                               |
| D. REFRIGERATORS     | 0.3           | 0.3   | 0.5   | 1.1       | 1.68    | 1.0       |                                                               |
| E. DRYER             | 3.7           | 4.4   | 3.7   | 11.8      | 1.50    | 11.8      |                                                               |
| F. LARGEST MOTOR     | 3.7           | 3.7   | 3.7   | 11.1      | 1.25    | 13.9      |                                                               |
| G. CONTINUOUS        | 9.3           | 1.8   | 1.8   | 15.8      | 1.25    | 19.8      |                                                               |
| H. WAT-CONTINUOUS    |               |       |       |           | 1.00    |           |                                                               |
| I. SPACE             |               |       |       |           | 1.00    |           |                                                               |
| J. NON-CONDUCT       |               |       |       |           | 0.00    |           |                                                               |
| K. DIRECT            |               |       |       |           | 1.00    |           |                                                               |
| L. DRYER             |               |       |       |           | 1.00    |           |                                                               |
| M. OTHER             |               |       |       |           | 1.00    |           |                                                               |
| GR. DIST. TO REDUC   |               |       |       |           | 1.25    |           |                                                               |
| F. TOTAL             |               |       |       |           |         |           |                                                               |
| TOTAL AIA (PASS)     | 14.4          | 13.2  | 12.8  | 40.2      |         | 47.1      |                                                               |
| TOTAL APPRPTS        | 119.9         | 110.3 | 104.7 | 111.7     |         | 130.7     |                                                               |
| PULSE VOLTAGE, SEC   | A-B           | B-C   | C-A   |           |         |           |                                                               |
| FIN                  | 1.65          | 2.07  | 1.65  |           |         |           |                                                               |

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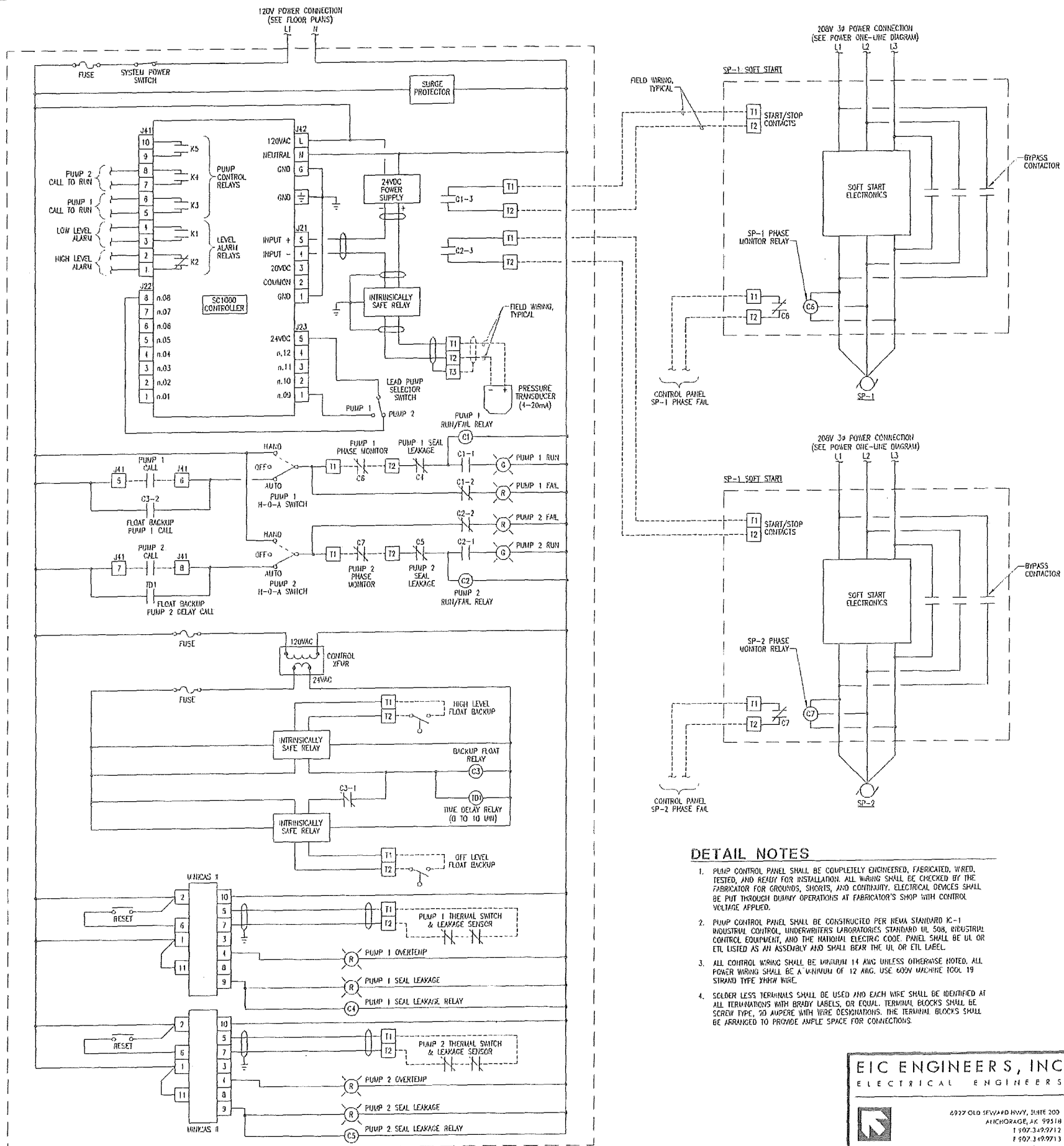




| CONTROL PANEL COMPONENT SCHEDULE                           |                                                                                                       |       |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------|
| ITEM                                                       | DESCRIPTION                                                                                           | NOTES |
| 1                                                          | CONTROL PANEL ENCLOSURE- NEMA 4, SIZED ADEQUATE TO HOUSE COMPONENTS                                   |       |
| 2                                                          | NAME TAG- BLACK LAMINATED PLASTIC W/ WHITE CORE, SCREW MOUNTED, 1/2" ENGRAVED LETTERS                 |       |
| 3                                                          | NAME TAG- BLACK LAMINATED PLASTIC W/ WHITE CORE, SCREW MOUNTED, 1/4" ENGRAVED LETTERS                 |       |
| 4                                                          | DUPLEX PUMP CONTROLLER- IPE, IHC STATION CONTROLLER SC1000                                            |       |
| 5                                                          | PLOT LIGHT- 30mm, GREEN, LED, 120VAC, PUSH TO TEST TYPE, ALLEN BRADLEY 800T-PTH160                    |       |
| 6                                                          | PLOT LIGHT- 30mm, RED, LED, 120VAC, PUSH TO TEST TYPE, ALLEN BRADLEY 800T-PTH16R                      |       |
| 7                                                          | SELECTOR SWITCH- 30mm, 3-POSITION MAINTAINED W/ TERMINAL BLOCKS & CAP SHOWN, ALLEN BRADLEY 800 SERIES |       |
| 8                                                          | SELECTOR SWITCH- 30mm, 2-POSITION MAINTAINED W/ TERMINAL BLOCKS & CAP SHOWN, ALLEN BRADLEY 600 SERIES |       |
| STANDARD NOTES                                             |                                                                                                       |       |
| A) CONTRACTOR TO PROVIDE PART NUMBERS SHOWN OR EQUIVALENT. |                                                                                                       |       |
| REFERENCED NOTES                                           |                                                                                                       |       |
| 1) NONE.                                                   |                                                                                                       |       |

**1 PUMP CONTROL PANEL LAYOUT & CONTROL DIAGRAM**

E6.2 SCALE: NONE



**EIC ENGINEERS, INC.**  
ELECTRICAL ENGINEERS

2927 OLD SEWARD HWY, SUITE 200  
ANCHORAGE, AK 99518  
T 907.349.9712  
F 907.349.9713  
www.eiceng.com

Project No. \_\_\_\_\_ Date: JAN 2011  
Designed by: BLS  
Drawn by: BLS  
Approved by: EDC

Sheet No. **E6.2**

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: 1" = 1'-0"

DATE: \_\_\_\_\_

NAME: \_\_\_\_\_

STATE OF ALASKA

19th DIVISION

REGISTERED PROFESSIONAL

2009 WASTEWATER SYSTEM IMPROVEMENTS

ELECTRICAL LIFT STATION CONTROLS

TULAKSAK, ALASKA

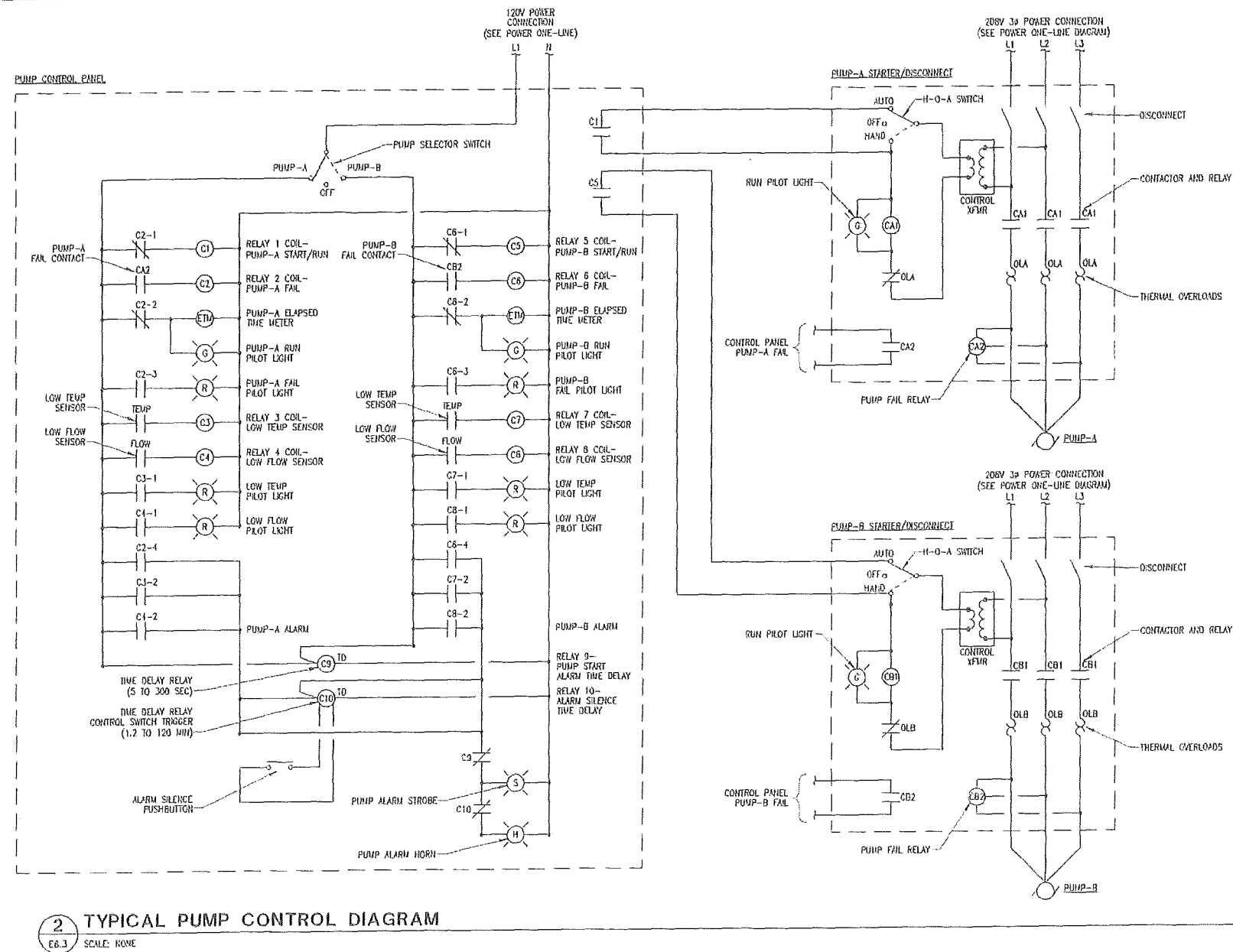
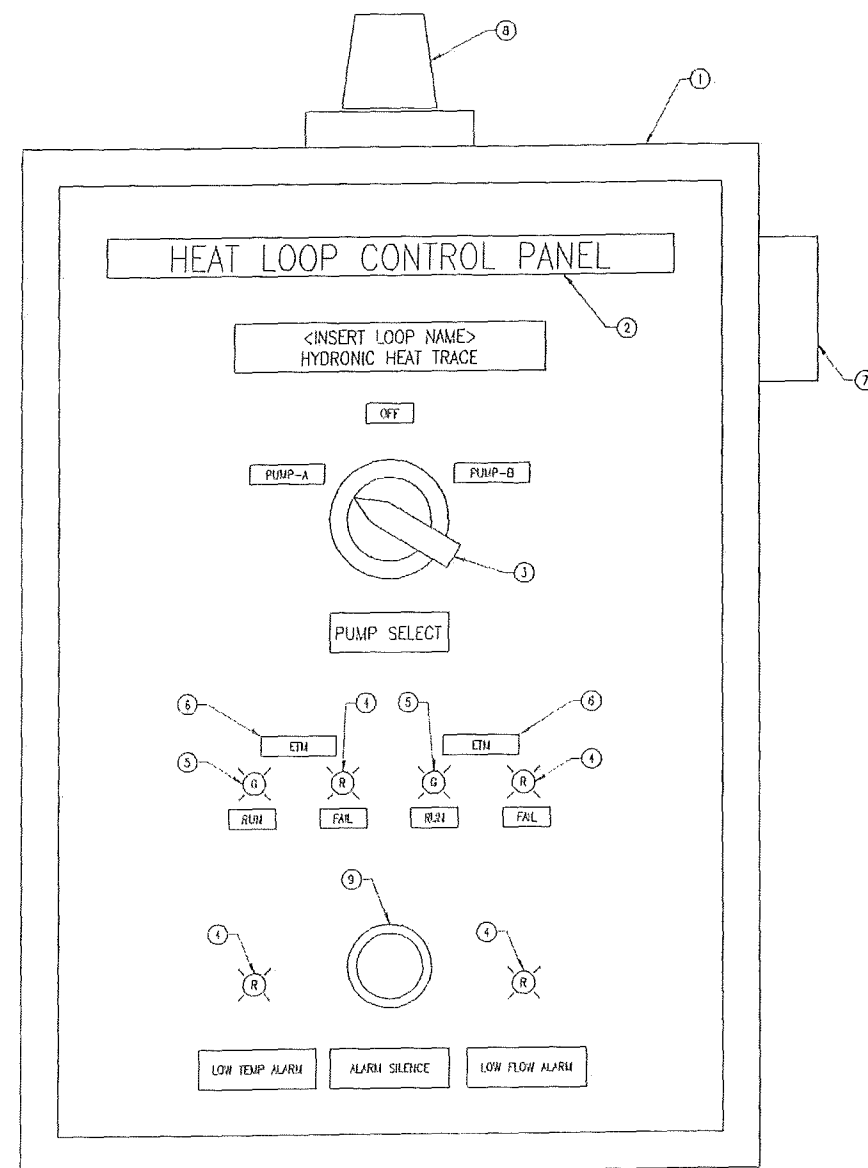
**CE2 ENGINEERS, INC.**

PO BOX 12345 ANCHORAGE AK 99518 PH: 307-545-0100 FAX: 307-545-0101

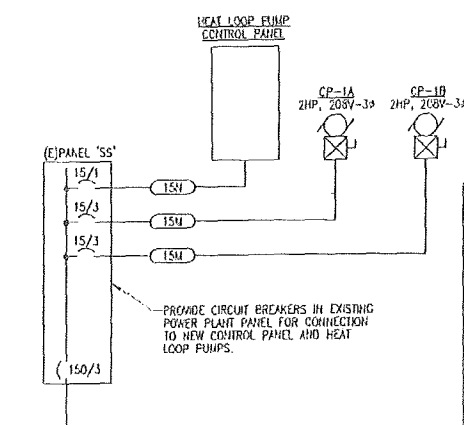
REVISION

BY

DATE



| HEAT LOOP CONTROL PANEL COMPONENT SCHEDULE                 |                                                                                                                  |      |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------|
| ITEM                                                       | DESCRIPTION                                                                                                      | NOTE |
| 1                                                          | CONTROL PANEL ENCLOSURE- NEMA 3R, SIZED AS ADEQUATE TO HOUSE COMPONENTS                                          |      |
| 2                                                          | NAME TAG- BLACK LAMINATED PLASTIC W/ WHITE CORE, SCREW MOUNTED, 1/4" (1/2" FOR FRONT DOOR ONLY) ENGRAVED LETTERS |      |
| 3                                                          | SELECTOR SWITCH- 30mm, 3-POSITION MAINTAINED W/ TERMINAL BLOCKS & CAM SHOWN                                      |      |
| 4                                                          | PILOT LIGHT- 18mm, RED, LED, 120VAC, PUSH TO TEST TYPE, ALLEN BRADLEY 800T-PSH16R                                |      |
| 5                                                          | PILOT LIGHT- 12mm, GREEN, LED, 120VAC, PUSH TO TEST TYPE, ALLEN BRADLEY 800T-PSH16G                              |      |
| 6                                                          | ELAPSE TIME METER- HOUR METER, NON-RESETTABLE, 99999.9 HOUR REGISTER, HOBBS #20017                               |      |
| 7                                                          | ALARM HORN- 120VAC, WEATHERPROOF, CAST BACK BOX                                                                  |      |
| 8                                                          | ALARM SIREN- 120VAC, WEATHERPROOF, CASE BACK BOX, AMBER LENS                                                     |      |
| 9                                                          | ALARM SILENCE PUSHBUTTON- MOMENTARY SWITCH, 120VAC, RED                                                          |      |
| STANDARD NOTES                                             |                                                                                                                  |      |
| A) CONTRACTOR TO PROVIDE PART NUMBERS SHOWN OR EQUIVALENT. |                                                                                                                  |      |
| REFERENCE NOTES                                            |                                                                                                                  |      |
| 1) NONE                                                    |                                                                                                                  |      |



| FEEDER SCHEDULE                          |         |      |                          |       |
|------------------------------------------|---------|------|--------------------------|-------|
| FEEDER ID                                | RACEWAY |      | CONDUCTORS               | NOTES |
|                                          | ONITY   | SIZE |                          |       |
| 15M                                      | 1       | 1/2" | (2)12 AWG, (1)12 AWG EGC |       |
| 15M                                      | 1       | 1/2" | (3)12 AWG, (1)12 AWG EGC |       |
| STANDARD NOTES                           |         |      |                          |       |
| A) ALL CONDUCTOR SIZES SHOWN ARE COPPER. |         |      |                          |       |
| REFERENCED NOTES                         |         |      |                          |       |
| 1) NONE                                  |         |      |                          |       |

PANEL 'SS' LOAD SUMMARY

EXISTING LOAD

PANEL 'SS' LOAD (FROM ASBUILTS) = 37.0 KVA

NEW LOAD

CP-1A/B = 2.70 KVA

HEAT LOOP PUMP CONTROL PANEL = 0.75 KVA

25% LARGEST MOTOR = 0.68 KVA

---

41.1 TOTAL KVA

CALCULATED CURRENT = 114.2 AMPS @

208 V, 3 PHASE

EXISTING 150 A 208 V, 3 PHASE, 4 WIRE

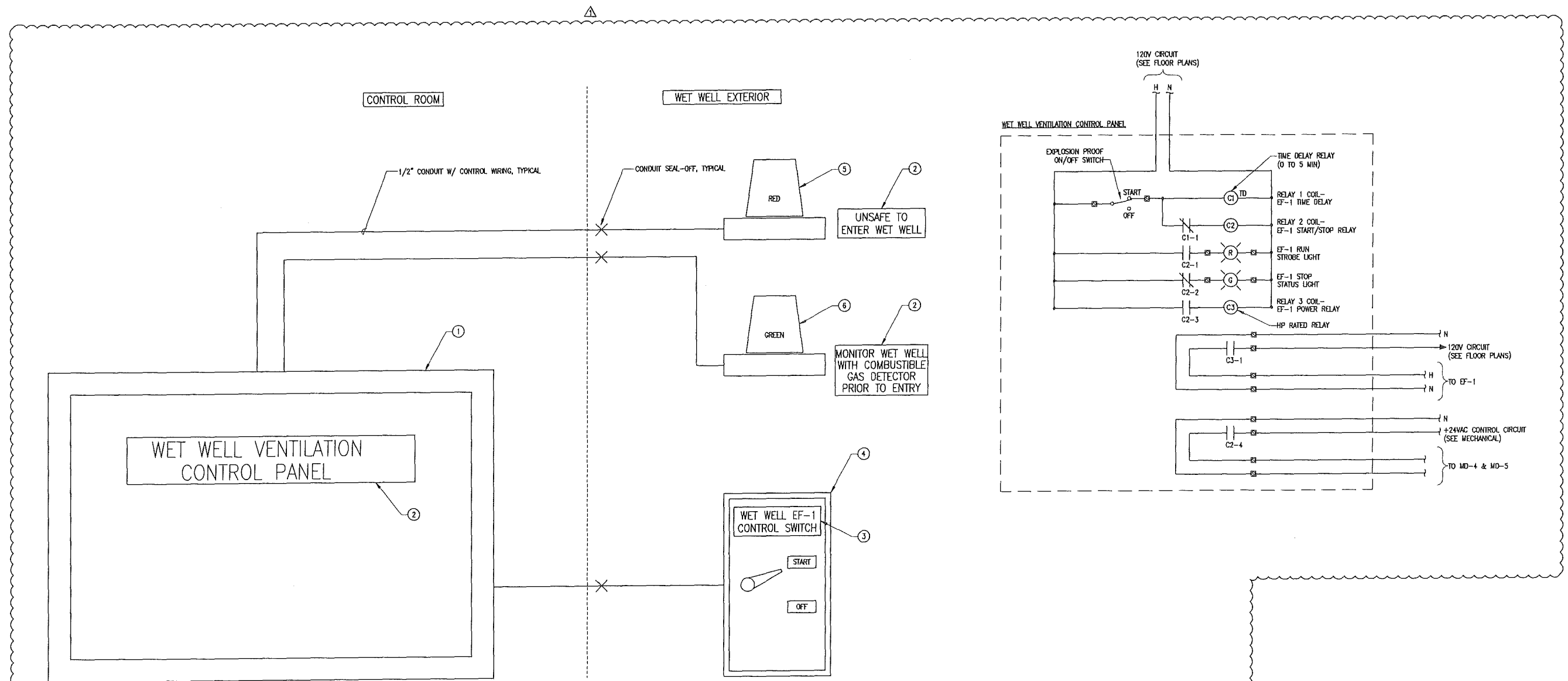
PANEL IS ADEQUATE

**EIC ENGINEERS, INC.**  
ELECTRICAL ENGINEERS

---

 6977 OLD SEWARD HWY., SUITE 500  
MICHIGAN, AK 99516  
1 907.349.9712  
F 907.349.9713  
[www.eiceng.com](http://www.eiceng.com)

BC 0334 #E10-1223



### CONTROL PANEL COMPONENT SCHEDULE

| ITEM                                              | DESCRIPTION                                                                           | NOTES |
|---------------------------------------------------|---------------------------------------------------------------------------------------|-------|
| 1                                                 | CONTROL PANEL ENCLOSURE- NEMA 4, SIZED ADEQUATE TO HOUSE COMPONENTS.                  |       |
| 2                                                 | NAME TAG- BLACK LAMINATED PLASTIC W/ WHITE CORE, SCREW MOUNTED, 1/2" ENGRAVED LETTERS |       |
| 3                                                 | NAME TAG- BLACK LAMINATED PLASTIC W/ WHITE CORE, SCREW MOUNTED, 1/4" ENGRAVED LETTERS |       |
| 4                                                 | 2-POSITION CLASS 1 DIVISION 2 EXPLOSION PROOF SELECTOR SWITCH                         |       |
| 5                                                 | RED CLASS 1 DIVISION 2 EXPLOSION PROOF STROBE LIGHT, RATED -40° F                     |       |
| 6                                                 | GREEN CLASS 1 DIVISION 2 EXPLOSION PROOF STATUS LIGHT, RATED -40° F                   |       |
| STANDARD NOTES                                    |                                                                                       |       |
| A) CONTRACTOR TO SELECT EXACT EQUIPMENT UTILIZED. |                                                                                       |       |
| REFERENCED NOTES                                  |                                                                                       |       |
| 1) NONE.                                          |                                                                                       |       |

### DETAIL NOTES

- CONTROL PANEL SHALL BE COMPLETELY ENGINEERED, FABRICATED, WIRED, TESTED, AND READY FOR INSTALLATION. ALL WIRING SHALL BE CHECKED BY THE FABRICATOR FOR GROUNDS, SHORTS, AND CONTINUITY. ELECTRICAL DEVICES SHALL BE PUT THROUGH DUMMY OPERATIONS AT FABRICATOR'S SHOP WITH CONTROL VOLTAGE APPLIED.
- PUMP CONTROL PANEL SHALL BE CONSTRUCTED PER NEMA STANDARD IC-1 INDUSTRIAL CONTROL UNDERWRITERS LABORATORIES STANDARD UL 508, INDUSTRIAL CONTROL EQUIPMENT, AND THE NATIONAL ELECTRIC CODE. PANEL SHALL BE UL OR ETL LISTED AS AN ASSEMBLY AND SHALL BEAR THE UL OR ETL LABEL.
- ALL CONTROL WIRING SHALL BE MINIMUM 14 AWG UNLESS OTHERWISE NOTED. ALL POWER WIRING SHALL BE A MINIMUM OF 12 AWG. USE 600V MACHINE TOOL 19 STRAND TYPE XHHW WIRE.
- SOLDER LESS TERMINALS SHALL BE USED AND EACH WIRE SHALL BE IDENTIFIED AT ALL TERMINATIONS WITH BRADY LABELS, OR EQUAL. TERMINAL BLOCKS SHALL BE SCREW TYPE, 20 AMPERE WITH WIRE DESIGNATIONS. THE TERMINAL BLOCKS SHALL BE ARRANGED TO PROVIDE AMPLE SPACE FOR CONNECTIONS.

**1 WET WELL VENTILATION CONTROL PANEL LAYOUT & CONTROL DIAGRAM**  
E6.4 SCALE: NONE

**EIC ENGINEERS, INC.**  
ELECTRICAL ENGINEERS

6927 OLD SEWARD HWY, SUITE 200  
ANCHORAGE, AK 99518  
T 907.349.9712  
F 907.349.9713  
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RECORD DRAWING CERTIFICATE  
THESE DRAWINGS REFLECT RECORDED  
INFORMATION OBTAINED DURING  
CONSTRUCTION. INFORMATION PROVIDED  
HEREIN IS ACCURATE TO THE BEST OF MY  
KNOWLEDGE.

SCALE: AS SHOWN  
IF NOT ONE INCH ON  
ORIGINAL DRAWING  
THE SHEET ADJUST  
SCALES ACCORDINGLY

DATE

NAME

WET WELL VENTILATION CONTROL PANEL

2009 WASTEWATER SYSTEM  
IMPROVEMENTS  
ELECTRICAL  
POWER PLANT  
CONTROLS & DIAGRAMS  
TULUKSAK, ALASKA

**CE2**  
ENGINEERS, INC.  
PO BOX 32294 ANCHORAGE, AK 99502 PH: 907-465-1000 FAX: 907-465-1005

REVISION BY DATE  
1 WET WELL VENTILATION CONTROL BLS 11/29/11

Project No. Date JAN 2011 BLS  
Designed BLS  
Drawn BLS  
Approved EDC

Sheet No. E6.4