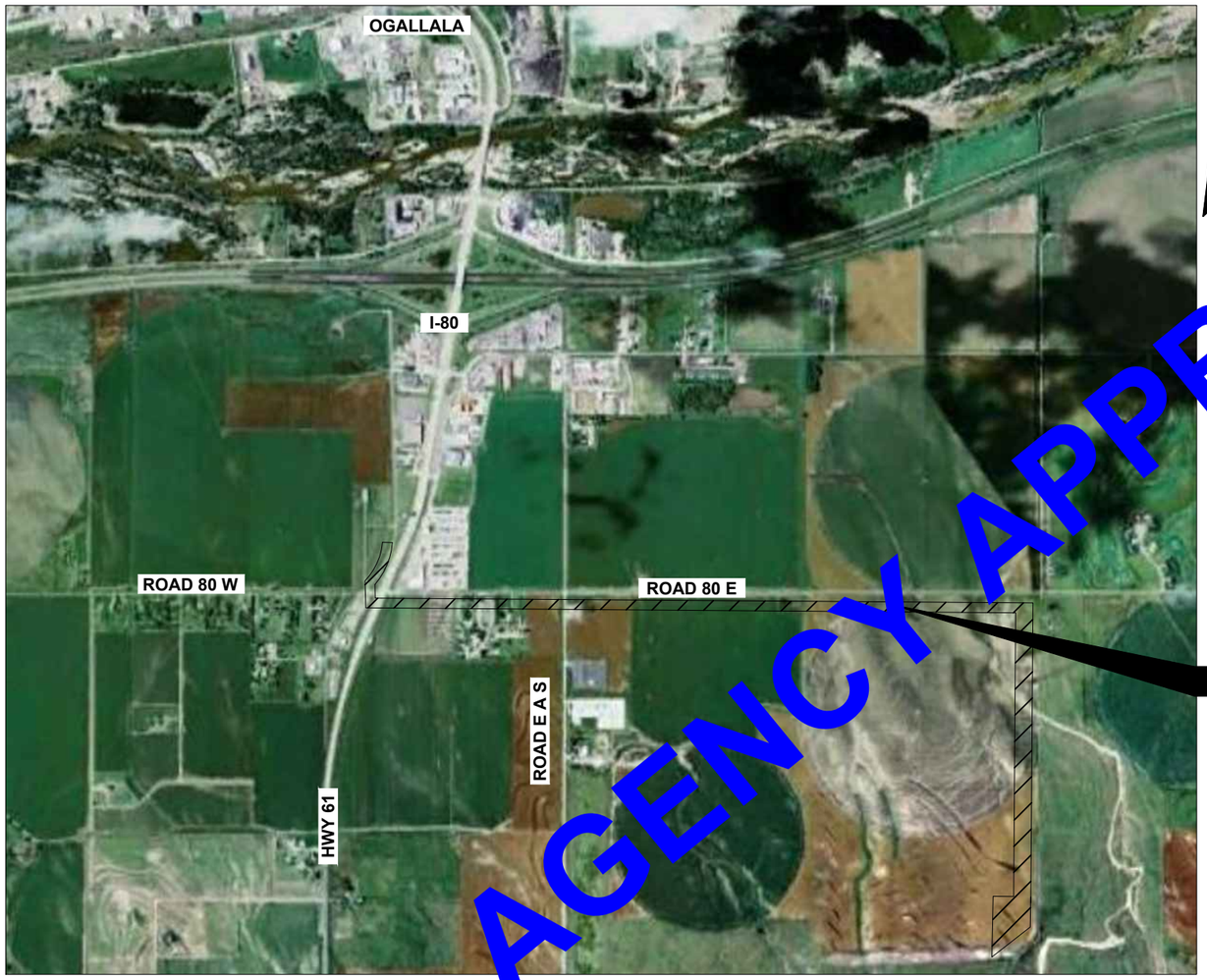
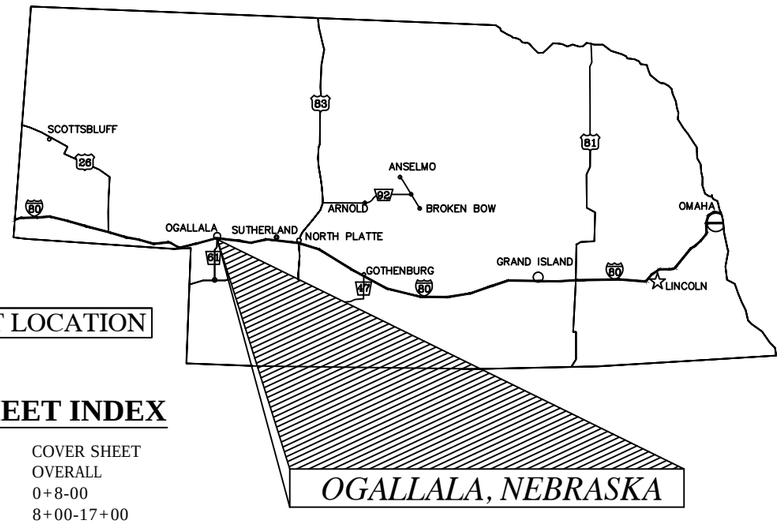
OGALLALA WATER IMPROVEMENTS 2009

OGALLALA, NEBRASKA



LEGEND

EXISTING CONCRETE	NEW INLET
EXISTING ASPHALT	GAS LINE
EXISTING GRAVEL	CABLE TV LINE
EXISTING POWER POLE/LIGHT POLE/GUY WIRE	TV CABLE RISER
OVERHEAD ELECTRIC	TELEPHONE LINE
UNDERGROUND ELECTRIC	TELEPHONE RISER
ELECTRICAL BOX	EXISTING SURFACE MAJOR CONTOUR
EXISTING SPOT ELEV.	EXISTING SURFACE MINOR CONTOUR



SHEET INDEX

NOTES:

1. CONTRACTOR SHALL CAREFULLY PRESERVE THE SURROUNDING PROPERTY BY CONFINING HIS OPERATION WITHIN THE LIMITS OF CONSTRUCTION.
2. CONTRACTOR SHALL NOTIFY ALL AFFECTED PROPERTY OWNERS 48 HOURS PRIOR TO START OF CONSTRUCTION.
3. CONTRACTOR SHALL NOTIFY ALL AFFECTED PROPERTY OWNERS 48 HOURS PRIOR TO ANY INTERRUPTION OF SERVICES.
4. CONTRACTOR IS RESPONSIBLE TO BARRICADE AND PROTECT CONSTRUCTION AREA FROM PEDESTRIAN TRAFFIC AT ALL TIMES.
5. EXISTING UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS. ***CONTRACTOR WILL VERIFY*** ALL UTILITIES HORIZONTALLY AND VERTICALLY **PRIOR TO CONSTRUCTION.**

DIGGERS HOTLINE OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

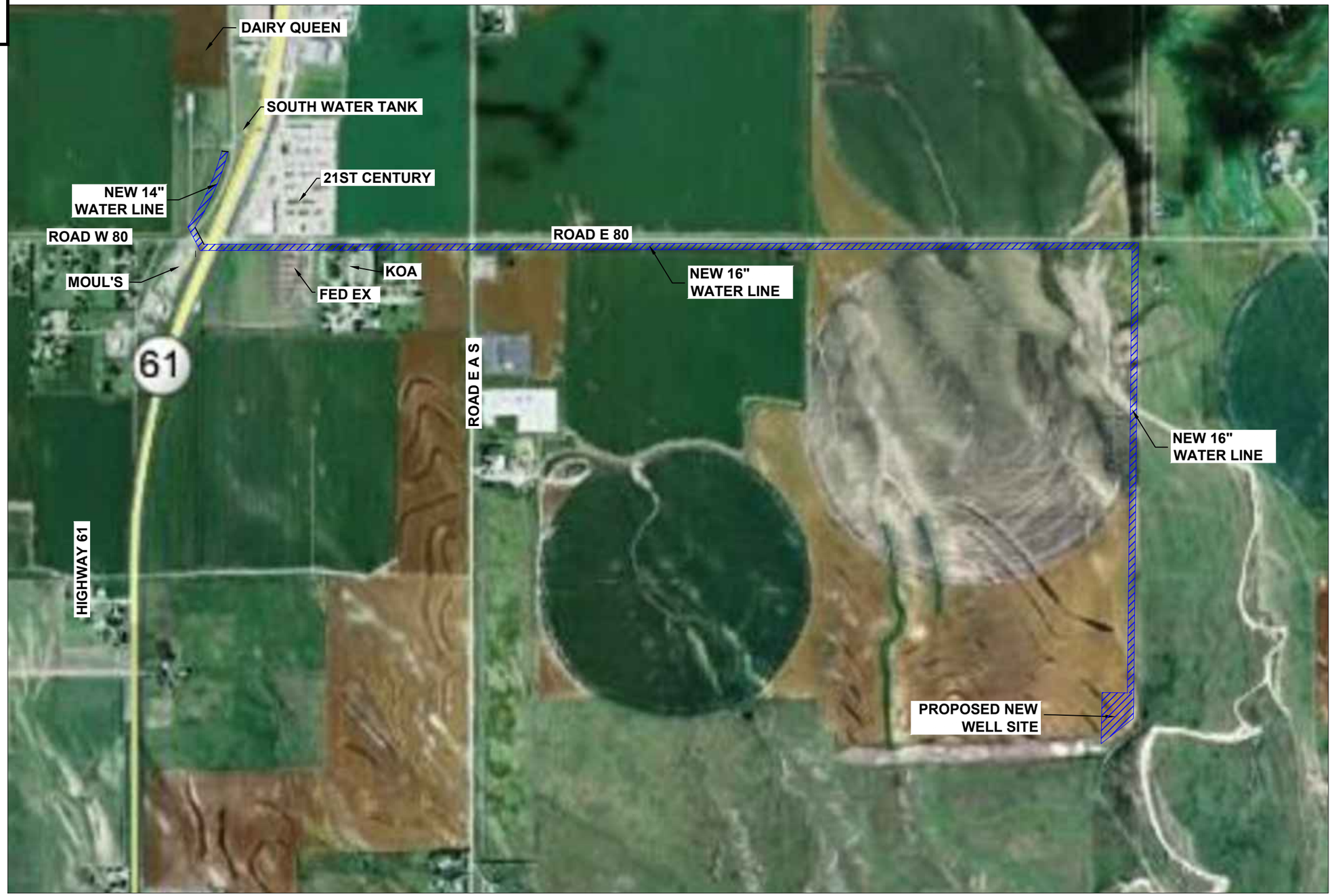
PROJECT:
REVISIONS: 1. 2. 3. 4.
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C1

LEGEND

NEW 16" WATER LINE

N

0' 500' 1000'



OVERALL

DIGGERS HOTLINE OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C2

LEGEND

EXISTING CONCRETE	UGE	UNDERGROUND ELECTRIC
EXISTING ASPHALT	GAS	GAS LINE
	T	TELEPHONE
REMOVALS	OHE	OVERHEAD ELECTRIC
EXISTING LANDSCAPE		FIBER OPTIC
	PP LP	EXISTING POWER POLE/LIGHT POLE/G

Bush

6" Conifer Tree

EXISTING 14" WATER MAIN TIE IN TO EXISTING WATER MAIN

EXISTING 14" BUTTERFLY VALVE AND BOX

EXISTING FIRE HYDRANT AND GATE VALVE AND BOX NORTH

OREGON TRAIL DRIVE

HIGHWAY 61

ROAD W 80

R.O.W MARKER

1+00

2+00

3+00

4+00

5+00

6+00

7+00

8+00

NEW 14" C-905 WATER LINE

NEW 14" 45° ELBOW @ STA. 3+37

BEGIN BORE @ STA. 3+37

NEW 14" C-905 DIRECTIONALLY DRILLED 192 L.F.

NEW 14" C-905 JACK AND BORE 24" STEEL CASING 228L.F.

BEGIN BORE @ STA. 5+34

NEW 14" TEE; NEW 14"x6" REDUCER @ STA. 5+38; NEW 14" BUTTERFLY VALVE & BOX EAST

END BORE @ STA. 5+29

END BORE @ STA. 7+62

NEW 6" C900 96 L.F.

NEW 6" GV&BOX; NEW 6" FIRE HYDRANT

0' 30' 60'

EXISTING GRADE

5' MIN.

NEW 14" C905 PVC PIPE

BEGIN BORE 3+37

NEW 14" C905 PVC PIPE DIRECTIONALLY DRILLED 192 L.F.

EXISTING 36" CMP END BORE @ STA.5+29

BEGIN BORE @ STA. 5+34

EXISTING BOX CULVERT

NEW 14" C-905 JACK AND BORE 24" STEEL CASING 228L.F.

DEFLECT PIPE UPWARD

END BORE @ STA. 7+62

3245 3240 3235 3230 3225 3220 3215

Exist. 3236.3 Exist. 3236.5 Exist. 3237.1 Exist. 3237.6 Exist. 3238.5 Exist. 3238.8 Exist. 3239.9 Exist. 3242.1 Exist. 3245.2 Exist. 3241.8 Exist. 3245.5 Exist. 3245.3 Exist. 3247.4 Exist. 3247.4 Exist. 3245.3 Exist. 3244.6 Exist. 3244.6

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00

DIGGERS HOTLINE OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

0+00-8+00

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:

REVISIONS: 1 2 3 4

DRAWN BY:

APPROVED BY:

DATE:

DWG.:

SCALE: As Shown

SHEET: C3

LEGEND

- EXISTING CONCRETE
- EXISTING ASPHALT
- REMOVALS
- EXISTING LANDSCAPE — Bush, 6" Conifer Tree
- UGE — UNDERGROUND ELECTRIC
- GAS — GAS LINE
- T — TELEPHONE
- OHE — OVERHEAD ELECTRIC
- PROPERTY LINE
- PP LP — EXISTING POWER POLE/LIGHT POLE/G

N

0' 30' 60'

21ST CENTURY

CONNECT TO EXISTING 12" TEE; CONTRACTOR TO FIELD VERIFY EXISTING WATER LINE

EXISTING FIRE HYDRANT

NEW 14" TEE; NEW 14"x6" REDUCER SOUTH

REMOVE AND REPLACE ASPHALT 25 SQ. YDS

ROAD E80

NEW 12" PVC C900 60 L.F.

TUNNEL UNDER ASPHALT

8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

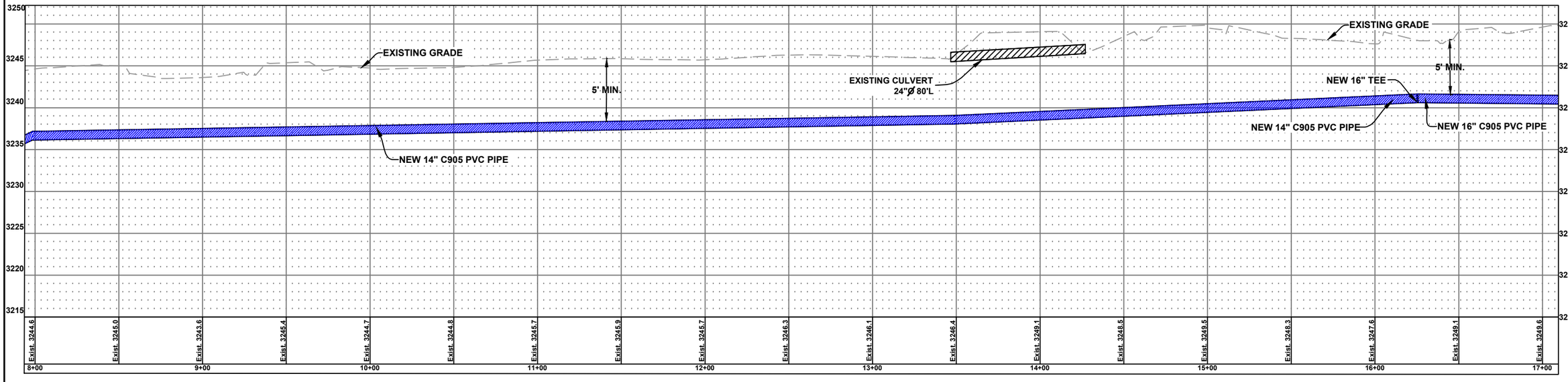
NEW 6" GV&BOX; NEW 6" FIRE HYDRANT

REMOVE AND REPLACE EXISTING CULVERT 24"Ø 80'L

FED EX ENTRANCE

KOA SIGN

NEW 16" TEE; NEW 16"x12" REDUCER NORTH;12" GV & BOX NORTH; 16"x14" REDUCER WEST; 14" BUTTERFLY VALVE & BOX WEST; 16" BUTTERFLY VALVE & BOX EAST



8+00-17+00

DIGGERS HOTLINE OF NEBRASKA NE-DIGGERS.COM

CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009

Ogallala, Nebraska

PROJECT:

REVISIONS:

DRAWN BY:

APPROVED BY:

DATE:

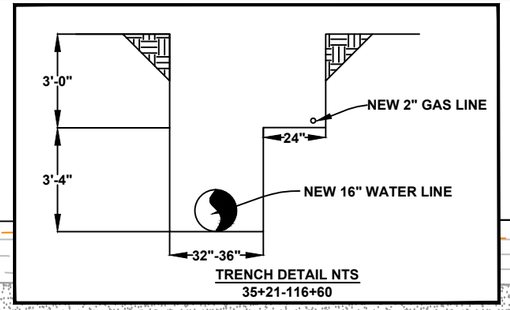
DWG.:

SCALE: As Shown

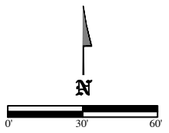
SHEET: C4

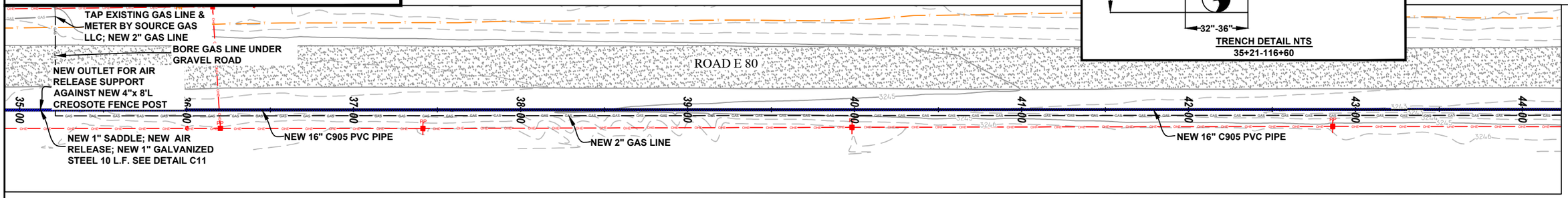
LEGEND

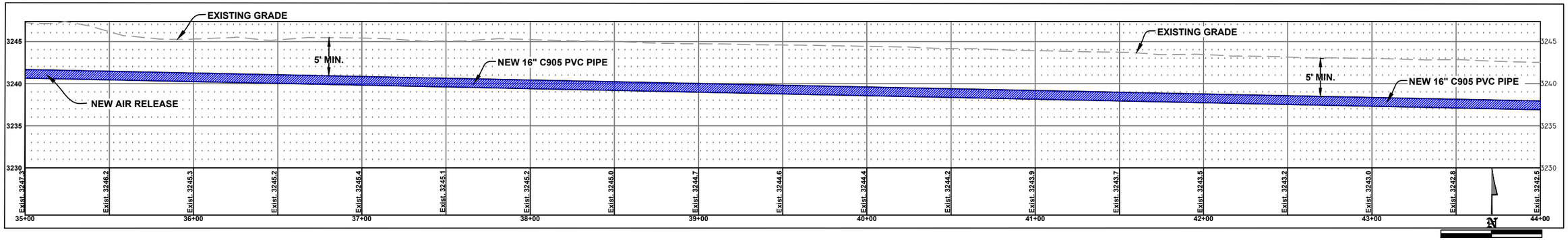
- EXISTING CONCRETE
- EXISTING ASPHALT
- REMOVALS
- EXISTING LANDSCAPE (Bush, 6" Conifer Tree)
- NEW GAS LINE
- UGE — UNDERGROUND ELECTRIC
- GAS — GAS LINE
- T — TELEPHONE
- OHE — OVERHEAD ELECTRIC
- PROPERTY LINE
- PP LP — EXISTING POWER POLE/LIGHT POLE/G

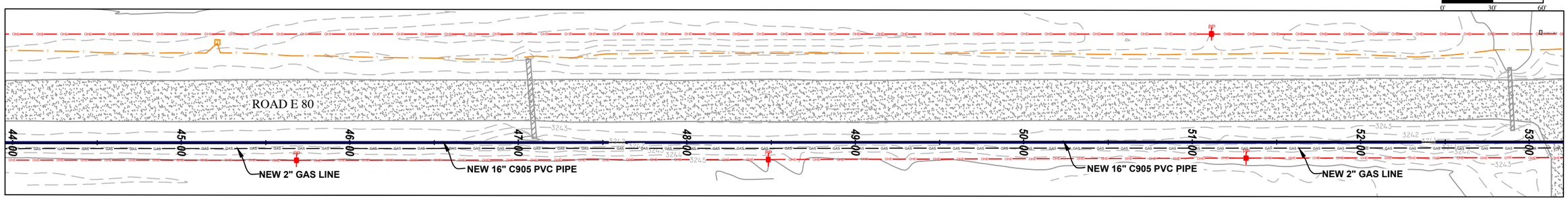


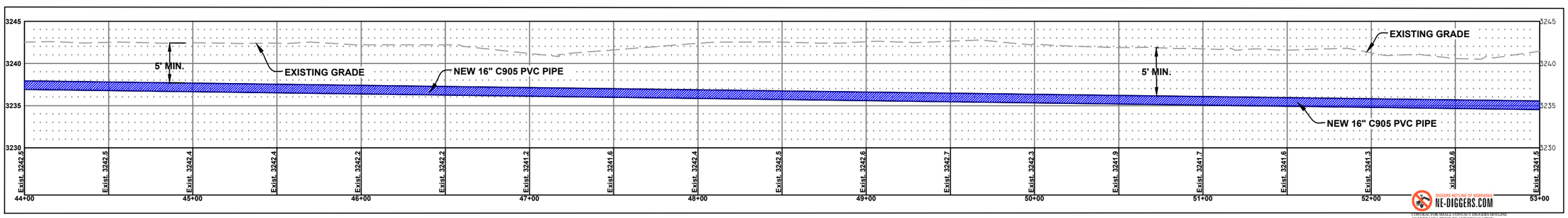
TRENCH DETAIL NTS
35+21-116+60











35+00-53+00

DIGGERS BUTTON OF NEBRASKA
NE-DIGGERS.COM
CONTACT FOR SMALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE THAT SHALL RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

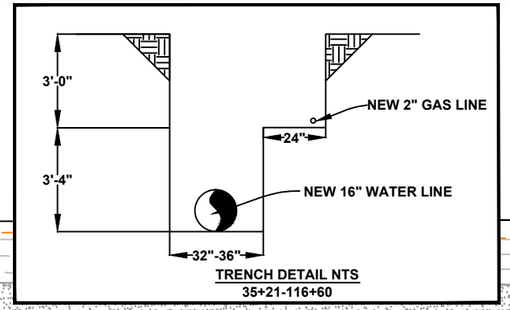
T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

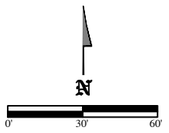
PROJECT:
REVISIONS: 1 2 3 4
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C6

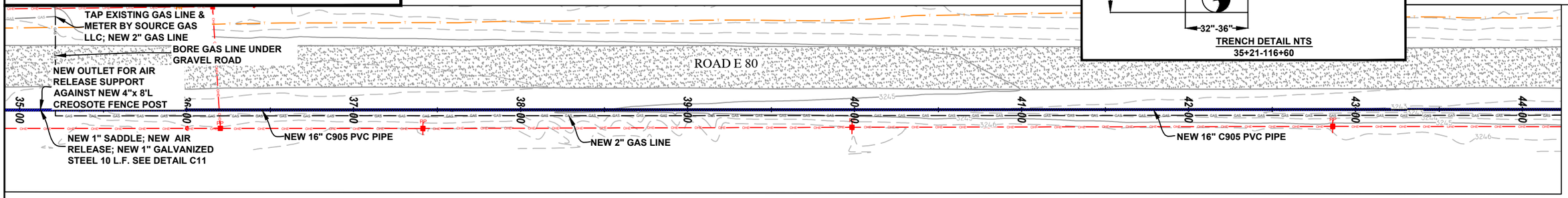
LEGEND

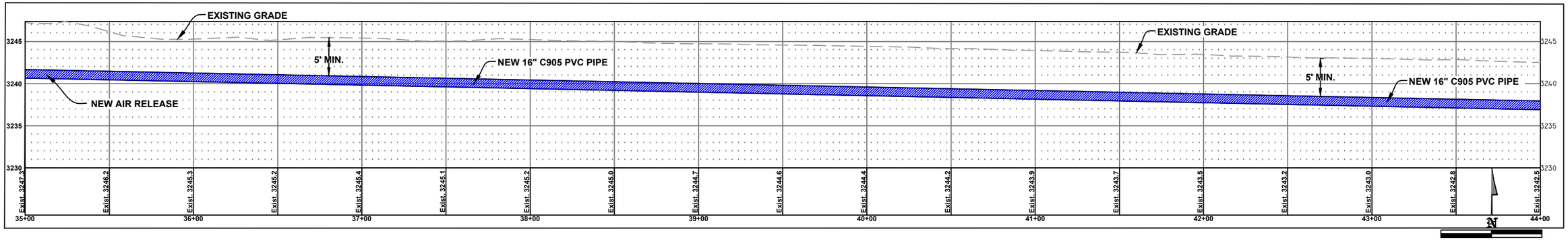
- EXISTING CONCRETE
- EXISTING ASPHALT
- REMOVALS
- EXISTING LANDSCAPE (Bush, 6" Conifer Tree)
- NEW GAS LINE
- UGE — UNDERGROUND ELECTRIC
- GAS — GAS LINE
- T — TELEPHONE
- OHE — OVERHEAD ELECTRIC
- PROPERTY LINE
- PP LP — EXISTING POWER POLE/LIGHT POLE/G

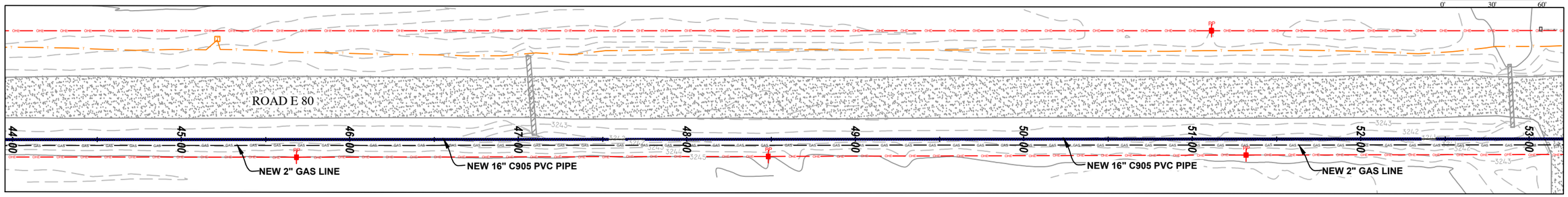


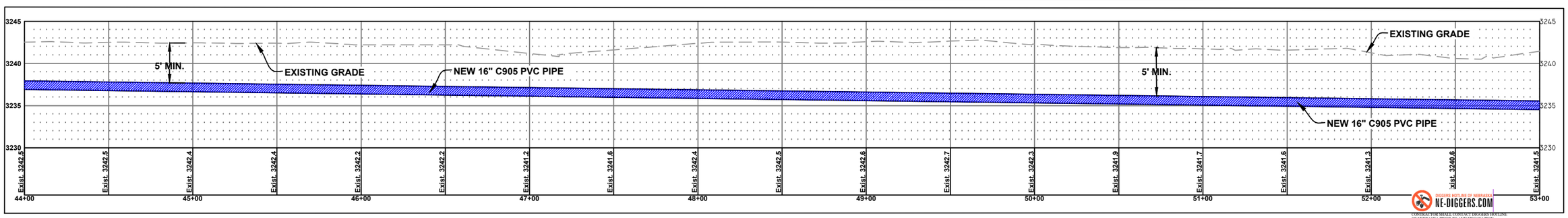
TRENCH DETAIL NTS
35+21-116+60











35+00-53+00

DIGGERS BUREAU OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY, LINE OR APPURTENANCE. CONTRACTOR SHALL BE LIABLE FOR ANY DAMAGE OR INJURY SUSTAINED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:
REVISIONS: 1 2 3 4
DRAWN BY:
APPROVED BY:
DATE:
DWG.:

SCALE: As Shown

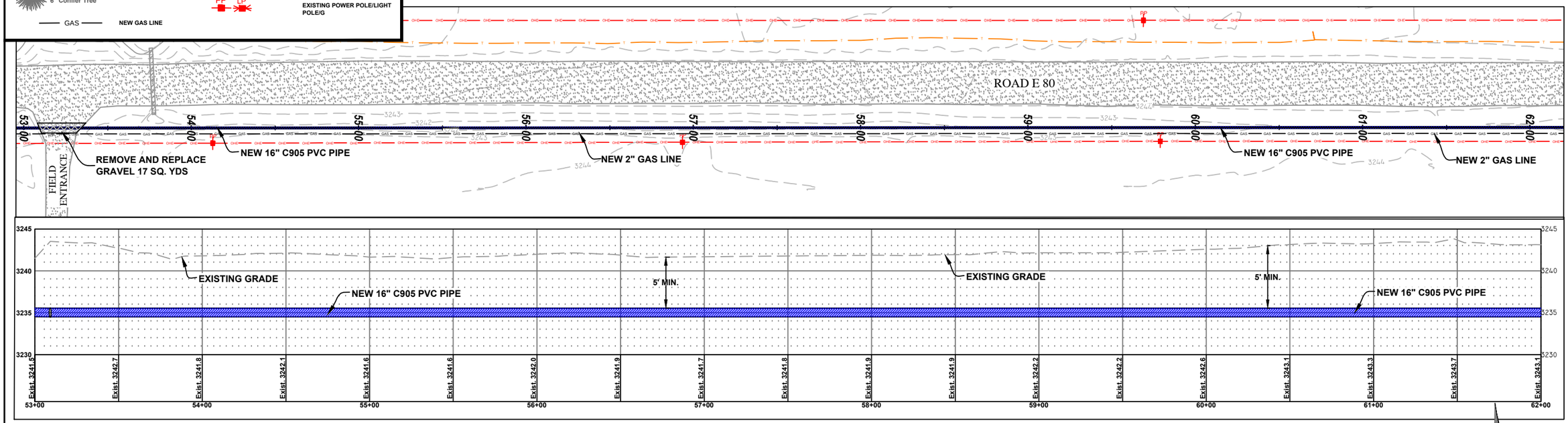
SHEET: C6

LEGEND

EXISTING CONCRETE		UGE	UNDERGROUND ELECTRIC
EXISTING ASPHALT		GAS	GAS LINE
REMOVALS		T	TELEPHONE
EXISTING LANDSCAPE	Bush, 6" Conifer Tree	OHE	OVERHEAD ELECTRIC
NEW GAS LINE	GAS		PROPERTY LINE
		PP LP	EXISTING POWER POLE/LIGHT POLE/G

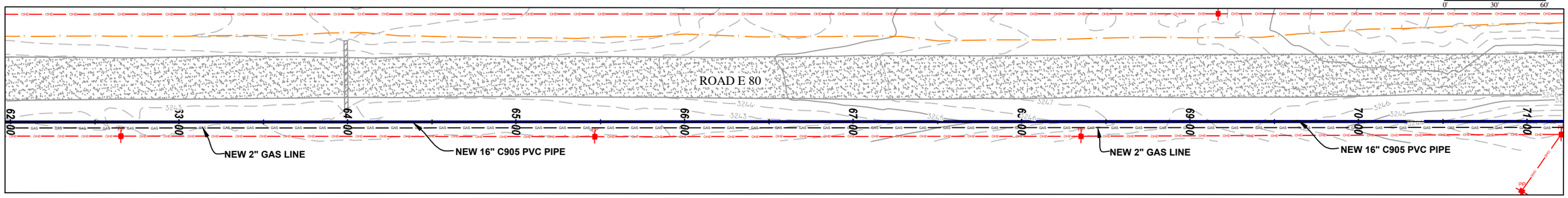
N

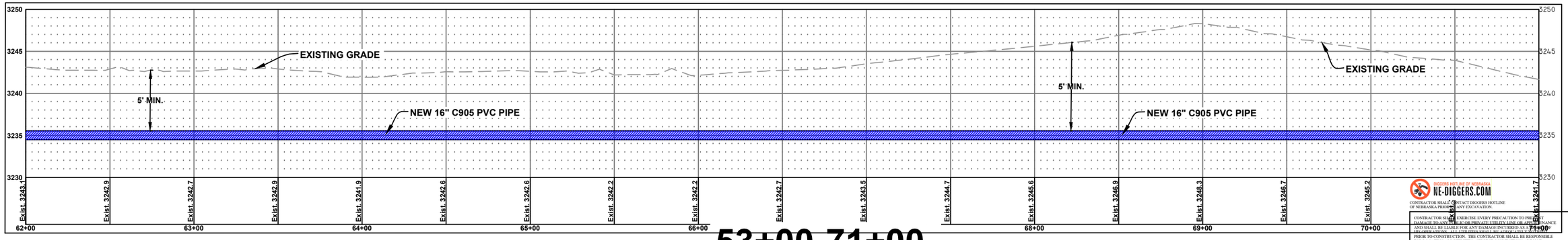
0' 30' 60'



N

0' 30' 60'





DIGGERS HOTLINE OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY LOCATED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

53+00-71+00

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009

Ogallala, Nebraska

PROJECT:

REVISIONS:

DRAWN BY:

APPROVED BY:

DATE:

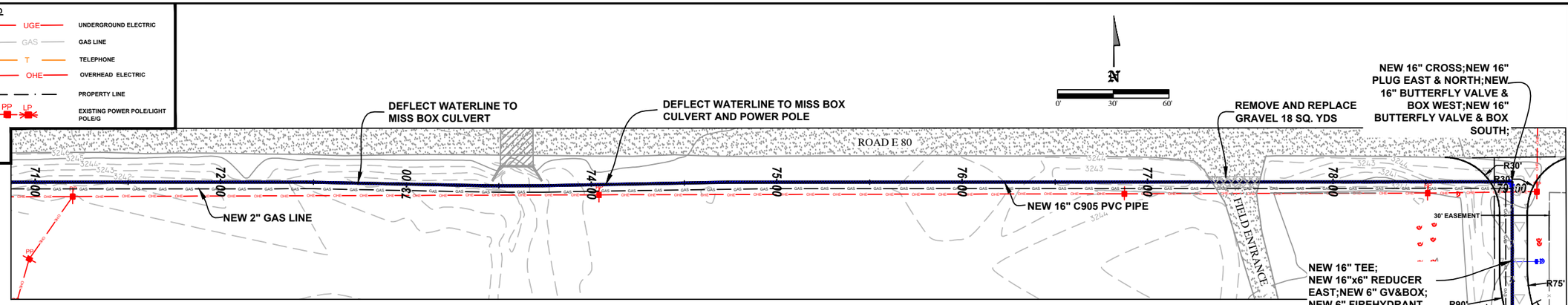
DWG.:

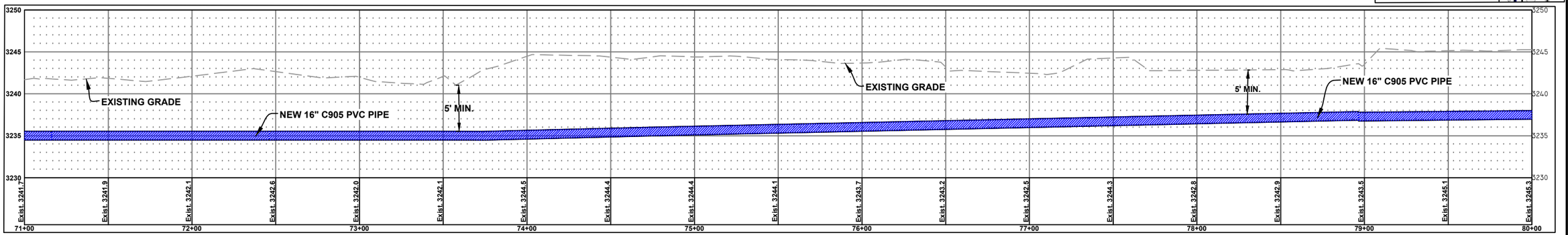
SCALE: As Shown

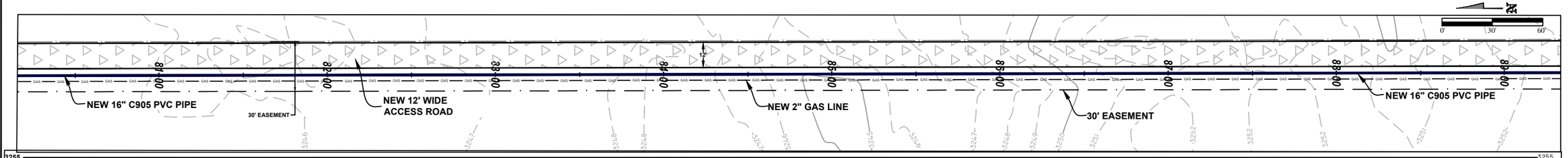
SHEET: C7

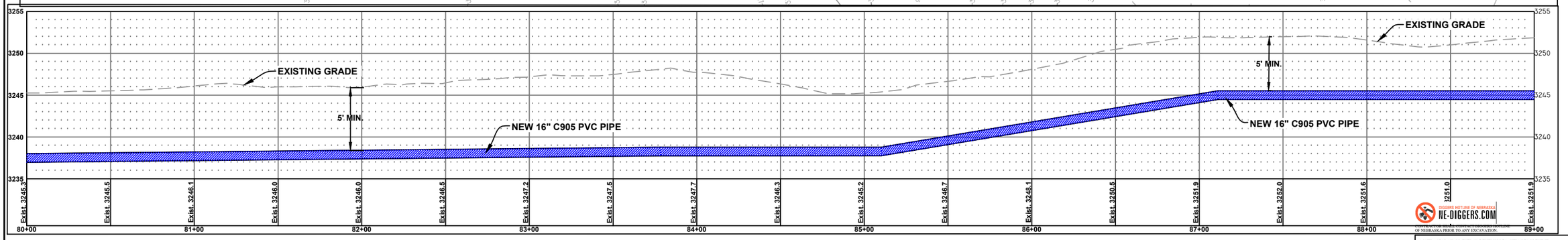
LEGEND

EXISTING CONCRETE	UGE	UNDERGROUND ELECTRIC
EXISTING ASPHALT	GAS	GAS LINE
EXISTING GRAVEL	T	TELEPHONE
NEW GRAVEL	OHE	OVERHEAD ELECTRIC
REMOVALS		PROPERTY LINE
	PP LP	EXISTING POWER POLE/LIGHT POLE/G
GAS		NEW GAS LINE









DIGGERS BEFORE IT NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT ONE-CALL LOCATING SERVICE TO OPERATE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE LOCATED AND MARKED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

71+00-89+00

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009

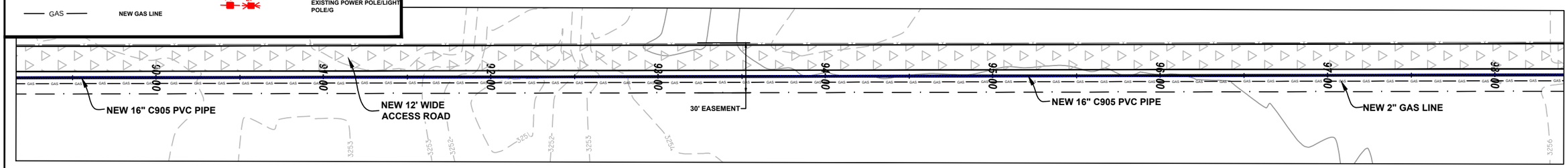
Ogallala, Nebraska

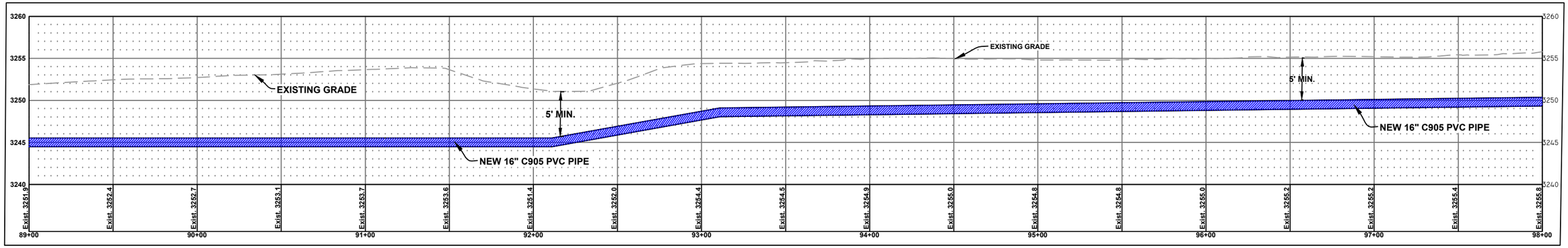
PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C8

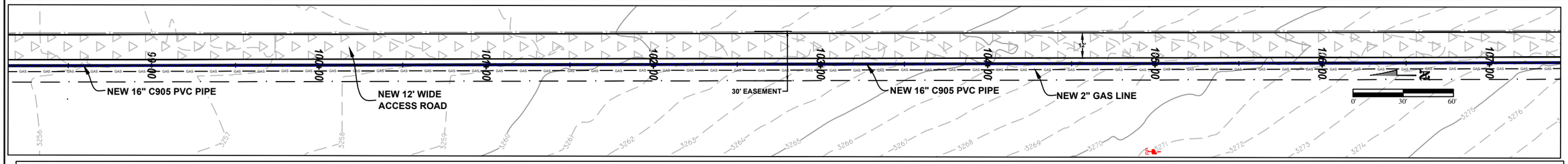
LEGEND

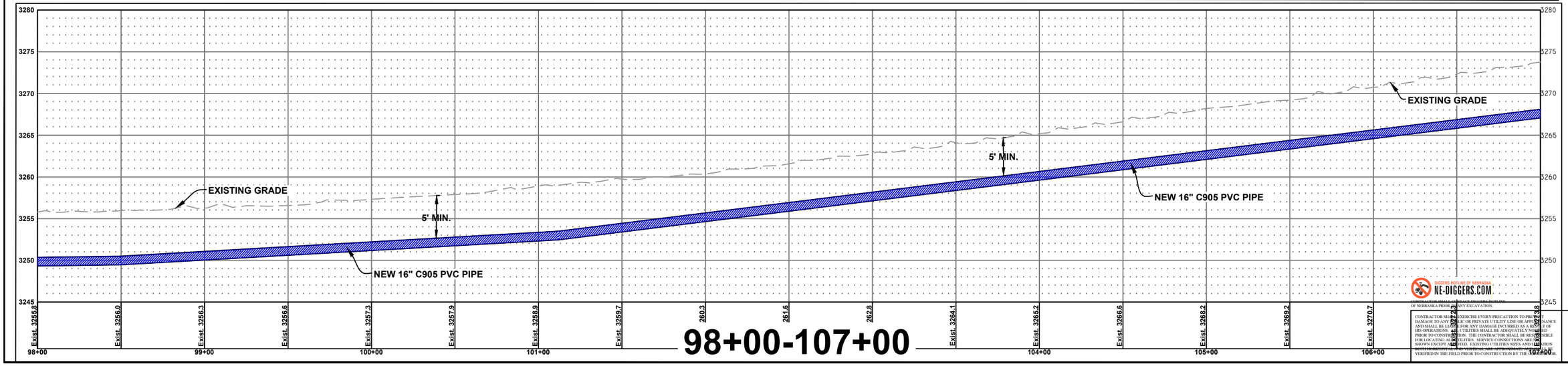
EXISTING CONCRETE	UGE	UNDERGROUND ELECTRIC
EXISTING ASPHALT	GAS	GAS LINE
REMOVALS	T	TELEPHONE
	OHE	OVERHEAD ELECTRIC
NEW GRAVEL		PROPERTY LINE
	PP LP	EXISTING POWER POLE/LIGHT POLE/G
GAS NEW GAS LINE		

N
0' 30' 60'









98+00-107+00

DIGGERS HOTLINE OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL NOTIFY ALL OF DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY SUPPORTED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION SHOWN ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT SIZE AND LOCATION OF ALL UTILITIES. VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:

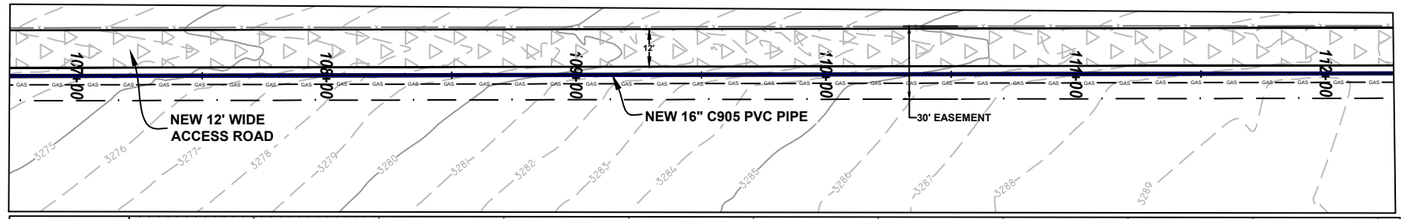
T C E

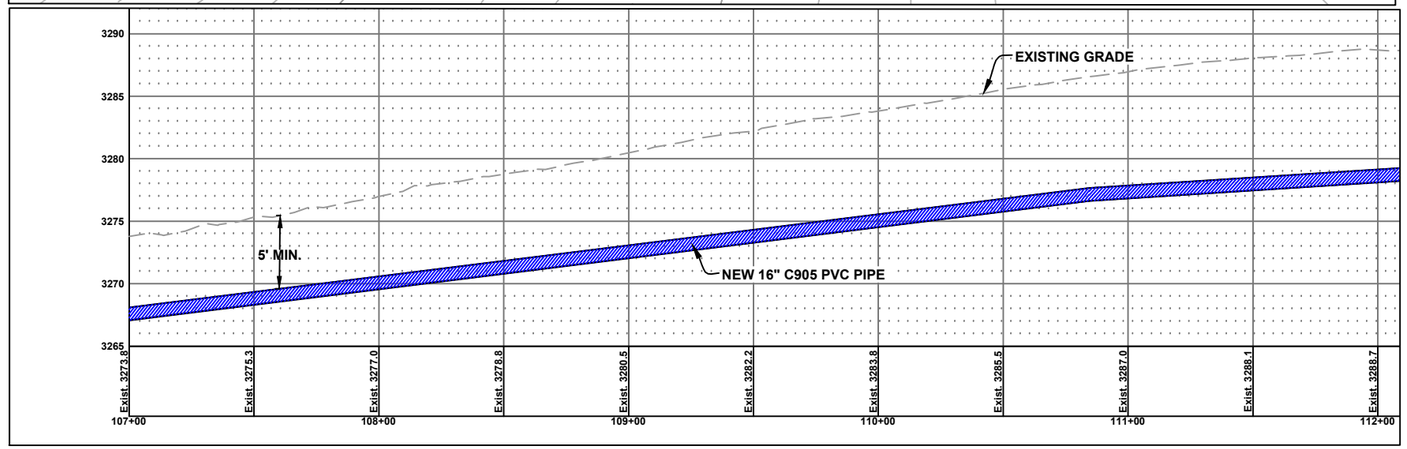
SCALE: As Shown

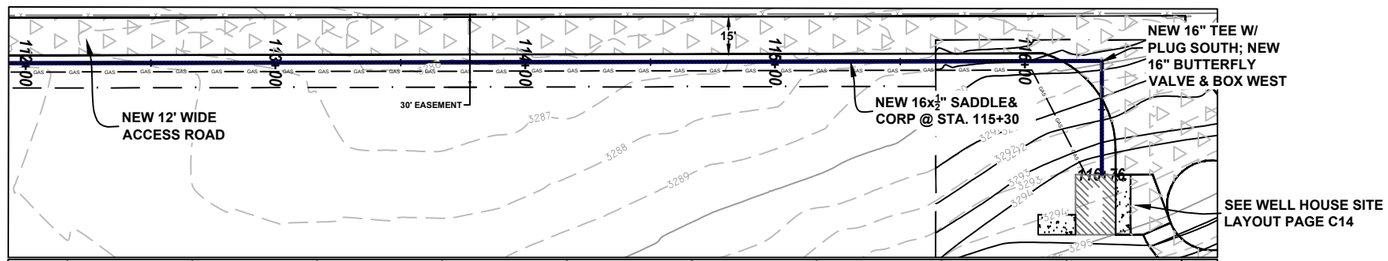
SHEET: C9

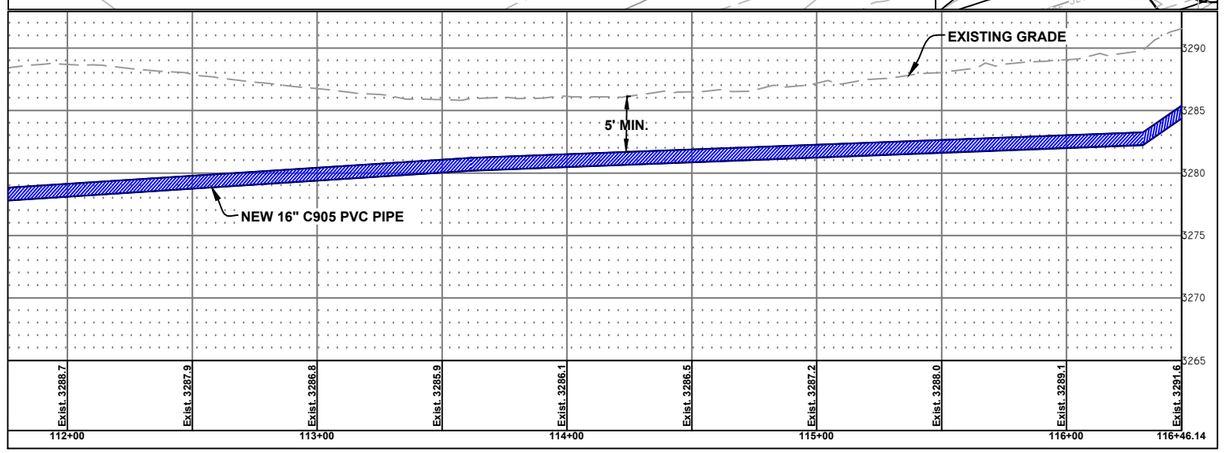
LEGEND

EXISTING CONCRETE	UNDERGROUND ELECTRIC (UGE)
EXISTING ASPHALT	GAS LINE (GAS)
REMOVALS	TELEPHONE (T)
	OVERHEAD ELECTRIC (OHE)
NEW GRAVEL	PROPERTY LINE
NEW GAS LINE (GAS)	EXISTING POWER POLE/LIGHT POLE/G (PP, LP)









107+00-116+60

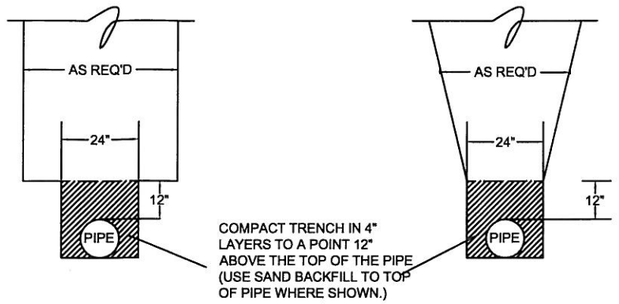
T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

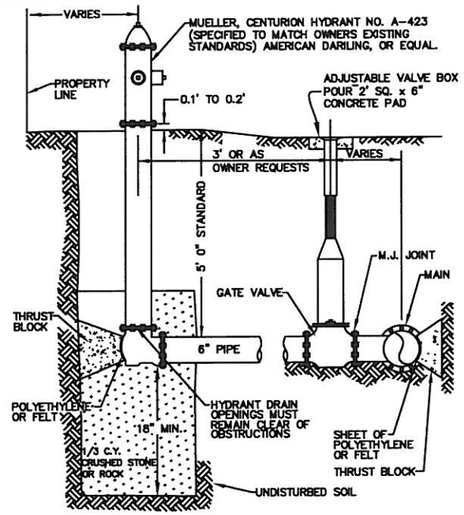
PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C10

DIGGERS HOTLINE OF NEBRASKA
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

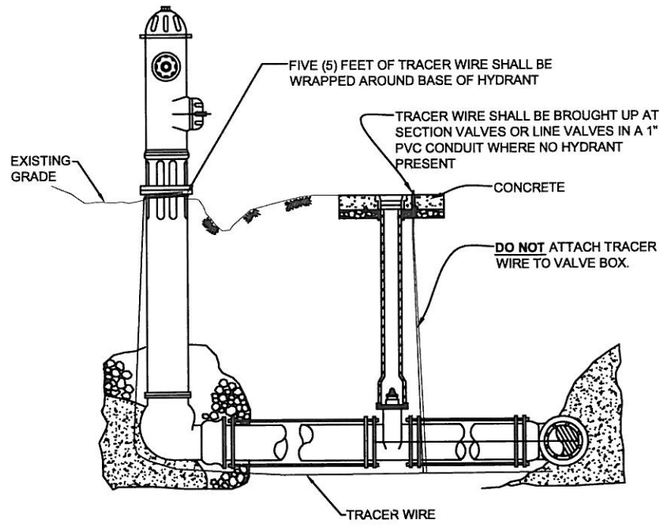
CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. THE LOCATION OF UTILITIES SHOWN SHALL BE VERIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.



TRENCH DETAIL
NOT TO SCALE



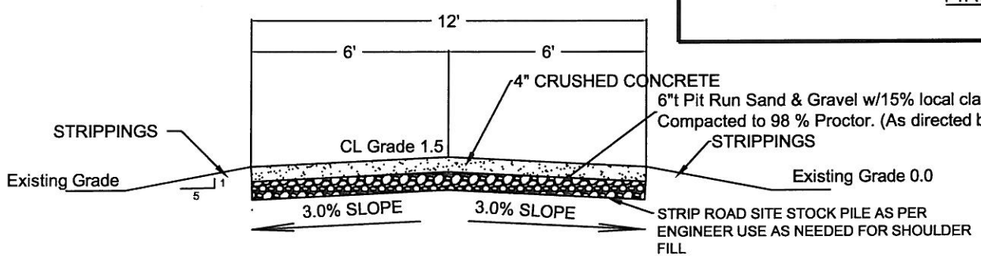
FIRE HYDRANT DETAIL
NOT TO SCALE



TRACER WIRE DETAIL

NOT TO SCALE

1. TRACER WIRES SHALL BE INSTALLED USING MANHOLES, VALVE BOXES OR VAULTS, WATER METERS AND FIRE HYDRANTS AS ACCESS POINTS.
2. TRACER WIRE SHALL BE A 12 GAUGE SOLID COPPER WIRE WITH POLYETHYLENE INSULATION OF 30 MIL THICKNESS.
3. SPLICES SHALL BE MADE USING A 3M DIRECT BURY SPLICE KIT (DBY) OR EQUIVALENT AND TAPED WITH APPROVED MATERIAL.
4. TRACER WIRE SHALL BE LONG ENOUGH TO EXTEND A DISTANCE OF FIVE (5) FEET BEYOND THE STRUCTURE.
5. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.
6. WHERE LINES ARE GREATER THAN SIX(6) FEET IN DEPTH, WIRE SHALL BE BROUGHT TO THE SURFACE EVERY ONE- HUNDRED (100) FEET AND PLACED IN A WATER METER BOX OR APPROVED JUNCTION BOX.
7. THE TRACER WILL BE TESTED BY THE AUTHORITY AS PART OF THE PROJECT'S FINAL ACCEPTANCE.

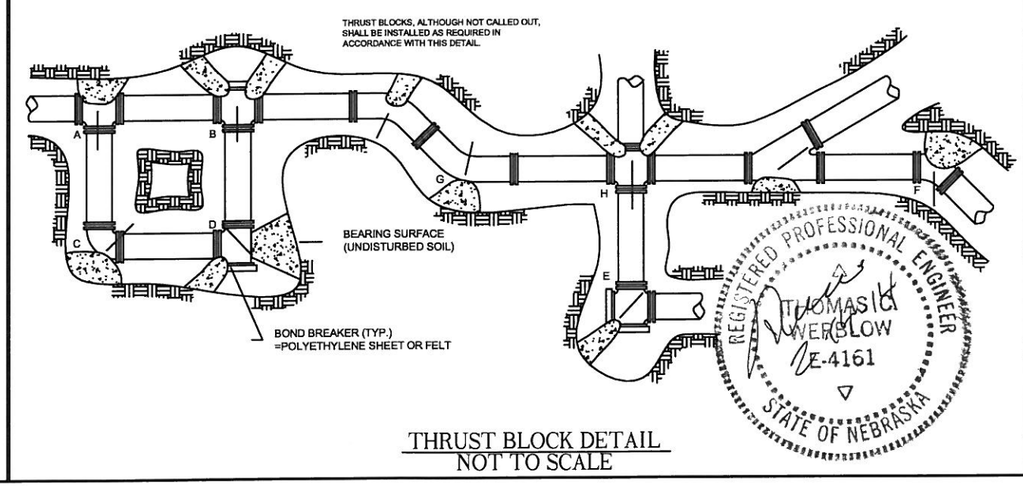


ACCESS ROAD SECTION (TYP.)

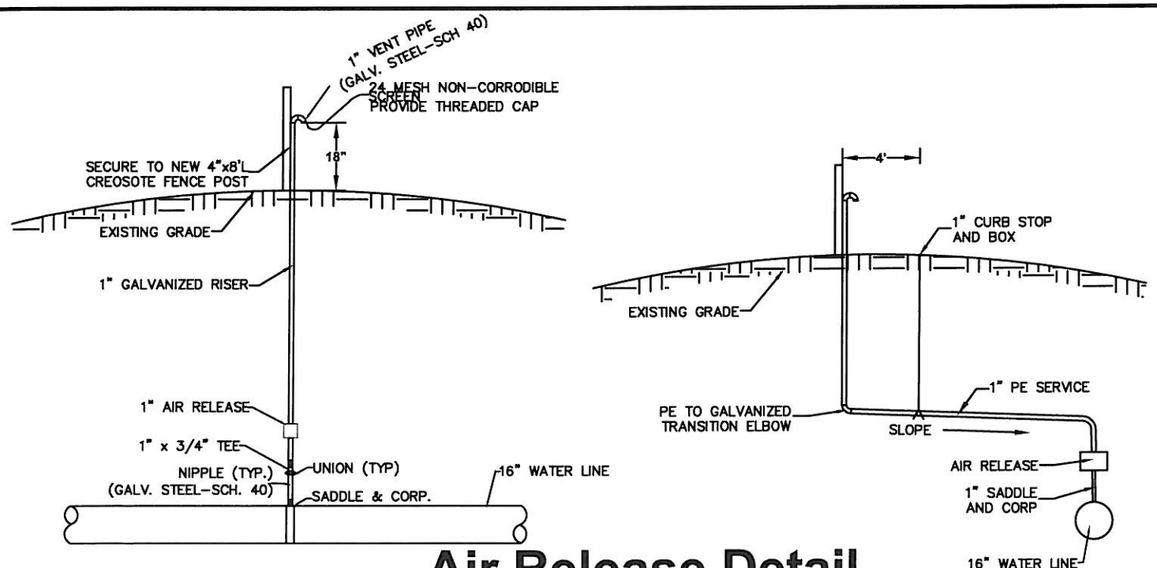
NOTE: Some portions of existing road are already partially graveled.
This may be incorporated in the base but without weed/brush/root debris.

PIPE SIZE	A	B&H (ea)	C	D	E	F&G 45°
4"	1.0	1.0	1.6	1.0	1.0	1.0
6"	1.56	1.0	2.25	1.0	2.25	1.56
8"	3.06	1.56	5.06	2.25	5.06	2.25
10"	5.06	2.25	7.56	4.0	7.56	4.0
12"	6.25	3.06	10.56	5.06	10.56	6.25

MINIMUM AREA OF THRUST FACE FOR 150 PSI PIPE IN 2500 LBS. LOAD BEARING SOIL (IN SQUARE FEET). CONTRACTOR SHALL ADJUST FOR EACH TYPE OF SOIL ENCOUNTERED.



THRUST BLOCK DETAIL
NOT TO SCALE



Air Release Detail

Not To Scale

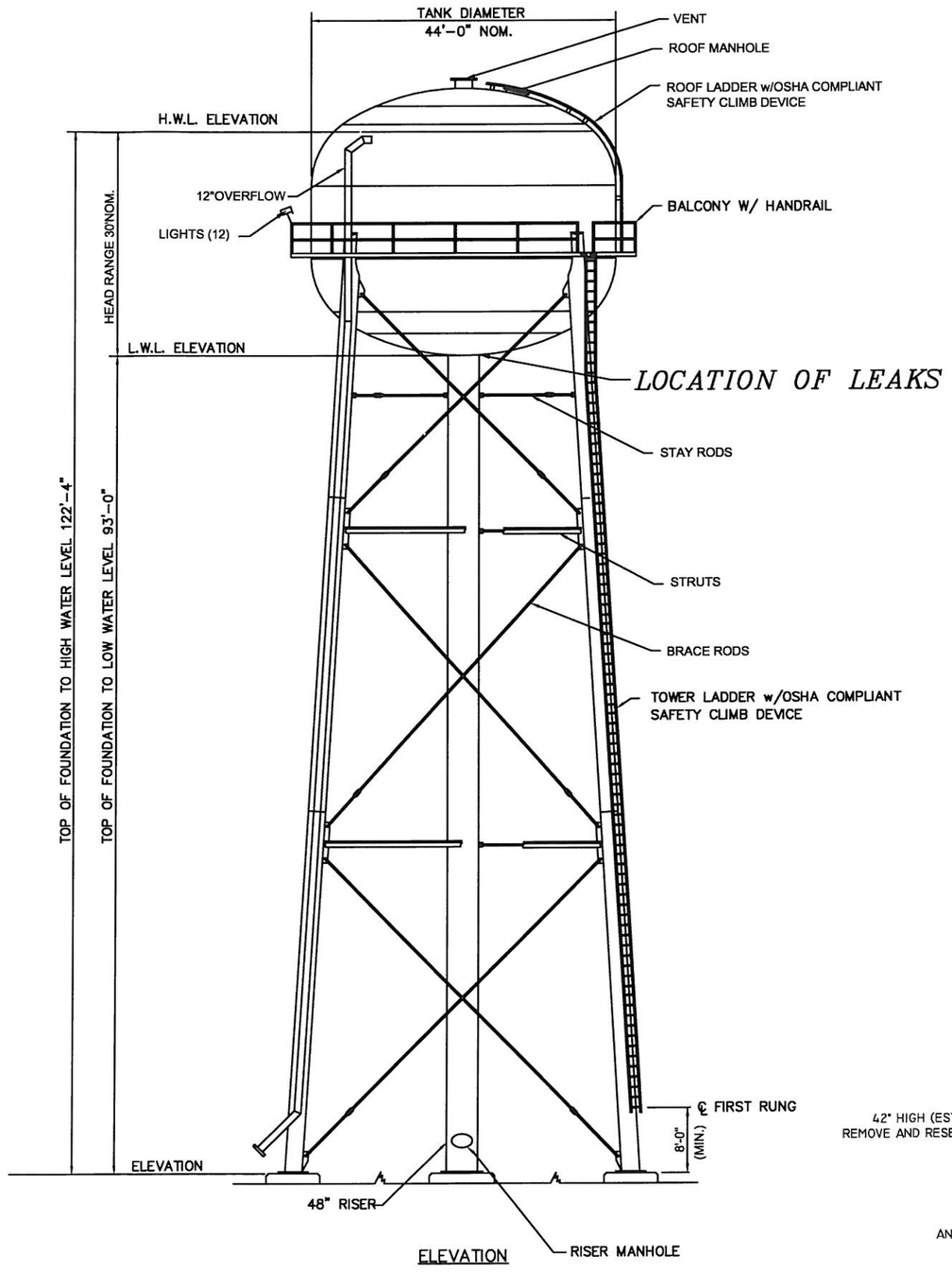
T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009

Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C11

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERBLOW
E-4161
STATE OF NEBRASKA



ELEVATION

EXISTING WATER TOWER

NOTES:

DESIGN:

TANK AND TOWER SHALL BE DESIGNED, FABRICATED AND ERECTED IN ACCORDANCE WITH AWWA D100-96 AND PROJECT SPECIFICATIONS.

MATERIALS:

STEEL PLATE: ASTM A283 GR. C / A36
STRUCTURAL STEEL SHAPES: ASTM A36

GENERAL:

- ACCESSORIES SHOWN ON ELEVATION DRAWING ARE ROTATED FOR CLARITY.
- DRAIN TANK, POWER WASH AND INSPECT TANK PRIOR TO COMPLETING REPAIR PLANNING
- DISFECT TANK IN ACCORDANCE WITH AWWA C652-92 AND PROJECT SPECIFICATIONS.
- PROVIDE ACCESS FOR ENGINEER & OWNER TO VERIFY WORK

LEAK REPAIR

1. TANK SHALL BE REPAIR WELDED INSIDE AND OUTSIDE THE BOWL, WHERE RISER MEETS THE BOWL

2. FLOOR WELD SEAM AT RISER SHALL BE SAND BLASTED TO NEAR WHITE SSPC-10. PROVIDE WELDED ANNULAR PATCH PLATE X $\frac{3}{8}$"t, AROUND RISER SEAM INTO BOWL. WELD ANNULAR REPAIR PLATE 12"wX INSIDE RADIUS 24" NOM. OUTSIDE RADIUS 36" NOM. CENTERED ON ENTIRE RISER CIRCUMFERENCE. CUT SLOT IN ROOF AS REQUIRED TO REMOVE MATERIAL. REPAIR SLOT UPON COMPLETION.

3. REMOVE VERTICAL STEEL PLATES ARRANGED AROUND THE RISER/BOWL SEAM. REMOVE EPOXY PATCH , REMOVE CATHODIC RODS & WIRES.

4. REPAIR WELD FLOOR CRACKS X 15 L.F. IN UP TO 10 LOCATIONS.

5. PROVIDE SHOP DRAWINGS OF REPAIR FOR SUBMITTED TO THE NEBRASKA DEPT. OF HEALTH AND HUMAN SERVICES.

FINISH

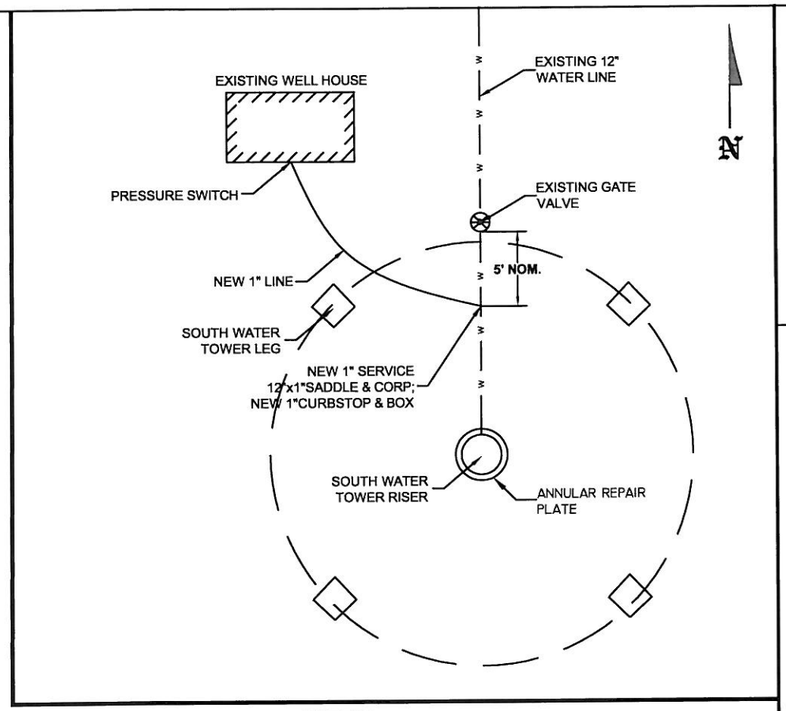
1. BRUSH BLAST ALL WELDS

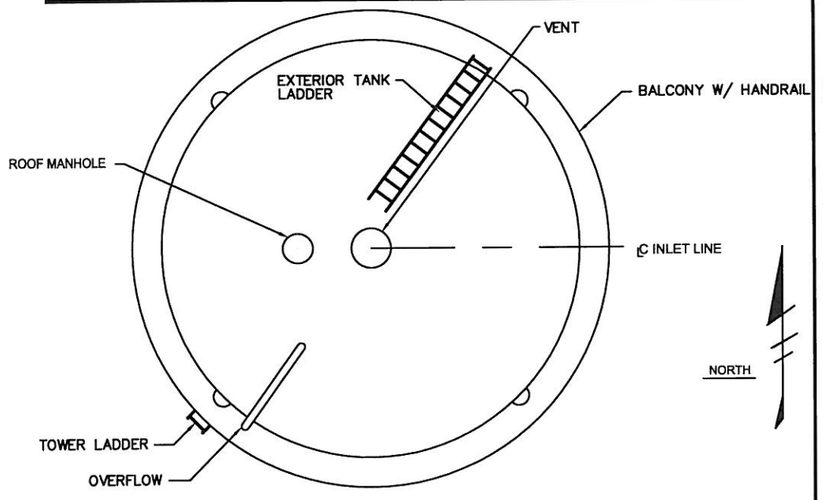
2. VERIFY COATING COMPATIBILITY WITH EXISTING COATINGS.

3. PRIME & PAINT REPAIRED AREAS

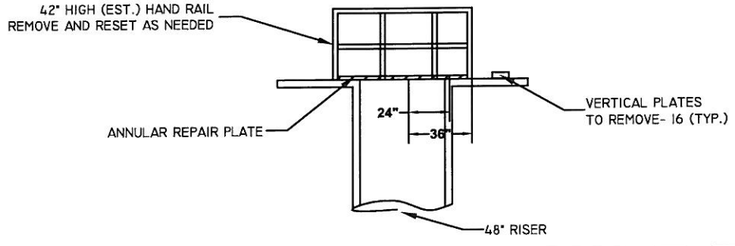
4. DISINFECT TANK PER AWAA SECTION 4.3.3

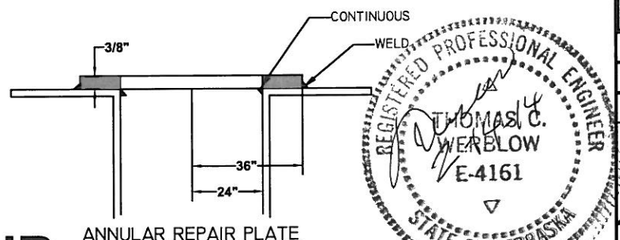
5. CONTRACTOR PULLS WATER SAMPLE AND TESTS PER NDHHS STANDARDS.





ORIENTATION





ANNULAR REPAIR PLATE

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERBLOW
E-4161
STATE OF NEBRASKA

SOUTH ELEVATED TOWER REPAIR

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009

Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C12

APPURTENANCES

1. ADJUST SHELL MANHOLES, OVERFLOW, INCLUDING INTERIOR OVERFLOW, ACCESS LADDERS AND OTHER APPURTENANCES TO BRING NEW TANK INTO CONFORMITY WITH NDHHS STANDARDS & NEW HEIGHT.

FINISH

1. COAT INTERIOR AND EXTERIOR PER SPECIFICATION.

2. DISINFECT TANK

3. CONTRACTOR PULLS WATER SAMPLES AND TESTS SHAL PASS PER NDHHS STANDARDS

NOTES:

DESIGN:

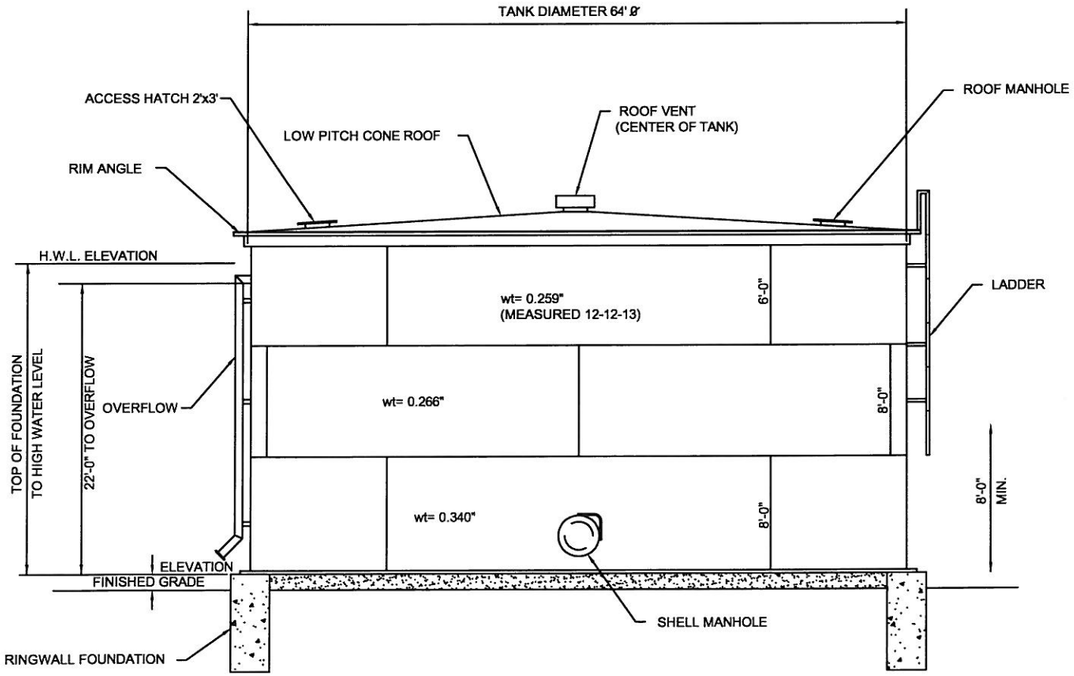
TANK AND TOWER SHALL BE DESIGNED, FABRICATED AND ERECTED IN ACCORDANCE WITH AWWA D100 AND PROJECT SPECIFICATIONS.

WIND LOAD: 100 MPH
SNOW LOAD: 25#/SF.
SEISMIC ZONE: 0

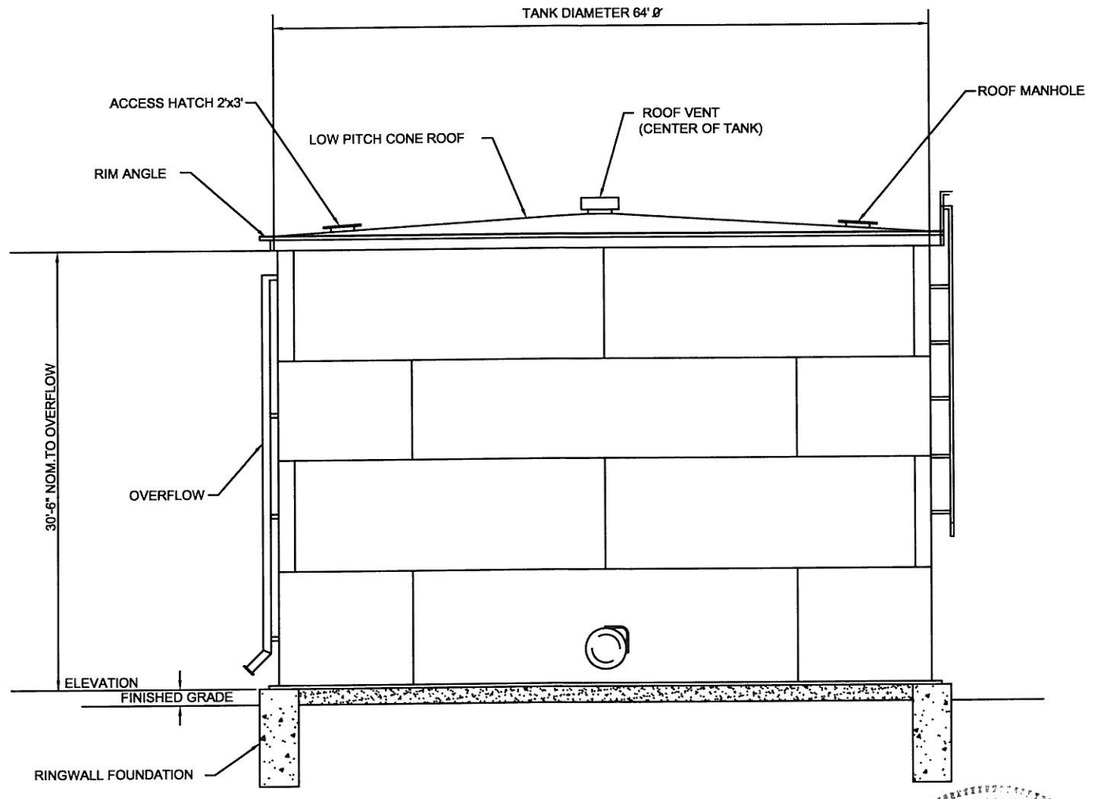
MATERIALS:
STEEL PLATE: ASTM A283 GR. C / A36
STRUCTURAL STEEL SHAPES: ASTM A36

GENERAL:

- ACCESSORIES SHOWN ON ELEVATION DRAWING ARE ROTATED FOR CLARITY.
- ALL LADDERS AND SAFETY CLIMB DEVICES SHALL CONFORM WITH CURRENT OSHA STANDARDS.
- SEE PROJECT SPECIFICATIONS FOR SHOP AND FIELD PAINT REQUIREMENTS.
- DISINFECT TANK IN ACCORDANCE WITH AWWA C652, 4.3.3, AND PROJECT SPECIFICATIONS.
- PROVIDE SHOP DRAWINGS OF APPURTANCES FOR SUBMITTAL TO NEBRASKA DEPT. OF HEALTH & HUMAN SERVICES.
- EXISTING TANK SHALL BE MODIFIED BY INSERTING ADDITIONAL 8'-6" OF WALL HEIGHT. CONTRACTOR SHALL DETERMINE MEANS & METHOD OF ADDING WALL HEIGHT. MINIMUM PLATE THICKNESS IF ADDED TO TOP OF EXISTING WALL SHALL BE $\frac{1}{4}$". MINIMUM PLATE THICKNESS IF ADDED TO BOTTOM OF EXISTING WALL SHALL BE $\frac{3}{8}$". PROVIDE ENGINEERING CERTIFIED CALCULATIONS FOR SYSTEM PROPOSED.CONTRACTOR SHALL EVALUATE EXISTING FOUNDATION FOR ADEQUACY AND SHALL PROVIDE ENGINEERING CERTIFIED CALCULATIONS FOR SYSTEM PROPOSED. SOIL REPORT FOR ORIGINAL CONSTRUCTION INCLUDED IN SPECIFICATIONS. MODIFY FOUNDATION PRIOR TO ADDING WALL HEIGHT.



EXISTING ELEVATION



PROPOSED ELEVATION

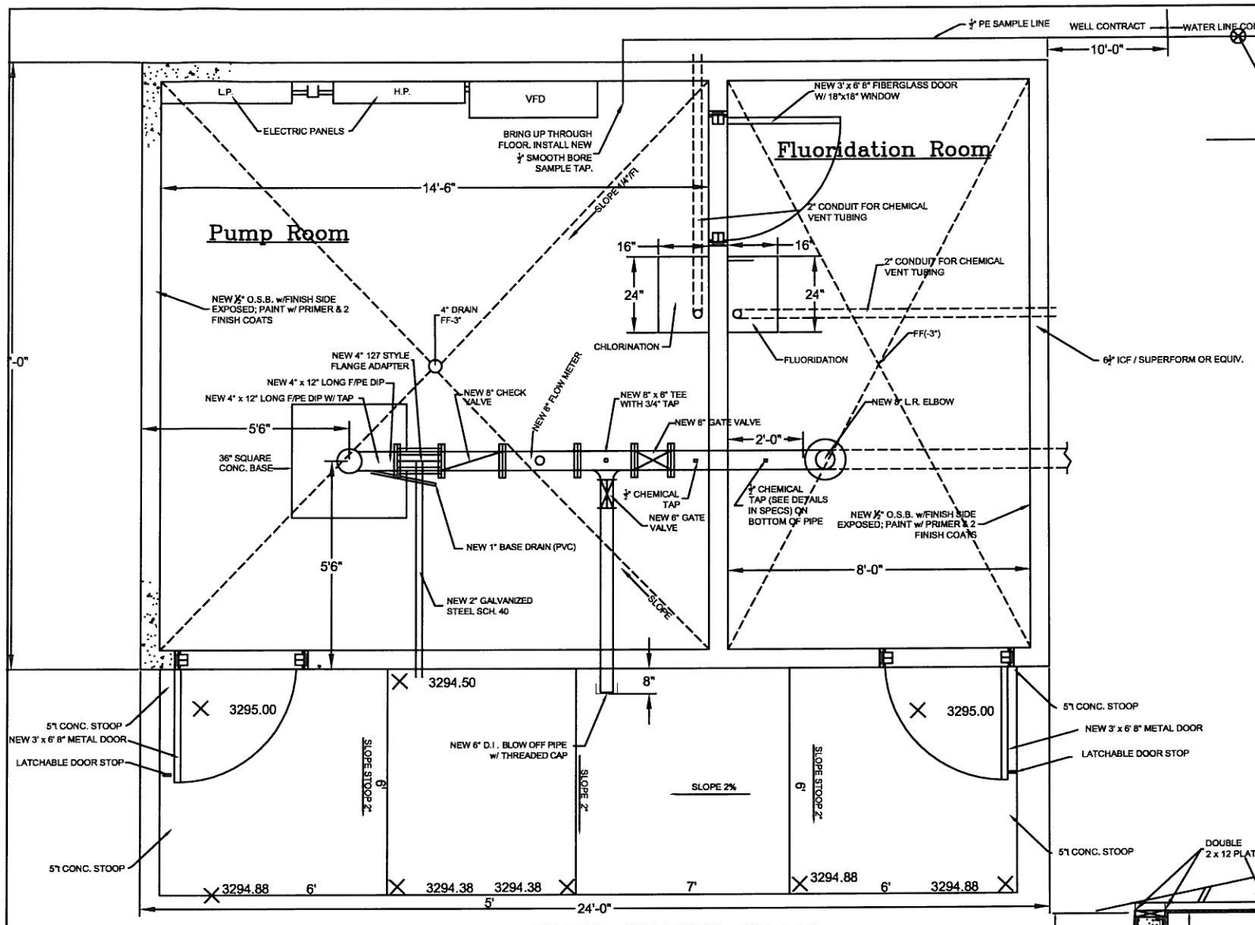
REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERDEN
E-4161
STATE OF NEBRASKA

GROUND STORAGE RESERVOIR REPAIR

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

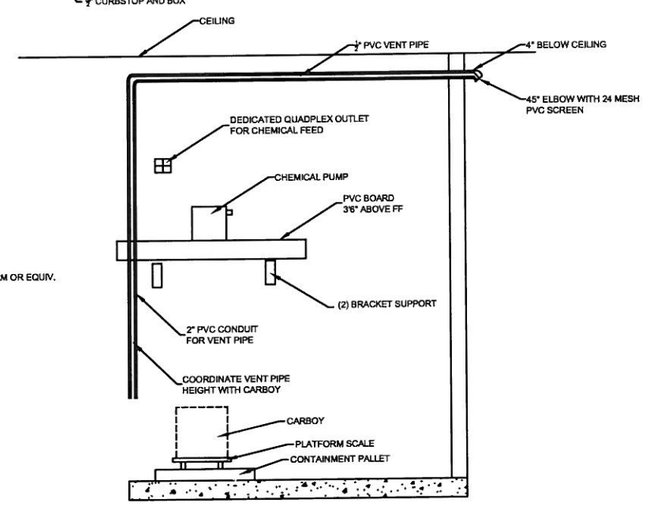
PROJECT:
REVISIONS: 1 2 3 4
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C13

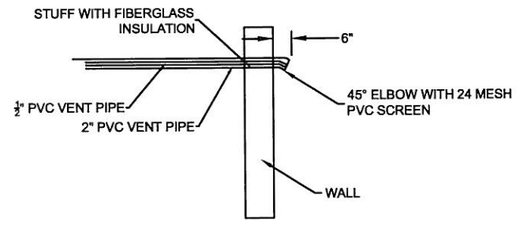


NOTE:
DOWEL EXTERIOR CONCRETE SLABS TO FOUNDATION WITH #4's x12" L @ 4'o/c.

WELL HOUSE PLAN

SCALE:
0 2' 4' 6'

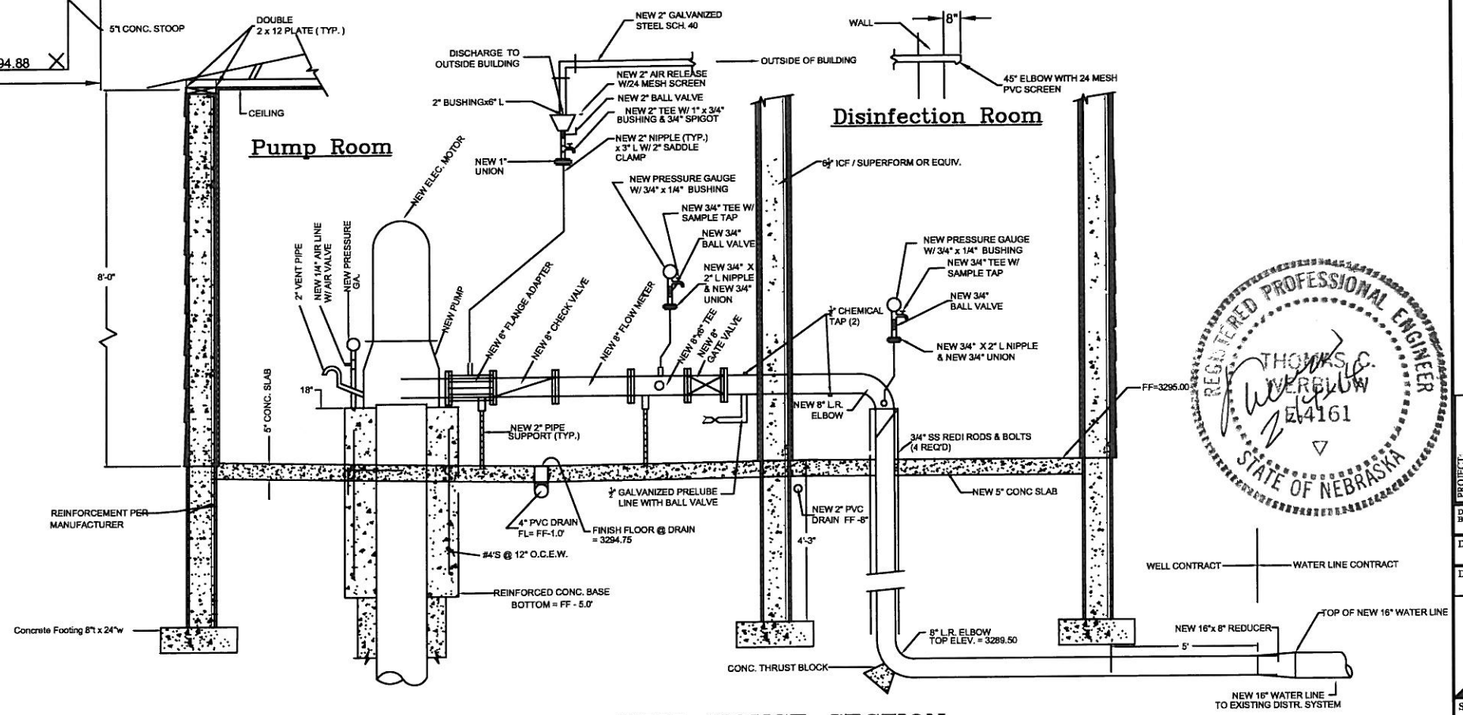




NOTE:
½" VENT RUNS INSIDE 2"C

CHEMICAL SCHEMATIC
(TYP. CHLORINATION & FLUORIDATION)

NOTE:
1. REQUIRED OPENINGS FOR HEATERS, ELECTRICAL CONDUIT, VENTS INCLUDED IN MECHANICAL/ ELECTRICAL SYSTEMS SHALL BE COORDINATED WITH BUILDING CONSTRUCTION, ESPECIALLY SIZE AND LOCATION



WELL HOUSE SECTION

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. VERBLOW
E-4161
STATE OF NEBRASKA

N

WELL HOUSE LAYOUT

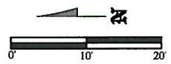
T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

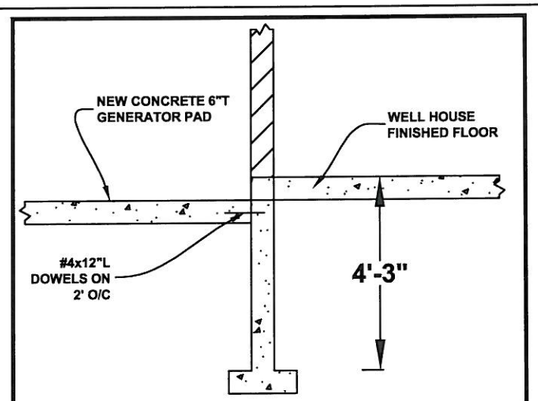
Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
T C E
SCALE: As Shown
SHEET: C15

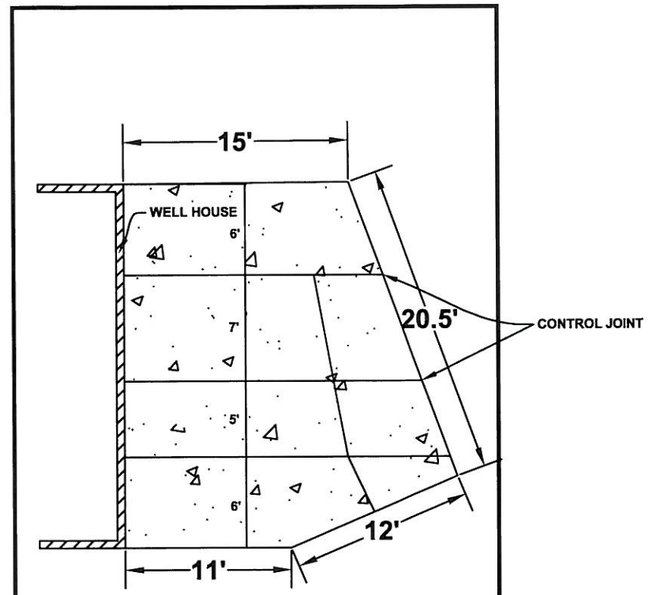
LEGEND

EXISTING CONCRETE	UGE — UNDERGROUND ELECTRIC
EXISTING ASPHALT	GAS — GAS LINE
REMOVALS	T — T — TELEPHONE
	OHE — OVERHEAD ELECTRIC
GAS — NEW GAS LINE	PROPERTY LINE

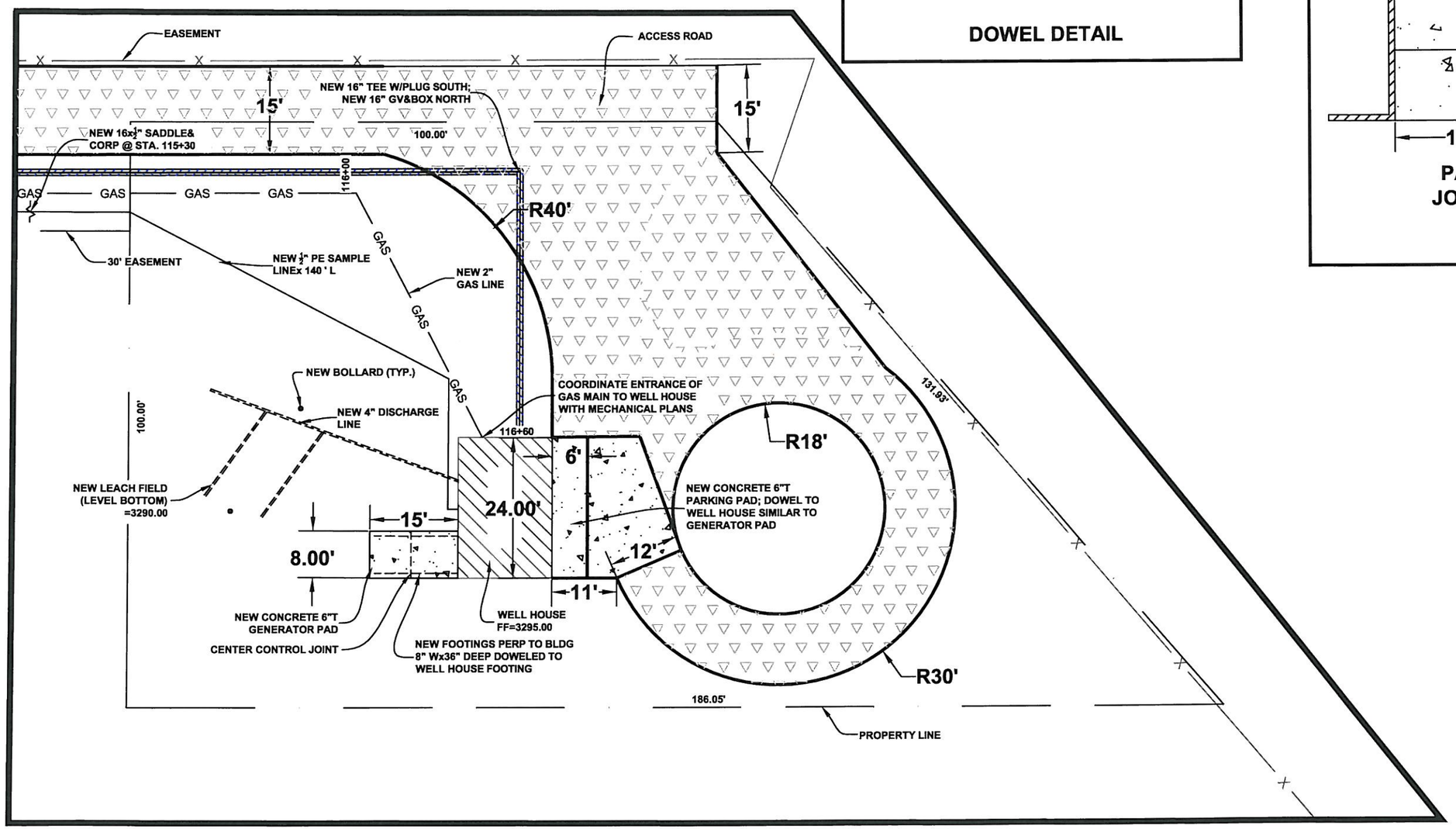




DOWEL DETAIL



PARKING PAD JOINT PATTERN



WELL HOUSE SITE LAYOUT

T.C. Engineering Inc.
North Platte, Nebraska

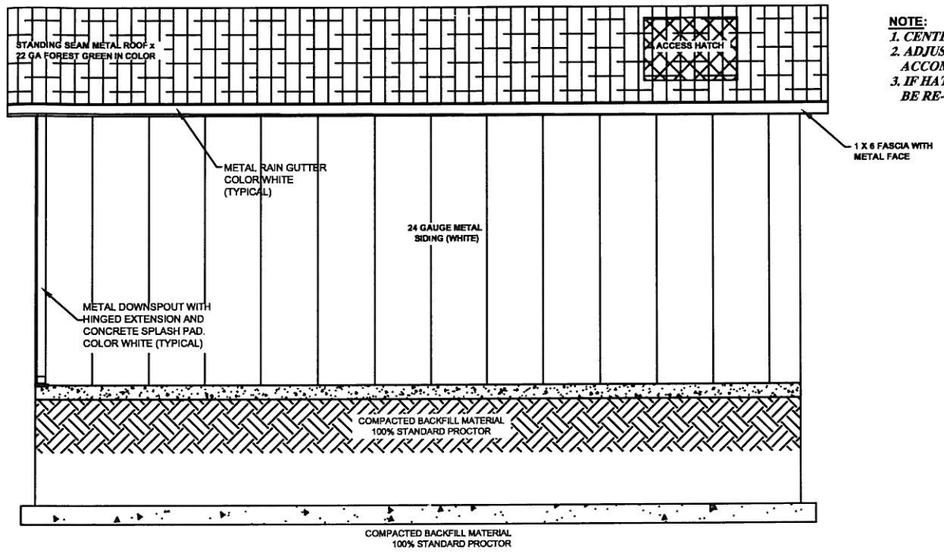
Ogallala Water Improvements 2009
Ogallala, Nebraska

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERDLOW
E-4161
STATE OF NEBRASKA

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C14

NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

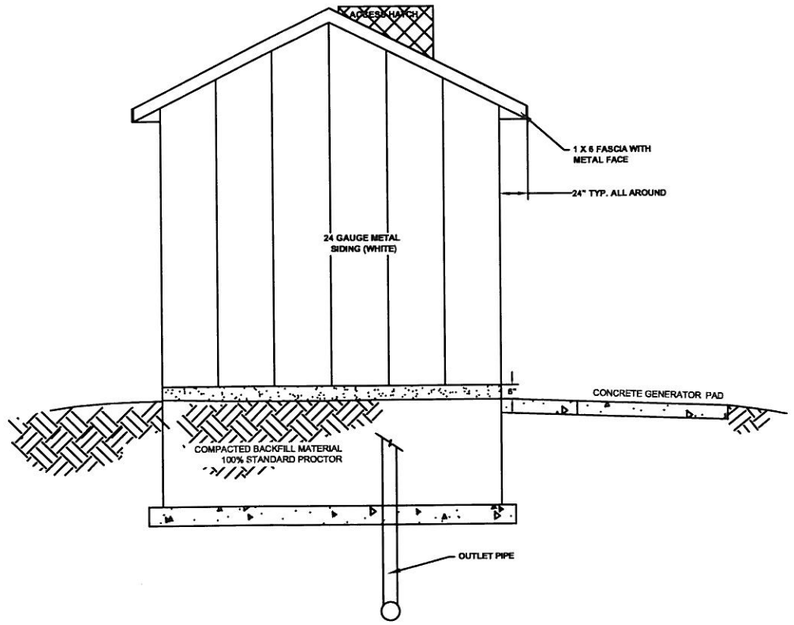
CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICES CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.



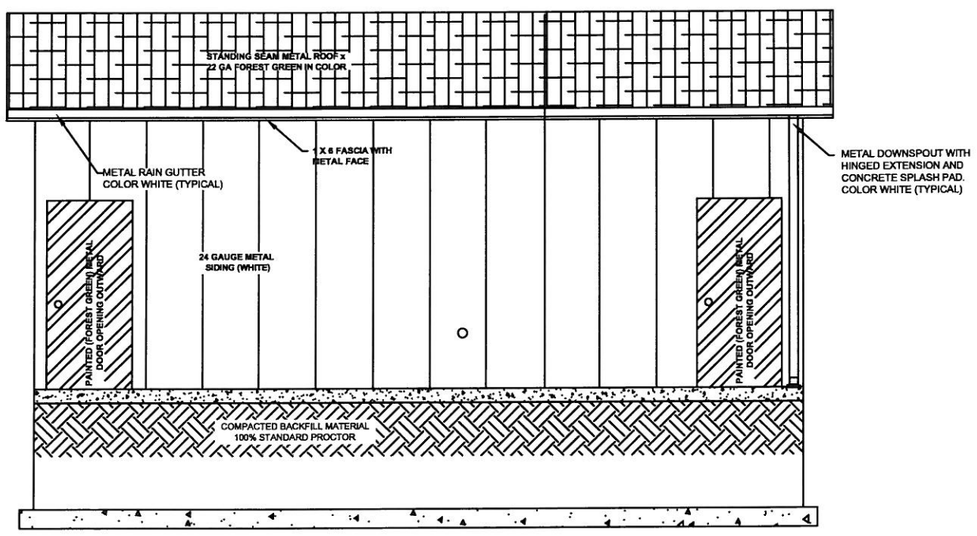
NORTH PROFILE

NOTE:

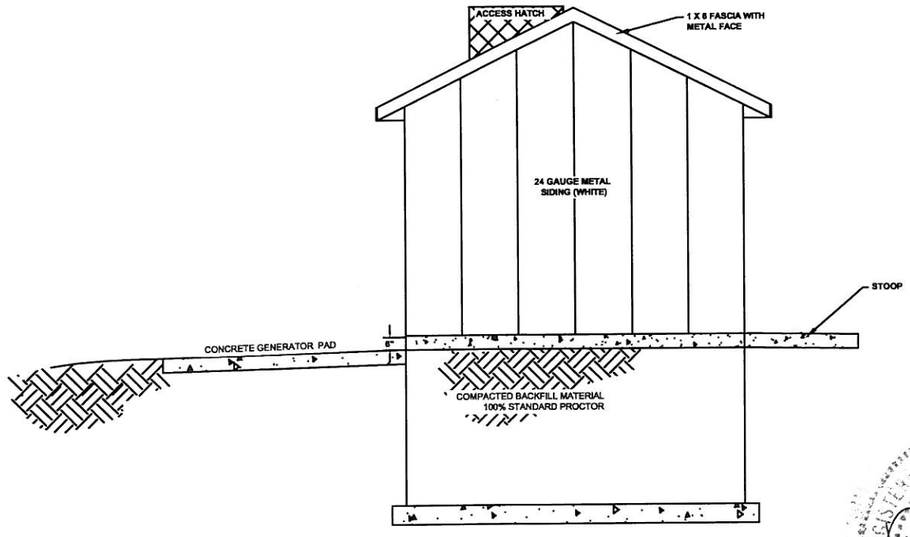
1. *CENTER ACCESS HATCH OVER PUMP*
2. *ADJUST TRUSS LAYOUT AND MODIFY ROOF STRUCTURE TO ACCOMMODATE ACCESS HATCH*
3. *IF HATCH IS NOT CENTERED OVER WELL ROOF IT SHALL BE RE-CONSTRUCTED UNTIL IT IS*



EAST PROFILE



SOUTH PROFILE



WEST PROFILE

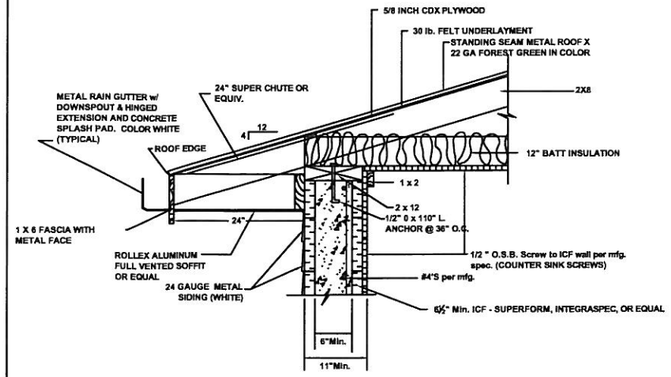
WELL HOUSE PROFILE VIEWS

NOT TO SCALE

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

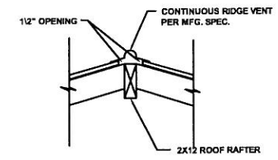
Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C16



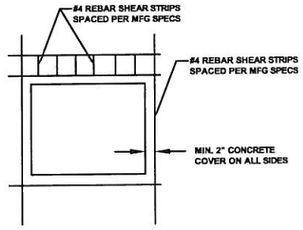
GABLE DETAIL

NTS



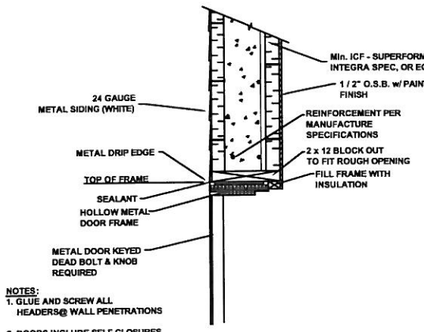
RIDGE VENT DETAIL

NTS



ROUGH OPENING REINFORCEMENT DETAIL

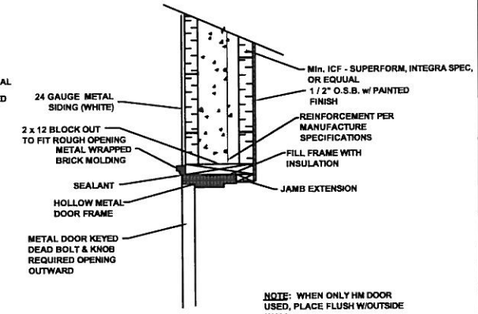
NTS



NOTES:
1. GLUE AND SCREW ALL HEADERS@ WALL PENETRATIONS
2. DOORS INCLUDE SELF CLOSURES AND DOOR STOPS

HEADER DETAIL

NTS

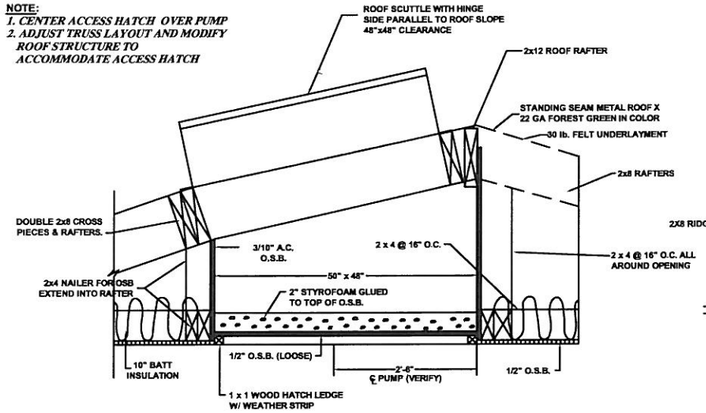


NOTE: WHEN ONLY HM DOOR USED, PLACE FLUSH W/OUTSIDE WALL.

JAMB DETAIL

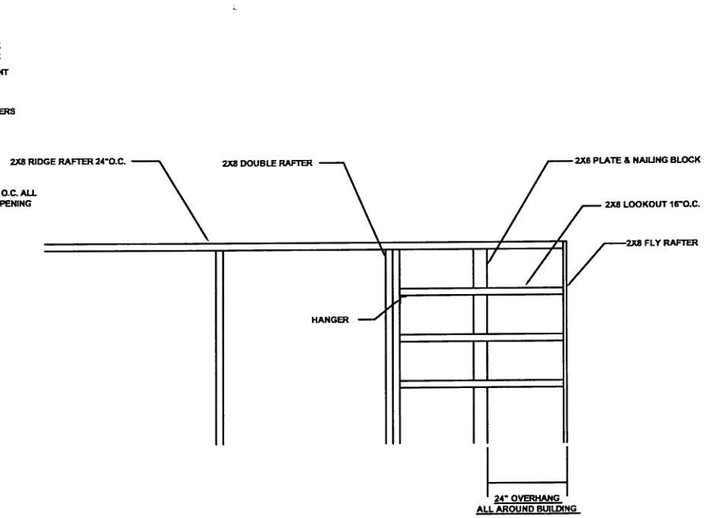
NTS

NOTE:
1. CENTER ACCESS HATCH OVER PUMP
2. ADJUST TRUSS LAYOUT AND MODIFY ROOF STRUCTURE TO ACCOMMODATE ACCESS HATCH



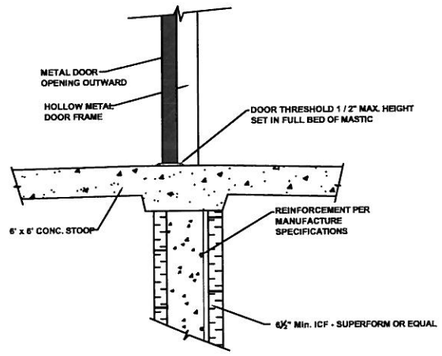
HATCH DETAIL

SCALE: NTS



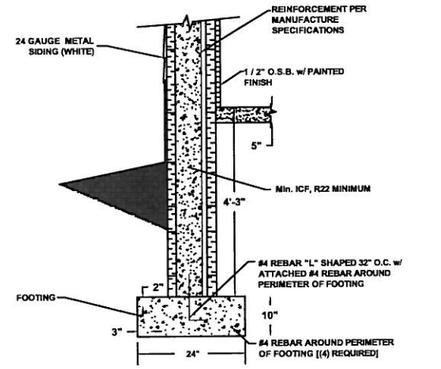
OVERHANG DETAIL

NTS



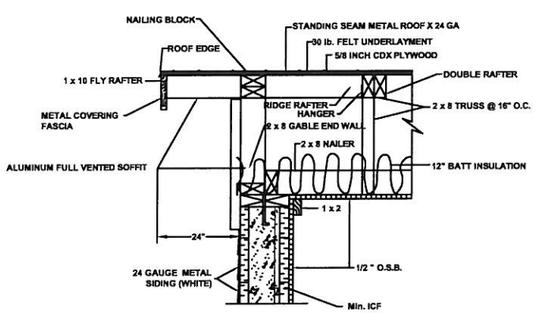
THRESHOLD DETAIL

NTS



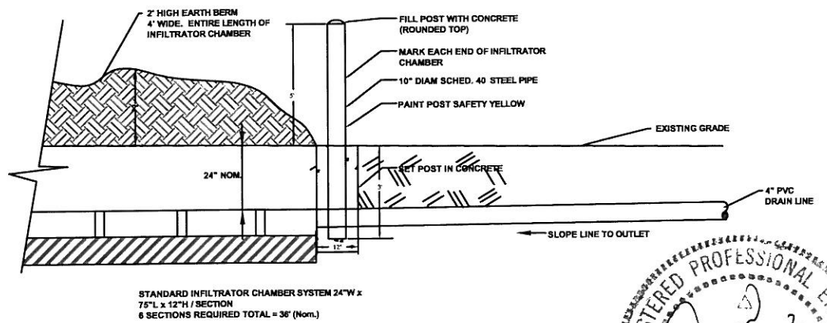
WALL SECTION

NTS



END WALL DETAIL

NTS



STANDARD INFILTRATOR CHAMBER SYSTEM 24"W x 75"L x 12"H / SECTION
6 SECTIONS REQUIRED TOTAL = 36' (Nom.)

NEW 4" DRAIN LINE OUTLET DETAIL

NTS

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERBLOW
E-4161
STATE OF NEBRASKA

WELL HOUSE DETAILS

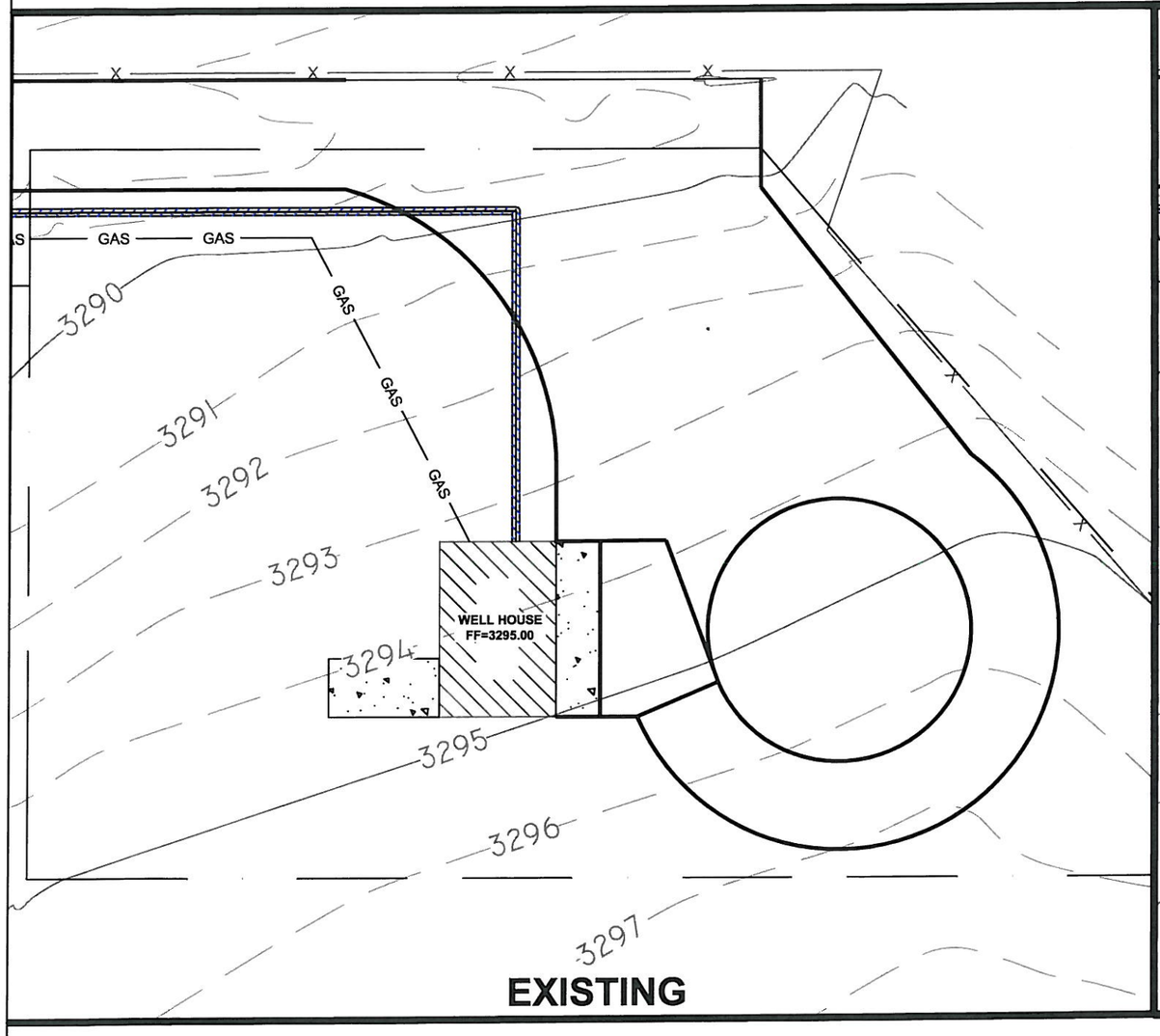
T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

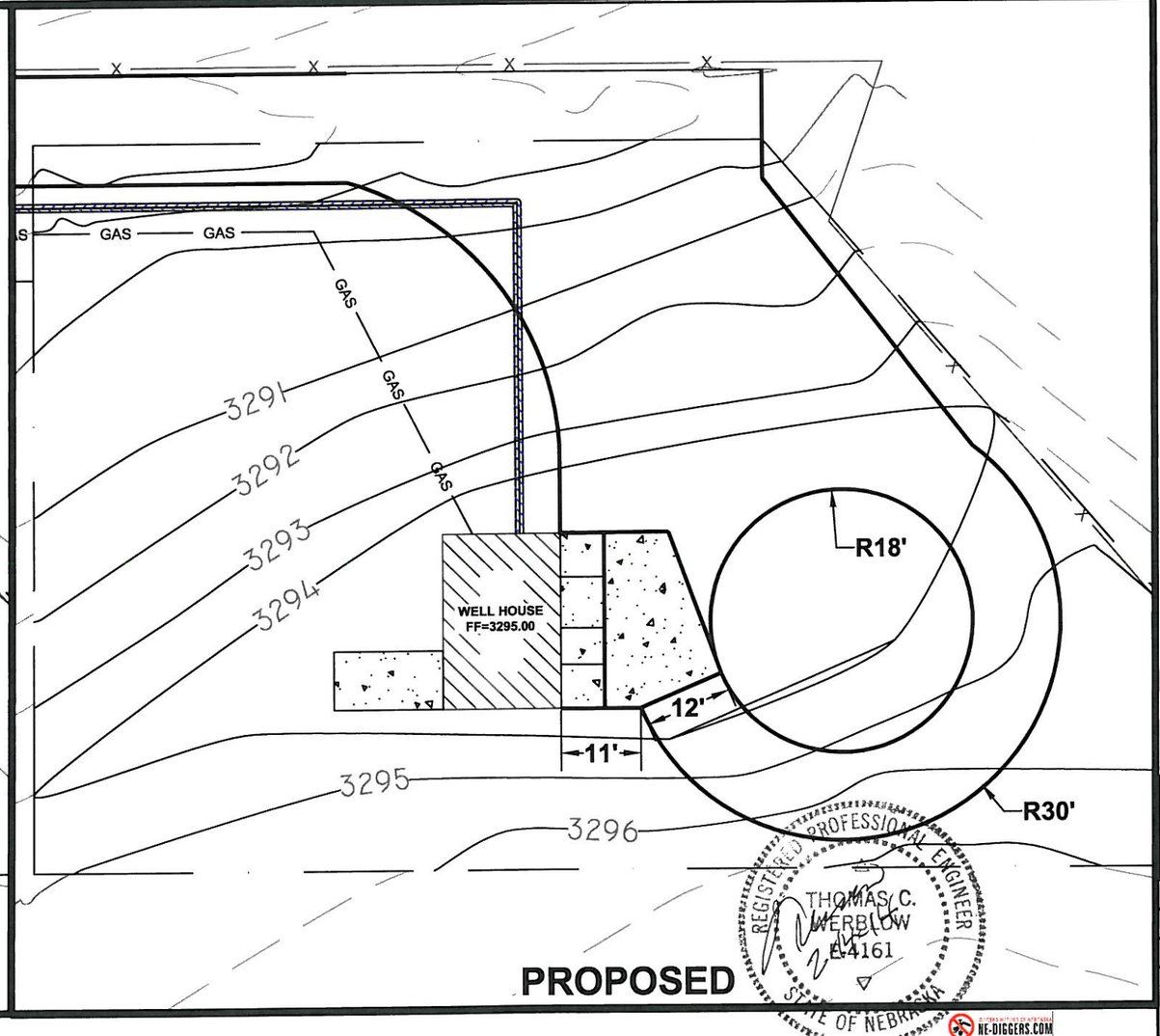
PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C17

LEGEND

- EXISTING CONCRETE
- EXISTING ASPHALT
- REMOVALS
- NEW GAS LINE
- UNDERGROUND ELECTRIC
- GAS LINE
- TELEPHONE
- OVERHEAD ELECTRIC
- PROPERTY LINE



EXISTING



PROPOSED

WELL HOUSE SITE CONTOURS

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERBLOW
E-4161
STATE OF NEBRASKA

NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE RESULTING AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY PROTECTED AT ALL TIMES AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED BY THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

PROJECT:
REVISIONS:
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
T C E
SCALE: As Shown
SHEET: C18

STORM WATER POLLUTION PREVENTION PLAN

THIS SWPPP MUST REMAIN ONSITE THROUGHOUT PROJECT WITH INSPECTION LOGS AND ANY DOCUMENTED CHANGES

CONSTRUCTION ACTIVITY INFORMATION

PROJECT LOCATION: SECTION 17/18, T13N, R38W, KEITH COUNTY, NEBRASKA

PROJECT TYPE: WATER MAIN

PROJECT AREA: TOTAL AREA= 3.6 ACRES INC. RIGHT OF WAY
DISTURBED AREA= 3.0 ACRES +/-
IMPERVIOUS SURFACE
EXISTING= 0.00 ACRES +/-
PROPOSED= 0.00 ACRES +/-

CONTACT INFORMATION:

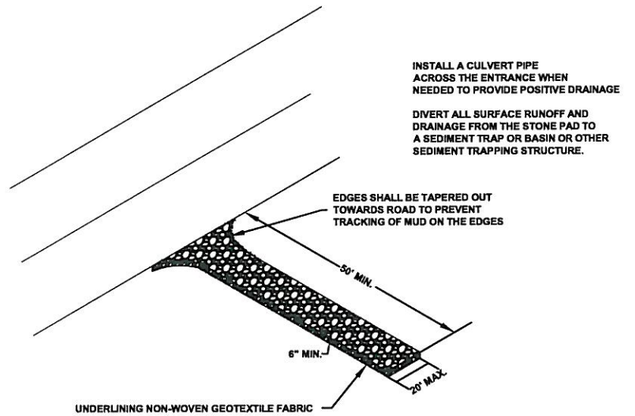
OWNER: CITY OF OGALLALA

PRIMARY SWPPP CONTACT:

CONTRACTOR: _____

EROSION CONTROL SUPERVISOR: _____
PHONE #: _____

SWPP LOCATION: _____



SEDIMENT DETAIL PLAN

CONSTRUCTION NOTES- EROSION PREVENTION/SEDIMENT CONTROL PRACTICES

1. PRIOR TO OPERATIONS, THE CONTRACTOR SHALL INSTALL SILT FENCE IN AREAS LEFT UNFINISHED GREATER THAN ONE WEEK.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL EROSION AND SEDIMENT CONTROL MEASURES AS REQUIRED BY THE CITY OF OGALLALA PERMIT FOR CONSTRUCTION. THIS INCLUDES ANY ADDITIONAL EROSION AND SEDIMENT CONTROLS BEYOND THAT SHOWN ON THE PLAN.
3. PHASED CONSTRUCTION SHALL BE USED TO MINIMIZE SEDIMENT TRANSPORT.
4. TURF ESTABLISHMENT &/OR TEMPORARY SEEDING SHALL TAKE PLACE ACCORDING TO THE CHART BELOW:

SLOPE	MAXIMUM TIME AREA CAN BE UNCOVERED
-STEEPER THAN 3:1	7 DAYS
-10:1 TO 3:1	14 DAYS
-FLATTER THAN 10:1	21 DAYS

FERTILIZER: 10-0-20 AS SPECIFIED IN 02820 SEEDING.

5. ENERGY DISSIPATION METHODS MUST BE INSTALLED WITHIN TWENTY FOUR HOURS AFTER CONNECTION TO STORM SEWER
6. IF DOWN GRADIENT BMPS ARE OVERLOADED DURING A STORM EVENT, ADDITIONAL UP GRADIENT BMPS ARE REQUIRED TO ELIMINATE THE OVERLOADED. THE ADDITIONAL BMPS MUST BE RECORDED ON THIS SWPPP IN THE AMENDMENTS TO SWPPP SECTION
7. TEMPORARY SOIL STOCKPILES MUST HAVE SILT FENCE OR OTHER EFFECTIVE SEDIMENT CONTROLS, AND CANNOT BE PLACED IN SURFACE WATERS INCLUDING STORM WATER CONVEYANCES SUCH AS CURB AND GUTTER SYSTEMS, OR CONDUITS AND DITCHES
8. A ROCK CONSTRUCTION ENTRANCE MUST BE INSTALLED ACCORDING TO CITY SPECS AT EVERY PROJECT ENTRANCE. ROCK ENTRANCES MUST BE INSPECTED AND MAINTAINED TO ENSURE PROPER FUNCTION.
9. THE CONTRACTOR SHALL CLEAN ALL TRACKED MATERIALS ON ADJACENT ROADWAYS ON A DAILY BASIS AND AS NEEDED AT THE DISCRETION OF THE CITY ENGINEER AND/OR HIS REPRESENTATIVES.
10. INLET PROTECTION CONFORMING TO THE DETAILS AND/OR SPECIAL PROVISIONS IS REQUIRED IN STORM INLET STRUCTURES AS WORK PROGRESSES.
11. THE CONTRACTOR IS RESPONSIBLE FOR ALL ERODED MATERIAL THAT LEAVES THE SITE. ALL ERODED MATERIAL SHALL BE GATHERED BY THE CONTRACTOR, REMOVED FROM DEPOSITION SITES AND RETURNED TO THE PROJECT.
12. A "RAMPING UP" METHOD OF BMP SELECTION SHALL BE USED IF CHOSEN BMPS PROVE TO BE INADEQUATE. (I.E IF MACHINE SLICED SILT FENCE DOES NOT WORK THE NEXT BMP TO TRY MAY BE HEAVY DUTY SILT FENCE. IF THAT IS INADEQUATE THE NEXT BMP TO INSTALL MAY BE SUPER DUTY SILT FENCE OR A ROCK WEEPER.)
13. CONTRACTOR SHALL REMOVE ALL EROSION CONTROL STRUCTURES AFTER FINAL STABILIZATION IS COMPLETED.

DEWATERING & BASIN DRAINING

1. WATER SHALL BE DISCHARGED IN A MANNER WHICH WILL NOT PRODUCE EROSION AND WILL BE TREATED BY SILT SOCK, TEMPORARY SETTLING BASIN, OR OTHER CITY APPROVED METHOD. THERE WILL BE NO DISHCHARGE OF SEDIMENT LADEN WATER TO SURFACE WATERS.
2. DEWATERING AND BASIN DRAINING PRACTICES SHALL NOT PRODUCE NUISANCE CONDITIONS UPON NEIGHBORING PROPERTIES.

AMENDMENTS TO SWPPP — DATE

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

INSPECTIONS AND MAINTENANCE

1. THE CONTRACTOR SHALL PROVIDE AN EROSION CONTROL SUPERVISOR FOR THE PROJECT WHO SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE SWPPP PROJECT.
2. THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING CONSTRUCTION DURING ACTIVE CONSTRUCTION. THIS INCLUDES THE REQUIRED WEEKLY INSPECTIONS ALONG WITH INSPECTING CONSTRUCTION SITE BMPS AFTER EVERY STORM EVENT RESULTING IN 0.5 INCHES OF RAIN OR SNOW MELT IN A 24 HOUR PERIOD. REQUIREMENTS FOR INSPECTIONS CAN BE FOUND IN THE CITY OF OGALLALA'S PERMIT REQUIREMENTS.
3. INSPECTION LOGS WILL BE KEPT ONSITE WITH THE PROJECT SWPPP FOR COMPLIANCE WITH THE NPDES GENERAL PERMIT.
4. THE CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVES WILL ROUTINELY INSPECT THE CONSTRUCTION SITE FOR NPDES COMPLIANCE. UPON ENTERING THE SITE THE INSPECTOR SHALL REVIEW THE SITES STORMWATER POLLUTION PREVENTION PLAN (SWPPP), ALL INSPECTION LOGS, DOCUMENTATION OF BMP MAINTENANCE ACCORDING TO CONTRACTORS INSPECTION RESULTS, AND ANY CHANGES TO THE PROJECTS SWPPP.
5. THE PERMITTEE SHALL MAINTAIN ALL BMP'S ACCORDING TO SPECIFICATION.
6. THE PERMITTEE SHALL KEEP STORM WATER PLAN CURRENT WITH CURRENT FEDERAL, STATE AND LOCAL REGULATIONS.

POLLUTION PREVENTION:

1. ALL SOLID OR HAZARDOUS WASTE COLLECTED OR GENERATED FROM THE PROJECT SITE SHALL BE DISPOSED OF ACCORDING TO APPLICABLE REGULATIONS.
2. ALL HAZARDOUS MATERIALS ONSITE SHALL BE STORED TO PREVENT LEAKS AND/OR SPILLS ACCORDING TO STATE AND FEDERAL STANDARDS.
3. ANY RUNOFF CONTAINING A HAZARDOUS MATERIAL SHALL BE COLLECTED AND PROPERLY DISPOSED OF.
4. IF A SPILL OCCURS OBSERVE THE SAFETY PRECAUTIONS ASSOCIATED WITH THE SPILLED MATERIAL. STOP THE SOURCE OF THE SPILL, IF POSSIBLE. CALL THE LOCAL FIRE AND/OR POLICE DEPARTMENTS IF FIRE OR PUBLIC SAFETY HAZARDS ARE CREATED. CONTAIN THE SPILLED MATERIAL, DIRT, SAND, OR ANY SEMI IMPERMEABLE MATERIAL MAY BE USED TO CREATE A CONTAINMENT STRUCTURE TO PREVENT THE MATERIAL FROM FLOWING. REPORT THE SPILL TO THE NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY (NDEQ) THROUGH THE 24 HOUR TELEPHONE NUMBER (877) 253-2603. CLEANUP THE SPILLED MATERIAL AND DISPOSE OF THE WASTES PROPERLY.
5. IF CONTAMINATED SOILS ARE DISCOVERED DURING THE COURSE OF THE PROJECT THE NDEQ OFFICER SHALL IMMEDIATELY BE CALLED AS MENTIONED ABOVE AND EMERGENCY CONTAINMENT ACTIONS TAKEN. THE CITY SHALL ALSO BE NOTIFIED IMMEDIATELY.
6. TRASH AND CONSTRUCTION DEBRIS SHALL BE DISPOSED OF PROPERLY. PROPER MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO KEEP DEBRIS FROM SURFACE WATERS DURING CONSTRUCTION.
7. CONCRETE TRUCK WASH SHALL BE CONFINED TO LINED WASHOUT SUMPS. THEY MAY BE RELOCATED TO FIT CONSTRUCTION SEQUENCING.

FINAL STABILIZATION:

1. FINAL STABILIZATION SHALL BE ACHIEVED BY SODDING, SEEDING, PAVING, LANDSCAPING OR GRAVEL SURFACING ALL DISTURBED AREAS. SOD SHALL BE STAKED IN AREAS WITH SLOPES STEEPER THAN 4:1
2. PERMITTEES MUST ENSURE STABILIZATION OF THE SITE ACCORDING TO THE SEEDING CHART.
3. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL EROSION AND SEDIMENTATION CONTROL BMPS AS PART OF FINAL STABILIZATION.

STABILIZED CONSTRUCTION ENTRANCE

When and where to use it:

Stabilized construction entrances should be used at all points where traffic will be leaving a construction site and moving directly onto a public road.

Important considerations:

If washing is used, provisions must be made to intercept the wash water and trap the sediment before it is carried offsite. Wash down facilities shall be required as directed by City of Ogallala as needed. Wash down areas in general must be established with crushed gravel and drain into a sediment trap or sediment basin. Construction entrances should be sued in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by vehicles.

Installation:

1. Remove all vegetation and any objectionable material from the construction area.
2. Divert all surface runoff and drainage to a sediment trap or basin.
3. Install a non-woven geotextile fabric prior to placing any stone.
4. Install a culvert pipe across the entrance when needed to provide positive drainage.
5. The entrance shall consist of 1" to 3" D50 stone placed at a minimum depth of 6".
6. Minimum dimensions of the entrance shall be 20' wide by 50' long, and may be modified as necessary to accommodate site constraints.
7. The edges of the entrance shall be tapered out towards the road to prevent tracking of mud at the edge of the entrance.

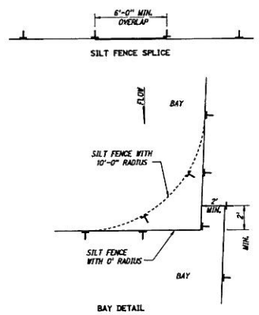
Inspection and Maintenance:

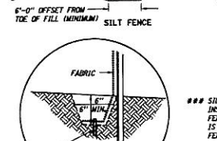
Inspection construction entrances every 7 calendar days and within 24 hours after each rainfall event that produces 1/2" or more of precipitation, or after heavy use. Check for mud and sediment buildup and pad integrity. Make daily inspections during periods of wet weather. Maintenance is required more frequently in wet weather conditions. Reshape the stone pad as needed for drainage and runoff control.

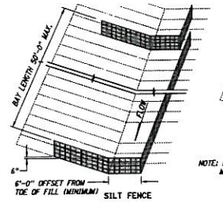
Wash or replace stones as needed and as directed by the inspector. The stone in the entrance should be washed or replaced whenever the entrance fails to reduce mud being carried off-sit by vehicles. Frequent washing will extend the useful life of stone.

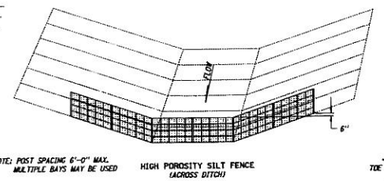
Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Flushing should only be used when the water can be discharged to sediment trap or basin.

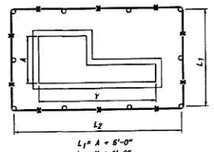
Repair any broken pavement immediately.

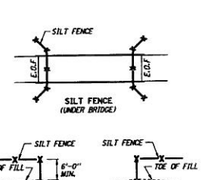


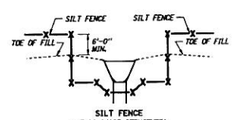


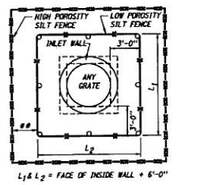




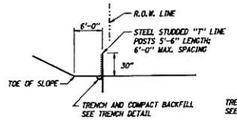


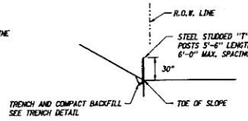


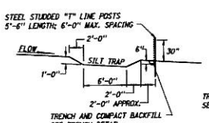


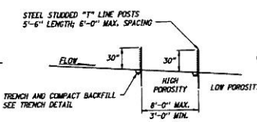


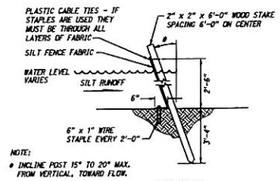
NOTE:
SILT FENCE SHOULD BE 30" ABOVE GRADE (MAY VARY)
SILT FENCE MINIMUM ROLL WIDTH:
LOW POROSITY = 42"
HIGH POROSITY = 42"
LOW PROFILE = 36"
COIR SILT FENCE = 36"
FOR EACH STEEL STUDDED "T" LINE POST, 3 PLASTIC CABLE TIES ARE REQUIRED.

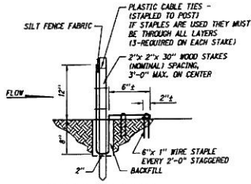


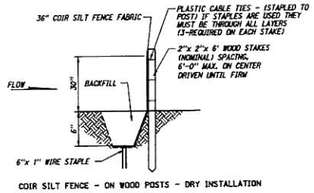












STANDARD NDOR SILT FENCE DETAILS

SWPP

REGISTERED PROFESSIONAL ENGINEER
THOMAS C. WERBLOW
E-4161
STATE OF NEBRASKA

Know what's below. Call before you dig.
NE-DIGGERS.COM
CONTRACTOR SHALL CONTACT DIGGERS HOTLINE OF NEBRASKA PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL EXERCISE EVERY PRECAUTION TO PREVENT DAMAGE TO ANY PUBLIC OR PRIVATE UTILITY LINE OR APPURTENANCE AND SHALL BE LIABLE FOR ANY DAMAGE INCURRED AS A RESULT OF HIS OPERATIONS. ALL UTILITIES SHALL BE ADEQUATELY NOTIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES. SERVICE CONNECTIONS ARE NOT SHOWN EXCEPT AS NOTED. EXISTING UTILITIES SIZES AND LOCATION BOTH HORIZONTAL AND VERTICAL ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION BY THE CONTRACTOR.

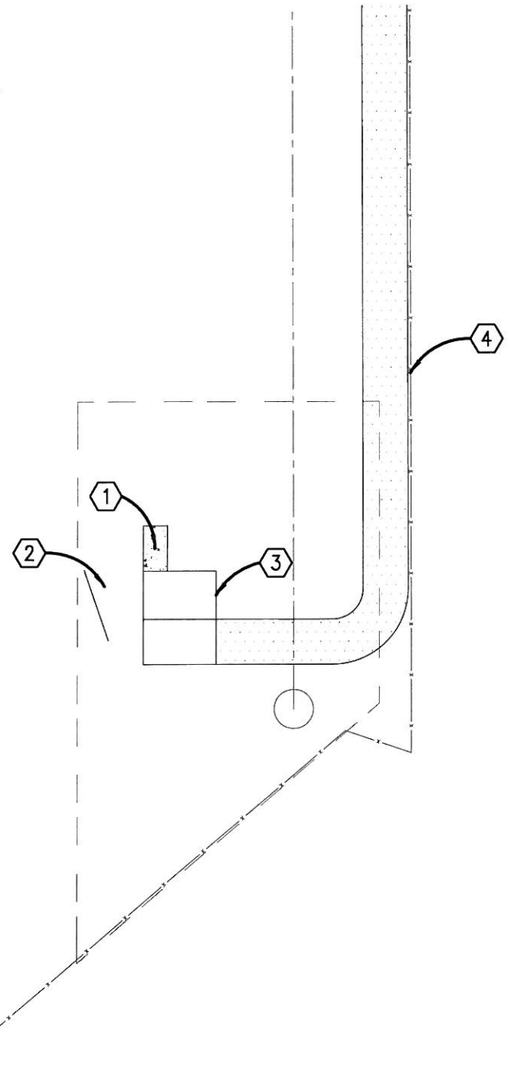
T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Improvements 2009
Ogallala, Nebraska

PROJECT:
REVISIONS: 1 2 3 4
DRAWN BY:
APPROVED BY:
DATE:
DWG.:
SCALE: As Shown
SHEET: C19

SHEET NOTES

1. LOCATION OF NEW GENERATOR SET. GENERATOR PAD BY OTHERS.
2. APPROXIMATE UTILITY TRANSFORMER LOCATION. COORDINATE EXACT LOCATION WITH NEBRASKA PUBLIC POWER.
3. WELL PUMP BUILDING.
4. UTILITY ROUTE TO WATER TOWER.



NORTH

N

SITE PLAN – MECHANICAL & ELECTRICAL

SCALE: 1" = 50'-0"

GENERAL NOTES

A. COORDINATE ROUTING OF NEW UNDERGROUND UTILITIES WITH EXISTING. LOCATE AND PROTECT EXISTING UTILITIES PRIOR TO STARTING WORK. REFER TO CIVIL PLANS FOR KNOWN EXISTING SITE UTILITIES.

B. PROVIDE WARNING TAPE ABOVE EXTERIOR UNDERGROUND ELECTRICAL AND TELECOMMUNICATION ROUTES WHERE TRENCHING. CONTRACTOR HAS THE OPTION TO TRENCH OR BORE.

C. HAND DIG AS NECESSARY TO ENSURE PROPER PROTECTION OF EXISTING UTILITIES AND MATERIALS.

D. PROVIDE TRACER WIRE WITHIN ELECTRICAL AND TELECOMMUNICATIONS CONDUITS TO BE UTILIZED IN THE FUTURE.

E. PROVIDE TEMPORARY POWER AS NECESSARY FOR OTHER TRADES TO PROCEED WITH WORK.

F. COORDINATE EXACT LOCATION FOR ELECTRICAL UTILITY ROUTING TO SITE WITH NEBRASKA PUBLIC POWER.

G. ENTIRE SCOPE OF PROJECT IS NOT SHOWN ON THIS PLAN. REFER TO CIVIL PLANS FOR SCOPE.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY J. HAUSER
E-11315
11/22/11
STATE OF NEBRASKA

PROFESSIONAL MECHANICAL ENGINEER
ERIC G. SHERMAN
E-11322
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SES SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

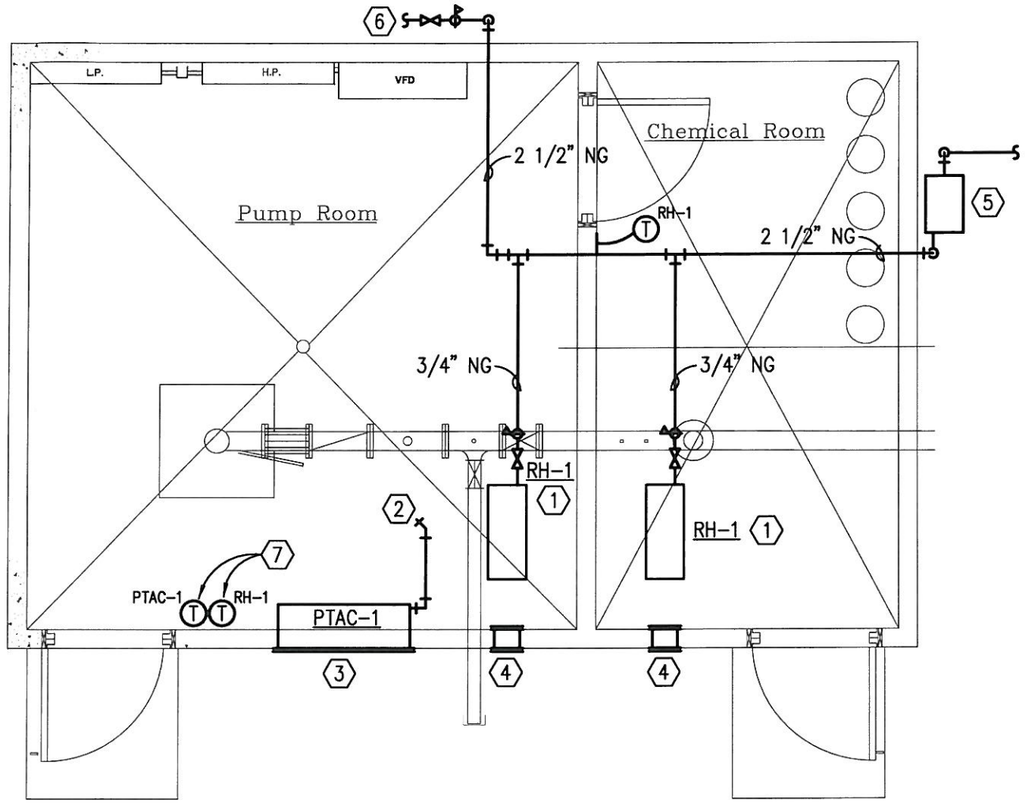
SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013

Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: ME1



NORTH

N

WELL HOUSE PLAN – MECHANICAL

SCALE: 1/4" = 1'-0"

SHEET NOTES

1. INSTALL RADIANT HEATER RH-1 AS REQUIRED BY EQUIPMENT MANUFACTURER.
2. DIRECT COOLING COIL CONDENSATE PIPING OUTLET FROM PACKAGED TERMINAL AIR CONDITIONER PTAC-1 TO FLOOR DRAIN.
3. OUTSIDE AIR LOUVER FOR PTAC-1 SHALL BE INSTALLED 6" ABOVE GRADE (MINIMUM).
4. INSTALL EXHAUST LOUVER AND GRILLE WITH BUG SCREEN AT HIGHEST POINT IN WALL ADJACENT TO RH-1. INSTALL 9"x9" COMBUSTION AIR INTAKE LOUVER AND GRILLE WITH BUG SCREEN IN WALL 18" A.F.F. DIRECTLY BELOW RH-1.
5. 10 PSIG NATURAL GAS SERVICE BY SOURCE GAS. PROVIDE ISOLATION VALVE AND REGULATE TO 2 PSIG. APPROX. 1,700 MBH TOTAL CONNECTED LOAD. APPROX. 65 FT LONGEST RUN (INCLUDES 25% FOR VALVES/FITTINGS). COORDINATE NATURAL GAS SERVICE WITH CIVIL DRAWINGS AND SERVICE PROVIDER.
6. PROVIDE NATURAL GAS PIPING CONNECTION AND ASSOCIATED APPURTENANCES TO GENERATOR. COORDINATE LOCATION WITH ELECTRICAL DRAWINGS.
7. PROVIDE INSULATED BASE FOR THERMOSTAT.

GENERAL NOTES

A. CONTRACTOR SHALL REFER TO THE DRAWINGS OF ALL TRADES TO FAMILIARIZE THEMSELVES WITH EXTENT OF WORK.

B. THESE DRAWINGS ARE NECESSARILY DIAGRAMMATIC IN NATURE. NOT ALL FITTINGS, OFFSETS, VENTS OR DRAINS ARE SHOWN. THE CONTRACTOR SHALL INCLUDE ALL FITTINGS, OFFSETS, VENTS, DRAINS, AND DEVICES REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING SYSTEM.

C. PIPING SHALL NOT BE ROUTED OVER ELECTRICAL EQUIPMENT. WHERE ROUTING OVER SUCH EQUIPMENT IS UNAVOIDABLE, CONTRACTOR SHALL COORDINATE WITH OWNER, DESIGN TEAM, AHJ, AND OTHER TRADES REGARDING LOCATION OF PANELS AND UTILITY ROUTING AND SHALL PROVIDE DRIP PANS UNDER ALL UTILITIES WITH DRAIN PIPING AS REQUIRED.

D. PROTECT ALL PIPING DURING CONSTRUCTION. PIPING ENDS SHALL BE COVERED AND SEALED TO PREVENT THE COLLECTION OF DUST AND DEBRIS. CLEAN ALL INTERIOR SURFACES PRIOR TO INSTALLATION AND PROTECT ONCE INSTALLED.

PROFESSIONAL MECHANICAL ENGINEER
ERIC G. SHERMAN
E-11322
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT:
REVISIONS: 1 2 3 4
DRAWN BY: BMS
APPROVED BY: BMS
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: M1

MECHANICAL SPECIFICATIONS

SECTION 15010 – GENERAL PROVISIONS

1. COORDINATE WORK WITH CIVIL, ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL DRAWINGS WHICH MAY DESIGNATE WORK TO BE ACCOMPLISHED.
2. WHERE FIXTURES AND EQUIPMENT ARE PROVIDED BY OTHERS, PROVIDE ROUGH-INS OF PIPING, DUCTS, NECESSARY TRAPS, STOPS, AND SUPPLIES, AND MAKE FINAL CONNECTIONS TO FIXTURES AND EQUIPMENT.
3. WORK SHALL MEET REQUIREMENTS OF LOCAL CODES, ORDINANCES, AND UTILITY COMPANIES. ADHERE TO CONTRACT DOCUMENTS WHERE MORE STRICT REQUIREMENTS ARE SPECIFIED.
4. PROVIDE SHOP DRAWINGS ON MECHANICAL EQUIPMENT, DUCTWORK, AND CONTROL SYSTEMS.
5. COORDINATE WORK SO IT PROCEEDS WITH MINIMUM OF INTERFERENCE WITH OTHER TRADES.
6. MAKE PIPING CONNECTIONS TO EQUIPMENT WITH UNIONS OR FLANGES TO PERMIT DISMANTLING. PROVIDE SLEEVES, FRAMES, AND WALL PIPES FOR PIPES AND DUCTS PASSING THROUGH CONCRETE FLOORS AND WALLS. COORDINATE WITH OTHER TRADES AND INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PROVIDE VALVES ON PIPING WHEREVER SHOWN OR SPECIFIED.

SECTION 15195 – NATURAL GAS PIPING

1. WORK IS TO BE ACCEPTABLE UNDER UNIFORM PLUMBING CODE, NATIONAL FUEL GAS CODE AND NFPA OR ACCEPTED AS SUITABLE FOR PROPOSED USE UNDER AUTHORITY HAVING JURISDICTION.

SECTION 15542 – GAS-FIRED RADIANT HEATERS

1. THE UNIT AS SPECIFIED HEREIN AND DEFINED IN THE SCHEDULE SHALL BE A FACTORY-ASSEMBLED AND TESTED UNIT; CONSISTING OF HEATER, WALL MOUNTING BRACKET, GAS CONTROL VALVE, POWERPILE GENERATOR, EXHAUST VENT, THERMOSTAT, AND THERMOSTAT CABLE.
2. INSTALL AND CONNECT GAS-FIRED RADIANT HEATER AND ASSOCIATED FUEL AND VENT FEATURES AND SYSTEMS ACCORDING TO NFPA, APPLICABLE LOCAL CODES AND REGULATIONS, AND MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.

SECTION 15735 – SELF-CONTAINED AIR-CONDTIONERS

1. THE UNIT AS SPECIFIED HEREIN AND DEFINED IN THE SCHEDULE SHALL BE A SELF-CONTAINED, FACTORY-ASSEMBLED AND -WIRED UNIT; CONSISTING OF CABINET, COMPRESSOR, EVAPORATOR FAN, EVAPORATOR COIL, AIR FILTERS, INTEGRAL CONDENSING UNIT, ELECTRIC-RESISTANCE HEATING COIL, AND CONTROLS; AND FULLY CHARGED WITH REFRIGERANT AND OIL.
2. DISCONNECT SWITCH SHALL BE FACTORY MOUNTED ON EQUIPMENT.
3. CABINET FRAME AND PANELS SHALL BE GALVANIZED-STEEL WITH BAKED-ENAMEL CORROSION RESISTANT FINISH WITH ACCESS DOORS OR PANELS.

INFRARED HEATER SCHEDULE

MARK	FUEL	MAX. OPERATING WEIGHT [LBS]	MAX. SIZE [LxWxH] [IN.]	OPERATING PRESSURE [IN. WC]	CAPACITY [MBH]	ELECTRIC DATA				MANUFACTURER	MODEL	REMARKS
						AMPS	VOLTS/PHASE	CONTROL DEVICE	REMARKS			
RH-1	NG	20	29.75x12.25x7	11-14	22.0	–	–	–	(1)	MR. HEATER	HEATSTAR MH25LP	(2)(3)(4)

REMARKS
(1) NO ELECTRICAL CONNECTION REQUIRED.
(2) PROVIDE COMBUSTION AIR AND EXHAUST VENTING PER SHEET NOTES ON DRAWING M1.
(3) PROVIDE WALL MOUNTING HARDWARE, GAS CONTROL VALVE, THERMOSTAT AND ALL OTHER ASSOCIATED APPURTENANCES REQUIRED FOR A COMPLETE AND WORKING SYSTEM.
(4) PROVIDE ALL VALVES, REGULATORS, GAUGES, PIPING, DIRT LEG, SLEEVES, SEALS AND ACCESSORIES AS REQUIRED FOR A COMPLETE AND WORKING SYSTEM.

PACKAGED TERMINAL AIR CONDITIONING UNIT SCHEDULE

MARK	MAX. SIZE (LxWxH) [IN.]	AIRFLOW [CFM]	COOLING [MBH]	COOLING [EER]	HEATING [MBH]	ELECTRICAL DATA		MANUFACTURER	MODEL	REMARKS
						MCA	VOLTS/PHASE			
PTAC-1	42x16x13.5	310	14.0	9.3	9.5	19.0	208/1	FRIEDRICH	PDE15K3S	(1)(2)(3)

REMARKS
(1) PROVIDE DISCONNECT.
(2) PROVIDE THERMOSTAT, WALL LOUVER, SLEEVE, UNIT BASE, AND INTERIOR DRAIN KIT.
(3) PROVIDE UNIT WITH DX COOLING COIL AND ELECTRIC HEATING COIL.

PROFESSIONAL MECHANICAL ENGINEER
ERIC G. SHERMAN
E-11322
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

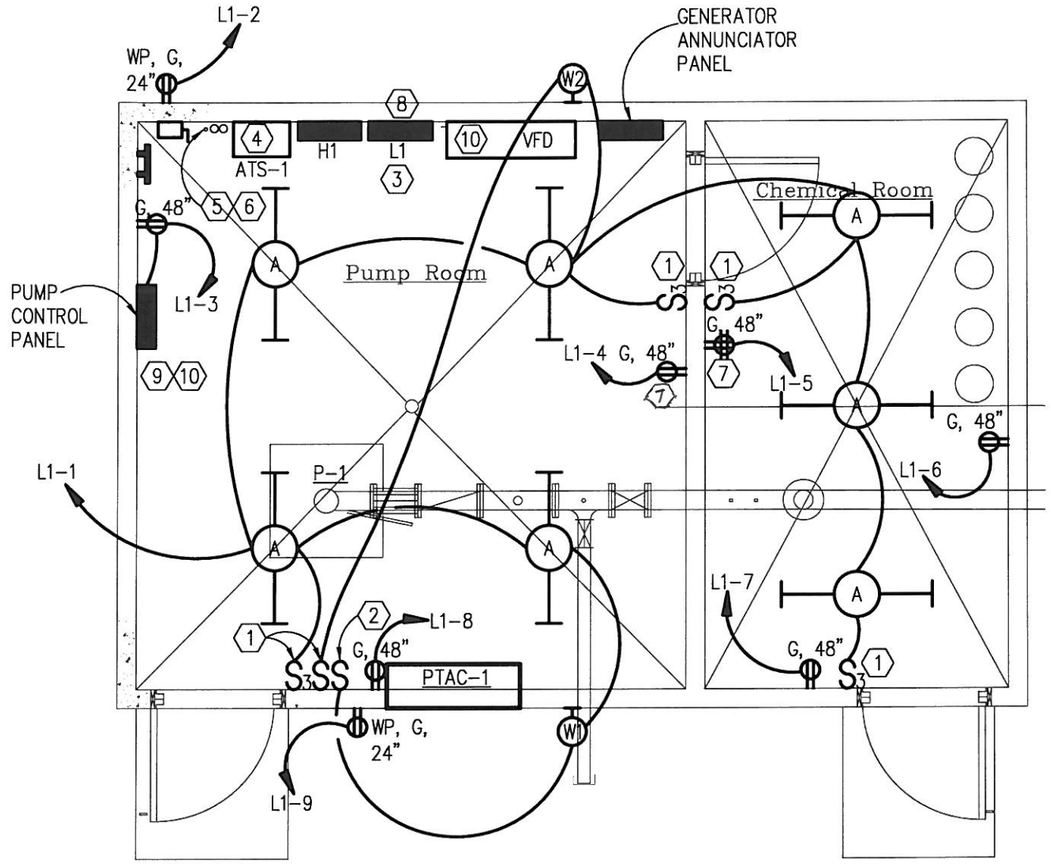
SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: BMS
APPROVED BY: BMS
DATE: 11/22/13
DWG.:
SCALE: NONE
SHEET: M2



NORTH

WELL HOUSE PLAN – ELECTRICAL

SCALE: 1/4" = 1'-0"

ELECTRICAL SYMBOLS

LIGHTING AND POWER "X" INDICATES FIXTURE NUMBER IN SCHEDULE

(X)H	WALL MOUNT FIXTURE	H(X)H	LED STRIP LIGHT
S	SWITCH – SINGLE POLE	S_3	SWITCH – 3-WAY
=⊖	RECEPTACLE – DUPLEX	=⊖G	RECEPTACLE – DUPLEX – GFCI
▬	PANELBOARD	⟶	HOMERUN TO PANEL
⌒	BRANCH CIRCUIT	▭	ENCLOSED CIRCUIT BREAKER
⊤	GROUND BAR		

GENERAL NOTES

A. ITEMS INDICATED 'WP' SHALL BE WEATHERPROOF.

B. MAINTAIN PROPER NEC WORKING CLEARANCES FOR ELECTRICAL EQUIPMENT.

C. ELECTRICAL CONTRACTOR SHALL PROVIDE RACEWAY AND CONDUCTORS TO CONNECT WELL PUMP, VFD, AND CONTROLLER. VERIFY REQUIREMENTS WITH ACTUAL EQUIPMENT.

SHEET NOTES

(1) PROVIDE WATTSTOPPER TS-400 OR EQUIVALENT TIME SWITCH. SWITCHES WITH SUBSCRIPT "3" SHALL BE CONNECTED FOR 3-WAY CONTROL OF LUMINAIRES.

(2) PROVIDE WATTSTOPPER RT-200 OR EQUIVALENT ASTRONOMICAL TIME SWITCH. SWITCH SHALL ENABLE LUMINAIRES WITH INTEGRAL OCCUPANCY SENSORS TO TURN ON FROM DUSK TO DAWN.

(3) PROVIDE 15 KVA MINI POWER CENTER WITH COPPER BUSSING AND BOLT-ON CIRCUIT BREAKERS, CUTLER-HAMMER P48G28T15CUB OR EQUIVALENT.

(4) PROVIDE 1" CONDUIT FROM ATS TO GENERATOR FOR GENERATOR START CONTROLS BY CONTRACTOR. PROVIDE 1" CONDUIT FROM ATS TO PUMP CONTROL PANEL FOR START SIGNAL PROVIDED BY OTHERS.

(5) PROVIDE (1) 1" CONDUIT STUBBED UNDERGROUND 5' FROM BUILDING FOOTPRINT AND CAPPED FOR TELECOMMUNICATIONS CABLING.

(6) PROVIDE (2) 2-1/2" SPARE CONDUITS STUBBED UNDERGROUND 5' FROM BUILDING FOOTPRINT AND CAPPED.

(7) INTERLOCK DEDICATED CHEMICAL FEED PUMP RECEPTACLE WITH WELL PUMP VFD SO THAT THE CHEMICAL FEED PUMP ONLY RUNS WHEN THE WELL PUMP IS RUNNING. COORDINATE EXACT LOCATION AND QUANTITY PRIOR TO ROUGH-IN.

(8) PROVIDE 20A, 120V CIRCUIT TO GENERATOR FOR ANCILLARY SYSTEMS (E.G. BATTERY CHARGER, JACKET HEATER).

(9) PROVIDE THE FOLLOWING CONNECTIONS FROM THE PUMP CONTROL PANEL TO ANCILLARY SYSTEM COMPONENTS:
- FLOW METER – 18/2 SHIELDED TWISTED PAIR
- WELL LEVEL TRANSDUCER –18/2 SHIELDED TWISTED PAIR
- DISCHARGE PRESSURE TRANSDUCER – 18/2 SHIELDED TWISTED PAIR
- CHEMICAL SCALES – 18/2 SHIELDED TWISTED PAIR
- CHEMICAL FEED PUMP – 18/2 SHIELDED TWISTED PAIR

(10) VFD AND PUMP CONTROL PANEL SHALL BE FURNISHED BY HOA AND INSTALLED BY CONTRACTOR. CONTRACTOR SHALL COORDINATE ALL INSTALLATIONS WITH HOA PRIOR TO BID. CONTACT LINCOLN WILLIAMS – (402) 430-8761.

INSTALL GREEN INSULATED GROUND WIRE WITH LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.

INSTALL INDIVIDUAL (DEDICATED) NEUTRAL CONDUCTORS FOR EACH 120V OR 277V PHASE CONDUCTOR SERVED FROM A SINGLE POLE CIRCUIT BREAKER

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

K:\Logos\SES Ellison.jpg
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013

Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E1

FEEDER SCHEDULE

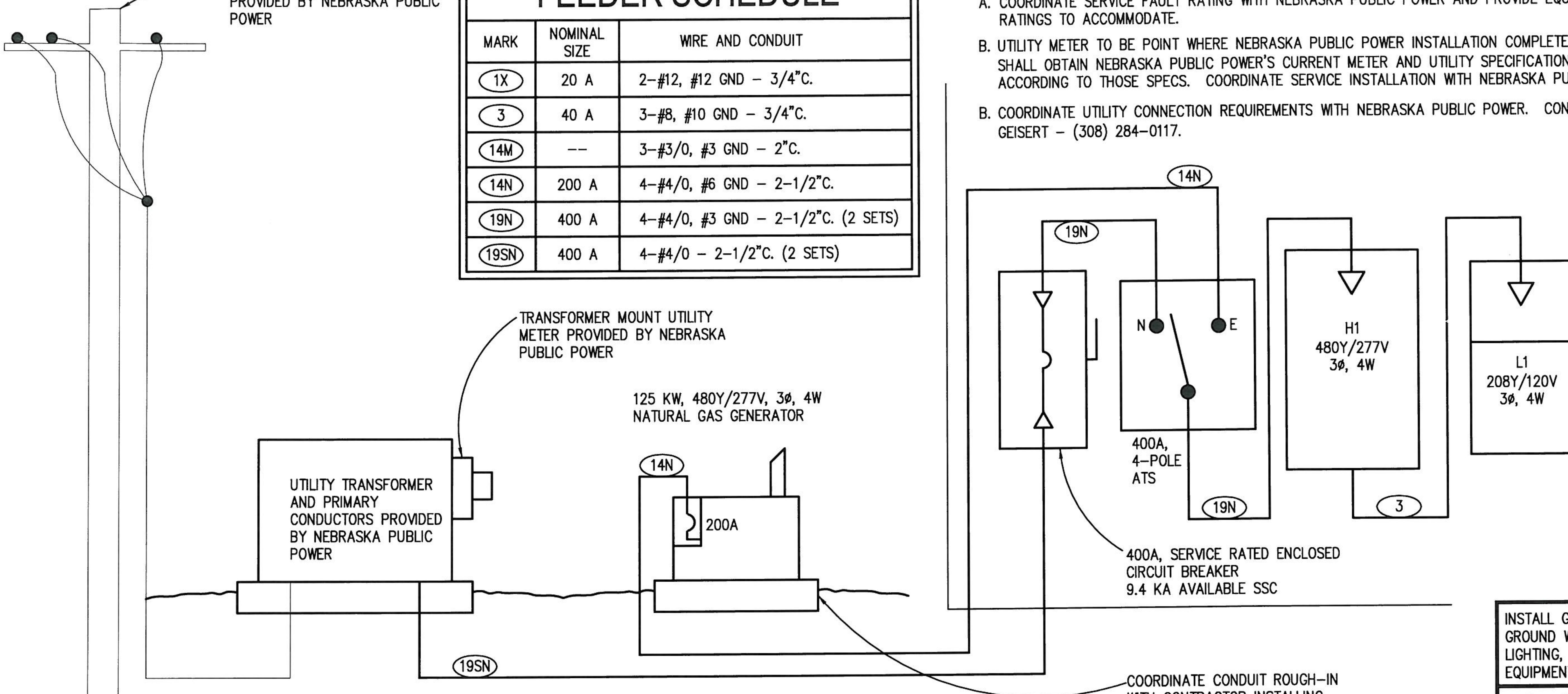
MARK	NOMINAL SIZE	WIRE AND CONDUIT
1X	20 A	2-#12, #12 GND - 3/4"C.
3	40 A	3-#8, #10 GND - 3/4"C.
14M	--	3-#3/0, #3 GND - 2"C.
14N	200 A	4-#4/0, #6 GND - 2-1/2"C.
19N	400 A	4-#4/0, #3 GND - 2-1/2"C. (2 SETS)
19SN	400 A	4-#4/0 - 2-1/2"C. (2 SETS)

GENERAL NOTES

A. COORDINATE SERVICE FAULT RATING WITH NEBRASKA PUBLIC POWER AND PROVIDE EQUIPMENT WITH RATINGS TO ACCOMMODATE.

B. UTILITY METER TO BE POINT WHERE NEBRASKA PUBLIC POWER INSTALLATION COMPLETES. CONTRACTOR SHALL OBTAIN NEBRASKA PUBLIC POWER'S CURRENT METER AND UTILITY SPECIFICATION AND CONNECT ACCORDING TO THOSE SPECS. COORDINATE SERVICE INSTALLATION WITH NEBRASKA PUBLIC POWER.

B. COORDINATE UTILITY CONNECTION REQUIREMENTS WITH NEBRASKA PUBLIC POWER. CONTACT GERALD GEISERT - (308) 284-0117.

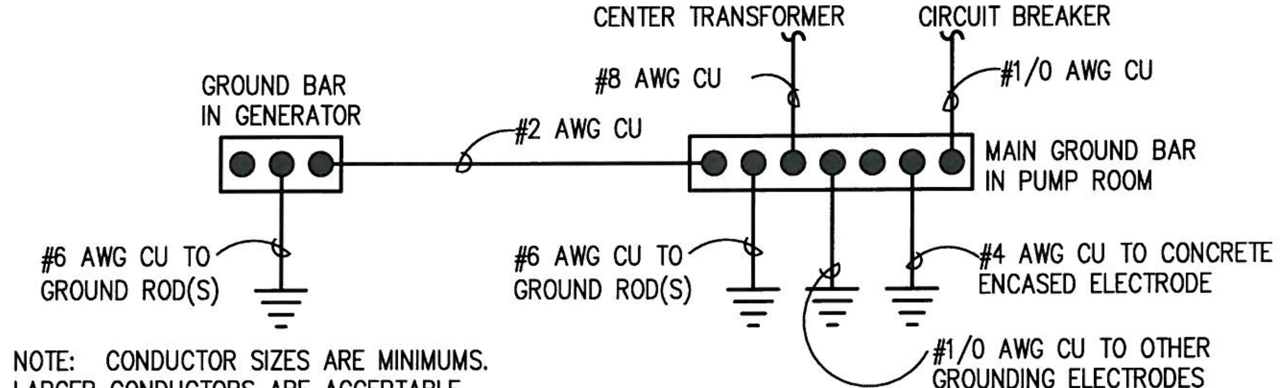


WELL HOUSE ELECTRICAL SCHEMATIC

SCALE: NTS

INSTALL GREEN INSULATED GROUND WIRE WITH LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.

INSTALL INDIVIDUAL (DEDICATED) NEUTRAL CONDUCTORS FOR EACH 120V OR 277V PHASE CONDUCTOR SERVED FROM A SINGLE POLE CIRCUIT BREAKER



NOTE: CONDUCTOR SIZES ARE MINIMUMS. LARGER CONDUCTORS ARE ACCEPTABLE. COORDINATE WITH LUG SIZING AT EQUIPMENT.

WELL HOUSE GROUNDING RISER

SCALE: NTS

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013

Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E2

LIGHTING FIXTURE SCHEDULE

FIXT NO.	MANUFACTURER	SUBS. (NOTE B)	CATALOG NO. (NOTE A)	LAMP TYPE	VOLTS	INPUT WATTS	MOUNTING	DESCRIPTION	REMARKS
A	LITHONIA	Y	MNSL MV M6	LED	120	24	SURFACE	LED STRIP LIGHT	--
W1	LITHONIA	Y	OFLR 9LC 120 MO BZ	LED	120	31	WALL	LED FLOODLIGHT WITH ADJUSTABLE HEADS AND OCCUPANCY SENSOR	--
W2	LITHONIA	Y	CSXW LED 30C 700 40K T4M MVOLT DDBXD	LED	120	70	WALL	EXTERIOR LED WALL PACK	--

GENERAL NOTES: (LIGHTING FIXTURE SCHEDULE)

A. CATALOG NUMBER VERIFICATION – CONTRACTOR SHALL VERIFY LIGHTING FIXTURE INSTALLATION REQUIREMENTS AND CATALOG NUMBER PRIOR TO ORDERING.

B. SUBSTITUTIONS – WHERE INDICATED WITH 'N' (NO), NO SUBSTITUTIONS WILL BE ACCEPTED. WHERE INDICATED WITH 'P' (PRIOR APPROVAL), SUBSTITUTIONS MUST BE APPROVED PRIOR TO BID WITH ACCEPTANCE ISSUED BY ADDENDUM. WHERE INDICATED WITH 'Y' (YES), THE FOLLOWING MANUFACTURER'S ARE CONSIDERED ACCEPTABLE EQUIVALENT MANUFACTURER'S, PROVIDED THE EQUIVALENT FIXTURE IS OF THE SAME QUALITY, EFFICIENCY, PERFORMANCE AND CHARACTERISTICS AS THAT SCHEDULED:
   1. ACUITY BRANDS
   2. COOPER
   3. HUBBELL
   4. WILLIAMS

   SEE PROJECT SPECIFICATIONS FOR SPECIFIC MANUFACTURER/MODEL EQUIVALENCY OF COMMONLY USED LIGHTING FIXTURE TYPES. ABSENCE OF A SELECTION INDICATES THAT PRIOR APPROVALS ARE REQUIRED.

LIGHTING PANEL SCHEDULE

PANEL DESIGNATION	QUANTITY AND SIZE BRANCHES: ACTIVE	QUANTITY AND SIZE BRANCHES: SPARE	REMARKS
L1 • 208Y/120V, 3ø, 4W WITH GROUND BAR MINI POWER CENTER • 50A MAIN CIRCUIT BREAKER • 15 KVA TRANSFORMER • COPPER BUSSING • BOLT–ON CIRCUIT BREAKERS • 1 KA AVAILABLE SSC	(1) 20A/2P, (10) 20A/1P	(4) 20/1P	--

GENERAL NOTES: (LIGHTING PANEL SCHEDULE)

1. CIRCUIT BREAKER SUFFIX 'S' OR 'ST' – PROVIDE SHUNT TRIP CIRCUIT BREAKER.
2. CIRCUIT BREAKER SUFFIX 'G' OR 'GFCI' – PROVIDE GFCI CIRCUIT BREAKER.
3. CIRCUIT BREAKER SUFFIX 'GFP' – PROVIDE GFP CIRCUIT BREAKER.
4. PANEL AIC (INTERRUPTING) RATING SHALL BE MINIMUM 110% OF THE AVAILABLE SCC (SHORT CIRCUIT CURRENT).

EQUIPMENT CONNECTION SCHEDULE

MARK	DESCRIPTION	QTY HP/KW/A	VOLTAGE–PHASE	MCA MOCP	STARTER/ CONTROLLER	CONTROL TYPE	DISCONNECT	FEEDER	CIRCUIT NUMBER O/C PROTECTION	GEN	KEY NOTES
PTAC–1	PTAC	--	208/1	19 20	INT	INT	BY MECH	(1X)	L1–10,11 20/2	Y	--
P–1	WELL PUMP	125 HP	480/3	195 400	VFD	OTHERS	INT	(14M)	H1–2 400/3	Y	--

GENERAL NOTES: (EQUIPMENT CONNECTION SCHEDULE)

A. "STARTER/CONTROLLER" – PROVIDE STARTER AND ASSOCIATED CONNECTIONS TO EQUIPMENT AND BRANCH CIRCUIT:
   • "VFD" = VFD FURNISHED BY HOA, INSTALLED BY ELECTRICAL CONTRACTOR.

B. "CONTROL TYPE" – PROVIDE CONTROL AND CONNECTIONS:
   • "OTHERS" = CONTROLS PROVIDED BY HOA. ELECTRICAL CONTRACTOR SHALL PROVIDE RACEWAY FOR CONTROLS WIRING.

C. "DISCONNECT" – PROVIDE DISCONNECT/RECEPTACLE AT EQUIPMENT LOCATION AND ASSOCIATED CONNECTION TO EQUIPMENT AND BRANCH CIRCUIT:
   • LOCATE RECEPTACLE OR JUNCTION BOX TO DIRECTLY SERVE EQUIPMENT. COORDINATE EXACT LOCATION WITH ARCHITECT, ARCHITECTURAL DETAILS, AND EQUIPMENT MANUFACTURER'S REQUIREMENTS.

DISTRIBUTION PANEL SCHEDULE

DESIGNATION	CIRCUIT NUMBER	NAMEPLATE DESIGNATION	ACTIVE	SPARE	SPACE	REMARKS
H1 • 480Y/277V. 3ø, 4W WITH GROUND BAR WITH INTEGRAL SPD • 400 A M.L.O. • BREAKER DISTRIBUTION • 9.3 KA AVAILABLE SCC	1	L1	(1) 40A/3P	--	--	--
	2	WELL PUMP	(1) 400A/3P	--	--	--

GENERAL NOTES: (DISTRIBUTION PANEL SCHEDULE)

1. CIRCUIT BREAKER SUFFIX 'S' OR 'ST' – PROVIDE SHUNT TRIP CIRCUIT BREAKER.
2. CIRCUIT BREAKER SUFFIX 'G' OR 'GFCI' – PROVIDE GFCI CIRCUIT BREAKER.
3. CIRCUIT BREAKER SUFFIX 'GFP' – PROVIDE GFP CIRCUIT BREAKER.
4. PANEL AIC (INTERRUPTING) RATING SHALL BE MINIMUM 110% OF THE AVAILABLE SCC (SHORT CIRCUIT CURRENT).

PROFESSIONAL ELECTRICAL ENGINEER
TRACY J. HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT: | REVISIONS:
DRAWN BY: NMT | APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E3

ELECTRICAL SPECIFICATIONS

16000 – GENERAL ELECTRICAL REQUIREMENTS

1. CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL CODES AND ORDINANCES.
2. CONTRACTOR SHALL MAKE APPLICATION FOR OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND CERTIFICATES OF INSPECTION.
3. THE OWNER WILL HAVE FIRST RIGHT OF SALVAGE.
4. PROVIDE PRODUCT DATA SUBMITTALS FOR WIRING DEVICES, AUTOMATIC LIGHTING CONTROL DEVICES AND INTERIOR LIGHTING.
5. WARRANTIES
   A. THE CONTRACTOR SHALL WARRANT ALL MATERIALS, WORKMANSHIP AND EQUIPMENT AGAINST DEFECTS FOR A PERIOD OF ONE YEAR AFTER THE DATE OF SUBSTANTIAL COMPLETION. CERTAIN EQUIPMENT SHALL BE WARRANTED BEGINNING AT THE TIME OF FINAL ACCEPTANCE OR FOR LONGER PERIODS OF TIME AS SPECIFIED IN THOSE DIVISIONS OF THE PROJECT MANUAL. THE CONTRACTOR SHALL REPAIR OR REPLACE, AT NO ADDITIONAL COST TO THE OWNER, ANY ITEM WHICH MAY BECOME DEFECTIVE WITHIN THE WARRANT PERIOD. ANY MANUFACTURERS' WARRANTIES CONCERNING ANY ITEM INSTALLED WILL RUN TO THE BENEFIT OF THE OWNER. THE CONTRACTOR AGREES NOT TO VOID OR IMPAIR, OR TO ALLOW SUB–CONTRACTORS TO VOID OR IMPAIR, ANY WARRANTIES REGARDING PRODUCTS OR ITEMS INSTALLED AS PART OF THIS PROJECT. THE REPAIR OF FAULTY WORKMANSHIP SHALL BE CONSIDERED TO BE INCLUDED IN THE CONTRACT.
6. EQUIPMENT ELECTRICAL CONNECTIONS
   A. ELECTRICAL CONNECTIONS IDENTIFIED ARE FOR THE SPECIFIC EQUIPMENT MANUFACTURER AND MODEL SCHEDULED, AND INCLUDES EQUIPMENT FURNISHED BY THIS TRADE OR FURNISHED BY OTHER TRADES UNDER THESE CONTRACT DOCUMENTS. IF THE CONTRACTOR CHOOSES TO PROVIDE EQUIPMENT FOUND ACCEPTABLE FROM A DIFFERENT MANUFACTURER OR MODEL THAN THAT SCHEDULED BUT LISTED AS EQUIVALENT IN THE SPECIFICATIONS, OR OTHERWISE ACCEPTED BY THE ARCHITECT/ENGINEER, THE CONTRACTOR SHALL INCLUDE ELECTRICAL CONNECTION REVISIONS ASSOCIATED WITH THAT MANUFACTURER'S ELECTRICAL CONNECTION REQUIREMENTS IN THEIR BID.

16050 – BASIC ELECTRICAL MATERIALS AND METHODS

1. COORDINATE ARRANGEMENT, MOUNTING, AND SUPPORT OF ELECTRICAL EQUIPMENT WITH OTHER TRADES.
2. STEEL PIPE SLEEVES: ASTM A 53/A 53M, TYPE E, GRADE B, SCHEDULE 40, GALVANIZED STEEL, PLAIN ENDS.
3. COMPLY WITH NECA 1.
4. RIGHT OF WAY: GIVE TO RACEWAYS AND PIPING SYSTEMS INSTALLED AT A REQUIRED SLOPE.
5. APPLY FIRESTOPPING TO ELECTRICAL PENETRATIONS OF FIRE–RATED FLOOR AND WALL ASSEMBLIES.
6. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100.
7. PROVIDE (1) SET OF AS–BUILT DRAWINGS TO OWNER
8. ELECTRICAL DEVICES' MOUNTING HEIGHTS SPECIFIED ON ARCHITECTURAL DOCUMENTS SHALL TAKE PRECEDENCE OVER MOUNTING HEIGHTS INDICATED BELOW:
   A. TYPICAL MOUNTING HEIGHTS (MEASURED TO THE CENTER OF THE DEVICE):
      a. WALL SWITCHES: 48 INCHES.
      b. RECEPTACLE OUTLETS (GENERAL): 18 INCHES.
      c. SPECIAL–PURPOSE OUTLETS: WITHIN 72 INCHES OF INTENDED USE.
      d. COMMUNICATIONS OUTLETS: 18 INCHES.
      e. PUSH BUTTONS: 48 INCHES.
      f. WALL PHONES: 48 INCHES.
9. PROVIDE DEDICATED NEUTRALS FOR ALL BRANCH CIRCUITS.
10. INCIDENTAL EQUIPMENT:
    A. CONTRACTOR SHALL PROVIDE ELECTRICAL CONNECTIONS AND DISCONNECTS FOR INCIDENTAL EQUIPMENT. CONNECTIONS INCLUDE REQUIRED LINE VOLTAGE BRANCH CIRCUITS, VOICE COMMUNICATIONS, AND CONTROL CONNECTIONS. "INCIDENTAL EQUIPMENT" SHALL MEAN EQUIPMENT FURNISHED BY THIS TRADE, OR FURNISHED BY OTHER TRADES UNDER THESE PROJECT DOCUMENTS, AND THAT ARE NOT SPECIFICALLY IDENTIFIED OR LOCATED ON THE PLANS. EXAMPLES INCLUDE, BUT ARE NOT LIMITED TO, BUILDING MANAGEMENT CONTROL PANELS AND CHEMICAL TREATMENT EQUIPMENT. COORDINATE REQUIREMENTS WITH EQUIPMENT PROVIDED AND OTHER ASSOCIATED TRADES.
11. SCHEDULED EQUIPMENT:
    A. PRIOR TO ORDERING AND INSTALLING MATERIAL AND ELECTRICAL EQUIPMENT, VERIFY THAT SCHEDULED CONNECTION REQUIREMENTS ARE CONSISTENT WITH EQUIPMENT BEING PROVIDED. THIS SHALL INCLUDE EQUIPMENT FURNISHED BY THIS TRADE, OR FURNISHED BY OTHER TRADES UNDER THESE PROJECT DOCUMENTS. VERIFICATION IS NECESSARY DUE TO THE UNCERTAINTY OF FINAL EQUIPMENT SELECTION PROVIDED BY OTHER TRADES; INCLUDING, BUT NOT LIMITED TO: ELEVATORS, MECHANICAL EQUIPMENT, ETC.

16060 – GROUNDING AND BONDING

1. COMPLY WITH UL 467 FOR GROUNDING AND BONDING MATERIALS AND EQUIPMENT.
2. INSULATED 600 V COPPER THHN–THWN CONDUCTORS, ASTM B 3 AND 8.
3. INSTALL INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH THE FOLLOWING ITEMS, IN ADDITION TO THOSE REQUIRED BY NFPA 70: FEEDERS AND BRANCH CIRCUITS. LIGHTING CIRCUITS. RECEPTACLE CIRCUITS.
4. GROUND BAR: RECTANGULAR BARS OF ANNEALED COPPER, MINIMUM 1/4 BY 2 INCHES IN CROSS SECTION, WITH INSULATORS. LENGTH AS REQUIRED TO ACCOMMODATE TERMINATIONS.
5. CONNECTORS FOR CONDUCTORS: MECHANICAL CRIMP TYPE, CAST SILICONE BRONZE, LONG CRIMP BARREL AND TWO–BOLT CONNECTION TO GROUND BUS BAR.

16075 – ELECTRICAL IDENTIFICATION

1. USE PERMANENT BLACK MARKER TO LABEL CONCEALED JUNCTION BOX COVERS INDICATING SYSTEM, PANEL AND BRANCH CIRCUIT(S).
2. PROVIDE TYPED PANEL BOARD DIRECTORY FOR EACH PANELBOARD.
3. PROVIDE UNIQUE LABEL ON EACH WIRING DEVICE COVERPLATE INDICATING PANELBOARD AND CIRCUIT NUMBER FROM WHICH DEVICE IS SERVED THAT IS CONSISTENT WITH PLANS. PROVIDE MACHINE PRINTED ADHESIVE FILM; CLEAR WITH BLACK PRINTING

16120 – CONDUCTORS AND CABLES

1. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100. COMPLY WITH NFPA 70.
2. COPPER CONDUCTORS: COMPLY WITH NEMA WC 70.
3. CONDUCTOR INSULATION: COMPLY WITH NEMA WC 70 FOR TYPES THHN–THWN AND XHHW.
4. FEEDER AND BRANCH CIRCUITS: COPPER. TYPE THHN–THWN, SINGLE CONDUCTORS IN RACEWAY.
5. SERVICE ENTRANCE AND GENERATOR CIRCUITS: COPPER. TYPE XHHW, SINGLE CONDUCTORS IN RACEWAY.

16130 – RACEWAYS AND BOXES

1. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
2. COMPLY WITH NFPA 70.
3. EMT: ANSI C80.3.
4. SHEET METAL OUTLET AND DEVICE BOXES: NEMA OS 1.
5. CAST–METAL OUTLET AND DEVICE BOXES: NEMA FB 1, FERROUS ALLOY, TYPE FD, WITH GASKETED COVER.
6. CONCEALED IN CEILINGS AND INTERIOR WALLS AND PARTITIONS: EMT
7. RACEWAYS FOR OPTICAL FIBER OR COMMUNICATIONS CABLE: EMT 1" INCH TRADE SIZE MINIMUM.
8. MINIMUM RACEWAY SIZE: 1/2" INCH TRADE SIZE.
9. STEEL OR CAST, COMPRESSION OR SET–SCREW FITTINGS.
10. INSTALL PULL CORDS IN EMPTY CONDUITS USE POLYPROPYLENE OR MONOFILAMENT PLASTIC LINE WITH NOT LESS THAN 200–LB TENSILE STRENGTH.
11. CONNECTION TO VIBRATING EQUIPMENT:
    A. LFMC; LIQUID TIGHT FLEXIBLE METALLIC CONDUIT
12. EXTERIOR CONDUIT:
    A. EXPOSED: RIGID STEEL CONDUIT.
    B. BURIED: PVC SCHEDULE 40. TRANSITION TO STEEL ELBOW BEFORE GOING ABOVE GRADE.

16139 – CABLE TRAYS AND CABLE SUPPORTS

1. USE CABLE SUPPORTS AND FITTINGS LISTED FOR THE CABLE BEING SUPPORTED.

16140 – WIRING DEVICES

1. CONVENIENCE RECEPTACLES, 125 V, 20 A NEMA 5–20R HARD USE SPECIFICATION.
2. SNAP SWITCHES 120/277 20 AMP SPECIFICATION GRADE.
3. FINISHES:
   A. RECEPTACLES: WHITE.
   B. LIGHT SWITCHES: WHITE.
   C. WALL PLATE: 0.035–INCH, SATIN–FINISHED STAINLESS STEEL.
5. COORDINATE COMPATIBILITY OF ALL LIGHTING CONTROL DEVICES WITH LIGHT FIXTURE BEING CONTROLLED.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SES SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013

Ogallala, Nebraska

PROJECT: | REVISIONS: 1 2 3 4

DRAWN BY: NMT | APPROVED BY: JLK

DATE: 11/22/13

DWG.:

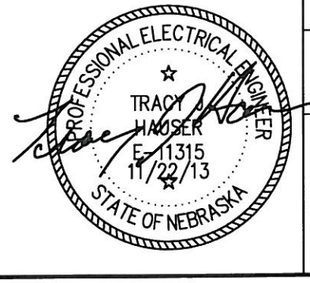
SCALE: As Shown

SHEET: E4

ELECTRICAL SPECIFICATIONS

16231 – PACKAGED ENGINE GENERATORS

1. SUBMITTALS
   A. PRODUCT DATA: FOR EACH TYPE OF PACKAGED ENGINE GENERATOR AND ACCESSORY INDICATED.
   B. SOURCE QUALITY–CONTROL TEST REPORTS.
   C. FIELD QUALITY–CONTROL TEST REPORTS.
   D. OPERATION AND MAINTENANCE DATA.
2. QUALITY ASSURANCE
   A. INSTALLER QUALIFICATIONS: MANUFACTURER'S AUTHORIZED REPRESENTATIVE WHO IS TRAINED AND APPROVED FOR INSTALLATION OF UNITS REQUIRED FOR THIS PROJECT.
   B. MANUFACTURER QUALIFICATIONS: A QUALIFIED MANUFACTURER. MAINTAIN, WITHIN 250 MILES OF PROJECT SITE, A SERVICE CENTER CAPABLE OF PROVIDING TRAINING, PARTS, AND EMERGENCY MAINTENANCE REPAIRS.
   C. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
   D. COMPLY WITH ASME B15.1.
   E. COMPLY WITH NFPA 37.
   F. COMPLY WITH NFPA 70.
   G. COMPLY WITH NFPA 110 REQUIREMENTS FOR LEVEL 2 EMERGENCY POWER SUPPLY SYSTEM.
   H. COMPLY WITH UL 2200, ALL COMPONENTS AS ASSEMBLED.
   I. ENGINE EXHAUST EMISSIONS: COMPLY WITH APPLICABLE STATE AND LOCAL GOVERNMENT REQUIREMENTS. PACKAGED UNIT SHALL BE EPA EMISSIONS CERTIFIED PRIOR TO SHIPMENT.
   J. NOISE EMISSION: COMPLY WITH APPLICABLE STATE AND LOCAL GOVERNMENT REQUIREMENTS FOR MAXIMUM NOISE LEVEL AT ADJACENT PROPERTY BOUNDARIES DUE TO SOUND EMITTED BY GENERATOR SET INCLUDING ENGINE, ENGINE EXHAUST, ENGINE COOLING–AIR INTAKE AND DISCHARGE, AND OTHER COMPONENTS OF INSTALLATION.
3. PROJECT CONDITIONS
   A. ENVIRONMENTAL CONDITIONS: ENGINE–GENERATOR SYSTEM SHALL WITHSTAND THE FOLLOWING ENVIRONMENTAL CONDITIONS WITHOUT MECHANICAL OR ELECTRICAL DAMAGE OR DEGRADATION OF PERFORMANCE CAPABILITY:
      a. AMBIENT TEMPERATURE: MINUS 15 TO PLUS 40 DEG C.
      b. ALTITUDE: SEA LEVEL TO 1000 FEET.
4. MANUFACTURERS
   A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
      a. CATERPILLAR; ENGINE DIV.
      b. ONAN/CUMMINS POWER GENERATION; INDUSTRIAL BUSINESS GROUP.
      c. KOHLER POWER SYSTEMS
5. ENGINE–GENERATOR SET
   A. FACTORY–ASSEMBLED AND –TESTED, ENGINE–GENERATOR SET.
   B. MOUNTING FRAME: MAINTAIN ALIGNMENT OF MOUNTED COMPONENTS WITHOUT DEPENDING ON CONCRETE FOUNDATION; AND HAVE LIFTING ATTACHMENTS.
   C. CAPACITIES AND CHARACTERISTICS:
      a. POWER OUTPUT RATINGS: NOMINAL RATINGS AS INDICATED.
      b. RATED OPERATING CONDITION: STANDBY.
      c. OUTPUT CONNECTIONS: THREE–PHASE, FOUR WIRE.
      d. NAMEPLATES: FOR EACH MAJOR SYSTEM COMPONENT TO IDENTIFY MANUFACTURER'S NAME AND ADDRESS, AND MODEL AND SERIAL NUMBER OF COMPONENT.
   D. GENERATOR–SET PERFORMANCE:
      a. STEADY–STATE VOLTAGE OPERATIONAL BANDWIDTH: 3 PERCENT OF RATED OUTPUT VOLTAGE FROM NO LOAD TO FULL LOAD.
      b. TRANSIENT VOLTAGE PERFORMANCE: NOT MORE THAN 20 PERCENT VARIATION FOR 50 PERCENT STEP–LOAD INCREASE OR DECREASE. VOLTAGE SHALL RECOVER AND REMAIN WITHIN THE STEADY–STATE OPERATING BAND WITHIN THREE SECONDS.
      c. STEADY–STATE FREQUENCY OPERATIONAL BANDWIDTH: 0.5 PERCENT OF RATED FREQUENCY FROM NO LOAD TO FULL LOAD.
      d. STEADY–STATE FREQUENCY STABILITY: WHEN SYSTEM IS OPERATING AT ANY CONSTANT LOAD WITHIN THE RATED LOAD, THERE SHALL BE NO RANDOM SPEED VARIATIONS OUTSIDE THE STEADY–STATE OPERATIONAL BAND AND NO HUNTING OR SURGING OF SPEED.
      e. TRANSIENT FREQUENCY PERFORMANCE: LESS THAN 5 PERCENT VARIATION FOR 50 PERCENT STEP–LOAD INCREASE OR DECREASE. FREQUENCY SHALL RECOVER AND REMAIN WITHIN THE STEADY–STATE OPERATING BAND WITHIN FIVE SECONDS.
      f. OUTPUT WAVEFORM: AT NO LOAD, HARMONIC CONTENT MEASURED LINE TO LINE OR LINE TO NEUTRAL SHALL NOT EXCEED 5 PERCENT TOTAL AND 3 PERCENT FOR SINGLE HARMONICS. TELEPHONE INFLUENCE FACTOR, DETERMINED ACCORDING TO NEMA MG 1, SHALL NOT EXCEED 50 PERCENT.
      g. SUSTAINED SHORT–CIRCUIT CURRENT: FOR A 3–PHASE, BOLTED SHORT CIRCUIT AT SYSTEM OUTPUT TERMINALS, SYSTEM SHALL SUPPLY A MINIMUM OF 250 PERCENT OF RATED FULL–LOAD CURRENT FOR NOT LESS THAN 10 SECONDS AND THEN CLEAR THE FAULT AUTOMATICALLY, WITHOUT DAMAGE TO GENERATOR SYSTEM COMPONENTS.
      h. START TIME: COMPLY WITH NFPA 110, TYPE 10, SYSTEM REQUIREMENTS. FROM THE MOMENT OF NORMAL SOURCE FAILURE, AND WELL PUMP START SIGNAL, THE TRANSFER SWITCH AND GENERATOR SHALL RESTORE SUITABLE POWER SOURCE TO THE LOAD WITHIN 10 SECONDS PER NFPA 110. COORDINATE WITH AND ACCOMMODATE TRANSFER SWITCH PERFORMANCE.
6. ENGINE
   A. FUEL: NATURAL GAS.
   B. RATED ENGINE SPEED: 1800 RPM.
   C. MAXIMUM PISTON SPEED FOR FOUR–CYCLE ENGINES: 2250 FPM.
   D. LUBRICATION SYSTEM: THE FOLLOWING ITEMS ARE MOUNTED ON ENGINE OR SKID:
      a. FILTER AND STRAINER: RATED TO REMOVE 90 PERCENT OF PARTICLES 5 MICROMETERS AND SMALLER WHILE PASSING FULL FLOW.
      b. THERMOSTATIC CONTROL VALVE: CONTROL FLOW IN SYSTEM TO MAINTAIN OPTIMUM OIL TEMPERATURE. UNIT SHALL BE CAPABLE OF FULL FLOW AND IS DESIGNED TO BE FAIL–SAFE.
      c. CRANKCASE DRAIN: ARRANGED FOR COMPLETE GRAVITY DRAINAGE TO AN EASILY REMOVABLE CONTAINER WITH NO DISASSEMBLY AND WITHOUT USE OF PUMPS, SIPHONS, SPECIAL TOOLS, OR APPLIANCES.
   E. COOLANT JACKET HEATER: ELECTRIC–IMMERSION TYPE, FACTORY INSTALLED IN COOLANT JACKET SYSTEM. COMPLY WITH NFPA 110 REQUIREMENTS FOR LEVEL 1 EQUIPMENT FOR HEATER CAPACITY.
   F. GOVERNOR: ADJUSTABLE ISOCHRONOUS, WITH SPEED SENSING.
   G. COOLING SYSTEM: CLOSED LOOP, LIQUID COOLED, WITH RADIATOR FACTORY MOUNTED ON ENGINE–GENERATOR–SET MOUNTING FRAME AND INTEGRAL ENGINE–DRIVEN COOLANT PUMP.
      a. COOLANT: SOLUTION OF 50 PERCENT ETHYLENE–GLYCOL–BASED ANTIFREEZE AND 50 PERCENT WATER, WITH ANTICORROSION ADDITIVES AS RECOMMENDED BY ENGINE MANUFACTURER.
      b. TEMPERATURE CONTROL: SELF–CONTAINED, THERMOSTATIC–CONTROL VALVE MODULATES COOLANT FLOW AUTOMATICALLY TO MAINTAIN OPTIMUM CONSTANT COOLANT TEMPERATURE AS RECOMMENDED BY ENGINE MANUFACTURER.
   H. MUFFLER/SILENCER: CRITICAL TYPE, SIZED AS RECOMMENDED BY ENGINE MANUFACTURER AND SELECTED WITH EXHAUST PIPING SYSTEM TO NOT EXCEED ENGINE MANUFACTURER'S ENGINE BACKPRESSURE REQUIREMENTS.
      a. SOUND LEVEL MEASURED AT A DISTANCE OF 10 FEET FROM EXHAUST DISCHARGE AFTER INSTALLATION IS COMPLETE SHALL BE 85 DBA OR LESS.
   I. AIR–INTAKE FILTER: HEAVY–DUTY, ENGINE–MOUNTED AIR CLEANER WITH REPLACEABLE DRY–FILTER ELEMENT AND "BLOCKED FILTER" INDICATOR.
   J. STARTING SYSTEM: 24–V ELECTRIC, WITH NEGATIVE GROUND.
      a. COMPONENTS: SIZED SO THEY WILL NOT BE DAMAGED DURING A FULL ENGINE–CRANKING CYCLE WITH AMBIENT TEMPERATURE AT MAXIMUM SPECIFIED IN PART 1 "PROJECT CONDITIONS" ARTICLE.
      b. CRANKING CYCLE: AS REQUIRED BY NFPA 110 FOR SYSTEM LEVEL SPECIFIED.
      c. BATTERY: ADEQUATE CAPACITY WITHIN AMBIENT TEMPERATURE RANGE SPECIFIED IN PART 1 "PROJECT CONDITIONS" ARTICLE TO PROVIDE SPECIFIED CRANKING CYCLE AT LEAST TWICE WITHOUT RECHARGING.
      d. BATTERY–CHARGING ALTERNATOR: FACTORY MOUNTED ON ENGINE WITH SOLID–STATE VOLTAGE REGULATION AND 35–A MINIMUM CONTINUOUS RATING.
      e. BATTERY CHARGER: CURRENT–LIMITING, AUTOMATIC–EQUALIZING AND FLOAT–CHARGING TYPE. UNIT SHALL COMPLY WITH UL 1236.



DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E5

ELECTRICAL SPECIFICATIONS
16231 – PACKAGED ENGINE GENERATORS CONTINUED.

7. CONTROL AND MONITORING
   A. AUTOMATIC STARTING SYSTEM SEQUENCE OF OPERATION: WHEN MODE–SELECTOR SWITCH ON THE CONTROL AND MONITORING PANEL IS IN THE AUTOMATIC POSITION, REMOTE–CONTROL CONTACTS IN AUTOMATIC TRANSFER SWITCH AND WELL PUMP START SIGNAL INITIATE STARTING AND STOPPING OF GENERATOR SET. WHEN MODE–SELECTOR SWITCH IS SWITCHED TO THE ON POSITION, GENERATOR SET STARTS. THE OFF POSITION OF SAME SWITCH INITIATES GENERATOR–SET SHUTDOWN. WHEN GENERATOR SET IS RUNNING, SPECIFIED SYSTEM OR EQUIPMENT FAILURES OR DERANGEMENTS AUTOMATICALLY SHUT DOWN GENERATOR SET AND INITIATE ALARMS.
   B. CONFIGURATION: OPERATING AND SAFETY INDICATIONS, PROTECTIVE DEVICES, BASIC SYSTEM CONTROLS, AND ENGINE GAGES SHALL BE GROUPED IN A COMMON CONTROL AND MONITORING PANEL MOUNTED ON THE GENERATOR SET. MOUNTING METHOD SHALL ISOLATE THE CONTROL PANEL FROM GENERATOR–SET VIBRATION.
   C. INDICATING AND PROTECTIVE DEVICES AND CONTROLS: AS REQUIRED BY NFPA 110 FOR LEVEL 2 SYSTEM, AND THE FOLLOWING:
      a. AC VOLTMETER.
      b. AC AMMETER.
      c. AC FREQUENCY METER.
      d. DC VOLTMETER (ALTERNATOR BATTERY CHARGING).
      e. ENGINE–COOLANT TEMPERATURE GAGE.
      f. ENGINE LUBRICATING–OIL PRESSURE GAGE.
      g. RUNNING–TIME METER.
      h. AMMETER–VOLTMETER, PHASE–SELECTOR SWITCH(ES).
      i. GENERATOR–VOLTAGE ADJUSTING RHEOSTAT.
      j. GENERATOR OVERLOAD.
   D. SUPPORTING ITEMS: INCLUDE SENSORS, TRANSDUCERS, TERMINALS, RELAYS, AND OTHER DEVICES AND INCLUDE WIRING REQUIRED TO SUPPORT SPECIFIED ITEMS. LOCATE SENSORS AND OTHER SUPPORTING ITEMS ON ENGINE OR GENERATOR, UNLESS OTHERWISE INDICATED.
   E. COMMON REMOTE AUDIBLE ALARM: COMPLY WITH NFPA 110 REQUIREMENTS FOR LEVEL 1 SYSTEMS. INCLUDE NECESSARY CONTACTS AND TERMINALS IN CONTROL AND MONITORING PANEL.
      a. OVERCRANK SHUTDOWN.
      b. COOLANT LOW–TEMPERATURE ALARM.
      c. CONTROL SWITCH NOT IN AUTO POSITION.
      d. BATTERY–CHARGER MALFUNCTION ALARM.
      e. BATTERY LOW–VOLTAGE ALARM.
8. GENERATOR OVERCURRENT AND FAULT PROTECTION
   A. GENERATOR CIRCUIT BREAKER: MOLDED–CASE, THERMAL–MAGNETIC TYPE; 100 PERCENT RATED; COMPLYING WITH NEMA AB 1 AND UL 489.
      a. TRIPPING CHARACTERISTIC: DESIGNED SPECIFICALLY FOR GENERATOR PROTECTION.
      b. TRIP RATING: MATCHED TO GENERATOR RATING.
      c. SHUNT TRIP: CONNECTED TO TRIP BREAKER WHEN GENERATOR SET IS SHUT DOWN BY OTHER PROTECTIVE DEVICES.
      d. MOUNTING: ADJACENT TO OR INTEGRATED WITH CONTROL AND MONITORING PANEL.
9. GENERATOR, EXCITER, AND VOLTAGE REGULATOR
   A. COMPLY WITH NEMA MG 1.
   B. DRIVE: GENERATOR SHAFT SHALL BE DIRECTLY CONNECTED TO ENGINE SHAFT. EXCITER SHALL BE ROTATED INTEGRALLY WITH GENERATOR ROTOR.
   C. ELECTRICAL INSULATION: CLASS H.
   D. STATOR–WINDING LEADS: BROUGHT OUT TO TERMINAL BOX TO PERMIT FUTURE RECONNECTION FOR OTHER VOLTAGES IF REQUIRED.
   E. CONSTRUCTION SHALL PREVENT MECHANICAL, ELECTRICAL, AND THERMAL DAMAGE DUE TO VIBRATION, OVERSPEED UP TO 125 PERCENT OF RATING, AND HEAT DURING OPERATION AT 110 PERCENT OF RATED CAPACITY.
   F. ENCLOSURE: DRIPPROOF.
   G. INSTRUMENT TRANSFORMERS: MOUNTED WITHIN GENERATOR ENCLOSURE.
   H. VOLTAGE REGULATOR: SOLID–STATE TYPE, SEPARATE FROM EXCITER, PROVIDING PERFORMANCE AS SPECIFIED.
      a. ADJUSTING RHEOSTAT ON CONTROL AND MONITORING PANEL SHALL PROVIDE PLUS OR MINUS 5 PERCENT ADJUSTMENT OF OUTPUT–VOLTAGE OPERATING BAND.
   I. STRIP HEATER: THERMOSTATICALLY CONTROLLED UNIT ARRANGED TO MAINTAIN STATOR WINDINGS ABOVE DEW POINT.
   J. WINDINGS: TWO–THIRDS PITCH STATOR WINDING AND FULLY LINKED AMORTISSEUR WINDING.
   K. SUBTRANSIENT REACTANCE: 12 PERCENT, MAXIMUM.
10. OUTDOOR GENERATOR–SET ENCLOSURE
   A. DESCRIPTION: CUSTOM, SOUND–ATTENUATED REACH–IN STYLE ENCLOSURE. VANDAL–RESISTANT, WEATHERPROOF STEEL HOUSING, WIND RESISTANT UP TO 100 MPH. MULTIPLE PANELS SHALL BE LOCKABLE AND PROVIDE ADEQUATE ACCESS TO COMPONENTS REQUIRING MAINTENANCE. PANELS SHALL BE REMOVABLE BY ONE PERSON WITHOUT TOOLS. INSTRUMENTS AND CONTROL SHALL BE MOUNTED WITHIN ENCLOSURE.
   B. ENGINE COOLING AIRFLOW THROUGH ENCLOSURE: MAINTAIN TEMPERATURE RISE OF SYSTEM COMPONENTS WITHIN REQUIRED LIMITS WHEN UNIT OPERATES AT 110 PERCENT OF RATED LOAD FOR 2 HOURS WITH AMBIENT TEMPERATURE AT TOP OF RANGE SPECIFIED IN SYSTEM SERVICE CONDITIONS.
      a. LOUVERS: FIXED–ENGINE, COOLING–AIR INLET AND DISCHARGE. STORM–PROOF AND DRAINABLE LOUVERS PREVENT ENTRY OF RAIN AND SNOW.
      b. DUCTING: TURNING VANES AND ASSOCIATED DUCT TO DIRECT DISCHARGE AIR UP AND OUT TO TOP OF ENCLOSURE. STORM–PROOF AND DRAINABLE.
11. VIBRATION ISOLATION DEVICES
   A. ELASTOMERIC ISOLATOR PADS: OIL– AND WATER–RESISTANT ELASTOMER OR NATURAL RUBBER, ARRANGED IN SINGLE OR MULTIPLE LAYERS, MOLDED WITH A NONSLIP PATTERN AND GALVANIZED–STEEL BASEPLATES OF SUFFICIENT STIFFNESS FOR UNIFORM LOADING OVER PAD AREA, AND FACTORY CUT TO SIZES THAT MATCH REQUIREMENTS OF SUPPORTED EQUIPMENT.
12. FINISHES
   A. INDOOR AND OUTDOOR ENCLOSURES AND COMPONENTS: MANUFACTURER'S STANDARD FINISH OVER CORROSION–RESISTANT PRETREATMENT AND COMPATIBLE PRIMER.
      a. COLOR: AS SELECTED BY ARCHITECT.
13. SOURCE QUALITY CONTROL
   A. PROTOTYPE TESTING: FACTORY TEST ENGINE–GENERATOR SET USING SAME ENGINE MODEL, CONSTRUCTED OF IDENTICAL OR EQUIVALENT COMPONENTS AND EQUIPPED WITH IDENTICAL OR EQUIVALENT ACCESSORIES.
      a. TESTS: COMPLY WITH NFPA 110, LEVEL 1 ENERGY CONVERTERS AND WITH IEEE 115.
      b. REPORT FACTORY TEST RESULTS WITHIN 10 DAYS OF COMPLETION OF TEST.
14. INSTALLATION
   A. COMPLY WITH PACKAGED ENGINE–GENERATOR MANUFACTURERS' WRITTEN INSTALLATION AND ALIGNMENT INSTRUCTIONS AND WITH NFPA 110.
   B. INSTALL PACKAGED ENGINE GENERATOR TO PROVIDE ACCESS, WITHOUT REMOVING CONNECTIONS OR ACCESSORIES, FOR PERIODIC MAINTENANCE.
   C. INSTALL PACKAGED ENGINE GENERATOR WITH ELASTOMERIC ISOLATOR PADS HAVING A MINIMUM DEFLECTION OF 1 INCH ON 4–INCH–HIGH CONCRETE BASE. SECURE SETS TO ANCHOR BOLTS INSTALLED IN CONCRETE BASES.
   D. INSTALL SCHEDULE 40, BLACK STEEL PIPING WITH WELDED JOINTS AND CONNECT TO ENGINE MUFFLER. INSTALL THIMBLE AT WALL. PIPING SHALL BE SAME DIAMETER AS MUFFLER OUTLET.
      a. INSTALL CONDENSATE DRAIN PIPING TO MUFFLER DRAIN OUTLET FULL SIZE OF DRAIN CONNECTION WITH A SHUTOFF VALVE, STAINLESS–STEEL FLEXIBLE CONNECTOR, AND SCHEDULE 40, BLACK STEEL PIPE WITH WELDED JOINTS.
   E. ELECTRICAL WIRING: INSTALL ELECTRICAL DEVICES FURNISHED BY EQUIPMENT MANUFACTURERS BUT NOT SPECIFIED TO BE FACTORY MOUNTED.
   F. PIPING INSTALLATION REQUIREMENTS ARE SPECIFIED IN DIVISION 15 SECTIONS. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING AND SPECIALTIES.
   G. CONNECT FUEL, COOLING–SYSTEM, AND EXHAUST–SYSTEM PIPING ADJACENT TO PACKAGED ENGINE GENERATOR TO ALLOW SERVICE AND MAINTENANCE.
   H. CONNECT ENGINE EXHAUST PIPE TO ENGINE WITH FLEXIBLE CONNECTOR.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E6

ELECTRICAL SPECIFICATIONS

16231 – PACKAGED ENGINE GENERATORS CONTINUED

I. CONNECT FUEL PIPING TO ENGINES WITH A GATE VALVE AND UNION AND FLEXIBLE CONNECTOR.
   a. NATURAL–GAS PIPING, VALVES, AND SPECIALTIES FOR GAS DISTRIBUTION OUTSIDE THE BUILDING ARE SPECIFIED IN DIVISION 2 SECTION "NATURAL GAS DISTRIBUTION."
   b. NATURAL–GAS PIPING, VALVES, AND SPECIALTIES FOR GAS PIPING INSIDE THE BUILDING ARE SPECIFIED IN DIVISION 15 SECTION "FUEL GAS PIPING."

J. REMOTE ANNUNCIATOR: PROVIDE CABLE IN CONDUIT TO REMOTE ANNUNCIATOR LOCATION.

K. START SIGNAL: PROVIDE CABLE IN CONDUIT FROM AUTOMATIC TRANSFER SWITCHES TO GENERATOR.

L. REMOTE SHUTDOWN SWITCH: PROVIDE REMOTE SHUTDOWN SWITCH WITH TAMPER–RESISTANT WEATHER–PROOF COVER. PROVIDE WITH ENGRAVED LABEL STATING "GENERATOR SHUTDOWN". COORDINATE EXACT LOCATION WITH ENGINEER. PROVIDE CONDUCTORS IN CONDUIT AND CONNECT TO SHUTDOWN GENERATOR.

M: BATTERY CHARGER: PROVIDE CONDUCTORS IN CONDUIT FROM BATTERIES TO LOCAL OR REMOTE BATTERY CHARGER.

15. FIELD QUALITY CONTROL
   A. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.
      a. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY–AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.
   B. TESTS AND INSPECTIONS:
      a. PERFORM TESTS RECOMMENDED BY MANUFACTURER AND EACH ELECTRICAL TEST AND VISUAL AND MECHANICAL INSPECTION (EXCEPT THOSE INDICATED TO BE OPTIONAL) FOR "AC GENERATORS AND FOR EMERGENCY SYSTEMS" SPECIFIED IN NETA ACCEPTANCE TESTING SPECIFICATION. CERTIFY COMPLIANCE WITH TEST PARAMETERS.
      b. NFPA 110 ACCEPTANCE TESTS: PERFORM TESTS REQUIRED BY NFPA 110 THAT ARE ADDITIONAL TO THOSE SPECIFIED HERE INCLUDING, BUT NOT LIMITED TO, SINGLE–STEP FULL–LOAD PICKUP TEST.
      c. BATTERY TESTS: EQUALIZE CHARGING OF BATTERY CELLS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. RECORD INDIVIDUAL CELL VOLTAGES.
         - MEASURE CHARGING VOLTAGE AND VOLTAGES BETWEEN AVAILABLE BATTERY TERMINALS FOR FULL–CHARGING AND FLOAT–CHARGING CONDITIONS. CHECK ELECTROLYTE LEVEL AND SPECIFIC GRAVITY UNDER BOTH CONDITIONS.
         - TEST FOR CONTACT INTEGRITY OF ALL CONNECTORS. PERFORM AN INTEGRITY LOAD TEST AND A CAPACITY LOAD TEST FOR THE BATTERY.
         - VERIFY ACCEPTANCE OF CHARGE FOR EACH ELEMENT OF THE BATTERY AFTER DISCHARGE.
         - VERIFY THAT MEASUREMENTS ARE WITHIN MANUFACTURER'S SPECIFICATIONS.
      d. BATTERY–CHARGER TESTS: VERIFY SPECIFIED RATES OF CHARGE FOR BOTH EQUALIZING AND FLOAT–CHARGING CONDITIONS.
      e. SYSTEM INTEGRITY TESTS: METHODICALLY VERIFY PROPER INSTALLATION, CONNECTION, AND INTEGRITY OF EACH ELEMENT OF ENGINE–GENERATOR SYSTEM BEFORE AND DURING SYSTEM OPERATION. CHECK FOR AIR, EXHAUST, AND FLUID LEAKS.
      f. EXHAUST EMISSIONS TEST: COMPLY WITH APPLICABLE GOVERNMENT TEST CRITERIA.
   C. COORDINATE TESTS WITH TESTS FOR TRANSFER SWITCHES AND RUN THEM CONCURRENTLY.
   D. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEM AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
   E. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
   F. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
   G. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.
   H. RETEST: CORRECT DEFICIENCIES IDENTIFIED BY TESTS AND OBSERVATIONS AND RETEST UNTIL SPECIFIED REQUIREMENTS ARE MET.
   I. REPORT RESULTS OF TESTS AND INSPECTIONS IN WRITING. RECORD ADJUSTABLE RELAY SETTINGS AND MEASURED INSULATION RESISTANCES, TIME DELAYS, AND OTHER VALUES AND OBSERVATIONS. ATTACH A LABEL OR TAG TO EACH TESTED COMPONENT INDICATING SATISFACTORY COMPLETION OF TESTS.

16. DEMONSTRATION
   A. ENGAGE A FACTORY–AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN PACKAGED ENGINE GENERATORS.

17. IDENTIFICATION
   A. EMERGENCY SOURCES: A SIGN SHALL BE PLACED AT THE SERVICE–ENTRANCE EQUIPMENT, INDICATING TYPE AND LOCATION OF ON–SITE EMERGENCY POWER SOURCES.

SECTION 16410 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1. SUBMITTALS
   A. PRODUCT DATA: FOR EACH TYPE OF ENCLOSED SWITCH, CIRCUIT BREAKER, ACCESSORY, AND COMPONENT INDICATED.
      a. ENCLOSURE TYPES AND DETAILS FOR TYPES OTHER THAN NEMA 250, TYPE 1.
      b. CURRENT AND VOLTAGE RATINGS.
      c. SHORT–CIRCUIT CURRENT RATINGS (INTERRUPTING AND WITHSTAND, AS APPROPRIATE).
   B. OPERATION AND MAINTENANCE DATA: FOR ENCLOSED SWITCHES AND CIRCUIT BREAKERS TO INCLUDE IN EMERGENCY, OPERATION, AND MAINTENANCE MANUALS. IN ADDITION TO ITEMS SPECIFIED IN DIVISION 1 SECTION "OPERATION AND MAINTENANCE DATA," INCLUDE THE FOLLOWING:

2. QUALITY ASSURANCE
   A. SOURCE LIMITATIONS: OBTAIN ENCLOSED SWITCHES AND CIRCUIT BREAKERS, OVERCURRENT PROTECTIVE DEVICES, COMPONENTS, AND ACCESSORIES, WITHIN SAME PRODUCT CATEGORY, FROM SINGLE SOURCE FROM SINGLE MANUFACTURER.
   B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
   C. COMPLY WITH NFPA 70.

3. MOLDED–CASE CIRCUIT BREAKERS
   A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
      a. EATON ELECTRICAL INC.; CUTLER–HAMMER BUSINESS UNIT.
      b. GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL – ELECTRICAL DISTRIBUTION.
      c. SIEMENS ENERGY & AUTOMATION, INC.
      d. SQUARE D; A BRAND OF SCHNEIDER ELECTRIC.
   B. GENERAL REQUIREMENTS: COMPLY WITH UL 489, NEMA AB 1, AND NEMA AB 3, WITH INTERRUPTING CAPACITY TO COMPLY WITH AVAILABLE FAULT CURRENTS.
   C. THERMAL–MAGNETIC CIRCUIT BREAKERS: INVERSE TIME–CURRENT ELEMENT FOR LOW–LEVEL OVERLOADS AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT–BREAKER FRAME SIZES 250 A AND LARGER.
   D. FEATURES AND ACCESSORIES:
      a. STANDARD FRAME SIZES, TRIP RATINGS, AND NUMBER OF POLES.
      b. LUGS: MECHANICAL TYPE, SUITABLE FOR NUMBER, SIZE, TRIP RATINGS, AND CONDUCTOR MATERIAL.

4. ENCLOSURES
   A. ENCLOSED SWITCHES AND CIRCUIT BREAKERS: NEMA AB 1, NEMA KS 1, NEMA 250, AND UL 50, TO COMPLY WITH ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION.
      a. INDOOR, DRY AND CLEAN LOCATIONS: NEMA 250, TYPE 1.
      b. OUTDOOR LOCATIONS: NEMA 250, TYPE 3R.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT: | REVISIONS:
DRAWN BY: NMT | APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E7

ELECTRICAL SPECIFICATIONS

SECTION 16415 – TRANSFER SWITCHES

1. SUBMITTALS
   - A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED. INCLUDE RATED CAPACITIES, WEIGHTS, OPERATING CHARACTERISTICS, FURNISHED SPECIALTIES, AND ACCESSORIES.
   - B. FIELD QUALITY-CONTROL TEST REPORTS.
   - C. OPERATION AND MAINTENANCE DATA: FOR EACH TYPE OF PRODUCT TO INCLUDE IN EMERGENCY, OPERATION, AND MAINTENANCE MANUALS. IN ADDITION TO ITEMS SPECIFIED IN DIVISION 1 SECTION "OPERATION AND MAINTENANCE DATA," INCLUDE THE FOLLOWING:
     - a. FEATURES AND OPERATING SEQUENCES, BOTH AUTOMATIC AND MANUAL.
     - b. LIST OF ALL FACTORY SETTINGS OF RELAYS; PROVIDE RELAY-SETTING AND CALIBRATION INSTRUCTIONS, INCLUDING SOFTWARE, WHERE APPLICABLE.
2. QUALITY ASSURANCE
   - A. MANUFACTURER QUALIFICATIONS: MAINTAIN A SERVICE CENTER CAPABLE OF PROVIDING TRAINING, PARTS, AND EMERGENCY MAINTENANCE REPAIRS WITHIN A RESPONSE PERIOD OF LESS THAN EIGHT HOURS FROM TIME OF NOTIFICATION.
   - B. SOURCE LIMITATIONS: OBTAIN AUTOMATIC TRANSFER SWITCHES THROUGH ONE SOURCE FROM A SINGLE MANUFACTURER.
   - C. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
   - D. COMPLY WITH NEMA ICS 1.
   - E. COMPLY WITH NFPA 70.
   - F. COMPLY WITH NFPA 110.
   - G. COMPLY WITH UL 1008 UNLESS REQUIREMENTS OF THESE SPECIFICATIONS ARE MORE STRINGENT.
3. MANUFACTURERS
   - A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
     - a. CATERPILLAR; ENGINE DIV.
     - b. GE ZENITH CONTROLS.
     - c. ONAN/CUMMINS POWER GENERATION; INDUSTRIAL BUSINESS GROUP.
4. GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS
   - A. INDICATED CURRENT RATINGS: APPLY AS DEFINED IN UL 1008 FOR CONTINUOUS LOADING AND TOTAL SYSTEM TRANSFER, UNLESS OTHERWISE INDICATED.
   - B. TESTED FAULT-CURRENT CLOSING AND WITHSTAND RATINGS: ADEQUATE FOR DUTY IMPOSED BY PROTECTIVE DEVICES AT INSTALLATION LOCATIONS IN PROJECT UNDER THE FAULT CONDITIONS INDICATED, BASED ON TESTING ACCORDING TO UL 1008.
   - C. SOLID-STATE CONTROLS: REPETITIVE ACCURACY OF ALL SETTINGS SHALL BE PLUS OR MINUS 2 PERCENT OR BETTER OVER AN OPERATING TEMPERATURE RANGE OF MINUS 20 TO PLUS 70 DEG C.
   - D. RESISTANCE TO DAMAGE BY VOLTAGE TRANSIENTS: COMPONENTS SHALL MEET OR EXCEED VOLTAGE-SURGE WITHSTAND CAPABILITY REQUIREMENTS WHEN TESTED ACCORDING TO IEEE C62.41. COMPONENTS SHALL MEET OR EXCEED VOLTAGE-IMPULSE WITHSTAND TEST OF NEMA ICS 1.
   - E. ELECTRICAL OPERATION: ACCOMPLISH BY A NONFUSED, MOMENTARILY ENERGIZED SOLENOID OR ELECTRIC-MOTOR-OPERATED MECHANISM, MECHANICALLY AND ELECTRICALLY INTERLOCKED IN BOTH DIRECTIONS.
   - F. SWITCH CHARACTERISTICS: DESIGNED FOR CONTINUOUS-DUTY REPETITIVE TRANSFER OF FULL-RATED CURRENT BETWEEN ACTIVE POWER SOURCES.
     - a. SWITCH ACTION: DOUBLE THROW; MECHANICALLY HELD IN BOTH DIRECTIONS.
     - b. CONTACTS: SILVER COMPOSITION OR SILVER ALLOY FOR LOAD-CURRENT SWITCHING. CONVENTIONAL AUTOMATIC TRANSFER-SWITCH UNITS, RATED 225 A AND HIGHER, SHALL HAVE SEPARATE ARCING CONTACTS.
   - G. NEUTRAL SWITCHING. PROVIDE NEUTRAL POLE SWITCHED SIMULTANEOUSLY WITH PHASE POLES.
   - H. FACTORY WIRING: TRAIN AND BUNDLE FACTORY WIRING AND LABEL, CONSISTENT WITH SHOP DRAWINGS, EITHER BY COLOR-CODE OR BY NUMBERED OR LETTERED WIRE AND CABLE TAPE MARKERS AT TERMINATIONS. COLOR-CODING AND WIRE AND CABLE TAPE MARKERS ARE SPECIFIED IN DIVISION 16 SECTION "ELECTRICAL IDENTIFICATION."
     - a. DESIGNATED TERMINALS: PRESSURE TYPE, SUITABLE FOR TYPES AND SIZES OF FIELD WIRING INDICATED.
     - b. POWER-TERMINAL ARRANGEMENT AND FIELD-WIRING SPACE: SUITABLE FOR TOP, SIDE, OR BOTTOM ENTRANCE OF FEEDER CONDUCTORS AS INDICATED.
     - c. CONTROL WIRING: EQUIPPED WITH LUGS SUITABLE FOR CONNECTION TO TERMINAL STRIPS.
   - I. ENCLOSURES: GENERAL-PURPOSE NEMA 250, TYPE 1, COMPLYING WITH NEMA ICS 6 AND UL 508, UNLESS OTHERWISE INDICATED.
   - J. DIGITAL POWER METER:
     - a. DISPLAY INDICATING VOLTS, AMPS, AND FREQUENCY.
5. AUTOMATIC TRANSFER SWITCHES
   - A. SWITCHING ARRANGEMENT: DOUBLE-THROW TYPE.
   - B. MANUAL SWITCH OPERATION: UNDER LOAD, WITH DOOR CLOSED AND WITH EITHER OR BOTH SOURCES ENERGIZED. TRANSFER TIME IS SAME AS FOR ELECTRICAL OPERATION. CONTROL CIRCUIT AUTOMATICALLY DISCONNECTS FROM ELECTRICAL OPERATOR DURING MANUAL OPERATION.
   - C. PROGRAMMED NEUTRAL SWITCH POSITION: SWITCH OPERATOR HAS A PROGRAMMED NEUTRAL POSITION ARRANGED TO PROVIDE A MIDPOINT BETWEEN THE TWO WORKING SWITCH POSITIONS, WITH AN INTENTIONAL, TIME-CONTROLLED PAUSE AT MIDPOINT DURING TRANSFER. PAUSE IS ADJUSTABLE FROM 0.5 TO 30 SECONDS MINIMUM AND FACTORY SET FOR 5 SECONDS. TIME DELAY OCCURS FOR BOTH TRANSFER DIRECTIONS. PAUSE IS DISABLED UNLESS BOTH SOURCES ARE LIVE. FROM THE MOMENT OF NORMAL-SOURCE FAILURE, THE TRANSFER SWITCH(ES) AND GENERATOR(S) SHALL RESTORE SUITABLE POWER SOURCE TO THE LOAD WITHIN 10 SECONDS PER NFPA 110. COORDINATE WITH AND ACCOMMODATE GENERATOR PERFORMANCE.
   - D. AUTOMATIC TRANSFER-SWITCH FEATURES:
     - a. UNDER VOLTAGE/OVER VOLTAGE SENSING AND UNDER/OVER FREQUENCY SENSING FOR EACH PHASE OF NORMAL SOURCE AND EMERGENCY SOURCES: SENSE LOW PHASE-TO-GROUND VOLTAGE ON EACH PHASE. PICKUP VOLTAGE SHALL BE ADJUSTABLE FROM 85 TO 100 PERCENT OF NOMINAL, AND DROPOUT VOLTAGE IS ADJUSTABLE FROM 75 TO 98 PERCENT OF PICKUP VALUE. FACTORY SET FOR PICKUP AT 90 PERCENT AND DROPOUT AT 85 PERCENT.
     - b. ADJUSTABLE TIME DELAY: FOR OVERRIDE OF NORMAL-SOURCE VOLTAGE SENSING TO DELAY TRANSFER AND ENGINE START SIGNALS. ADJUSTABLE FROM 0 TO 120 SECONDS, AND FACTORY SET FOR ONE SECOND.
     - c. VOLTAGE/FREQUENCY LOCKOUT RELAY: PREVENT PREMATURE TRANSFER TO GENERATOR. PICKUP VOLTAGE SHALL BE ADJUSTABLE FROM 85 TO 100 PERCENT OF NOMINAL. FACTORY SET FOR PICKUP AT 90 PERCENT. PICKUP FREQUENCY SHALL BE ADJUSTABLE FROM 90 TO 100 PERCENT OF NOMINAL. FACTORY SET FOR PICKUP AT 95 PERCENT.
     - d. TIME DELAY FOR TRANSFER TO EMERGENCY SOURCE FIELD ADJUSTABLE 0 TO 120 SECONDS AND FACTORY SET AT 3 SECONDS.
     - e. TIME DELAY FOR RETRANSFER TO NORMAL SOURCE: ADJUSTABLE FROM 0 TO 30 MINUTES, AND FACTORY SET FOR 10 MINUTES TO AUTOMATICALLY DEFEAT DELAY ON LOSS OF VOLTAGE OR SUSTAINED UNDERVOLTAGE OF EMERGENCY SOURCE, PROVIDED NORMAL SUPPLY HAS BEEN RESTORED.
     - f. TIME DELAY STOP: A TIME DELAY PROVIDED TO ALLOW GENERATOR SET TO OPERATE UNLOADED FOR AN ADJUSTABLE PERIOD OF 0 TO 30 MINIMUM AND FACTORY SET AT 5 MINUTES.
     - g. TEST SWITCH: SIMULATE NORMAL-SOURCE FAILURE. SELECTOR SHALL BE PROVIDED FOR TESTING EITHER WITH OR WITHOUT LOAD.
     - h. SWITCH-POSITION PILOT LIGHTS: INDICATE SOURCE TO WHICH LOAD IS CONNECTED.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT: | REVISIONS:
DRAWN BY: NMT | APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E8

ELECTRICAL SPECIFICATIONS
SECTION 16415 – TRANSFER SWITCHES CONTINUED.

i. SOURCE-AVAILABLE INDICATING LIGHTS: SUPERVISE SOURCES VIA TRANSFER-SWITCH NORMAL- AND EMERGENCY-SOURCE SENSING CIRCUITS.
- NORMAL POWER SUPERVISION: GREEN LIGHT WITH NAMEPLATE ENGRAVED "NORMAL SOURCE AVAILABLE."
- EMERGENCY POWER SUPERVISION: RED LIGHT WITH NAMEPLATE ENGRAVED "EMERGENCY SOURCE AVAILABLE."

j. UNASSIGNED AUXILIARY CONTACTS: ONE NORMALLY OPEN AND ONE NORMALLY CLOSED, SINGLE-POLE DOUBLE THROW CONTACTS FOR EACH SWITCH POSITION, RATED 10 A AT 240-V AC.

k. TRANSFER OVERRIDE SWITCH: OVERRIDES AUTOMATIC RETRANSFER CONTROL SO AUTOMATIC TRANSFER SWITCH WILL REMAIN CONNECTED TO EMERGENCY POWER SOURCE REGARDLESS OF CONDITION OF NORMAL SOURCE. PILOT LIGHT INDICATES OVERRIDE STATUS.

l. ENGINE STARTING CONTACTS: ONE ISOLATED AND NORMALLY CLOSED, AND ONE ISOLATED AND NORMALLY OPEN; RATED 10 A AT 32-V DC MINIMUM.

m. ENGINE SHUTDOWN CONTACTS: TIME DELAY ADJUSTABLE FROM ZERO TO FIVE MINUTES, AND FACTORY SET FOR FIVE MINUTES. CONTACTS SHALL INITIATE SHUTDOWN AT ENGINE-GENERATOR CONTROLS AFTER RETRANSFER OF LOAD TO NORMAL SOURCE.

n. ENGINE-GENERATOR EXERCISER: SOLID-STATE, PROGRAMMABLE-TIME SWITCH STARTS ENGINE GENERATOR AND TRANSFERS LOAD TO IT FROM NORMAL SOURCE FOR A PRESET TIME, THEN RETRANSFERS AND SHUTS DOWN ENGINE AFTER A PRESET COOL-DOWN PERIOD. INITIATES EXERCISE CYCLE AT PRESET INTERVALS ADJUSTABLE FROM 7 TO 30 DAYS. RUNNING PERIODS ARE ADJUSTABLE FROM 10 TO 30 MINUTES. FACTORY SETTINGS ARE FOR 7-DAY EXERCISE CYCLE, 20-MINUTE RUNNING PERIOD, AND 5-MINUTE COOL-DOWN PERIOD. EXERCISER FEATURES INCLUDE THE FOLLOWING:
- EXERCISER TRANSFER SELECTOR SWITCH: PERMITS SELECTION OF EXERCISE WITH AND WITHOUT LOAD TRANSFER.
- PUSH-BUTTON PROGRAMMING CONTROL WITH DIGITAL LED DISPLAY OF ALL CALIBRATIONS, SETTINGS, AND DATE TIME STAMP EVENT LOG OF THE LAST 50 EVENTS. VOLTAGE AND FREQUENCY METERING OF EACH PHASE NORMAL AND EMERGENCY LOADS.
- INTEGRAL BATTERY OPERATION OF TIME SWITCH WHEN NORMAL CONTROL POWER IS NOT AVAILABLE.

o. MANUAL OPERATING HANDLE PERMANENTLY MOUNTED ON TRANSFER SWITCH.

6. SOURCE QUALITY CONTROL
   A. FACTORY TEST AND INSPECT COMPONENTS, ASSEMBLED SWITCHES, AND ASSOCIATED EQUIPMENT. ENSURE PROPER OPERATION. CHECK TRANSFER TIME AND VOLTAGE, FREQUENCY, AND TIME-DELAY SETTINGS FOR COMPLIANCE WITH SPECIFIED REQUIREMENTS. PERFORM DIELECTRIC STRENGTH TEST COMPLYING WITH NEMA ICS 1.
7. INSTALLATION
   A. SET FIELD-ADJUSTABLE INTERVALS AND DELAYS, RELAYS, AND ENGINE EXERCISER CLOCK.
8. CONNECTIONS
   A. WIRING TO REMOTE COMPONENTS: MATCH TYPE AND NUMBER OF CABLES AND CONDUCTORS TO CONTROL AND COMMUNICATION REQUIREMENTS OF TRANSFER SWITCHES AS RECOMMENDED BY MANUFACTURER. INCREASE RACEWAY SIZES AT NO ADDITIONAL COST TO OWNER IF NECESSARY TO ACCOMMODATE REQUIRED WIRING.
   B. START SIGNAL: PROVIDE CABLE IN CONDUIT FROM TRANSFER SWITCHES TO GENERATOR.
9. FIELD QUALITY CONTROL
   A. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.
   B. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.
      a. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATION, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.
      b. AFTER INSTALLING EQUIPMENT AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS.
      c. PERFORM EACH VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL TEST STATED IN NETA ACCEPTANCE TESTING SPECIFICATION. CERTIFY COMPLIANCE WITH TEST PARAMETERS.
      d. MEASURE INSULATION RESISTANCE PHASE-TO-PHASE AND PHASE-TO-GROUND WITH INSULATION-RESISTANCE TESTER. INCLUDE EXTERNAL ANNUNCIATION AND CONTROL CIRCUITS. USE TEST VOLTAGES AND PROCEDURE RECOMMENDED BY MANUFACTURER. COMPLY WITH MANUFACTURER'S SPECIFIED MINIMUM RESISTANCE.
         - CHECK FOR ELECTRICAL CONTINUITY OF CIRCUITS AND FOR SHORT CIRCUITS.
         - INSPECT FOR PHYSICAL DAMAGE, PROPER INSTALLATION AND CONNECTION, AND INTEGRITY OF BARRIERS, COVERS, AND SAFETY FEATURES.
         - VERIFY THAT MANUAL TRANSFER WARNINGS ARE PROPERLY PLACED.
         - PERFORM MANUAL TRANSFER OPERATION.
      e. AFTER ENERGIZING CIRCUITS, DEMONSTRATE INTERLOCKING SEQUENCE AND OPERATIONAL FUNCTION FOR EACH SWITCH AT LEAST THREE TIMES.
         - SIMULATE POWER FAILURES OF NORMAL SOURCE TO AUTOMATIC TRANSFER SWITCHES AND OF EMERGENCY SOURCE WITH NORMAL SOURCE AVAILABLE.
         - SIMULATE LOSS OF PHASE-TO-GROUND VOLTAGE FOR EACH PHASE OF NORMAL SOURCE.
         - VERIFY TIME-DELAY SETTINGS.
         - VERIFY PICKUP AND DROPOUT VOLTAGES BY DATA READOUT OR INSPECTION OF CONTROL SETTINGS.
         - VERIFY PROPER SEQUENCE AND CORRECT TIMING OF AUTOMATIC ENGINE STARTING, TRANSFER TIME DELAY, RETRANSFER TIME DELAY ON RESTORATION OF NORMAL POWER, AND ENGINE COOL-DOWN AND SHUTDOWN.
   C. COORDINATE TESTS WITH TESTS OF GENERATOR AND RUN THEM CONCURRENTLY.
   D. REPORT RESULTS OF TESTS AND INSPECTIONS IN WRITING. RECORD ADJUSTABLE RELAY SETTINGS AND MEASURED INSULATION AND CONTACT RESISTANCES AND TIME DELAYS. ATTACH A LABEL OR TAG TO EACH TESTED COMPONENT INDICATING SATISFACTORY COMPLETION OF TESTS.
   E. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.
10. DEMONSTRATION
   A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN TRANSFER SWITCHES AND RELATED EQUIPMENT AS SPECIFIED BELOW. REFER TO DIVISION 1 SECTION "DEMONSTRATION AND TRAINING."
   B. COORDINATE THIS TRAINING WITH THAT FOR GENERATOR EQUIPMENT.

NOTE: THOUGH TRANSFER SWITCH IS AUTOMATIC, TRANSFER SWITCH SHALL NOT START GENERATOR UNTIL START SIGNAL IS RECEIVED FROM WELL PUMP CONTROLLER. TRANSFER SWITCH SHALL BE PROVIDED WITH STARTING CONTACTS AND PROGRAMMING TO achieve THIS SEQUENCE. PROVIDE FACTORY START-UP AND TESTING TO ENSURE PROGRAMMING IS WORKING CORRECTLY.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E-11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013
Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E9

ELECTRICAL SPECIFICATIONS

16442 – PANELBOARDS

1. PROVIDE PRODUCT DATA FOR EACH TYPE OF PANELBOARD. INCLUDE DIMENSIONS AND MANUFACTURERS' TECHNICAL DATA ON FEATURES, PERFORMANCE, ELECTRICAL CHARACTERISTICS, RATINGS, AND FINISHES.
2. OBTAIN PANELBOARDS, OVERCURRENT PROTECTIVE DEVICES, COMPONENTS, AND ACCESSORIES FROM SINGLE SOURCE FROM SINGLE MANUFACTURER. PROVIDE BY ONE OF THE FOLLOWING MANUFACTURERS: CUTLER–HAMMER, GE, SIEMENS, OR SQUARE D.
3. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES ARE LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION, COMPLY WITH NEMA PB 1 AND NECA–407, AND COMPLY WITH NFPA 70.
4. COORDINATE LAYOUT AND INSTALLATION OF PANELBOARDS AND COMPONENTS WITH OTHER CONSTRUCTION THAT PENETRATES WALLS OR IS SUPPORTED BY THEM. COORDINATE INSTALLATION OF FLUSH MOUNTED PANELBOARDS WITH ARCHITECTURAL WALL DEPTHS. MAINTAIN REQUIRED WORKSPACE CLEARANCES, DEDICATED ELECTRICAL SPACE, AND REQUIRED CLEARANCES FOR EQUIPMENT ACCESS DOORS AND PANELS.
5. ENCLOSURES SHALL BE RATED FOR ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION. INDOOR DRY AND CLEAN LOCATIONS SHALL BE RATED FOR NEMA 250, TYPE 1. OUTDOOR LOCATIONS SHALL BE RATED FOR NEMA 250, TYPE 3R. DISTRIBUTION PANELBOARDS SHALL HAVE A SECURED DOOR WITH VAULT–TYPE LATCH WITH TUMBLER LOCK; KEYED ALIKE. LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS SHALL HAVE CONCEALED HINGES AND COVERS WITH DOOR–IN–DOOR CONSTRUCTION; SECURED WITH FLUSH LATCH WITH TUMBLER LOCK; KEYED ALIKE. PROVIDE DIRECTORY CARD INSIDE PANELBOARD DOOR, MOUNTED IN METAL FRAME WITH TRANSPARENT PROTECTIVE COVER. COORDINATE FLUSH AND SURFACE MOUNTING TYPES AS SCHEDULED OR AS REQUIRED TO ACCOMMODATE CONSTRUCTION.
6. PHASE, NEUTRAL, AND GROUND BUSES SHALL BE OF HARD–DRAWN COPPER, 98 PERCENT CONDUCTIVITY MATERIAL. EQUIPMENT GROUND BUS SHALL BE ADEQUATE FOR FEEDER AND BRANCH–CIRCUIT EQUIPMENT GROUNDING CONDUCTORS; BONDED TO BOX. NEUTRAL BUS SHALL BE ADEQUATE FOR DEDICATED NEUTRAL CONDUCTORS OF FEEDERS AND BRANCH CIRCUITS.
7. PANELBOARDS SHALL BE FULLY RATED TO INTERRUPT SYMMETRICAL SHORT–CIRCUIT CURRENT AVAILABLE AT TERMINALS.
8. DISTRIBUTION PANELBOARDS SHALL COMPLY WITH NEMA PB 1, POWER AND FEEDER DISTRIBUTION TYPE. PROVIDE BOLT–ON CIRCUIT BREAKERS FOR BRANCH OVERCURRENT PROTECTIVE DEVICES FOR CIRCUIT–BREAKER FRAME SIZES 125 A AND SMALLER. PROVIDE BOLT–ON CIRCUIT BREAKERS OR PLUG–IN CIRCUIT BREAKERS WHERE INDIVIDUAL POSITIVE–LOCKING DEVICE REQUIRES MECHANICAL RELEASE FOR REMOVAL FOR BRANCH OVERCURRENT PROTECTIVE DEVICES FOR CIRCUIT–BREAKER FRAME SIZES LARGER THAN 125 A.
9. PROVIDE MINI POWER CENTER WITH INTEGRAL 15 KVA TRANSFORMER, COPPER BUSSING, AND BOLT–ON CIRCUIT BREAKERS.
10. PROVIDE MOLDED–CASE CIRCUIT BREAKER (MCCB) THAT COMPLY WITH UL 489, WITH INTERRUPTING CAPACITY TO MEET AVAILABLE FAULT CURRENTS.
11. PROVIDE THERMAL–MAGNETIC CIRCUIT BREAKERS WITH INVERSE TIME–CURRENT ELEMENT FOR LOW–LEVEL OVERLOADS, AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. PROVIDE ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT–BREAKER FRAME SIZES 250 A AND LARGER.
12. PROVIDE ADJUSTABLE INSTANTANEOUS–TRIP CIRCUIT BREAKERS WITH MAGNETIC TRIP ELEMENT WITH FRONT–MOUNTED, FIELD–ADJUSTABLE TRIP SETTING.
13. PROVIDE A TYPED DIRECTORY TO INDICATE INSTALLED CIRCUIT LOADS; INCORPORATE OWNER'S FINAL ROOM DESIGNATIONS. LABEL EACH PANELBOARD WITH A NAMEPLATE INDENTIFYING EQUIPMENT NAME, BRANCH, VOLTAGE, AND SOURCE "FED FROM". LABEL EACH BRANCH CIRCUIT DEVICE IN DISTRIBUTION PANELBOARDS WITH A NAMEPLATE. NAMEPLATE SHALL BE ENGRAVED OR MELAMINE LABEL, ADHESIVE–BACKED WITH WHITE LETTERS ON A BLACK BACKGROUND. MINIMUM LETTER HEIGHT SHALL BE 3/8 INCH.
14. SURGE PROTECTION DEVICES:
    A. NON–MODULAR.
    B. LED INDICATOR LIGHTS FOR POWER AND PROTECTION STATUS.
    C. SPD SHALL BE UL LABLED WITH TYPE 2, 200KA SHORT CIRCUIT CURRENT RATING (SCCR) AND 20KA I NOMINAL. FUSE RATINGS SHALL NOT BE CONSIDERED IN LIEU OF DEMONSTRATED WITHSTAND TESTING OF SPD.
    D. FABRICATION USING BOLTED COMPRESSION LUGS FOR INTERNAL WIRING.
    E. REDUNDANT SUPPRESSION CIRCUITS.
    F. ARRANGEMENT WITH WIRE CONNECTIONS TO PHASE BUSES, NEUTRAL BUS, AND GROUND BUS.
15. PEAK SINGLE–IMPULSE SURGE CURRENT RATING: 50KA PER MODE/100KA PER PHASE.
16. PROTECTION MODES AND UL 1449, 3RD EDITION, VPRS FOR GROUNDED WYE CIRCUTIS WITH 480Y/277V, 3–PHASE, 4–WIRE CIRCUITS SHALL BE AS FOLLOWS.
    A. LINE TO NEUTRAL: 800V FOR 480Y/277V.
    B. LINE TO GROUND: 800V FOR 480Y/277V.
    C. NEUTRAL TO GROUND: 800V FOR 480Y/277V.

16511 – INTERIOR LIGHTING

1. PROVIDE PRODUCT DATA FOR EACH TYPE OF LIGHTING FIXTURE.
2. LED LUMINAIRES:
    A. COMPLY WITH UL 1598 AND UL 8750.
    B. EACH LUMINAIRE SHALL BE RATED FOR A MINIMUM OPERATIONAL LIFE (L70) OF 50,000 HOURS AS DEFINED BY IES LM–80 AND TM–21.
    C. ABSOLUTE PHOTOMETRICS SHALL BE AVAILABLE FOR EACH LUMINAIRE BASED ON IES LM–79.
    D. INDIVIDUAL LEDS WITHIN THE LUMINAIRE SHALL BE CONNECTED SUCH THAT LOSS OR FAILURE OF A SINGLE LED WILL NOT RESULT IN THE LOSS OF THE ENTIRE ARRAY.
    E. LUMINAIRE POWER FACTOR: 0.90 OR HIGHER.
    F. TOTAL HARMONIC DISTORTION RATING: LESS THAN 20 PERCENT.

PROFESSIONAL ELECTRICAL ENGINEER
TRACY HAUSER
E–11315
11/22/13
STATE OF NEBRASKA

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
10360 Ellison Circle
Omaha, NE 68134
Phone: 402.991.5520
www.specializedeng.com

SES PROJ. #13172

T.C. ENGINEERING INC.
NORTH PLATTE, NEBRASKA

Ogallala Water Well 2013

Ogallala, Nebraska

PROJECT:
REVISIONS:
DRAWN BY: NMT
APPROVED BY: JLK
DATE: 11/22/13
DWG.:
SCALE: As Shown
SHEET: E10