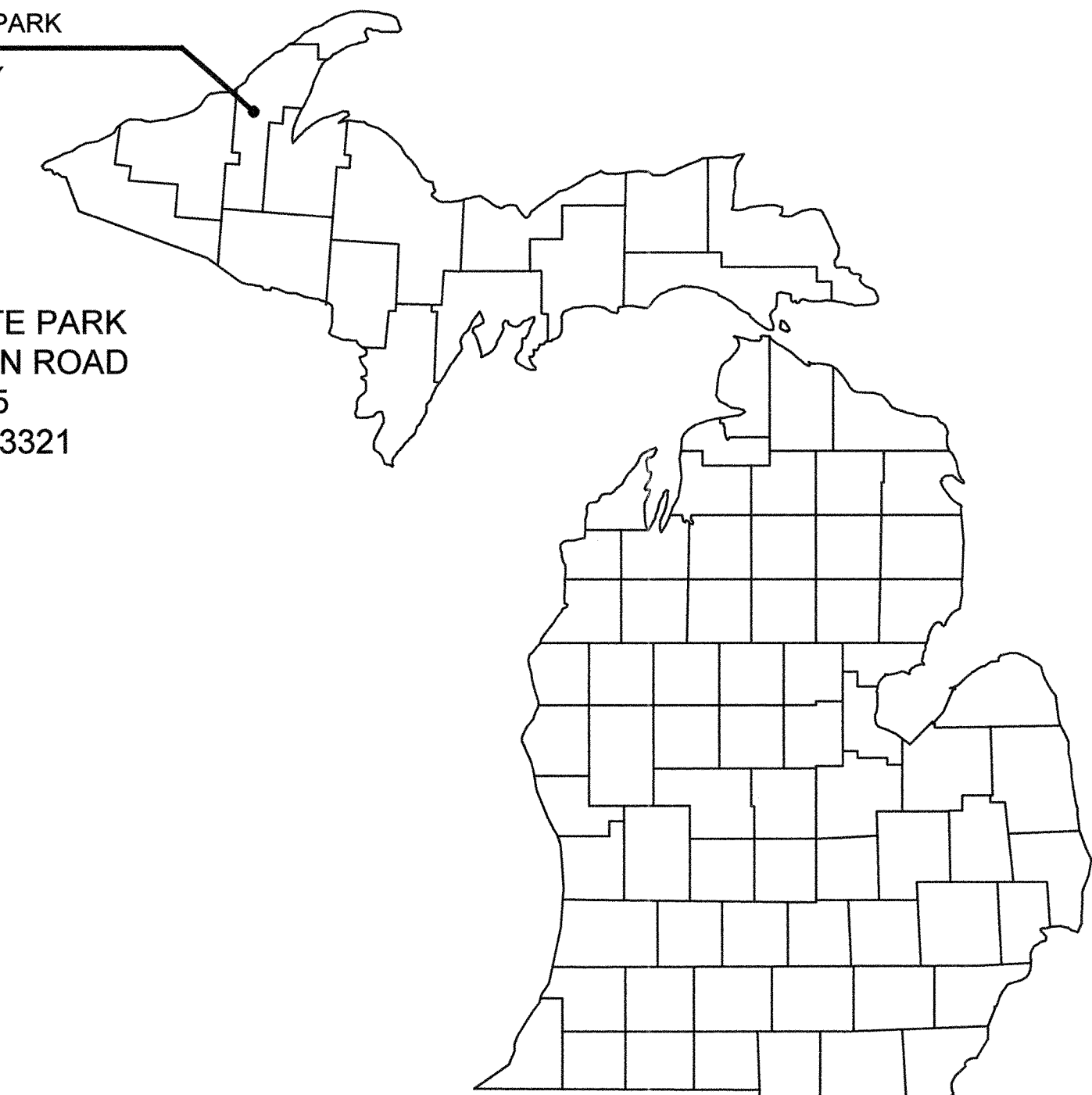



TWIN LAKES STATE PARK
HOUGHTON COUNTY

TWIN LAKES STATE PARK
6204 E. POYHONEN ROAD
TOIVOLA, MI 49965
PHONE: (906) 288-3321






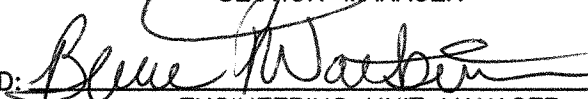
 **Michigan DNR**
STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF LAND AND FACILITIES
DESIGN & CONSTRUCTION SECTION
P.O. BOX 30033 LANSING, MI 48909-7933
517.241.1919 VOICE 517.241.4278 FAX

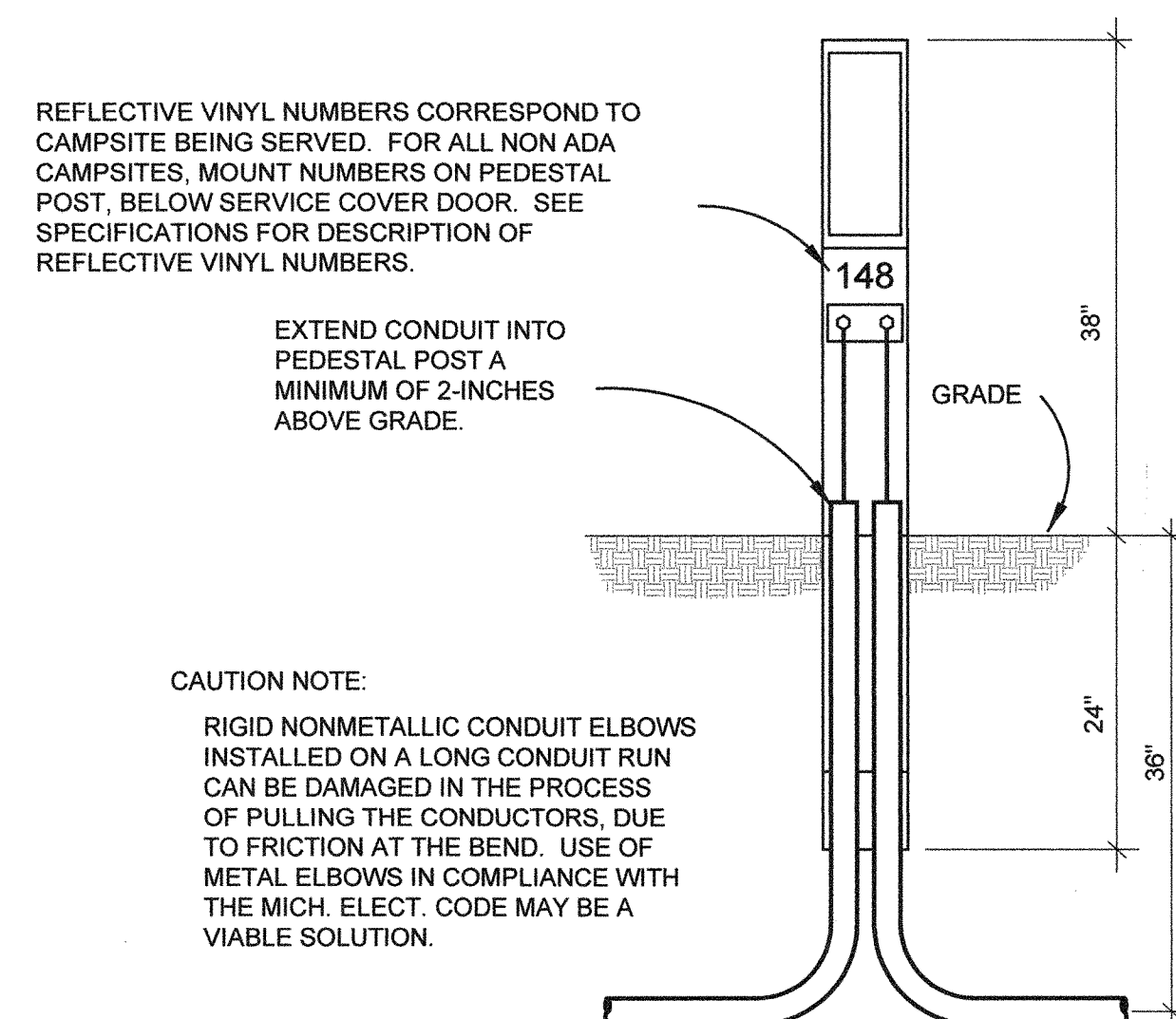
**TWIN LAKES
STATE PARK**
HOUGHTON COUNTY

TITLE SHEET

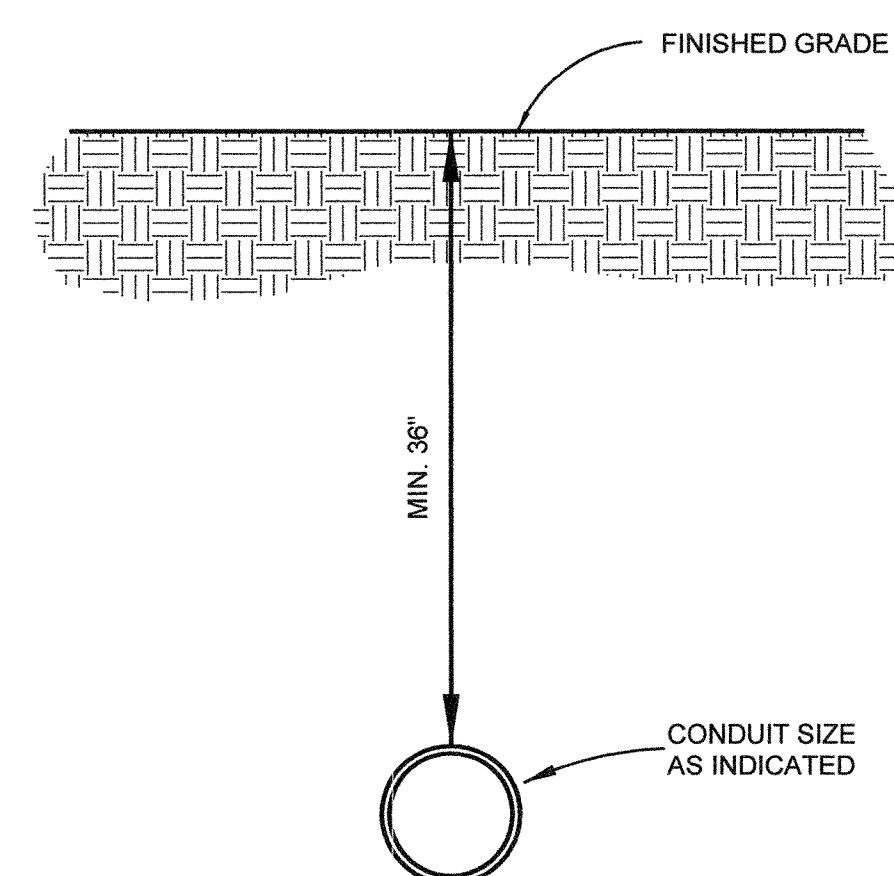
DRAWING INDEX	
SHT. NO.	TITLE
E-1	TITLE SHEET
E-2	EXISTING UTILITIES SITE PLAN
E-3	DEMOLITION SITE PLAN
E-4	ELECTRICAL SITE PLAN
E-5	ELECTRICAL DETAILS
E-6	SOIL EROSION CONTROL SITE PLAN

PARKS AND REC. DIVISION	
<input checked="" type="checkbox"/> APPROVED:  <div style="text-align: right;">DIVISION CHIEF</div>	<div style="text-align: right;">7/10/06</div> <div style="text-align: right;">DATE</div>
<input checked="" type="checkbox"/> RECOMMENDED FOR APPROVAL:  <div style="text-align: right;">PLANNING SECTION MANAGER</div>	<div style="text-align: right;">7/10/06</div> <div style="text-align: right;">DATE</div>

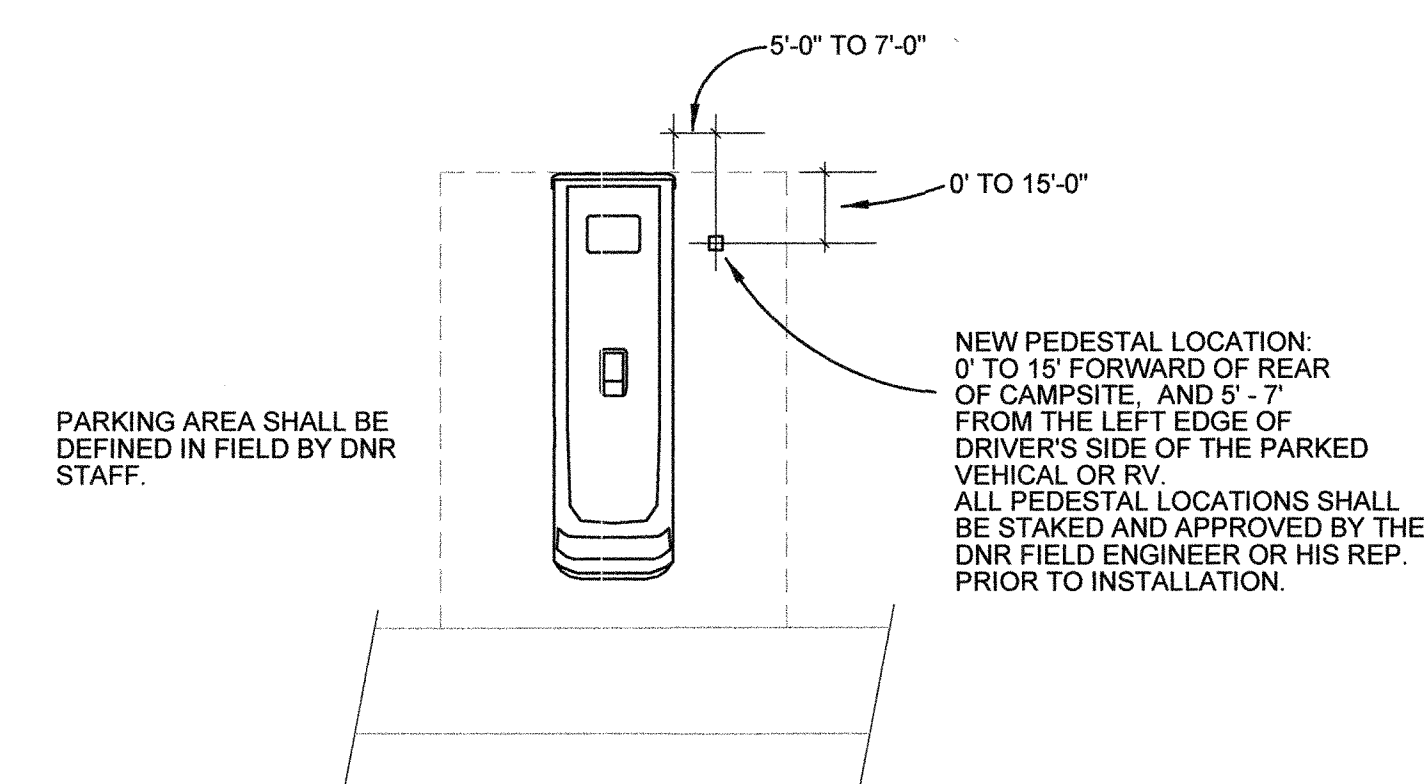
OFFICE OF LAND AND FACILITIES DESIGN & CONSTRUCTION SERVICES	
<input checked="" type="checkbox"/> APPROVED:  <div style="text-align: right;">SECTION MANAGER</div>	<div style="text-align: right;">7-10-06</div> <div style="text-align: right;">DATE</div>
<input checked="" type="checkbox"/> APPROVED:  <div style="text-align: right;">ENGINEERING UNIT MANAGER</div>	<div style="text-align: right;">7/10/06</div> <div style="text-align: right;">DATE</div>



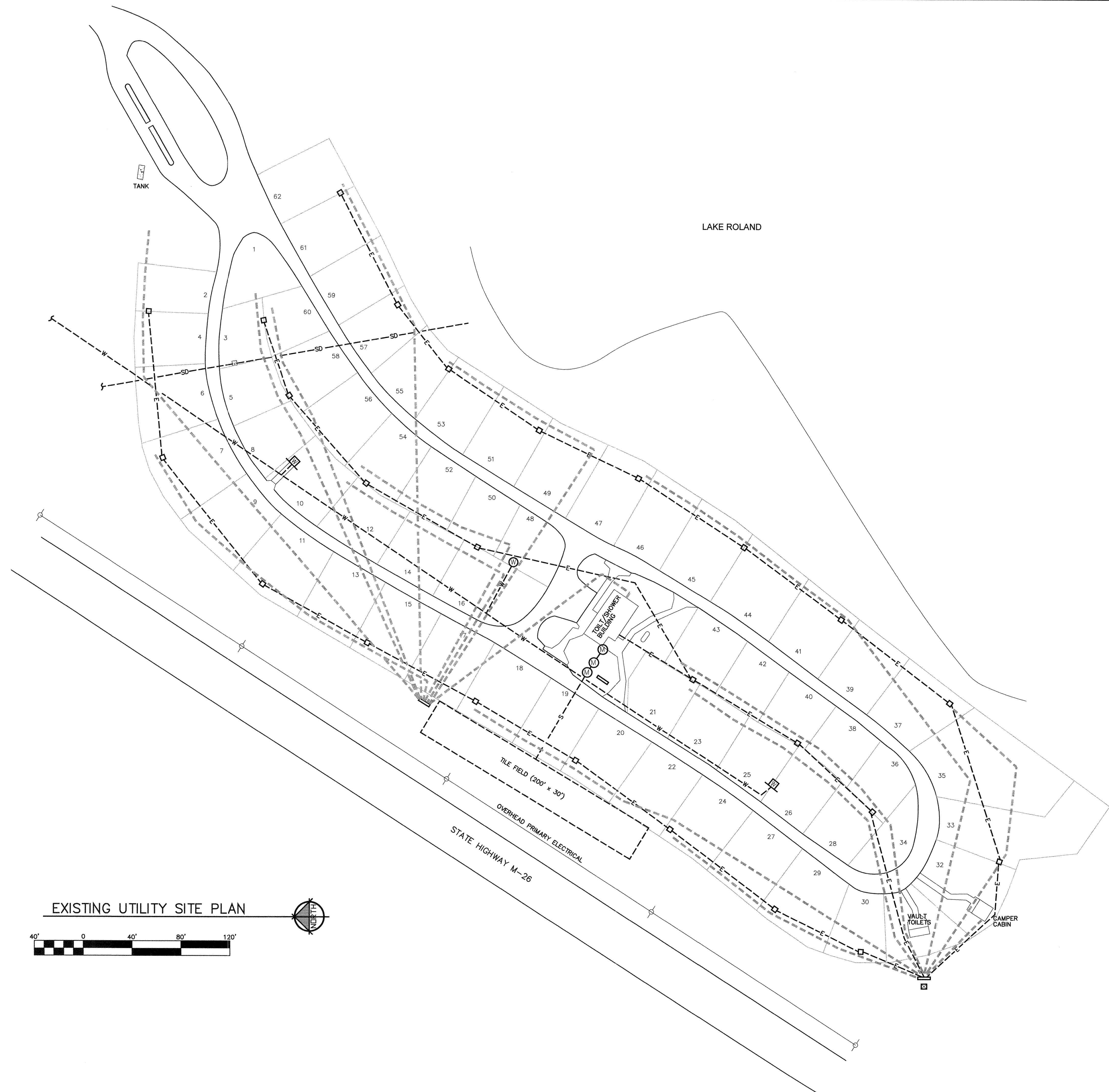
PEDESTAL DETAIL
NO SCALE
















UNDERGROUND CONDUIT INSTALLATION DETAIL



TYPICAL STANDARD CAMPSITE
WITHOUT DEFINED STAND
NO SCALE










LEGEND

	EXISTING CAMPGROUND MAIN DISTRIBUTION SWITCHGEAR
	EXISTING UTILITY PAD MOUNT TRANSFORMER
	EXISTING CAMPGROUND ELECT. PEDESTAL
	EXISTING WATER SPIGOT
	EXISTING WATER WELL
	EXISTING SANITARY MANHOLE
	EXISTING STORM MANHOLE
22	CAMPSITE NUMBER
	EXISTING UNDERGROUND ELECTRICAL
	PROPOSED UNDERGROUND ELECTRICAL
	EXISTING UNDERGROUND PRIMARY ELECTRICAL
	EXISTING UNDERGROUND WATER
	EXISTING UNDERGROUND SANITARY
	EXISTING UNDERGROUND STORM DRAIN

THIS DRAWING INDICATES THE APPROX. LOCATION OF KNOWN ACTIVE AND INACTIVE UNDERGROUND UTILITIES BASED UPON A COMBINATION OF ORIGINAL AND AS-BUILT DOCUMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY UNDERGROUND UTILITY LOCATIONS PRIOR TO ANY EXCAVATION.

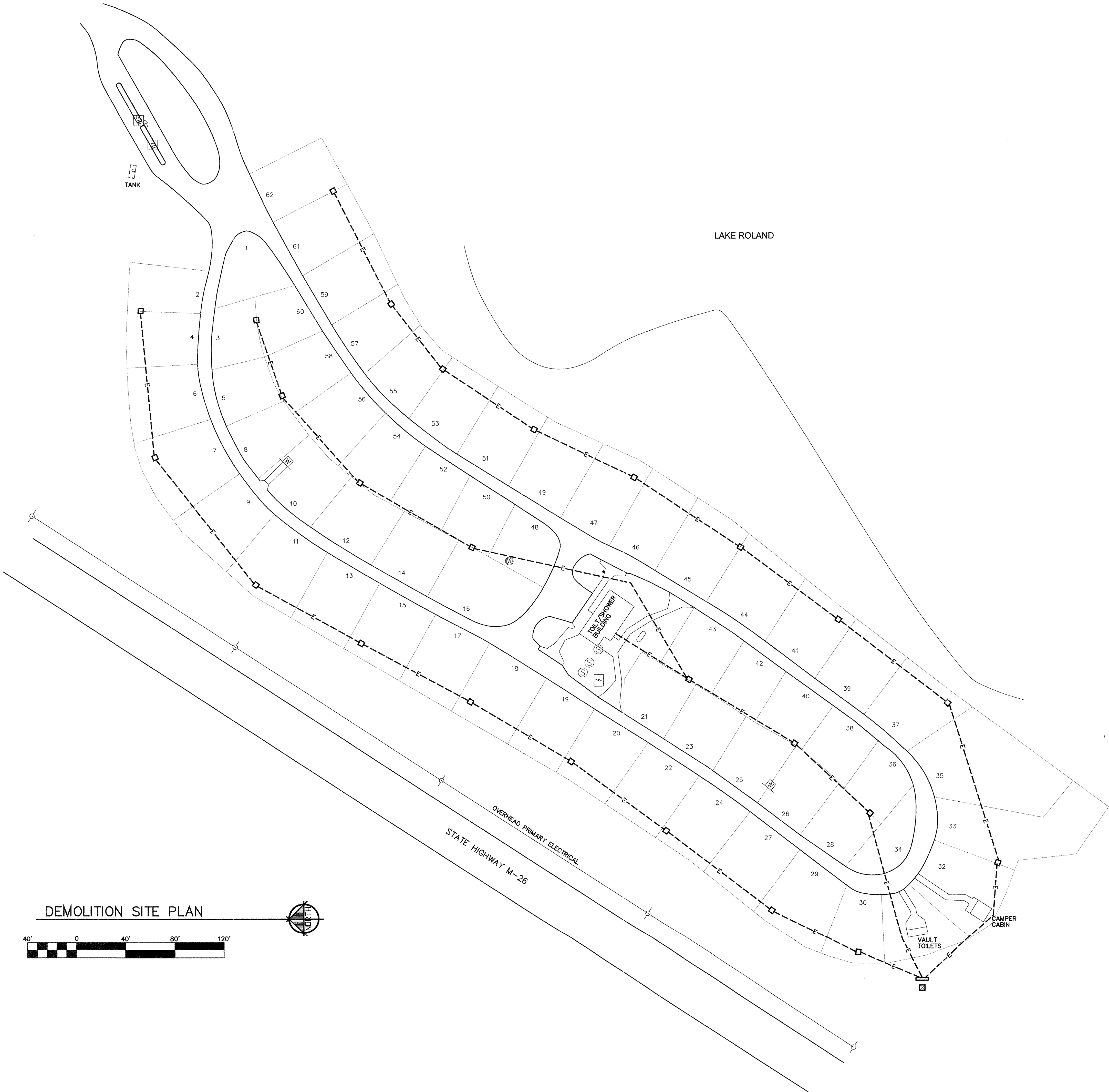
THE CONTRACTOR SHALL PAY FOR THE REPLACEMENT AND/OR REPAIR OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION AS DETERMINED BY THE DNR FIELD ENGINEER.

LEGEND

- | | |
|---|--|
|  | EXISTING CAMPGROUND MAIN DISTRIBUTION SWITCHGEAR |
|  | EXISTING PAD MOUNT TRANSFORMER |
|  | EXISTING CAMPGROUND ELECT. PEDESTAL |
|  | EXISTING ELECTRICAL POWER POLE |
|  | EXISTING WATER SPIGOT |
|  | EXISTING WATER VALVE BOX |
|  | EXISTING SANITARY MANHOLE |
| 120 | CAMPSITE NUMBER |
| — E — — — | EXISTING UNDERGROUND ELECTRICAL |
| PE — — — | EXISTING UNDERGROUND PRIMARY ELECTRICAL |

SITE ELECTRICAL DEMOLITION NOTES

1. REMOVE ALL CAMPGROUND ELECTRICAL PEDESTALS & JUNCTION POSTS. COORDINATE WITH PARK MANAGER ANY PEDESTALS TO BE SALVAGED BY THE CONTRACTOR FOR OWNER. PEDESTALS NOT SALVAGED SHALL BE REMOVED BY THE CONTRACTOR AND DEBRIS TO BE REMOVED FROM THE SITE.
2. UNDERGROUND, HORIZONTAL SECONDARY BRANCH CIRCUIT WIRING SERVING THE CAMPGROUND PEDESTALS THAT ARE TO BE REMOVED MAY BE ABANDONED IN PLACE. RISERS AND ABOVE GRADE BRANCH CIRCUIT WIRING SHALL BE REMOVED AT A MINIMUM, TO A POINT EQUAL WITH THE UNDERGROUND HORIZONTAL RUN. ALL REMOVED WIRING AND CONDUIT SHALL BECOME PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE SITE.
3. REMOVE CAMPGROUND MAIN DISTRIBUTION PANELS AND ASSOCIATED UNISTRUT RACKS AND CONCRETE BASES. ALL DISTRIBUTION SWITCH GEAR, UNISTRUT FRAMES AND CONCRETE BASES SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
4. SEE PLAN SHEET #2 FOR COORDINATION WITH EXISTING UNDERGROUND UTILITIES.



DISTRIBUTION PANEL "A" ELECTRICAL SCHEDULE				
BRANCH NUMBER	LOAD	TOTAL BRANCH LENGTH	BRANCH FEEDERS	CONDUIT SIZE
A-1	(1) 30/20 AMP, (3) 50/30/20 AMP PEDESTALS	460'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-2	(1) 30/20 AMP, (3) 50/30/20 AMP PEDESTALS	410'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-3	(1) 30/20 AMP, (2) 50/30/20 AMP PEDESTALS	360'	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-4	(2) 30/20 AMP, (2) 50/30/20 AMP PEDESTALS	310'	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-5	(3) 30/20 AMP, (1) 50/30/20 AMP PEDESTALS	385'	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-6	(1) 30/20 AMP, (3) 50/30/20 AMP PEDESTALS	295'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-7	(2) 30/20 AMP, (2) 50/30/20 AMP PEDESTALS	490'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-8	(5) 30/20 AMP, (1) 50/30/20 AMP PEDESTALS	345'	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-9	TOILET/SOWER BUILDING	230'	(3) #1, (1) #4 GRD.	2" DIA.

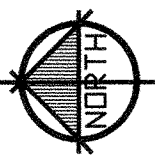
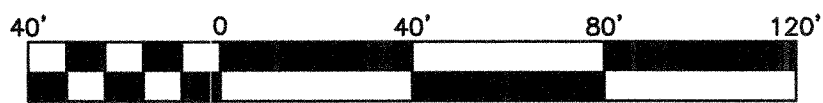
DISTRIBUTION PANEL "B" ELECTRICAL SCHEDULE				
BRANCH NUMBER	LOAD	TOTAL BRANCH LENGTH	BRANCH FEEDERS	CONDUIT SIZE
B-1	(2) 30/20 AMP, (3) 50/30/20 AMP PEDESTALS	560'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-2	(4) 50/30/20 AMP PEDESTALS	345'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-3	(5) 30/20 AMP, (1) 50/30/20 AMP PEDESTALS	380'	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
B-4	(4) 30/20 AMP, (1) 50/30/20 AMP PEDESTALS	345'	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
B-5	(2) 30/20 AMP, (2) 50/30/20 AMP PEDESTALS	445'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-6	(4) 50/30/20 AMP PEDESTALS	250'	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-7	CAMPER CABIN	75'	(3) #4, (1) #4 GRD.	1-1/2" DIA.

NOTES:

- CONTRACTOR SHALL BALANCE LOADS ON EACH CAMPGROUND BRANCH FEEDER BETWEEN PHASE A AND PHASE B. AT CAMPSITE PEDESTALS, 30 AMP RECEPTACLE FEEDS SHALL ALTERNATE BETWEEN PHASE A AND PHASE B, FROM PEDESTAL TO PEDESTAL ON THE BRANCH FEEDER. 20 AMP PEDESTAL RECEPTACLE FEEDS SHALL BE ON THE OPPOSITE PHASE FROM THE 30 AMP PEDESTAL RECEPTACLE AND SHALL ALSO ALTERNATE BETWEEN PHASE A AND PHASE B, FROM PEDESTAL TO PEDESTAL ON THE BRANCH FEEDER.
- THE LINEAR FEET OF BRANCH FEEDERS AS INDICATED ON THE SWITCHBOARD ELECTRICAL SCHEDULE ARE POINT TO POINT LINEAR ESTIMATES OF PLANNED HORIZONTAL DISTANCES BETWEEN PEDESTALS, DISTRIBUTION SWITCHBOARDS, PANELBOARDS, ETC. THESE DISTANCES ARE FOR INFORMATIONAL PURPOSES ONLY, AND DO NOT ACCOUNT FOR VERTICAL RISERS OR ACTUAL FIELD ADJUSTMENTS.
- TRENCHING SHALL NOT BE ALLOWED ACROSS BITUMINOUS ROADWAYS, ANY BITUMINOUS SURFACES, OR CONCRETE WALKWAYS. CONDUITS SHALL BE JACKED OR BORED A MINIMUM OF 36-INCHES BELOW THESE SURFACES.
- LOCATE PEDESTALS AS INDICATED ON THIS PLAN, UNLESS SHOWN OTHERWISE ON ELECTRICAL DETAILS, OR AS DIRECTED BY THE FIELD ENGINEER OR HIS REPRESENTATIVE. ALL PEDESTAL LOCATIONS SHALL BE STAKED AND APPROVED BY THE FIELD ENGINEER OR HIS REPRESENTATIVE PRIOR TO INSTALLATION OF THE UNDERGROUND BRANCH FEEDERS AND THE CAMPSITE ELECTRICAL PEDESTALS. THE CONTRACTOR SHALL PROVIDE ALL STAKES.
- CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT CAMPSITE FIRE RINGS DURING CONSTRUCTION. THE CONTRACTOR SHALL PAY FOR REPLACEMENT OF FIRE RINGS DAMAGED AS A RESULT OF PROJECT CONSTRUCTION.
- NO ALTERATIONS SHALL BE MADE TO BRANCH LOAD SEQUENCING WITHOUT PRIOR APPROVAL OF THE DNR FIELD ENGINEER.

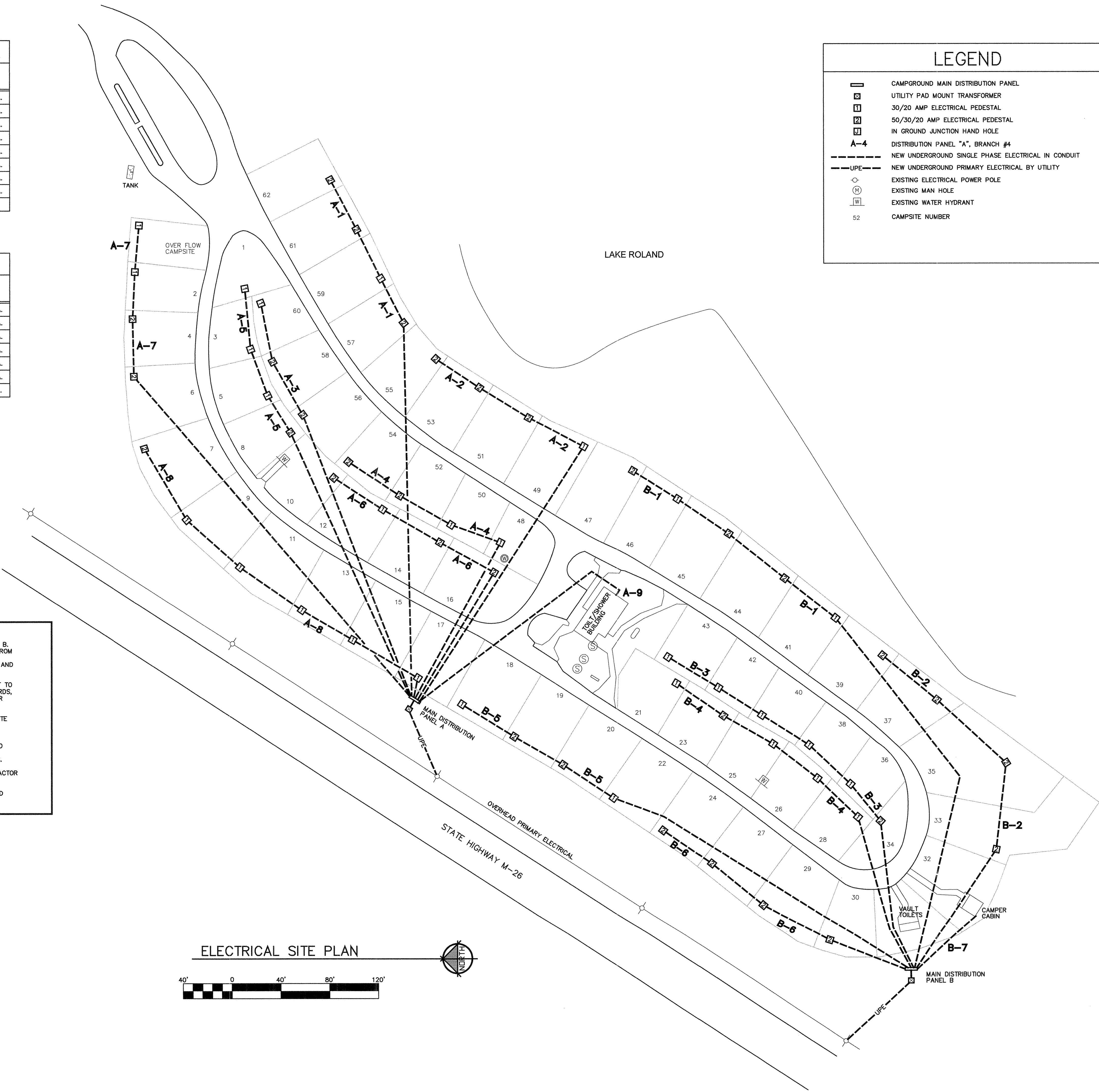
DIRECTIONAL BORING SHALL BE THE ONLY METHOD ALLOWED FOR THE INSTALLATION OF UNDERGROUND BRANCH CIRCUIT CONDUCTORS AND CONDUIT FOR THIS PROJECT.

ELECTRICAL SITE PLAN

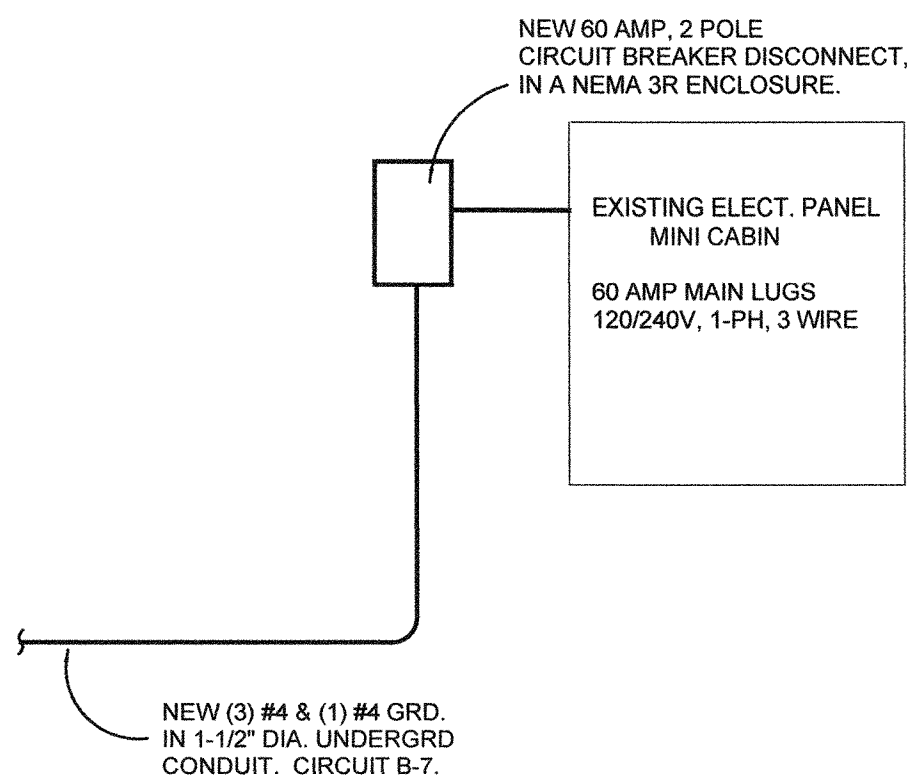


LEGEND

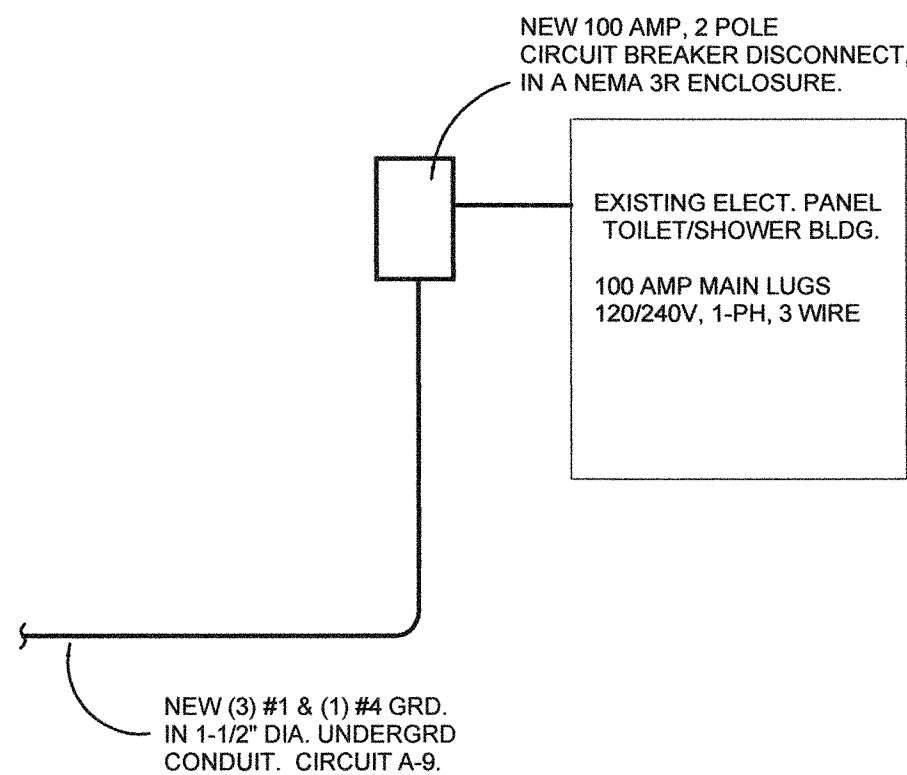
- CAMPGROUND MAIN DISTRIBUTION PANEL
- UTILITY PAD MOUNT TRANSFORMER
- 30/20 AMP ELECTRICAL PEDESTAL
- 50/30/20 AMP ELECTRICAL PEDESTAL
- IN GROUND JUNCTION HAND HOLE
- DISTRIBUTION PANEL "A", BRANCH #4
- NEW UNDERGROUND SINGLE PHASE ELECTRICAL IN CONDUIT
- NEW UNDERGROUND PRIMARY ELECTRICAL BY UTILITY
- EXISTING ELECTRICAL POWER POLE
- EXISTING MAN HOLE
- EXISTING WATER HYDRANT
- CAMPSITE NUMBER



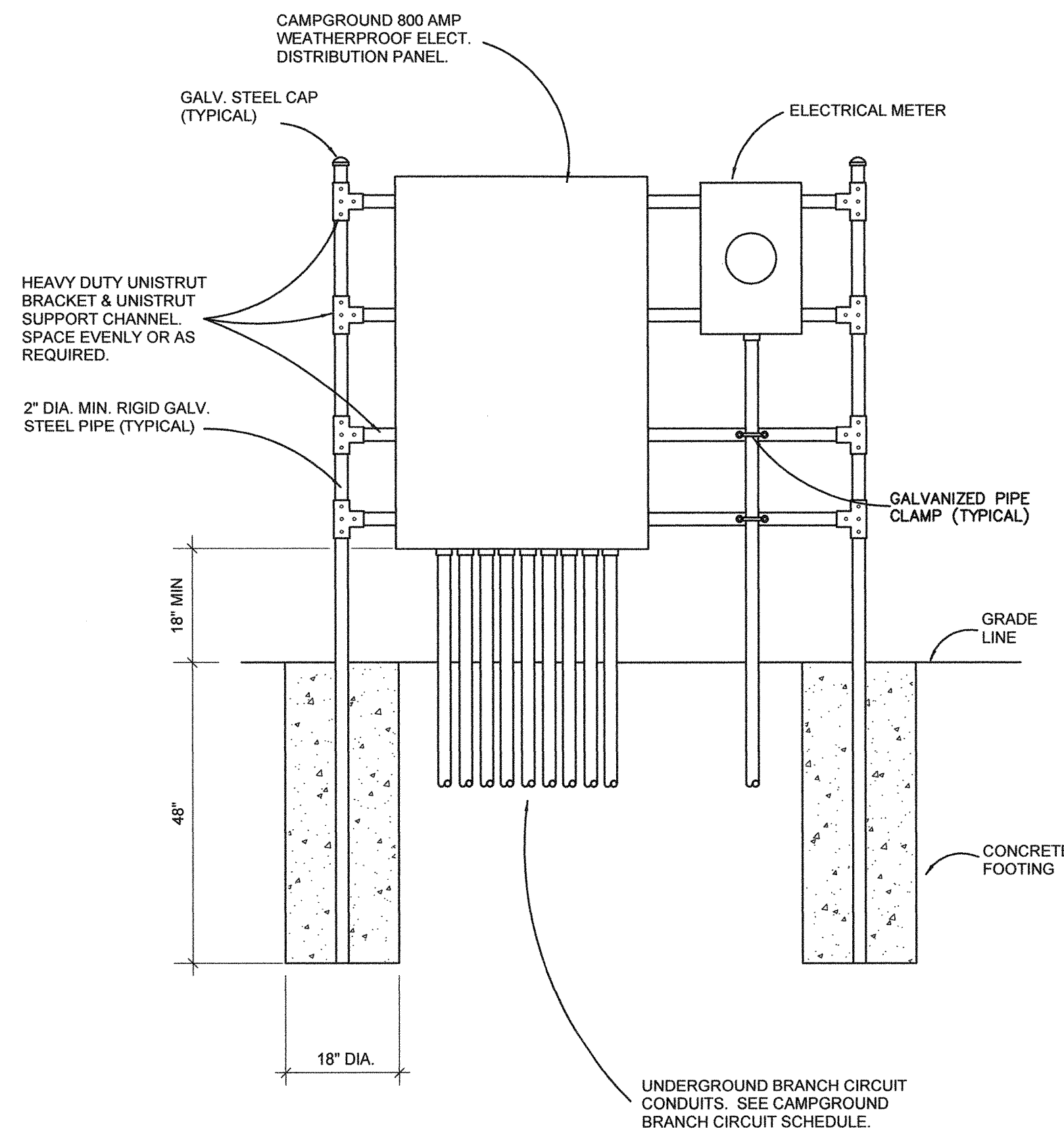
Q:\ACADDWG-ACTV\TWIN LAKES\E-5 DETAILS.dwg, 07/05/2006 1:14:50 PM



ELECTRICAL RISER DIAGRAM
CAMPER CABIN
NO SCALE



ELECTRICAL RISER DIAGRAM
TOILET/SHOWER BUILDING
NO SCALE

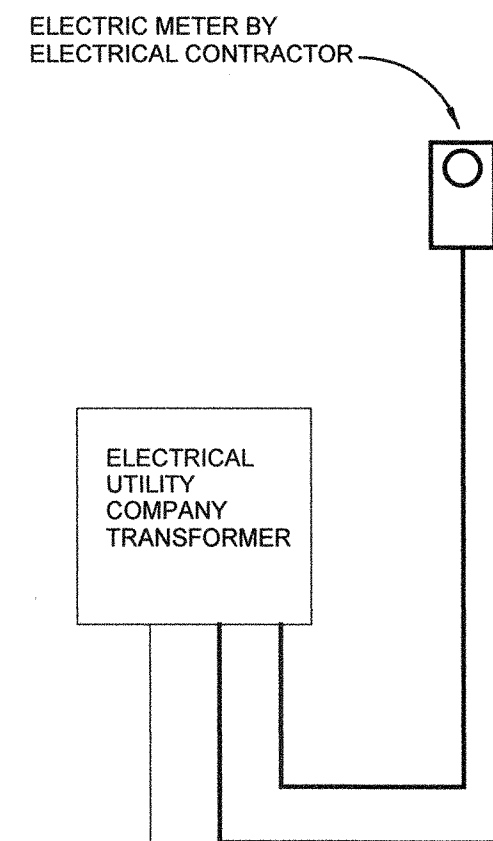
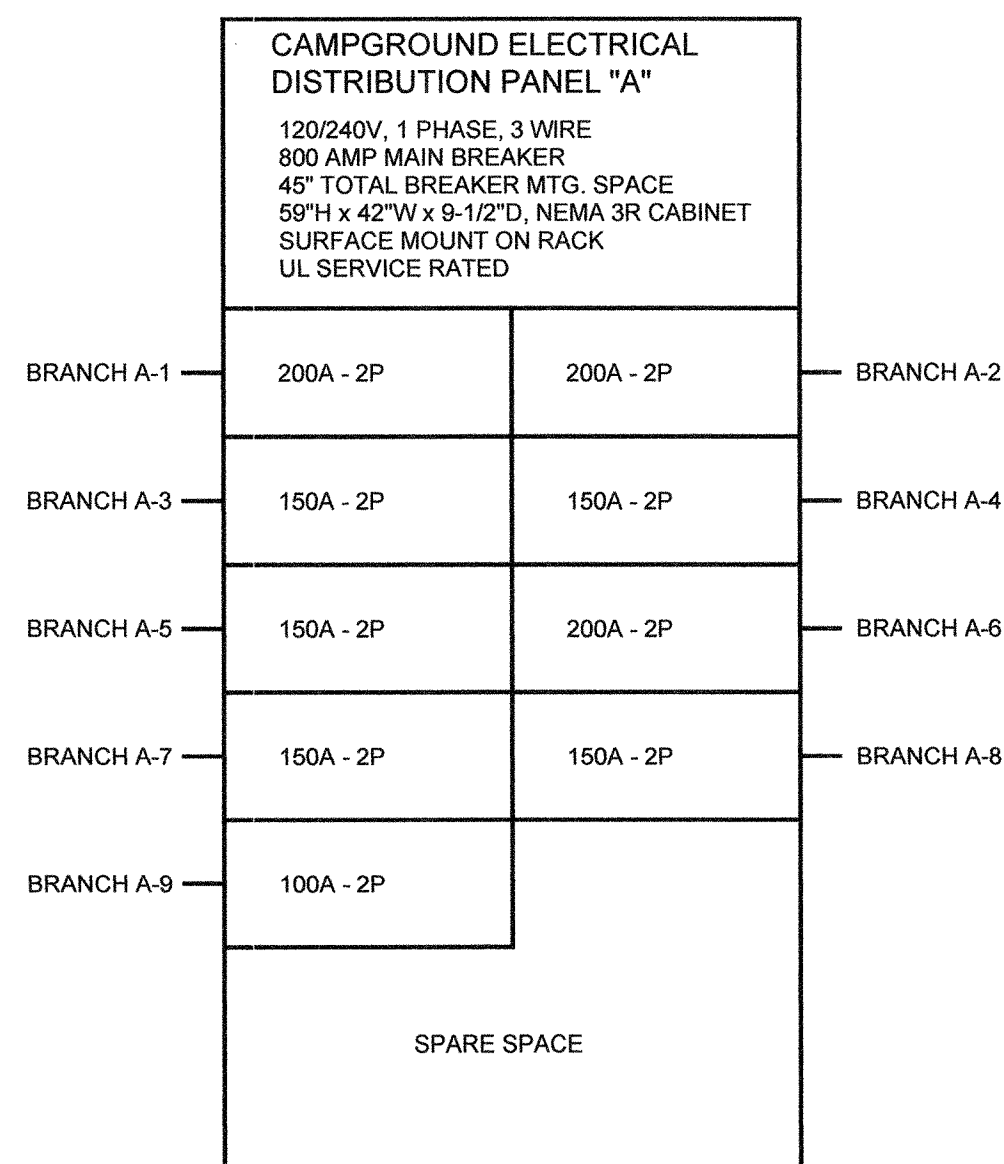


ELECTRIC SERVICE RACK DETAIL
NO SCALE

ELECTRICAL SCHEDULE - DISTRIBUTION PANEL "A"									
BRANCH NUMBER	CIRCUIT NUMBER	CALCULATED LOAD (VA)	NUMBER SITES	DEMAND FACTOR	ADJUSTED LOAD (VA)	ADJUSTED LOAD (VA) 240V	OCPD	BRANCH CIRCUIT FEEDERS	CONDUIT SIZE
A-1	1, 3	39,600	4	0.75	29,700	124 AMPS	200 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-2	2, 4	39,600	4	0.75	29,700	124 AMPS	200 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-3	5, 7	27,600	3	0.80	22,080	92 AMPS	150 AMPS	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-4	6, 8	31,200	4	0.75	23,400	98 AMPS	150 AMPS	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-5	9, 11	22,800	4	0.75	17,100	71 AMPS	150 AMPS	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-6	10, 12	39,600	4	0.75	29,700	124 AMPS	200 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-7	13, 15	31,200	4	0.75	23,400	98 AMPS	150 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
A-8	14, 16	30,000	6	0.70	21,000	88 AMPS	150 AMPS	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
A-9	17, 19	24,000	T/S BLDG	0.80	14,400	60 AMPS	100 AMPS	(3) #1, (1) #4 GRD.	2" DIA.

(16) 30 AMP PEDESTALS @ 3,600 VA / PED	57,600 VA
(17) 50 AMP PEDESTALS @ 12,000 VA / PED	204,000 VA
TOTAL CAMPSITE LOAD	261,600 VA
(NEC 551-73) DEMAND FACTOR	0.60
ADJUSTED CAMPSITE LOAD	156,960 VA
(1) TOILET/SHOWER BUILDING @ 24,000 VA	24,000 VA
TOTAL BUILDING LOAD	24,000 VA
DEMAND FACTOR	0.50
ADJUSTED BUILDING LOAD	12,000 VA
TOTAL LOAD	168,960 VA

$\frac{168,960 \text{ VA}}{240 \text{ V}} = 704 \text{ AMPS}$



NOTE:
CONTRACTOR SHALL COORDINATE INSTALLATION
OF ELECTRICAL SERVICE COMPONENTS AND
REQUIREMENTS WITH THE ELECTRICAL UTILITY.

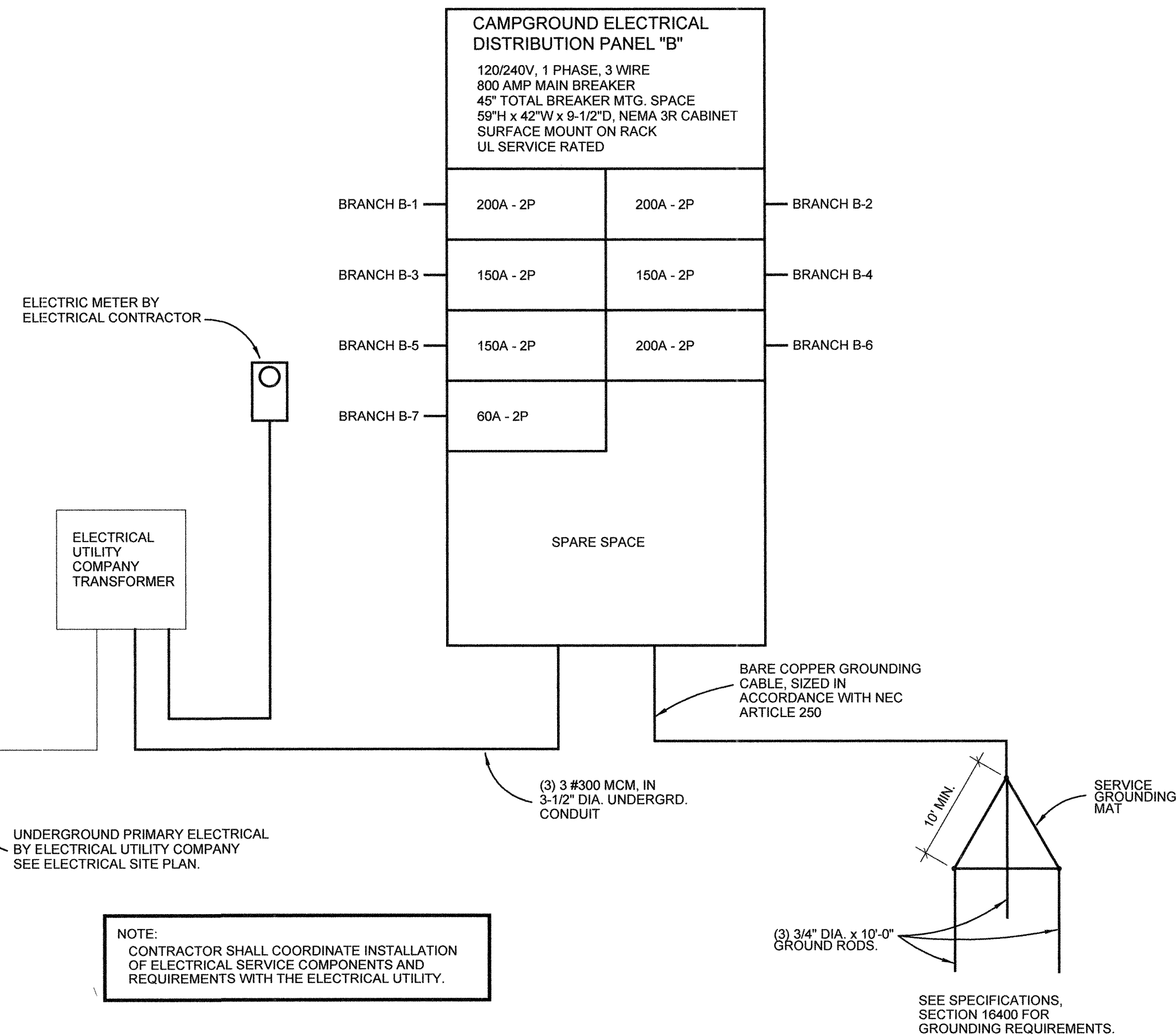
ELECTRICAL RISER DIAGRAM
DISTRIBUTION PANEL "A"

NO SCALE

ELECTRICAL SCHEDULE - DISTRIBUTION PANEL "B"									
BRANCH NUMBER	CIRCUIT NUMBER	CALCULATED LOAD (VA)	NUMBER SITES	DEMAND FACTOR	ADJUSTED LOAD (VA)	ADJUSTED LOAD (VA) 240V	OCPD	BRANCH CIRCUIT FEEDERS	CONDUIT SIZE
B-1	1, 3	43,200	5	0.70	30,240	126 AMPS	200 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-2	2, 4	48,000	4	0.75	36,000	150 AMPS	200 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-3	5, 7	30,000	6	0.70	21,000	88 AMPS	150 AMPS	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
B-4	6, 8	26,400	5	0.70	18,480	77 AMPS	150 AMPS	(3) #1/0, (1) #4 GRD.	2-1/2" DIA.
B-5	9, 11	31,200	4	0.75	23,400	98 AMPS	150 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-6	10, 12	48,000	4	0.75	36,000	150 AMPS	200 AMPS	(3) #4/0, (1) #2 GRD.	2-1/2" DIA.
B-7	13, 15	14,400	CABIN	0.50	7,200	30 AMPS	60 AMPS	(3) #4, (1) #4 GRD.	1-1/2" DIA.

(13) 30 AMP PEDESTALS @ 3,600 VA / PED	46,800 VA
(15) 50 AMP PEDESTALS @ 12,000 VA / PED	180,000 VA
TOTAL CAMPSITE LOAD	226,800 VA
(NEC 551-73) DEMAND FACTOR	0.60
ADJUSTED CAMPSITE LOAD	136,080 VA
(1) CAMPER CABIN @ 14,400 VA	14,400 VA
TOTAL BUILDING LOAD	14,400 VA
DEMAND FACTOR	0.50
ADJUSTED BUILDING LOAD	7,200 VA
TOTAL LOAD	143,280 VA

$\frac{143,280 \text{ VA}}{240 \text{ V}} = 597 \text{ AMPS}$



ELECTRICAL RISER DIAGRAM
DISTRIBUTION PANEL "B"

NO SCALE

SILT FENCE SPECIFICATIONS

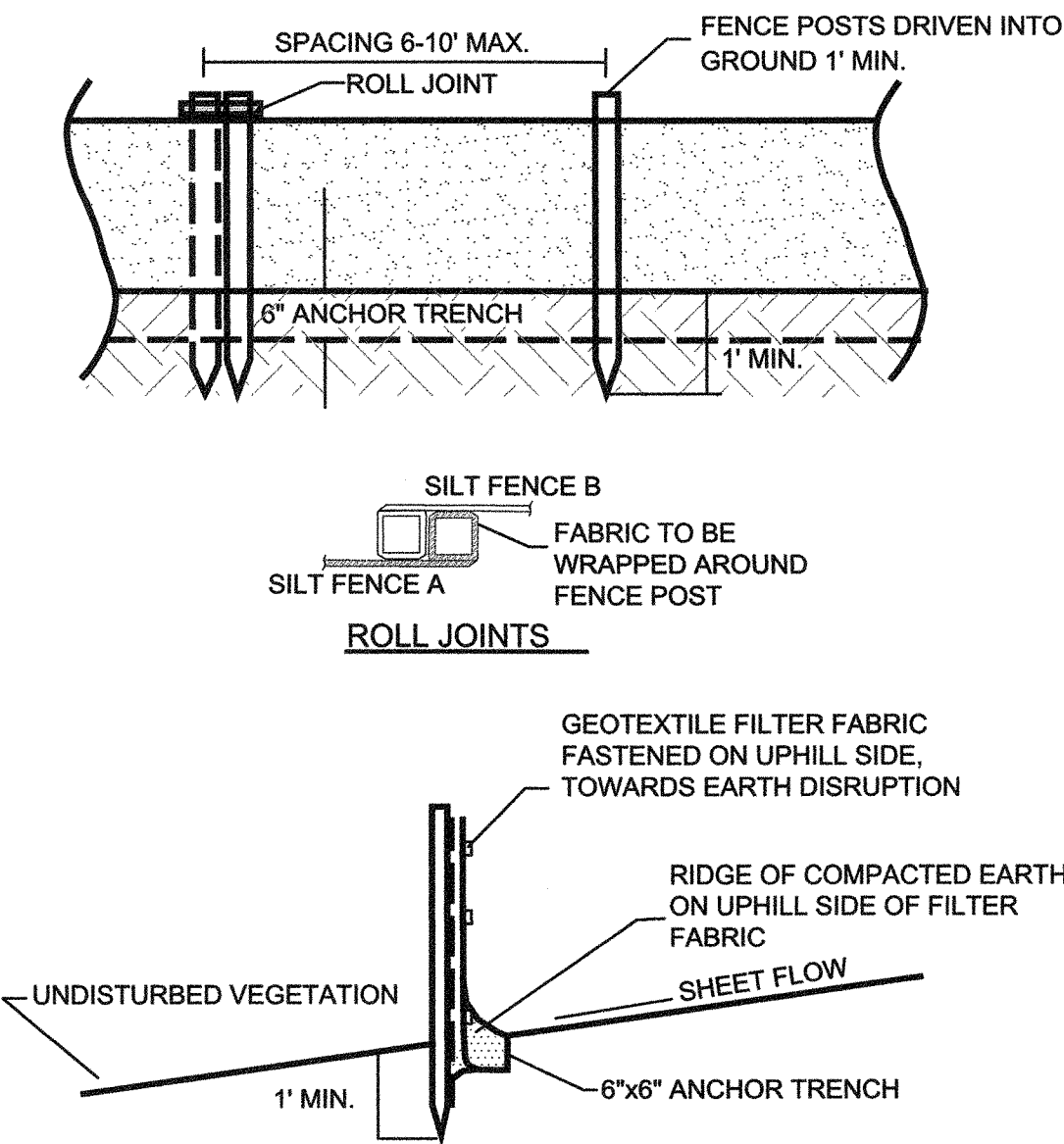
- When
- A temporary measure for preventing sediment movement.
- Why
- Used to prevent sediment suspended in runoff from leaving an earth change area.
- Where
- Use adjacent to critical areas, wetlands, base of slopes, and watercourses.
- How
- Install parallel to a contour.
 - The silt fence should be made of woven geotextile fabric.
 - Silt fence should accommodate no more than 1/2 to 1 acre of drainage per 100' of fence.
 - Dig a 6" trench along the area where the fence is to be installed.
 - Place 6" of the silt fence bottom flap into the trench.
 - Backfill the trench with soil and compact the soil on both sides. Create a small ridge on the up-slope side of the fence.
 - Install wooden stakes 6 - 10' apart and drive into the ground a minimum of 12".
 - Staple the geotextile fabric to the wooden stakes.
 - Join sections of silt fence by wrapping ends together (See drawing).
- Maintenance
- Inspect frequently and immediately after each storm event. Check several times during prolonged storm events. If necessary, repair immediately.
 - If the sediment has reached 1/3 the height of the fence, the soil should be removed and disposed of in a stable upland site.
 - The fence should be re-installed if water is seeping underneath it or if the fence has become ineffective.
 - Silt fence should be removed once vegetation is established and up-slope area has stabilized.
- Limitations
- Silt fence may cause temporary ponding and could fail if too much water flows through the area.
 - Do not use in areas with concentrated flows.
 - Chance of failure increases if fence is installed incorrectly or if sediment accumulation is not removed.

SOIL EROSION NOTES

PROJECT LOCATION: TWIN LAKES STATE PARK,
HOUGHTON COUNTY, ELM RIVER TOWNSHIP,
T. 52 N., R. 36 W., SECT 22.

SILT FENCE IS TO BE IN PLACE PRIOR TO
EXCAVATION AND INSTALLATION OF UNDERGROUND
ELECTRICAL.

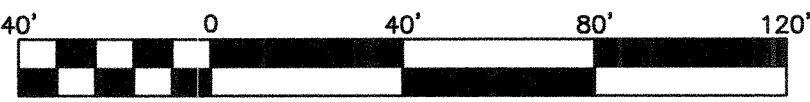
BACKFILLING AND RESTORATION SHALL BE ACCOMPLISHED
ACCORDING TO SECTION 16300 OF THE SPECIFICATION
AS WORK PROGRESSES OR AS DIRECTED BY THE FIELD
ENGINEER.



SILT FENCE DETAIL

NOT TO SCALE

SOIL EROSION CONTROL SITE PLAN



LEGEND

- 52 EXISTING CAMPSITE NUMBER
- [Symbol] NEW PAD MOUNT TRANSFORMER BY ELT. UTILITY
- [Symbol] NEW CAMPGROUND MAIN DISTRIBUTION SWITCHBOARD
- [Symbol] NEW CAMPSITE ELECTRICAL PEDESTAL
- [Symbol] NEW UNDERGROUND ELECTRICAL
- [Symbol] SILT FENCE

