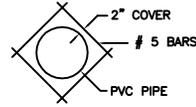


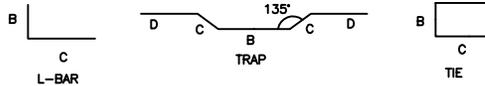
## BENT REINFORCEMENT SCHEDULE

BAR LOCATION	SIZE	QUANTITY	LENGTH	TYPE	B	C	D	TOTAL LENGTH
WALL DOWELS	#5		2-9	L	0-10	1-11		
COLUMN TIES	#3			TIE	0-8			
ENDWALL HORIZ. POCKET	#5		3-3	TRAP	1-0	0-6	1-9	
HORIZ. CORNER	#5		3-6	L	1-9	1-9		

CUT THE MINIMUM NUMBER OF BARS.  
MAINTAIN 2" COVER BETWEEN PIPE AND BARS  
ADD 4 BARS AS SHOWN IN THE DETAIL BELOW.



DETAIL OF PIPE THROUGH WALL



BAR TYPES

## BENT BAR QUANTITIES

BAR SIZE	TOTAL LENGTH	TOTAL WEIGHT
#3		
#5		

## REQUIRED LIVE LOADS FOR PRECAST TOP SECTIONS

- lbs. VEHICLE AXLE
- psf. LIVESTOCK
- psf. MANURE (60 psf/ft OF DEPTH)
- psf. SNOWLOAD (70 psf. MAX FOR MN.)

## ESTIMATED QUANTITIES

ITEM	SIZE	QUANTITY	UNIT
5" DIA. TILE W/SYN. FILTER			LN. FT.
ASTM C-33 FINE AG.			CY. YD.
EXCAVATION			CU. YD.
GRANULAR BASE			CU. YD.
CONC. FLOOR & FOOTINGS			CU. YD.
CONCRETE WALLS			CU. YD.
CONCRETE COLUMNS			CU. YD.
TOTAL TANK CONCRETE			CU. YD.
REINFORCING STEEL			LB.
FLEXIBLE WATERSTOP			LN. FT.
BASE SEAL WATERSTOP			LN. FT.
PRECAST BEAM 1	11" x 14" x " " "		EACH
PRECAST BEAM 2	11" x 14" x " " "		EACH
PRECAST TOP 1	" x " x " " "		EACH
PRECAST TOP 2	" x " x " " "		EACH
PRECAST PUMPOUT TOP	" x " x " " "		EACH
PUMPOUT COVER			EACH
BACKFILL			CU. YD.

## DESIGN NOTES

THIS PLAN IS BASED ON MIDWEST PLAN SERVICE 36 (MWPS-36) FIRST EDITION 1994. MWPS-36 USES THE ULTIMATE STRENGTH DESIGN METHOD IN ACI 318. THIS PLAN ALSO MEETS THE REQUIREMENTS OF NRCS PRACTICE STANDARD 313 WASTE STORAGE FACILITY.

THE MINIMUM FOUNDATION BEARING CAPACITY REQUIRED IS 3000 PSF.

### DESIGN STRENGTHS

CAST IN PLACE CONCRETE  $f'_c=4,000$  psi  
PRECAST CONCRETE BEAMS MIN.  $f'_c=4,500$  psi  
STEEL  $f_y=60,000$  psi

### BEAM LOADS

DEAD LOAD (9.5" SOLID TOP & 11"x14" BEAM) = 1585 pif

### LIVE LOADING CONDITIONS:

① 2-5000# WHEEL LOADS 4' APART +  
100 psf (70 psf SNOW & 30 psf MANURE)  
OR ② 200 psf

### COLUMN LOAD

$P_a = 48k$

### COLUMN FOOTING LOAD

COLUMN LOAD = 49K

### WALL LOADS

THE VEHICLE SURCHARGE ON THE OUTSIDE OF THE WALL IS 100 PSF. THE WALL LOADING OF 85 PSF/FT IS BASED ON BACKFILL WITH LOW TO MEDIUM PLASTICITY SILTS & CLAYS LACKING IN SAND & GRAVEL, CL OR ML.

### WALL FOOTING LOAD

7670 lb/ft (INCLUDES LOAD FACTORS)

TOTAL VOLUME OF TANK = \_\_\_\_\_ GALLONS

## CONSTRUCTION SPECIFICATIONS

### TILE DRAIN

- INSTALL TILE DRAIN AROUND THE PIT PRIOR TO CONSTRUCTION.
- THE TILE AND ENVELOPE MATERIAL SHALL MEET NRCS CONSTRUCTION SPECIFICATION MN-250 CORRUGATED THERMOPLASTIC TUBING. THE TILE SHALL BE HEAVY DUTY POLYETHYLENE.

EXCAVATIONS SHALL MEET OSHA STANDARDS.

SUB-BASE AND TILE ENVELOPE SHALL BE CLEAN SAND OR GRAVEL WITH LESS THAN 5% BY WEIGHT PASSING THE #200 SIEVE.

### STEEL REINFORCEMENT

- STEEL REINFORCEMENT SHALL MEET NRCS CONSTRUCTION SPECIFICATION MN-34 STEEL REINFORCEMENT.
- STEEL REINFORCEMENT SHALL BE GRADE 60, DEFORMED BILLET STEEL.
- THE CONCRETE COVER OVER THE STEEL SHALL BE 2" ON FORMED SURFACES AND 3" AGAINST EARTH. THE TOLERANCE FOR COVER SHALL BE 1/4".
- THE FLOOR STEEL SHALL BE SUPPORTED WITH CONCRETE BRICKS.
- THE MINIMUM BEND DIAMETER OF THE L-BARS AND TIES SHALL BE 6 BAR DIAMETERS.

### CAST IN PLACE CONCRETE

- CONCRETE MATERIALS AND PLACEMENT SHALL MEET NRCS CONSTRUCTION SPECIFICATION MN-31 CONCRETE.
- THE MINIMUM 28-DAY COMPRESSIVE STRENGTH SHALL BE 4000 PSI.
- THE MAXIMUM AGGREGATE SIZE SHALL BE 3/4".
- THE AIR CONTENT SHALL BE BETWEEN 5% AND 8%.
- THE SLUMP SHALL BE BETWEEN 3" AND 5".
- FLEXIBLE WATERSTOPS SHALL MEET NRCS MATERIAL SPECIFICATION MN-537 WATERSTOPS. THEY SHALL BE FIRMLY FIXED INTO POSITION PRIOR TO CONCRETE PLACEMENT.
- STEEL REINFORCEMENT & JOINTS SHALL BE FREE OF FORM OIL.
- TOLERANCES: ELEVATION OF TOP OF WALLS, LEDGES, BEAM POCKETS, AND TOP OF COLUMNS +/- 1/4". HORIZONTAL LENGTH, WIDTH, AND DIAGONAL DIMENSIONS OF WALL AND LOCATION OF BEAM POCKETS AND COLUMNS +/- 1/2". PLUMBNESS OF WALL +/- 1/4". HORIZONTAL WALL ALIGNMENT SHALL DEViate NO MORE THAN 1/4" IN 10' AND NO MORE THAN 1/2" OVER THE FULL LENGTH OF THE WALL.
- CURING COMPOUND SHALL MEET ASTM C 309 & SHALL CONTAIN FUGITIVE DYE. IT SHALL BE APPLIED AT A UNIFORM RATE OF AT LEAST 1 GAL. PER 175 SQ. FT. IT SHALL NOT BE APPLIED TO JOINTS OR STEEL.

### SUPERPLASTICIZER (IF USED)

- PLASTICIZING ADMIXTURE SHALL MEET THE REQUIREMENTS OF ASTM C 1017.
- PLASTICIZING ADMIXTURE SHALL BE COMPATIBLE WITH OTHER ADMIXTURES. ALL ADMIXTURES SHALL BE SUPPLIED BY THE SAME READY MIX SUPPLIER.
- THE SLUMP SHALL NOT EXCEED 7-1/2 INCHES WITH SUPERPLASTICIZER.
- SUPERPLASTICIZED CONCRETE SHALL BE PLACED IN TWO 4 FOOT HORIZONTAL LIFTS. IT SHALL BE PLACED AT A FAST ENOUGH RATE SO THAT THE FIRST LIFT CAN BE EASILY MIXED WITH THE SECOND LIFT.
- EACH LIFT SHALL BE VIBRATED. DUE TO LOWERED SURFACE TENSION IN THE MIX, LESS VIBRATION IS REQUIRED THAN IN A STANDARD MIX.

### PRECAST CONCRETE & GROUTING

- THE MIN. 28 DAY BEAM COMPRESSIVE STRENGTH SHALL BE 4,500 PSI.
- THE SUPPLIER SHALL PROVIDE A MATERIAL CERTIFICATION FOR THE PRECAST BEAMS TO THE OWNER & NRCS.
- THE SUPPLIER SHALL SUBMIT A CERTIFICATION FROM A REGISTERED PROFESSIONAL ENGINEER THAT THE PRECAST TOP WILL SUPPORT THE LIVE LOAD SPECIFIED ON THE DRAWINGS TO THE OWNER & NRCS.
- PRECAST COMPONENTS SHALL NOT BE PLACED UNTIL THE CONCRETE WALLS AND COLUMNS HAVE CURED AT LEAST 7 DAYS.
- A DRY PATCHING (PRE-SHRINK) MORTAR SHALL BE USED TO FILL ALL SPACES BETWEEN THE ENDS OF THE PRECAST TOP AND THE WALL, AND TO LEVEL UP THE SUPPORTS FOR THE PRECAST COMPONENTS. THE DRY PATCHING MORTAR SHALL BE MIXED NOT RICHER THAN 1 PART CEMENT TO 3 PARTS SAND. SURFACES SHALL BE THOROUGHLY CLEANED AND KEPT CONTINUOUSLY WET FOR AT LEAST 3 HOURS PRIOR TO PATCHING. A PRE-PACKAGED, NON-SHRINK, NON-METALLIC, MORTAR CAN BE SUBSTITUTED FOR THE SPECIFIED MORTAR MIX. SMALL WOOD SHIMS MAY BE USED TO SUPPORT THE PRECAST COMPONENTS UNTIL THE MORTAR SETS.

### BACKFILLING

- THE BEAMS AND TOP SECTIONS MUST BE IN PLACE & GROUTED BEFORE BACKFILLING TO SUPPORT THE TOP OF THE TANK WALL.
- THE BACKFILL MATERIAL MAY BE SOIL FROM THE EXCAVATION, EXCEPT HIGH PLASTICITY SILTS AND CLAYS (CH & MH) SHALL NOT BE USED.
- THERE ARE NO MOISTURE OR COMPACTION REQUIREMENTS.

### SAFETY

- CONCRETE CONSTRUCTION SHALL COMPLY WITH ALL REQUIREMENTS OF THE 1996 NATIONAL ELECTRIC CODE (NEC), SECTION 547-84b, REGARDING CONCRETE EMBEDDED ELEMENTS AND ELECTRICAL BONDING. ELECTRICAL CERTIFICATION SHALL BE SUBMITTED TO THE OWNER & NRCS.
- NO ONE SHALL ENTER THE STORAGE TANK UNLESS THE OSHA STANDARDS FOR CONFINED SPACES ARE MET.
- SAFETY FENCE & WARNING SIGNS SHALL BE PLACED AROUND OPEN TOP TANKS.
- WARNING SIGNS SHALL BE PLACED AT THE PUMPOUTS OF COVERED TANKS.

USDA  
(S/WR)  
(S/WR)  
(S/WR)  
(M/R)  
(M/R)  
(M/R)  
(M/R)  
Designed  
Drawn  
Checked  
Approved

MINNESOTA

8 FT. DEEP CONCRETE TANK  
CONSTRUCTION DETAILS

COUNTY, SWCD  
COUNTY, MN

USDA NRCS  
Natural Resources Conservation Service

File No.  
MN614b.dwg

Drawing No.  
MN-ENG-614  
5/02

Sheet 2 of 2