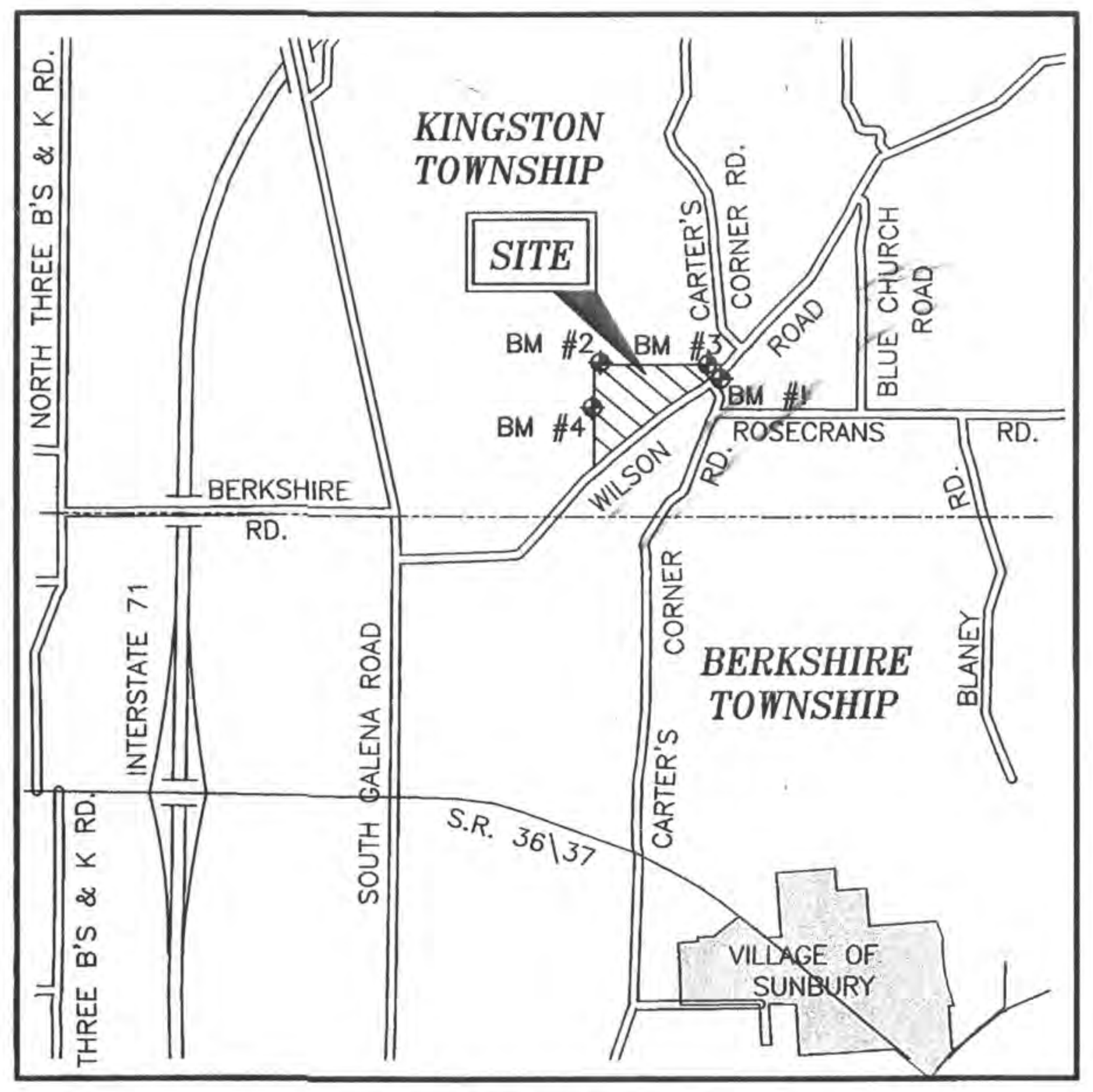
NORTHSTAR WATER RECLAMATION FACILITY

DELAWARE COUNTY, OHIO
JUNE 2006

INDEX OF SHEETS



SITE MAP
NOT TO SCALE

LOCATION MAP
NOT TO SCALE

UNDERGROUND UTILITIES
Two Working Days
BEFORE YOU DIG
Call 800-362-2764 (Toll free)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

ISSUED
JUL 0 6 2006
R. D. ZANDE & ASSOCIATES, INC.

CLIENT
NORTHSTAR LAND LLC
41 S. HIGH STREET
SUITE 1010
COLUMBUS, OHIO 43215

ATTN: MARK SCHELL, PARTNER
(614) 221-4286

COUNTY SANITARY ENGINEER
DELAWARE ~~COUNTY~~ REGIONAL SEWER DISTRICT
50 CHANNING STREET
DELAWARE, OHIO 43015

ATTN: JACK SMELKER, P.E.
(740) 833-2240

MECHANICAL ENGINEER
CUSTOM AIR CONDITIONING
935 CLAYCRAFT ROAD
GAHANNA, OHIO 43230

ATTN: PAT HALAIKO, P.E.
(614) 552-4822

SITE ENGINEER
MACK INDUSTRIES, INC
201 COLUMBIA ROAD
VALLEY CITY, OHIO 44280

ATTN: AL MONG
(330) 483-3111 EXT. 6302

WASTEWATER PROCESS DESIGN
IRRIGATION POND DESIGN
SITE DESIGN
R.D. ZANDE & ASSOCIATES, INC.
1500 LAKE SHORE DRIVE
SUITE 100
COLUMBUS, OHIO 43204

ATTN: DALE KOCAREK, P.E..
ATTN: KEVIN KERSHNER, P.E.
(614) 486-4383

ELECTRICAL ENGINEER
FLOYD BROWNE ASSOCIATES, INC.
107 N. MAIN STREET
SUITE 200
MARION, OHIO 43302

ATTN: JAMES A. SUTHERIN
(740) 383-2187

THIS IS TO CERTIFY THAT GOOD ENGINEERING PRACTICES HAVE BEEN UTILIZED IN THE DESIGN OF THIS PROJECT AND THAT ALL MINIMUM STANDARDS AS DELINEATED IN THE DELAWARE COUNTY ENGINEERING AND SURVEYING STANDARDS FOR SUBDIVISION DEVELOPMENT HAVE BEEN MET, INCLUDING THOSE STANDARDS GREATER THAN MINIMUM WHERE, IN MY OPINION, THEY ARE NEEDED TO PROTECT THE SAFETY OF THE PUBLIC.

PREPARED BY:

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive, Suite 100, Columbus, Ohio 43204
(614) 486-4383 1-800-340-2743
FAX (614)-486-4387

STATE OF OHIO — KEVIN D. KERSHNER E-64492 — REGISTERED PROFESSIONAL ENGINEER

[signature] E-64492 — 6-19-06
REGISTERED ENGINEER — DATE

STATE OF OHIO — DALE EDWARD KOCAREK E-50185 — REGISTERED PROFESSIONAL ENGINEER

Dale E. Kocarek E-50185 — 6-19-06
REGISTERED ENGINEER — DATE

BENCH MARKS (1988 DATUM)

SOURCE BENCH MARK:
USGS BP IN CONCRETE MONUMENT STAMPED "97-139", 8.5' E. OF EDGE OF PAVEMENT OF WILSON ROAD & 0.5 MILES EAST OF INTERSECTION OF N. GALENA ROAD.
ELEV 932.89

BM #1 COTTON GIN SPIKE SET, WEST SIDE OF POWER POLE #29309, EAST SIDE OF WILSON ROAD ACROSS FROM GUY POLE
ELEV 960.93

BM #2 IRON PIN, MYERS TRAVERSE POINT, NORTH WEST CORNER OF SITE
ELEV 967.47

BM #3 NORTH RIM OF MON. WELL, WEST SIDE OF WILSON ROAD, NEAR NORTH EAST PROPERTY CORNER
ELEV 961.84

BM #4 NORTH RIM MON. WELL, WEST SIDE OF 33+/- ACRE TRACT, 800 FEET +/- SOUTH OF NORTHWEST CORNER
ELEV 965.34

NOTE:

THE CONTRACTOR AND ANY SUBCONTRACTORS SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR PROTECTION OF PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS ALSO THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SUBCONTRACTORS TO INITIATE, MAINTAIN, AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.

NOTICE TO CONTRACTORS: THE ELECTRONIC FILES FOR THIS PROJECT ARE INSTRUMENTS OF SERVICE OF, AND ARE OWNED BY R. D. ZANDE & ASSOCIATES, INC. DATA FROM SUCH ELECTRONIC FILES CAN BE PROVIDED FOR CONSTRUCTION STAKING. CONTACT MARY SHERRETS, P.E., ZANDE'S PROJECT MANAGER FOR THIS PROJECT, FOR INFORMATION ABOUT THE FEES ASSOCIATED WITH PROVIDING SUCH DATA AND THE RELEASE AND INDEMNITY THAT MUST BE SIGNED BEFORE THE DATA IS RELEASED.

CHANGE ORDER SCHEDULE

CHANGE	PREPARED	DATE	DESCRIPTION OF CHANGE	SHEET NO.	APPROVED	APP'D DATE

APPROVED BY:

APPROVED THIS 20th DAY OF June 2006 — Jack Smelker — DELAWARE COUNTY SANITARY ENGINEER

APPROVED THIS 26 DAY OF June 2006 — Glenn A. Evans — DELAWARE COUNTY COMMISSIONER

APPROVED THIS 26 DAY OF June 2006 — James D. Ward — DELAWARE COUNTY COMMISSIONER

APPROVED THIS 26 DAY OF June 2006 — Kristopher W. Jordan — DELAWARE COUNTY COMMISSIONER

markpaxton P:\5820\WASTE WATER TREATMENT SITE\Basin\Dwg\Submittal\EPA\5820ip01.dwg Layout1 Layout MAY 09, 2005 4:13 PM

DELAWARE COUNTY, OHIO
NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENT PLANT SITE PLAN
SITUATED IN THE TOWNSHIP OF KINGSTON, DELAWARE COUNTY, OHIO

GENERAL NOTES

THE DELAWARE COUNTY DESIGN, CONSTRUCTION, AND SURVEYING STANDARDS MANUAL EFFECTIVE DATE JUNE 1, 1998 TOGETHER WITH THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, INCLUDING ALL SUPPLEMENTS THERETO IN FORCE ON JANUARY 1, 1997, SHALL GOVERN ALL MATERIAL AND WORKMANSHIP INVOLVED IN THE IMPROVEMENTS SHOWN ON THESE PLANS UNLESS OTHERWISE NOTED.

THE CONTRACTOR AND SUB-CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL, STATE AND LOCAL SAFETY REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS ALSO THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SUB-CONTRACTOR TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.

THE IDENTITY AND LOCATION OF THE EXISTING UNDERGROUND UTILITY FACILITIES KNOWN TO BE LOCATED IN THE CONSTRUCTION AREA HAVE BEEN SHOWN ON THE PLANS AS ACCURATELY AS PROVIDED BY THE OWNER OF THE UNDERGROUND UTILITY. THE COUNTY OF DELAWARE AND/OR ENGINEER ASSUME NO RESPONSIBILITY AS TO THE ACCURACY OF THE UNDERGROUND FACILITIES SHOWN ON THE PLANS.

THE CONTRACTOR IS RESPONSIBLE FOR THE INVESTIGATION, LOCATION, SUPPORT, PROTECTION, AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES WHETHER SHOWN ON THESE PLANS OR NOT. THE CONTRACTOR SHALL EXPOSE ALL UTILITIES OR STRUCTURES PRIOR TO CONSTRUCTION TO VERIFY THE VERTICAL AND HORIZONTAL EFFECT ON THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL CALL, TOLL FREE, THE OHIO UTILITIES PROTECTION SERVICES (1-800-362-2764) 72 HOURS PRIOR TO CONSTRUCTION AND SHALL NOTIFY ALL UTILITY COMPANIES AT LEAST 48 HOURS PRIOR TO WORK IN THE VICINITY OF THEIR UNDERGROUND LINES.

ANY MODIFICATION TO THE WORK AS SHOWN ON THESE DRAWINGS MUST HAVE PRIOR WRITTEN APPROVAL BY THE COUNTY ENGINEER.

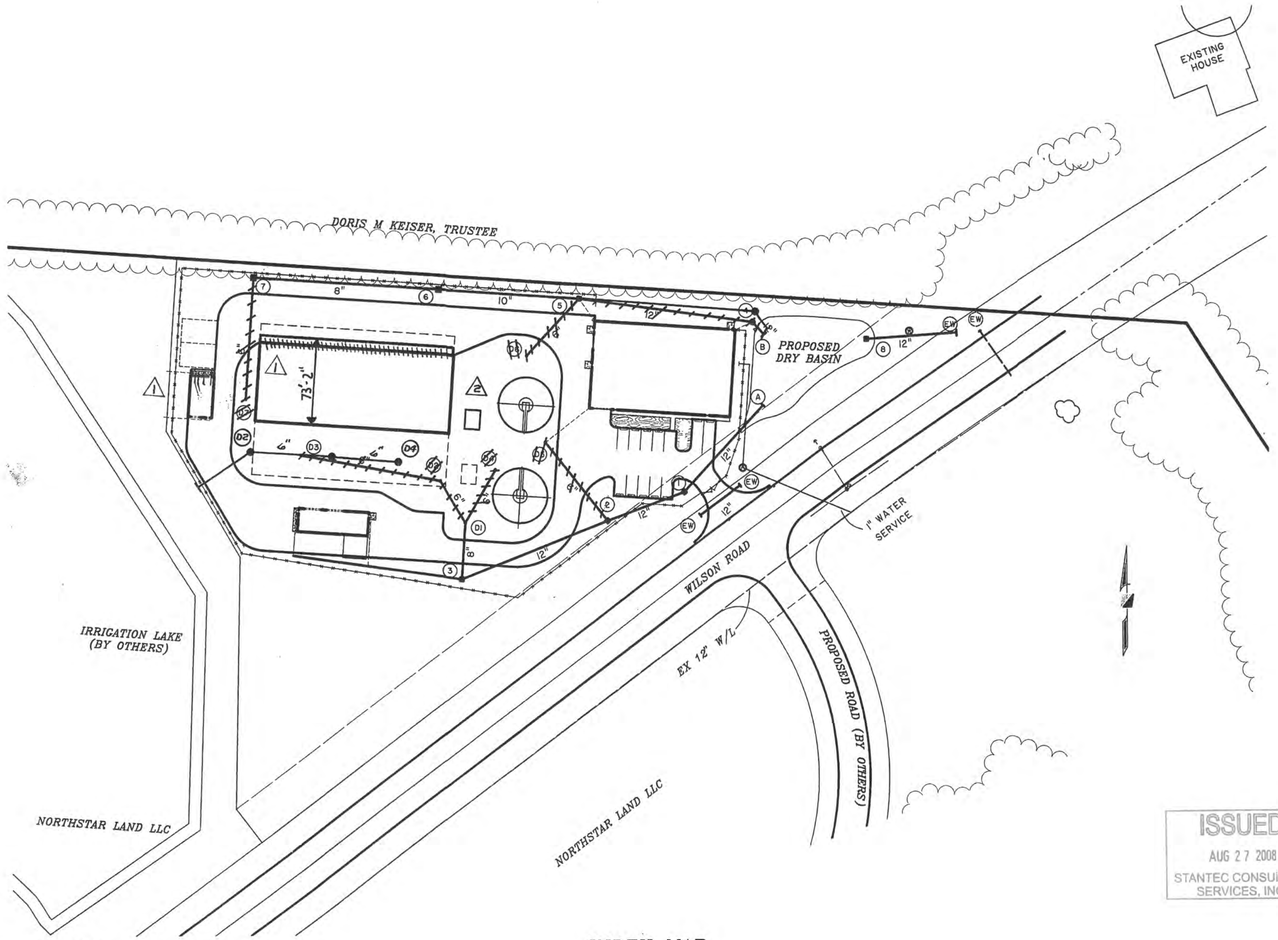
THE CONTRACTOR SHALL NOTIFY THE COUNTY ENGINEER'S OFFICE FORTY-EIGHT (48) HOURS PRIOR TO CONSTRUCTION.

SUPPORT, PROTECTION AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES SHALL BE THE RESPONSIBILITY OF THE CONTRATOR. THE COST OF THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS ITEMS.

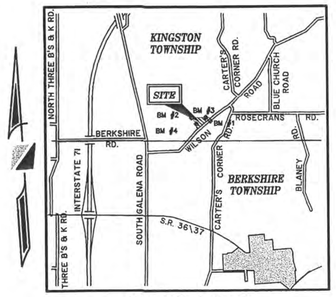
CONDUIT SLEEVES FOR NATURAL GAS CROSSING SHALL BE INSTALLED AS A PART OF THIS PLAN. COLUMBIA GAS WILL PROVIDE 4" P.V.C. TO BE INSTALLED AT A MINIMUM DEPTH OF 36" BELOW GRADE. NOTIFY COLUMBIA GAS CO. A MINIMUM OF 1 WEEK PRIOR TO INSTALLATION.

ROADWAY ITEMS ARE TO BE PER O.D.O.T. AND DELAWARE COUNTY STANDARDS.

PROOF SURVEYS ARE REQUIRED TO BE PERFORMED BY THE DEVELOPER IN ORDER TO DEMONSTRATE CONCLUSIVELY THAT THE FACILITIES ARE CONSTRUCTED TO THE CAPACITY, ELEVATIONS, SLOPES, GRADES AND SIZES SHOWN ON THE APPROVED PLANS. SUCH SURVEYS SHALL BE CONDUCTED BY A REGISTERED PROFESSIONAL SURVEYOR, SHALL EMPLOY STANDARD TECHNIQUES, AND SHALL PRODUCE AND FURNISH FIELD NOTES TO THE COUNTY ENGINEER FOR REVIEW AND RECORD PURPOSES. REDUCTION OF NOTES AND ANY PLOTTING NECESSARY TO MAKE NOTES INTERPRETABLE SHALL BE BY THE SURVEYOR PERFORMING THE PROOF SURVEY. PROOF SURVEYS SHALL BE IN ADDITION TO AND SEPERATE FROM OTHER INSPECTIONS THAT MAY BE CONDUCTED BY THE COUNTY ENGINEER. ALL DISCREPANCIES REVEALED IN THE AS-CONSTRUCTED FACILITIES BY THE PROOF SURVEY SHALL BE RECTIFIED BY THE DEVELOPER, AND THE PROOF SURVEY RE-PERFORMED IN ORDER TO DEMONSTRATE CONFORMANCE.



INDEX MAP
SCALE: 1" = 60'



VICINITY MAP
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(1988 DATUM)

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PREPARED BY:

R.D. Zande & Associates, Inc.
1600 Lake Shore Drive, Suite 100, Columbus, Ohio 43204
(614) 486-4383 1-800-840-2743
FAX (614) 486-1561

STATE OF OHIO — KEVIN D. KERSHNER #E-64492 REGISTERED PROFESSIONAL ENGINEER

REGISTERED ENGINEER — E64492 — 6-29-06 DATE

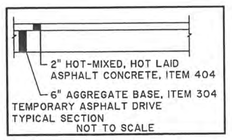
ISSUED
AUG 27 2008
STANTEC CONSULTING SERVICES, INC.

STANDARD DRAWINGS

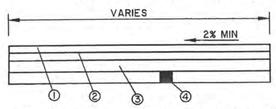
DELAWARE COUNTY

STREET	STORM		
DCED-RI00	DCED-SI02	DCED-SI39	
DCED-R2220	DCED-SI06	DCED-SI45	
DCED-R23I9	DCED-SI07	DCED-SI49	
	DCED-SI08	DCED-SI50	
	DCED-SI12	DCED-SI51	
	DCED-SI14	DCED-SI55	
	DCED-SI15	DCED-SI68	
	DCED-SI17	DCED-SI69	
	DCED-SI19	DCED-S201	
	DCED-SI33		

THE STANDARD DRAWINGS LISTED ABOVE SHALL BE CONSIDERED A PART OF THESE DRAWINGS.



TEMPORARY ASPHALT DRIVE
TYPICAL SECTION
NOT TO SCALE



① 2" ASPHALT CONCRETE, SURFACE COURSE, O.D.O.T. ITEM 404
② 2" ASPHALT CONCRETE INTERMEDIATE COURSE, O.D.O.T. ITEM 402
③ 6" AGGREGATE BASE, O.D.O.T. ITEM 304
④ 6" #1 & #2 STONE

TYPICAL HEAVY DUTY PAVEMENT SECTION
NOT TO SCALE

NOTE: ALL PAVEMENT TO BE HEAVY DUTY

UNDERGROUND UTILITIES
Two Working Days
BEFORE YOU DIG
Call 800-362-2764 (Toll free)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS MUST BE CALLED DIRECTLY

THE DELAWARE COUNTY SIGNATURES ON THIS PLAN SIGNIFY ONLY CONCURRENCE WITH THE GENERAL PURPOSES AND LOCATION OF THE PROPOSED IMPROVEMENTS. ALL TECHNICAL DETAILS REMAIN THE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHO PREPARED AND CERTIFIED THESE PLANS

APPROVALS

APPROVED THIS 20th DAY OF June, 2006 — Chris E. Bauserman per 6/30/06 — DELAWARE COUNTY ENGINEER

APPROVED THIS 20th DAY OF June, 2006 — Jack Sneller — DELAWARE COUNTY SANITARY ENGINEER

APPROVED THIS 26 DAY OF June, 2006 — Glenn A. Eaton — DELAWARE COUNTY COMMISSIONER

APPROVED THIS 26 DAY OF June, 2006 — James D. Ward — DELAWARE COUNTY COMMISSIONER

APPROVED THIS 26 DAY OF June, 2006 — Kristopher W. Good — DELAWARE COUNTY COMMISSIONER

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	JANUARY 6, 2005
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
8/22/06	⚠ REVISED BUILDING FOOT PRINTS
8/2/07	⚠ REVISED STORM & GRADING
	8/17/07 DWR 8/24/07
10/31/07	⚠ REVISED GRADING
05/12/08	⚠ STORM AS-BUILTS

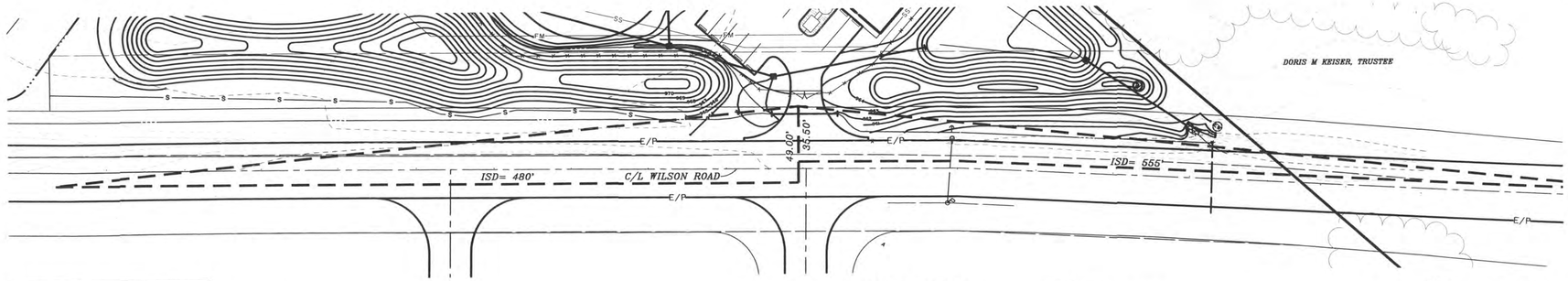
NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

SCALE: 1" = 60' / 30'

WASTEWATER TREATMENT PLANT

SHEET NO.
S1 OF 5

P:\5820\dwg\SITE PLAN-CV.dwg Layout1 Jun 19, 2006 - 2:27:51pm ryandennison



SIGHT DISTANCE DETAIL
SCALE: 1" = 40'

BASIN DATA		
ELEVATION	AREA (AC)	CUMMULATIVE VOLUME (AC-FT)
958.50	0.003	
959.00	0.017	0.020
960.00	0.076	0.057
961.00	0.095	0.130
962.00	0.114	0.230
963.00	0.139	0.360
964.00	0.155	0.517
	TOTAL	0.517

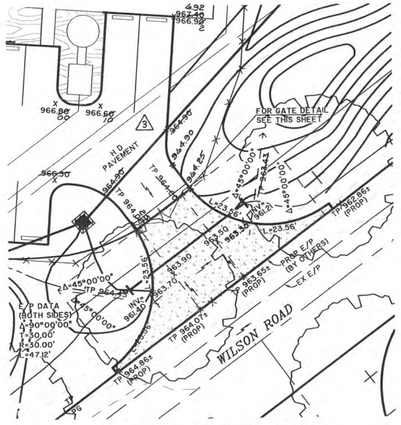
CURRENT ACREAGE CONTRIBUTING SEDIMENT BASIN = 2.21 AC
BASED ON 67 CY PER ACRE= 0.092 AC-FT REQUIRED SEDIMENT STORAGE.
VOLUME PROVIDED= 0.517 AC.

ESTIMATE OF QUANTITIES			
ITEM	TOTAL	UNIT	DESCRIPTION
207	410	LF	SILT FENCE
304	679	CY	AGGREGATE BASE
305	123	SY	CONCRETE BASE
402	453	TONS	ASPHALT CONCRETE
404	463	TONS	ASPHALT CONCRETE
407	123	SY	TACK COAT
604	7	EA	DITCH DRAINS
604	7	EA	CATCH BASINS
604	1	EA	MANHOLES
604	3	EA	ENDWALLS
604	2	EA	HEADWALLS
605	170	LF	4" PERFORATED UNDERDRAINS
605	248	LF	6" ROOF DRAINS
605	612	LF	6" STORM PIPE
605	206	LF	8" STORM PIPE
605	120	LF	10" STORM PIPE
605	508	LF	12" STORM PIPE
605	77	LF	15" STORM PIPE
805	196	LF	1" WATERLINE SERVICE

SEQUENCE OF CONSTRUCTION

SITE CLEARING.

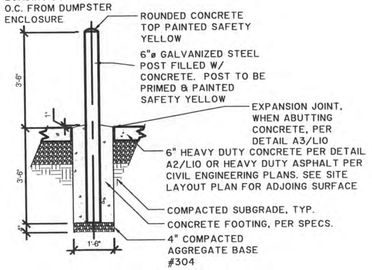
1. INSTALL CONSTRUCTION ENTRANCE.
2. INSTALL SILT FENCE.
3. INSTALL SEDIMENT BASIN & RISER PIPE.
4. INSTALL STORM & SANITARY SEWERS PER PLAN. LIMIT DISTURBANCE TO TRENCH.
5. INSTALL INLET PROTECTION AS STORM SEWERS ARE CONSTRUCTED.
6. BEGIN GRADING, AND MAINTAIN SEDIMENT AND EROSION CONTROL THROUGHOUT THE
7. DURATION OF THE PROJECT.
8. CONSTRUCT WATERLINE.
9. BEGIN BUILDING CONSTRUCTION.
10. FINISH SITE GRADING AND PAVE SITE.
11. STABILIZE REMAINING DISTURBED AREAS WITH SEEDING & MULCHING PER SPECIFICATIONS ON THIS SHEET.
12. REMOVE EROSION CONTROLS ONCE SITE IS STABILIZED.



INTERSECTION DETAIL
SCALE: 1" = 20'

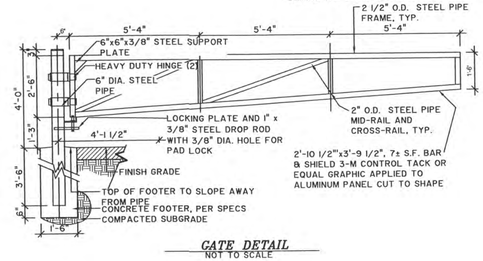
CONCRETE DRIVE APPROACH PER DCED-R2220
8" P.C. CLASS C, PER ITEM 305
CONTRACTOR TO OBTAIN DRIVE PERMIT FROM DELAWARE COUNTY PERMIT DEPARTMENT

NOTE:
LOCATE 24" O.C. FROM LOADING DOCK AND 12" O.C. FROM DUMPSTER ENCLOSURE.



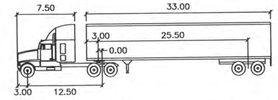
GUARD BOLLARD DETAIL
NOT TO SCALE

NOTES:
1. ALL STEEL PIPE AND HARDWARE SHALL BE GALVANIZED.
2. ALL STEEL PIPING AND HARDWARE TO BE PAINTED BLACK, PER SPECS.
3. ALL MEASUREMENTS TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO INSTALLATION.
4. CONTRACTOR TO PROVIDED SHOP DRAWINGS OF GATE AND ALL ASSOCIATED HARDWARE PRIOR TO INSTALLATION.
5. 2 GATES TOTAL AT DRIVE.
6. LOCK PLATE SHALL BE FABRICATED IN SUCH AWAY TO LOCK THE GATE IN A CLOSED POSITION PERPENDICULAR TO THE CENTERLINE OF THE ROAD AND LOCK THE GATE IN AN OPEN POSITION WITH THE GATE PARALLEL TO THE CENTERLINE OF THE ROAD BEHIND THE BACK OF CURB.



GATE DETAIL
NOT TO SCALE

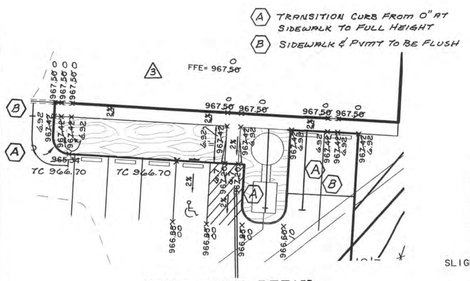
VEHICLE TURNING DETAIL
SCALE: 1" = 30'



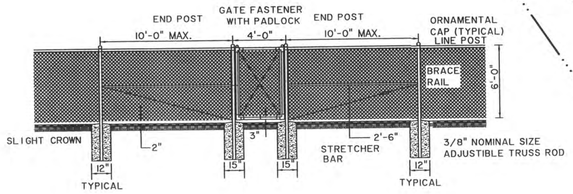
WB-40 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.00
Trailer Width	: 8.00	Steering Angle	: 20.30
Tractor Track	: 8.00	Articulating Angle	: 70.00
Trailer Track	: 8.00		

NOT TO SCALE



CURB RAMP DETAIL
SCALE: 1" = 20'



R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: JANUARY 4, 2005 DRAWING NO. 766-101	REVISIONS DATE / REMARKS 8/22\06 ⚠ REVISED BUILDING FOOT PRINTS 10/31/07 ⚠ REVISED GRADING	NORTHSTAR DEVELOPMENT WASTEWATER TREATMENT PLANT
SCALE: 1" = 30'	WASTEWATER TREATMENT PLANT NOTES, & DETAILS	SHEET NO. S2 OF 5	

P:\5820\dwg\SITE PLAN-GRADING.dwg Layout: Jun 30, 2006 - 9:49:34am dongreming

DORIS M KEISER TRUSTEE

EXISTING TREELINE (DO NOT DISTURB)

OFFSITE 0.45 AC

0.69 AC OFFSITE

GATE (SEE DETAIL SHT 2)

CHAINLINK FENCE (TYP) SEE DETAIL SHEET 2

ODOR CONTROL

BIO FILTER

4' SIDEWALK

PROPOSED HEADWORKS BUILDING (BY OTHERS) FFE = 972.08

ROOF DRAIN (TYP)

BOLLARD (TYP)

8' OVERHEAD DOOR

TIE INTO EX. DITCH

ROOF DRAINS TO BE PROFILE SHALE INTO

BOLLARD (TYP) SEE DETAIL SHEET 2

PROPOSED TREATMENT FACILITY (BY OTHERS) TOP OF CONC. = 971.00 GA = 969.8

ZB-4 BORING LOCATION SEE IRRIGATION POND PLAN FOR FIELD LOG.

CLARIFIER (BY OTHERS) TOP OF CONC. = 971.00 GA = 970.5

TC=971.0 PUMP STATION

DCED-SI30 DITCH DRAIN (TYP)

TC=971.0 VALVE VAULT

CLARIFIER (BY OTHERS) TOP OF CONC. = 971.00 GA = 970.5

TC=971.0 PUMP STATION

PROPOSED SLUDGE BUILDING (BY OTHERS) FFE = 970.0

14' OVERHEAD DOORS

3' DOOR

6'X6' CONC. SLAB

4' SIDEWALK

ROOF DRAIN (TYP)

TIE 6" ROOF DRAINS INTO 6" STM PIPE W/ 6"x6" TEE (TYP)

STM PIPE

PROPOSED IRRIGATION LAKE (BY OTHERS)

PROPOSED DIVERSION DITCH BY OTHERS. SEE NORTH STAR IRRIGATION POND PLANS.

EX R/W

C/L WILSON ROAD

PROP DITCH FOR WILSON ROAD IMPROVEMENTS 964.0

TEMPORARY ASPHALT DRIVE APPROACH 5' MIN FLARE RADIUS TO BE REMOVED BY OTHERS UPON COMPLETION OF WILSON ROAD WIDENING. (SEE PAVEMENT DETAILS SHEET 2)

NORTHSTAR LANE

PROPOSED OPERATIONS BUILDING (BY OTHERS) F.F.E. = 967.5

EX 3' DOOR GA= 970.5 ON NORTH SIDE

6'X6' CONC. PAD (TYP)

12' OVERHEAD DOOR

BOLLARDS (TYP)

ADDED 3' ACCESS DOOR

ROOF DRAIN 3' DOOR

16' OVERHEAD DOOR

MULCHED LANDSCAPE BED

EFFLUENT PUMP STATION TC=967.5

3' DOOR

HC SIGN

STRAIGHT 18" CURB

ROOF DRAIN (TYP)

PARKING BLOCK (TYP)

10' WIDE PARKING SPACE (TYP)

VALVE VAULT TC=967.5

DRIVEWAY SECTION (SEE SHT 2)

ENTRANCE GATE SEE SHEET 2

PROPOSED DRIVE (BY OTHERS)

RCP TYPE B 10'X5'X1.5' DETENTION BASIN 100-YEAR ELEV=962.45 8" PERF. UNDER DRAIN

RCP TYPE B 10'X5'X1.5'

RCP TYPE "B" 10'X5'X1.5'

EX INV 956.20 (FIELD)

EX 15" STEEL PIPE

EX MONITORING WELL (TO BE ADJUSTED TO GRADE)

C/L PROP DITCH

C/L EX DITCH

PROF E/P

EX E/P

EX R/W

EX OVERHEAD POWER LINES

PROPOSED 1" WATER SERVICE

42.00 L.F. -12" @ 0.44%

NOTE:
RISER PIPE TO BE REMOVED & INSTALL 4" PERFORATED UNDERDRAIN UPON SITE STABILIZATION & DETENTION BASIN TO BE RESTORED TO GRADE.

TIE INTO EX. GROUND @ 4:1 (MAX)

100 YR. ELEV = 962.45

TOP OF BANK ELEV = 964.0

SECTION A-A
NOT TO SCALE

964.0

963.6

2' 8' 2'

EMERGENCY SPILLOVER WEIR DETENTION BASIN
NOT TO SCALE

(A) TAP & METER BY DELCO WATER AT CONTRACTOR'S EXPENSE. CONTRACTOR TO PROVIDE 1" WATER SERVICE FROM THE METER TO THE BUILDING.

VARIES 10'

VARIES

TYPICAL DITCH/SWALE SECTION
SCALE : NONE

4" PERFORATED UNDERDRAIN

4"x4" PVC TEE

4" UNDERDRAIN TO CB #8

45° BEND

UNDERDRAIN CONNECTION DETAIL
NOT TO SCALE

TOP SOIL

GRANULAR BACKFILL

2.0%

CB #8

ORIFICE PLATE

6" ORIFICE

12" OUTLET PIPE

INV.= 956.75

BOTTOM=956.65

4" PERFORATED UNDERDRAIN PER ITEM 707.17 WITH END CAPPED. PERFORATED PIPE TO BE WRAPPED IN GEOTEXTILE FABRIC AND BACKFILLED WITH GRANULAR MATERIAL TO 1" ABOVE TOP OF PIPE.

CONCRETE CHANNELIZATION

30 0 30 60

SCALE IN FEET

TOP OF BANK=964.0

21"ø TRASH RACK, 7" HIGH TOP RISER = 960.58

TC = 961.16

EMERGENCY SPILLOVER=963.5

10" RISER W/ 1" HOLES 4" ON CENTER & FILTER FABRIC

10"X10" FABRICATED TEE

16"X16"X8" CLASS "C" CONCRETE BASE

CATCH BASIN

BASIN BOTTOM = 959.0

10" BARREL INV. = 959.33

6" GRAVEL

4" PERFORATED UD INV. = 956.75 SEE THIS SHEET ORIFICE DETAIL

12" OUTLET PIPE INV. = 956.65

SEDIMENT BASIN RISER DETAIL

NOT TO SCALE
SEE VOLUME DATA (SHEET 2)

PUBLIC ROAD

COURSE AGGREGATE

AS REQUIRED

50' MIN. AS REQUIRED

20' MIN.

6" MINIMUM

GRAVEL CONSTRUCTION ENTRANCE

960.31

3:1

DCED S-133 2x2 CATCH BASIN

961.16

2.00'

960.33

2" OUTLET

6" ORIFICE

956.45

CONCRETE CHANNELIZATION

DETAIL OF WINDOW FOR CB #8
NOT TO SCALE

ORIFICE PLATE - TO BE SET ON OUTLET PIPE WALL AT EACH BASIN INDICATED BELOW.

W

TYP. OF 4

2"

1/4" ALUMINUM PLATE

H

CATCH BASIN

2" X 1/2" STAINLESS STEEL BOLT SET IN EXPANDABLE GROUT

CONCRETE CHANNELIZATION

OUTLET PIPE INV. AT BOTTOM OF ORIFICE PLATE

STRUCTURE NO.	"D"	"W"	"H"
CB #8	6"	10"	10"

DETAIL OF ORIFICE PLATE (DCED-S145)
NOT TO SCALE

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R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	RDD
APPROVED BY:	
DATE:	MAY 5, 2006
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
8/22/06	1 REVISED BUILDING FOOTPRINTS
9/27/07	2 VOIDED SHEET, SEE SHEET S3A OF 5

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENT PLANT

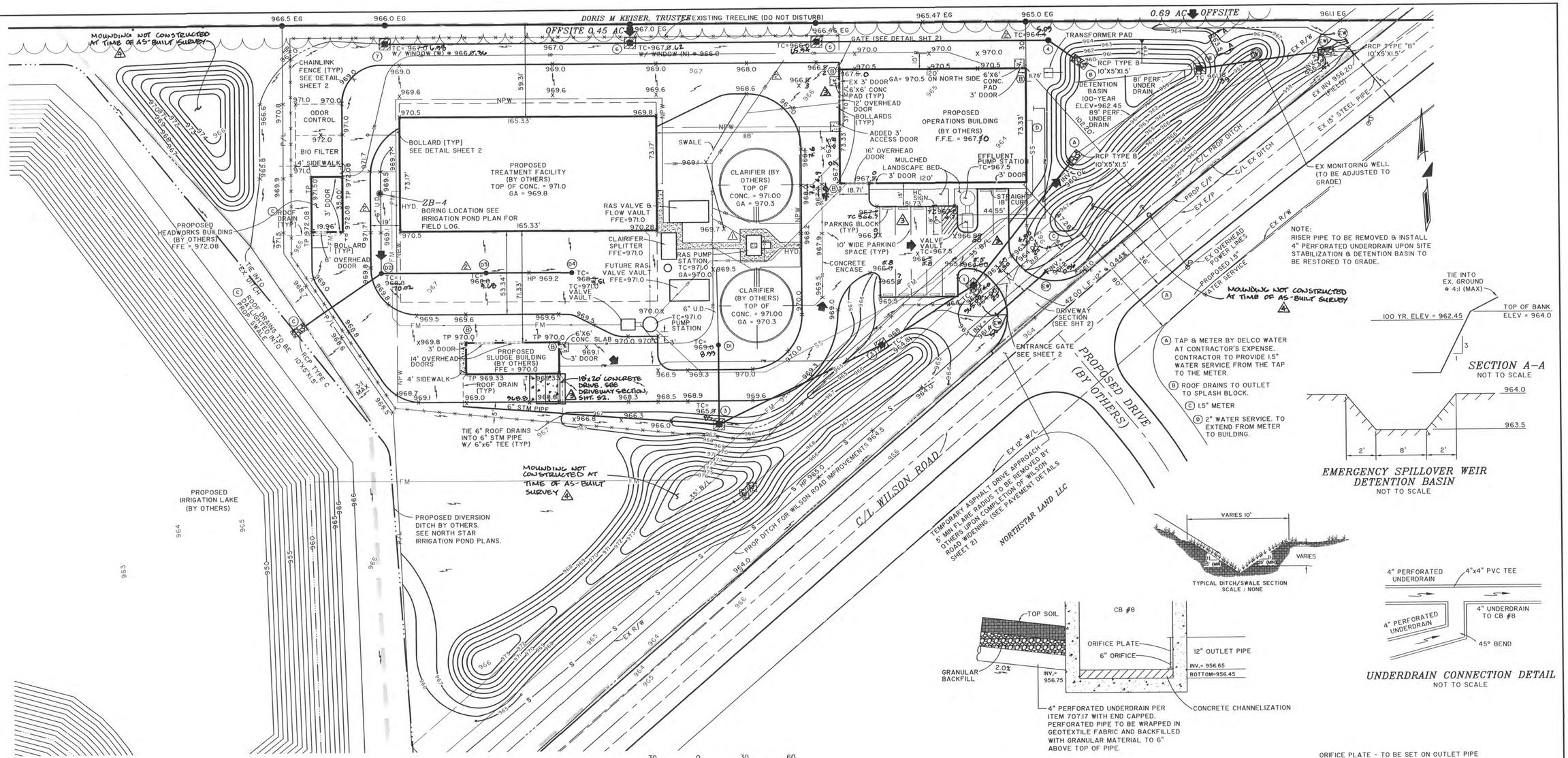
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

GRADING PLAN

SHEET NO.

S3 OF 5



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R. D. Zande & Associates

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DRAWN BY:	ADM
CHECKED BY:	RDD
APPROVED BY:	
DATE:	MAY 5, 2006
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
7-27-07 (A)	REPLACED SHEET S3 OF 5
10/31/07 (A)	REVISED GRADING
08/21/08 (A)	STORM AS-BUILTS

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENT PLANT

SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

GRADING PLAN

SHEET NO.

S3A OF 5

GENERAL LAND CONSERVATION NOTES

NO DISTURBED AREA WILL BE DENUDED FOR MORE THAN 30 DAYS IF IT IS TO REMAIN DORMANT FOR MORE THAN 45 DAYS UNLESS AUTHORIZED BY THE GOVERNING JURISDICTION'S INSPECTOR. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DISTURBED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE.

ALL STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING FOR ALL SITES.

ALL STORM SEWER, SANITARY SEWER, WATER MAIN AND SERVICE TRENCHES SHALL BE MULCHED AND SEEDED WITHIN 7 DAYS AFTER BACKFILL IF INSTALLATION IS THROUGH STABILIZED AREAS. NO MORE THAN 500 FEET OF TRENCH WILL BE OPEN AT ANY ONE TIME.

ELECTRIC POWER, TELEPHONE, CATV AND GAS SUPPLY TRENCHES SHALL BE COMPACTED SEEDED AND MULCHED WITHIN 7 DAYS AFTER BACKFILL, IF INSTALLATION IS THROUGH STABILIZED AREAS.

ALL TEMPORARY DIVERSIONS, SEDIMENT BASIN EMBANKMENTS AND EARTH STOCKPILES SHALL BE SEEDED AND MULCHED FOR TEMPORARY VEGETATIVE COVER WITHIN 7 DAYS AFTER GRADING. STRAW, HAY MULCH OR EQUIVALENT IS REQUIRED.

ANY DISTURBED AREA NOT STABILIZED WITH SEEDING, SODDING, PAVING OR BUILT UPON BY NOVEMBER 1ST, OR AREAS DISTURBED AFTER THAT DATE, SHALL BE MULCHED IMMEDIATELY WITH HAY OR STRAW AT THE RATE OF 2 TONS PER ACRE AND OVER-SEEDED BY APRIL 15TH.

AT THE COMPLETION OF CONSTRUCTION, ALL TEMPORARY SEDIMENT CONTROLS SHALL BE REMOVED AND ALL DENUDED AREAS SHALL BE STABILIZED.

SEEDING & MULCHING

GENERAL:

THE SEEDING, EITHER PERMANENT OR TEMPORARY, SHALL COMMENCE WITHIN 14 DAYS AFTER THE STREET AND LOT GRADING IS COMPLETED.

THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT, AND MATERIALS REQUIRED TO ACCOMPLISH BOTH TEMPORARY AND PERMANENT SEEDING.

THE LIMITS OF SEEDING AND MULCHING ARE AS SHOWN ON THE PLAN. SEEDING DISTURBED DURING CONSTRUCTION SHALL BE SEEDED AND MULCHED, OR SODDED.

ALL DITCHES, DIVERSIONS, SEDIMENT BASINS/TRAPS, RIGHT-OF-WAY AREAS, AND AREAS HAS BEEN ASSUMED TO A DISTANCE OF 5 FEET OUTSIDE THE WORK LIMITS OR RIGHT- OF-WAY, WHICHEVER IS GREATER. ALL AREAS NOT DESIGNATED TO BE SODDED SHALL REMAIN UNDER EXISTING GROUND COVER. THOSE AREAS DISTURBED OUTSIDE THE SEEDING LIMITS SHALL BE SEEDED AND MULCHED AT THE CONTRACTOR'S EXPENSE.

PAYMENT FOR TEMPORARY SEEDING SHALL BE INCLUDED UNDER "EROSION CONTROL".

OTHER EROSION AND SEDIMENT CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL THEY ARE ORDERED REMOVED BY THE ENGINEER OR AS DIRECTED BY THE "SEQUENCE OF CONSTRUCTION".

INSTALLATION:

A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION AND ANCHORING, AND MAINTENANCE. AFTER THE GRADING OPERATION SPREAD TOPSOIL WHERE NEEDED.

B. WHERE COMPACTED SOILS OCCUR, THEY SHOULD BE BROKEN UP SUFFICIENTLY TO CREATE A FAVORABLE ROOTING DEPTH OF 6-8 INCHES.

C. FOR PERMANENT SEEDING, PLACE TOPSOIL TO A DEPTH OF 4 INCHES MINIMUM

D. APPLY LIME AT A RATE AS RECOMMENDED BY SOIL TESTS, OR AT A RATE OF 100 POUNDS PER 1000 SQUARE FEET OR TWO TONS PER ACRE OF AGRICULTURAL GROUND LIMESTONE. FOR BEST RESULTS MAKE A SOIL TEST.

E. APPLY FERTILIZER AT A RATE AS RECOMMENDED BY SOIL TESTS, OR AT A RATE OF 25 POUNDS PER 1000 SQUARE FEET OR 1000 POUNDS PER ACRE OF 10-10-10. FOR BEST RESULTS MAKE A SOIL TEST.

F. WORK THE LIME AND FERTILIZER INTO THE SOIL WITH A DISK HARROW, SPRINGTOOTH HARROW, OR OTHER SUITABLE FIELD EQUIPMENT TO A DEPTH OF THREE INCHES. ON SLOPING LAND THE FINAL OPERATION SHALL BE ON THE CONTOUR.

G. APPLY THE SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL, CULTIPACKER SEEDER OR HYDROSEEDER (SLURRY MAY INCLUDE SEED AND FERTILIZER) PREFERABLY ON A FIRM, MOIST SEEDBED. SEED WHEAT OR RYE NO DEEPER THAN ONE INCH. SEED RYE GRASS NO DEEPER THAN ONE-FOURTH INCH.

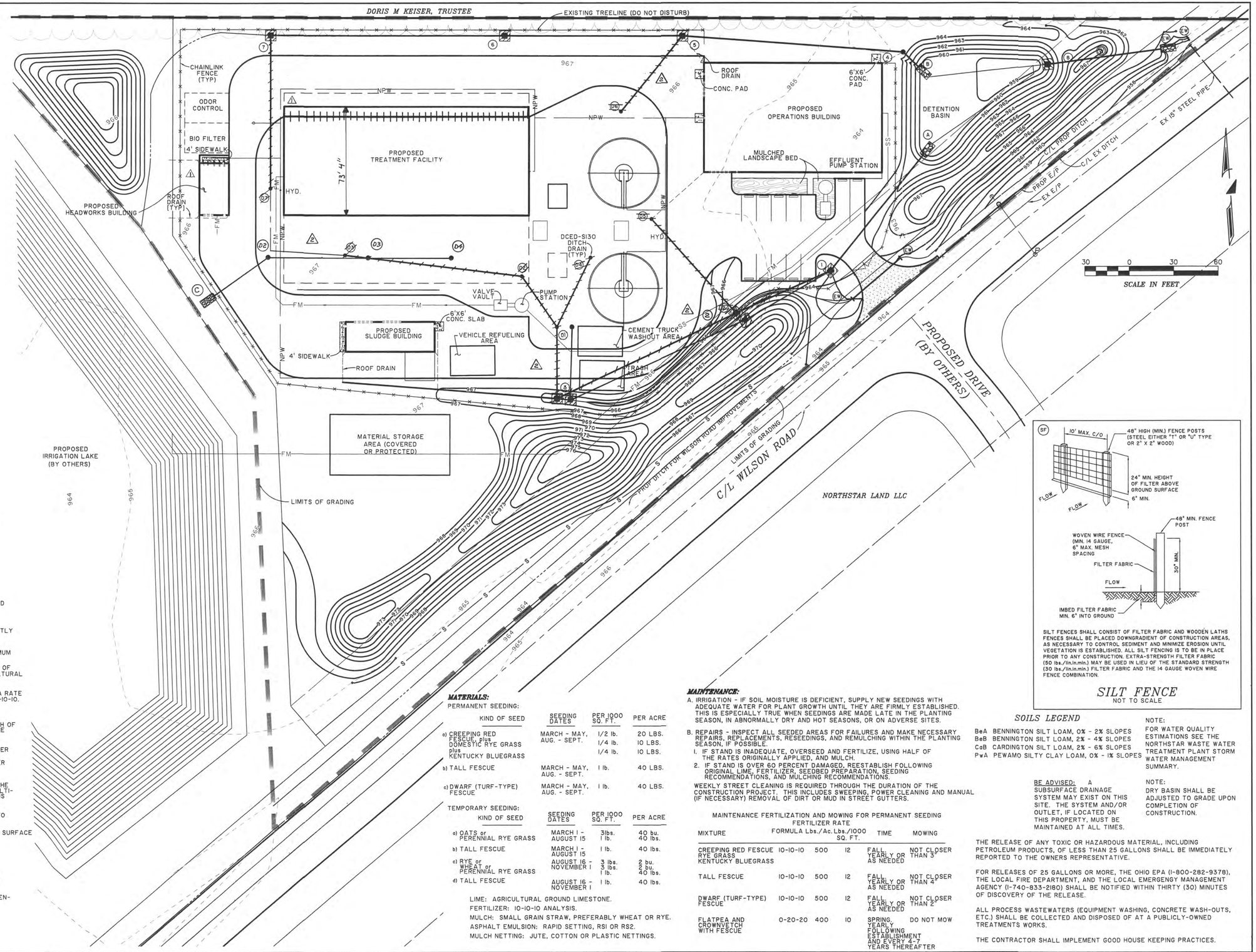
H. WHEN FEASIBLE, EXCEPT WHERE A CULTIPACKER TYPE SEEDER IS USED, THE SEEDBED SHOULD BE FIRMED FOLLOWING SEEDING OPERATIONS WITH A CULTI-PACKER, ROLLER, OR LIGHT DRAG. ON SLOPING LAND SEEDING OPERATIONS SHOULD BE ON THE CONTOUR WHEREVER POSSIBLE.

I. APPLY MULCH AT A RATE OF TWO TONS PER ACRE OR 100 POUNDS (TWO TO THREE BALES) PER 1000 SQUARE FEET.

J. SPREAD THE MULCH UNIFORMLY BY HAND OR MECHANICALLY SO THE SOIL SURFACE IS COVERED.

K. ANCHOR MULCH BY ONE ONE OF THE FOLLOWING METHODS:

1. MECHANICAL - USE A DISK, CRIMPER, OR SIMILAR TYPE TOOL SET STRAIGHT TO PUNCH OR ANCHOR THE MULCH MATERIAL INTO THE SOIL.
2. ASPHALT EMULSION - APPLY AT THE RATE OF 160 GALLONS PER ACRE INTO THE MULCH AS IT IS BEING APPLIED.
3. MULCH NETTINGS - USE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. USE IN AREAS OF WATER CONCENTRATION TO HOLD MULCH IN PLACE.



SILT FENCES SHALL CONSIST OF FILTER FABRIC AND WOODEN LATHS FENCES SHALL BE PLACED DOWNGRADIENT OF CONSTRUCTION AREAS, AS NECESSARY TO CONTROL SEDIMENT AND MINIMIZE EROSION UNTIL VEGETATION IS ESTABLISHED. ALL SILT FENCING IS TO BE IN PLACE PRIOR TO ANY CONSTRUCTION. EXTRA-STRENGTH FILTER FABRIC (50 lbs./lin.in.min.) MAY BE USED IN LIEU OF THE STANDARD STRENGTH (30 lbs./lin.in.min.) FILTER FABRIC AND THE 14 GAUGE WOVEN WIRE FENCE COMBINATION.

SILT FENCE
NOT TO SCALE

MATERIALS:

PERMANENT SEEDING:

KIND OF SEED	SEEDING DATES	PER 1000 SQ. FT.	PER ACRE
a) CREEPING RED FESCUE, plus DOMESTIC RYE GRASS plus KENTUCKY BLUEGRASS	MARCH - MAY, AUG. - SEPT.	1/2 lb. 1/4 lb. 1/4 lb.	20 LBS. 10 LBS. 10 LBS.
b) TALL FESCUE	MARCH - MAY, AUG. - SEPT.	1 lb.	40 LBS.
c) DWARF (TURF-TYPE) FESCUE	MARCH - MAY, AUG. - SEPT.	1 lb.	40 LBS.

TEMPORARY SEEDING:

KIND OF SEED	SEEDING DATES	PER 1000 SQ. FT.	PER ACRE
a) OATS or PERENNIAL RYE GRASS	MARCH 1 - AUGUST 15	3lbs. 1 lb.	40 bu. 40 lbs.
b) TALL FESCUE	MARCH 1 - AUGUST 15	1 lb.	40 lbs.
c) RYE or WHEAT or PERENNIAL RYE GRASS	AUGUST 16 - NOVEMBER 1	3 lbs. 3 lbs. 1 lb.	2 bu. 2 bu. 40 lbs.
d) TALL FESCUE	AUGUST 16 - NOVEMBER 1	1 lb.	40 lbs.

LIME: AGRICULTURAL GROUND LIMESTONE.
FERTILIZER: 10-10-10 ANALYSIS.
MULCH: SMALL GRAIN STRAW, PREFERABLY WHEAT OR RYE.
ASPHALT EMULSION: RAPID SETTING, RSI OR RS2.
MULCH NETTING: JUTE, COTTON OR PLASTIC NETTINGS.

MAINTENANCE:

A. IRRIGATION - IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY AND HOT SEASONS, OR ON ADVERSE SITES.

B. REPAIRS - INSPECT ALL SEEDED AREAS FOR FAILURES AND MAKE NECESSARY REPAIRS, REPLACEMENTS, RESEEDINGS, AND REMULCHING WITHIN THE PLANTING SEASON, IF POSSIBLE.
1. IF STAND IS INADEQUATE, OVERSEED AND FERTILIZE, USING HALF OF THE RATES ORIGINALLY APPLIED, AND MULCH.
2. IF STAND IS OVER 60 PERCENT DAMAGED, REESTABLISH FOLLOWING ORIGINAL LIME, FERTILIZER, SEEDBED PREPARATION, SEEDING RECOMMENDATIONS, AND MULCHING RECOMMENDATIONS.

WEEKLY STREET CLEANING IS REQUIRED THROUGH THE DURATION OF THE CONSTRUCTION PROJECT. THIS INCLUDES SWEEPING, POWER CLEANING AND MANUAL (IF NECESSARY) REMOVAL OF DIRT OR MUD IN STREET GUTTERS.

MAINTENANCE FERTILIZATION AND MOWING FOR PERMANENT SEEDING

MIXTURE	FERTILIZER RATE FORMULA	Lbs./Ac.	Lbs./1000 SQ. FT.	TIME	MOWING
CREEPING RED FESCUE RYE GRASS KENTUCKY BLUEGRASS	10-10-10	500	12	FALL, YEARLY OR AS NEEDED	NOT CLOSER THAN 3"
TALL FESCUE	10-10-10	500	12	FALL, YEARLY OR AS NEEDED	NOT CLOSER THAN 4"
DWARF (TURF-TYPE) FESCUE	10-10-10	500	12	FALL, YEARLY OR AS NEEDED	NOT CLOSER THAN 2"
FLATPEA AND CROWNVETCH WITH FESCUE	0-20-20	400	10	SPRING, YEARLY FOLLOWING ESTABLISHMENT AND EVERY 4-7 YEARS THEREAFTER	DO NOT MOW

SOILS LEGEND

BeA BENNINGTON SILT LOAM, 0% - 2% SLOPES
BeB BENNINGTON SILT LOAM, 2% - 4% SLOPES
CoB CARDINGTON SILT LOAM, 2% - 6% SLOPES
PwA PEWAMO SILTY CLAY LOAM, 0% - 1% SLOPES

NOTE:
FOR WATER QUALITY ESTIMATIONS SEE THE NORTHSTAR WASTE WATER TREATMENT PLANT STORM WATER MANAGEMENT SUMMARY.

NOTE:
DRY BASIN SHALL BE ADJUSTED TO GRADE UPON COMPLETION OF CONSTRUCTION.

BE ADVISED: A SUBSURFACE DRAINAGE SYSTEM MAY EXIST ON THIS SITE. THE SYSTEM AND/OR OUTLET, IF LOCATED ON THIS PROPERTY, MUST BE MAINTAINED AT ALL TIMES.

THE RELEASE OF ANY TOXIC OR HAZARDOUS MATERIAL, INCLUDING PETROLEUM PRODUCTS, OF LESS THAN 25 GALLONS SHALL BE IMMEDIATELY REPORTED TO THE OWNERS REPRESENTATIVE.

FOR RELEASES OF 25 GALLONS OR MORE, THE OHIO EPA (1-800-282-9378), THE LOCAL FIRE DEPARTMENT, AND THE LOCAL EMERGENGY MANAGEMENT AGENCY (1-740-833-2180) SHALL BE NOTIFIED WITHIN THIRTY (30) MINUTES OF DISCOVERY OF THE RELEASE.

ALL PROCESS WASTEWATERS (EQUIPMENT WASHING, CONCRETE WASH-OUTS, ETC.) SHALL BE COLLECTED AND DISPOSED OF AT A PUBLICLY-OWNED TREATMENTS WORKS.

THE CONTRACTOR SHALL IMPLEMENT GOOD HOUSE KEEPING PRACTICES.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	JANUARY 9, 2006
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
8-22-06	⚠ REVISED BUILDING FOOTPRINTS

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

SCALE: 1" = 30'

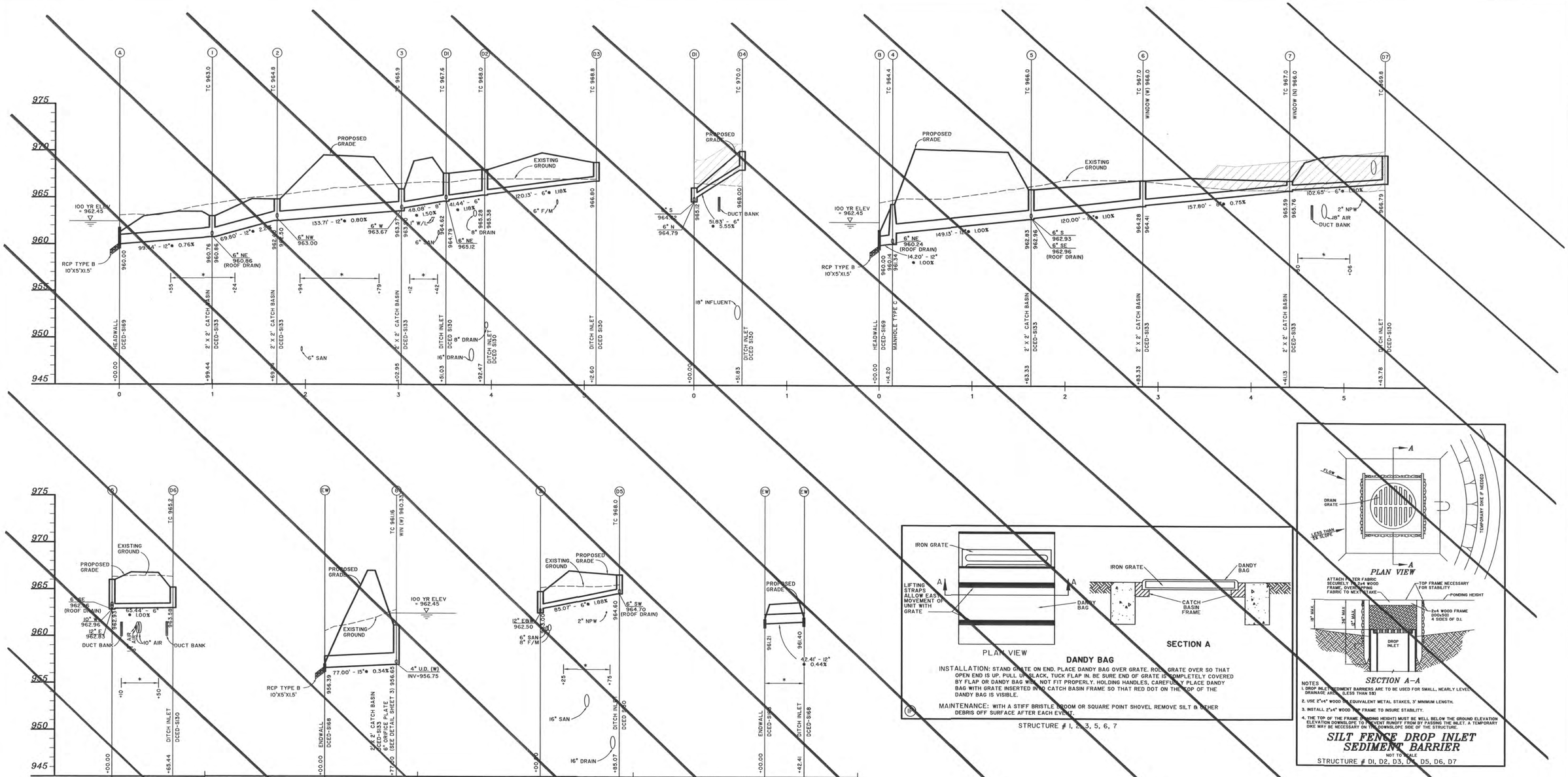
WASTEWATER TREATMENT PLANT

EROSION CONTROL/DESC PLAN

SHEET NO.

S4 OF 5

P:\5820\dwg\SITE PLAN-EROSION.dwg Layout1 Jun 30, 2006 - 9:33:20am dangremling



DANDY BAG

INSTALLATION: STAND GRATE ON END. PLACE DANDY BAG OVER GRATE. ROLL GRATE OVER SO THAT OPEN END IS UP. PULL UP SLACK, TUCK FLAP IN. BE SURE END OF GRATE IS COMPLETELY COVERED BY FLAP OR DANDY BAG WILL NOT FIT PROPERLY. HOLDING HANDLES, CAREFULLY PLACE DANDY BAG WITH GRATE INSERTED IN TO CATCH BASIN FRAME SO THAT RED DOT ON THE TOP OF THE DANDY BAG IS VISIBLE.

MAINTENANCE: WITH A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL REMOVE SILT & OTHER DEBRIS OFF SURFACE AFTER EACH EVENT.

STRUCTURE # 1, 2, 3, 5, 6, 7

NOTES

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS (LESS THAN 5%).
2. USE 2"x4" WOOD OR EQUIVALENT METAL STAKES, 3' MINIMUM LENGTH.
3. INSTALL 2"x4" WOOD TOP FRAME TO INSURE STABILITY.
4. THE TOP OF THE FRAME (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BY PASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

SILT FENCE DROP INLET SEDIMENT BARRIER

NOT TO SCALE

STRUCTURE # D1, D2, D3, D4, D5, D6, D7

NOTES:

* GRANULAR BACKFILL PER ITEM 912

ALL STORM PIPE TO BE INSTALLED PER ITEM 706.

ALL UTILITY CROSSINGS SHALL HAVE A MINIMUM OF 1.5' CLEARANCE.

PROVIDE 2.5' COMPACTED FILL OVER PROPOSED STORM PRIOR TO CONSTRUCTION.

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R. D. Zande & Associates

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CHECKED BY:	RDD
APPROVED BY:	
DATE:	
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
7-27-07	VOIDED SHEET, SEE SHEET S5A OF 5

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENT PLANT

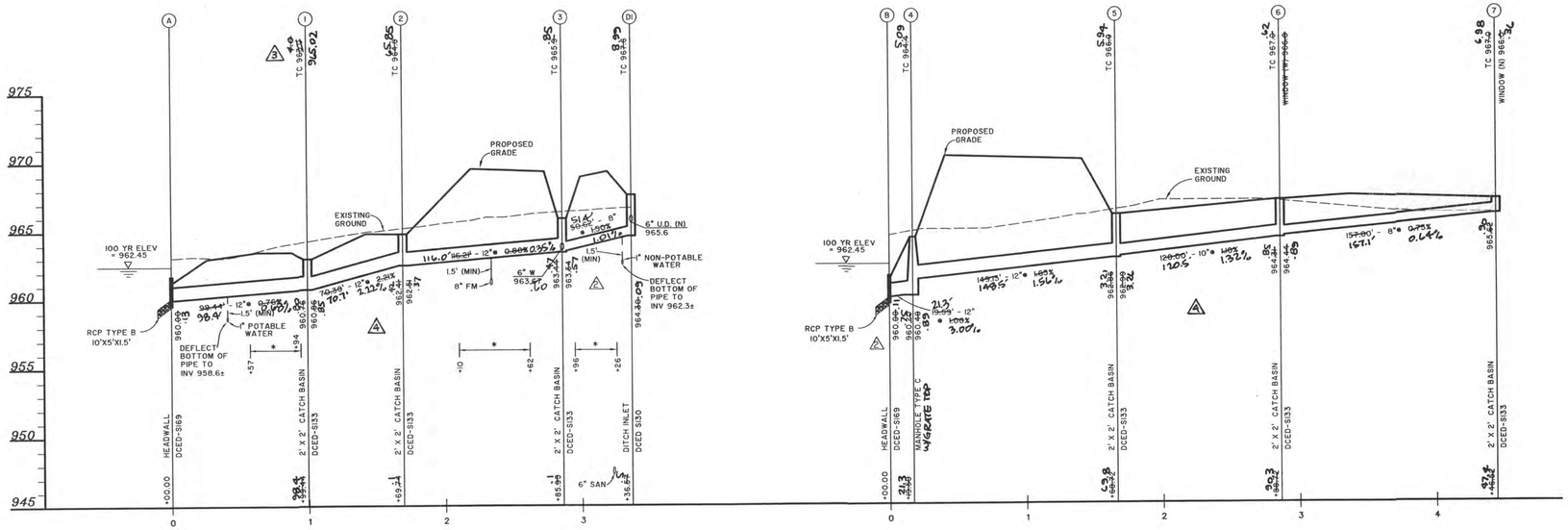
SCALE: HORIZ. 1" = 50' VERT. 1" = 5'

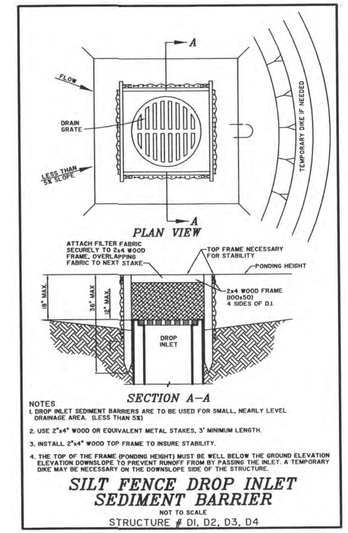
WASTEWATER TREATMENT PLANT

STORM SEWERS PROFILES

SHEET NO.

S5 OF 5





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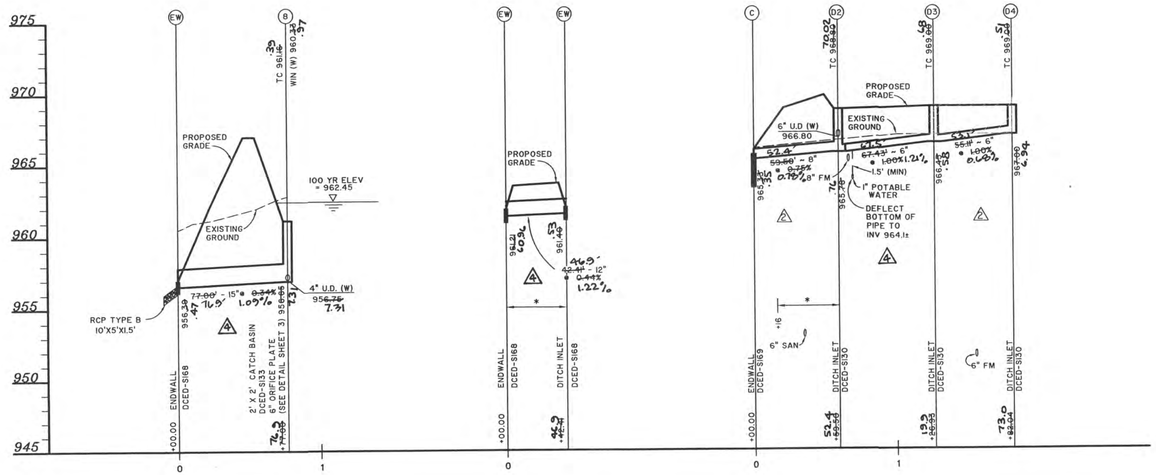
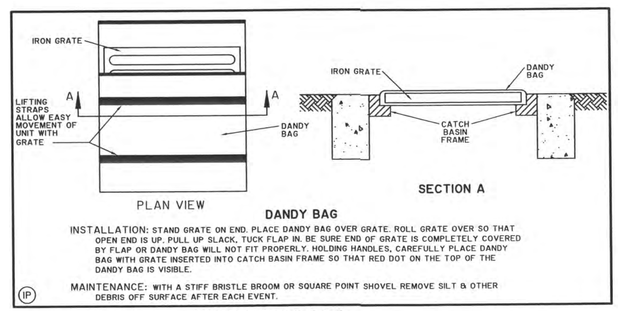
SILT FENCE DROP INLET SEDIMENT BARRIER

NOT TO SCALE

STRUCTURE # D1, D2, D3, D4





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INSTALLATION: STAND GRATE ON END. PLACE DANDY BAG OVER GRATE. ROLL GRATE OVER SO THAT OPEN END IS UP. PULL UP SLACK, TUCK FLAP IN. BE SURE END OF GRATE IS COMPLETELY COVERED BY FLAP OR DANDY BAG WILL NOT FIT PROPERLY. HOLDING HANDLES, CAREFULLY PLACE DANDY BAG WITH GRATE INSERTED INTO CATCH BASIN FRAME SO THAT RED DOT ON THE TOP OF THE DANDY BAG IS VISIBLE.

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STRUCTURE # 1, 2, 3, 5, 6, 7

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PROVIDE 2.5' COMPACTED FILL OVER PROPOSED STORM PRIOR TO CONSTRUCTION.

P:\5820\dwg\SITE PLAN-STORM PROFILES-REV.dwg Layout3 Oct 30, 2007 - 11:26:21am dangraming

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	RDD
APPROVED BY:	
DATE:	
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
7-27-07	2 REPLACED SHEET S5A OF 5
10/31/07	3 REVISED TC STRUCTURE 1
08/21/08	4 STORM AS-BUILTS

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENT PLANT

SCALE: HORIZ. 1" = 50' VERT. 1" = 5'

WASTEWATER TREATMENT PLANT

STORM SEWERS PROFILES

SHEET NO. S5A OF 5

UNDERGROUND UTILITIES

Two Working Days

BEFORE YOU DIG

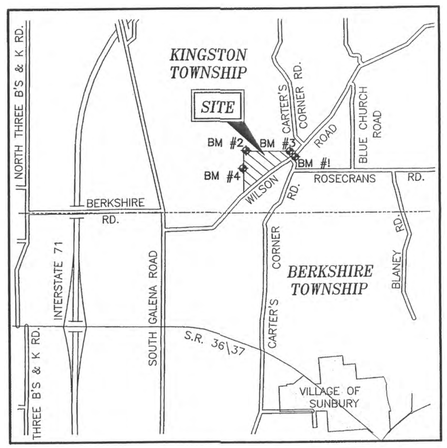
Call 800-362-2764 (Toll free)

OHIO UTILITIES PROTECTION SERVICE

NON-MEMBERS MUST BE CALLED DIRECTLY

NORTHSTAR IRRIGATION POND

DELAWARE COUNTY, OHIO
FEBRUARY 2006



SITE MAP
NOT TO SCALE

INDEX OF SHEETS

TITLE	SHEET NO.	*CADD FILE NAME
TITLE SHEET	1	5820IP01
GENERAL NOTES	2	5820IP02
GRADING PLAN	3	5820IP03
CROSS SECTIONS A, B, & C	4	5820IP04
BERM AND DRAINAGE DETAILS	5	5820IP05
BORING LOGS & SOIL LABORATORY RESULTS	6	5820IP06
BORING LOGS	7	5820IP07
BORING LOGS	8	5820IP08

*NOTE: SEE DATE STAMP ALONG LEFT EDGE OF EACH SHEET FOR PATH TO CADD FILE.

LOCATION MAP

NOT TO SCALE

BENCH MARKS (1988 DATUM)

SOURCE BENCH MARK:
USGS BP IN CONCRETE MONUMENT STAMPED "97-139", 8.5' E. OF EDGE OF PAVEMENT OF WILSON ROAD & 0.5 MILES EAST OF INTERSECTION OF N. GALENA ROAD.
ELEV 932.89

BM #1 COTTON GIN SPIKE SET, WEST SIDE OF POWER POLE #29309, EAST SIDE OF WILSON ROAD ACROSS FROM GUY POLE
ELEV 960.93

BM #2 IRON PIN, MYERS TRAVERSE POINT, NORTH WEST CORNER OF SITE
ELEV 967.47

BM #3 NORTH RIM OF MON. WELL, WEST SIDE OF WILSON ROAD, NEAR NORTH EAST PROPERTY CORNER
ELEV 961.84

BM #4 NORTH RIM MON. WELL, WEST SIDE OF 33+/- ACRE TRACT, 800 FEET +/- SOUTH OF NORTHWEST CORNER
ELEV 965.34

STATE OF OHIO KEVIN D. KERSHNER E-64492 REGISTERED PROFESSIONAL ENGINEER

KEVIN D. KERSHNER, PE E-64492

STATE OF OHIO KEVIN D. KERSHNER E-64492 REGISTERED PROFESSIONAL ENGINEER

DATE

PTI APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
ISSUANCE DATE MARCH 07, 2006
EFFECTIVE DATE MARCH 07, 2006

R. D. Zande & Associates

markpaxton P:\5820\WASTE WATER TREATMENT SITE\Basin\Dwg\Submittal\EPA 02-16-06\5820ip01.dwg Layout1 Layout FEB 16, 2006 10:31 AM

GENERAL NOTES

GENERAL

ALL WORK SHALL BE DONE AND ALL MATERIAL FURNISHED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, CONSTRUCTION AND MATERIAL SPECIFICATIONS, LATEST EDITION AND CURRENT DELAWARE COUNTY SPECIFICATIONS. SEWER STANDARD DRAWINGS REFER TO THE DELAWARE COUNTY SANITARY ENGINEERING DEPARTMENT STANDARD DRAWINGS.

COMMENCEMENT OF WORK

THE CONTRACTOR SHALL NOTIFY THE DELAWARE COUNTY SANITARY DEPARTMENT 48 HOURS PRIOR TO COMMENCING WORK ON THIS PROJECT, HOLIDAYS AND WEEKENDS EXCLUDED.

EXTRA COMPENSATION

NO EXTRA COMPENSATION WILL BE PAID TO THE CONTRACTOR BY REASON OF COMPLIANCE WITH ANY OF THE REQUIREMENTS INDICATED IN THE CONTRACT DRAWINGS. PAYMENT SHALL BE DEEMED TO BE INCLUDED AMONG THE PAY ITEMS, AS BID UPON, UNLESS OTHERWISE SPECIFICALLY PROVIDED.

SAFETY REQUIREMENTS

THE CONTRACTOR AND SUBCONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL AMENDMENTS THERETO, DURING THE CONDUCT AND PERFORMANCE ON AND IN CONJUNCTION WITH THIS PROJECT.

STATIONING

STATIONING ALONG THE DRAINAGE CHANNELS ARE BASED ON DISTANCES ALONG THE CHANNEL CENTERLINE. BASELINE AND CENTERLINE ARE FIELD LOCATED WITH THE REFERENCE POINTS SHOWN ON THE DRAWING.

BENCHMARKS AND ELEVATIONS

ALL ELEVATIONS SHOWN ARE BASED ON U.S.G.S. DATUM. BENCHMARKS HAVE BEEN SET AND REFERENCED ON THE DRAWINGS. CONTRACTOR SHALL VERIFY ELEVATION ON EACH WITH PERMANENT BENCHMARKS PRIOR TO COMMENCING THE WORK. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE COUNTY'S REPRESENTATIVE AND RESOLVED BEFORE PROCEEDING WITH WORK. BENCHMARKS SHALL BE MAINTAINED AS REQUIRED TO COMPLETE THE WORK AT THE CONTRACTOR'S COST.

IRON PINS AND MONUMENTS

THE CONTRACTOR SHALL REFERENCE ALL IRON PINS, AND MONUMENTS FOUND BEFORE EXCAVATING AT OR NEAR THEM. COPIES OF REFERENCE DOCUMENTATION SHALL BE SUBMITTED TO COUNTY. IF ANY PINS OR MONUMENTS ARE DESTROYED OR DAMAGED THEY SHALL BE ACCURATELY REPLACED BY A REGISTERED SURVEYOR AT THE COMPLETION OF THE PROJECT AT CONTRACTOR'S COST.

MAINTENANCE OF TRAFFIC

ALL TRAFFIC CONTROL DEVICES SHALL BE FURNISHED, ERECTED, MAINTAINED AND REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH THE "OHIO MANUAL OF CONTROL DEVICES FOR CONSTRUCTION AND MAINTENANCE OPERATION" (CURRENT EDITION); COPIES OF WHICH ARE AVAILABLE FROM THE OHIO DEPARTMENT OF TRANSPORTATION BUREAU OF TRAFFIC, 25 S. FRONT STREET, COLUMBUS, OHIO 43215.

THE CONTRACTOR SHALL NOT BEGIN WORK UNTIL STANDARD BARRICADES AND WARNING SIGNS ARE IN ACCEPTABLE POSITION AND THE MARKERS AND SIGNS CONFORM TO THE "OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS".

TWO-WAY, ONE LANE TRAFFIC SHALL BE MAINTAINED ON HOME ROAD AT ALL TIMES DURING WORKING HOURS IN ACCORDANCE WITH PAGE C-22 OF THE OHIO MANUAL.

THE CONTRACTOR SHALL MAINTAIN LOCAL TRAFFIC AT ALL TIMES DURING CONSTRUCTION OF THIS PROJECT IN A MANNER CAUSING THE LEAST AMOUNT OF INCONVENIENCE TO THE ABUTTING PROPERTY OWNERS. TEMPORARY DRIVEWAYS, TEMPORARY ROADWAYS, OR RUN-AROUNDS AS MAY BE NECESSARY TO PROVIDE VEHICULAR ACCESS TO AND FROM THE ABUTTING PROPERTIES SHALL BE CONSTRUCTED, MAINTAINED AND SUBSEQUENTLY REMOVED BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER.

ALL PAVEMENT AND/OR RIGHT-OF-WAY OPENINGS WITHIN THE PUBLIC RIGHT-OF-WAY MUST CONFORM TO THE CURRENT EDITION OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, CONSTRUCTION AND MATERIAL SPECIFICATIONS, WITH SUPPLEMENTS OR CHANGES THERETO. ALSO, THE CONTRACTOR ASSUMES ALL RESPONSIBILITIES AND LIABILITIES REGARDING STRICT ADHERENCE TO APPLICABLE SECTIONS FOR THE MAINTENANCE OF TRAFFIC AND PUBLIC SAFETY AS SET FORTH IN THE "OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS". ALL TRAFFIC CONTROL DEVICES MUST BE IN PLACE PRIOR TO STARTING CONSTRUCTION.

EXCAVATION WHICH ARE NOT PROTECTED BY TEMPORARY FENCING SHALL BE BACKFILLED AT THE END OF EACH WORKING DAY.

IF AT ANY TIME TRAFFIC HAS TO BE BLOCKED, THE CONTRACTOR SHALL NOTIFY THE NEAREST FIRE AND POLICE DEPARTMENTS (EMERGENCIES ONLY).

NO NON-RUBBER TIRED VEHICLES SHALL BE MOVED ON COUNTY ROADS.

EXISTING UTILITIES

THE CONTRACT DRAWINGS SHOW ALL UTILITIES, WATER, GAS, AND SEWER LINES KNOWN TO EXIST. HOWEVER, THIS DOES NOT GUARANTEE THAT ALL EXISTING LINES AND APPURTENANCES HAVE BEEN SHOWN ON THE CONTRACT DRAWINGS, AND THE COUNTY ASSUMES NO RESPONSIBILITY FOR THE ACCURACY THEREOF AND DOES NOT FREE THE CONTRACTOR FROM NECESSARY PRECAUTIONS FOR THE PROTECTION OF ANY UTILITY ENCOUNTERED ON THE PROJECT OR THE RESTORATION OF ANY UTILITY DAMAGED DURING THE WORK.

THE CONTRACTOR SHALL EXPOSE THE UTILITY OR STRUCTURE INDICATED ON THE DRAWING BEFORE PERFORMING THE ASSOCIATED WORK IN ORDER TO VERIFY THE LOCATION.

THE CONTRACTOR SHALL NOTIFY AT LEAST 48 HOURS BEFORE BREAKING GROUND, ALL PUBLIC AND/OR PRIVATE SERVICE CORPORATIONS HAVING WIRE, POLES, PIPES, CONDUIT, MANHOLES OR OTHER STRUCTURES THAT MAY BE AFFECTED BY THIS OPERATION, INCLUDING ALL STRUCTURES WHICH ARE AFFECTED AND NOT SHOWN ON THESE PLANS. OWNERS OF UNDERGROUND UTILITIES WHICH ARE MEMBERS OF THE OHIO UTILITIES PROTECTION SERVICE CAN BE NOTIFIED BY CALLING 800-362-2764 (TOLL FREE). NON-MEMBER UNDERGROUND UTILITY OWNERS MUST BE CALLED DIRECTLY.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ALL RESIDENTS OF INTERRUPTION TO THEIR UTILITIES THAT WILL BE CAUSED BY CONSTRUCTION AT LEAST 24 HOURS IN ADVANCE.

SUPPORTING AND/OR PROTECTING EXISTING WATER LINES, GAS MAINS, TELEPHONE CONDUIT, STORM SEWERS, ETC., SHALL BE INCLUDED IN PAYMENT FOR THE VARIOUS CONTRACT ITEMS OF WORK.

ALL WORK REQUIRED FOR THE MAINTENANCE OF SERVICE OF EXISTING UTILITIES SHALL BE DONE BY, AND AT THE EXPENSE OF THE CONTRACTOR.

ALL MAINTENANCE, REPAIR AND/OR REPLACEMENT OF EXISTING UTILITIES, WHETHER SHOWN ON THE DRAWINGS OR NOT, SHALL BE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE VARIOUS UTILITY COMPANIES HAVING JURISDICTION, AND SHALL BE INCLUDED IN PAYMENT FOR THE VARIOUS CONTRACT ITEMS OF WORK.

ALL EXISTING STORM SEWERS, DRIVEWAY DRAINS, AND OTHER SURFACE DRAIN PIPES, WHETHER SHOWN ON THE CONTRACT DRAWINGS OR NOT, REMOVED OR DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED AND RECONNECTED BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER, AT NO COST TO THE COUNTY.

USE OF PREMISES

IN ADDITION TO DIRECT REQUIREMENTS OF THE CONTRACT SPECIFICATION, THE CONTRACTOR SHALL OBSERVE AND CONFORM TO THE SPECIFIC REQUIREMENTS OF ALL RIGHT-OF-WAY, INCLUDING EASEMENTS, COURT ENTRIES, RIGHT-OF-ENTRY, OR ACTION FILED IN COURT IN ACCORDANCE WITH THE CODE OF APPLICABLE GOVERNING AGENCY.

THE CONTRACTOR SHALL NOT TRESPASS UPON OR IN ANY WAY DISTURB PROPERTY ADJACENT TO THE STREET RIGHT-OF-WAY WITHOUT FIRST OBTAINING WRITTEN PERMISSION FROM THE OWNER TO DO SO. A COPY OF SUCH WRITTEN PERMISSION SHALL BE FURNISHED TO THE ENGINEER.

IF THE CONTRACTOR FINDS IT NECESSARY TO OBTAIN ADDITIONAL WORKING AREA, IT SHALL BE HIS RESPONSIBILITY FOR ITS ACQUISITION. ALL REQUIREMENTS LISTED UNDER THE "USE OF PREMISES" SHALL APPLY IF ADDITIONAL AREA IS OBTAINED.

THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, RESTORE SUCH PROPERTY TO THE FULL SATISFACTION OF THE OWNER, AND SHALL OBTAIN FROM THE OWNER A WRITTEN RELEASE STATING THAT RESTORATION HAS BEEN SATISFACTORILY MADE. A COPY OF THE WRITTEN RELEASE SHALL BE FURNISHED TO THE ENGINEER.

THE CONTRACTOR SHALL NOT WASTE ANY EXCESS EARTH, STONE, OR OTHER EXCAVATED MATERIAL ON ANY PROPERTY WITHOUT FIRST OBTAINING WRITTEN PERMISSION OF THE OWNER OF THE PROPERTY AND SECURING THE APPROVAL OF THE ENGINEER. ONE COPY OF THE OWNER'S WRITTEN PERMISSION AND ONE COPY OF A WRITTEN RELEASE FROM THE OWNER STATING THAT THE WORK HAS BEEN COMPLETED SATISFACTORILY, SHALL BE FURNISHED TO THE ENGINEER.

ALL ITEMS WITHIN THE STREET RIGHT-OF-WAY SHALL BE REMOVED, OR REMOVED AND REPLACED, OR RESTORED AS REQUIRED BY THE CONTRACT DRAWINGS AND DETAILED PROVISIONS, AS DIRECTED BY THE ENGINEER.

STORAGE OF MATERIALS

THE CONTRACTOR SHALL NOT PARK EQUIPMENT OR STORE MATERIALS WITHIN THE RIGHT-OF-WAY.

PROTECTION OF TREES

SPECIAL CARE SHALL BE TAKEN TO AVOID DAMAGES TO TREES AND THEIR ROOT SYSTEM. MACHINE EXCAVATION SHALL NOT BE USED WHEN, IN THE OPINION OF THE ENGINEER, IT WOULD ENDANGER TREE ROOTS. IN GENERAL, WHERE THE LINE OF TRENCH FALLS WITHIN THE LIMITS OF THE LIMB SPREAD, THE LEAVING OF HEADERS ACROSS THE TRENCH TO PROTECT ROOTS WILL BE REQUIRED. THE OPERATION OF ALL EQUIPMENT, PARTICULARLY WHEN EMPLOYING BOOMS; THE STORAGE OF MATERIALS; AND THE DEPOSITION OF EXCAVATION SHALL BE CONDUCTED IN THE MANNER WHICH WILL NOT INJURE TREES, TRUNKS, BRANCHES OR THEIR ROOTS.

BRANCHES WHICH OVERHANG THE CONSTRUCTION LIMITS AND WHICH INTERFERE WITH THE OPERATION OF EQUIPMENT SHALL BE TIED BACK TO AVOID DAMAGE, IF POSSIBLE. WHERE INJURY TO BRANCHES IS UNAVOIDABLE, THE BRANCHES SHALL BE SAWED OFF NEATLY AT THE TRUNK OR MAIN BRANCH AND THE CUT AREA SHALL BE PAINTED WITH AN APPROVED TREE PAINT IMMEDIATELY. ANY TREE DAMAGE BEYOND SAVING SHALL BE REMOVED BY THE CONTRACTOR AT HIS OWN EXPENSE, AND IN THE CASE OF TREES LOCATED ON PRIVATE PROPERTY, RESTITUTION SHALL BE MADE TO THE OWNER BY THE CONTRACTOR.

CLEARING AND GRUBBING

TREES AND SHRUBS WITHIN CONSTRUCTION EASEMENT NOT DESIGNATED TO BE SAVED ON THE DRAWINGS MAY BE REMOVED AND SHALL BE DISPOSED OF WITH NO ADDITIONAL COST TO THE COUNTY.

SURPLUS EXCAVATION

THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL SURPLUS EXCAVATION TO A LOCATION ACCEPTABLE BY THE COUNTY.

ENCOUNTERING HAZARDOUS OR TOXIC MATERIALS

IF THE CONTRACTOR ENCOUNTERS ANY ABNORMAL MATERIALS SUCH AS, BUT NOT LIMITED TO, DRUMS, TANKS, OR STAINED EARTH OR ANY UNUSUAL ODOR DURING CONSTRUCTION OPERATION, THE WORK IN THIS AREA SHALL BE TEMPORARILY DISCONTINUED, EQUIPMENT LEFT IN PLACE, THE AREA CORDONED OFF AND THE COUNTY NOTIFIED. IF THE AREA IS CONSIDERED TO CONTAIN HAZARDOUS OR TOXIC MATERIALS IT MUST BE HANDLED CORRECTLY IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL LAWS.

DELAWARE COUNTY PERMIT

ALL WORK WITHIN DELAWARE COUNTY ROAD RIGHT-OF-WAY IS SUBJECT TO THE INSPECTION AND APPROVAL OF THE DELAWARE COUNTY ENGINEER. THE CONTRACTOR SHALL SECURE A WRITTEN PERMIT FROM THE DELAWARE COUNTY ENGINEER, 50 CHANNING STREET, DELAWARE, OHIO 43015, 48 HOURS IN ADVANCE OF STARTING ANY WORK WITHIN THE COUNTY RIGHT-OF-WAY.

DELAWARE COUNTY NOTIFICATION

THE CONTRACTOR SHALL NOTIFY THE DELAWARE COUNTY ENGINEER, AND COUNTY SANITARY ENGINEER 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

2.1 EXCAVATION, BACKFILL AND EMBANKMENTS

TOP SOIL

ALL TOP SOIL SHALL BE REMOVED AND STOCKPILED FOR FUTURE COVERING OF THE EXCAVATED OR OTHERWISE DISTURBED AREAS.

BACKFILL AND EMBANKMENT

THE CONTRACTOR SHALL FURNISH AND PLACE ACCEPTABLE MATERIAL AS BACKFILL AND EMBANKMENT AROUND THE STRUCTURES. MATERIALS USED SHALL BE OBTAINED FROM THE POND EXCAVATION AREA. WASTE EXCAVATION MAY BE DISPOSED OF ON THE SITE, OR ON OFF-SITE AREAS WHEN REQUIRED. ALL BACKFILL AND EMBANKMENT SHALL BE PLACED SO AS TO MINIMIZE SUBSEQUENT SETTLEMENT.

TOP SOIL PLACEMENT

BACKFILL AND EMBANKMENT SHALL BE MADE TO WITHIN APPROXIMATELY 3 INCHES OF FINAL GRADE, MAKING REASONABLE ALLOWANCE FOR SETTLEMENT. TOP SOIL SHALL THEN BE DISTRIBUTED OVER THE AREA TO THE FINISHED GRADE LINES SHOWN ON THE PLANS. FOREIGN MATERIAL SHALL BE REMOVED FROM THE TOP SOIL AS IT IS PLACED AND THE SURFACE RAKED EVENLY.

GRANULAR BACKFILL

GRANULAR BACKFILL, WHERE SHOWN ON THE DRAWINGS, MAY BE CRUSHED STONE OR GRAVEL COMPACTED TO THE THICKNESS SHOWN. THE GRANULAR MATERIAL SHALL BE DEPOSITED AFTER THE SUBGRADES HAVE BEEN LEVELED AND CLEARED OF ALL DEBRIS AND IMMEDIATELY PRIOR TO THE POURING OF THE CONCRETE SLABS.

THE GRANULAR MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 310.02, 304.02, STATE OF OHIO, DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS OR BE OTHER WELL GRADED GRANULAR MATERIAL APPROVED BY THE ENGINEER.

2.2 GRADING, FERTILIZING, AND SEEDING

DESCRIPTION

THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT, AND MATERIALS REQUIRED TO ACCOMPLISH THE FINE GRADING, FERTILIZER, AND SEEDING AS SPECIFIED HEREIN.

IF SUITABLE TOPSOIL IS AVAILABLE AS PART OF THE MATERIAL EXCAVATED, IT SHALL BE REMOVED AND STORED SEPARATELY AND USED TO BACKFILL THE TOP 4 INCHES. AFTER THE BACKFILL HAS BEEN GIVEN A REASONABLE TIME TO SETTLE, IT SHALL BE GRADED OFF TO THE FINISHED GRADE, THEN HARROWED TO A DEPTH OF 3 INCHES. ALL GRASS, WEEDS, ROOTS, STICKS, STONES, ETC. ARE TO BE REMOVED AND THE SOIL CAREFULLY BROUGHT TO THE FINISHED GRADE BY RAKING. AN APPLICATION OF NOT LESS THAN 1 POUND PER 100 S.F. OF A 12-7-5 LAWN OR TURF GRADE FERTILIZER SHALL BE UNIFORMLY DISTRIBUTED AND RAKED IN. IF THERE IS NO SUITABLE TOPSOIL AVAILABLE ON ANY PART OF THE WORK, OR IF THERE IS A DEFICIENCY OF SUITABLE TOPSOIL, THE CONTRACTOR SHALL FURNISH AND APPLY NOT LESS THAN 2 POUNDS PER 100 S.F. OF 12-7-5 LAWN OR TURF GRADE FERTILIZER IN THE METHOD ABOVE SPECIFIED.

IMMEDIATELY AFTER THE PREPARATION AND FERTILIZATION OF THE SEED BED, THE SEED SHALL BE THOROUGHLY MIXED AND THEN EVENLY SOWN OVER THE PREPARED AREAS AT THE RATE OF 3 POUNDS PER 1,000 S.F. SEED SHALL BE SOWN DRY OR HYDRAULICALLY.

A. ALL AREAS TO BE SEEDED WHICH ARE CONSIDERED TO BE URBAN IN CHARACTER, AND ANY AREA IMMEDIATELY IN FRONT OF A RESIDENCE, SHALL BE SEEDED WITH THE FOLLOWING MIXTURE: (PERCENTAGES ARE BY WEIGHT.)
   35 PERCENT KENTUCKY BLUEGRASS (POA PRATENSIS)
   55 PERCENT CREEPING RED FESCUE (FESTUCA RUBRA)
   5 PERCENT RED TOP (AGROSTIS ALBA)
   5 PERCENT WHITE DUTCH CLOVER (ARIFOLIUM REPENS)

B. ALL AREAS IN RIGHT-OF-WAY OR IN EASEMENTS ADJACENT TO RIGHT-OF-WAY AND OTHER THAN THOSE MENTIONED ABOVE, SHALL BE SEEDED WITH THE FOLLOWING MIXTURE:
   100 PERCENT KENTUCKY 31 FESCUE (FESTUCA ARUNDINACEA VAR. KY. 31)

THE SEED SHALL BE CAREFULLY AND UNIFORMLY SOWN BY EXPERIENCED AND SKILLED WORKMEN. FOLLOWING THE SEEDING, THE SURFACE SHALL BE LIGHTLY RAKED AND ROLLED WITH A LIGHT ROLLER. FOLLOWING THE ROLLING, THE AREA SEEDED SHALL BE COVERED WITH 2 INCHES, LOOSE MEASUREMENT, OF VEGETATIVE MULCH, TIED DOWN OR KEPT IN PLACE BY OTHER ACCEPTABLE METHOD.

ALL SEEDED AREAS SHALL BE CAREFULLY LOOKED AFTER AND TENDED BY THE CONTRACTOR, WATERING AS NECESSARY TO SECURE A GOOD TURF. SETTLED AREA SHALL BE FILLED, GRADED, AND RESEEDED.

SEEDING TIME

ALL FERTILIZING AND SEEDING SHALL BE DONE IN THE MONTHS BETWEEN APRIL AND NOVEMBER. THE CONTRACTOR SHALL MAINTAIN AREAS UNTIL SEEDING IS COMPLETE.

AREAS TO BE SEEDED

ALL THE EMBANKMENTS AND DISTURBED AREAS WITHIN THE PROJECT SITE, ALL ROADWAY EMBANKMENTS, FILLS, AND DITCHES NOT SODDED, SHALL BE SEEDED.

2.3 TEMPORARY SEEDING

THE WORK SHALL CONSIST OF FURNISHING ALL LABOR, EQUIPMENT, AND MATERIALS FOR SEEDING THE AREAS AS DIRECTED BY THE ENGINEER, AND FOR LIMING, FERTILIZING, PREPARING A SEEDBED, AND MULCHING WHEN REQUIRED.

SEED REQUIREMENTS

ALL SEED SHALL BE LABELED OR MARKED IN ACCORDANCE WITH SECTION 907.03 OF THE REVISED CODE OF OHIO. ALL SEED TEMPORARILY STORED ON THE JOB SHALL BE PROTECTED FROM DAMPNESS AT ALL TIMES.

SEEDING

THE VARIETY OF SEED AND RATE OF APPLICATION SHALL BE AS SPECIFIED. UNLESS SPECIFIED OTHERWISE, THE TEMPORARY SEEDING OPERATION MAY BE PERFORMED AT ANY TIME DURING THE YEAR.

DETAILS

NO SEEDBED PREPARATION IS REQUIRED AND NO MULCH IS REQUIRED.

SEEDING SHALL BE MADE BEFORE THE CLOSE OF EACH DAY'S WORK ON ALL AREAS AS SPECIFIED BY THE ENGINEER FOR TEMPORARY SEEDING. SEEDING AND FERTILIZER SHALL BE COVERED TO A DEPTH OF ONE (1) INCH. A DISK HARROW, OR OTHER SUITABLE EQUIPMENT AS APPROVED BY THE ENGINEER, SHALL BE USED TO COVER SEED AND FERTILIZER.

FERTILIZER SHALL BE UNIFORMLY APPLIED ON ALL AREAS TO BE SEEDED AT THE RATE OF 30 POUNDS PER ACRE OF NITROGEN; 30 POUNDS PER ACRE OF P205; AND 30 POUNDS PER ACRE OF K20. (EXAMPLE: THIS SPECIFICATION CAN BE MET BY APPLYING FERTILIZER HAVING AN ANALYSIS OF 10-10-10 AT THE RATE OF 300 POUNDS PER ACRE.)

TEMPORARY SEEDING SCHEDULE

DATES FROM	TO (INCLUSIVE)	KIND OF SEED	RATE OF SEEDING BU./AC.	MINIMUM GERMINATION	MINIMUM PURITY
3/1	8/15	OATS*	3	80%	97.5%
8/16	11/1	RYE**	3	85%	97.0%

* RYE GRASS MAY BE SUBSTITUTED FOR THIS TIME OF YEAR, IF OATS ARE IN SHORT SUPPLY.

** RYE GRASS OR WINTER WHEAT MAY BE SUBSTITUTED FOR THIS TIME OF YEAR, IF RYE IS IN SHORT SUPPLY.

2.4 EROSION AND SEDIMENTATION CONTROL

THE CONTRACTOR SHALL PROVIDE LABOR AND MATERIAL REQUIRED TO PROTECT THOSE DISTURBED AREAS OF EXPOSED SOILS REQUIRING IMMEDIATE VEGETATIVE STABILIZATION (AS DETERMINED BY THE ENGINEER), SUCH AS THE WATERCOURSE CHANNELS AND OTHER EARTHEN STRUCTURES. THE METHOD OF PROTECTION SHALL BE DEPENDENT UPON THE TIME OF YEAR WHEN CONSTRUCTION OF THE ABOVE IS COMPLETED. DURING FAVORABLE PLANTING CONDITIONS, TEMPORARY SEEDING SHALL BE PLANTED IMMEDIATELY UPON COMPLETION OF CONSTRUCTION. DURING UNFAVORABLE PLANTING CONDITIONS, A PROTECTIVE LAYER OF STRAW OR HAY MULCH SHALL BE SPREAD OVER THE EXPOSED SUBSOILS WITH OVER SEEDING CONDUCTED LATER WHEN FAVORABLE GROWING CONDITIONS DEVELOP. EROSION CONTROL FABRIC CONSISTING OF KNITTED YARN CONSTRUCTION WITH INTERWOVEN STRIPS OF BIODEGRADABLE PAPER, SUCH AS HOLD/GRO AS MANUFACTURED BY GULF STATES PAPER, TUSCALOOSA, ALABAMA, OR EQUAL, SHALL ALSO BE ACCEPTABLE.

ON LARGE AREAS OF DISTURBANCE NEAR WATERCOURSE, WHICH WILL BE DISTURBED IN EXCESS OF 30 DAYS THE CONTRACTOR SHALL PROVIDE A SEDIMENTATION TRAP BY INSTALLING A CONTINUOUS CUT-OFF WALL OF STRAW BALES BETWEEN THE CONSTRUCTION AREA AND CREEK. THE WIRE OR PLASTIC TIED STRAW BALES SHALL BE LAID ON THEIR SIDE, SET IN A TRENCH WITH A MINIMUM PROJECTION ABOVE THE GROUND SURFACE OF 10 INCHES, AND ANCHORED TO THE GROUND BY DRIVING TWO WOODEN OR METAL STAKES THROUGH EACH BALE. THE STRAW BALE WALL SHALL BE MAINTAINED UNTIL THE SITE SEEDING IS ESTABLISHED, AFTER WHICH SAID WALL SHALL BE REMOVED, THE TRENCH FILLED WITH TOPSOIL, AND THE STRAW AND SEDIMENT UTILIZED AS MULCHING AND FILL MATERIAL ON THE SITE.

2.5 RIPRAP

DESCRIPTION

THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, AND EQUIPMENT NECESSARY FOR CONSTRUCTION AND PLACEMENT OF RIPRAP WITHIN THE LIMITS AND AT THE ELEVATION SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.

MATERIAL

ALL RIPRAP STONE SHALL BE OF SUCH QUALITY THAT IT WILL NOT DISINTEGRATE UNDER ACTION OF AIR, WATER OR CONDITIONS TO BE MET IN HANDLING AND PLACING. THE MATERIAL SHALL BE HARD, DURABLE, CLEAN AND FREE FROM EARTH, CLAY, REFUSE, ADHERENT COATING AND OTHER FOREIGN MATTER. INDIVIDUAL STONES SHALL NOT EXCEED "ONE MAN SIZE" AND SHALL WEIGH BETWEEN TEN POUNDS AND THREE HUNDRED POUNDS.

INSTALLATION

THE LOOSE ROCK RIPRAP SHALL BE PLACED BY SKIP, CLAMSHELL, BY HAND OR OTHER ACCEPTABLE METHOD AND ARRANGED, IF NECESSARY, BY HAND SO AS TO PROVIDE A DENSE COMPACT PAVING OF A MINIMUM THICKNESS OF TWELVE INCHES. THE SPACES BETWEEN THE LARGER STONES SHALL BE FILLED WITH SMALLER PIECES TO FORM A DENSE COMPACT ROCK BLANKET OF FAIRLY EVEN SURFACE. SOME HANDWORK WILL BE REQUIRED TO PROPERLY SEAT AND KEY THE ROCK TOGETHER, AND TO CHINK THE VOIDS LEFT AFTER THE ROUGH PLACEMENT. IF EXCESSIVE FINES EXIST IN THE ROCK AS DELIVERED, IT MUST BE DUMPED AND REHANDLED TO REMOVE THE EXCESS THEREFROM. THE CONTRACTOR SHALL MAINTAIN THE SLOPE PAVING UNTIL ACCEPTED BY THE OWNER. ANY MATERIAL DISPLACED BY SLIPPAGE OR ANY OTHER CAUSE SHALL BE REPLACED TO THE LINES AND GRADES AS SHOWN OR AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.

2.6 SOILS COMPACTION

STRUCTURAL FILL

SOIL UTILIZED FOR STRUCTURAL FILL WILL BE PLACED IN COMPACTED LIFTS NO GREATER THAN 12-INCHES IN THICKNESS. SOILS WILL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR DENSITY TEST (ASTM-D698). THE SOIL WILL BE COMPACTED USING MACHINERY OF SUFFICIENT WEIGHT AND MECHANICAL CHARACTERISTICS TO PROVIDE THE COMPACTIVE EFFORT AND MANIPULATION NECESSARY. A PENETRATING-FOOT COMPACTOR SHOULD BE USED AS COMPACTION MACHINERY SUBJECT TO THE APPROVAL OF THE ENGINEER.

RECOMPACTED COHESIVE SOIL LINER

THE FLOOR OF THE IRRIGATION IMPOUNDMENT WILL BE EXCAVATED TO THE TOP OF IN-SITU SOIL LINER GRADES (LIMITS OF EXCAVATION CONTOURS) AS SHOWN ON SHEET 3, GRADING PLAN, CREATING 3 FEET OF SEPARATION BETWEEN THE UPPERMOST AQUIFER AND THE BASE OF THE RECOMPACTED COHESIVE SOIL LINER.

A 2 FOOT RECOMPACTED COHESIVE SOIL LINER WILL THEN BE PLACED OVER THE ENTIRE EXCAVATED FLOOR CONSTRUCTED OF 8" LOOSE LIFTS, 6" COMPACTED. THE RECOMPACTED COHESIVE SOIL LINER WILL BE CONSTRUCTED OF SOILS THAT MEET AT A MINIMUM THE FOLLOWING REQUIREMENTS:

- EACH LIFT SHALL HAVE MAXIMUM PERMEABILITY OF 1×10^{-7} cm/sec
- SOILS WILL HAVE A MAXIMUM CLOD SIZE OF THREE INCHES OR HALF THE LIFT THICKNESS, WHICHEVER IS LESS
- ONE HUNDRED PER CENT OF THE PARTICLES HAVING A MAXIMUM DIMENSION NOT GREATER THAN TWO INCHES
- NOT MORE THAN TEN PERCENT OF THE PARTICLES, BY VOLUME, HAVING A DIMENSION GREATER THAN 0.75 INCHES
- NOT LESS THAN THIRTY OR THIRTY-FIVE PER CENT OF THE PARTICLES, BY WEIGHT, HAVING A MAXIMUM DIMENSION NOT GREATER THAN 0.002 MILLIMETERS

THE SIDE SLOPES OF THE IRRIGATION IMPOUNDMENT WILL BE EXCAVATED TO THE BOTTOM OF THE RECOMPACTED COHESIVE SOIL LINER GRADES (LIMITS OF EXCAVATION CONTOURS) ALSO SHOWN ON SHEET 3. A 2 FOOT RECOMPACTED COHESIVE SOIL LINER WILL THEN BE CONSTRUCTED ON THE SIDE SLOPES OF THE IRRIGATION IMPOUNDMENT. ANY LIFT PENETRATIONS MADE INTO THE COHESIVE SOIL LINER SHALL BE BACKFILLED WITH A BENTONITE/WATER MIXTURE.

THE SOILS LAYER WILL BE COMPACTED USING STANDARD ENGINEERING COMPACTION METHODS TO A MINIMUM COMPACTION DENSITY OF 95 PER CENT OF MAXIMUM DRY DENSITY USING ASTM-698 TO ACHIEVE 1×10^{-7} CENTIMETERS PER SECOND MAXIMUM PERMEABILITY. COMPACTED SOILS MATERIAL SHALL BE TESTED FOR DENSITY AND MOISTURE CONTENT AT A RATE OF ONE TEST PER LIFT, WITH A MINIMUM OF ONE TEST FOR ANY DAY THAT SOIL MATERIAL IS COMPACTED. RESULTS OF CONSTRUCTION OBSERVATION WILL BE MADE AVAILABLE TO THE OWNER FOR THEIR RECORDS.

GENERAL FILL

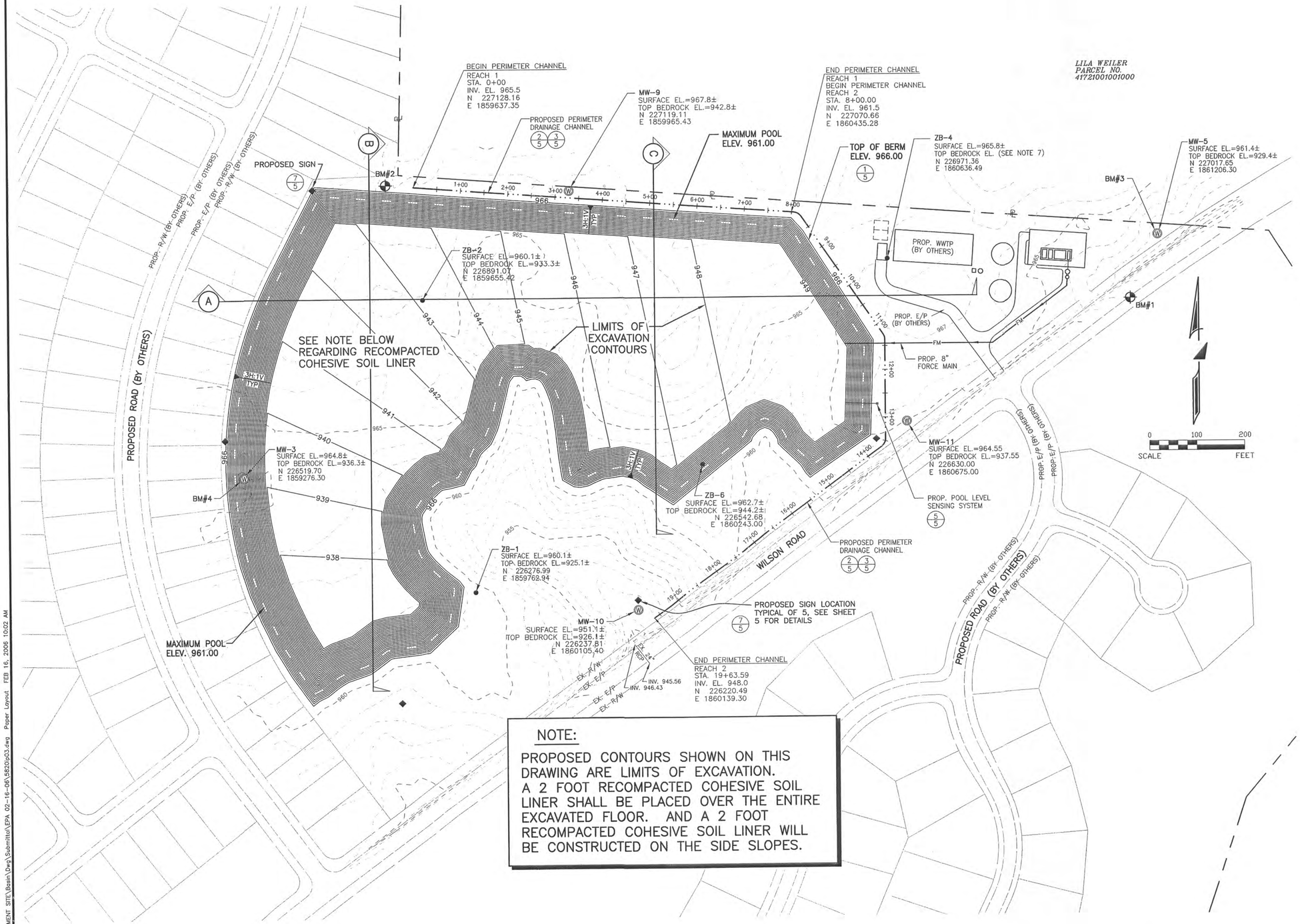
GENERAL FILL WILL BE PLACED IN 24-INCH THICK COMPACTED LIFTS. FILL WILL BE COMPACTED USING A PENETRATING FOOT COMPACTOR OR ENGINEER APPROVED EQUIVALENT.

R. D. Zande & Associates

DESIGNED BY:	GWF
DRAWN BY:	MAP
CHECKED BY:	GWF
APPROVED BY:	TAF
DATE:	FEB. 16, 2006
JOB NO.	5820

REVISIONS	
DATE	REMARKS

PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
NORTHSTAR IRRIGATION POND	NONE	GENERAL NOTES	2 OF 8



NOTE:

PROPOSED CONTOURS SHOWN ON THIS DRAWING ARE LIMITS OF EXCAVATION. A 2 FOOT RECOMPACTED COHESIVE SOIL LINER SHALL BE PLACED OVER THE ENTIRE EXCAVATED FLOOR. AND A 2 FOOT RECOMPACTED COHESIVE SOIL LINER WILL BE CONSTRUCTED ON THE SIDE SLOPES.

LEGEND

- PROPERTY LINE
- 960 EXISTING GROUND
- 948 LIMITS OF EXCAVATION CONTOURS
- ℄ CHANNEL
- FM PROPOSED 8" FORCEMAIN
- SOIL BORING
- (W) EXISTING MONITORING WELL
- PROPOSED SIGN LOCATION

NOTES:

1. TEST BORINGS ZB-1, ZB-2, ZB-3, ZB-9 AND ZB-10 WERE SURVEYED BY R.D. ZANDE & ASSOCIATES, INC. ON JULY 22 & 23, 2003. MW-11 WAS SURVEYED JANUARY 9, 2006 AND INSTALLED JANUARY 25, 2006.
2. COORDINATE GRID SYSTEM DEPICTED ON THIS DRAWING REFERENCES THE NAD 83 STATE PLANE COORDINATE SYSTEM. ELEVATIONS REFERENCE NAVD 88.
3. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IF ANY SPRINGS OR SEEPS ARE ENCOUNTERED WITHIN THE SUBGRADE AREA.
4. BOUNDARY AND TOPOGRAPHIC MAPPING IS BASED ON THE DELAWARE COUNTY GIS MAPPING AND WAS FIELD VERIFIED BY GPS SURVEY, BY R.D. ZANDE & ASSOCIATES, INC., IN JULY AND AUGUST 1998. THE BEARINGS SHOWN ARE BASED ON THE GRID BEARING OF N 86°28'32" W BETWEEN DELAWARE COUNTY GIS MONUMENTS, DEL94 AND DEL89, DETERMINED BY A GPS NETWORK OF FIELD OBSEREVATIONS PERFORMED IN JULY, 1998.
5. REFER TO SHEET 5 FOR SURFACE WATER CONTROL NOTES AND DETAILS.
6. A POOL LEVEL SENSING SYSTEM WILL BE INSTALLED TO CONTINUOUSLY MONITOR THE WATER LEVEL IN THE IRRIGATION POND. THE SYSTEM WILL CONSIST OF A STILLING PIPE WITH AN ULTRASONIC LEVEL SENSOR AND TELEMETRY EQUIPMENT. WHEN THE POOL LEVEL RISES TO A DETERMINED SET POINT ELEVATION, A 4-20 mA SIGNAL IS TELEMETERED TO THE PUMP CONTROLS AT THE WASTEWATER TREATMENT PLANT. THIS WILL SOUND AN ALARM AT BOTH THE TREATMENT PLANT AND GOLF COURSE CLUB HOUSE. GOLF COURSE PERSONNEL MUST THEN RESPOND BY TAKING MEASURES TO LOWER THE LEVEL IN THE IRRIGATION POND. WHEN THE POOL LEVEL HAS BEEN LOWERED TO A PRESET ELEVATION AS MEASURED BY THE ULTRASONIC LEVEL SENSOR THE ALARM WILL SHUT OFF.
7. SOIL BORING ZB-4 DRILLED TO DEPTH OF 915.77 AT WHICH ELEVATION BEDROCK WAS STILL NOT ENCOUNTERED.
8. SEE SHEET 2 OF 7, SECTION 2.6 FOR SOILS COMPACTION REQUIREMENTS.
9. ACCESS TO THE IRRIGATION IMPOUNDMENT WILL BE RESTRICTED THROUGH THE USE OF FENCING.

STAGE STORAGE

Contour Elevation (FT)	Area (SQ FT)	Volume (CU FT)	Volume (AC-FT)	Volume (GALLONS)
961	744200.45			
		737332.03	16.93	5515626.61
960	730484.87			
		723650.78	16.61	5413283.73
959	716838.13			
		710038.38	16.30	5311455.90
958	703260.26			
		696494.80	15.99	5210142.94
957	689751.18			
		683019.50	15.68	5109340.66
956	676309.86			
		669612.98	15.37	5009052.93
955	662938.35			
		656277.65	15.07	4909297.75
954	649639.41			
		643015.88	14.76	4810092.83
953	636415.02			
		629829.17	14.46	4711449.35
952	623266.19			
		616717.99	14.16	4613370.96
951	610192.89			
		559040.52	12.83	4181913.52
950	509403.46			
		475427.24	10.91	3556442.72
949	442241.98			
		406833.05	9.34	3043322.55
948	372423.23			
		347417.71	7.98	2598864.93
947	322998.38			
		306737.58	7.04	2294556.42
946	290759.21			
		270638.80	6.21	2024518.82
945	251005.23			
		224346.30	5.15	1678226.86
944	198704.57			
		171570.15	3.94	1283433.82
943	145797.98			
		122359.44	2.81	915312.14
942	100332.76			
		81955.94	1.88	613073.04
941	64863.38			
		49096.56	1.13	367267.74
940	34868.84			
Total Storage =	9781412.43	224.55		73170046.24

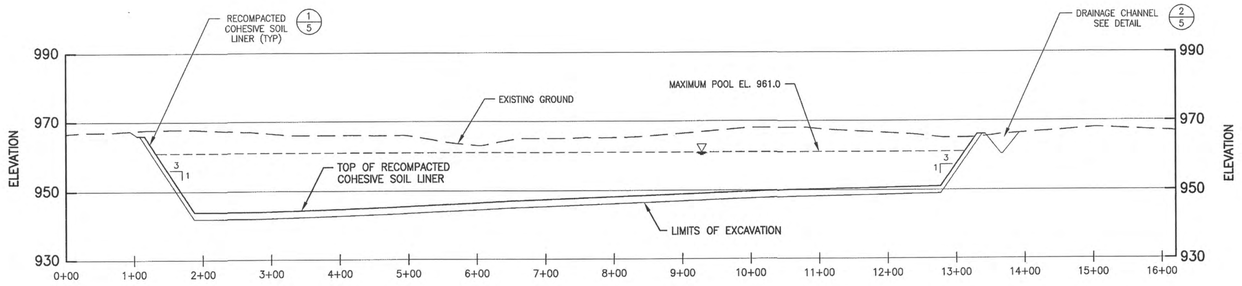
NOTE: STORAGE CAPACITY CALCULATED FROM TOP OF RECOMPACTED COHESIVE SOIL LINER TO MAXIMUM POOL ELEVATION.

R. D. Zande & Associates

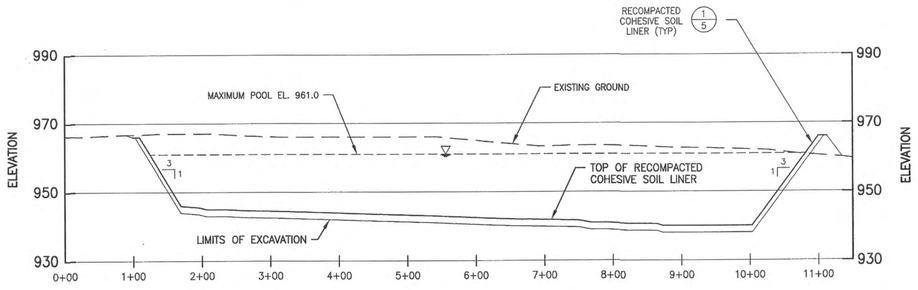
DESIGNED BY:	GWF
DRAWN BY:	MAP
CHECKED BY:	GWF
APPROVED BY:	TAF
DATE:	FEB. 16, 2006
JOB NO.	5820

REVISIONS	
DATE	REMARKS

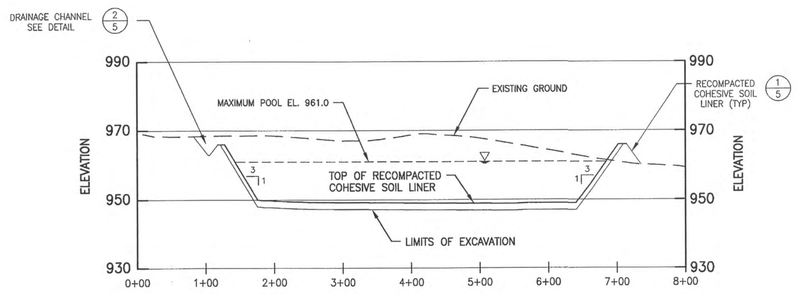
PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
NORTHSTAR IRRIGATION POND	1"=100'	GRADING PLAN	3 OF 8



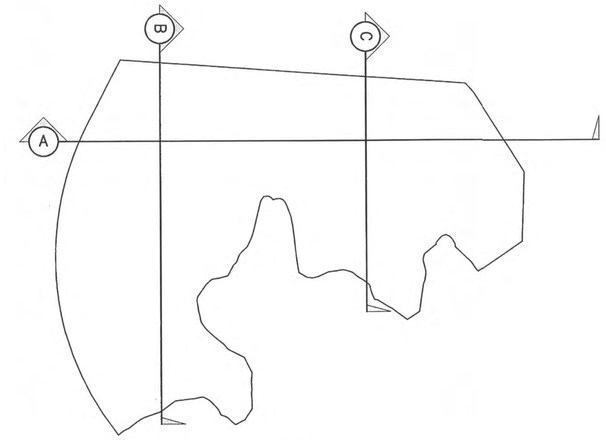
POND CROSS SECTION A



POND CROSS SECTION B



POND CROSS SECTION C



PLAN VIEW

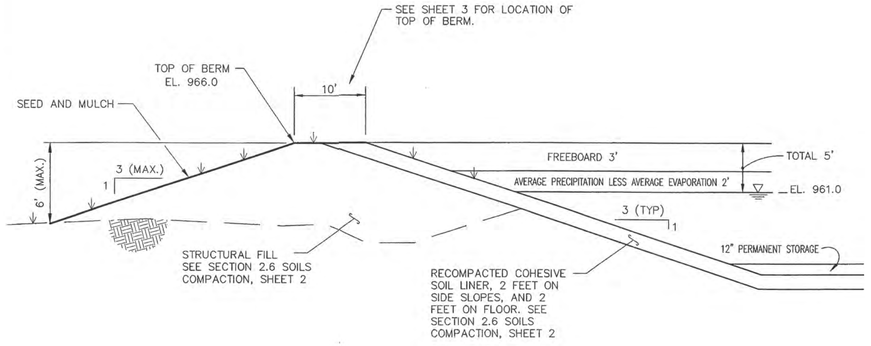
NOT TO SCALE

R. D. Zande & Associates

DESIGNED BY:	GWF
DRAWN BY:	MAP
CHECKED BY:	GWF
APPROVED BY:	TAF
DATE:	FEB. 16, 2006
JOB NO.	5820

REVISIONS	
DATE	REMARKS

PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
NORTHSTAR IRRIGATION POND	HORIZ. 1"=100' VERT. 1"=20'	CROSS SECTIONS A, B, & C	4 OF 8



1 EARTH BERM DETAIL (TYPICAL)

(NOT TO SCALE)

SEDIMENT BARRIERS

SEDIMENT BARRIERS INCLUDE SILT FENCING AND STRAW BALES. WHERE SEDIMENT BARRIERS ARE DESIGNATED FOR USE WITHIN THIS PLAN, THE LANDFILL OPERATOR, AT HIS DISCRETION, MAY INSTALL EITHER SILT FENCING OR STRAW BALES, OR MAY USE A COMBINATION OF BOTH DEVICES.

A. INSTALLATION OF A SILT FENCE

1. THE HEIGHT OF A SILT FENCE SHALL NOT EXCEED 36 INCHES.
2. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED.
3. POSTS SHALL BE SPACED A MAXIMUM OF 10 FEET APART AT THE SILT FENCE LOCATION AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12 INCHES).
4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 4 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE SILT FENCE.
5. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE POSTS, AND 8 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. THE TRENCH SHALL BE BACKFILLED AND SOIL COMPACTED OVER THE FILTER FABRIC.
7. SILT FENCING SHALL BE MAINTAINED AT ALL TIMES AND REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

B. SILT FENCE MATERIALS

1. SYNTHETIC FILTER SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE YARN AND SHALL BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER AS CONFORMING TO THE FOLLOWING REQUIREMENTS:

PHYSICAL PROPERTY	REQUIREMENTS
FILTERING EFFICIENCY	75% (MIN.)
TENSILE STRENGTH AT 20% (MAX.) ELONGATION	STANDARD STRENGTH – 30 LBS. PER LINEAR INCH (MIN.)
FLOW RATE	0.3 GAL./SQ.FT./MIN. (MIN.)

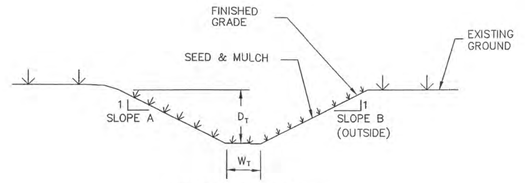
2. SYNTHETIC FILTER FABRIC SHALL CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS TO PROVIDE A MINIMUM OF SIX MONTHS OF EXPECTED USABLE CONSTRUCTION LIFE AT A TEMPERATURE RANGE OF 0° F TO 120° F.
3. POSTS FOR SEDIMENT BARRIERS SHALL BE EITHER 4-INCH DIAMETER WOOD OR 1.33 POUNDS PER LINEAR FOOT STEEL. STEEL POSTS SHALL HAVE PROJECTIONS FOR FASTENING WIRE TO THEM.

C. INSTALLATION OF STRAW BALES

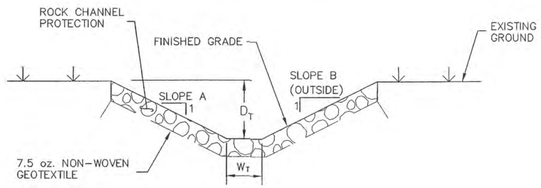
1. BALES INSTALLED FOR SURFACE RUNOFF CONTROL SHALL BE PLACED IN A SINGLE ROW, LENGTHWISE ON THE CONTOUR, WITH BOTH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER.
2. TEMPORARY STRAW BARRIERS SHALL BE PLACED NEAR THE DOWNSTREAM END OF THE PROPOSED PERIMETER DRAINAGE CHANNEL AT 15 FOOT INTERVALS. AT THE DISCRETION OF THE SITE OPERATOR AND BASE UPON FIELD CONDITIONS, STRAW BALES MAY BE INSTALLED IN OTHER DRAINAGE CHANNELS, TO AID IN SEDIMENT DEPOSITION, UNTIL VEGETATION IS ESTABLISHED OVER TRIBUTARY AREA. STRAW BALES INSTALLED IN GRASSED DRAINAGE CHANNELS SHALL BE PLACED AT MAXIMUM 2 ACRE TRIBUTARY INTERVALS ALONG CHANNEL SEGMENTS WHICH CONVEY FLOW FROM AREAS DISTURBED BY OPERATIONS. STRAW BARRIERS SHALL REMAIN IN PLACE UNTIL PERMANENT VEGETATIVE COVER IS ESTABLISHED. BALES PLACED IN A SINGLE ROW SHALL BE EXTENDED TO SUCH A LENGTH THAT THE BOTTOMS OF THE END BALES ARE HIGHER IN ELEVATION THAN THE TOP OF THE LOWEST BALE TO ENSURE THAT SEDIMENT-LADEN RUNOFF WILL FLOW EITHER THROUGH OR OVER THE BARRIER.
3. ALL BALES SHALL BE EITHER WIRE-BOUND OR STRING-TIED. STRAW BALES SHALL BE INSTALLED SO THAT BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES (IN ORDER TO PREVENT DETERIORATION OF THE BINDINGS).
4. THE BARRIER SHALL BE ENTRENCHED AND BACKFILLED. A TRENCH SHALL BE EXCAVATED THE WIDTH AND THE LENGTH OF THE PROPOSED BARRIER TO A MINIMUM DEPTH OF 4 INCHES. AFTER THE BALES ARE STAKED AND CHINKED, THE EXCAVATED SOIL SHALL BE BACKFILLED AGAINST THE BARRIER. BACKFILL SOIL SHALL CONFORM TO THE GROUND LEVEL ON THE DOWNHILL SIDE AND SHALL BE BUILT UP TO 4 INCHES AGAINST THE UPHILL SIDE OF THE BARRIER.
5. EACH BALE SHALL BE SECURELY ANCHORED BY AT LEAST TWO STAKES OR REBARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER. STAKES OR REBARS SHALL BE DRIVEN DEEP ENOUGH INTO THE GROUND TO SECURELY ANCHOR THE BALES.
6. THE GAPS BETWEEN BALES SHALL BE CHINKED (FILLED BY WEDGING) WITH STRAW TO PREVENT WATER FROM ESCAPING BETWEEN THE BALES. LOOSE STRAW SCATTERED OVER THE AREA IMMEDIATELY UPHILL FROM A STRAW BALE BARRIER TENDS TO INCREASE BARRIER EFFICIENCY.
7. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
8. STRAW BALE BARRIERS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, BUT NOT BEFORE THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.

3 CHANNEL SCHEDULE

DRAINAGE CHANNEL	REACH	LENGTH (ft.)	SLOPE (ft./ft.)	SIDE SLOPE A	SIDE SLOPE B	BOTTOM WIDTH W_T (ft.)	TOTAL DEPTH D_T (ft.)	LINING
PERIMETER	1	800	0.005	2.0	2.0	2.0	2.0	GRASS
	2	1163.59	0.0116	2.0	2.0	2.0	2.0	ROCK



GRASS LINED CHANNEL



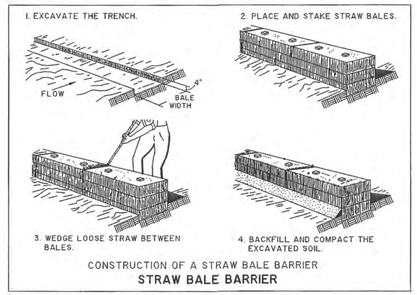
ROCK LINED CHANNEL

2 TYPICAL CHANNEL SECTIONS

(NOT TO SCALE)

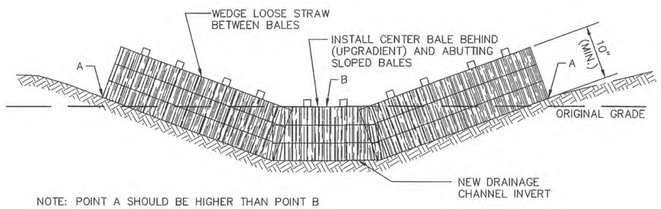
CHANNEL NOTES

1. THE CONTRACTOR SHALL DETERMINE THE APPROPRIATE AMOUNT OF EXCAVATION REQUIRED TO INSTALL CHANNELS TO THE FINISHED GRADE. THE CONTRACTOR SHALL NOT BE PAID FOR OVEREXCAVATION OF THESE CHANNELS.
2. ROCK CHANNEL PROTECTION SHALL BE ODOT TYPE "C" DUMPED ROCK. FILL PLACED TO A MINIMUM LAYER THICKNESS OF 1.0 FOOT.
3. ONE LAYER OF 7.5 OZ. PER S.Y. NON-WOVEN GEOTEXTILE SHALL BE INSTALLED BENEATH ROCK CHANNEL PROTECTION AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. A MINIMUM OF 12 INCHES GEOTEXTILE OVERLAP IS REQUIRED WHEN JOINING TWO SECTIONS OF MATERIAL.



CONSTRUCTION OF A STRAW BALE BARRIER

STRAW BALE BARRIER

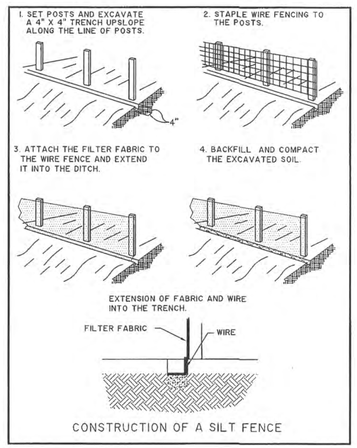


NOTE: POINT A SHOULD BE HIGHER THAN POINT B

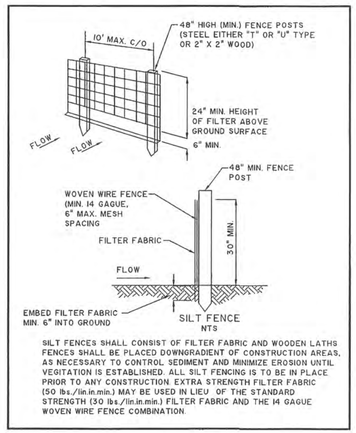
DRAINAGE CHANNEL INSTALLATION

4 STRAW BALE BARRIER

(NOT TO SCALE)



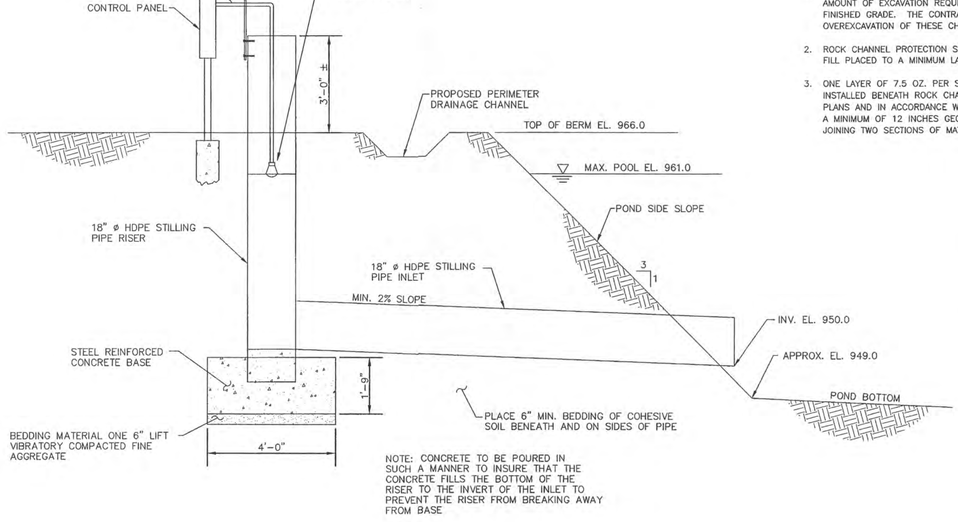
CONSTRUCTION OF A SILT FENCE



SILT FENCES SHALL CONSIST OF FILTER FABRIC AND WOODEN LATHS FENCES SHALL BE PLACED DOWNGRADIENT OF CONSTRUCTION AREAS, AS NECESSARY TO CONTROL SEDIMENT AND MINIMIZE EROSION UNTIL VEGITATION IS ESTABLISHED. ALL SILT FENCING IS TO BE IN PLACE PRIOR TO ANY CONSTRUCTION. EXTRA STRENGTH FILTER FABRIC (50 lbs./lin.in.min.) MAY BE USED IN LIEU OF THE STANDARD STRENGTH (30 lbs./lin.in.min.) FILTER FABRIC AND THE 14 GAGUE WOVEN WIRE FENCE COMBINATION.

6 SILT FENCE DETAIL

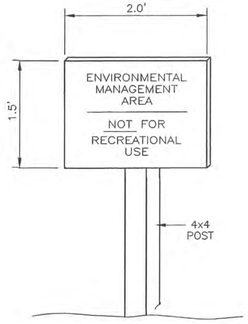
(NOT TO SCALE)



NOTE: CONCRETE TO BE POURED IN SUCH A MANNER TO INSURE THAT THE CONCRETE FILLS THE BOTTOM OF THE RISER TO THE INVERT OF THE INLET TO PREVENT THE RISER FROM BREAKING AWAY FROM BASE

5 POOL LEVEL SENSING SYSTEM DETAIL

(NOT TO SCALE)



7 PROPOSED ENVIRONMENTAL AREA SIGN

(NOT TO SCALE)

R. D. Zande & Associates

DESIGNED BY:	GWF
DRAWN BY:	MAP
CHECKED BY:	GWF
APPROVED BY:	TAF
DATE:	FEB. 16, 2006
JOB NO.	5820

REVISIONS	
DATE	REMARKS

PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
NORTHSTAR IRRIGATION POND	NOT TO SCALE	BERM AND DRAINAGE DETAILS	5 OF 8

FIELD BOREHOLE LOG — ZB-1

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

BOREHOLE NO.: **ZB-1**
TOTAL DEPTH: **-35.0**
WEATHER: **P. CLOUDY 70-85 F**
ELEVATION: **690.06**

PROJECT INFORMATION

PROJECT: **NORTHSTAR DEVELOPMENT**
CLIENT: **ROBERT WEILER COMPANY**
SITE LOCATION: **RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO**
RDZ JN: **5820.1**
LOGGED BY: **NATHAN HULL**
DATES DRILLED: **MON. 6-30-03**

DRILLING INFORMATION

DRILLING CO.: **GEO PRO SERVICES, INC.**
DRILLER(S): **ENOCH & RODNEY**
RIG TYPE: **MOBILE B-61**
DRILLING METHOD: **4.25" HOLLOW STEM AUGER**
SAMPLING METHODS: **SPLIT-SPOON & SHELBY TUBES**
HAMMER WT./DROP: **140 LBS./30.0" DROP**
DETAILED BORING LOCATION: **WEST END OF IMPOUNDMENT**

SZ Water level during drilling ▼ Water level in completed well

SOIL DESCRIPTION	SAMP. NO.	BLOWS /FT.	REC FT.
CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, little fine sand and trace fine gravel - subrounded. Dry	1	2-3-6	1.00
CLAY AND SILT			
CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, some fine sand and gravel, few seams. Damp.	2	3-5-8	1.17
CLAY AND SILT			
CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, some fine-coarse gravel, little fine-coarse sand - subrounded. Moist.	3	3-6-8	0.50
CLAY AND SILT			
TILL: Dark Brown, VERY STIFF SILTY CLAY, some fine-medium shale fragments little fine-medium sand and gravel. Moist	4	4-10-11	1.33
TILL			
TILL: Dark Brown, STIFF SILTY CLAY, some medium-coarse shale fragments, fine-medium sand and gravel. Moist.	5	3-6-7	1.33
TILL			
TILL: Dark Brown, VERY STIFF SILTY CLAY, some medium-coarse shale fragments, fine-medium sand and gravel. Moist	6	3-7-12	0.83
GRAVEL AND SAND: Dark Gray, MEDIUM DENSE SAND AND GRAVEL, fine-medium, some silt, trace clay. Wet			
GRAVEL AND SAND: Dark Gray, MEDIUM DENSE SAND AND GRAVEL, fine-medium, some silt, trace clay. Wet	7	7-14-19	1.00
TILL: Dark Gray, VERY STIFF SILTY CLAY, more sand % then the -8.5 to -15.0' till. Some fine grained and thin sand seams (Wet). Moist.	8	5-8-12	0.83
TILL			
SAND: Dark Gray, DENSE SAND, fine grained, some silt, grading into fine gravel @ -34.0'. Wet	9	50/5 5"	0.50
SHALE: Black to Dark Gray, SHALE, weathered, very fissle. Wet			

WELL DESCRIPTION: WATER LEVEL @ 24HR; WATER LEVEL @ COMPLETION; BENTONITE GROUT BACKFILL; WATER LEVEL @ INITIAL; BENTONITE GROUT BACKFILL

NOTES: NA

FIELD BOREHOLE LOG — ZB-2

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

BOREHOLE NO.: **ZB-2**
TOTAL DEPTH: **-32.5**
WEATHER: **P. CLOUDY 70-85 F**
ELEVATION: **965.82**

PROJECT INFORMATION

PROJECT: **NORTHSTAR DEVELOPMENT**
CLIENT: **ROBERT WEILER COMPANY**
SITE LOCATION: **RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO**
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DRILLER(S): **ENOCH & RODNEY**
RIG TYPE: **MOBILE B-61**
DRILLING METHOD: **4.25" HOLLOW STEM AUGER**
SAMPLING METHODS: **SPLIT-SPOON & SHELBY TUBES**
HAMMER WT./DROP: **140 LBS./30.0" DROP**
DETAILED BORING LOCATION:

SZ Water level during drilling ▼ Water level in completed well

SOIL DESCRIPTION	SAMP. NO.	BLOWS /FT.	REC FT.
CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, little to trace fine sand and gravel - subrounded. Dry.	1	3-6-7	0.83
CLAY AND SILT			
CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, little fine sand and gravel. Damp.	2	2-4-5	1.00
CLAY AND SILT			
TILL: Brown/mottled gray, VERY STIFF SILTY CLAY, some fine-medium sand and gravel - subrounded. Moist.	3	4-7-9	0.67
TILL			
TILL: Dark Brown, VERY STIFF SILTY CLAY, some fine shale fragments, little fine-medium sand and gravel. Moist.	4	4-9-8	1.00
TILL			
TILL: Dark Brown and Gray, VERY STIFF SILTY CLAY, some medium shale fragments, little fine-medium sand and gravel. Moist.	5	5-10-9	0.67
TILL			
TILL: Dark Gray, VERY STIFF SILTY CLAY, some medium shale fragments, little fine-medium sand and gravel. Moist.	6	7-12-17	1.17
TILL			
TILL: Dark Gray, HARD SILTY CLAY, then much more silt and less clay and gravel, more fine sand. Moist	7	13-21-29	1.33
TILL			
GRAVEL AND SAND: Dark Gray, DENSE SILTY SAND AND GRAVEL, fine-coarse shale fragments, trace clay. Wet	8	13-23-23	1.17
GRAVEL AND SAND			
SHALE: Black to Dark Gray, SHALE, weathered, very fissle. Wet		50/4.0"	0.25

WELL DESCRIPTION: WATER LEVEL @ 24HR; WATER LEVEL @ COMPLETION; BENTONITE GROUT BACKFILL; WATER LEVEL @ INITIAL; BENTONITE GROUT BACKFILL

NOTES: NA

FIELD BOREHOLE LOG — ZB-3/MW-3

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

BOREHOLE NO.: **ZB-3/MW-3**
TOTAL DEPTH: **-30.0**
WEATHER: **P. CLOUDY 70-85 F**
ELEVATION: **964.77**

PROJECT INFORMATION

PROJECT: **NORTHSTAR DEVELOPMENT**
CLIENT: **ROBERT WEILER COMPANY**
SITE LOCATION: **RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO**
RDZ JN: **5820.1**
LOGGED BY: **NATHAN HULL**
DATES DRILLED: **TUE. 7-1-03**

DRILLING INFORMATION

DRILLING CO.: **GEO PRO SERVICES, INC.**
DRILLER(S): **ENOCH & RODNEY**
RIG TYPE: **MOBILE B-61**
DRILLING METHOD: **4.25" HOLLOW STEM AUGER**
SAMPLING METHODS: **SPLIT-SPOON & SHELBY TUBES**
HAMMER WT./DROP: **140 LBS./30.0" DROP**
DETAILED BORING LOCATION: **WEST END OUTSIDE OF IMPOUNDMENT**

SZ Water level during drilling ▼ Water level in completed well

USCS	SOIL DESCRIPTION	SAMP. NO.	BLOWS /FT.	REC FT.
	CLAY AND SILT: Brown/mottled gray, STIFF SILTY CLAY, little fine sand and gravel - subrounded. Damp.	1	2-3-4	0.67
	CLAY AND SILT			
	CLAY AND SILT: Brown/mottled gray, STIFF SILTY CLAY, little fine sand and gravel - subrounded. Damp.	2	2-6-9	0.83
	CLAY AND SILT			
		ST		
	TILL: Dark Brown and Gray, STIFF SILTY CLAY, some fine-coarse sand, gravel and shale fragments. Moist.	3	4-5-10	1.00
	TILL			
		ST		
CL	TILL: Dark Gray, VERY STIFF CLAY, and fine silty sand. Fine-medium gravel seam @ 23.5' (wet). Moist.	4	8-11-14	1.00
	TILL			
	GRAVEL AND SAND: Dark Gray, DENSE SILTY SAND AND GRAVEL, fine-coarse shale fragments, trace clay. Wet.	5	10-13-33	1.33
	SHALE: Black to Dark Gray, SHALE, weathered, very fissle. Wet			

WELL DESCRIPTION: FLUSH-MOUNT WELL CAP; CONCRETE SEAL; BENTONITE SLURRY GROUT; BENTONITE HOLE PLUG; SAND PACK

NOTES: NA

FIELD BOREHOLE LOG — ZB-4

R. D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

Boring No.: **ZB-4**
Total Depth: **-50.0**
Weather Conditions: **SUNNY 70-85 F**
Elevation: **965.77**

PROJECT INFORMATION

PROJECT NAME: **NORTHSTAR DEVELOPMENT**
CLIENT: **ROBERT WEILER COMPANY**
SITE LOCATION:
RDZ JN: **5820.1**
LOGGED BY: **NATHAN HULL**
DATES DRILLED: **TUE. 7-1-03**

DRILLING INFORMATION

DRILLING CO.: **GEO PRO SERVICES, INC.**
DRILLER(S): **ENOCH & RODNEY**
RIG TYPE: **MOBILE B-61**
DRILLING METHOD: **4.25" HOLLOW STEM AUGER**
SAMPLING METHODS: **SPLIT-SPOON & SHELBY TUBES**
HAMMER WT./DROP: **140 LBS./30.0" DROP**
DETAILED BORING LOCATION:
RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO

SZ Water level during drilling ▼ Water level in completed well

BLOW COUNTS	PID READINGS	SOIL DESCRIPTION
3-3-5	0.50	CLAY AND SILT: Brown/mottled gray, MEDIUM STIFF CLAYEY SILT, little fine-medium sand and gravel - subrounded. Damp.
		CLAY AND SILT
3-7-9	0.67	CLAY AND SILT: Brown/mottled gray, VERY STIFF CLAYEY SILT, little fine-medium sand and gravel - subrounded. Damp.
		CLAY AND SILT
3-3-5	1.17	TILL: Brown, MEDIUM STIFF CLAY, some silt, medium-coarse sand, gravel and shale fragments. Moist.
3-8-12	1.33	TILL
		TILL: Dark Brown, VERY STIFF CLAY, some silt, medium-coarse sand, gravel and shale fragments. Moist.
		TILL
5-8-11	1.17	TILL: Dark Gray, VERY STIFF SILTY CLAY, some fine-coarse shale fragments, sand and gravel. Moist.
		TILL
7-10-10	0.0	
4-7-13	1.50	TILL: Dark Gray, VERY STIFF SILTY CLAY, some fine-coarse shale fragments, sand and gravel. Moist.
		TILL
3-6-9	1.33	TILL: Dark Gray, STIFF SILTY CLAY, some fine-coarse shale fragments, sand and gravel. Moist.
		TILL
7-8-10	1.17	TILL: Dark Gray, VERY STIFF SILTY CLAY, some fine-medium shale fragments, sand and gravel. Moist.
		TILL
7-40-42	1.00	TILL: Dark Gray, VERY STIFF SILTY CLAY, some fine-medium shale fragments, sand and gravel. Moist. Pushing limestone cobble, this is why the last 1.0' of the Standard Penetration Test count were so high.
		TILL
23-25-50	1.17	TILL: Dark Gray, HARD SILTY TILL, less clay and more shale fragments, little fine-coarse sand and gravel.

Soil Laboratory Results

Source	Elevation ((Ft.)	PARTICLE SIZE Gravel %	Sand %	Silt* %	Clay* %	ATTERBERG LIMITS Liquid Limit	Plastic Limit	Plasticity Index	USCS**	MOISTURE-DENSITY RELATIONSHIP *** Dry Density (pcf)	Moisture Content %	Permeability cm/sec
ZB-1	13.5-15.0	8.2	36.1	35	20.7	28	15	13	CL			
	23.5-25.0	35.4	52.1	12.5		NP	NV	_	SM			
ZB-3	7.0-9.0 (ST)	10.3	48.2	25.7	15.8	22	15	7	SC			5.40E-08
	23.5-25.0	10.3	31.7	36	22	26	14	12	CL			
ZB-4	3.5-5.0	0	18.6	54	27.4	34	16	18	CL			
	33.5-35.0	8.2	33.7	37.6	20.5	26	13	13	CL			
ZB-5	9.0-11.0 (ST)	5.4	28	33	23.6	26	16	10	CL			5.0E-.08
	28.5-30.0	12.8	34.6	33.5	19.1	26	14	12	CL			
ZB-6	8.5-10.0	4.9	38.1	36.5	20.5	28	16	12	CL			
ZB-8	8.5-10.0 (ST)	2.9	25.3	49.7	22.1				**			2.0-08

NP- Non Plastic
NV- Non Viscous
ST- Shelby Tube
** Atterberg Limit required for classification

DESIGNED BY:	GWF
DRAWN BY:	MAP
CHECKED BY:	GWF
APPROVED BY:	TAF
DATE:	FEB. 16, 2006
JOB NO.	5820

REVISIONS

DATE	REMARKS

R. D. Zande & Associates

PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
NORTHSTAR IRRIGATION POND	NONE	BORING LOGS AND SOIL LABORATORY RESULTS	6 OF 8

R.D. Zande & Associates, Inc. — FIELD BOREHOLE LOG

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

BOREHOLE NO.: ZB-5/MW-5
TOTAL DEPTH: -35.0
WEATHER: SUNNY 70-85 F
ELEVATION: 961.40

PROJECT INFORMATION

PROJECT: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION: RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO
RDZ JN: 5820.1
LOGGED BY: NATHAN HULL
DATES DRILLED: WED. 7-2-03

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & RODNEY
RIG TYPE: MOBILE B-61
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON & SHELBY TUBES
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:

▽ Water level during drilling ▼ Water level in completed well

USCS	SOIL DESCRIPTION	SAMP. NO.	BLOWS /FT.	REC FT.
	CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, trace to little fine sand and gravel - subrounded. Damp.	1	5-7-6	0.67
	CLAY AND SILT			
	CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, trace to little fine sand and gravel - subrounded. Damp.	2	3-6-9	1.00
	CLAY AND SILT			
	CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, some fine-medium sand and gravel, large shale fragsments - subrounded. Damp.	3	4-5-5	1.33
		ST		
	TILL. Dark Gray, VERY STIFF SILTY CLAY. some fine-coarse sand, gravel and shale fragments. Damp.	4	3-9-12	0.83
	TILL			
	TILL. Dark Gray, VERY STIFF SILTY CLAY. some fine-coarse sand, gravel and shale fragments - rounded-subrounded. Damp	5	6-9-10	1.17
	TILL			
	TILL. Dark Gray, VERY STIFF SILTY CLAY, little fine-coarse sand, gravel and shale fragments - subrounded. Moist.	6	5-7-9	1.50
	TILL			
CL	TILL. Dark Gray, VERY STIFF SILTY CLAY. little fine-coarse sand, gravel and shale fragments - subrounded. Moist.	7	4-6-6	1.17
	TILL			
	SHALE			
	SHALE: Black to Dark Gray, SHALE, weathered, very fissle. Wet	8	50/2.0"	0.33

WELL DESCRIPTION: FLUSH-MOUNT WELL CAP; CONCRETE SEAL; BENTONITE SLURRY GROUT; BENTONITE HOLE PLUG; SAND PACK

NOTES: NA

Page 1 of 1

R.D. Zande & Associates, Inc. — FIELD BOREHOLE LOG

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

BOREHOLE NO.: ZB-6
TOTAL DEPTH: -25.0
WEATHER: P. CLOUDY 70-85 F
ELEVATION: 962.70

PROJECT INFORMATION

PROJECT: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION: RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO
RDZ JN: 5820.1
LOGGED BY: NATHAN HULL
DATES DRILLED: WED. 7-2-03

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & RODNEY
RIG TYPE: MOBILE B-61
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON & SHELBY TUBES
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:

▽ Water level during drilling ▼ Water level in completed well

USCS	SOIL DESCRIPTION	SAMP. NO.	BLOWS /FT.	REC FT.
	CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, little fine-medium sand and gravel - subrounded. Dry.	1	7-6-7	0.67
		ST		
		ST		
CL	TILL: Dark Brown, STIFF CLAYEY SILT, some fine-medium shale fragments, sand and gravel. Moist.	2	5-6-7	1.17
	TILL			
	TILL: Dark Brown, VERY STIFF CLAYEY SILT, interbedded with silty sand and gravel. Wet.	3	3-7-18	1.00
	TILL			
	SHALE: Dark Gray/Black, WEATHERED SHALE. little silty fine sand and gravel. Wet.	4	9-17-36	0.83
	SHALE			

WELL DESCRIPTION: BENTONITE GROUT BACKFILL; WATER LEVEL @ INITIAL; BENTONITE GROUT BACKFILL

NOTES: NA

Page 1 of 1

R. D. Zande & Associates, Inc — FIELD BOREHOLE LOG

R. D. Zande & Associates, Inc
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

Boring No.: ZB-7/MW-7
Total Depth: -50.0
Weather Conditions: SUNNY 87 F
Elevation: 945.69

PROJECT INFORMATION

PROJECT NAME: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION:
RDZ JN: 5820.1
LOGGED BY: NATHAN HULL
DATES DRILLED: TUE.7-8-03

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & RODNEY
RIG TYPE: MOBILE B-61
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON & SHELBY TUBES
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:
RT 36/37 ON NORTH GALENA
AND WILSON ROADS - SUNBURY, OHIO

▽ Water level during drilling ▽ Water level in completed well

BLOW COUNTS	SAMPLE NO.	SOIL DESCRIPTION
3-5-6	1	CLAY AND SILT: Brown, STIFF CLAYEY SILT, little fine sand and gravel. Damp.
		CLAY AND SILT
3-5-10	2	CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, little fine sand and trace gravel. Damp.
		CLAY AND SILT
3-6-6	3	CLAY AND SILT: Brown/mottled gray, STIFF CLAYEY SILT, little fine sand and trace gravel. Damp.
		CLAY AND SILT
4-8-11	4	CLAY AND SILT: Brown, VERY STIFF CLAYEY SILT, little sand and gravel. Moist.
		CLAY AND SILT
15-16-50/3.0"	5	CLAY AND SILT: Dark Brown, HARD CLAYEY SILT, some fine-coarse sand and gravel. Moist.
		CLAY AND SILT
14-16-15	6	GRAVEL AND SAND: Dark Brown, DENSE SAND AND GRAVEL, medium grained, fractured. Wet.
		GRAVEL AND SAND
14-18-22	7	GRAVEL AND SAND: Dark Brown, DENSE SAND AND GRAVEL, medium grained, fractured. Wet.
4-3-12	8	GRAVEL AND SAND: Gray, MEDIUM DENSE SAND AND GRAVEL, medium grained, fractured. Wet.
		GRAVEL AND SAND
		GRAVEL AND SAND
6-4-7	9	SAND: Gray, MEDIUM DENSE SAND, trace gravel. Wet.
11-23-17	10	SAND AND SILT: Gray, DENSE SAND AND SILT, fine grained. Wet
		SAND AND SILT

Page 2 of 2

R.D. Zande & Associates, Inc. — FIELD BOREHOLE LOG

R.D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

BOREHOLE NO.: ZB-8/MW-8
TOTAL DEPTH: -30.0
WEATHER: P. CLOUDY 70-85 F
ELEVATION: 965.56

PROJECT INFORMATION

PROJECT: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION: RT 36/37 ON NORTH GALENA AND WILSON ROADS - SUNBURY, OHIO
RDZ JN: 5820.1
LOGGED BY: NATHAN HULL
DATES DRILLED: WED. 7-9-03

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & RODNEY
RIG TYPE: MOBILE B-61
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON & SHELBY TUBES
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:

▽ Water level during drilling ▼ Water level in completed well

USCS	SOIL DESCRIPTION	SAMP. NO.	BLOWS /FT.	REC FT.
	SANDY SILT: Reddish Brown. STIFF SANDY SILT, some clay. Moist.	1	2-4-7	0.83
	SANDY SILT: Brown, STIFF SANDY SILT, some clay, silt seams. Moist.	2	3-6-7	1.08
	SANDY SILT: Brown, VERY STIFF SANDY SILT. some clay, silt seams, trace medium gravel. Moist.	3	2-8-12	1.25
		ST		
	CLAY AND SILT: Tan/Gray, VERY STIFF CLAYEY SILT, some fine-medium gravel. Moist-Wet.	4	6-9-13	1.08
	SAND: Brown, DENSE SAND, then silty clay, some gravel, then cobbles and gravel. We	5	7-10-17	0.75
	SHALE: Dark Gray/Black. DENSE WEATHERED SHALE GRAVEL, highly fractured. Wet	6	12-19-17	1.08
	SAND AND SILT: Gray, VERY STIFF SAND AND SILT, fine-medium, some clay. Wet.	7	12-11-10	0.58
	SHALE: Dark Gray/Black. VERY DENSE WEATHERED SHALE, highly fractured. Wet.	8	30-50/2.0"	0.58
	SHALE			

WELL DESCRIPTION: FLUSH-MOUNT WELL CAP; CONCRETE SEAL; BENTONITE SLURRY GROUT; BENTONITE HOLE PLUG; SAND PACK

NOTES: NA

Page 1 of 1

R. D. Zande & Associates	DESIGNED BY: GWF	REVISIONS	PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
	DRAWN BY: MAP	DATE / REMARKS	NORTHSTAR IRRIGATION POND	NONE	BORING LOGS	7 OF 8
	CHECKED BY: GWF					
	APPROVED BY: TAF					
	DATE: FEB. 16, 2006					
	JOB NO. 5820					

R. D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

FIELD BOREHOLE LOG

Boring No.: ZB-9/MW-9
Total Depth: -26.0
Weather Conditions: CLEAR/BREEZY 48F
Elevation: NA

PROJECT INFORMATION

PROJECT NAME: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION: SUNBURY, OHIO
RDZ JN: 5820.1
LOGGED BY: ENOCH
DATES DRILLED: TUE. 4-5-05

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & GORDON
RIG TYPE: MOBILE B-57 ORV
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON &SHELBY TUBES
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:
RT 36/37 ON NORTH GALENA AND WILSON ROADS

Water level during drilling ▽ Water level in completed well

DEPTH	WATER LEVEL	LITHOLOGY	WELL CONSTRUCTION	REC. (IN.)	BLOW COUNTS	SAMPLE NO.	PID READINGS	SOIL DESCRIPTION
0								TOPSOIL
				8	2-3-7			CLAY: Brown and gray, STIFF, moist.
-5				12	3-8-12			SANDY SILT: Brown and gray, VERY STIFF, little fine gravel, moist.
				12	5-8-13			SANDY SILT: Brown and gray, VERY STIFF, little fine gravel, moist.
-10				12	7-14-23			SANDY CLAY: Brown, HARD, some limestone fragments, moist.
				8	4-12-14			SAND: Brownish-gray, MEDIUM DENSE, fine to medium sand, trace medium gravel and shale fragments, moist.
-15								
-20	▽			12	8-13-23			SANDY CLAY: Gray, HARD, little gravel, moist.
								SANDY CLAY: Gray, HARD, some shale fragments (from bedrock), little gravel, wet.
-25				7	45-50/1.0"			
				5	50/5.0"			SHALE: Dark gray, HARD, fissle and weathered, wet.
-30								

Page 2 of 2

R. D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

FIELD BOREHOLE LOG

Boring No.: ZB-10/MW-10
Total Depth: -26.0
Weather Conditions: CLEAR/BREEZY 48F
Elevation: NA

PROJECT INFORMATION

PROJECT NAME: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION: SUNBURY, OHIO
RDZ JN: 5820.1
LOGGED BY: ENOCH
DATES DRILLED: MON. 4-4-05

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & GORDON
RIG TYPE: MOBILE B-57 ORV
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON &SHELBY TUBES
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:
RT 36/37 ON NORTH GALENA AND WILSON ROADS
ENTER BORING LOCATION 2 HERE

Water level during drilling ▽ Water level in completed well

DEPTH	WATER LEVEL	LITHOLOGY	WELL CONSTRUCTION	REC. (IN.)	BLOW COUNTS	SAMPLE NO.	PID READINGS	SOIL DESCRIPTION
0								TOPSOIL
				12	3-3-4	S1		SILTY CLAY: Brown, MEDIUM STIFF, trace sand and organics, moist.
-5				12	2-5-7	S2		CLAYEY SAND: Brown-rust, STIFF, moist.
				12	3-5-7	S3		CLAYEY SAND: Brown-rust, STIFF, little shale fragments, moist.
-10				3	3-10-14	S4		SILTY CLAY: Brown, VERY STIFF, trace sand and gravel, moist.
								SILTY SAND: Gray, VERY DENSE, some gravel, wet.
-15	▽			9	8-19-31	S5		
-20				8	7-9-19	S6		SANDY CLAY: Gray, VERY STIFF, little gravel, moist.
				12	12-22-36	S7		SANDY CLAY: Gray, HARD, little gravel, trace shale fragments, moist.
-25								
-30								

Page 2 of 2

R. D. Zande & Associates, Inc.
1500 Lake Shore Drive
Columbus, Ohio 43204
(614) 486-4383 FAX (614) 486-4387

FIELD BOREHOLE LOG

Boring No.: ZB-11/MW-11
Total Depth: 27.0
Weather Conditions: OVERCAST 32F
Elevation: 964.55

PROJECT INFORMATION

PROJECT NAME: NORTHSTAR DEVELOPMENT
CLIENT: ROBERT WEILER COMPANY
SITE LOCATION: SUNBURY, OHIO
RDZ JN: 5820.1
LOGGED BY: ENOCH & GORDON
DATES DRILLED: WED. 1-25-06

DRILLING INFORMATION

DRILLING CO.: GEO PRO SERVICES, INC.
DRILLER(S): ENOCH & GORDON
RIG TYPE: MOBILE B-57 ORV
DRILLING METHOD: 4.25" HOLLOW STEM AUGER
SAMPLING METHODS: SPLIT-SPOON
HAMMER WT./DROP: 140 LBS./30.0" DROP
DETAILED BORING LOCATION:
RT 36/37 ON NORTH GALENA AND WILSON ROADS

Water level during drilling ▽ Water level in completed well

DEPTH	WATER LEVEL	LITHOLOGY	WELL CONSTRUCTION	REC. (IN.)	BLOW COUNTS	SAMPLE NO.	PID READINGS	SOIL DESCRIPTION
0								TOPSOIL
				9	6-11-14			CLAYEY SILT: Brown with gray mottles, VERY STIFF, little sand and gravel, fine grained. Moist.
-5				12	8-13-15			CLAYEY SILT: Brown with gray mottles, VERY STIFF, little sand, trace gravel, fine grained. Moist.
				16	7-9-15			SILTY CLAY: Brown with gray and beige mottles, VERY STIFF, little sand, gravel and shale fragments, fine to coarse grained. Moist.
-10				14	12-13-16			SILTY CLAY: Brown and gray, VERY STIFF, little sand, gravel and shale fragments, fine to coarse grained. Moist.
								NO RETURN
-15				NR	33-50/5.0"			
				15	13-23-37			TILL: Gray, HARD, some fine shale fragments, little sand and gravel, fine to medium grained. Moist.
-20				16	10-14-26			
								TILL: Gray, DENSE, some fine shale fragments, little sand and gravel, fine to medium grained, subrounded to rounded. Moist.
-25								
								SHALE: Black to dark gray, very fissle.
-30								
-35								

Page 1 of 1

R. D. Zande & Associates

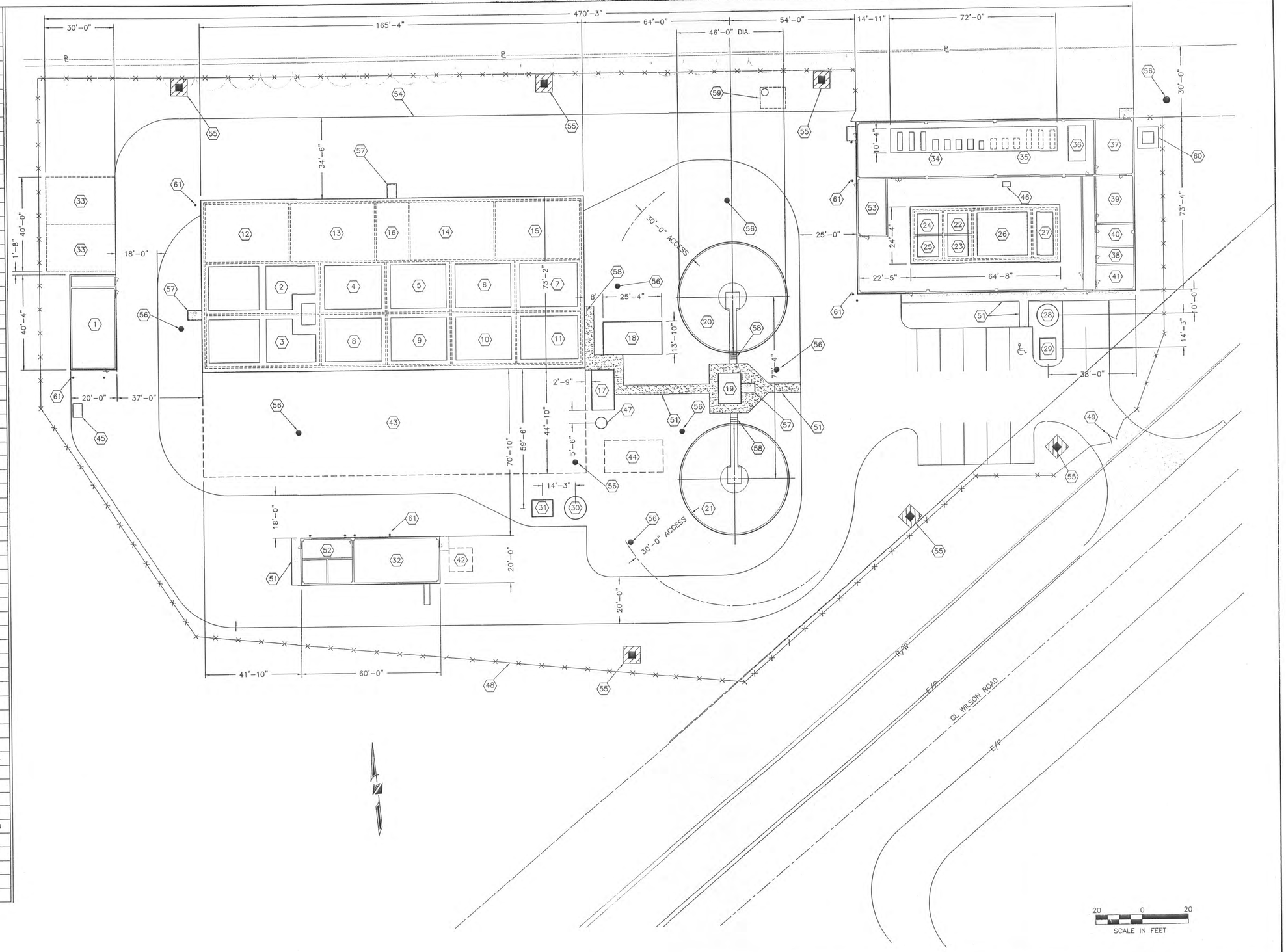
DESIGNED BY:	GWF
DRAWN BY:	MAP
CHECKED BY:	GWF
APPROVED BY:	TAF
DATE:	FEB. 16, 2006
JOB NO.	5820

REVISIONS	
DATE	REMARKS

PROJECT TITLE	SCALE	SHEET TITLE	SHEET NO.
NORTHSTAR IRRIGATION POND	NONE	BORING LOGS	8 OF 8

STRUCTURE LEGEND

		REF. DWG.
1	HEADWORKS BUILDING	766-105
2	FLOW EQUALIZATION NO.1	766-106
3	FLOW EQUALIZATION NO. 2	766-106
4	ANOXIC / AERATION NO. 1	766-106
5	AERATION NO. 2	766-106
6	ANOXIC / AERATION NO. 3	766-106
7	AERATION NO. 4	766-106
8	ANOXIC / AERATION NO. 5	766-106
9	AERATION NO. 6	766-106
10	ANOXIC / AERATION NO. 7	766-106
11	AERATION NO. 8	766-106
12	SLUDGE HOLDING NO. 1	766-106
13	SLUDGE HOLDING NO. 2	766-106
14	SLUDGE HOLDING NO. 3	766-106
15	SLUDGE HOLDING NO. 4	766-106
16	FAN / SLUDGE PUMP CHAMBER	766-107
17	CLARIFIER SPLITTER	766-111
18	RAS VALVE AND FLOWMETER VAULT	766-111
19	RAS PUMP STATION	766-111
20	CLARIFIER NO. 1	766-111
21	CLARIFIER NO. 2	766-111
22	FILTER CELL NO.1	766-115
23	FILTER CELL NO.2	766-115
24	FILTER CELL NO.3 (FUTURE)	766-115
25	FILTER CELL NO.4 (FUTURE)	766-115
26	CLEARWELL	766-115
27	UV DISINFECTION / FLOWMETER	766-115
28	EFFLUENT PUMP STATION	766-114
29	VALVE VAULT	766-114
30	PLANT DRAIN PUMP STATION	766-114
31	VALVE VAULT	766-114
32	SLUDGE DE-WATERING FACILITIES	766-124
33	ODOR CONTROL BIOFILTER	766-118
34	PROCESS BLOWERS	766-117
35	FUTURE PROCESS BLOWERS	766-117
36	STAND-BY DIESEL GENERATOR	
37	ELECTRICAL CONTROL ROOM	
38	WASHROOM	
39	LAB	
40	BREAK ROOM	
41	OFFICE	
42	AREA FOR FUTURE THICKENED SLUDGE PUMP STATION	
43	AREA FOR FUTURE FLOW EQ. AND AERATION	
44	AREA FOR FUTURE RAS VALVE VAULT	
45	DUMPSTER STORAGE AREA	
46	COMPOSITE SAMPLER	766-128
47	CHLORINE LINE VALVE BOX	766-126
48	6' HIGH GALV. CHAINLINK FENCE W/3 STRAND BARB WIRE	
49	12'-0" WIDE DOUBLE LEAF GATE	
50	4'-0" WIDE SINGLE LEAF GATE	
51	4'-0" WIDE CONCRETE SIDEWALK	
52	CHEMICAL STORAGE AND FEED EQUIPMENT	766-124
53	WORK ROOM	
54	ASPHALT DRIVE	
55	STORM DRAIN INLET	
56	YARD DRAIN	
57	CONCRETE RAMP	766-120
58	CONCRETE STEPS	
59	ELECTRICAL VAULT (SEE ELEC. PLANS FOR DETAILS)	
60	PAD MTD. TRANSFORMER (SEE ELEC. PLANS FOR DETAILS)	
61	BOLLARDS	



R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-101

REVISIONS	
DATE	REMARKS
1/31/05	PER 1/19/05 REVIEW MTG.

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: 1"=20'

WASTEWATER TREATMENT PLANT

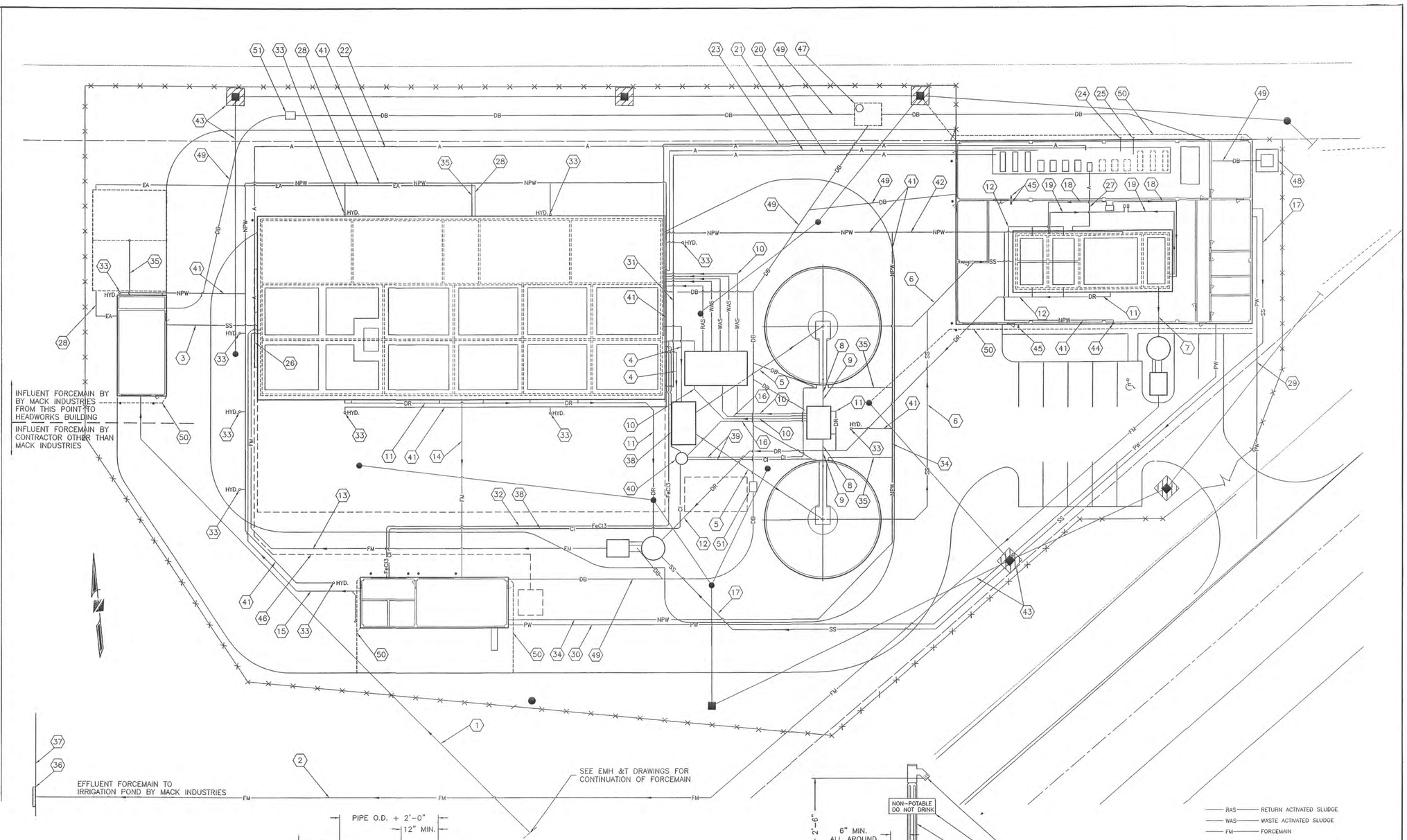
SITE PLAN

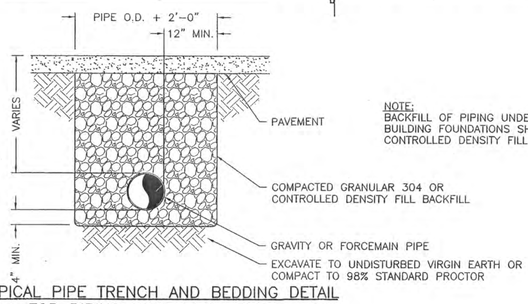
SHEET NO.

W2 OF 32

PIPING LEGEND

1	16" D.I.P. INFLUENT FORCEMAIN (2300 GPM MAX.)
2	8" D.I.P. EFFLUENT FORCEMAIN WITH RESTRAINED JOINTS
3	18" D.I.P. GRAVITY SANITARY SEWER
4	12" D.I.P. AERATION EFFLUENT
5	18" D.I.P. SPLITTER BOX EFFLUENT
6	16" D.I.P. CLARIFIER EFFLUENT
7	16" D.I.P. UV / FLOW METER EFFLUENT
8	6" D.I.P. SLUDGE WITHDRAWAL LINE
9	6" D.I.P. SCUM PIPE
10	6" D.I.P. RAS / WAS FORCEMAIN WITH RESTRAINED JOINTS
11	8" D.I.P. TANK DRAIN PIPING
12	16" D.I.P. TANK DRAIN PIPING
13	8" D.I.P. FORCEMAIN WITH RESTRAINED JOINTS
14	6" D.I.P. SLUDGE FORCEMAIN WITH RESTRAINED JOINTS
15	8" D.I.P. SLUDGE DE-WATERING FILTRATE DRAIN
16	4" SDR35 PVC DRAIN
17	6" PVC BUILDING SANITARY SEWER @ 1.0% MINIMUM SLOPE
18	3" SCH.80 PVC SAMPLER RETURN PIPE
19	3/4" SCH.80 PVC SAMPLER WITHDRAWAL PIPE
20	10" D.I.P. AIRLINE
21	10" D.I.P. AIRLINE
22	6" D.I.P. AIRLINE
23	1 1/2" SCH.40 STAINLESS STEEL COMPRESSED AIRLINE
24	10" D.I.P. AIRLINE CAPPED FOR FUTURE USE
25	10" D.I.P. AIRLINE CAPPED FOR FUTURE USE
26	4" D.I.P. AIRLINE
27	2" SCH.40 STAINLESS STEEL AIRLINE
28	18" HDPE FOUL AIR DUCT
29	3/4" COPPER POTABLE WATERLINE
30	1" P.E. FLEXIBLE WATERLINE, POTABLE, NSF APPROVED
31	8" D.I.P. AIRLINE
32	3/4" P.E. FLEXIBLE TUBING
33	1 1/2" NON-FREEZE YARD HYDRANT
34	1" P.E. FLEXIBLE WATERLINE, NON-POTABLE
35	3/4" P.E. FLEXIBLE WATERLINE, NON-POTABLE
36	HEADWALL
37	EDGE OF IRRIGATION POND
38	3/4" P.E. FLEXIBLE TUBING
39	1/2" P.E. FLEXIBLE TUBING
40	CHLORINE FEED VALVE BOX
41	2" P.E. FLEXIBLE WATERLINE, NON-POTABLE
42	3" SCH.80 PVC NON-POTABLE WATERLINE
43	SITE DRAINAGE SYSTEM
44	NON-POTABLE WALL TYPE HYDRANT
45	POTABLE HOSE SPIGOT
46	FUTURE LOCATION OF THICKENED SLUDGE FORCEMAIN
47	ELECTRICAL VAULT (SEE ELECTRICAL PLANS)
48	PAD MTD. TRANSFORMER (SEE ELECTRICAL PLANS)
49	CONCRETE ENCASED DUCT BANKS (SEE ELECTRICAL PLANS)
50	BUILDING DOWNSPOUT DRAINS
51	QUAZITE PULL BOX

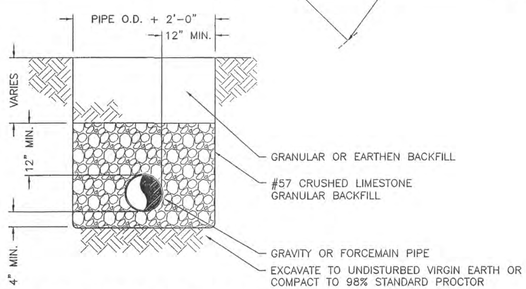




TYPICAL PIPE TRENCH AND BEDDING DETAIL FOR PIPING UNDER PAVEMENT

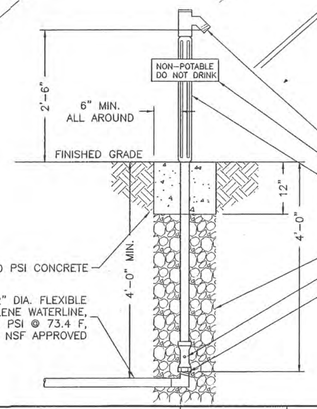
SCALE: 3/4"=1'

NOTE:
BACKFILL OF PIPING UNDER THE INFLUENCE OF BUILDING FOUNDATIONS SHALL BE BACKFILLED WITH CONTROLLED DENSITY FILL (CDF).



TYPICAL PIPE TRENCH AND BEDDING DETAIL

SCALE: 3/4"=1'



NOTE:
1. TWO SETS OF 100 FOOT LONG 1 1/2" DIA. HOSES SHALL BE PROVIDED FOR YARD HYDRANTS

TYPICAL NON-FREEZE POST HYDRANT DETAIL

SCALE: 3/4"=1'

RAS	RETURN ACTIVATED SLUDGE
WAS	WASTE ACTIVATED SLUDGE
FM	FORCEMAIN
DR	DRAIN
NPW	NON POTABLE WATER
PW	POTABLE WATER
A	AIRLINE
SS	SANITARY SEWER
FeCl3	FERRIC CHLORIDE
Cl	LIQUID CHLORINE
DB	UNDERGROUND DUCT BANK
EA	EXHAUST AIR DUCTS

20 0 20
SCALE IN FEET

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-102

REVISIONS	
DATE	REMARKS
1/24/05	PER 1/19/05 REVIEW MTG.
5/7/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT

WATER RECLAMATION FACILITY

SCALE: 1"=20'

WASTEWATER TREATMENT PLANT

SITE PIPING PLAN

SHEET NO.

W3 OF 32

SLUDGE HOLDING NO. 1
94,418 GALLONS

SLUDGE HOLDING NO. 2
94,418 GALLONS

SLUDGE HOLDING NO. 3
94,418 GALLONS

SLUDGE HOLDING NO. 4
94,418 GALLONS

SLUDGE WITHDRAWAL

SUPERNATANT

WAS

FOUL AIR

BIOFILTER ODOR CONTROL SYSTEM

BIOFILTER ODOR CONTROL SYSTEM

VFD

FILTRATE DRAIN

SLUDGE DE-WATERING CENTRIFUGE

POLYMER ADDITION

CAM-LOK

CONVEYOR

DRY SLUDGE TRANSPORT OFF SITE

FERRIC CHLORIDE ADDITION FOR PHOSPHORUS REMOVAL

SLUDGE DE-WATERING BUILDING

RAS

MANUAL BARSCREEN

GRINDER WITH SOLIDS DEWATERER

HEADWORKS BUILDING

INFLUENT FORCEMAIN
2300 GPM MAX.
0.4 MGD

EQUALIZATION NO. 1
101,000 GALLONS

EQUALIZATION NO. 2
101,000 GALLONS

FLOW CONTROL SPLITTER BOX

ANOXIC/AERATION NO. 1
62,500 GALLONS

AERATION NO. 2
62,500 GALLONS

ANOXIC/AERATION NO. 3
62,500 GALLONS

AERATION NO. 4
62,500 GALLONS

ANOXIC/AERATION NO. 5
62,500 GALLONS

AERATION NO. 6
62,500 GALLONS

ANOXIC/AERATION NO. 7
62,500 GALLONS

AERATION NO. 8
62,500 GALLONS

MLSS

CLARIFIER SPLITTER BOX

CLARIFIER NO. 1

CLARIFIER NO. 2

RAS PUMP STATION

PLANT DRAIN PUMP STATION

BACKWASH RETURN

120 SQ.FT. FILTER NO.3 (FUTURE)

120 SQ.FT. FILTER NO.1

120 SQ.FT. FILTER NO.2

120 SQ.FT. FILTER NO.4 (FUTURE)

FILTER CELL SPLITTER

SAMPLER

CLEARWELL

ULTRAVIOLET DISINFECTION

FLOW METERING

EFFLUENT PUMP STATION

FORCEMAIN TO IRRIGATION POND

BYPASS

OPERATIONS BUILDING

KEY

- E — ELECTRICALLY ACTUATED VALVE
- CHECK VALVE
- VALVE OR GATE
- P — PUMP
- FM — FLOW METER
- F — FAN
- DIRECTION OF FLOW
- MLSS — MIXED LIQUOR SUSPENDED SOLIDS
- RAS — RETURN ACTIVATED SLUDGE
- WAS — WASTE ACTIVATED SLUDGE

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-103

REVISIONS	
DATE	REMARKS
1/20/05	PER 1/19/05 REVIEW MTG.
4/29/06	PER 4/5/06 REVIEW COMMENTS

R. D. Zande & Associates

Mack Industries, Inc.
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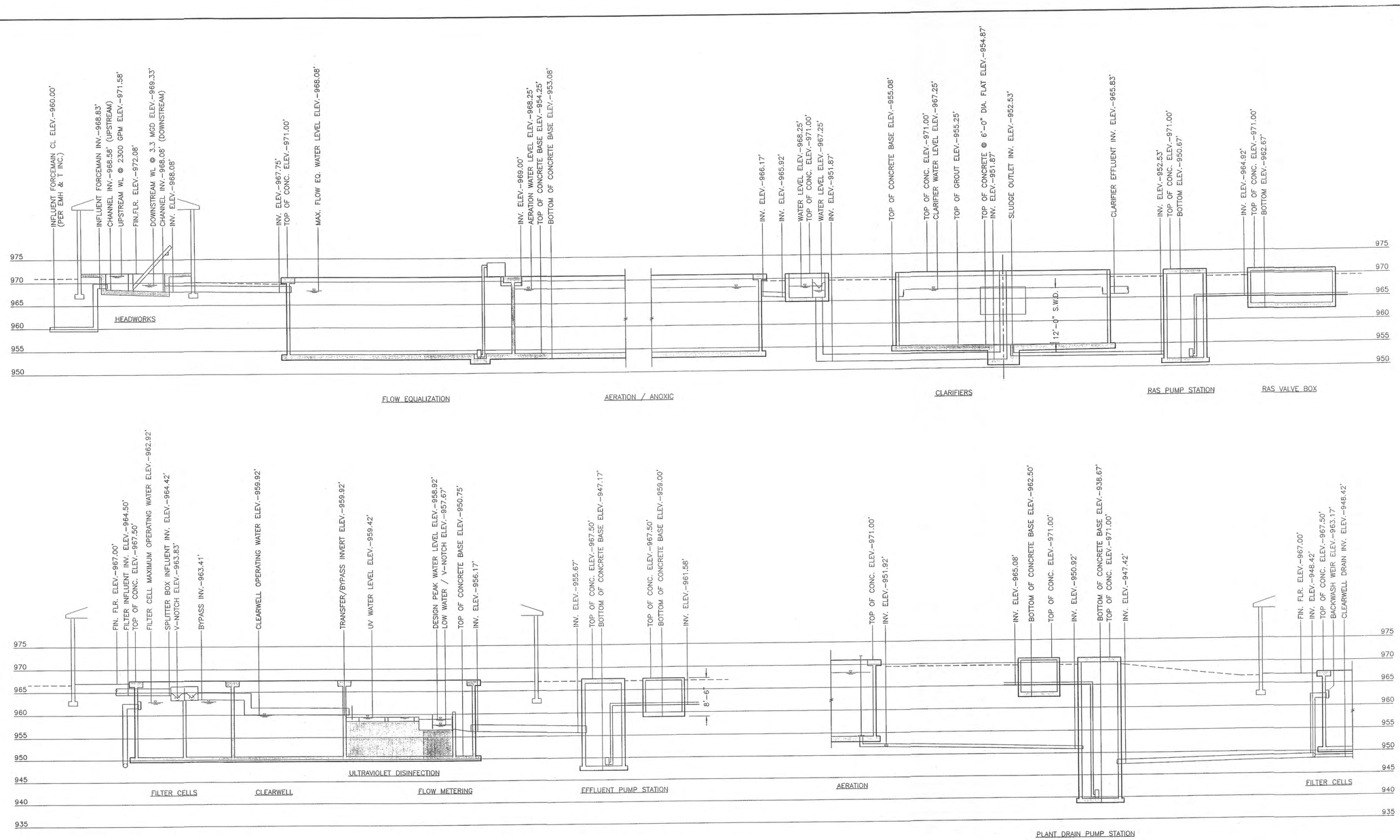
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: NTS

WASTEWATER TREATMENT PLANT
PROCESS FLOW DIAGRAM

SHEET NO.
W4 OF 32



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DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-104

REVISIONS	
DATE	REMARKS
1/31/05	PER 1/19/05 REVIEW MTG.

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NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

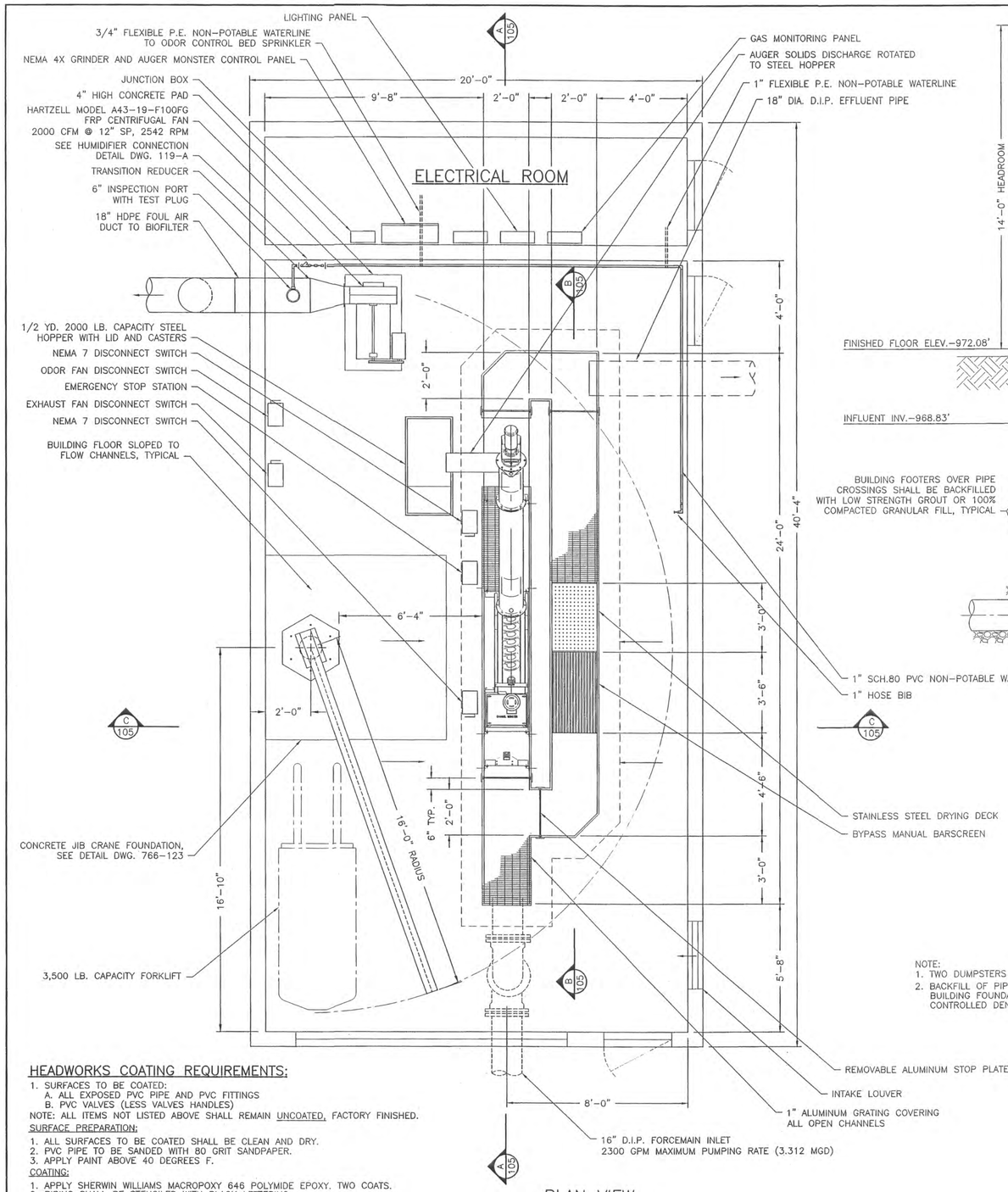
SCALE: 1"=10'

WASTEWATER TREATMENT PLANT

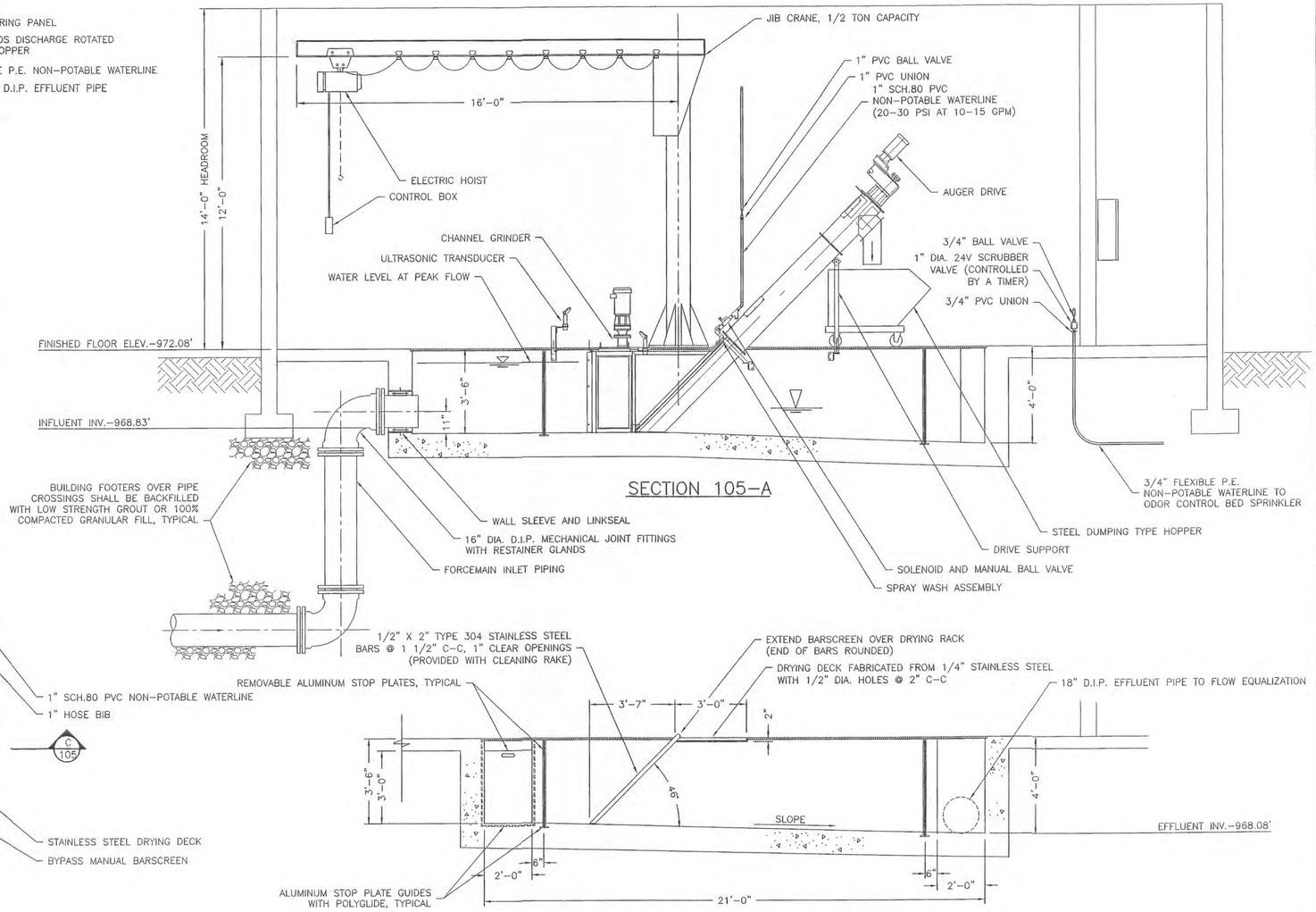
HYDRAULIC PROFILE

SHEET NO.

W5 OF 32



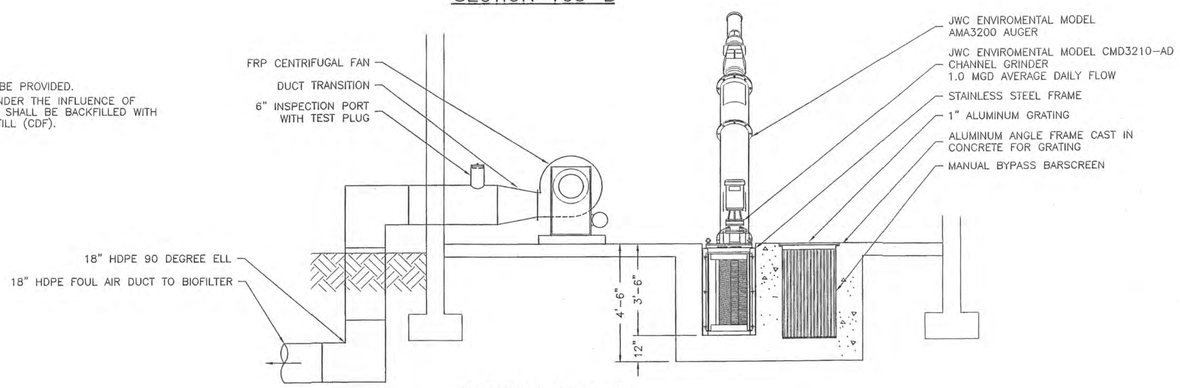
PLAN VIEW



SECTION 105-A

SECTION 105-B

NOTE:
1. TWO DUMPSTERS WILL BE PROVIDED.
2. BACKFILL OF PIPING UNDER THE INFLUENCE OF BUILDING FOUNDATIONS SHALL BE BACKFILLED WITH CONTROLLED DENSITY FILL (CDF).



SECTION 105-C

HEADWORKS COATING REQUIREMENTS:

1. SURFACES TO BE COATED:
   A. ALL EXPOSED PVC PIPE AND PVC FITTINGS
   B. PVC VALVES (LESS VALVES HANDLES)

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED, FACTORY FINISHED.

SURFACE PREPARATION:

1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. NON-POTABLE WATERLINES SHALL BE AQUA (SW 4061).

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-105

REVISIONS	
DATE	REMARKS

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201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

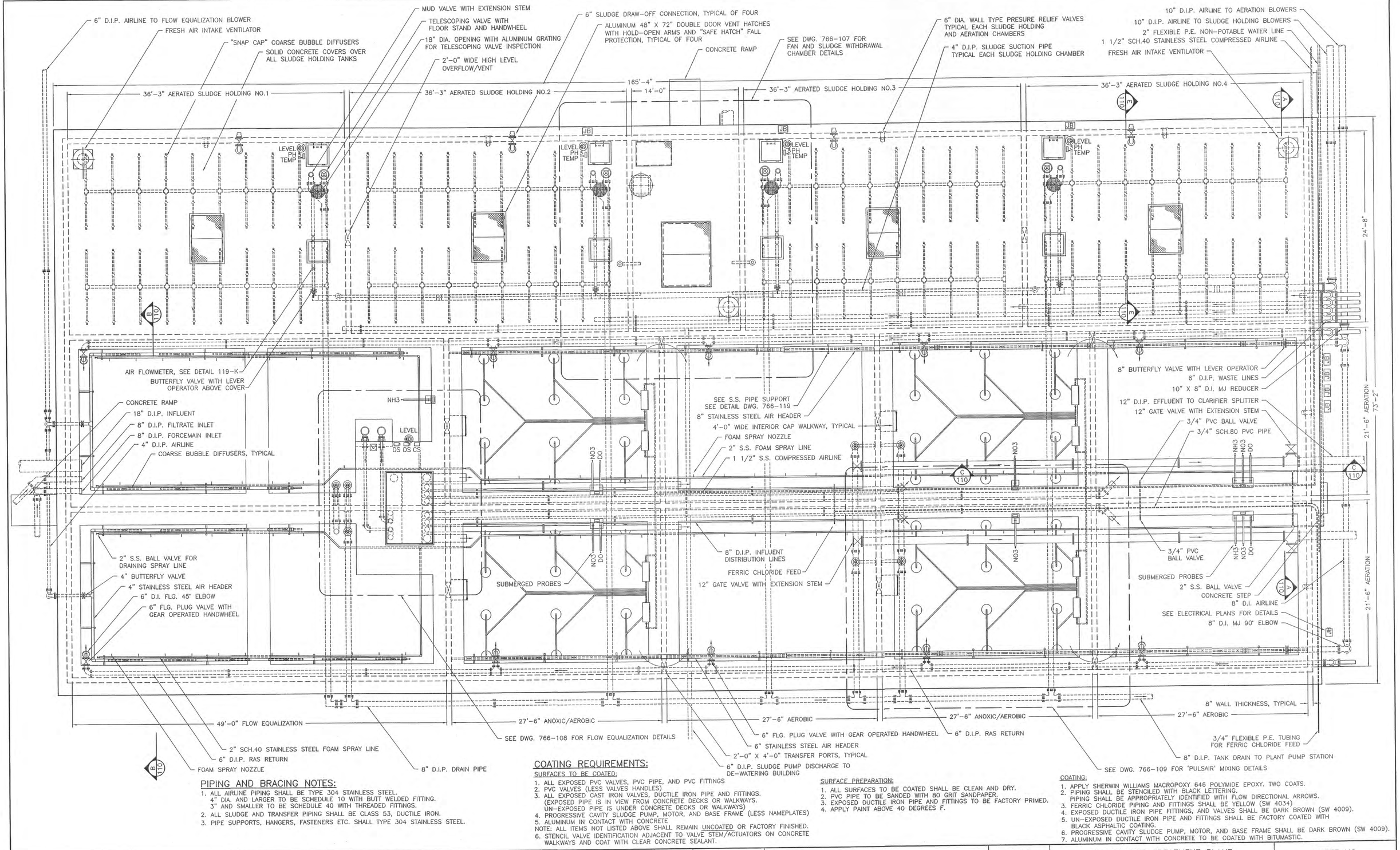
NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: 3/8"=1'

WASTEWATER TREATMENT PLANT

HEADWORKS PLAN AND SECTIONS

SHEET NO. W6 OF 32



PIPING AND BRACING NOTES:

1. ALL AIRLINE PIPING SHALL BE TYPE 304 STAINLESS STEEL.
   4" DIA. AND LARGER TO BE SCHEDULE 10 WITH BUTT WELDED FITTING.
   3" AND SMALLER TO BE SCHEDULE 40 WITH THREADED FITTINGS.
2. ALL SLUDGE AND TRANSFER PIPING SHALL BE CLASS 53, DUCTILE IRON.
3. PIPE SUPPORTS, HANGERS, FASTENERS ETC. SHALL TYPE 304 STAINLESS STEEL.

COATING REQUIREMENTS:

SURFACES TO BE COATED:

1. ALL EXPOSED PVC VALVES, PVC PIPE, AND PVC FITTINGS
2. PVC VALVES (LESS VALVES HANDLES).
3. ALL EXPOSED CAST IRON VALVES, DUCTILE IRON PIPE AND FITTINGS.
   (EXPOSED PIPE IS IN VIEW FROM CONCRETE DECKS OR WALKWAYS.
   UN-EXPOSED PIPE IS UNDER CONCRETE DECKS OR WALKWAYS)
4. PROGRESSIVE CAVITY SLUDGE PUMP, MOTOR, AND BASE FRAME (LESS NAMEPLATES)
5. ALUMINUM IN CONTACT WITH CONCRETE

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED OR FACTORY FINISHED.

6. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

SURFACE PREPARATION:

1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. EXPOSED DUCTILE IRON PIPE AND FITTINGS TO BE FACTORY PRIMED.
4. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING.
   PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. FERRIC CHLORIDE PIPING AND FITTINGS SHALL BE YELLOW (SW 4034)
4. EXPOSED DUCTILE IRON PIPE FITTINGS, AND VALVES SHALL BE DARK BROWN (SW 4009).
5. UN-EXPOSED DUCTILE IRON PIPE AND FITTINGS SHALL BE FACTORY COATED WITH BLACK ASPHALTIC COATING.
6. PROGRESSIVE CAVITY SLUDGE PUMP, MOTOR, AND BASE FRAME SHALL BE DARK BROWN (SW 4009).
7. ALUMINUM IN CONTACT WITH CONCRETE TO BE COATED WITH BITUMASTIC.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-106

REVISIONS	
DATE	REMARKS
1/21/05	PER 1/19/05 REVIEW MTG.
5/10/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
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NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

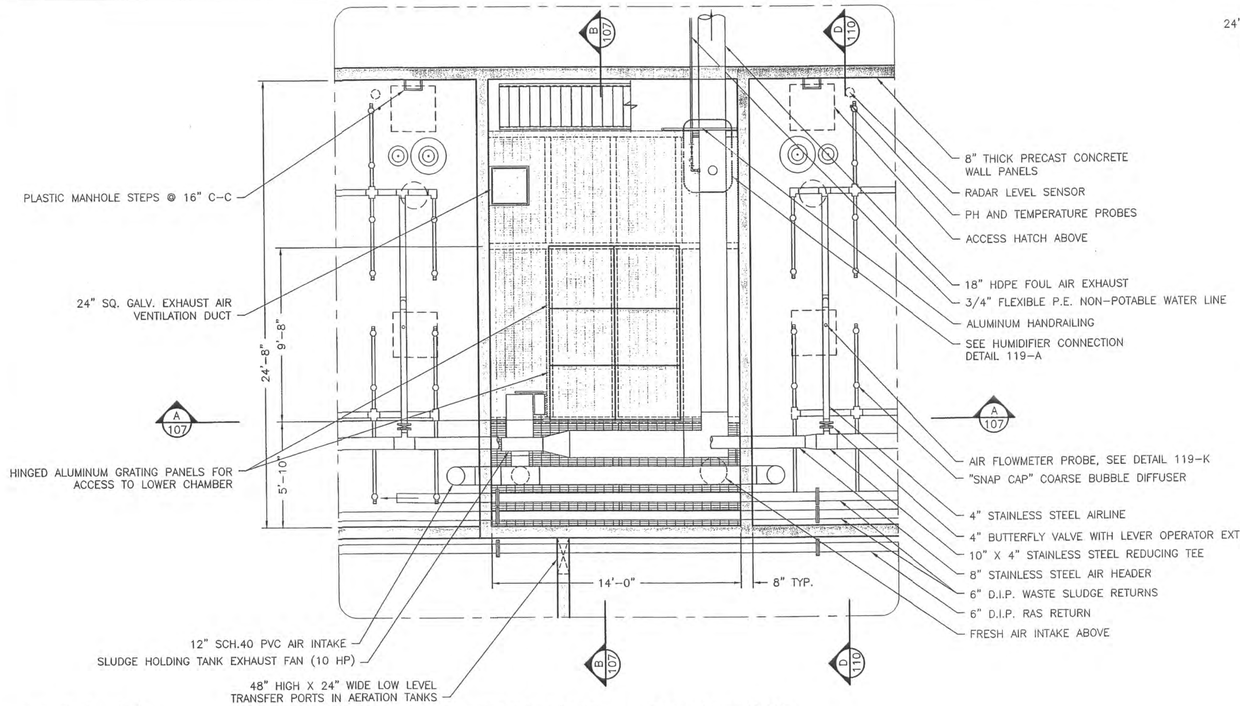
SCALE: 3/16"=1'-0"

WASTEWATER TREATMENT PLANT

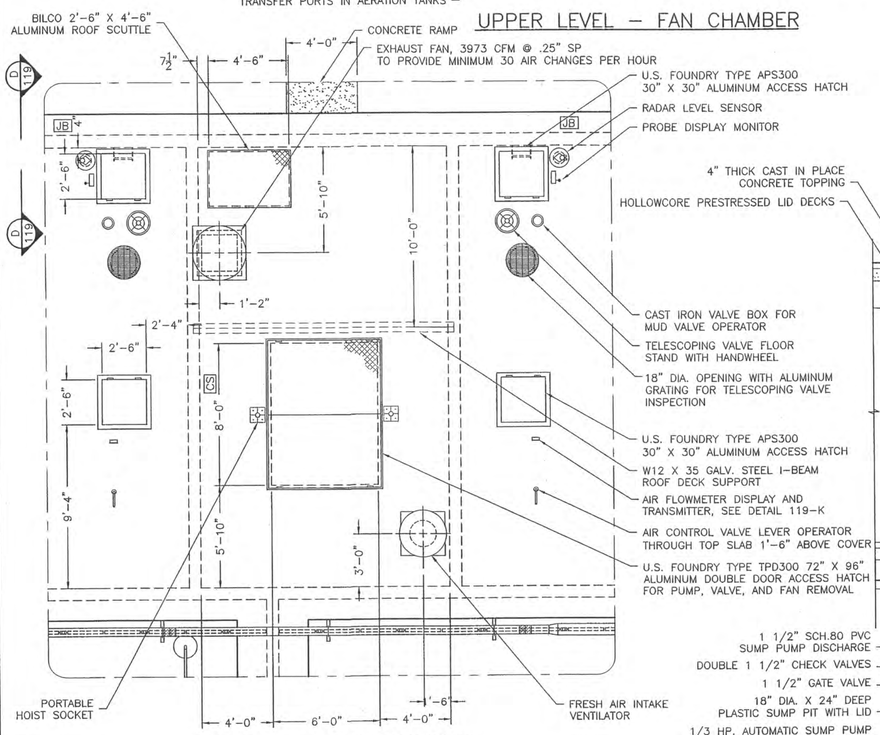
FLOW EQUALIZATION, AERATION, & SLUDGE HOLDING PLAN VIEW

SHEET NO.

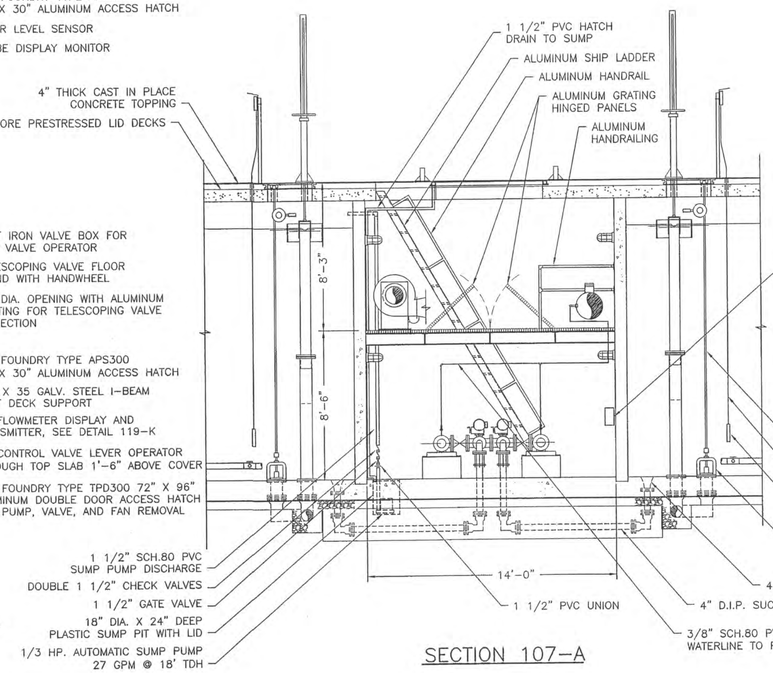
W7 OF 32



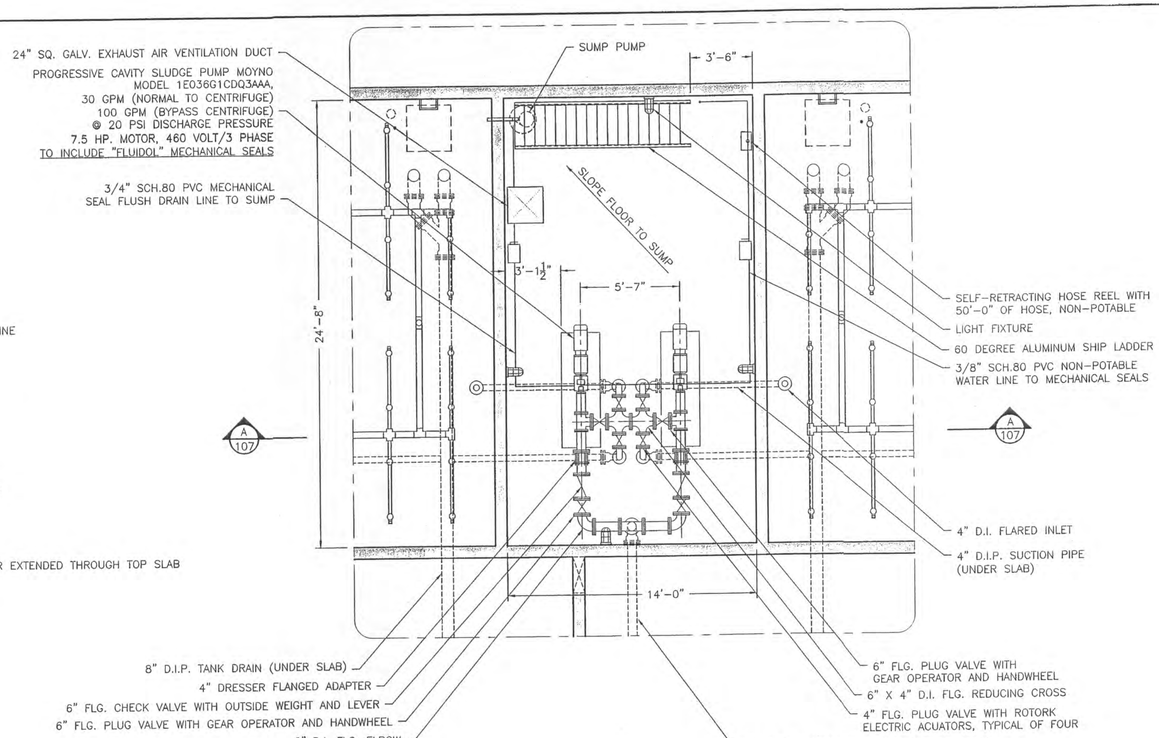
UPPER LEVEL – FAN CHAMBER



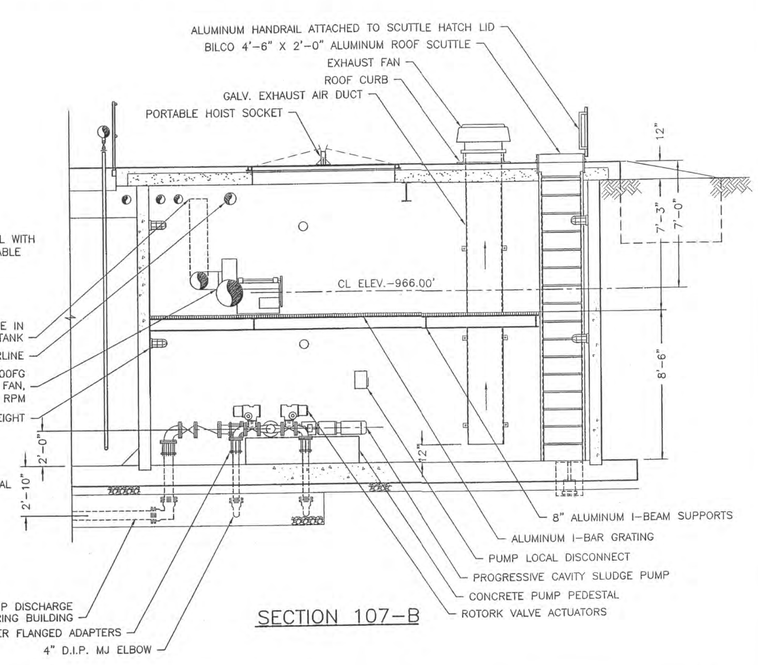
TOP PLAN – FAN CHAMBER



SECTION 107–A



LOWER LEVEL –SLUDGE PUMP CHAMBER



SECTION 107–B

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-107

REVISIONS	
DATE	REMARKS
12/18/04	ADM
1/24/05	PER 1/19/05 REVIEW MTG.
6/18/05	PER 5/2/05 REVIEW MTG.
4/29/06	PER 4/5/06 REVIEW COMMENTS

R. D. Zande & Associates

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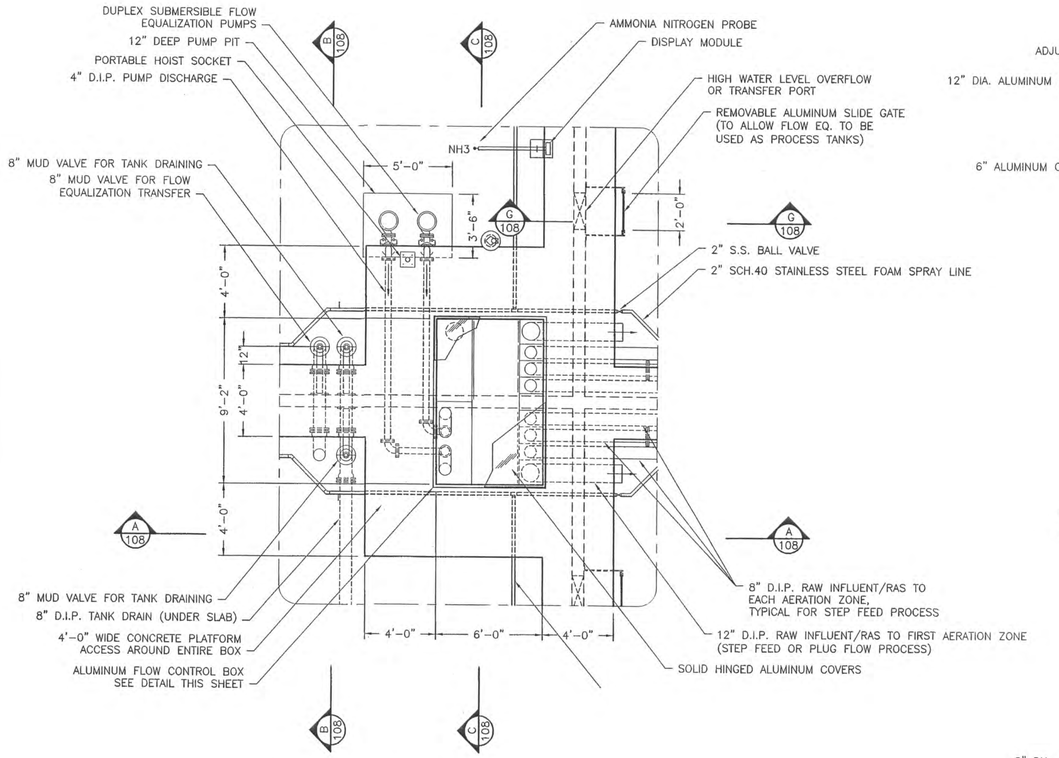
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

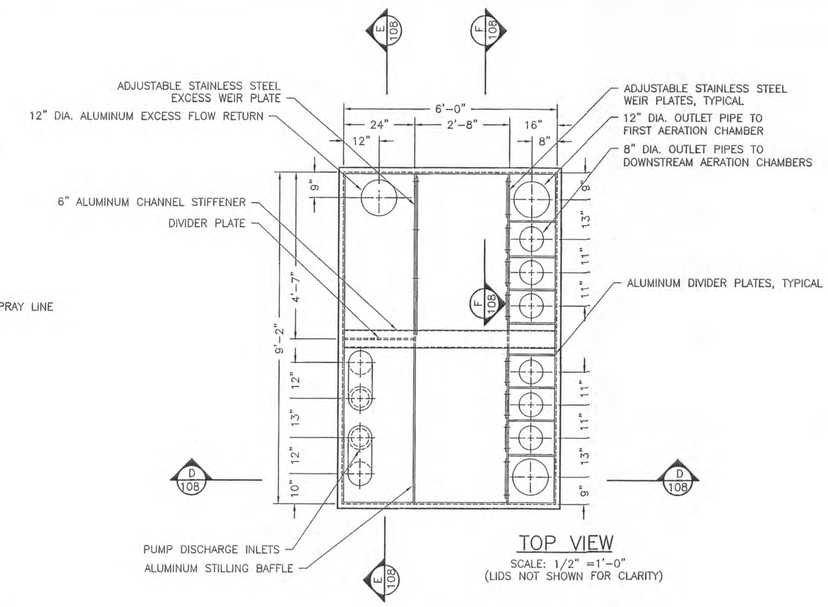
SCALE: 1/4"=1'

WASTEWATER TREATMENT PLANT
FAN AND SLUDGE PUMP CHAMBER

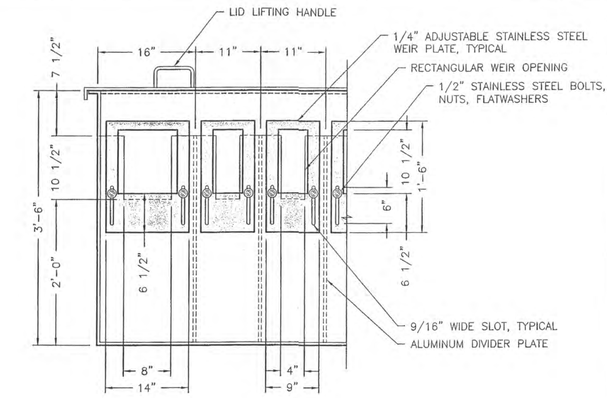
SHEET NO.
W8 OF 32



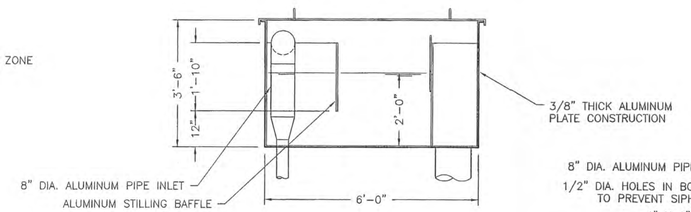
PLAN VIEW– FLOW EQUALIZATION SYSTEM



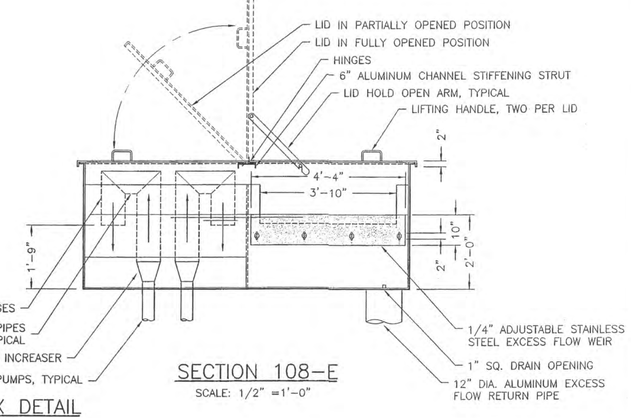
TOP VIEW
SCALE: 1/2" =1'-0"
(LIDS NOT SHOWN FOR CLARITY)



SECTION 108–F
SCALE: 1" =1'-0"

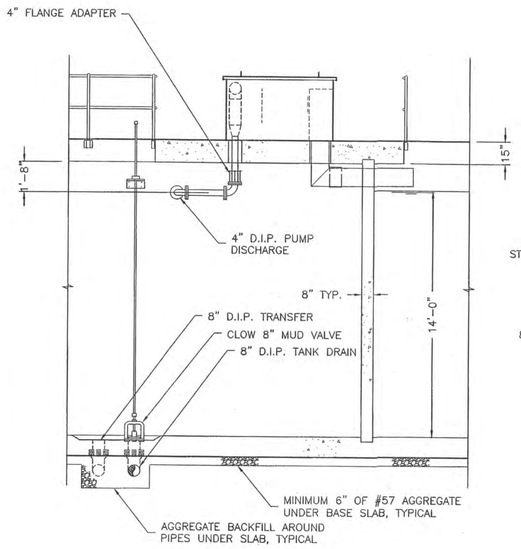


SECTION 108–D
SCALE: 1/2" =1'-0"

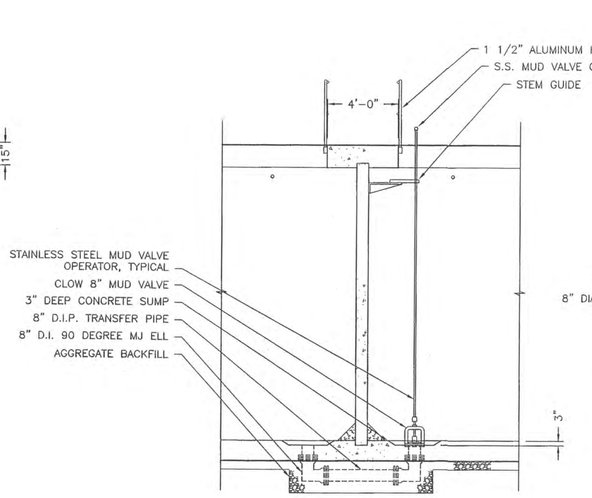


SECTION 108–E
SCALE: 1/2" =1'-0"

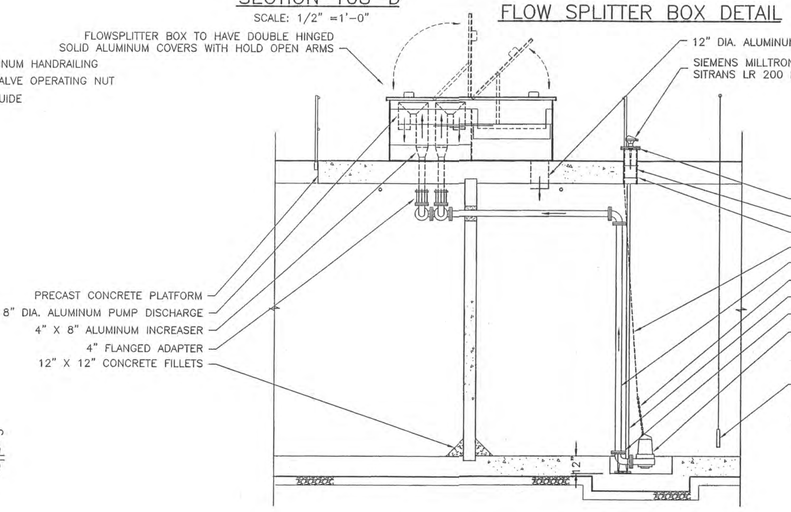
FLOW SPLITTER BOX DETAIL



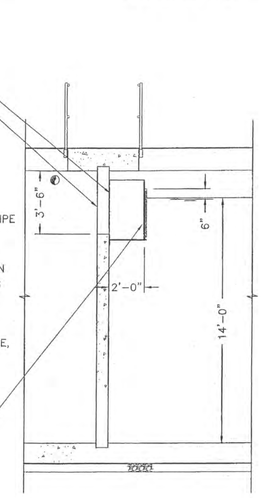
SECTION 108–A



SECTION 108–B



SECTION 108–C



SECTION 108–G

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766–108

REVISIONS	
DATE	REMARKS
1/21/05	PER 1/19/05 REVIEW MTG.
5/10/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

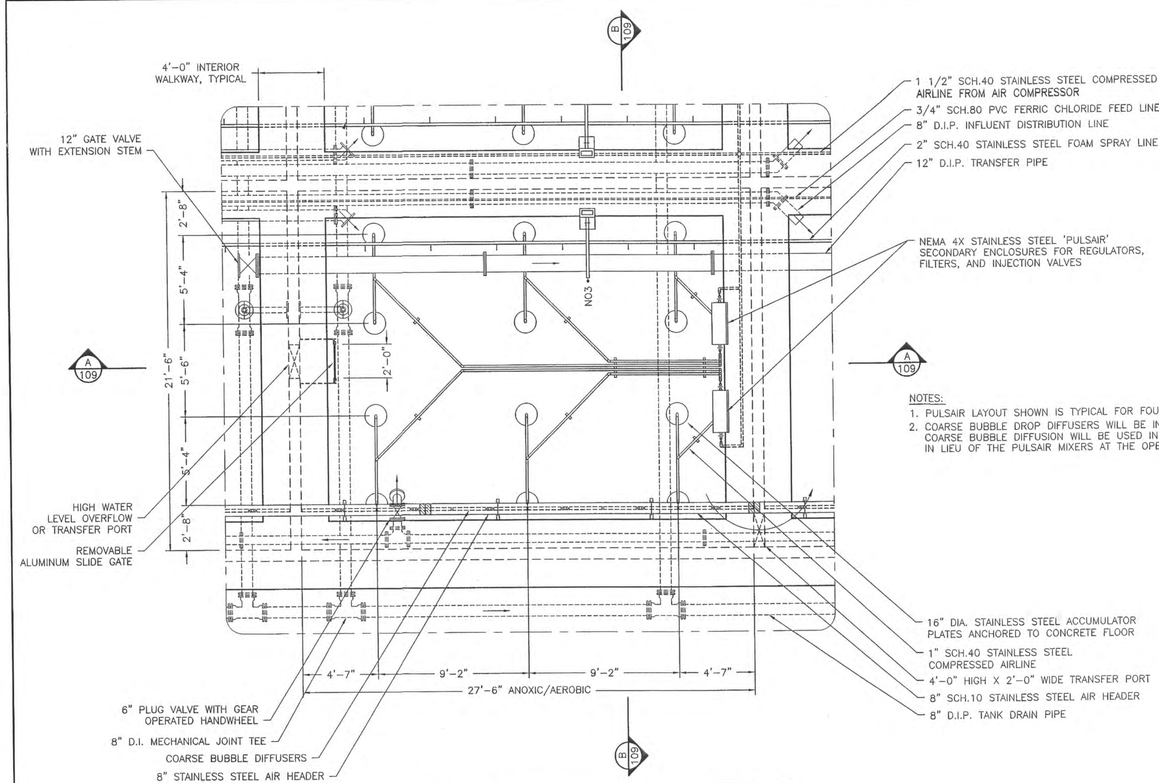
Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330–483–3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: 1/4"=1'

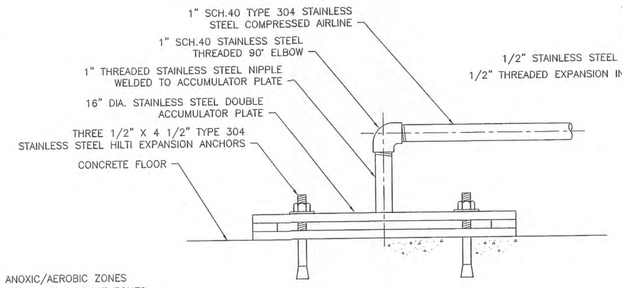
WASTEWATER TREATMENT PLANT
FLOW EQUALIZATION DETAILS

SHEET NO.
W9 OF 32



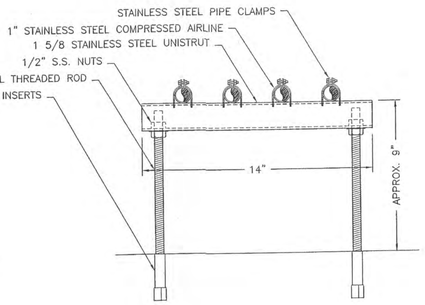
NOTES:

1. PULSAIR LAYOUT SHOWN IS TYPICAL FOR FOUR ANOXIC/AEROBIC ZONES
2. COARSE BUBBLE DROP DIFFUSERS WILL BE INSTALLED IN ALL EIGHT ZONES. COARSE BUBBLE DIFFUSION WILL BE USED IN THE ANOXIC ZONES AS AN OPTION IN LIEU OF THE PULSAIR MIXERS AT THE OPERATOR'S DISCRETION



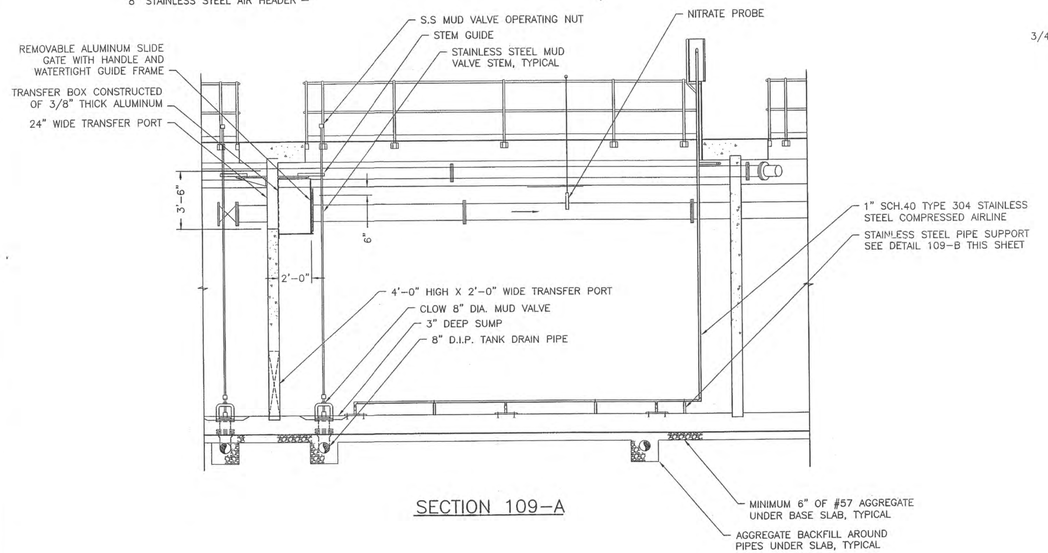
DETAIL 109-A
ACCUMULATOR PLATE INSTALLATION

SCALE: 3"=1'

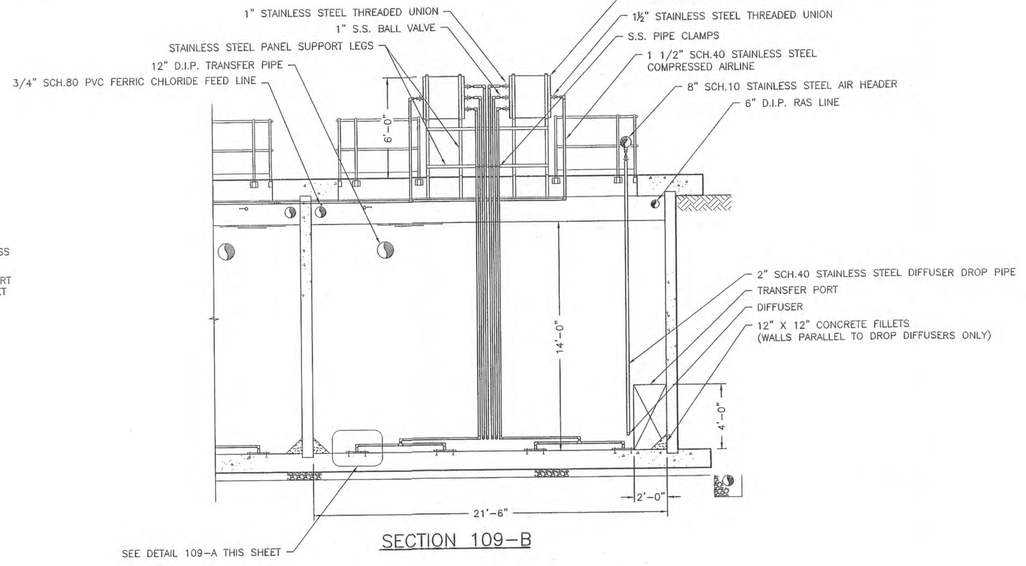


DETAIL 109-B PIPE SUPPORT

SCALE: 3"=1'



SECTION 109-A



SECTION 109-B

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-109

REVISIONS	
DATE	REMARKS
1/21/05	PER 1/19/05 REVIEW MTG.
4/29/06	PER 4/5/06 REVIEW COMMENTS

R. D. Zande & Associates

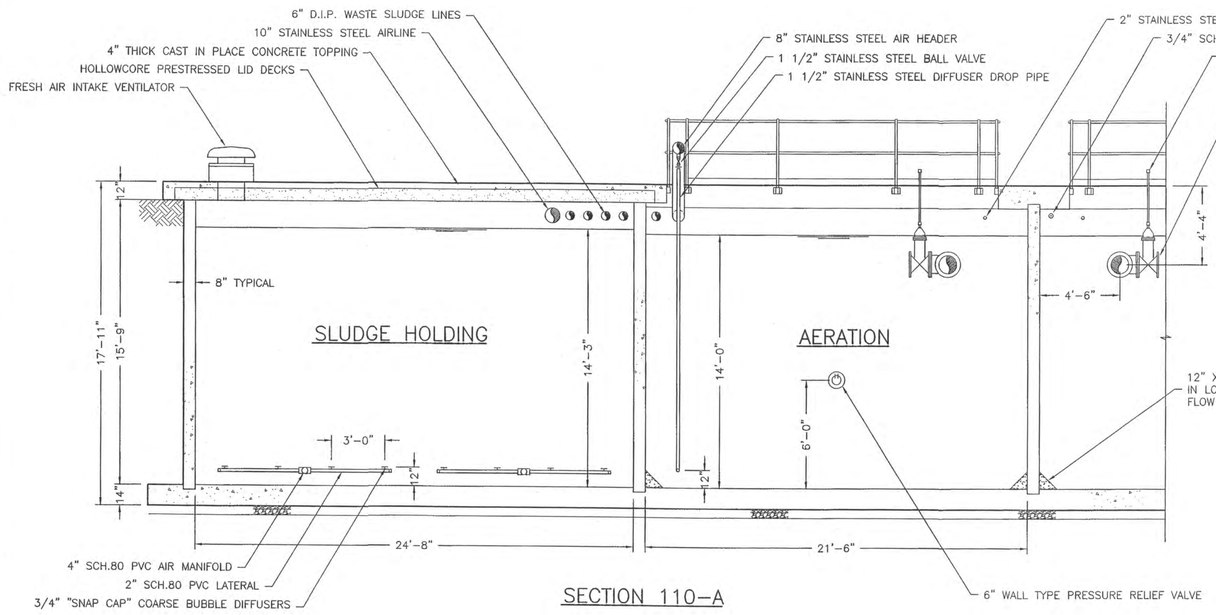
Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

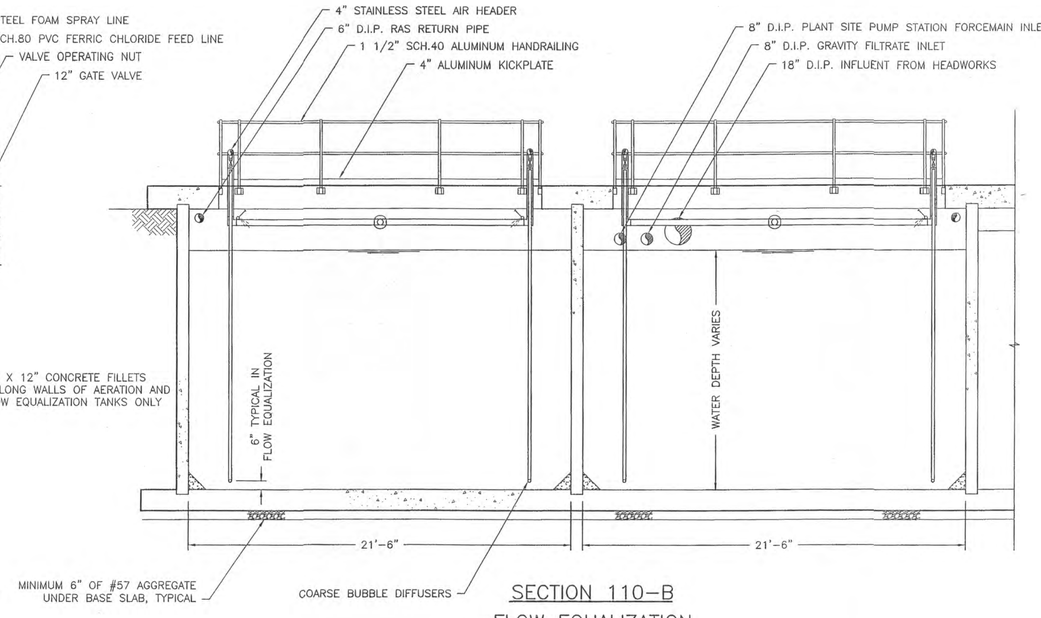
SCALE: 1/4"=1'

WASTEWATER TREATMENT PLANT
PULSAIR MIXING SYSTEM PLAN AND SECTION VIEWS

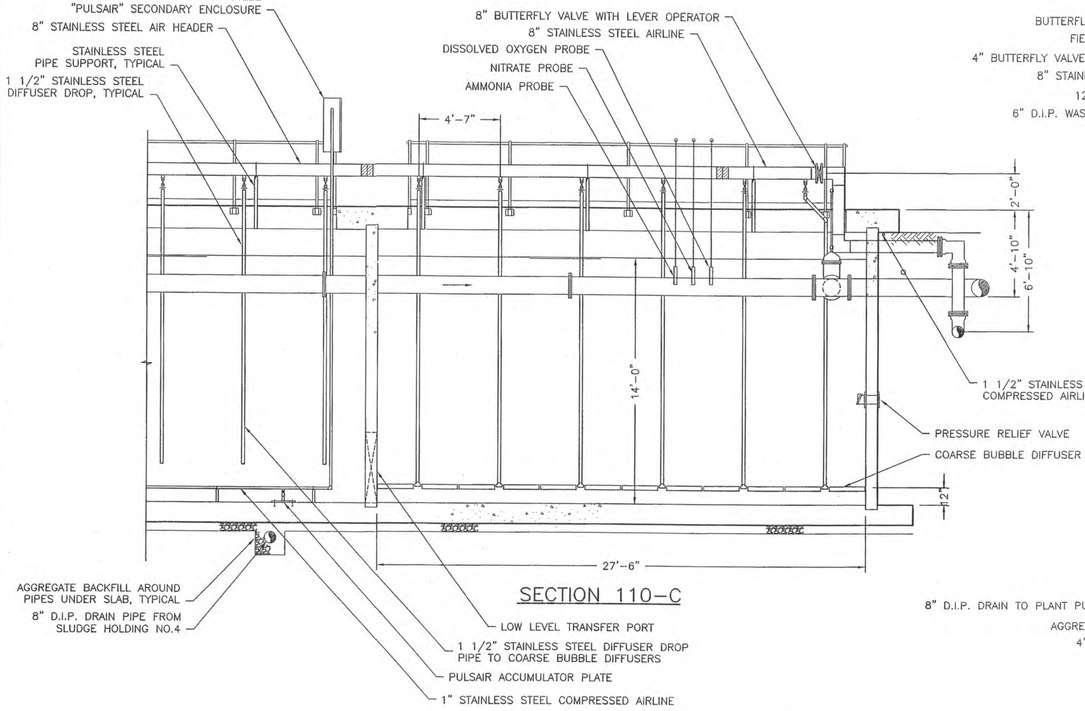
SHEET NO.
W10 OF 32



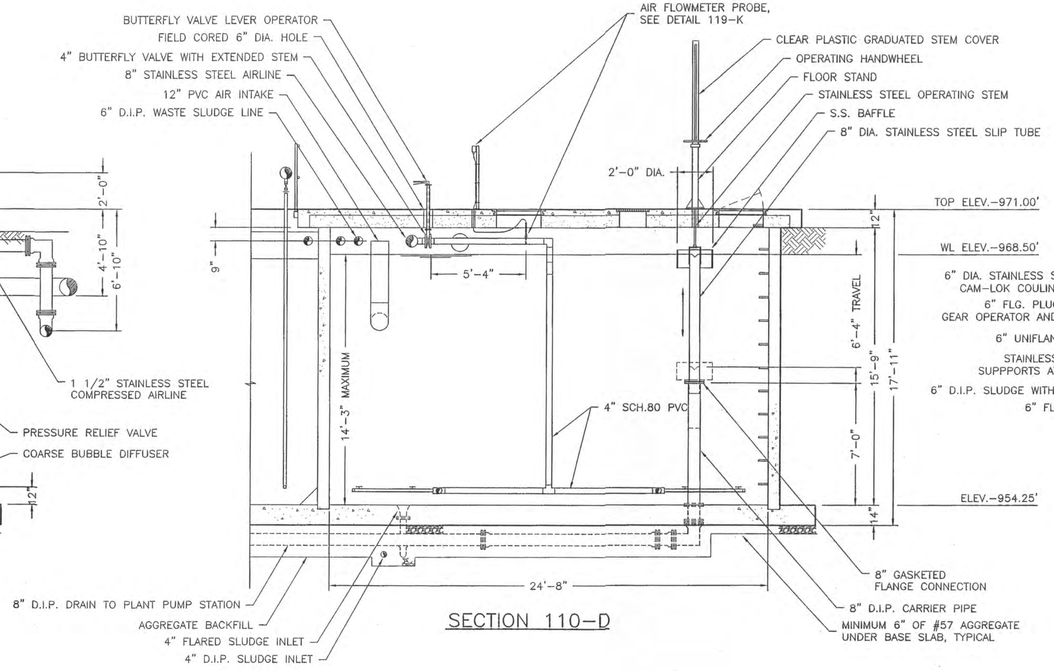
SECTION 110–A



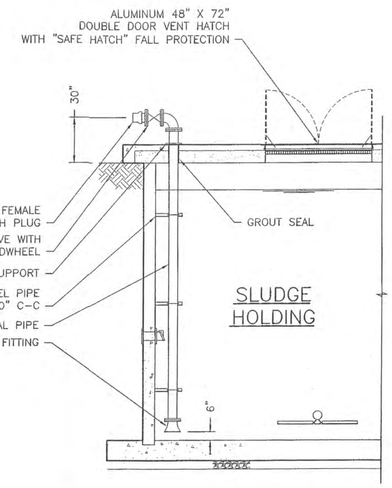
SECTION 110–B
FLOW EQUALIZATION



SECTION 110–C

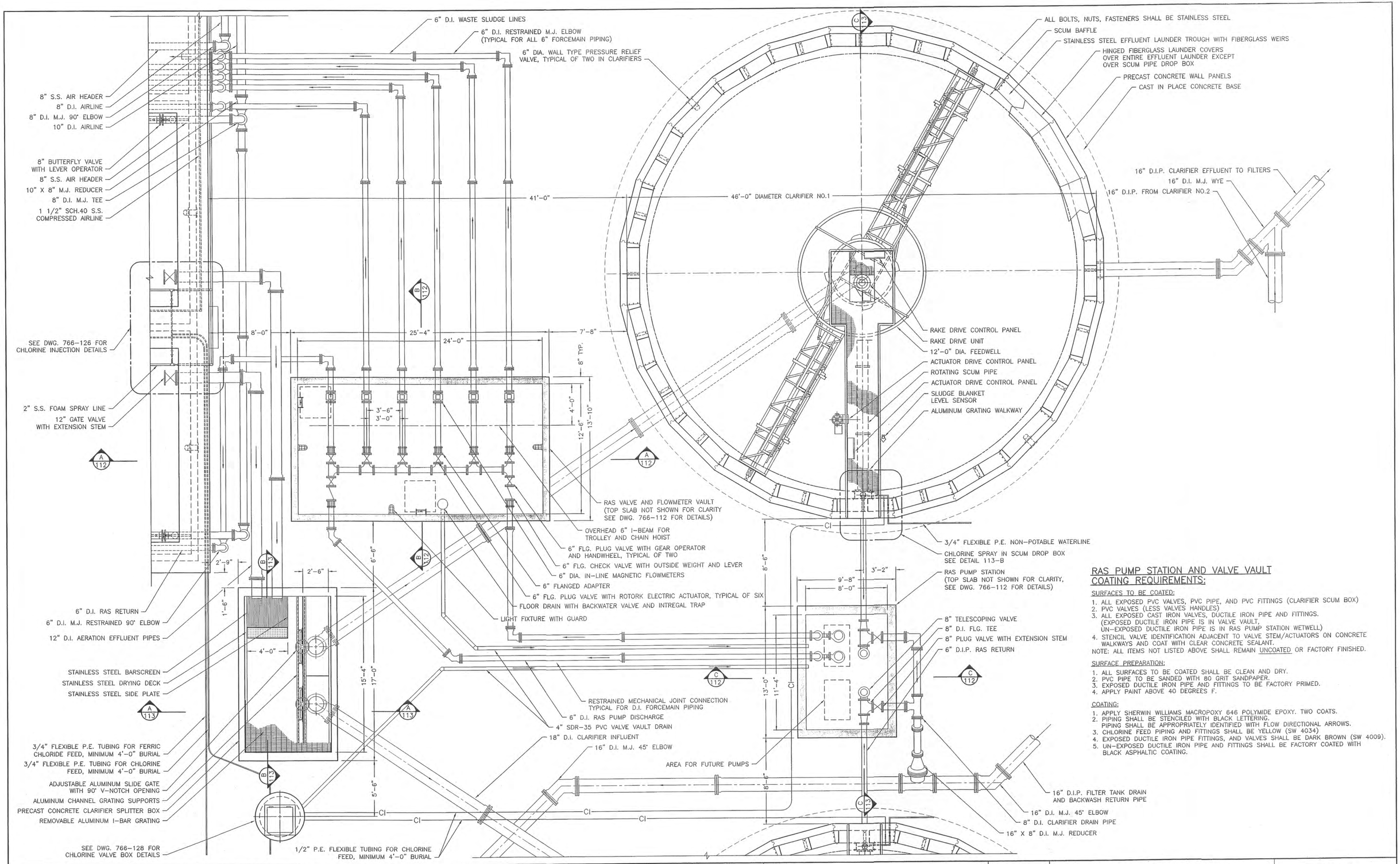


SECTION 110–D



SECTION 110–E

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766–110	REVISIONS DATE / REMARKS 1/21/05 PER 1/19/05 REVIEW MTG. 5/20/05 PER 5/2/05 MTG. COMMENTS 4/29/06 PER 4/5/06 REVIEW COMMENTS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330–483–3111	NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 1/4"=1'	WASTEWATER TREATMENT PLANT SECTION VIEWS	SHEET NO. W11 OF 32



RAS PUMP STATION AND VALVE VAULT COATING REQUIREMENTS:

SURFACES TO BE COATED:

1. ALL EXPOSED PVC VALVES, PVC PIPE, AND PVC FITTINGS (CLARIFIER SCUM BOX)
2. PVC VALVES (LESS VALVES HANDLES)
3. ALL EXPOSED CAST IRON VALVES, DUCTILE IRON PIPE AND FITTINGS. (EXPOSED DUCTILE IRON PIPE IS IN VALVE VAULT. UN-EXPOSED DUCTILE IRON PIPE IS IN RAS PUMP STATION WETWELL)
4. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED OR FACTORY FINISHED.

SURFACE PREPARATION:

1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. EXPOSED DUCTILE IRON PIPE AND FITTINGS TO BE FACTORY PRIMED.
4. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. CHLORINE FEED PIPING AND FITTINGS SHALL BE YELLOW (SW 4034)
4. EXPOSED DUCTILE IRON PIPE FITTINGS, AND VALVES SHALL BE DARK BROWN (SW 4009).
5. UN-EXPOSED DUCTILE IRON PIPE AND FITTINGS SHALL BE FACTORY COATED WITH BLACK ASPHALTIC COATING.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-111

DATE	REMARKS
5/20/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILTIY

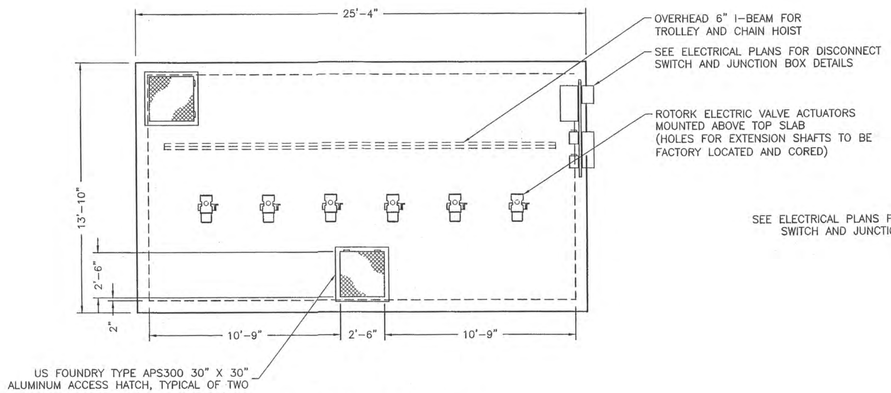
SCALE: 1/4"=1'

WASTEWATER TREATMENT PLANT

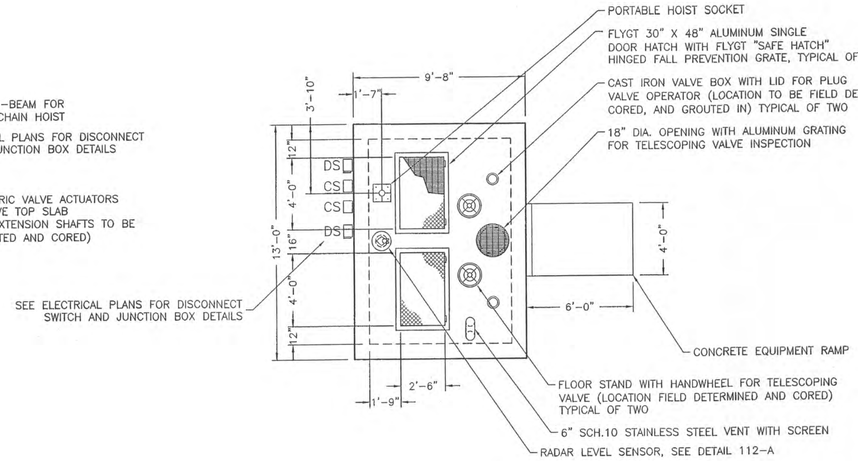
CLARIFIER SPLITTER, VALVE VAULT, & RAS PUMP STATION PLAN VIEW

SHEET NO.

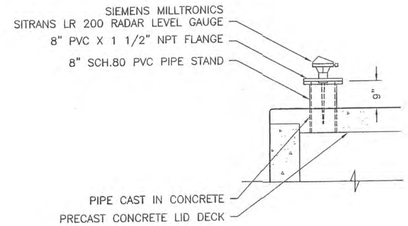
W12 OF 32



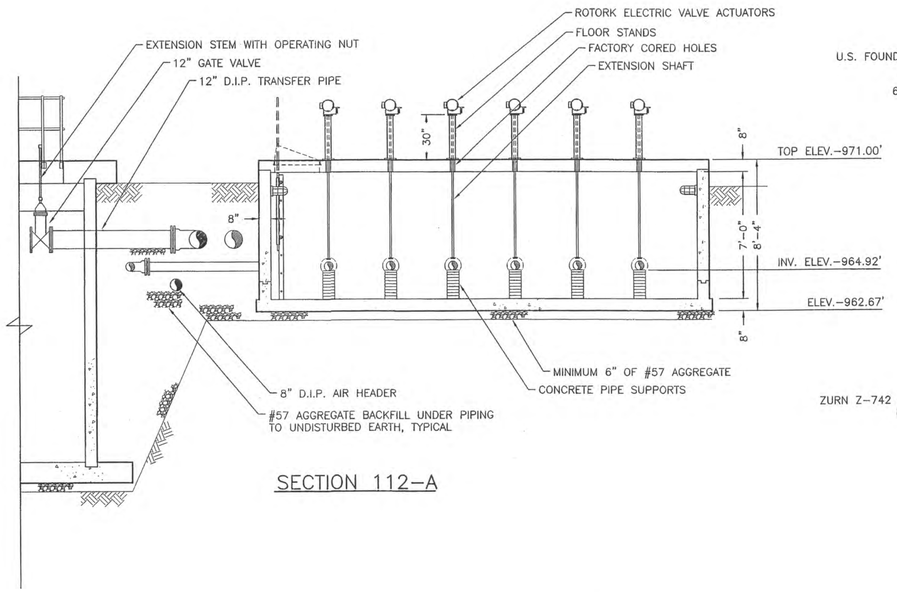
TOP SLAB PLAN VIEW
RAS VALVE AND FLOWMETER VAULT



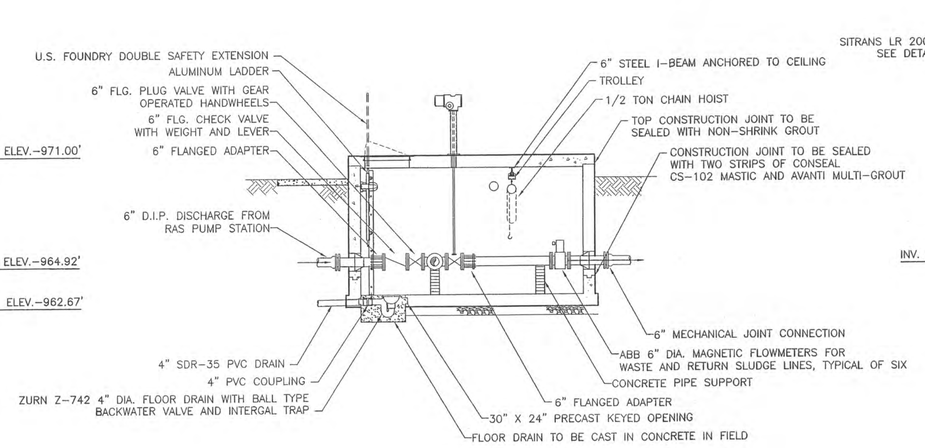
TOP SLAB PLAN VIEW
RAS PUMP STATION



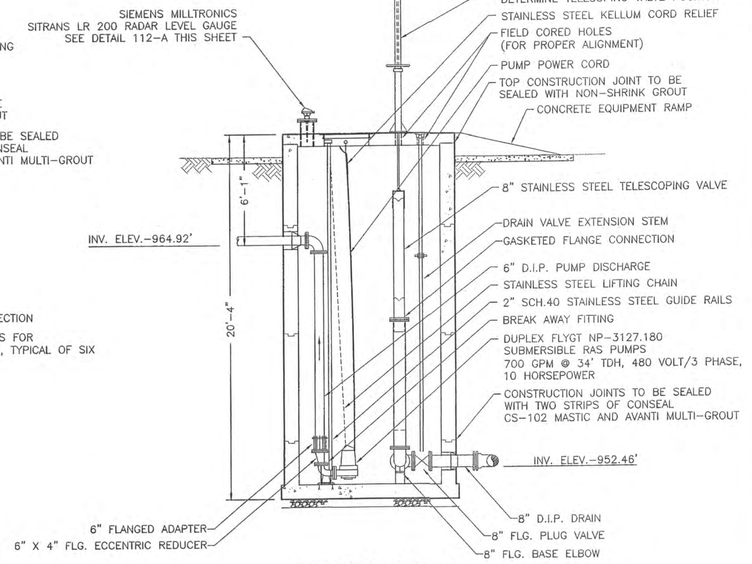
DETAIL 112-A
SCALE: 1/2"=1'-0"



SECTION 112-A

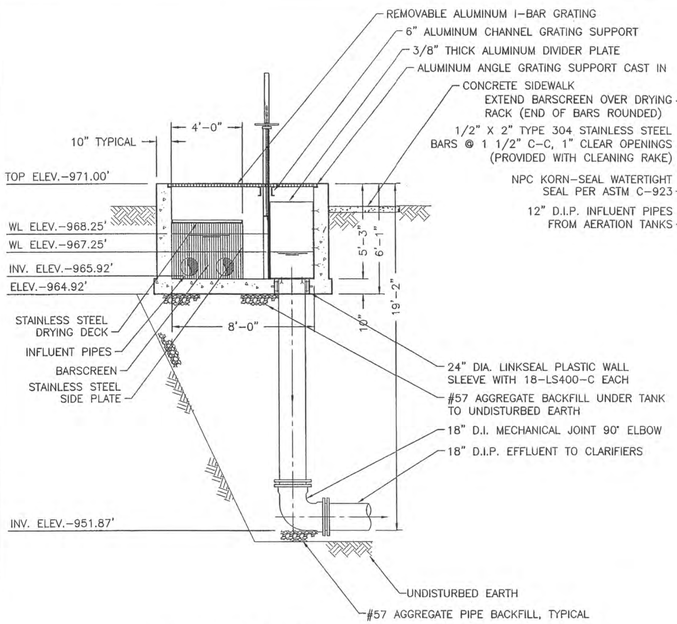


SECTION 112-B

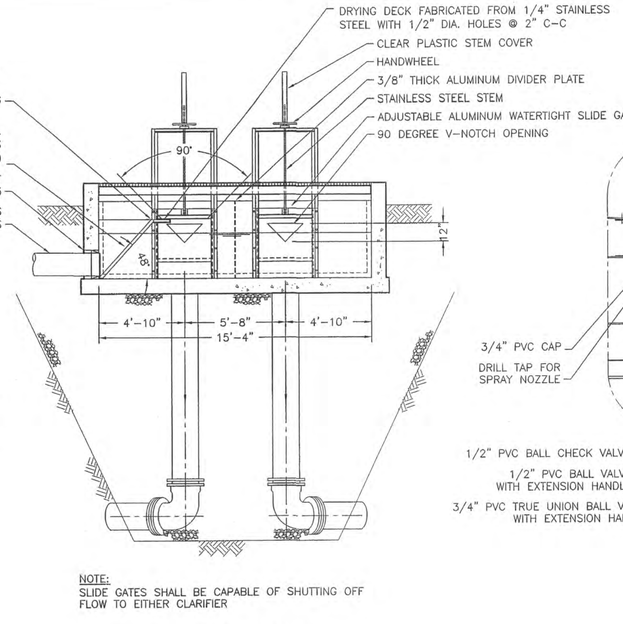


SECTION 112-C

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-112	REVISIONS DATE / REMARKS 4/29/06 PER 4/5/06 REVIEW COMMENTS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111		NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 1/4"=1'	WASTEWATER TREATMENT PLANT RAS PUMP STATION AND VALVE VAULT SECTION VIEWS	SHEET NO. W13 OF 32

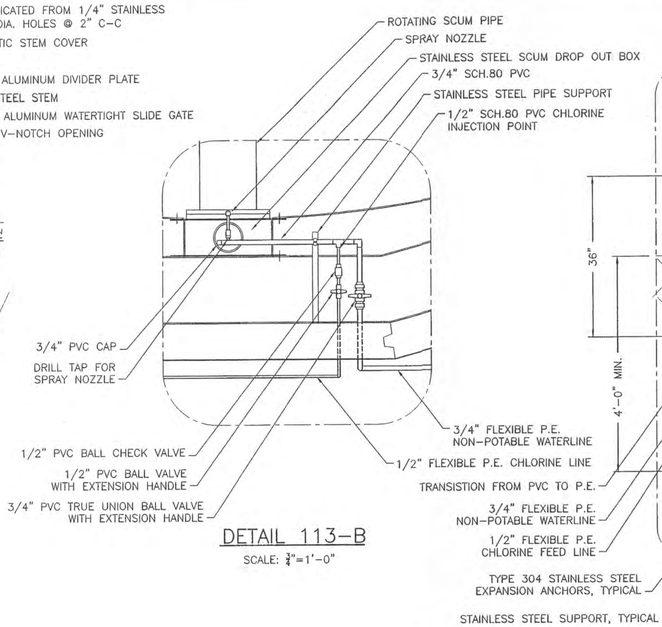


SECTION 113-A

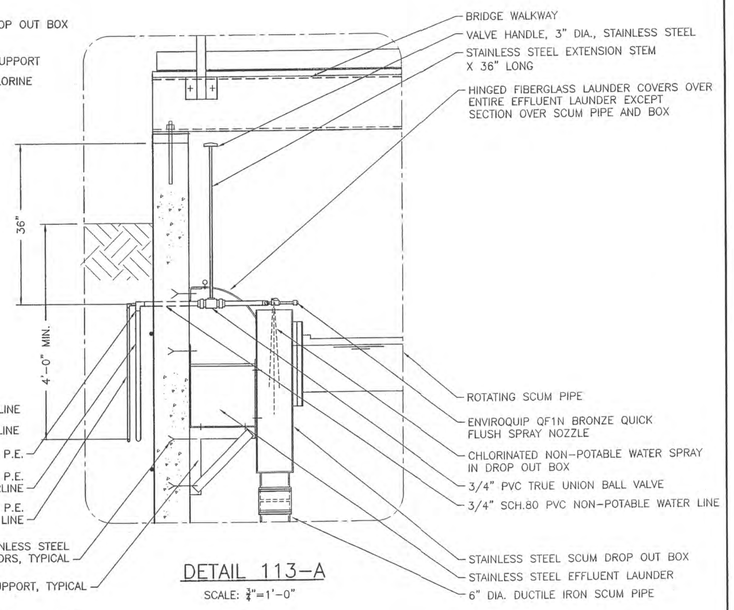


NOTE:
SLIDE GATES SHALL BE CAPABLE OF SHUTTING OFF FLOW TO EITHER CLARIFIER

SECTION 113-B

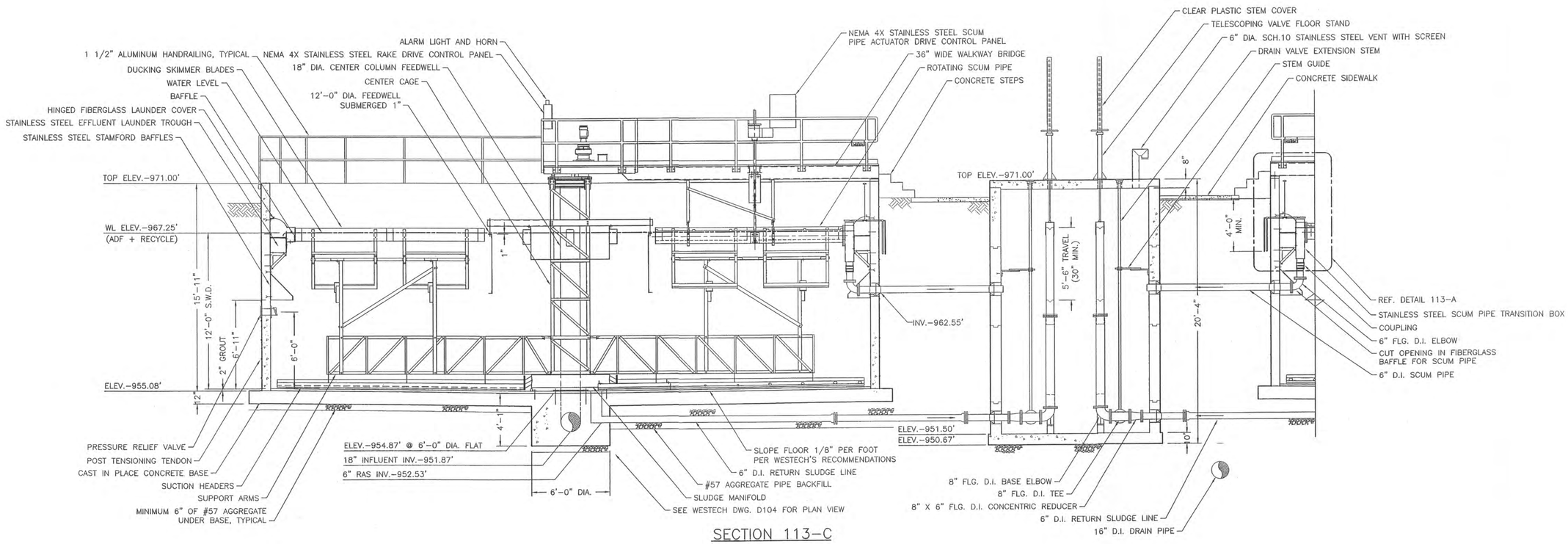


DETAIL 113-B
SCALE: 3/4"=1'-0"



DETAIL 113-A
SCALE: 3/4"=1'-0"

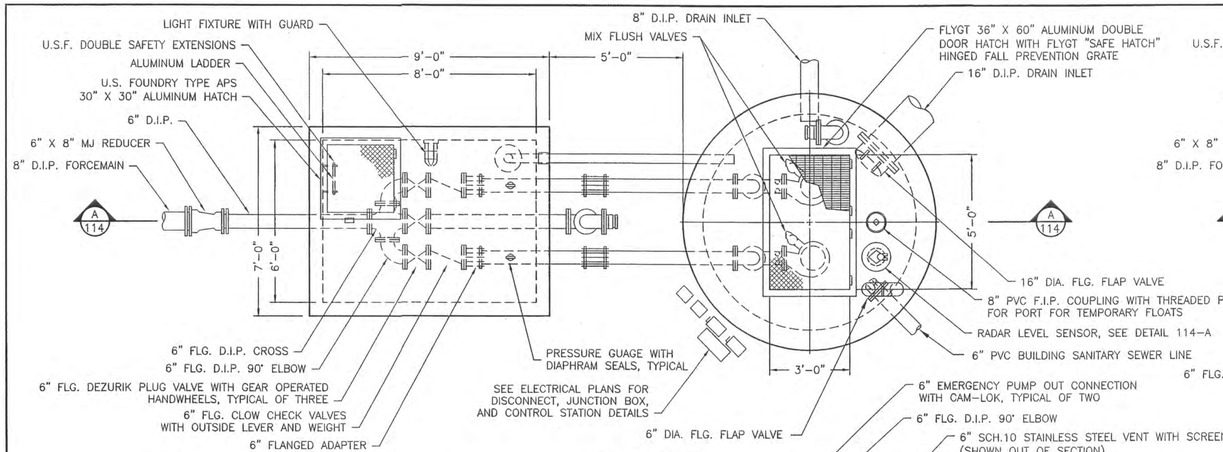
NOTE:
SEE COATING REQUIREMENTS DRAWING 766-111



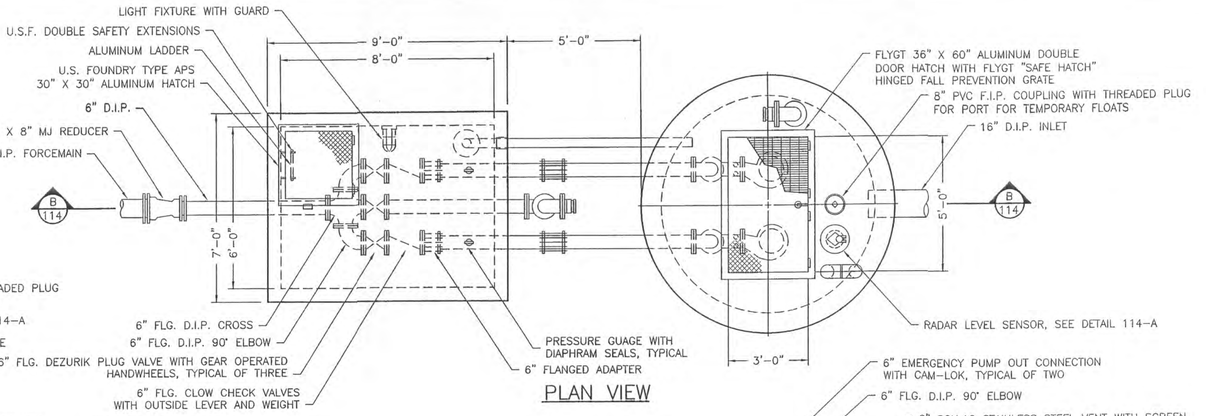
SECTION 113-C

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-113	REVISIONS 5/20/05 PER 5/2/05 MTG. COMMENTS 4/29/06 PER 4/5/06 REVIEW COMMENTS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111

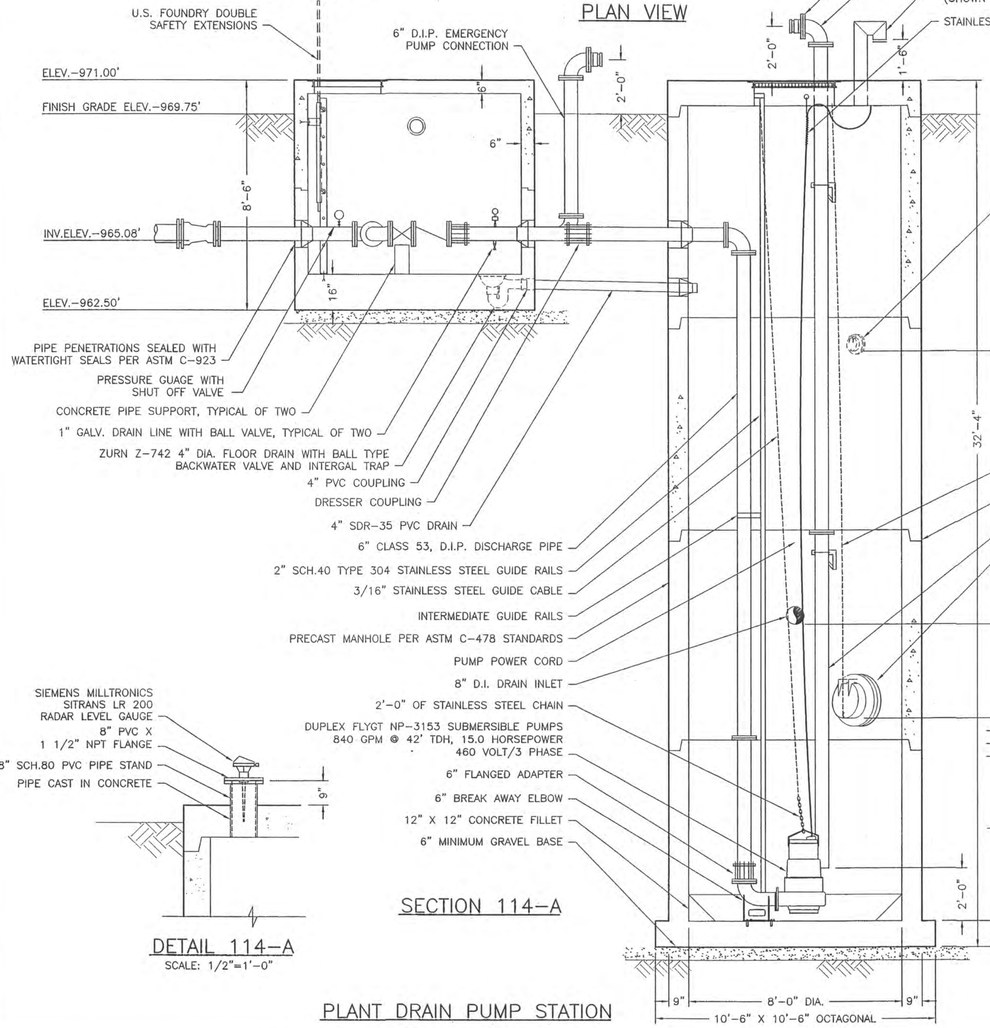
NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 1/4"=1'	WASTEWATER TREATMENT PLANT CLARIFIER SECTION VIEWS	SHEET NO. W14 OF 32



PLAN VIEW



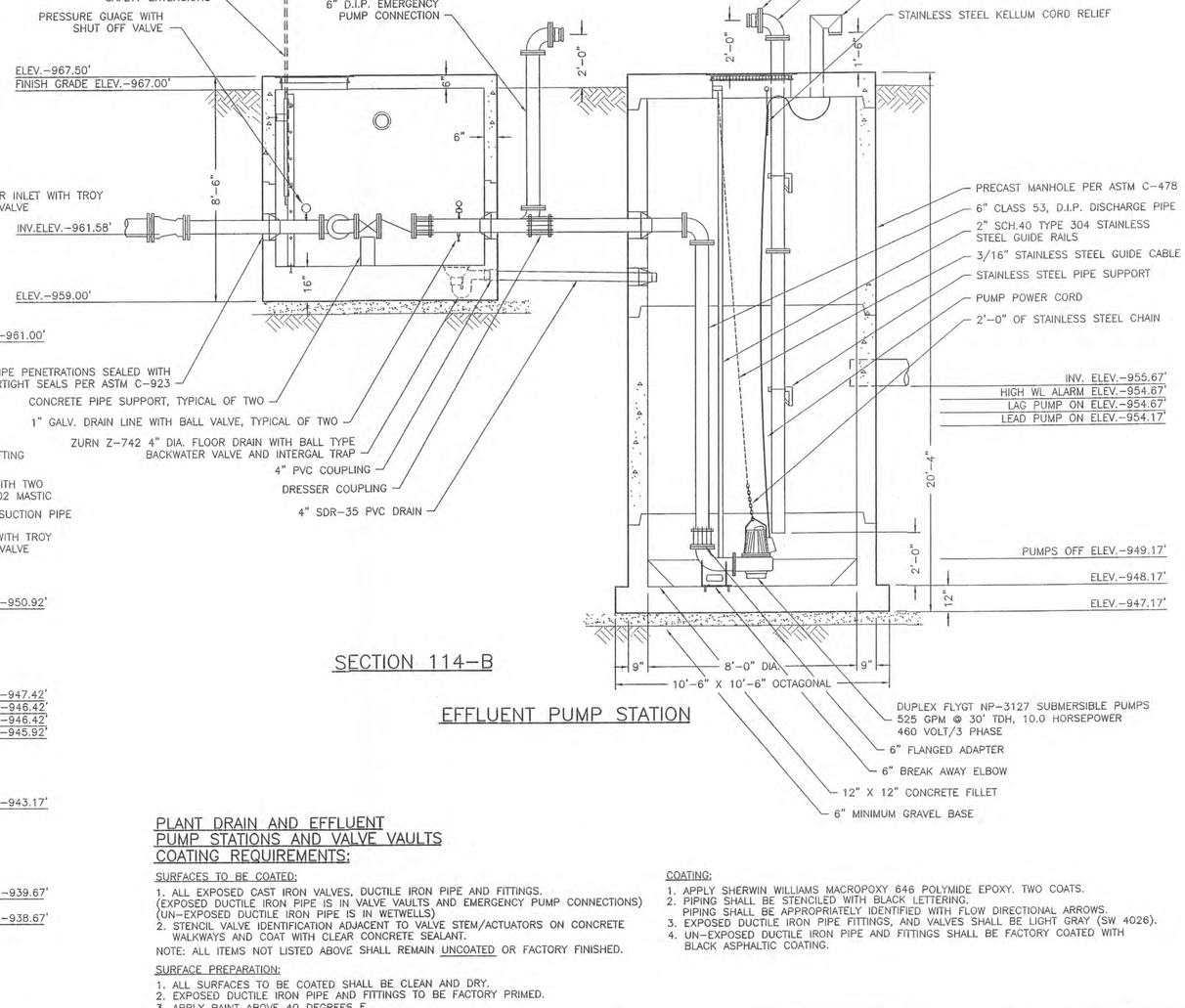
PLAN VIEW



SECTION 114-A

DETAIL 114-A
SCALE: 1/2"=1'-0"

PLANT DRAIN PUMP STATION



SECTION 114-B

EFFLUENT PUMP STATION

PLANT DRAIN AND EFFLUENT PUMP STATIONS AND VALVE VAULTS COATING REQUIREMENTS:

SURFACES TO BE COATED:

1. ALL EXPOSED CAST IRON VALVES, DUCTILE IRON PIPE AND FITTINGS. (EXPOSED DUCTILE IRON PIPE IS IN VALVE VAULTS AND EMERGENCY PUMP CONNECTIONS) (UN-EXPOSED DUCTILE IRON PIPE IS IN WETWELLS)
2. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED OR FACTORY FINISHED.

SURFACE PREPARATION:

1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. EXPOSED DUCTILE IRON PIPE AND FITTINGS TO BE FACTORY PRIMED.
3. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. EXPOSED DUCTILE IRON PIPE FITTINGS, AND VALVES SHALL BE LIGHT GRAY (SW 4026).
4. UN-EXPOSED DUCTILE IRON PIPE AND FITTINGS SHALL BE FACTORY COATED WITH BLACK ASPHALTIC COATING.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-114

REVISIONS	
DATE	REMARKS
1/20/05	PER 1/19/05 REVIEW MTG.
1/6/06	PER 12/28/05 EPA COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT

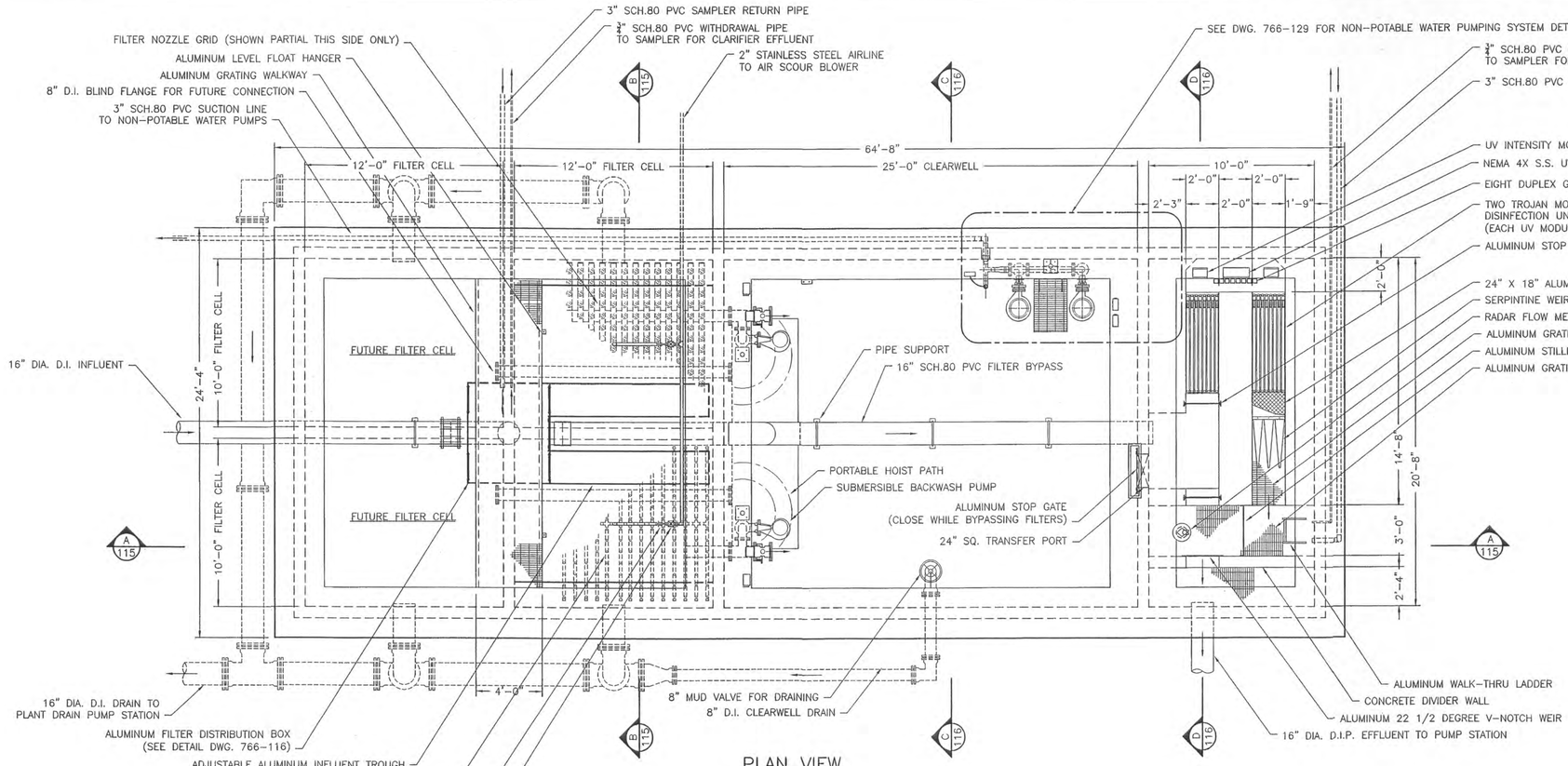
WATER RECLAMATION FACILITY

SCALE: 3/8"=1'

WASTEWATER TREATMENT PLANT

PLANT DRAIN AND EFFLUENT PUMP STATIONS

SHEET NO. W15 OF 32



PLAN VIEW

TERTIARY FILTER DESIGN CRITERIA:

0.4 MGD INITIAL AVERAGE DAILY FLOW

1.5 PEAK FACTOR (AFTER EQUALIZATION)

TWO OPERATIONAL 120 SQ. FILTER CELLS INITIALLY PROVIDED
TWO EMPTY 120 SQ.FT. FILTER CELLS PROVIDED (FOR ULTIMATE FLOW)
1.15 GPM PER SQ.FT. (0.4 MGD AVERAGE DAILY WITH TWO CELLS ON LINE)
1.74 GPM PER SQ.FT. (0.4 MGD X 1.5 PF WITH TWO CELLS ON LINE)
2.30 GPM PER SQ.FT. (0.4 MGD AVERAGE DAILY WITH ONE CELL ON LINE)
3.48 GPM PER SQ.FT. (0.4 MGD X 1.5 PF WITH ONE CELL ON LINE)

7.0 GPM PER SQ.FT. BACKWASH RATE
840 GPM BACKWASH PUMP
35,000 GALLON CLEARWELL CAPACITY (SIZED FOR ULTIMATE FLOW)
840 GPM X 10 MINUTE BACKWASH DURATION = 8,400 GALLON BACKWASH VOLUME

TERTIARY FILTER COATING REQUIREMENTS:

SURFACES TO BE COATED:

1. ALL EXPOSED PVC PIPE AND FITTINGS.
2. ALL EXPOSED DUCTILE IRON PIPE AND FITTINGS. (BACKWASH PUMP PIPING)
3. ALUMINUM IN CONTACT WITH CONCRETE
4. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

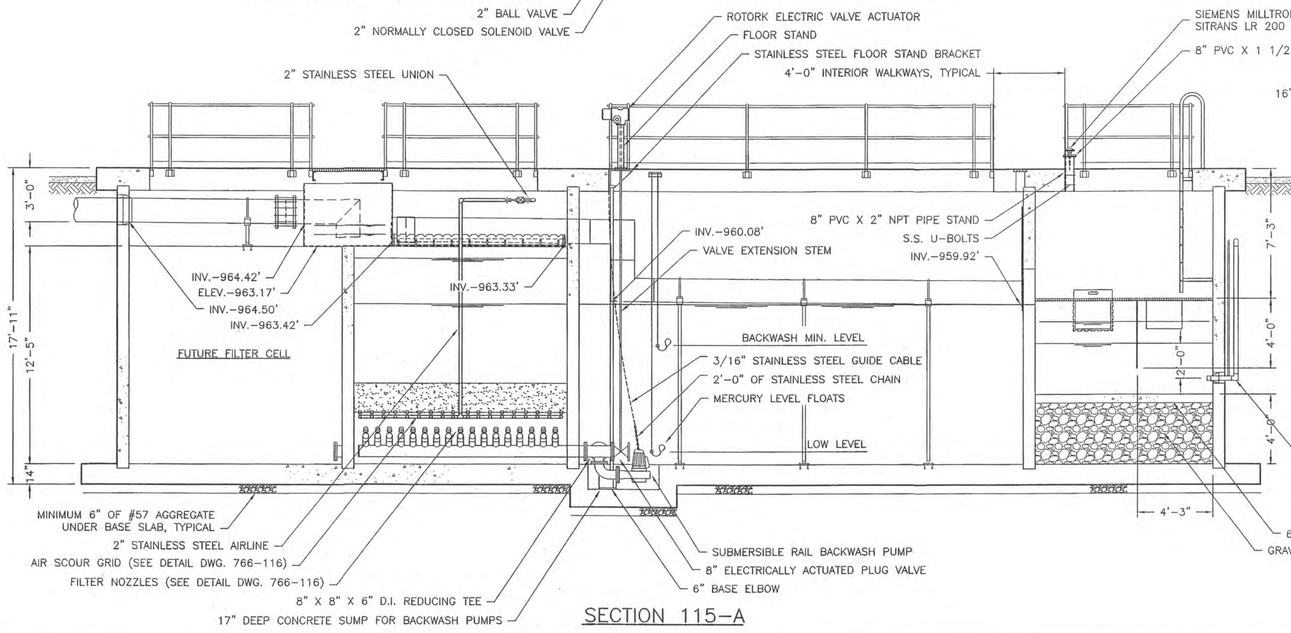
NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED OR FACTORY FINISHED.

SURFACE PREPARATION:

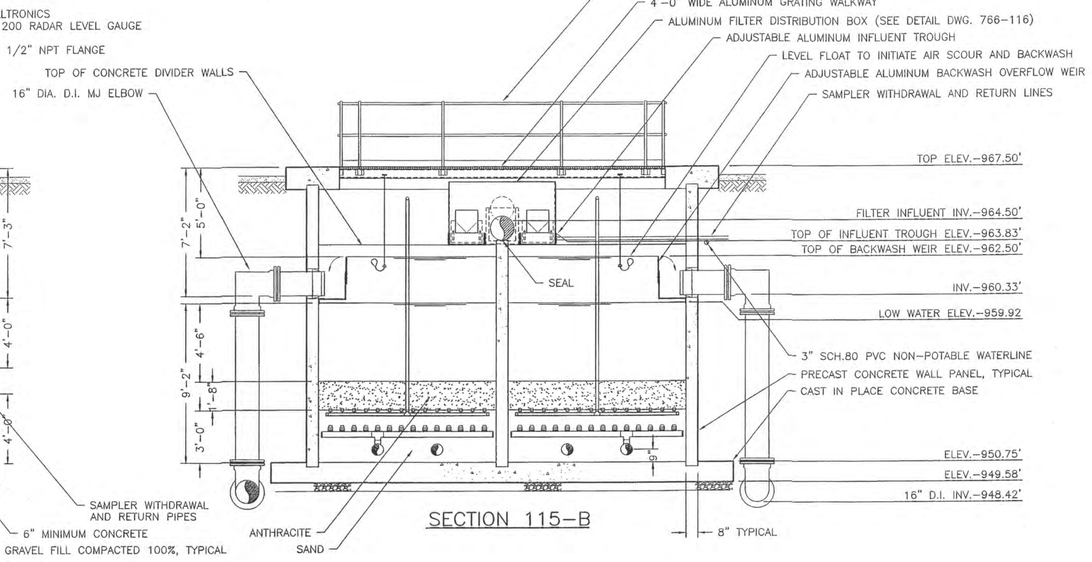
1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. DUCTILE IRON PIPE AND FITTINGS TO BE FACTORY PRIMED.
4. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. BACKWASH PIPING AND FITTINGS SHALLBE LIGHT BROWN (SW 4001)
4. PVC BYPASS PIPE AND FITTINGS SHALL BE LIGHT GRAY (SW 4026)
5. ALUMINUM IN CONTACT WITH CONCRETE TO BE COATED WITH BITUMASTIC

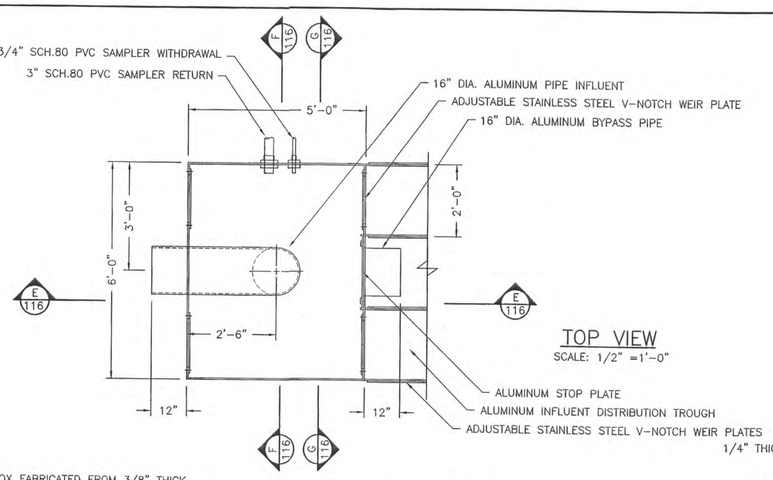


SECTION 115-A

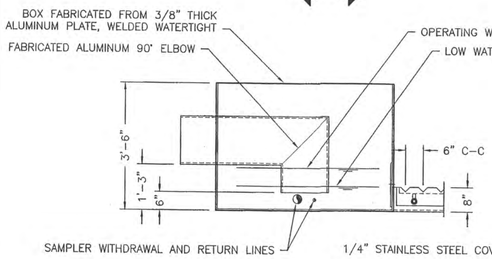


SECTION 115-B

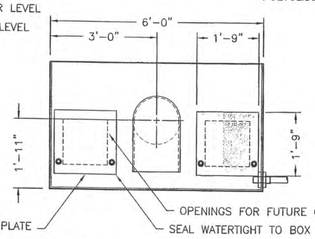
R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-115	REVISIONS DATE / REMARKS 4/29/06 PER 4/5/06 REVIEW COMMENTS	Mack Industries, Inc. 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111	NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 1/4"=1'	WASTEWATER TREATMENT PLANT TERTIARY FILTERS UV DISINFECTION	SHEET NO. W16 OF 32



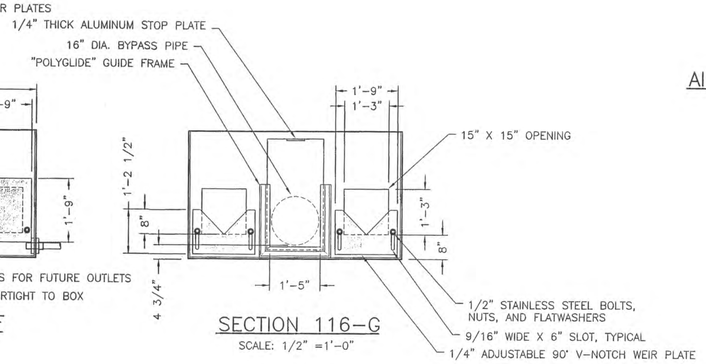
TOP VIEW
SCALE: 1/2" =1'-0"



SECTION 116-E
SCALE: 1/2" =1'-0"

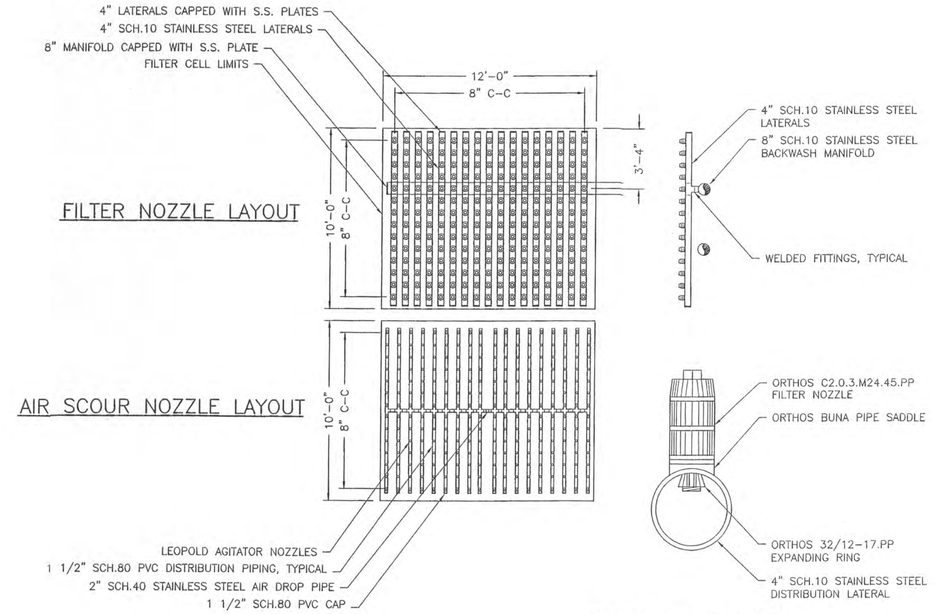


SECTION 116-F
SCALE: 1/2" =1'-0"



SECTION 116-G
SCALE: 1/2" =1'-0"

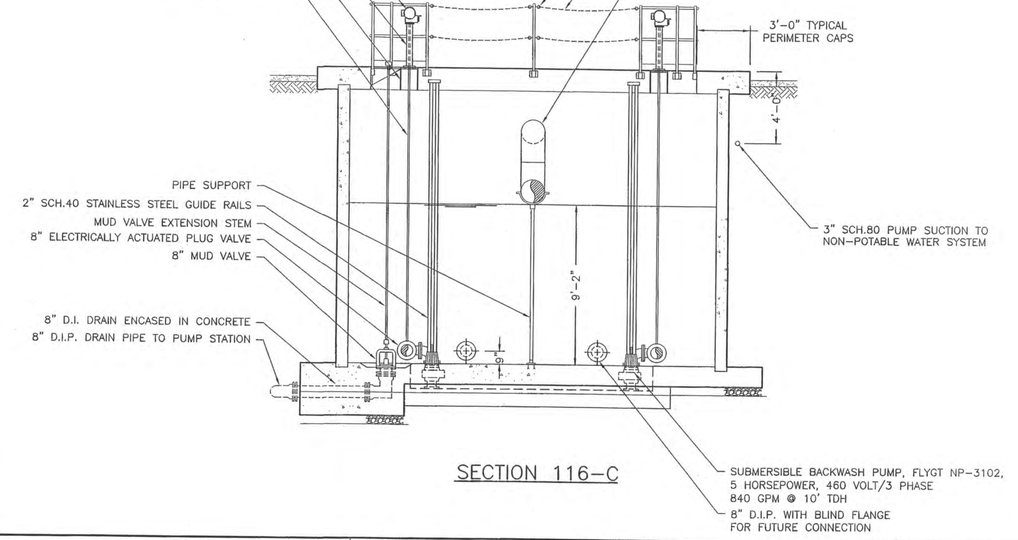
FILTER DISTRIBUTION BOX
SCALE: 1/2" =1'-0"



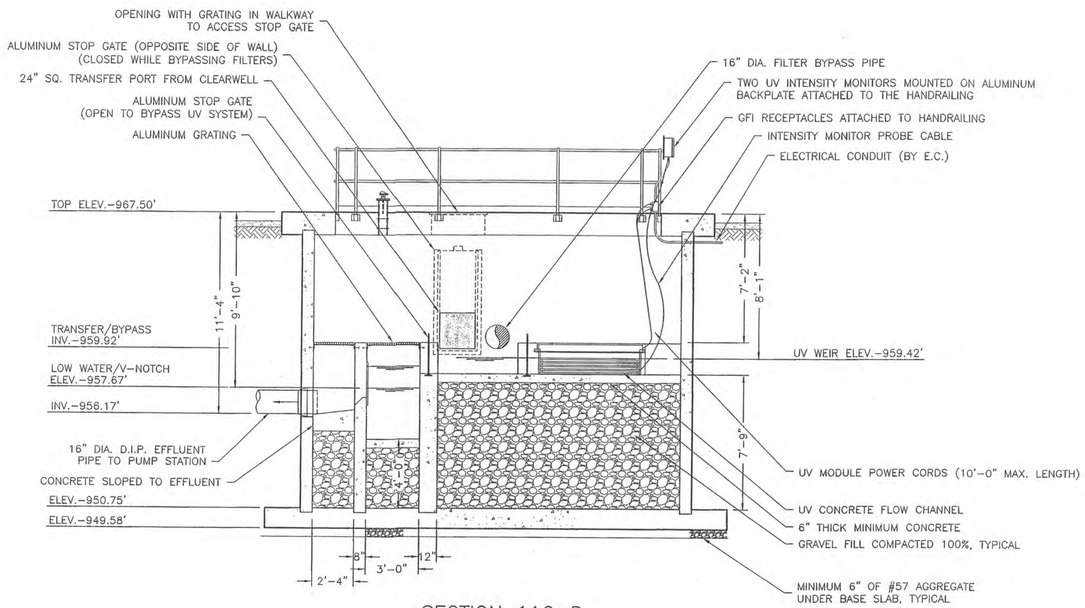
FILTER NOZZLE LAYOUT

AIR SCOUR NOZZLE LAYOUT

FILTER NOZZLE DETAIL
SCALE: 3" =1'-0"

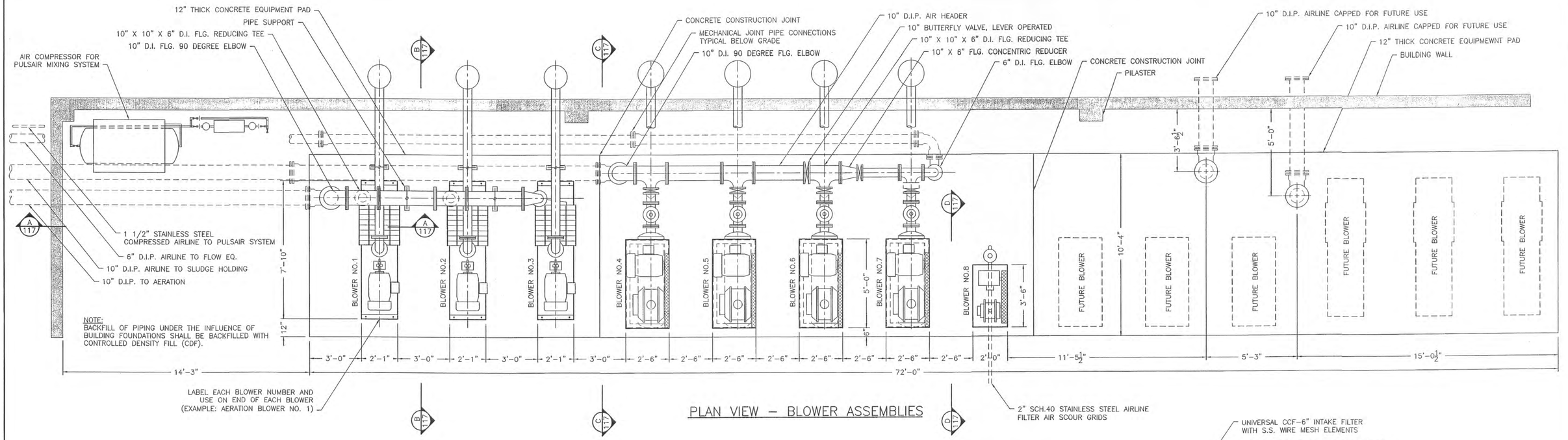


SECTION 116-C

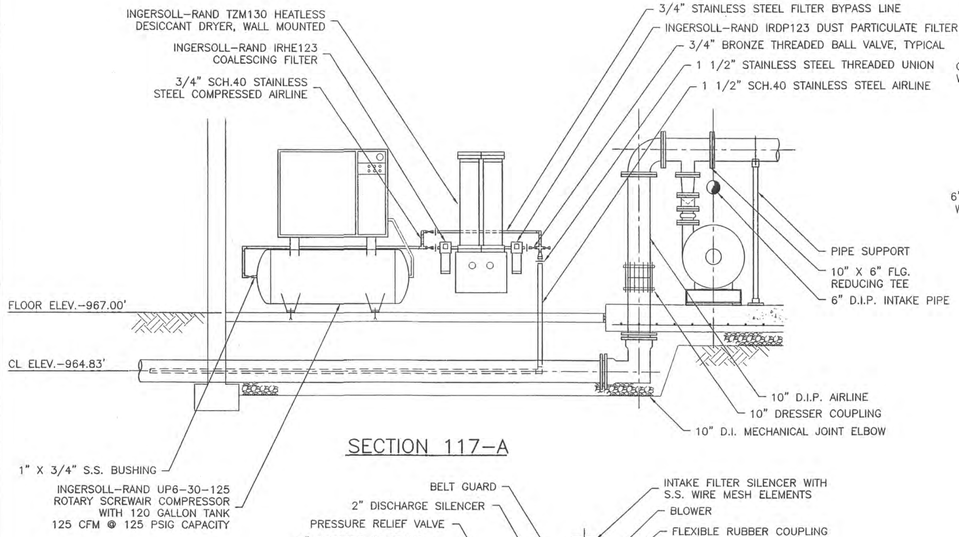


SECTION 116-D

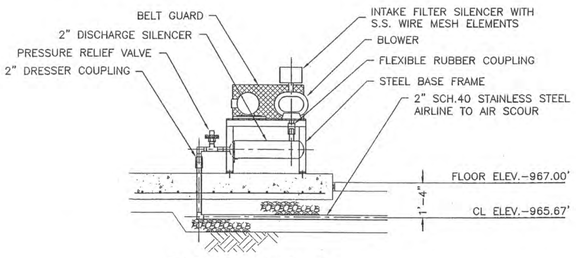
R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-116	REVISIONS DATE / REMARKS 4/29/06 PER 4/5/06 REVIEW COMMENTS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111		NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 1/4"=1'	WASTEWATER TREATMENT PLANT TERTIARY FILTER UV DISINFECTION	SHEET NO. W17 OF 32



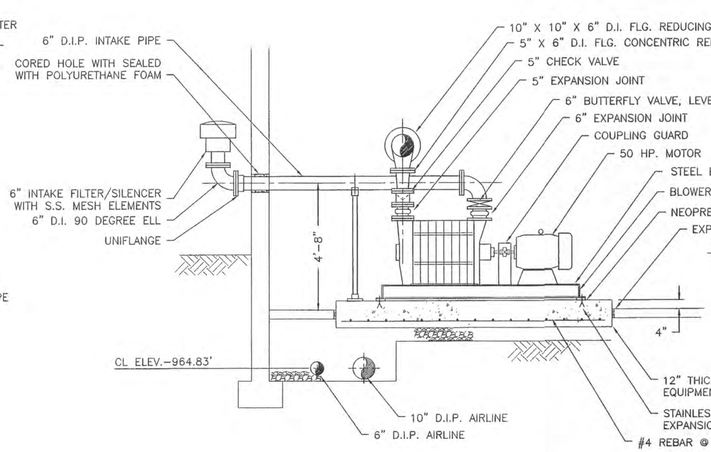
PLAN VIEW – BLOWER ASSEMBLIES



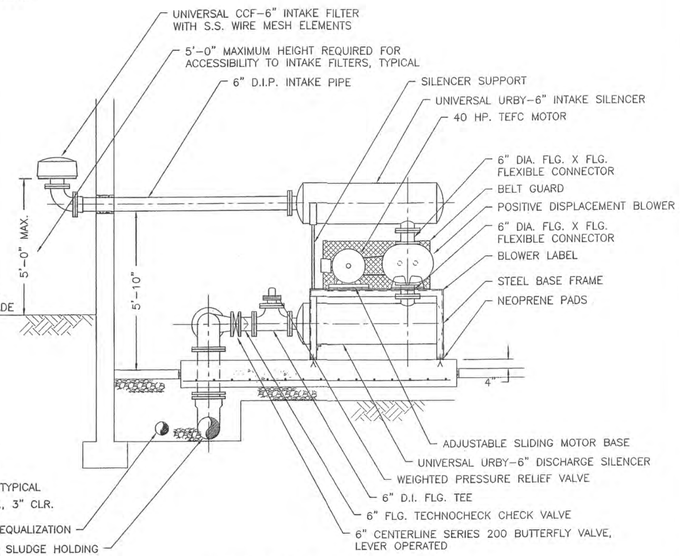
SECTION 117–A



SECTION 117–D



SECTION 117–B



SECTION 117–C

AERATION BLOWERS NO.1, 2, & 3
TWO OPERATING, ONE STAND–BY
GARDNER DENVER MODEL 559
CENTRIFUGAL BLOWER
691 SCFM @ 8 PSIG
50 HORSEPOWER, 3600 RPM

SLUDGE HOLDING BLOWERS NO. 4, 5, & 6
TWO OPERATING, ONE STAND–BY
ROOTS MODEL URAI–711
POSITIVE DISPLACEMENT BLOWER
765 SCFM @ 8 PSIG
40 HORSEPOWER, 1765 RPM

FLOW EQUALIZATION BLOWER NO.7
ROOTS MODEL URAI–68
POSITIVE DISPLACEMENT BLOWER
505 SCFM @ 8 PSIG
30 HORSEPOWER, 1765 RPM

AIR SCOUR BLOWER NO.8
ROOTS MODEL URAI–33
POSITIVE DISPLACEMENT BLOWER
120 SCFM @ 8 PSIG
7.5 HORSEPOWER, 1750 RPM

BLOWER ASSEMBLY COATING REQUIREMENTS:

1. SURFACES TO BE COATED:
   A. ALL EXPOSED DUCTILE IRON PIPE, FITTINGS, AND FASTENERS
   B. ALL VALVES (LESS VALVES HANDLES)
   C. BLOWERS, MOTORS, SILENCERS, FILTERS, AND BASES (LESS NAMEPLATES)
   D. PD BLOWER BELT GUARDS.

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED, FACTORY FINISHED.

SURFACE PREPARATION:

1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. DUCTILE IRON PIPE AND FITTINGS WILL BE FACTORY PRIMED.
3. STEEL FABRICATIONS SHALL BE FACTORY PRIMED.
4. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY, TWO COATS.
2. COLOR SHALL BE SAFETY GREEN (SW 4095), EXCEPT BELT GUARDS. BELT GUARDS SHALL BE OSHA SAFETY YELLOW.
3. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766–117

REVISIONS	
DATE	REMARKS
1/3/06	PER 12/28/05 EPA COMMENTS

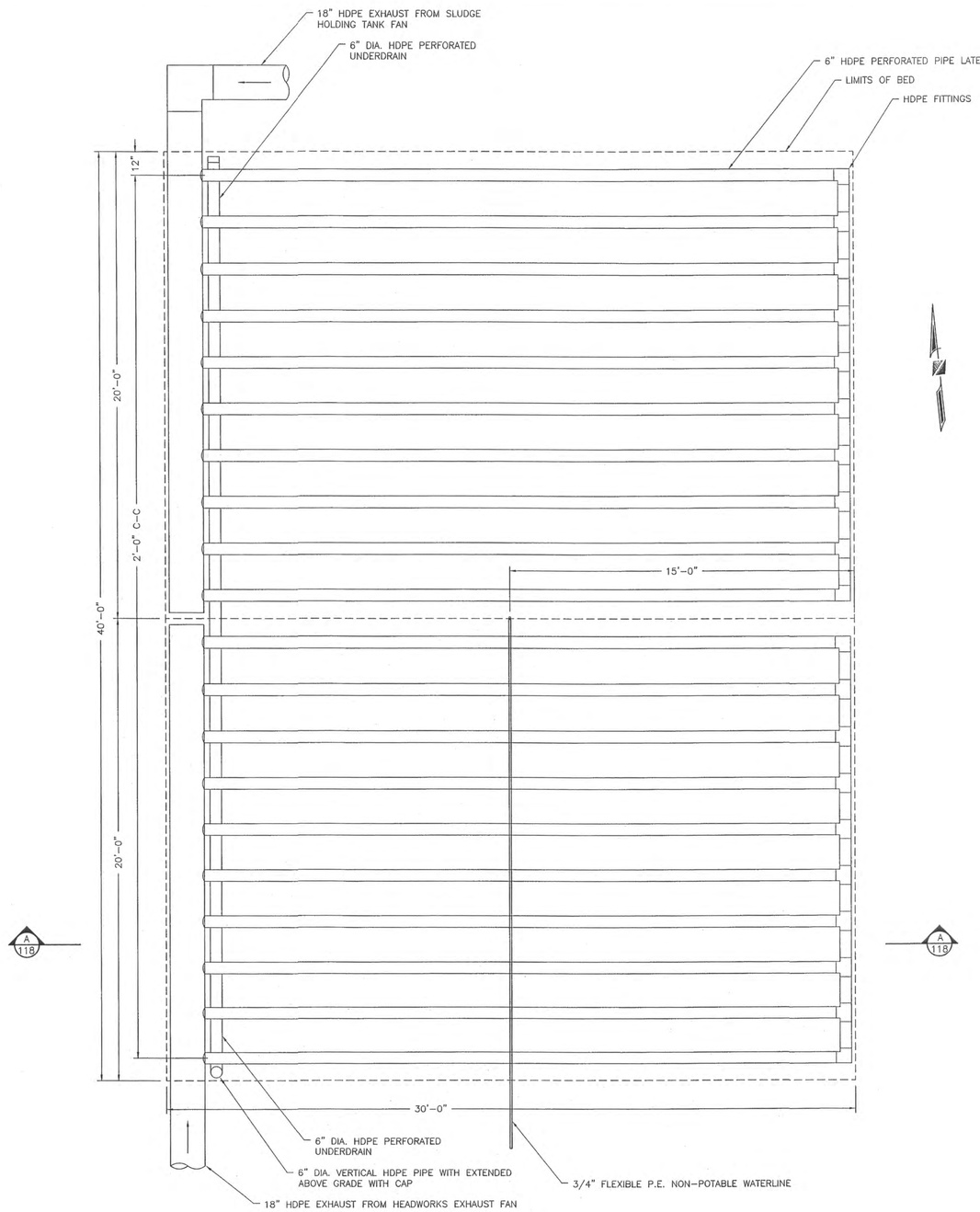
Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330–483–3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

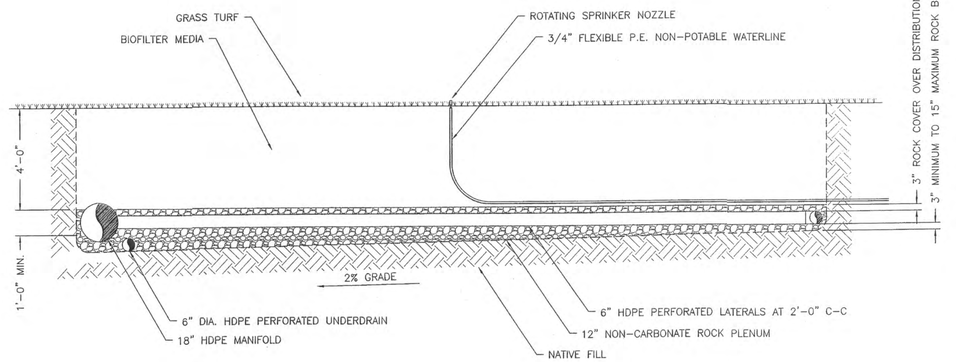
SCALE: 3/8"=1'

WASTEWATER TREATMENT PLANT
BLOWER ASSEMBLIES

SHEET NO.
W18 OF 32



PLAN VIEW



SECTION 118-A

GENERAL NOTES:

1. BIOFILTER SHALL BE SUPPLIED BY BOHN BIOFILTER CORP., TUCSON, ARIZONA

AIR FLOW RATE:	2000 CFM EACH BED
BIOFILTER MEDIA:	ACTIVATED SOIL
MEDIA LIFETIME:	>20 YEARS
BIOFILTER AREA:	600 SQ.FT. EACH
BIOFILTER HEADLOSS:	<9" WC
REMOVAL EFFICIENCY:	99% H2S REMOVAL (10 PPM AND ABOVE)
MAXIMUM DISCHARGE:	0.100 PPM H2S (INLET CONCENTRATION <10 PPM)

2. ROCK SPECIFICATIONS:
ROCK TO BE WASHED GRAVEL 3/4" TO 1" IN SIZE. ROCK SHALL BE TESTED FOR SIEVE ANALYSIS AND ACID SOLUBILITY BY BOHN BIOFILTER.
ROCK SHALL BE APPROVED FOR USE BY BOHN BIOFILTER..

3. GROUNDWATER ISSUES:
GROUNDWATER INFILTRATION DOES NOT NEED CONTROL. THE PLENUM ZONE WILL ACT AS A SUMP.
THE CAPACITY IS DESIGNED FOR THREE TIMES THE MONTHLY RAINFALL.
IN ADDITION, THE SITE IS GRADED SUCH AS TO DIRECT SURFACE RUN-OFF AWAY FROM BIOFILTER BEDS.
IF NECESSARY, GROUNDWATER CAN BE PUMPED OUT VIA THE 6" UNDERDRAIN.

4. FREEZING ISSUES:
THE TEMPERATURE OF THE BIOFILTER WILL BE THAT OF THE INPUT AIR, NOT AMBIENT AIR.
THE IRRIGATION WATERLINE WILL NOT BE USED IN THE WINTER AND WILL BE DRAINED.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-118

REVISIONS	
DATE	REMARKS
5/9/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

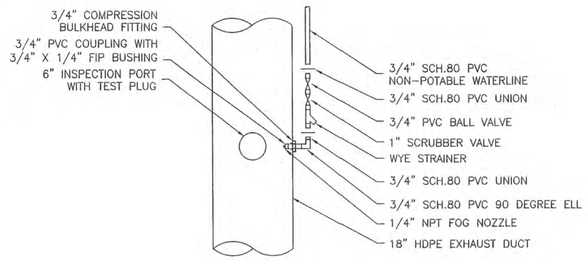
Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

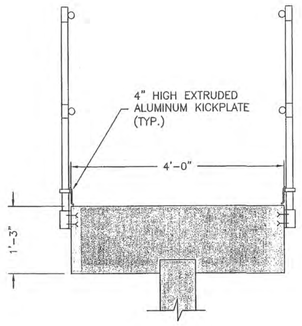
SCALE: 3/8"=1'

WASTEWATER TREATMENT PLANT
ODOR CONTROL BIOFILTER

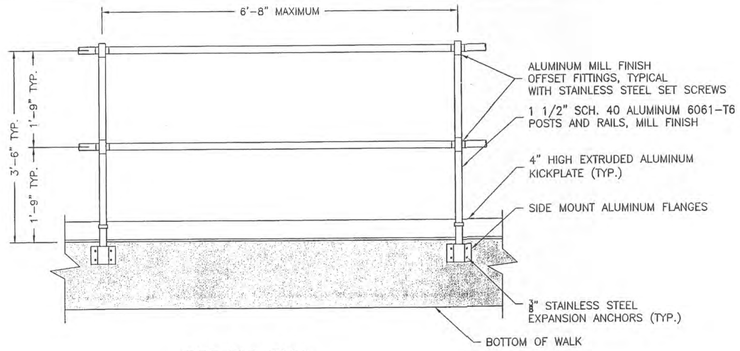
SHEET NO.
W19 OF 32



DETAIL 119-A
HUMIDIFIER CONNECTION DETAIL
SCALE: 3/4"=1'-0"

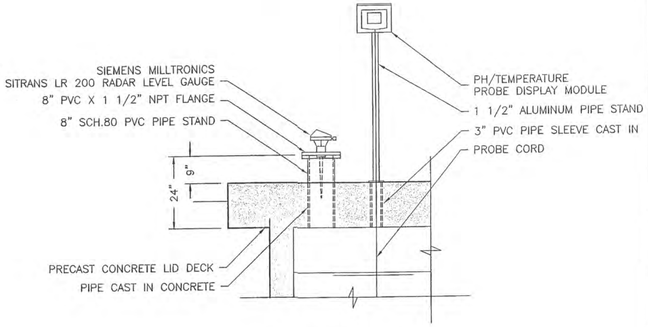


END VIEW

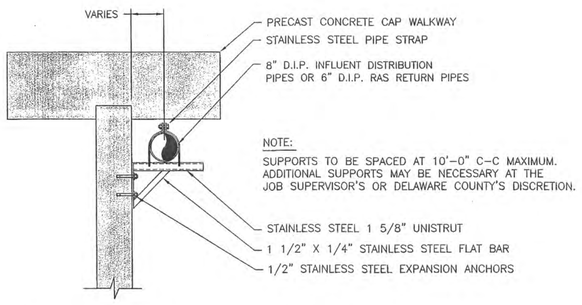


SIDE ELEVATION

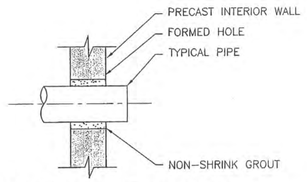
TYPICAL HANDRAILNG DETAIL-119-B
SCALE 3/4" = 1'-0"



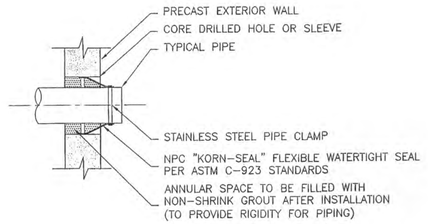
SECTION 119-D
SCALE: 1/2"=1'-0"



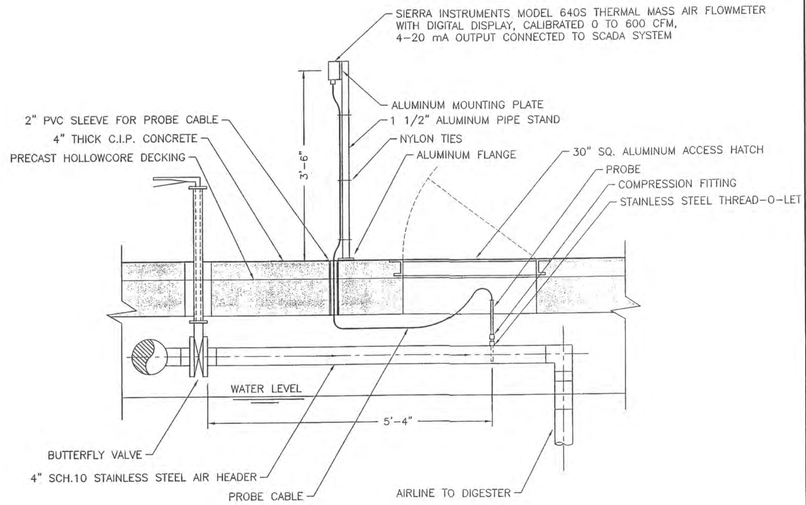
TYPICAL SIDE MOUNT PIPE SUPPORT DETAIL- 119-C
SCALE: 3/4"=1'-0"



TYPICAL PIPE TO INTERIOR WALL CONNECTION DETAIL- 119-F
SCALE 3/4" = 1'-0"

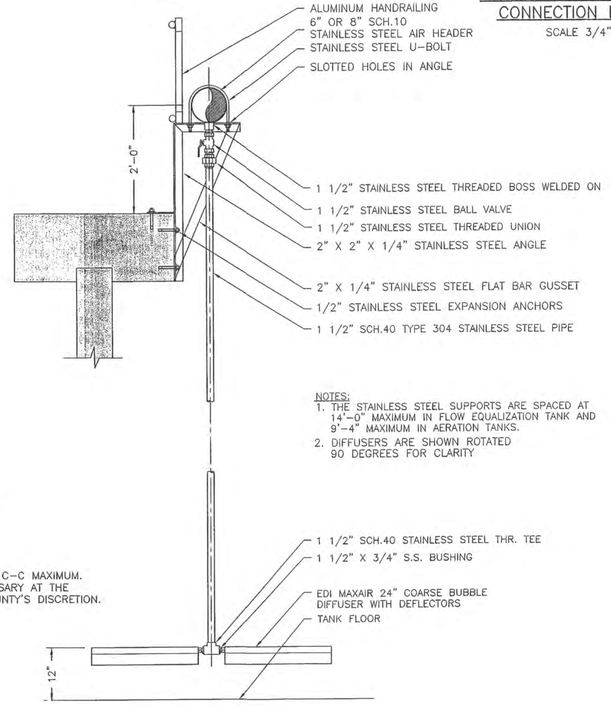


TYPICAL PIPE TO EXTERIOR WALL CONNECTION DETAIL- 119-E
SCALE 3/4" = 1'-0"

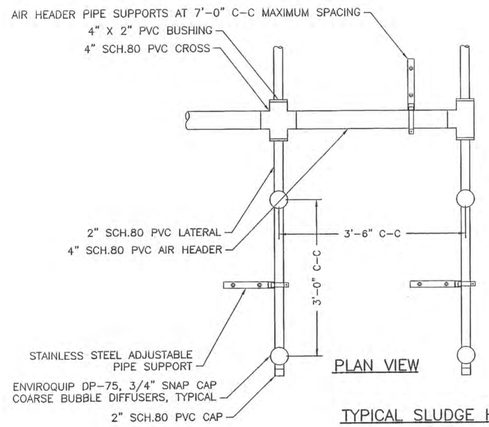


TYPICAL AIR FLOWMETER DETAIL 119-K
SCALE: 3/4"=1'-0"

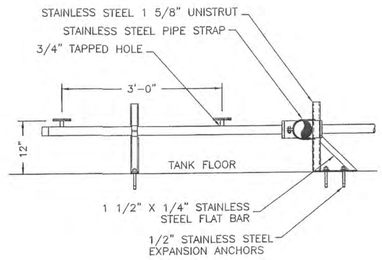
TYPICAL CEILING MOUNT PIPE SUPPORT DETAIL- 119-G
SCALE: 3/4"=1'-0"



TYPICAL AERATION AIR DIFFUSER DETAIL 119-H
SCALE: 3/4"=1'-0"

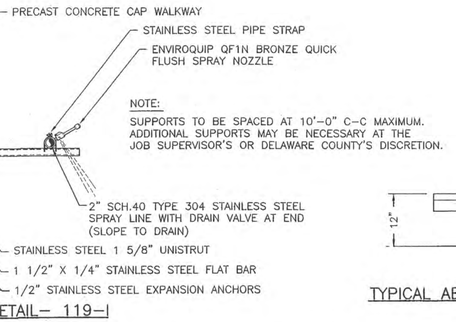


PLAN VIEW



SIDE ELEVATION

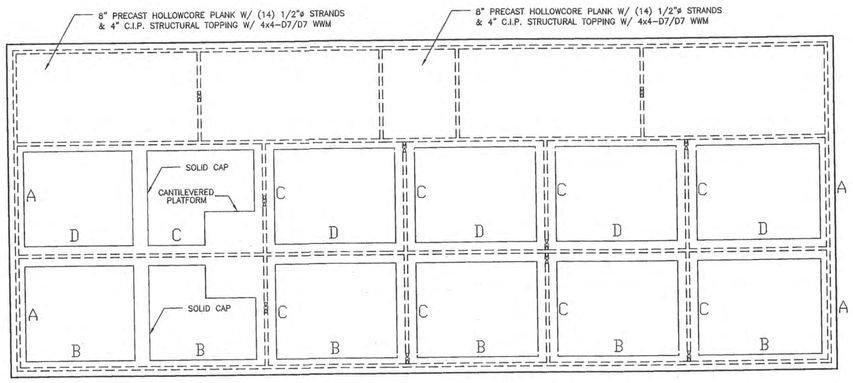
TYPICAL SLUDGE HOLDING AIR DIFFUSER DETAIL 119-J
SCALE: 3/4"=1'-0"



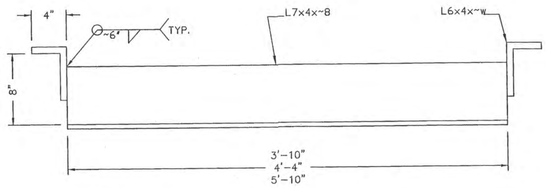
TYPICAL FOAM SPRAY NOZZLE DETAIL- 119-I
SCALE: 3/4"=1'-0"

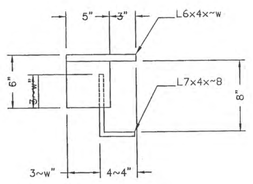
R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-119	REVISIONS DATE / REMARKS 1/31/05 PER 1/19/05 REVIEW MTG. 4/29/06 PER 4/5/06 REVIEW COMMENTS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111

NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 3/4"=1'	WASTEWATER TREATMENT PLANT PLANT MECHANICAL DETAILS	SHEET NO. W20 OF 32

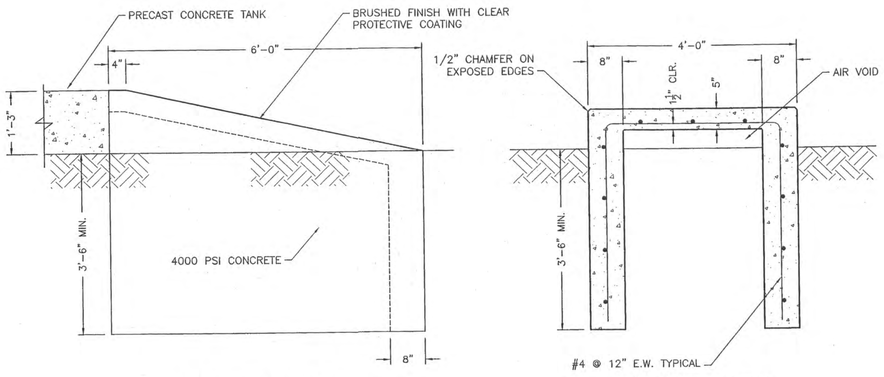


WALL CAP PLAN





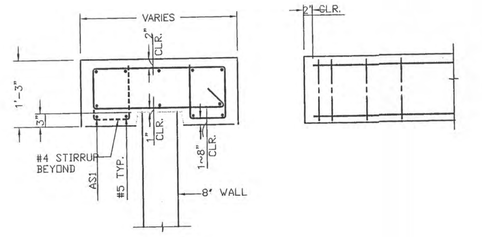
HEADER DETAIL



SIDE ELEVATION

SECTION VIEW

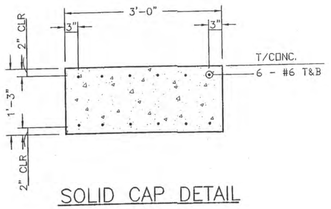
TYPICAL CONCRETE EQUIPMENT RAMP DETAIL



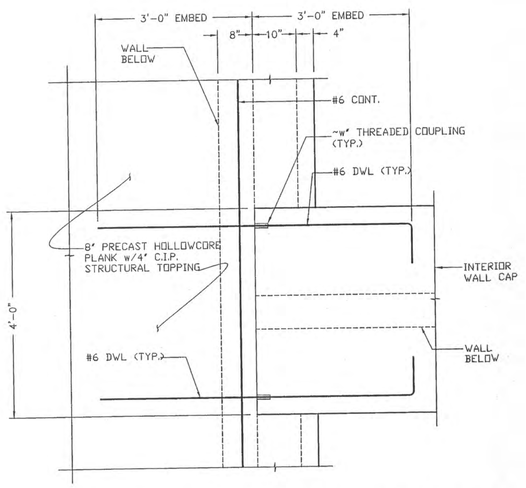
WALL CAP	WIDTH (FT.)	SPAN (FT.)	AS1	STIRRUP SPACING (IN.)	
A	3'-0"	18'-2"	3-#8 E.F.	#4 @ 10"	TO 6'-0" FROM ENDS
					BALANCE - #4 @ 12"
B	3'-0"	24'-2"	3-#10 E.F.	#4 @ 7"	TO 6'-0" FROM ENDS
					BALANCE - #4 @ 12"
C	4'-0"	18'-2"	3-#7 E.F.	#4 @ 12"	
D	4'-0"	24'-2"	3-#8 E.F.	#4 @ 12"	

NOTES:
1. PLACE FIRST STIRRUP AT ~8 SCHEDULED SPACING FROM THE FACE OF SUPPORT.
2. PROVIDE #4 STIRRUPS @ 12" O.C. U.O.N.

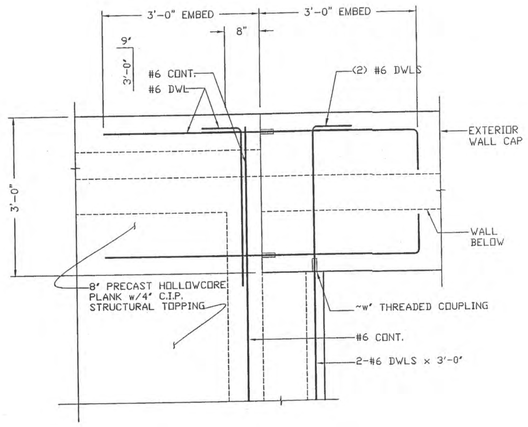
WALL CAP REINFORCING DETAILS



SOLID CAP DETAIL



WALL CAP & PRECAST PLANK CONNECTION PLAN VIEW



WALL CAP & PRECAST PLANK CONNECTION PLAN VIEW

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-120

REVISIONS	
DATE	REMARKS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

STATE OF OHIO — J. T. OHLIN 32188 — J. P. REED 62588 — PROFESSIONAL ENGINEER

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

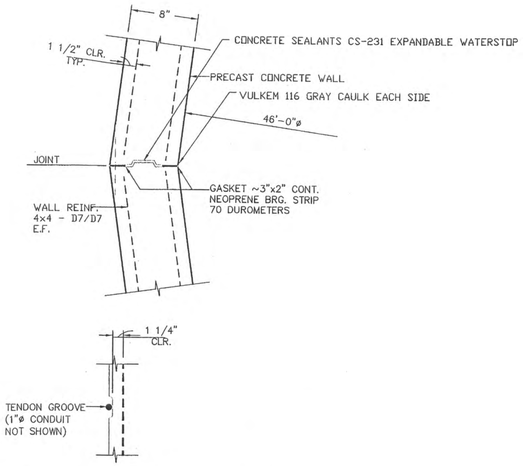
SCALE: NTS

WASTEWATER TREATMENT PLANT

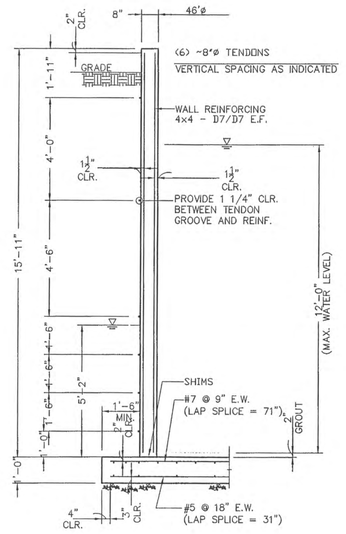
CONCRETE CONSTRUCTION DETAILS

SHEET NO.

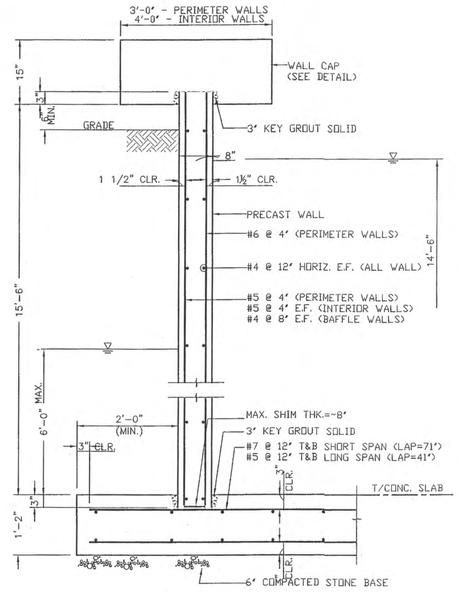
W21 OF 32



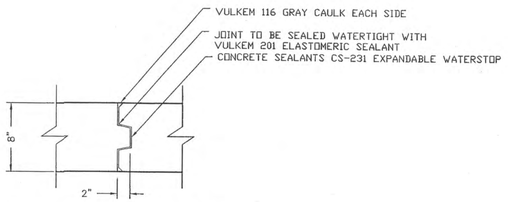
CIRCULAR CLARIFIER JOINT DETAIL



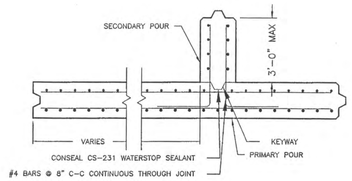
POST-TENSIONED CIRCULAR CLARIFIER WALL SECTION



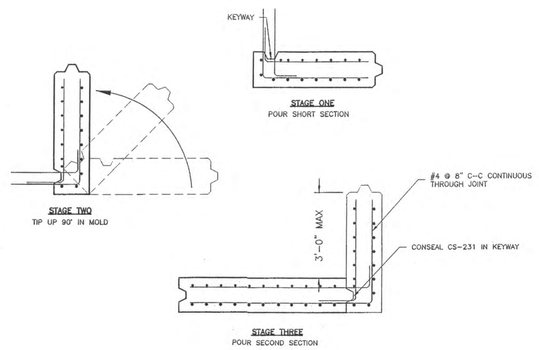
MAIN PLANT & TERTIARY FILTER TANK WALL & BASE SLAB REINFORCING DETAILS



PRECAST WALL PANEL CONSTRUCTION JOINT DETAIL

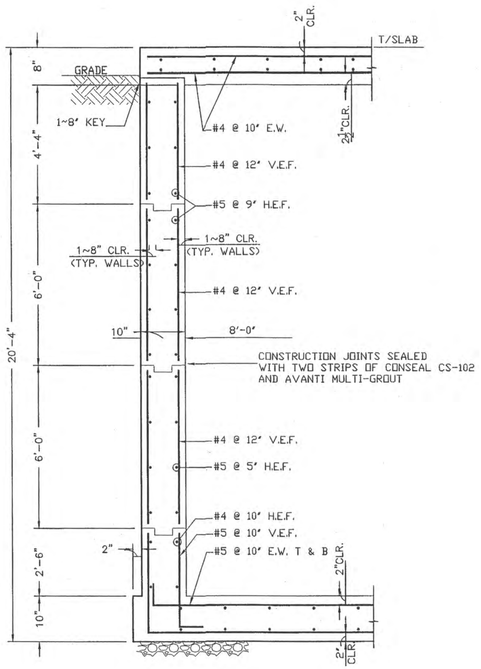


TYPICAL WALL PANEL "TEE"

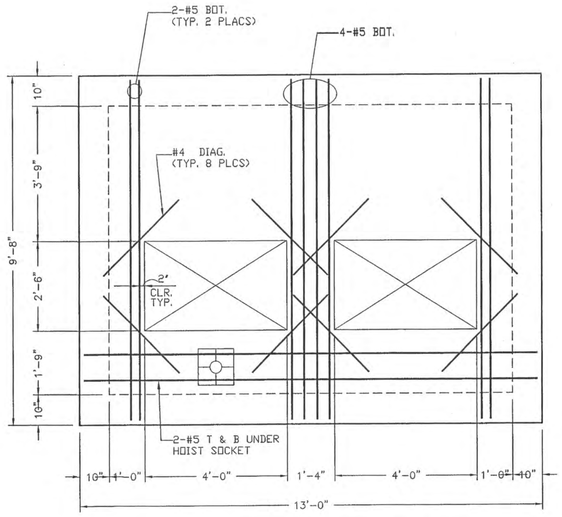


TYPICAL WALL PANEL "CORNER"

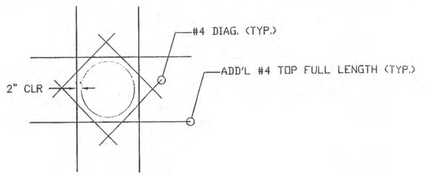
R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-121	REVISIONS DATE / REMARKS	Mack Industries, Inc. 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111	STATE OF OHIO J. T. OHLIN 32186 J. P. REED 50068 REGISTERED PROFESSIONAL ENGINEERS	NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: NTS	WASTEWATER TREATMENT PLANT CONCRETE CONSTRUCTION DETAILS SHEET NO. W22 OF 32



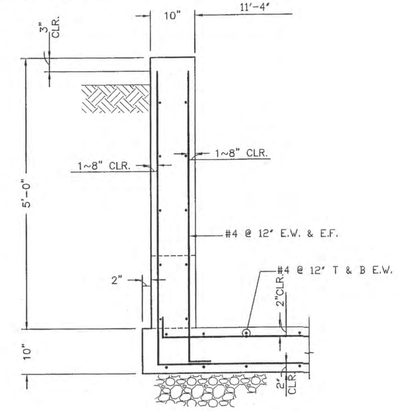
WALL REINFORCING DETAILS
RAS PUMP STATION



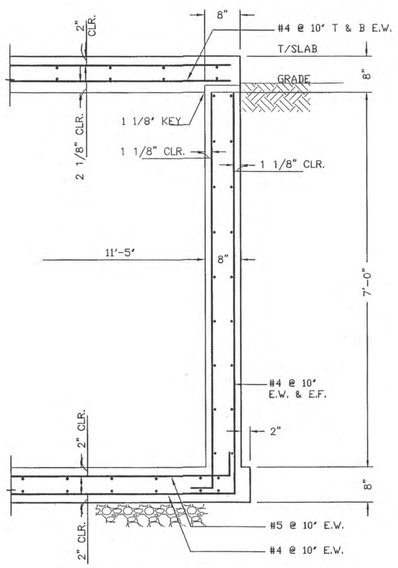
OPENING REINFORCING PLAN
RAS PUMP STATION



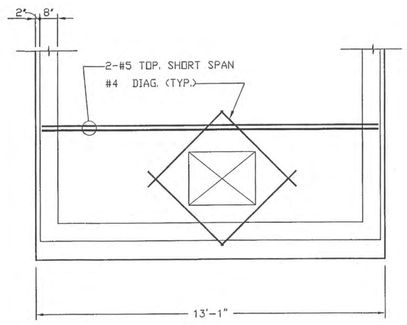
24"Ø HOLE IN BASE



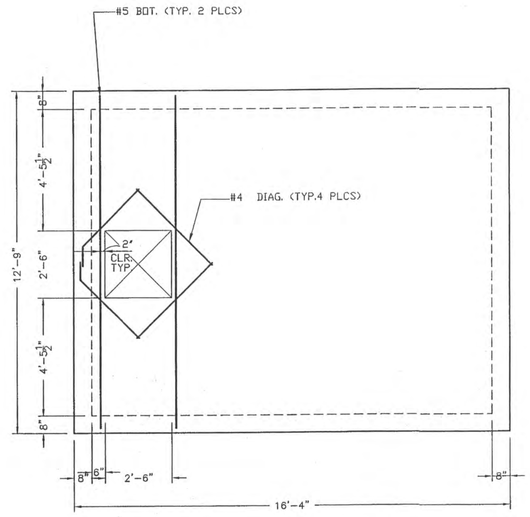
REINFORCING DETAILS
CLARIFIER SPLITTER BOX



REINFORCING DETAILS
RAS VALVE & FLOW METER VAVLT

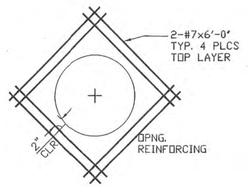


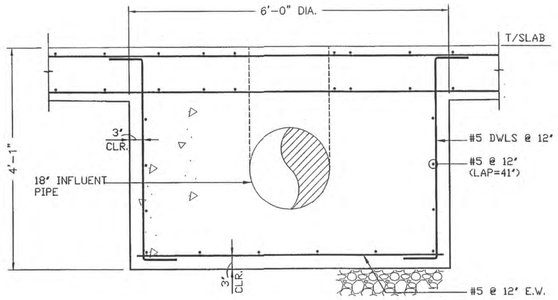
30"x24" PRECAST KEYED OPENING
IN RAS VALVE AND FLOWMETER VAULT



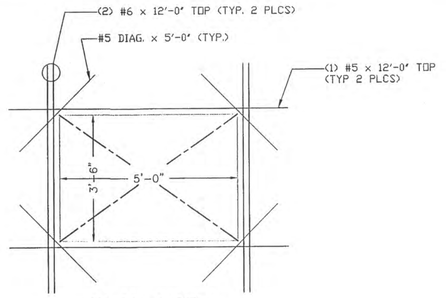
OPENING REINFORCING PLAN
RAS FLOWMETER & VALVE VAULT

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-122	REVISIONS DATE / REMARKS	Mack Industries, Inc. 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111	STATE OF OHIO J. T. OHLIN 32180 J. P. REED 50588 PROFESSIONAL ENGINEERS	NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: NTS	WASTEWATER TREATMENT PLANT CONCRETE CONSTRUCTION DETAILS	SHEET NO. W23 OF 32

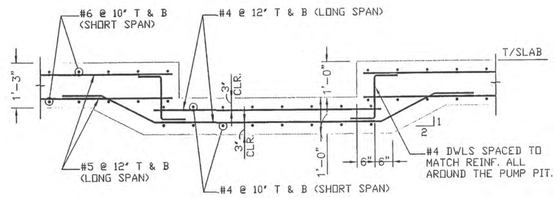




REINFORCING DETAILS – CLARIFIER TANK

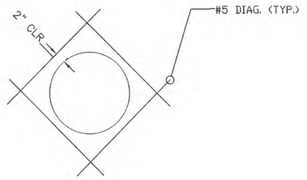


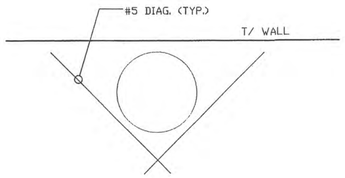
PLAN VIEW



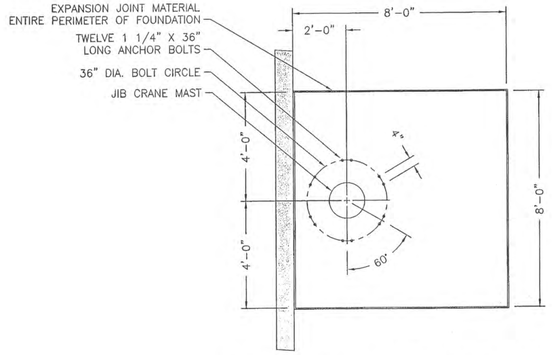
SECTION VIEW

FLOW–EQUALIZATION PUMP PIT

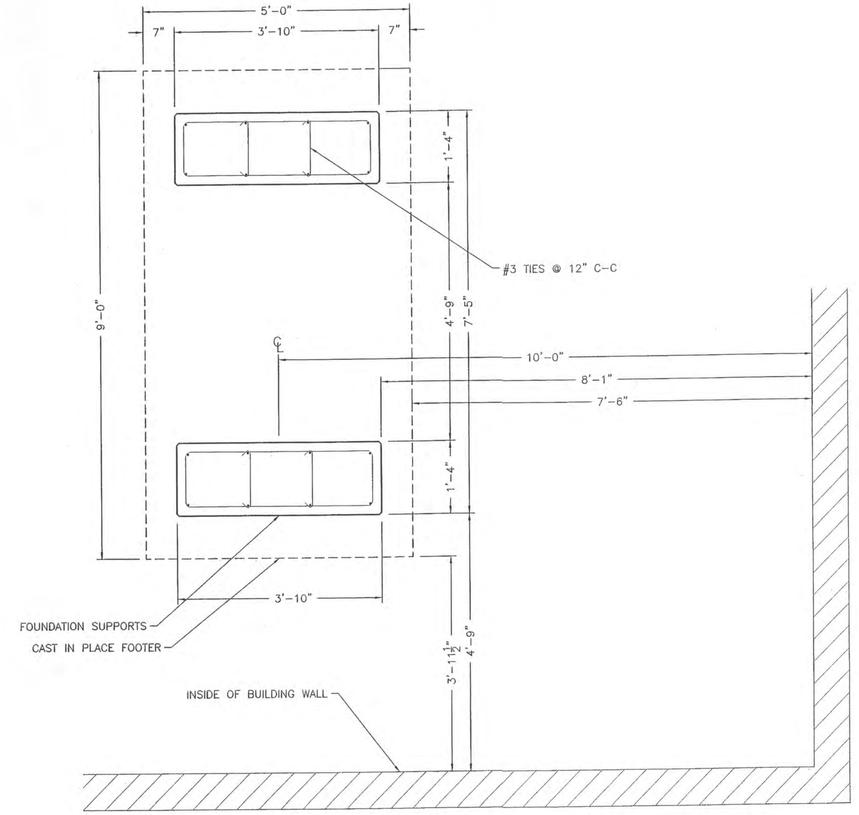




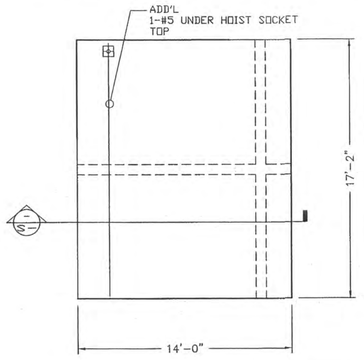
TYP. PIPE HOLES IN WALLS (ALL STRUCTURES)

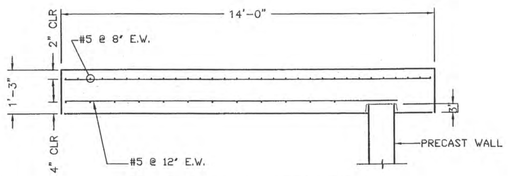


PLAN VIEW – JIB CRANE FOUNDATION

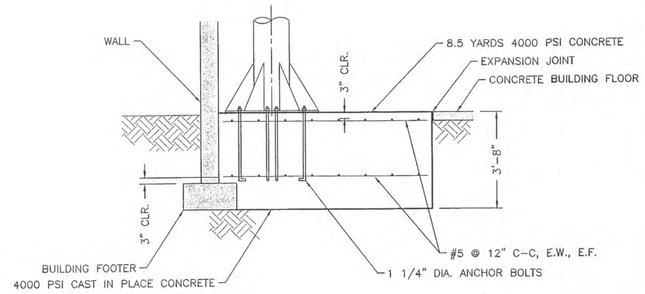


PLAN VIEW – CENTRIFUGE FOUNDATION

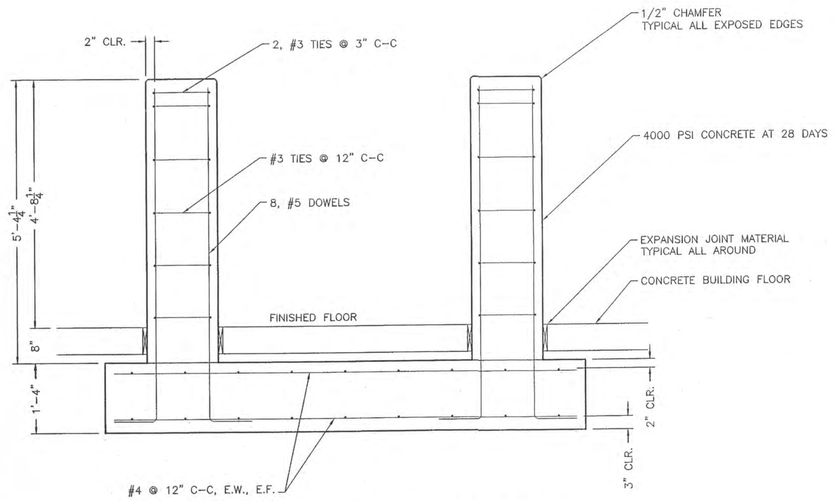




CANTILEVERED PLATFORM



SECTION VIEW – JIB CRANE FOUNDATION



SECTION VIEW – CENTRIFUGE FOUNDATION

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766–123

REVISIONS	
DATE	REMARKS
5/7/05	PER 5/2/05 MTG. COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330–483–3111

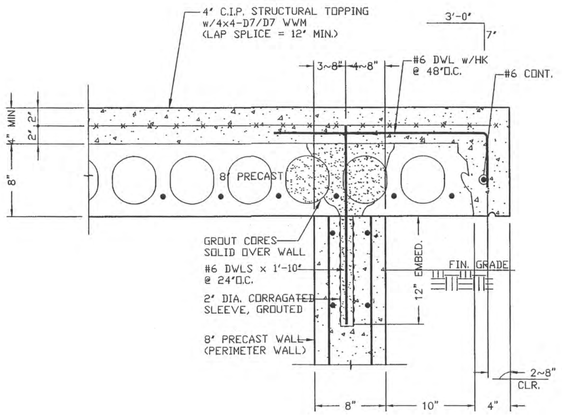
STATE OF OHIO J. T. CHLIN 32188 J. P. REED 50088 REGISTERED PROFESSIONAL ENGINEERS

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

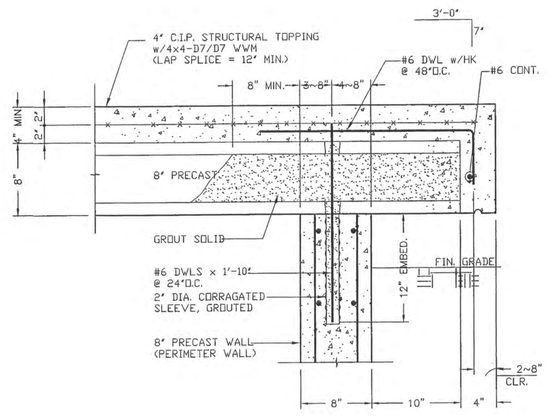
SCALE: NTS

WASTEWATER TREATMENT PLANT
CONCRETE CONSTRUCTION DETAILS

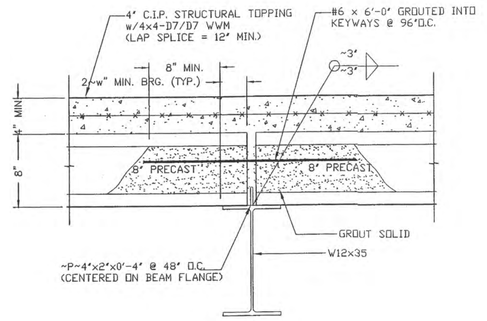
SHEET NO.
W24 OF 32



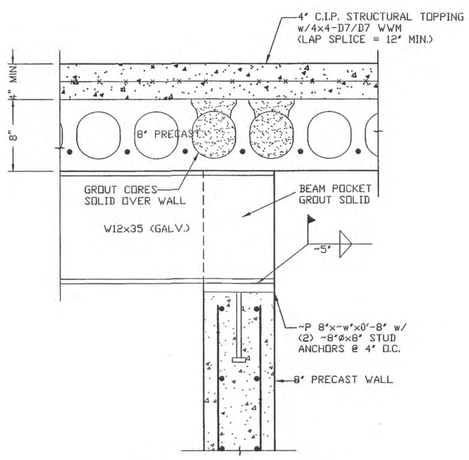
WALL & PRECAST PLANK CONNECTION DETAIL



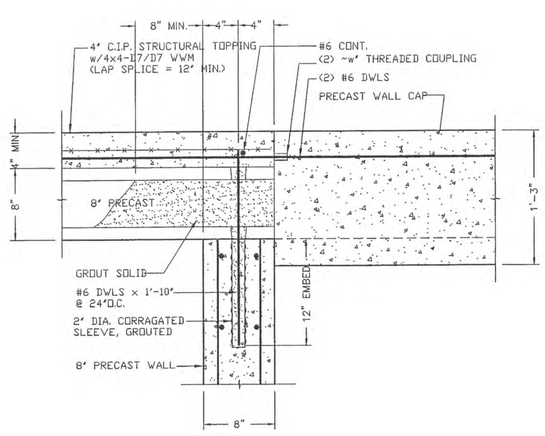
WALL & PRECAST PLANK CONNECTION DETAIL



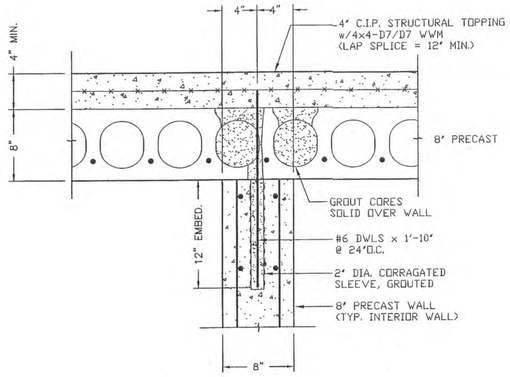
PRECAST PLANK BEARING ON BEAM DETAIL



BEAM BEARING DETAIL



WALL CAP & PRECAST PLANK CONNECTION



PRECAST PLANK & INTERIOR WALL CONNECTION

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 4, 2004
DRAWING NO.	766-124

REVISIONS	
DATE	REMARKS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

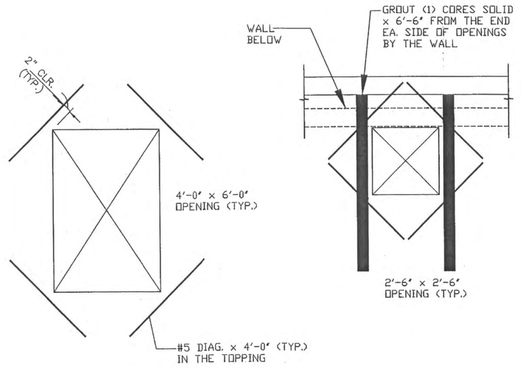
STATE OF OHIO
J. T. OHLIN 32180
J. P. REED 20088
PROFESSIONAL ENGINEERS

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

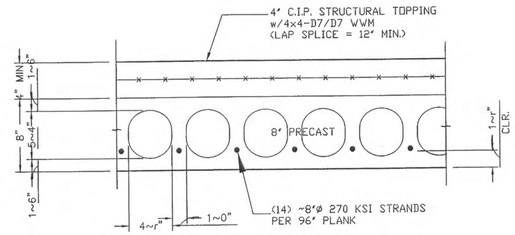
SCALE: NTS

WASTEWATER TREATMENT PLANT
CONCRETE CONSTRUCTION DETAILS

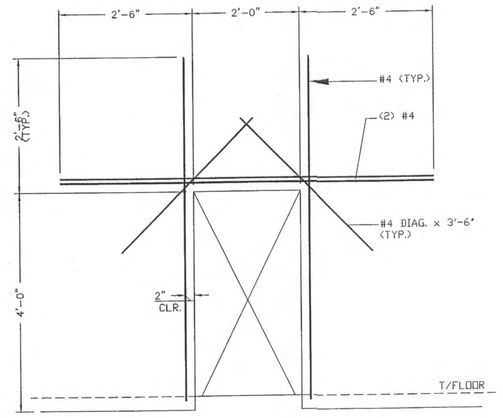
SHEET NO.
W25 OF 32



TYPICAL OPENING REINFORCING
8" HOLLOWCORE PRECAST PLANK

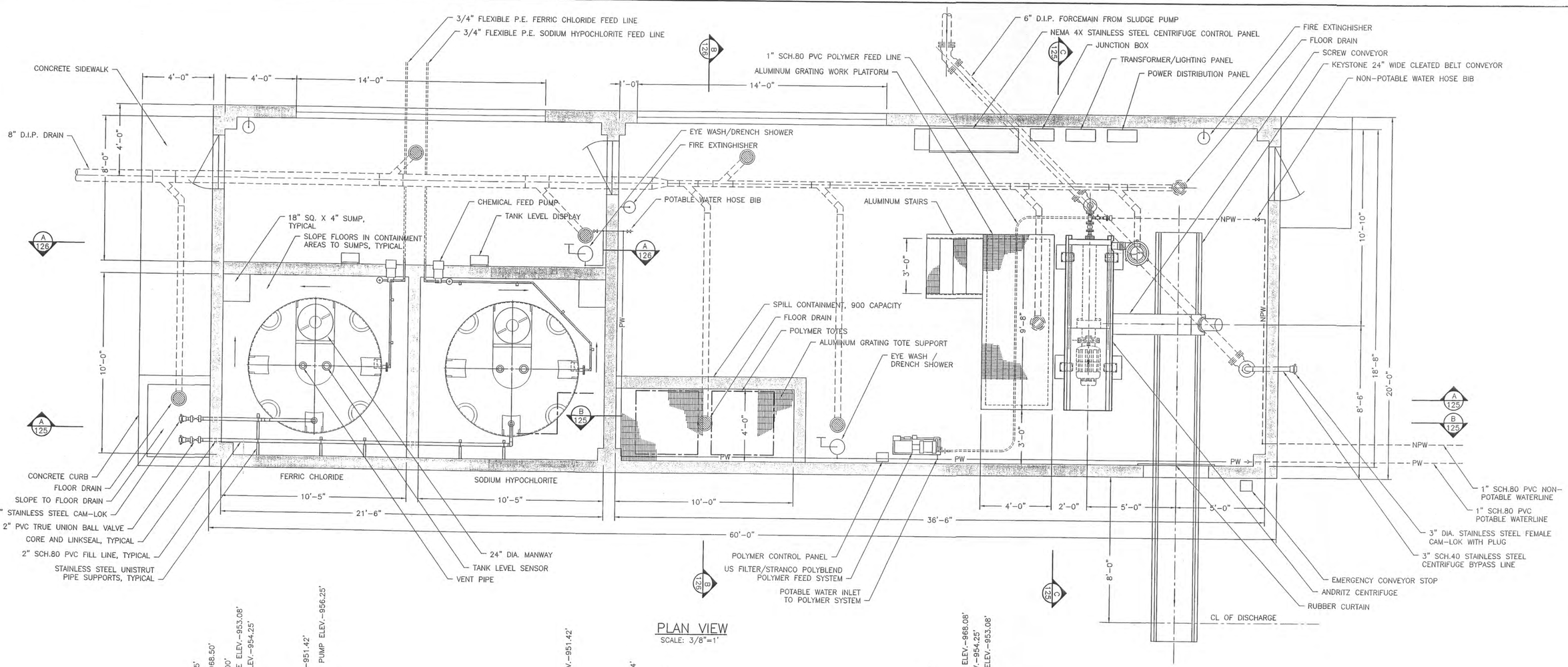


8" PRECAST HOLLOWCORE
TYPICAL CROSS-SECTION

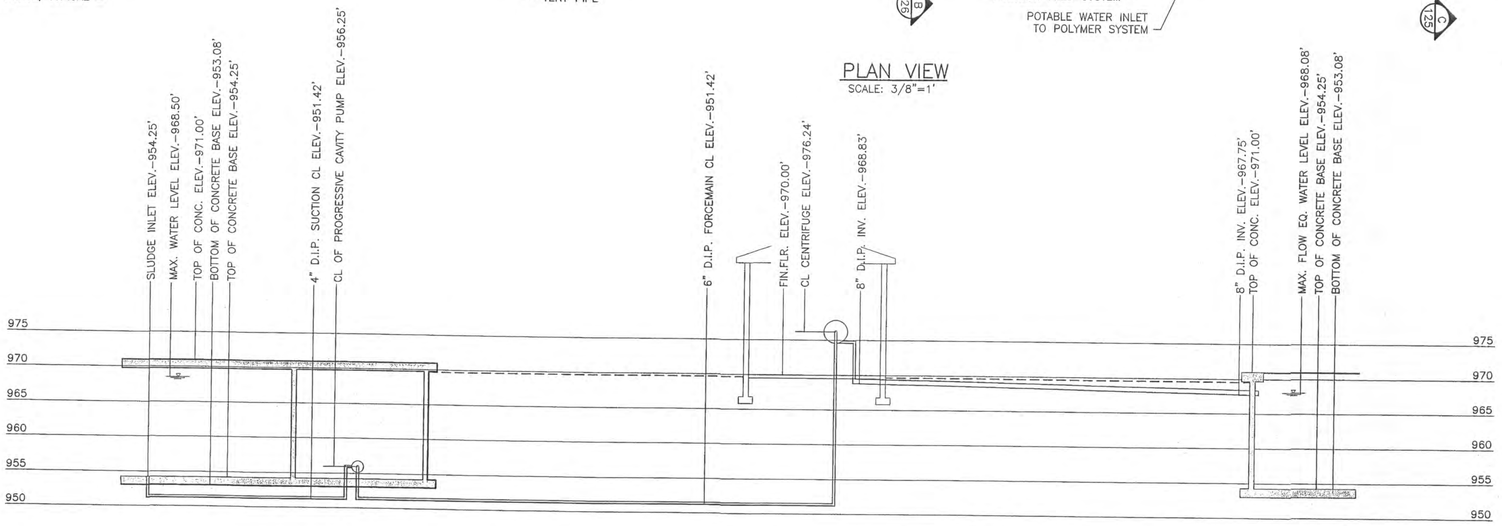


TYPICAL BAFFLE WALL PANEL REINFORCING
FOR LOW LEVEL TRANSFER PORTS

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: NOVEMBER 4, 2004 DRAWING NO. 766-125	REVISIONS DATE / REMARKS	Mack Industries, Inc. 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111	STATE OF OHIO J. T. OHLIN 32180 J. P. REED 50588 PROFESSIONAL ENGINEERS	NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: NTS	WASTEWATER TREATMENT PLANT CONCRETE CONSTRUCTION DETAILS	SHEET NO. W26 OF 32



PLAN VIEW
SCALE: 3/8"=1'



HYDRAULIC PROFILE – SLUDGE DE-WATERING
SCALE: 1"=10'

NOTE:
BACKFILL OF PIPING UNDER THE INFLUENCE OF BUILDING FOUNDATIONS SHALL BE BACKFILLED WITH CONTROLLED DENSITY FILL (CDF).

SLUDGE DE-WATERING AND CHEMICAL FEED EQUIPMENT COATING REQUIREMENTS:

SURFACES TO BE COATED:
1. ALL EXPOSED PVC PIPE AND PVC FITTINGS
2. PVC VALVES (LESS VALVES HANDLES)
3. ALL EXPOSED DUCTILE IRON PIPE AND FITTINGS.
4. ALUMINUM IN CONTACT WITH CONCRETE
5. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED OR FACTORY FINISHED.

SURFACE PREPARATION:
1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. DUCTILE IRON PIPE AND FITTINGS TO BE FACTORY PRIMED.
4. APPLY PAINT ABOVE 40 DEGREES F.

COATING:
1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. FERRIC CHLORIDE AND SODIUM HYPOCHLORITE PIPING AND FITTINGS SHALL BE YELLOW (SW 4034).
4. SLUDGE FEED PIPING SHALL BE DARK BROWN (SW 4009).
5. NON-POTABLE WATERLINES SHALL BE AQUA (SW 4061).
6. POTABLE WATERLINES SHALL BE DARK BLUE (SW 4064).
7. 6" PVC CENTRIFUGE VENT SHALL BE LIGHT GRAY (SW 4026).
8. ALUMINUM IN CONTACT WITH CONCRETE TO BE COATED WITH BITUMASTIC

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	NOVEMBER 13, 2004
DRAWING NO.	766-126

REVISIONS	
DATE	REMARKS
5/7/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

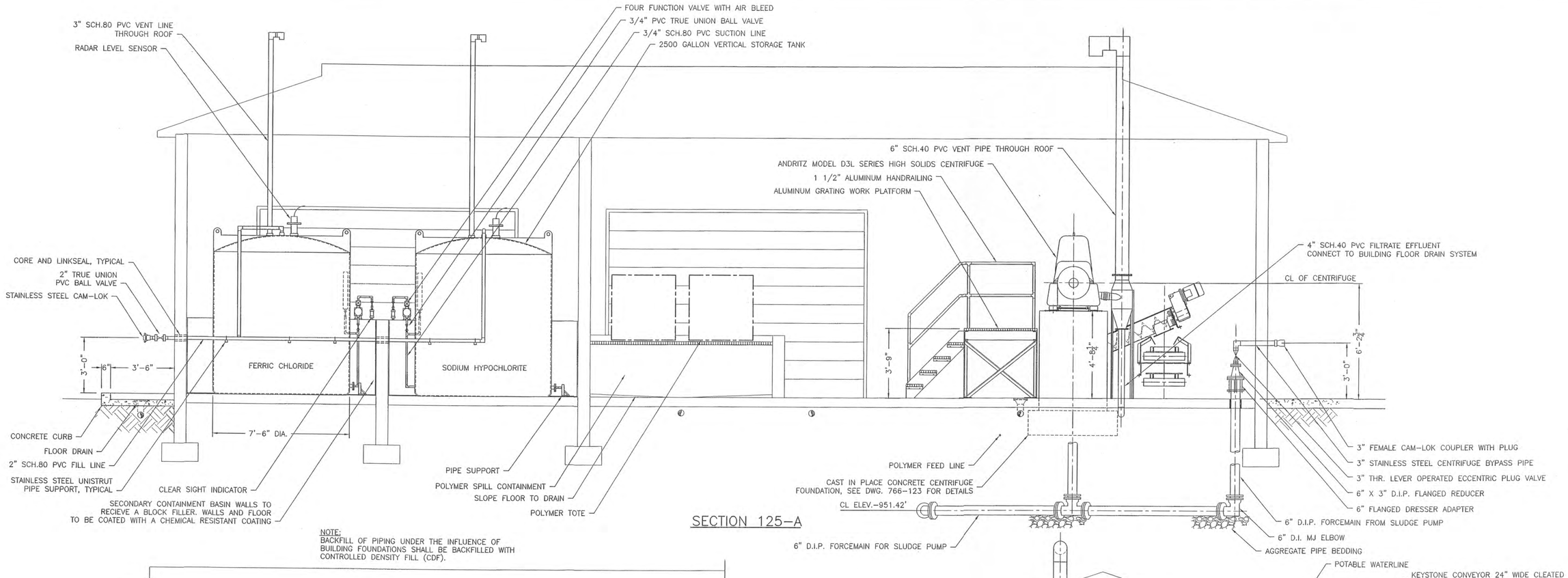
NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

SLUDGE DE-WATERING FACILITIES
CHEMICAL FEED SYSTEMS
BUILDING PLAN AND PROFILE

SHEET NO.
W27 OF 32



R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	DECEMBER 10, 2004
DRAWING NO.	766-127

REVISIONS	
DATE	REMARKS
5/9/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT

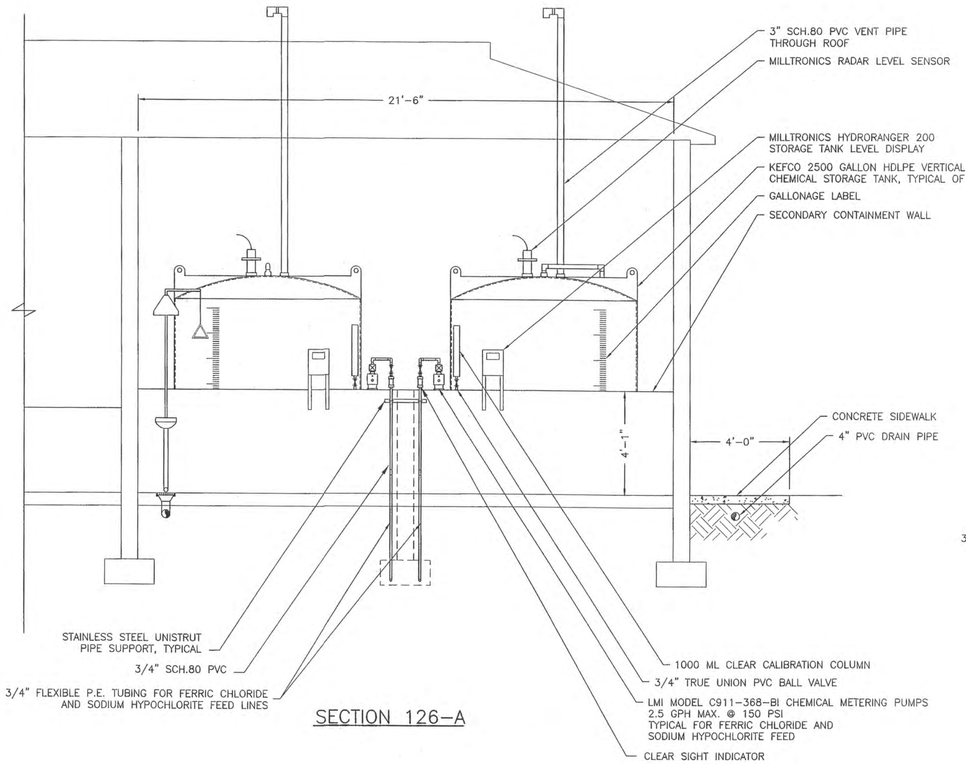
WATER RECLAMATION FACILITY

SCALE: 3/8"=1'

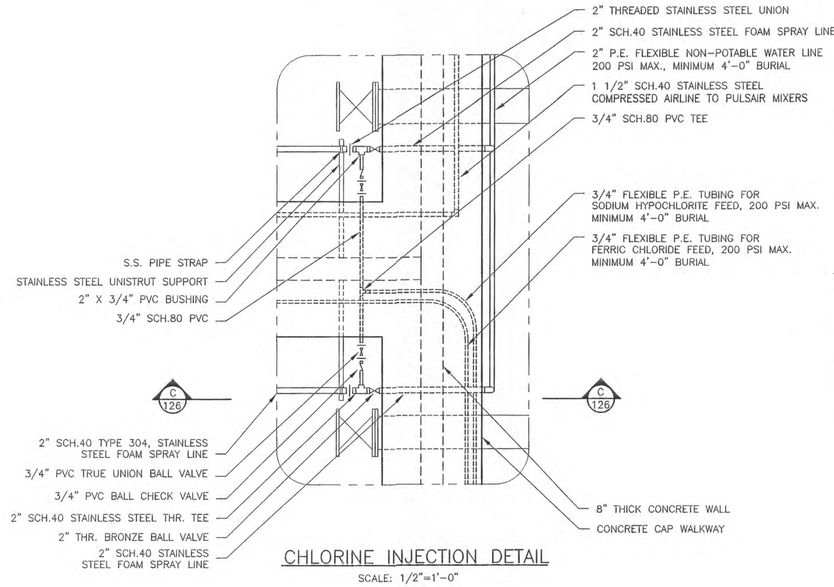
WASTEWATER TREATMENT PLANT

SLUDGE DE-WATERING FACILITIES SECTION VIEWS

SHEET NO. W28 OF 32

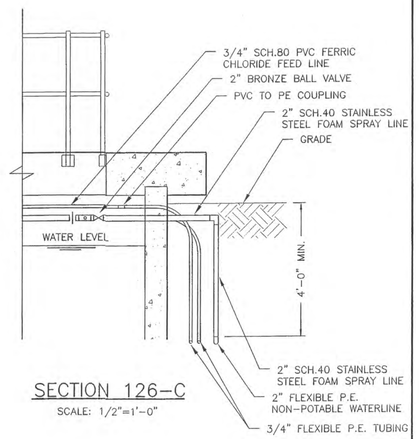


SECTION 126-A



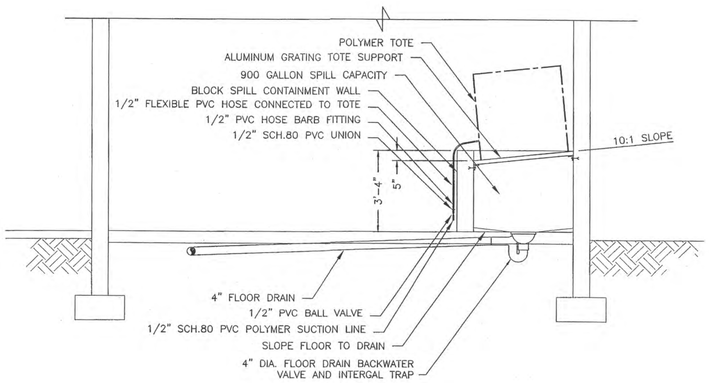
CHLORINE INJECTION DETAIL

SCALE: 1/2"=1'-0"

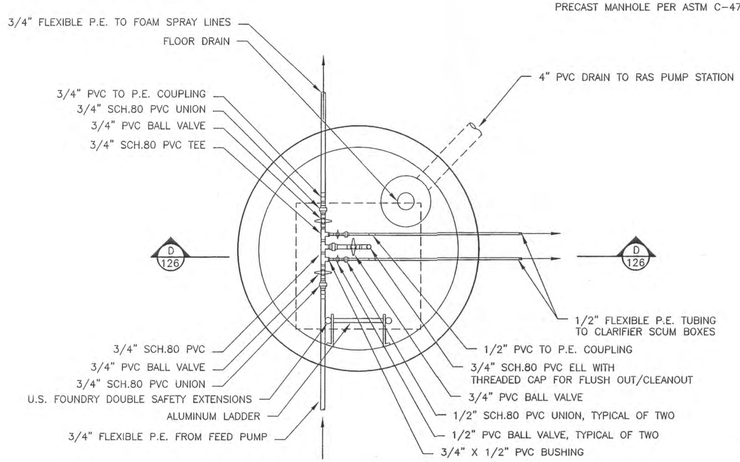


SECTION 126-C

SCALE: 1/2"=1'-0"

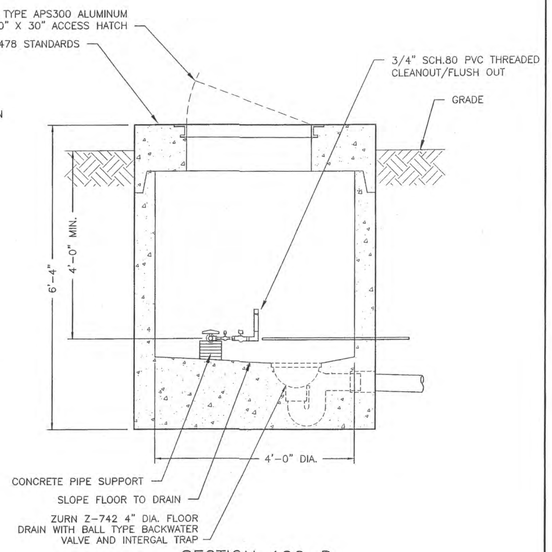


SECTION 126-B



CHLORINE FEED LINE VALVE BOX DETAIL

SCALE: 3/4"=1'-0"



SECTION 126-D

SCALE: 3/4"=1'-0"

CHLORINE VALVE BOX COATING REQUIREMENTS:

SURFACES TO BE COATED:

1. ALL EXPOSED PVC PIPE AND PVC FITTINGS
2. PVC VALVES (LESS VALVES HANDLES)
3. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED OR FACTORY FINISHED.

SURFACE PREPARATION:

1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. PIPING SHALL BE STENCILED WITH BLACK LETTERING. PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.
3. FERRIC CHLORIDE AND SODIUM HYPOCHLORITE PIPING AND FITTINGS SHALL BE YELLOW (SW 4034).

DESIGNED BY:	ADM	REVISIONS	
DRAWN BY:	ADM	DATE	REMARKS
CHECKED BY:		4/29/06	PER 4/5/06 REVIEW COMMENTS
APPROVED BY:			
DATE:	NOVEMBER 13, 2004		
DRAWING NO.	766-128		

R. D. Zande & Associates

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT

WATER RECLAMATION FACILITY

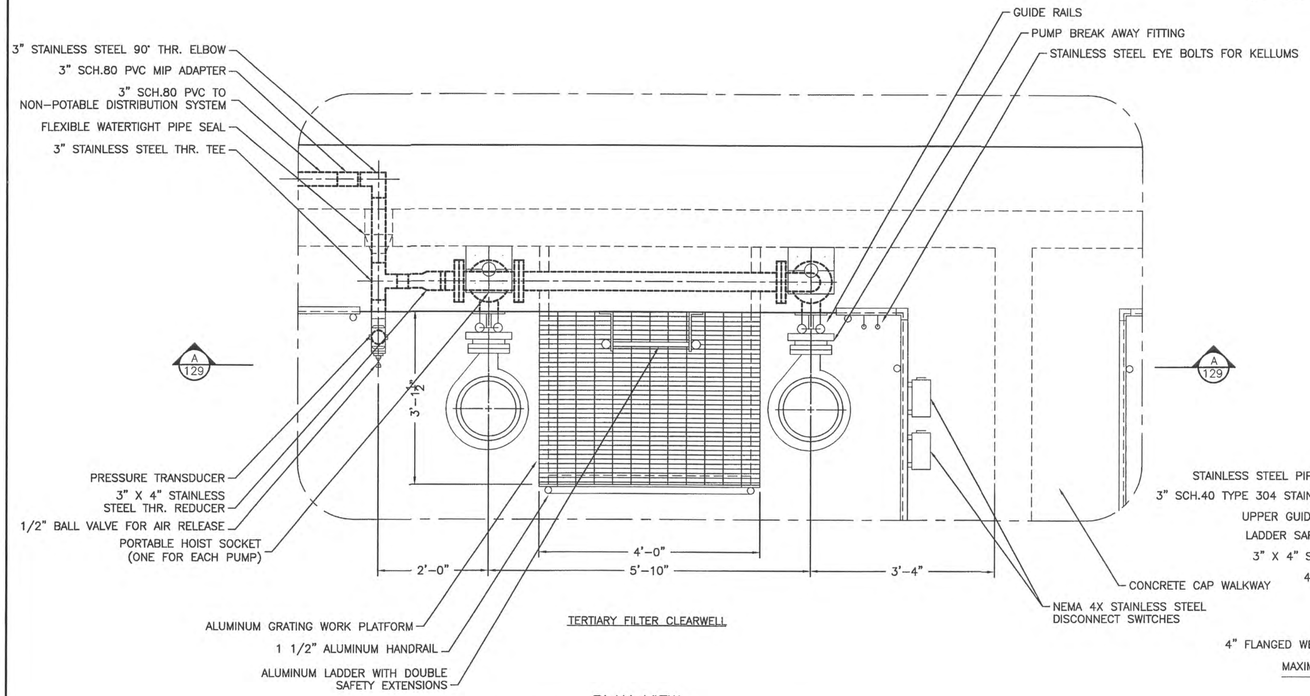
SCALE: 3/8"=1'

WASTEWATER TREATMENT PLANT

CHLORINE VALVE BOX DETAILS AND SECTION VIEWS

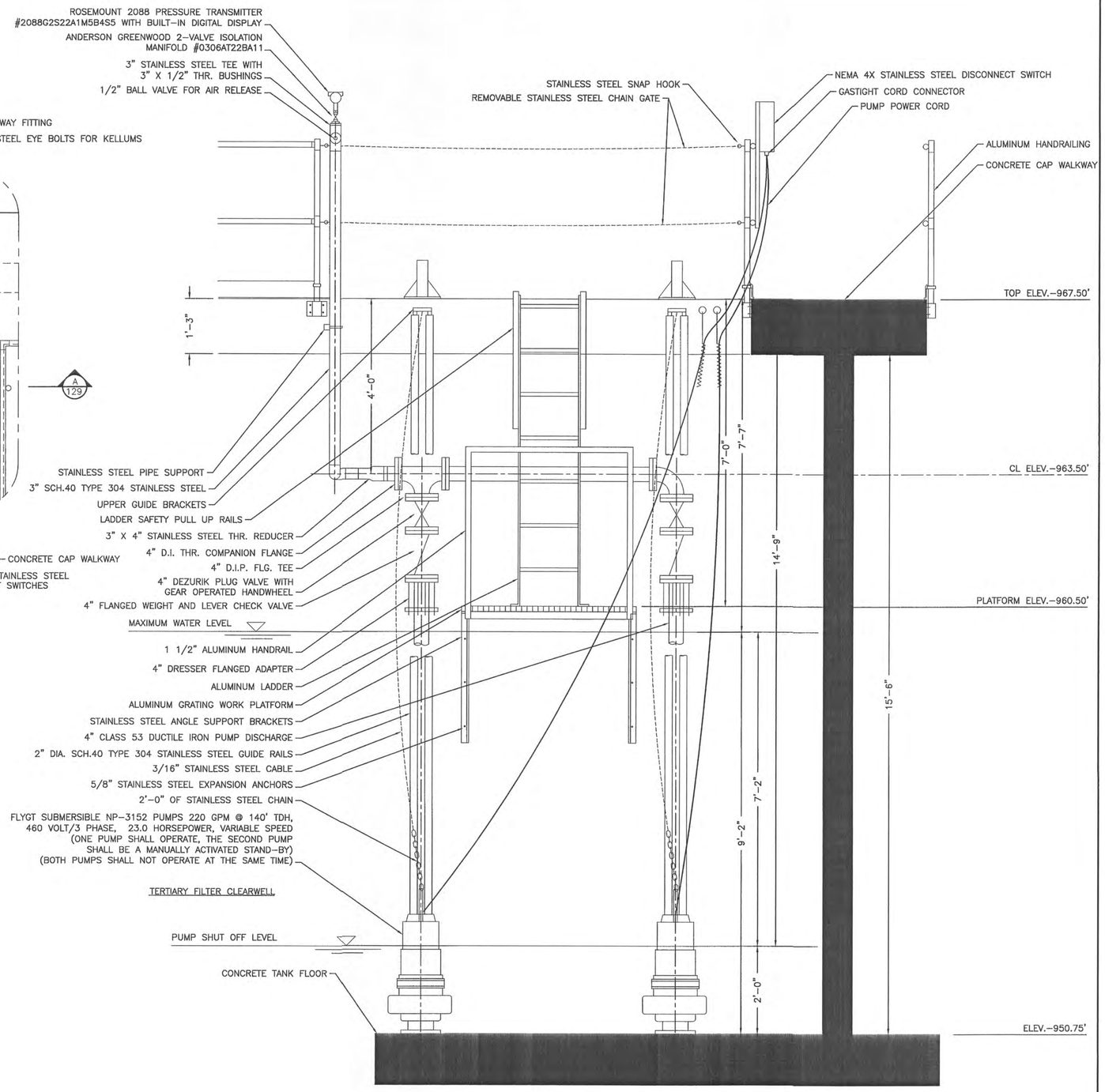
SHEET NO.

W29 OF 32



TERTIARY FILTER CLEARWELL

PLAN VIEW
NON-POTABLE WATER PUMPING SYSTEM



SECTION 129-A

PUMP SYSTEM DESIGN:

WATER DEMAND:
15 GPM - AUGER SPRAY WASH
5 GPM - BIOFILTER BED SPRINKLER
40 GPM - CENTRIFUGE WASHWATER (CLEAN-UP ONLY)
106.4 GPM - FROTH SPRAY SYSTEM (76 NOZZLES @ 1.4 GPM EACH)
50 GPM - YARD HYDRANTS (ASSUME ONE IN USE)
3.6 GPM - MISCELLANEOUS FAN HUMIDIFIERS
220 GPM TOTAL NON-POTABLE WATER DEMAND

WATER LINE PRESSURE TO BE SET AT 40 PSI (ADJUSTABLE)
SUBMERSIBLE PUMP CAPABLE OF 220 GPM @ 140' TDH (60 PSI)

CONTROL DESIGN:
THE PRESSURE TRANSDUCER SHALL SENSE LINE PRESSURE AND CONVERT TO A 4-20 mA SIGNAL. THE SIGNAL SHALL FEED TO THE DIGITAL PRESSURE DISPLAY AND CONNECT TO THE PLC BASED CONTROL PANEL. THE PLC SHALL CONTROL A VFD CONTROLLER WHICH SHALL CONTROL PUMP SPEED THUS MAINTAINING A SET LINE PRESSURE. PUMPS SHALL AUTOMATICALLY ALTERNATE.

NON-POTABLE WATER SYSTEM COATING REQUIREMENTS:

1. SURFACES TO BE COATED:
   A. ALL EXPOSED PVC PIPE AND PVC FITTINGS
   B. CAST IRON VALVES
   C. DUCTILE IRON PIPE AND FITTINGS
2. STENCIL VALVE IDENTIFICATION ADJACENT TO VALVE STEM/ACTUATORS ON CONCRETE WALKWAYS AND COAT WITH CLEAR CONCRETE SEALANT.

NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED, FACTORY FINISHED.

SURFACE PREPARATION:
1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. APPLY PAINT ABOVE 40 DEGREES F.

COATING:
1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. COLOR SHALL BE AQUA (SW 4061)
3. PIPING SHALL BE STENCILED WITH BLACK LETTERING.
   PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	DECEMBER 14, 2004
DRAWING NO.	766-129

REVISIONS	
DATE	REMARKS
6/13/05	PER 5/2/05 MTG. COMMENTS
4/29/06	PER 4/5/06 REVIEW COMMENTS
5/18/06	PLATFORM SIZE

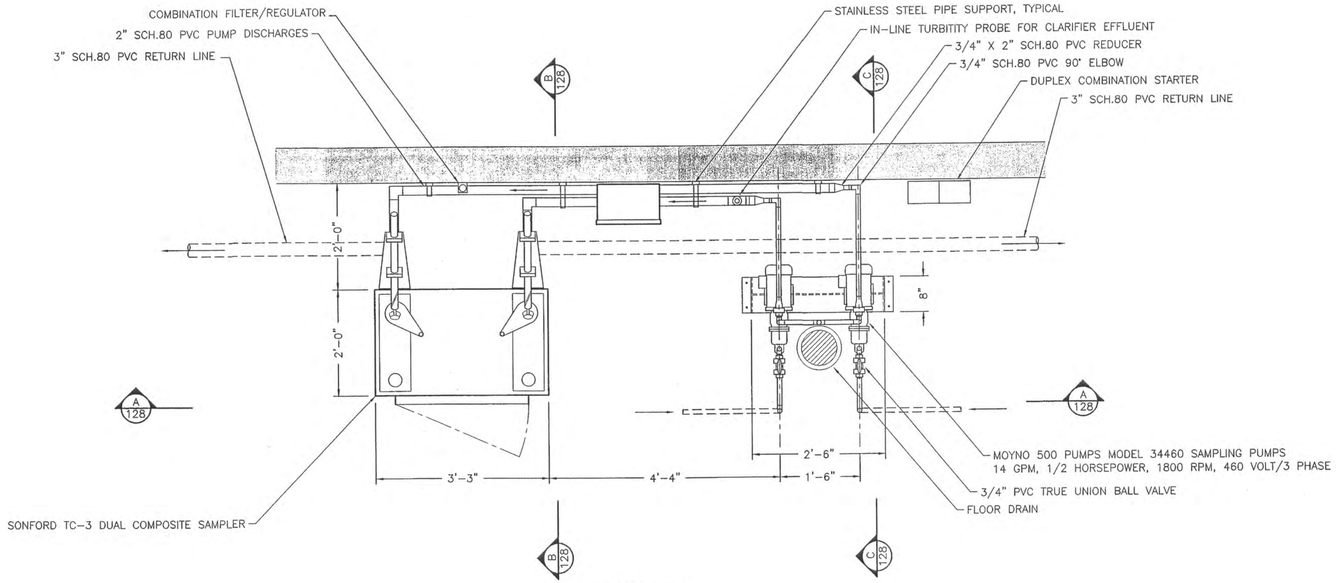
Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: 3/4"=1'

WASTEWATER TREATMENT PLANT
NON-POTABLE WATER SYSTEM

SHEET NO.
W30 OF 32



PLAN VIEW

SAMPLER EQUIPMENT COATING REQUIREMENTS:

1. SURFACES TO BE COATED:
   A. ALL EXPOSED PVC PIPE AND PVC FITTINGS
   B. PVC VALVES (LESS VALVES HANDLES)
   C. SAMPLING PUMPS AND MOTORS (LESS NAMEPLATES)

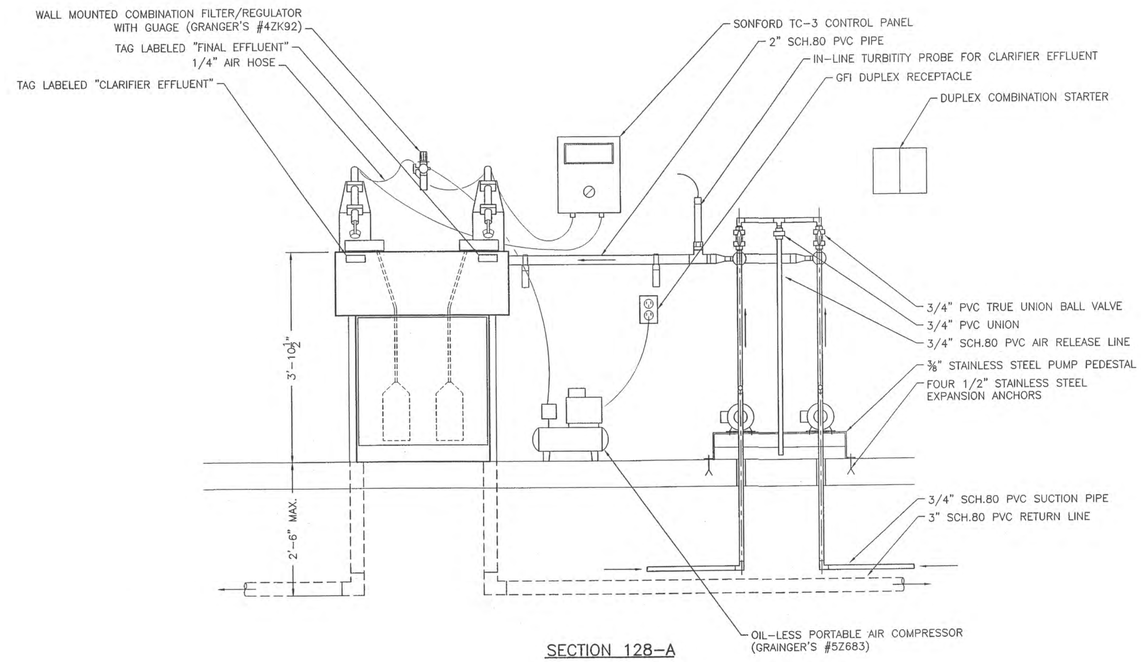
NOTE: ALL ITEMS NOT LISTED ABOVE SHALL REMAIN UNCOATED, FACTORY FINISHED.

SURFACE PREPARATION:

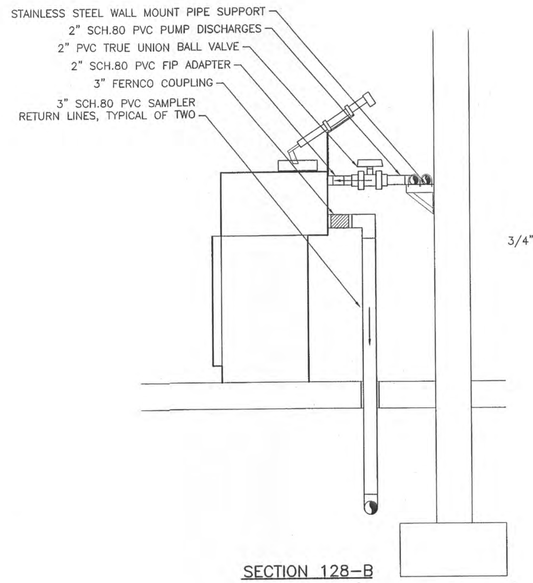
1. ALL SURFACES TO BE COATED SHALL BE CLEAN AND DRY.
2. PVC PIPE TO BE SANDED WITH 80 GRIT SANDPAPER.
3. APPLY PAINT ABOVE 40 DEGREES F.

COATING:

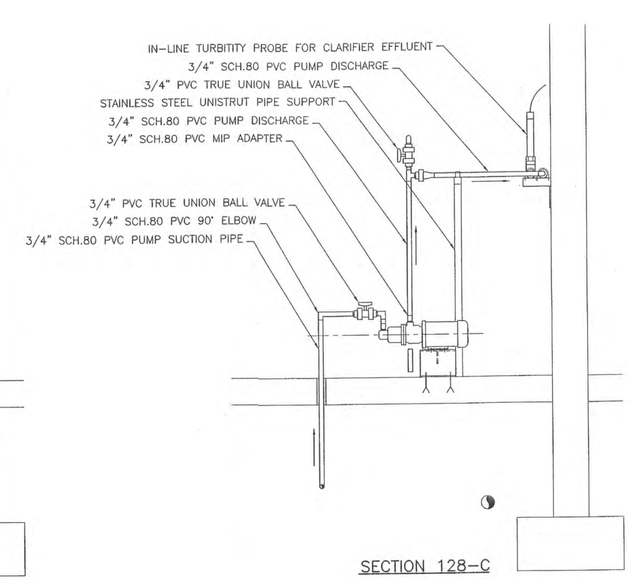
1. APPLY SHERWIN WILLIAMS MACROPOXY 646 POLYMIDE EPOXY. TWO COATS.
2. COLOR SHALL BE LIGHT GRAY (SW 4026)
3. PIPING SHALL BE STENCILED WITH BLACK LETTERING.
   PIPING SHALL BE APPROPRIATELY IDENTIFIED WITH FLOW DIRECTIONAL ARROWS.



SECTION 128-A

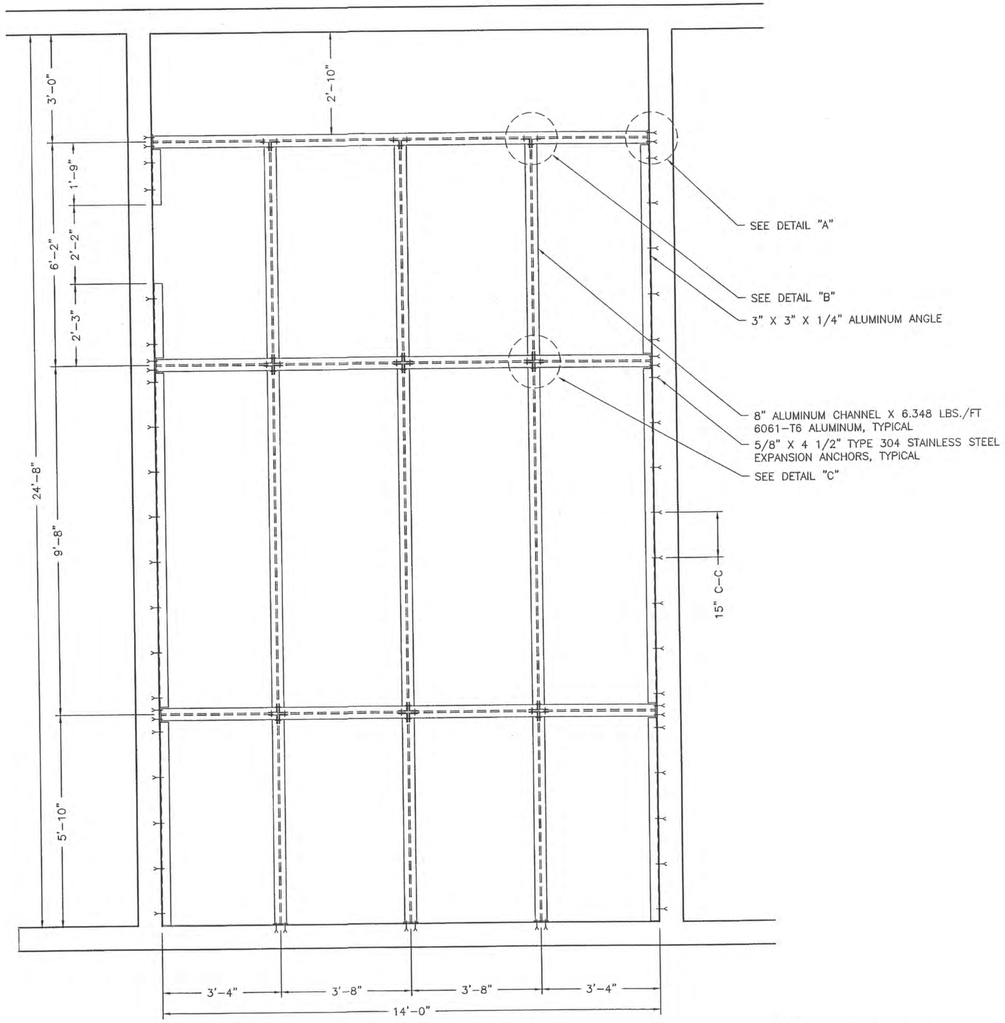


SECTION 128-B

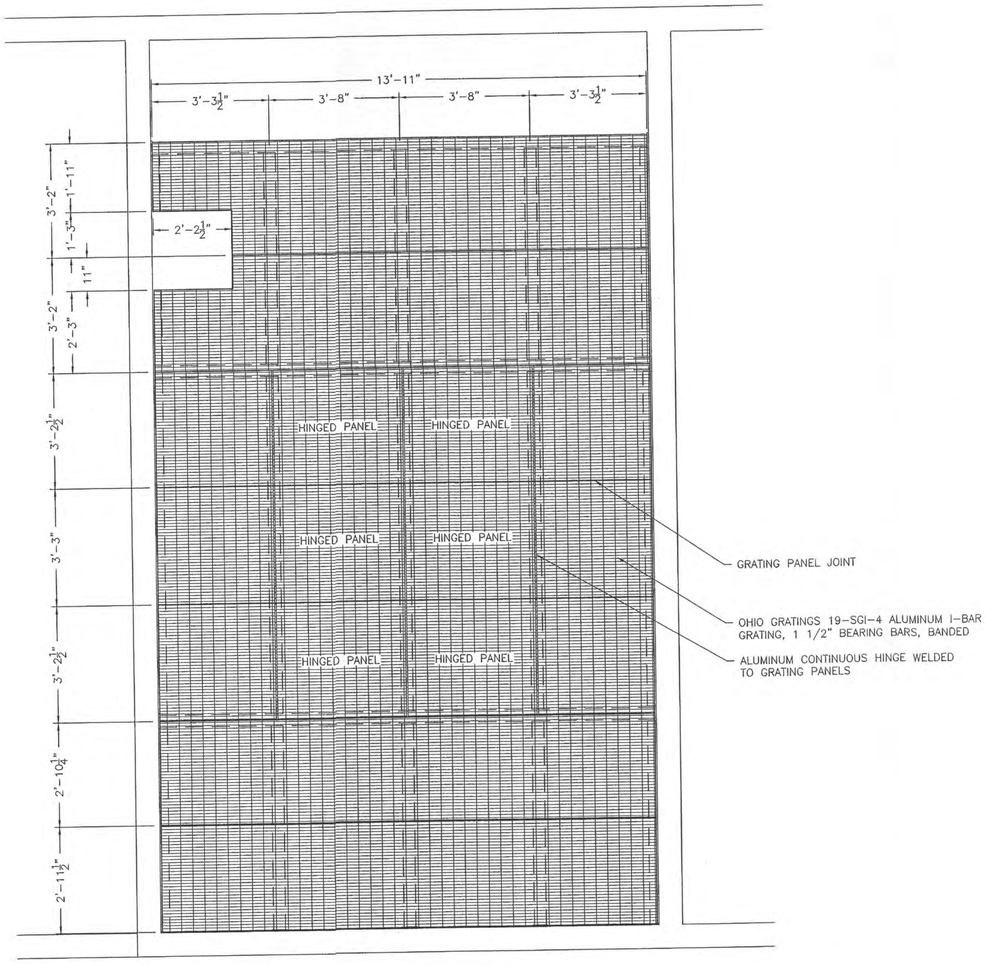


SECTION 128-C

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: DECEMBER 27, 2004 DRAWING NO. 766-130	REVISIONS DATE / REMARKS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111		NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 3/4"=1'	WASTEWATER TREATMENT PLANT COMPOSITE SAMPLER INSTALLATION DETAILS	SHEET NO. W31 OF 32

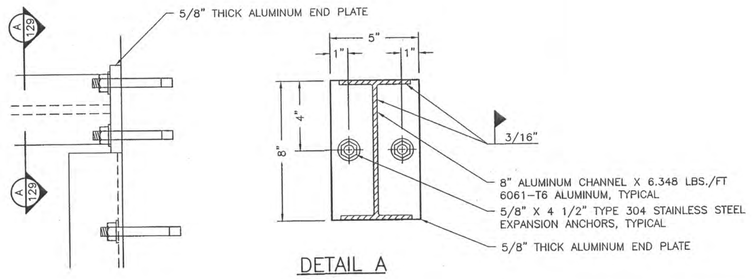


SUPPORT STRUCTURE PLAN

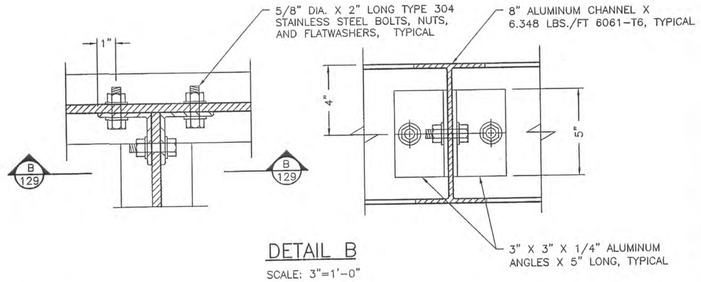


GRATING PLAN

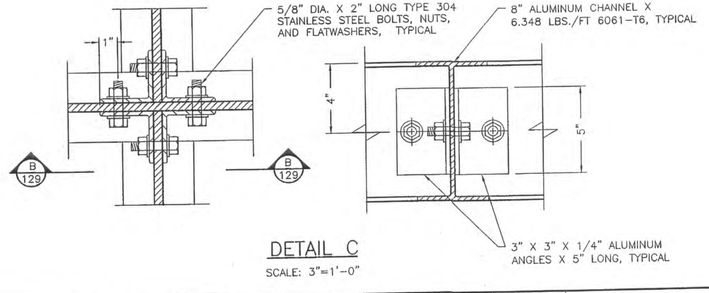
NOTE:
ANY ALUMINUM IN CONTACT WITH CONCRETE TO BE COATED WITH BITUMASTIC



DETAIL A
SCALE: 3"=1'-0"



DETAIL B
SCALE: 3"=1'-0"



DETAIL C
SCALE: 3"=1'-0"

R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: FEBUARY 20, 2005 DRAWING NO. 766-131	REVISIONS DATE / REMARKS 12/18/04 ADM 1/24/05 PER 1/19/05 REVIEW MTG.	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111	NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: 1/2"=1' WASTEWATER TREATMENT PLANT FAN AND SLUDGE PUMP CHAMBER INTERMEDIATE PLATFORM DETAIL SHEET NO. W32 OF 32

GENERAL NOTES

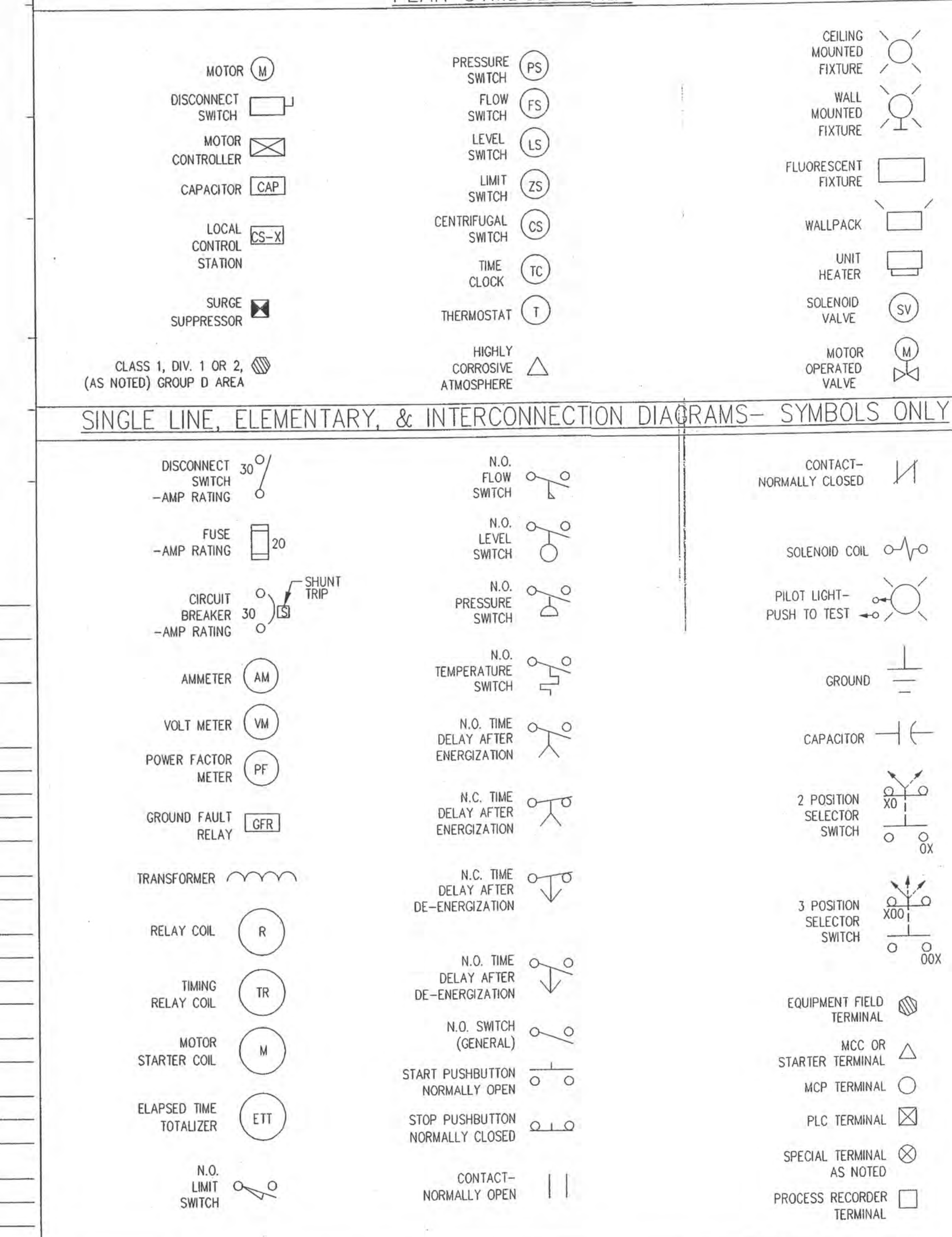
1. ⧅⧅⧅ CLASS 1, DIVISION 1 OR 2 (AS NOTED), GROUP D. ALL CONDUITS AND FITTINGS PVC COATED. SEAL OFF FITTINGS REQUIRED ON ALL CONDUITS AND DEVICES PER NEC ARTICLE 501.15.
2. ALL LIGHTING AND RECEPTACLE WIRING TO BE #12 XHHW WITH EQUIPMENT GROUND IN 3/4" C UNLESS OTHERWISE NOTED.
3. DO NOT MOUNT ANY LIGHT FIXTURE DIRECTLY OVER PIPING OR EQUIPMENT THAT WILL INTERFERE WITH NORMAL LIGHTING DISTRIBUTION.
4. SIZE JB 'S AS REQUIRED PER NEC. PROVIDE BARRIER TYPE TERMINAL STRIPS, AND ALL WIRING TO BE IN CONDUIT.
5. SIZE PULL BOXES AS REQUIRED PER NEC.
6. PROVIDE SEPARATE PB 'S FOR CONTROL AND POWER.
7. MOTOR OVERLOAD SETTING SHALL BE FIELD SELECTED PER MOTOR NAME PLATE CURRENT AND INSTALLED ACCORDINGLY.
8. WATERTIGHT CONNECTIONS – HEAT SHRINK INSULATION RAYCHEM, THOMAS BETTS, OR EQUAL
9. LOCAL CONTROLS AT EQUIPMENT SHALL BE MOUNTED 60" ABOVE FINISHED FLOOR. MOUNT CONTROLS ON WALL NEAREST EQUIPMENT WHERE POSSIBLE. (MAX. DISTANCE FROM WALL TO EQUIPMENT –10 FEET).

LIGHTING SWITCHES & RECEPTACLES

MARK *	ITEM	AMPS	VOLTS	PHASE	DESCRIPTION
	RECEPTACLE	20	125	1	3 WIRE GROUNDING DUPLEX TYPE
GFI	RECEPTACLE– GROUND FAULT	20	125	1	3 WIRE GROUNDING, DUPLEX TYPE, NEMA REF: RECEPT 5–20R PLUG 5–20P
W	RECEPTACLE– GROUND FAULT WET LOCATION	20	125	1	3 WIRE GROUNDING, DUPLEX TYPE, COMPLETE W/COVER & RECEPTACLE
T	TELEPHONE JACK				MODULAR PHONE JACK TYPE, COMPLETE W/COVER
XP	RECEPTACLE– EXPLOSION PROOF	20	125	1	3 WIRE GROUNDING SINGLE GANG W/ PLUG NEMA 7
	RECEPTACLE– 208V 3PH 5W	30	120/208	3	4 POLE 5 WIRE GROUNDING, TYPE, COMPLETE W/COVER & RECEPTACLE
$\$$	WALL SWITCH	20	120/277	1	SINGLE POLE PRESS SWITCH & PLATE W/ PILOT LIGHT
$\$_3$	WALL SWITCH	20	120/277	1	THREE WAY PRESS SWITCH & PLATE W/ PILOT LIGHT
$\$_4$	WALL SWITCH	20	120/277	1	FOUR WAY PRESS SWITCH & PLATE W/ PILOT LIGHT

* PROVIDE ENCLOSURE W/ NEMA RATING AS REQ'D.
  NEMA 1 – OFFICE & LAB AREAS
  NEMA 4X – OUTSIDE/CORROSIVE AREAS
  NEMA 7 – HAZARDOUS AREAS
  NEMA 12 – INSIDE

LEGEND OF ELECTRICAL SYMBOLS



PLAN SYMBOLS ONLY
MOTOR
M
DISCONNECT SWITCH
MOTOR CONTROLLER
CAPACITOR
CAP
LOCAL CONTROL STATION
CS-X
SURGE SUPPRESSOR
CLASS 1, DIV. 1 OR 2, (AS NOTED) GROUP D AREA
PRESSURE SWITCH
PS
FLOW SWITCH
FS
LEVEL SWITCH
LS
LIMIT SWITCH
ZS
CENTRIFUGAL SWITCH
CS
TIME CLOCK
TC
THERMOSTAT
T
HIGHLY CORROSIVE ATMOSPHERE
CEILING MOUNTED FIXTURE
WALL MOUNTED FIXTURE
FLUORESCENT FIXTURE
WALLPACK
UNIT HEATER
SOLENOID VALVE
SV
MOTOR OPERATED VALVE
M
SINGLE LINE, ELEMENTARY, & INTERCONNECTION DIAGRAMS– SYMBOLS ONLY
DISCONNECT SWITCH –AMP RATING
30
FUSE –AMP RATING
20
CIRCUIT BREAKER –AMP RATING
30
SHUNT TRIP
S
AMMETER
AM
VOLT METER
VM
POWER FACTOR METER
PF
GROUND FAULT RELAY
GFR
TRANSFORMER
RELAY COIL
R
TIMING RELAY COIL
TR
MOTOR STARTER COIL
M
ELAPSED TIME TOTALIZER
ETT
N.O. LIMIT SWITCH
N.O. FLOW SWITCH
N.O. LEVEL SWITCH
N.O. PRESSURE SWITCH
N.O. TEMPERATURE SWITCH
N.O. TIME DELAY AFTER ENERGIZATION
N.C. TIME DELAY AFTER ENERGIZATION
N.C. TIME DELAY AFTER DE–ENERGIZATION
N.O. TIME DELAY AFTER DE–ENERGIZATION
N.O. SWITCH (GENERAL)
START PUSHBUTTON NORMALLY OPEN
STOP PUSHBUTTON NORMALLY CLOSED
CONTACT– NORMALLY OPEN
CONTACT– NORMALLY CLOSED
SOLENOID COIL
PILOT LIGHT– PUSH TO TEST
GROUND
CAPACITOR
2 POSITION SELECTOR SWITCH
XO
OX
3 POSITION SELECTOR SWITCH
XOO
OOX
EQUIPMENT FIELD TERMINAL
MCC OR STARTER TERMINAL
MCP TERMINAL
PLC TERMINAL
SPECIAL TERMINAL AS NOTED
PROCESS RECORDER TERMINAL

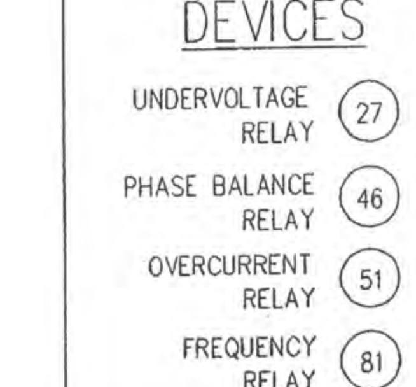
ELECTRICAL ABBREVIATIONS

A	AMPS
AI	ANALOG INPUT (PLC)
AL	ALUMINUM
AM	AMMETER
AO	ANALOG OUTPUT (PLC)
AP	ALARM PANEL
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CJB	CONTROL JUNCTION BOX
CP	CONTROL PANEL
CPT	CONTROL POWER TRANFORMER
CR	CORROSION RESISTANT
CS	CONTROL STATION
CT	CURRENT TRANSFORMER
CU	COPPER
DB	DUCT BANK
DI	DIGITAL INPUT (PLC)
DO	DIGITAL OUTPUT (PLC)
EAG	ELECTRICALLY ACTIVATED GATE
EAV	ELECTRICALLY ACTIVATED VALVE
EF	EXHAUST FAN
ESPB	EMERGENCY STOP PUSHBUTTON (MAINTAINED)
ETT	ELAPSED TIME TOTALIZER
EWD	ELEMENTARY WIRING DIAGRAM
FDS	FUSED DISCONNECT SWITCH
FLA	FULL LOAD AMPERES
FS	FLOW SWITCH
FVC	FULL VOLTAGE CONTACTOR
FVNR–1	FULL VOLTAGE NON–REVERSING STARTER SIZE 1
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GFR	GROUND FAULT RELAY
HOA	HAND/OFF/AUTO SELECTOR SWITCH
HP	HORSEPOWER
HT	HIGH TORQUE SWITCH
HTR	HEATER
Hz	HERTZ
ICP	INSTRUMENTATION & CONTROL PANEL
IPP	INSTRUMENT POWER PANEL
JB	JUNCTION BOX
JBC	JUNCTION BOX–CONTROL
JBM	JUNCTION BOX–METERING
JBP	JUNCTION BOX–POWER
KCM	KILO (1000) CIRCULAR MILL
KVA	KILOVOLT AMPERES
KVAR	KILOVOLT AMPERES–REACTIVE
KW	KILOWATT
LA	LIGHTING ARRESTOR
LGT	LIGHT
LOR	LOCAL/OFF/REMOTE SELECTOR SWITCH
LP	LIGHTING PANEL
LS	LEVEL SWITCH
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MJB	METERING JUNCTION BOX
MSC	MANUFACTURE SUPPLIED CABLE
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MFR ASSOC.
NEUT	NEUTRAL
NFDS	NON–FUSED DISCONNECT SWITCH
OCSS	OPEN/CLOSE SELECTOR SWITCH
OL	OVERLOAD
OOSS	ON/OFF SELECTOR SWITCH
OT	OVER TORQUE SWITCH
P	POLE
PB	PUSHBUTTON
PBC	PULLBOX–CONTROL
PBM	PULLBOX–METERING
PBP	PULLBOX–POWER
PC	PHOTO CONTROL
PF	POWER FACTOR
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PJB	POWER JUNCTION BOX
PP	POWER PANEL
PRI	PRIMARY
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
R	RELAY
RCP	REINFORCED CONCRETE PIPE
RL	RUN LIGHT
SCP	SURGE CONTROL PANEL
SEC	SECONDARY
SF	SUPPLY FAN
SHLD	SHIELDED
SP	SHEAR PIN SWITCH
SPK	SPEAKER
SS	SELECTOR SWITCH OR STAINLESS STEEL
SSOR	SOLID STATE OVERLOAD RELAY
SSPB	START/STOP PUSHBUTTON
SSS	SOLID STATE STARTER
STD	STANDARD
STRTR	STARTER
SV	SOLENOID VALVE
SW	SWITCH
T	TELEPHONE
TB	TERMINAL BOARD
TC	TIME CLOCK
TD	TRENCH DUCT
TEB	TELEPHONE EQUIPMENT BACKBOARD
TEMP	TEMPERATURE
TOR	THERMAL OVERLOAD RELAY
TR	TIMING RELAY
TRANS	TRANSFORMER
TSTAT	THERMOSTAT
TVSS	TRANSIENT VOLTAGE SUPRESSOR
UH	UNIT HEATER
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLTS
VC	VOLUME CONTROL
VFD	VARIABLE FREQUENCY DRIVE
VM	VOLT METER
X/P	EXPLOSION PROOF
ZS	LIMIT SWITCH

ISA IDENTIFICATION LETTERS

	FIRST–LETTER		SUCCEEDING–LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

PROTECTIVE DEVICES



R. D. Zande & Associates

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:			
APPROVED BY:			
DATE: JAN 13, 2006			
DWG NO.5724-01 MACK-IND-NORTHSTAR\E1-2			

FLOYD BROWNE ASSOCIATES, FBA INC.

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STATE OF OHIO WILLIAM CLIFFORD MESS 68390 REGISTERED PROFESSIONAL ENGINEER
JAN. 17, 2006

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENT PLANT

SCALE: NONE

WASTEWATER TREATMENT PLANT
ELECTRICAL NOTES/LEGENDS/ABBREVIATIONS

SHEET NO. 30
E1 OF 18

NOTES – MOTOR DATA AND FEEDERS

A. FULL LOAD CURRENTS ARE BASED ON TABLE 430-250, 2005 NEC.

B. STARTER SIZES ARE MINIMUM PER NEMA STANDARDS AND FB SPECIFICATIONS.

C. SIZES LISTED ARE FOR COMBINATION STARTERS. PROVIDE PROTECTIVE DEVICES AS INDICATED ON SINGLE LINE DIAGRAMS, OR AS NOTED. FUSES PROVIDE BACKUP MOTOR OVERLOAD PROTECTION.

D. SIZES ARE BASED ON 2005 NEC. TABLE 310.16, AND ARTICLE 110.14, 60° AND 75° C FOR XHHW WIRES. SIZES ARE APPLICABLE ONLY FOR THE WIRE AND CONDUIT BETWEEN THE MOTOR AND STARTER. ONE WIRE PER PHASE AND GROUND UNLESS NOTED OTHERWISE.

E. DISTANCE SHOWN IS THE MAXIMUM DISTANCE ALLOWABLE FOR A 2% VOLTAGE DROP. VOLTAGE IS BASED ON 3 SINGLE CONDUCTORS/STEEL CONDUIT, 0.8 POWER FACTOR. DISTANCES MAY CHANGE FOR NON-MAGNETIC CONDUIT, CAPACITORS AT MOTOR, ETC.

F. PROVIDE GROUND WIRE FOR EACH SET OF POWER CONDUCTORS.

G. OVERCURRENT PROTECTION FOR CONTROL TRANSFORMERS SHALL BE AS FOLLOWS:

PRIMARY FUSE SIZE			120 VOLT SECONDARY	
480 V	240 V	SIZE	FUSE	CIRCUIT BREAKER
0.6 A	1.4 A	150 VA	1.5 A	2 A
1-1/4 A	2.5 A	250 VA	3.0 A	3 A
1.8 A	3.5 A	350 VA	4.5 A	4 A

WHERE FUSES ARE PROVIDED FOR SECONDARY PROTECTION, A SEPARATE "ON-OFF" SWITCH IS REQUIRED.

H. SIZES ARE BASED ON 2005 NEC, TABLE 310.16, AND ARTICAL 110.14 TYPE XHHW WIRE, 60° C AND 75° C RATING. ONE WIRE PER PHASE/NEUTRAL AND GROUND UNLESS NOTED OTHERWISE. MAXIMUM LOAD IS ASSUMED AT 80% OF THE BRANCH RATING.

I. POWER FACTOR CORRECTION CAPACITORS SHALL BE PROVIDED AND SIZED ACCORDING TO MOTOR KW AND POWER FACTOR DATA SHOWN ON APPROVED SHOP DRAWINGS. CAPACITORS SHALL BE SIZED SUCH THAT FINAL MOTOR OPERATING POWER FACTOR SHALL BE BETWEEN 0.90 AND 0.95 LAGGING.

SINGLE PHASE TRANSFORMERS

PRIMARY & SECONDARY PROTECTION				
	480 VOLT PRIMARY		240/120 V SECONDARY	
SIZE	* MAX PRI CB OR FUSE	FLA	* MAX SEC CB OR FUSE	FLA
5	25	10.4	25	20.8
10	50	20.8	50	41.7
15	70	31.3	80	62.5
25	125	52.1	125	104
37.5	200	78.1	200	156
50	250	104	250	208
75	350	156	350	313
100	500	208	500	417
PRIMARY PROTECTION ONLY				
	480 VOLT PRIMARY		240/120 V SECONDARY	
SIZE	* MAX PRI CB OR FUSE	FLA	* MAX SEC CB OR FUSE	FLA
5	15	10.4	---	20.8
10	30	20.8	---	41.7
15	40	31.3	---	62.5
25	70	52.1	---	104
37.5	100	78.1	---	156
50	125	104	---	208
75	175	156	---	313
100	250	208	---	417

* SEE FEEDER CHART FOR WIRE SIZE

THREE PHASE TRANSFORMERS

PRIMARY & SECONDARY PROTECTION				
	480 VOLT PRIMARY		208/120 V SECONDARY	
SIZE	* MAX PRI CB OR FUSE (250%)	FLA	* MAX SEC. CB OR FUSE (125%)	FLA
6	20	7.2	25	16.7
9	30	10.8	35	25.0
15	45	18.1	60	41.7
30	90	36.1	110	83.4
45	125	54.2	175	125.1
75	225	90.3	300	208.4
112.5	350	135.5	400	312.6
150	450	180.0	500	417
PRIMARY PROTECTION ONLY				
	480 VOLT PRIMARY		208/120 V SECONDARY	
SIZE	* MAX PRI CB OR FUSE (125%)	FLA	* MAX SEC CB OR FUSE	FLA
6	15	7.2	---	16.7
9	15	10.8	---	25.0
15	25	18.1	---	41.7
30	45	36.1	---	83.4
45	70	54.2	---	125.1
75	125	90.3	---	208.4
112.5	175	135.5	---	312.6
150	225	180.0	---	417

* SEE FEEDER CHART FOR WIRE SIZE

POWER CABLE & CONDUIT SCHEDULE

NO.	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
I	NOT USED		
II	NOT USED		
III	2-#12	1-#12	3/4"
IV	3-#12	1-#12	3/4"
V	5-#12	1-#12	3/4"
VI	6-#12	1-#12	3/4"

NO.	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
VII	8-#12	1-#12	1"
VIII	10-#12	1-#12	1"
IX	2-#10	1-#10	3/4"
X	3-#10	1-#10	3/4"
XI	6-#10	1-#10	1"
XII	2-#8	1-#10	1"
XIII	3-#8	1-#10	1"
XIV	6-#8	1-#10	1 1/4"

NO.	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
XV	2-#6	1-#10	1"
XVI	3-#6	1-#10	1"
XVII	2-#4	1-#8	1 1/4"
XVIII	3-#4	1-#8	1 1/2"
XIX	NOT USED		
XX	2-#2	1-#8	1 1/2"
XXI	3-#2	1-#8	1 1/2"
XXII	2-#1	1-#8	1 1/2"

NO.	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
XXIII	3-#1	1-#6	1 1/2"
XXIV	3-#1/0	1-#6	2"
XXV	3-#2/0	1-#6	2"
XXVI	3-#3/0	1-#6	2"
XXVII	3-#4/0	1-#4	2 1/2"
XXVIII	3-#250	1-#4	2 1/2"
XXIX	3-#350	1-#4	3"
XXX	3-#500	1-#2	3"
PA	3-#12	1-#12	3/4" MIN
BELDEN 29502 OR EQUAL			

NO.	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
PB	3-#10	1-#10	1" MIN
BELDEN 29503 OR EQUAL			
PC	3 #8	1-#8	1-1/4" MIN
BELDEN 29504 OR EQUAL			
PD	3-#6	1-#6	1-1/4" MIN
BELDEN 29505 OR EQUAL			
PE	3-#4	1-#4	1-1/2" MIN
BELDEN 29506 OR EQUAL			
PF	3-#2	1-#2	2" MIN
BELDEN 29507 OR EQUAL			

CONTROL CABLE & CONDUIT SCHEDULE

CONTROL (C)							
MARK	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE	MARK	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
CA	2-#14	1-#14	3/4"	CJ	14-#14	1-#14	1"
CB	3-#14	1-#14	3/4"	CK	16-#14	1-#14	1 1/2"
CC	4-#14	1-#14	3/4"	CL	18-#14	1-#14	1 1/2"
CD	5-#14	1-#14	3/4"	CM	20-#14	1-#14	1 1/2"
CE	6-#14	1-#14	3/4"	CN	22-#14	1-#14	1 1/2"
CF	8-#14	1-#14	3/4"	CP	MULTI 18C-#14	1-#14	1 1/2"
CG	10-#14	1-#14	1"				
CH	12-#14	1-#14	1"				

METERING (M)			
MARK	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
MA	1-PR #18 SHIELDED	DRAIN WIRE	3/4"
MB	2-PR #18 OVERALL SHIELDED	DRAIN WIRE	3/4"
MC	3-PR #18 OVERALL SHIELDED	DRAIN WIRE	3/4"
MD	4-PR #18 OVERALL SHIELDED	DRAIN WIRE	3/4"

MARK	CIRCUIT COND.	GND. COND. GREEN	CONDUIT SIZE
ME	8-PR #18 IND. SHIELD & OVERALL SHIELDED	DRAIN WIRE	2"
MF	3C #18 SHIELDED	DRAIN WIRE	3/4"
MG	2-3C #18 OVERALL SHIELDED	DRAIN WIRE	3/4"
MJ	TYPE "J" THERMO-COUPLE WIRE-#20		3/4"

FEEDER CHART

	BRANCH CIRCUIT DEVICE	WIRE SIZE & QTY (NOTE H)	GROUND	CONDUIT	DISTANCE (NOTE E)				
					3 PHASE			1 PHASE	
					480 V	240 V	208 V	240 V	120 V
60° C	15	#12	#12	3/4"	325	160	140	282	140
	20	#12	#12	3/4"	245	120	130	210	110
	25	#10	#12	3/4"	300	150	150	260	130
	30	#10	#10	3/4"	250	125	110	220	110
	35	#8	#10	1"	345	170	150	245	150
	40	#8	#10	1"	300	150	130	250	130
	50	#6	#10	1"	240	120	105	210	100
	60	#4	#10	1"	310	155	135	270	135
	70	#4	#8	1.5"	400	200	170	345	170
	80	#2	#8	1.5"	350	175	150	300	150
	90	#2	#8	1.5"	600	300	200	260	260
	100	#1	#8	1.5"	540	270	180	235	
75° C	110	#2	#6	1.5"	500	250	165	215	
	125	#1	#6	2"	620	310	225	270	
	150	#1/0	#6	2"	425	210	180	370	
	175	#2/0	#6	2"	430	210	190	375	
	200	#3/0	#6	2.5"	520	265	225		
	225	#4/0	#4	2.5"	460	230	200		
	250	#250	#4	2.5"	450	230	200		
	300	#350	#2	3"	425	215	185		
	350	#500	#2	3"	445	220	190		
	400	2-(#3/0	#2	2.5")	520	265	225		
	450	2-(#4/0	#2	2.5")	460	230	200		
	500	2-(#250	#2	2.5")	450	230	200		
	600	2-(#350	#1	3")	425	215	185		
	800	2-(750	#1/0	3")	445	225	190		
	1000	3-(#500	#2/0	3")	445	225	190		
	1200	3-(#750	#3/0	4")	485	240	210		

460 VOLT MOTOR DATA

HP	FLA (NOTE A)	STRTR SIZE ((NOTE B)	FUSE SIZE ((NOTE C)	MCP SIZE ((NOTE C)	CB SIZE ((NOTE C)	WIRE ((NOTE D)	GND ((NOTE F)	COND ((NOTE D)	DIST ((NOTE E)	CPT SIZE ((NOTE G)
1/2	1.1	1	1.8	3	15	#12	#12	3/4"	3200'	150 VA
3/4	1.6	1	2.8	3	15	#12	#12	3/4"	2300'	150 VA
1	2.1	1	3.5	3	15	#12	#12	3/4"	1800'	150 VA
1.5	3.0	1	5	7	15	#12	#12	3/4"	1350'	150 VA
2	3.4	1	6	7	15	#12	#12	3/4"	950'	150 VA
3	4.8	1	8	7	15	#12	#12	3/4"	700'	150 VA
5	7.6	1	12	15	15	#12	#12	3/4"	420'	150 VA
7.5	11	1	17.5	15	20	#12	#12	3/4"	300'	150 VA
10	14	1	25	30	25	#12	#12	3/4"	375'	150 VA
15	21	2	35	30	40	#10	#10	1"	390'	150 VA
20	27	2	45	50	60	#8	#10	1"	460'	150 VA
25	34	2	60	50	70	#6	#8	1.5"	370'	150 VA
30	40	3	70	70	80	#6	#8	1.5"	475'	150 VA
40	52	3	90	100	90	#4	#8	1.5"	530'	150 VA
50	65	3	110	100	100	#2	#6	1.5"	420'	150 VA
60	77	4	125	150	110	#1	#6	2"	520'	200 VA
75	96	4	150	150	125	#1	#6	2"	420'	200 VA
100	124	4	200	250	200	#2/0	#4	2.5"	510'	200 VA
125	156	5	250	250	225	#3/0	#4	2.5"	400'	350 VA
150	180	5	300	250	250	#4/0	#2	2.5"	400'	350 VA
200	240	5	400	400	350	#350	#2	3"	400'	350 VA

R. D. Zande & Associates

DESIGNED BY: FBA	REVISIONS	
DRAWN BY: JAS	DATE	REMARKS
CHECKED BY:		
APPROVED BY:		
DATE: JAN. 13, 2006		
DWG NO.5724-01 MACK-IND-NORTHSTAR\E1-2		

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STATE OF OHIO WILLIAM CLIFFORD DAVIS 68390 REGISTERED PROFESSIONAL ENGINEER
JAN. 17, 2006

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

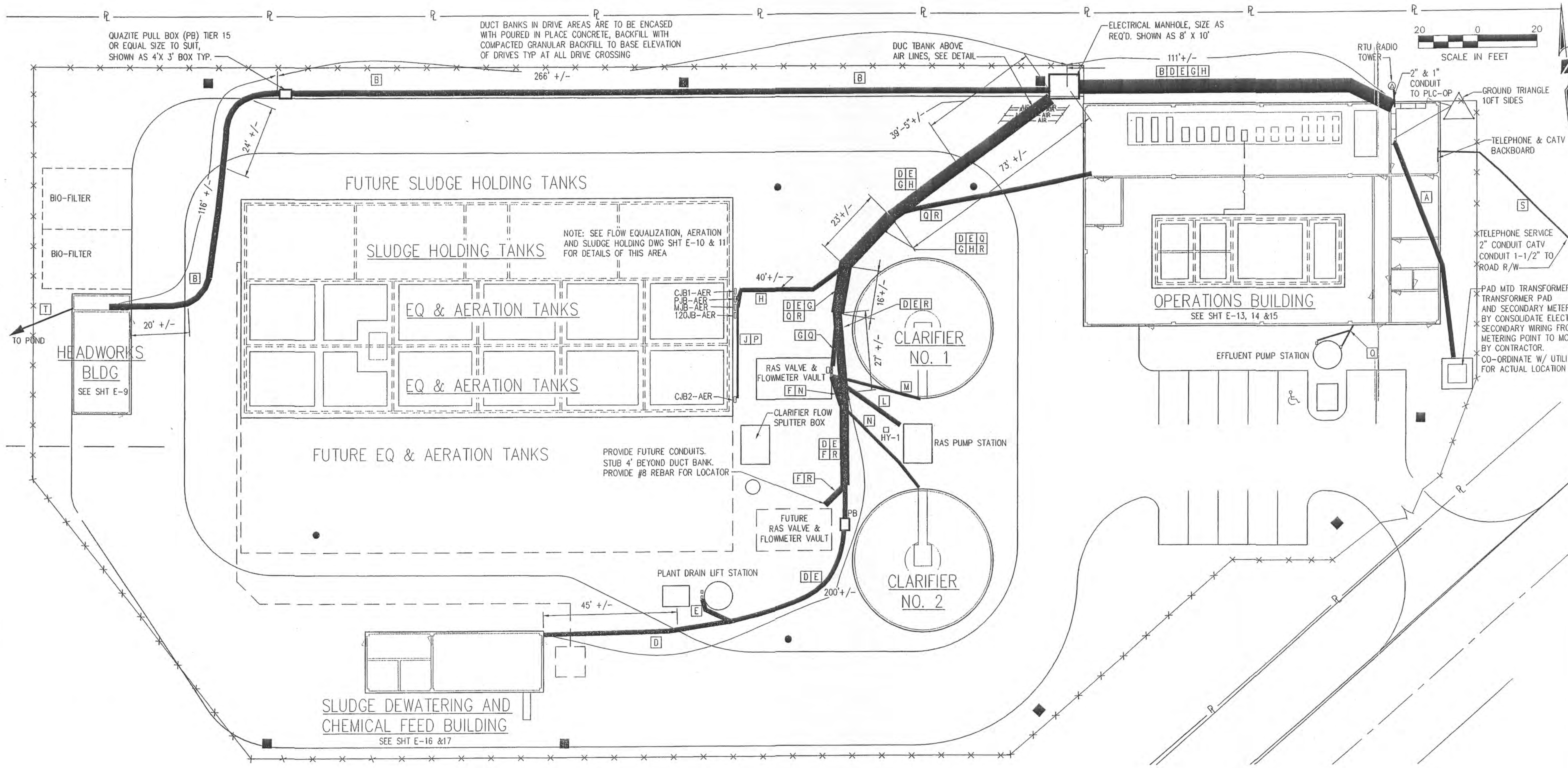
SCALE: NONE

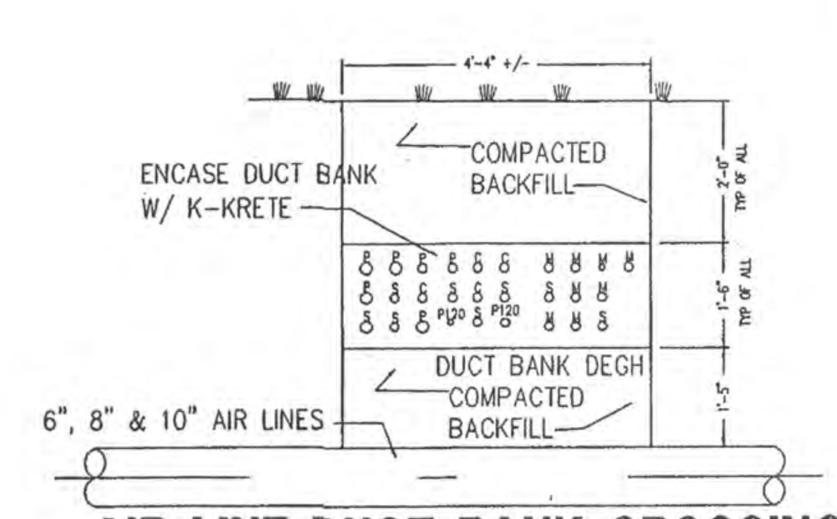
WASTEWATER TREATMENT PLANT
ELECTRICAL SCHEDULES

SHEET NO. 31
E2 OF 18

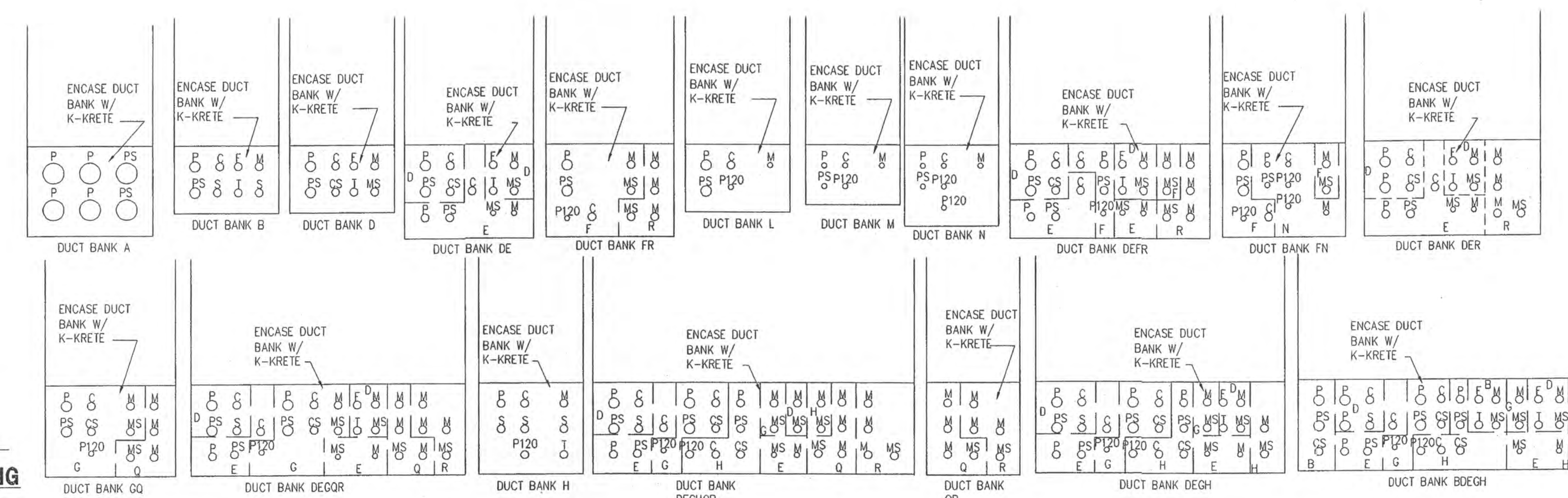
NOTE: SPARE CONDUITS ARE TO BE TERMINATED WITH THE USED CONDUITS IN SAME RUN. SPARE CONDUITS ARE TO BE TERMINATED MIN. OF 8" ABOVE FLOOR OR SLAB AND CAPPED. SPARE CONDUITS ARE TO HAVE SS TAGS ATTACHED TO STUBS INDENTIFING WHAT SPARE IS AND WHERE SPARE CONDUIT IS ENDED

DUCT	FROM	TO	NO. OF CONDUITS	SIZE OF CONDUIT	USE	WIRE CODE
A	TRANS	MCC-OP	4	4	P	4-750 MCM W/ 1-4/0 GND
	"	MCC-OP SPARE	2	4		SPARE
B	PP-HW	MCC-OP	1	2	P	XXIV
	"	"	1	2	P	SPARE
	JB-HW	PLC-OP	1	1 - 1/2"	M	2 - M C
	"	"	1	1 - 1/2"	C	C K
	"	"	2	1 - 1/2"	M / C	SPARE
	"	"	1	1 - 1/2"	F	FIBER
	"	TEB	1	1 - 1/2"	T	TELEPHONE
C	NOT USED					
D	PP-DW	MCC-OP	1	2"	P	XXIV
	"	"	1	2"	P	SPARE
	DW BLDG JB-DW	PLC-OP	1	1 - 1/2"	C	C K
	"	"	1	1 - 1/2"	C	SPARE
	"	"	1	1 - 1/2"	M	M D
	"	"	1	1 - 1/2"	M	SPARE
	"	"	1	1 - 1/2"	F	FIBER
	"	TEB	1	1 - 1/2"	T	TELEPHONE
E	PLANT DR LS	MCC-OP	1	1 - 1/2"	P	2 - X V I I I
	"	"	1	1 - 1/2"	P	SPARE
	PLANT DR LS CS'S	PLC-OP	1	1 - 1/2"	C	C G
	PLANT DR LS LIT	"	1	1"	M	M A
	"	"	1	1"	M / C	SPARE
F	PJB-RAS	STUB UP	1	1 - 1/2"	P	PULL STRING
	"	"	1	1 - 1/2"	P	PULL STRING
	CJB-RAS	"	1	1 - 1/2"	C	PULL STRING
	MJB-RAS	"	1	1 - 1/2"	M	PULL STRING
	"	"	1	1 - 1/2"	M	PULL STRING
	120PJB-RAS	"	1	1"	P-120	PULL STRING
G	PJB-RAS	MCC-OP	1	2"	P	2-PB'S
	"	"				3-X'S
	"	"	1	2"	P	SPARE
	CJB-RAS	"	1	1 - 1/2"	C	2-CH'S, 2-CE'S
						2-CG'S, 4-CF'S
	"	"	1	1 - 1/2"	C	SPARE
	MJB-RAS	PLC-OP	1	1 - 1/2"	M	5-MA'S
	"	PLC-OP	1	1 - 1/2"		SPARE
	120PJB-RAS	LP-OP	1	1"	P-120	X
H	PJB-AER	MCC-OP	1	1 - 1/2"	P	2-X'S
	"	"				3-IV'S
	"		1	1 - 1/2"	P	SPARE
	CJB1-AER	PLC-OP	1	1 - 1/2"	C	2-CM'S
	"	"				1-CG
	"	"	1	1 - 1/2"	C	SPARE
	MJB-AER	PLC-OP	1	1 - 1/2"	M	6-MA'S
		TEB	1	1 - 1/2"	T	TELEPHONE
	120JB-AER	LP-OP	1	1 - 1/2"	P-120	3-X'S
	"	"	1	1 - 1/2"	M/C	SPARE
I	NOT USED					
J	CJB2-AER	CJB1-AER	1	1"	C	CJ
	"	"		1"		SPARE
K	NOT USED					
L	RAS PUMP STATION	PJB-RAS	1	2"	P	2-PB'S
	"	MJB-RAS	1	1"	M	MA
	"	CJB-RAS	1	1 - 1/2"	C	2-CH'S
	"	120PJB-RAS	1	1"	P-120	IX
	"	STUB UP	1	2"		SPARE
M	CLARIFIER NO. 1	PJB-RAS	1	1"	P	IV
	"	MJB-RAS	1	1"	M	MA
	"	CJB-RAS	1	1"	C	CE
	"	120PJB-RAS	1	1"	P-120	IX
	"	STUB UP	1	1"		SPARE
N	CLARIFIER NO. 2	PJB-RAS	1	1"	P	IV
	"	"	1	1"	P	SPARE
	"	CJB-RAS	1	1"	C	CE
	"	MJB-RAS	1	1"	M	MA
	"	120PJB-RAS	1	1"	P-120	IX
	YARD LIGHT	120PJB-RAS	1	1"	P-120	X
	"	STUB UP	1	1"		SPARE
O	EFF PUMP STA.	DISC SWS	2	1"	P	X
	LIT-XXX	OP-JB	1	1"	M	M A
	EFF PUMP STA.	CS-3	2	1"	C	C C
P	NOT USED					
Q	FE-504A,B 505A,B,C,D	FIT-504A,B 505A,B,C,D	3	1 - 1/2"	M	FE/FIT CABLES
	"	"	1	1 - 1/2"	M	SPARE
R	STUB UP	OP-BLDG	3	1 - 1/2"	M	FUTURE FLOWMETER CABLES
	"	"	1	1 - 1/2"	M	SPARE
S	TELPHONE & CATV	ELECT ROOM	2	2"	TEL	PULL STRING
	"	"		1 - 1/2"	CATV	PULL STRING
T	LP-HW	POND	1	1"	P-240	X





AIR LINE DUCT BANK CROSSING



R. D. Zande & Associates	DESIGNED BY: FBA	REVISIONS	
	DRAWN BY: JAS	DATE	REMARKS
	CHECKED BY:		
	APPROVED BY:		
	DATE: JAN. 6, 2006		
	DWG NO. 5724-01 MACK-IND-NORTHSTAR\E3		

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STATE OF OHIO — WILLIAM CLIFFORD — REGISTERED PROFESSIONAL ENGINEER
JAN. 17, 2006

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

SCALE:

WASTEWATER TREATMENT PLANT

ELECTRICAL
YARD DUCT BANKS AND WIRING

SHEET NO. 32

E3 OF 18

P-1 YARD LIGHT POLE – 30FT HINGED STEEL POLE. PROVIDE ONE LOWERING HAND CRANK WINCH. DESIGN FOR 100MPH WIND. PAINT TO MATCH FIXTURE. PROVIDE ONE GFI RECEPT W/ WEATHER PROOF IN-USE COVER AT BASE. INC. CONC. BASE & MTG. BOLTS

HY-1 — YARD LIGHT

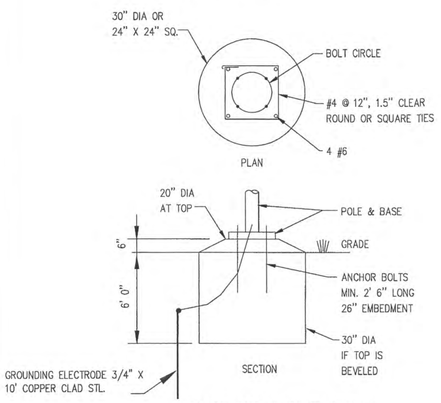
HY-1 – 400 WATT CLEAR MH HOLOPHANE CRESTWOOD FIXTURE CW3A400MH12BZMN W/ P-1 POLE

HK-1

HK-1 – HOLOPHANE MODEL WL2K-070MH-12-XX-LAMP, OR EQUAL

HY-2 — LOCAL YARD LIGHT

HY-2 – 150 WATT QAURTZ FLOOD LIGHT TO BE SIMILAR TO CLARIFIER LIGHT DETAIL ON SHT. E12



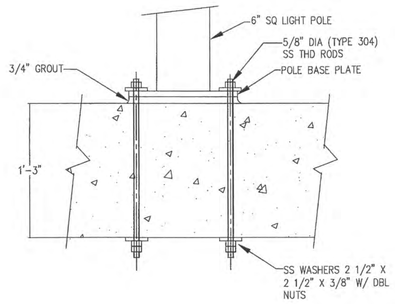
CONCRETE LIGHT POLE FOUNDATION DETAIL – TYPICAL

NO SCALE

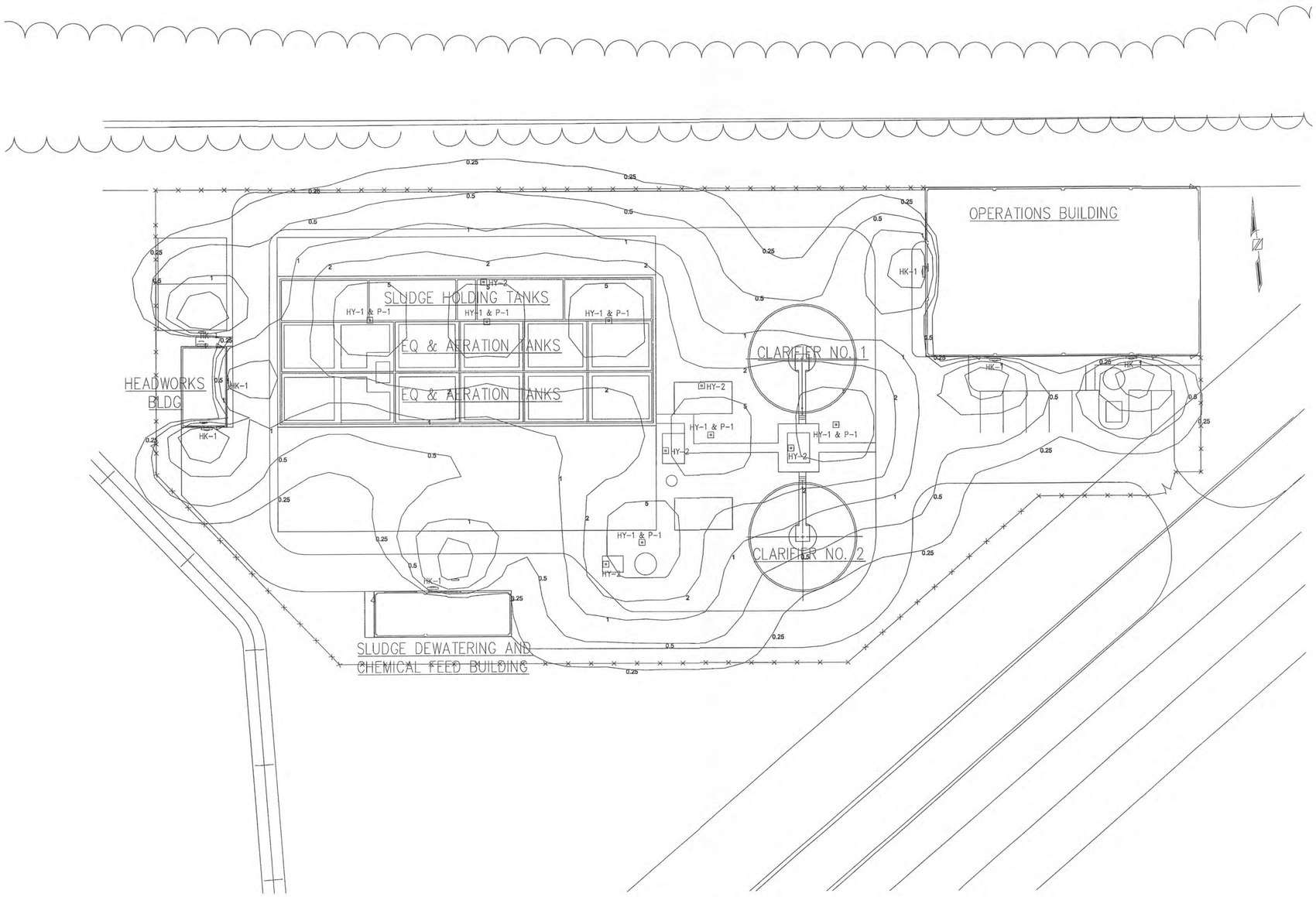
NOTES:

A. REST FOUNDATION ON UNDISTURBED SOIL OR FOUNDATION CUSHION.

B. DIMENSIONS MAY VARY DUE TO SOIL CONDITIONS, WIND CONDITIONS, OR OTHER FACTORS.



LIGHT POLE MOUNTING DETAIL AT SLUDGE STORAGE TANKS



R. D. Zande & Associates	DESIGNED BY: FBA DRAWN BY: JAS CHECKED BY: APPROVED BY: DATE: JAN 13, 2006 DWG NO. 5724-01 MACK-IND-NORTHSTAR\E4	REVISIONS DATE: 5-18-06 REMARKS: REVISED PER DELWARE CO. COMMENTS	FLOYD BROWNE ASSOCIATES, FBA INC. * Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.363.6792 * Marion, Ohio 740.383.2187
NORTHSTAR DEVELOPMENT WASTEWATER TREATMENTPLANT	SCALE: NO SCALE	WASTEWATER TREATMENT PLANT ELECTRICAL SITE LIGHTING PLAN	SHEET NO. 33 E4 OF 17

R. D. Zande & Associates

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:		5-2-06	REVISED PER DELAWARE CO. COMMENTS
APPROVED BY:			
DATE: JAN,13 2006			

DWG NO. 5724-01 MACK-IND-NORTHSTAR\E5-8

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NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

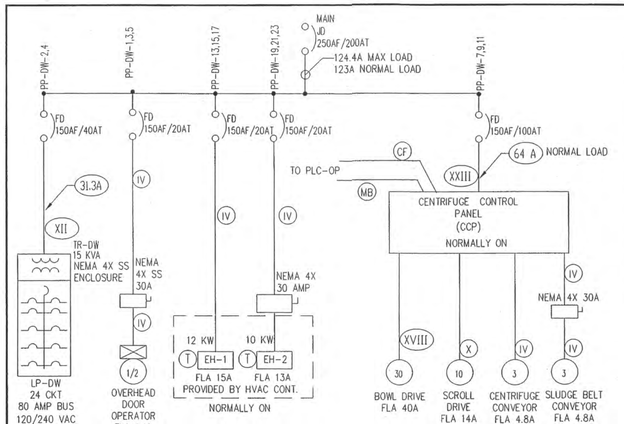
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

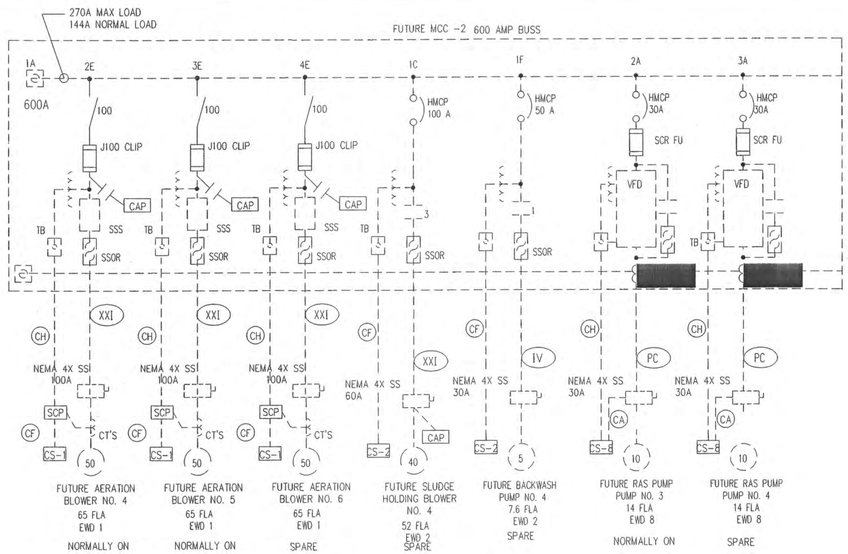
ELECTRICAL
ONE-LINE DISTRIBUTION

SHEET NO. 34

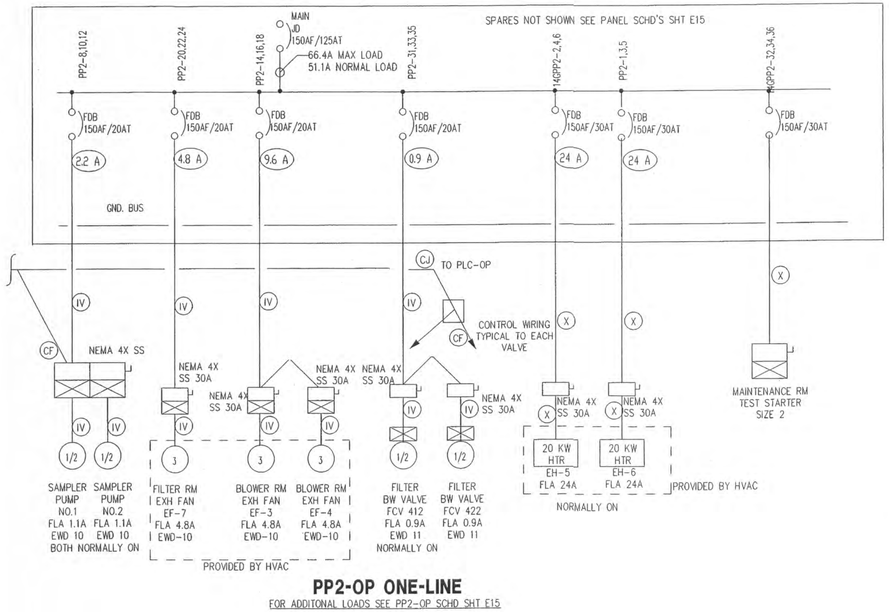
E5 OF 18



PP-DW ONE-LINE

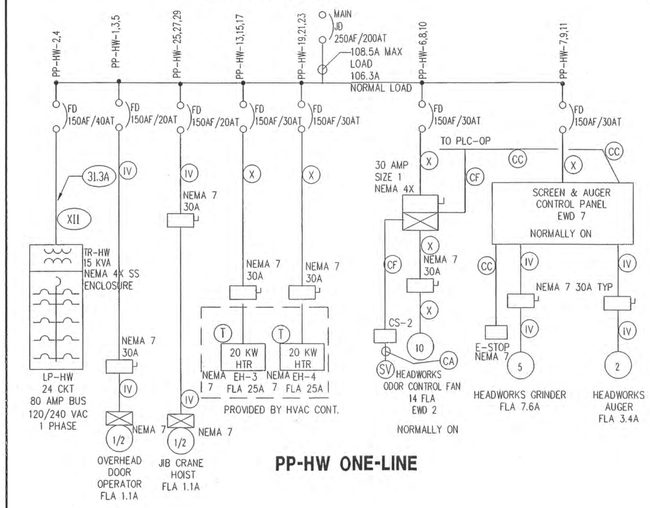


FUTURE MCC-OP-2 ONE-LINE



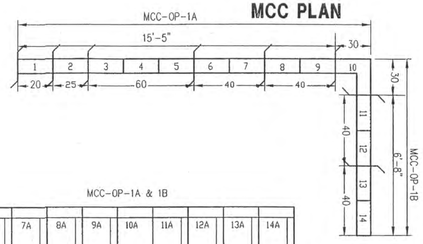
PP2-OP ONE-LINE

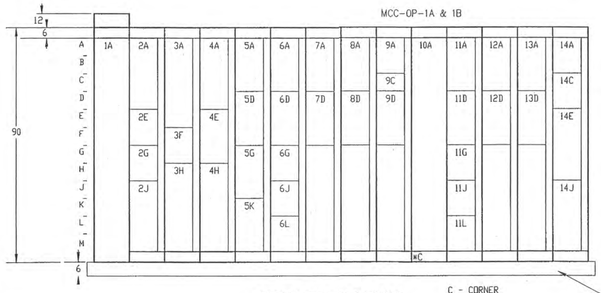
FOR ADDITONAL LOADS SEE PP2-OP SCHD SHT E15



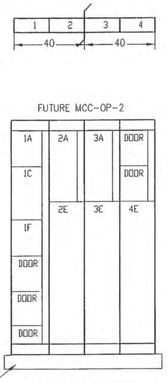
PP-HW ONE-LINE

MCC PLAN

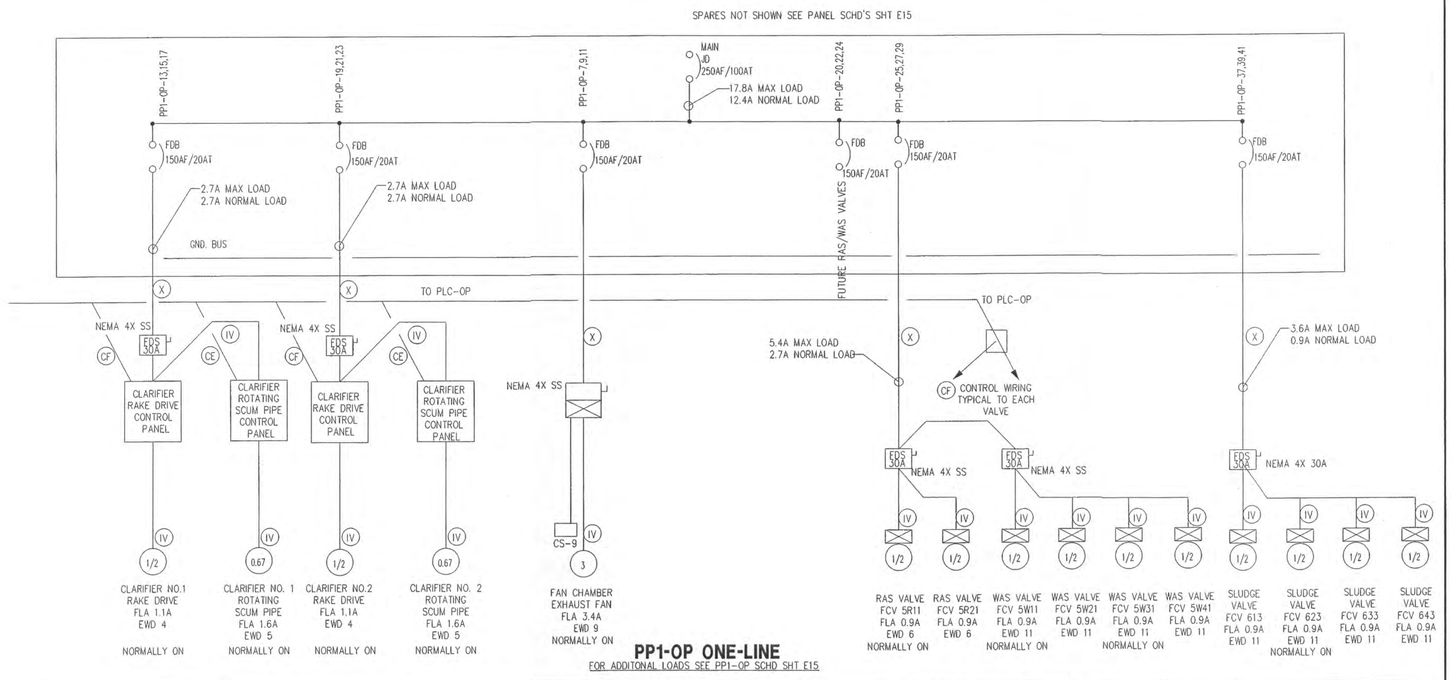




MCC ELEVATION



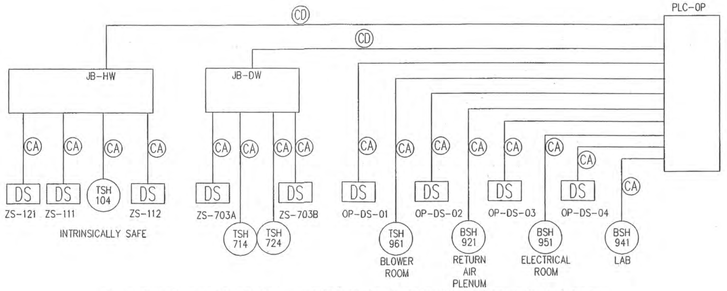
MCC-OP-2



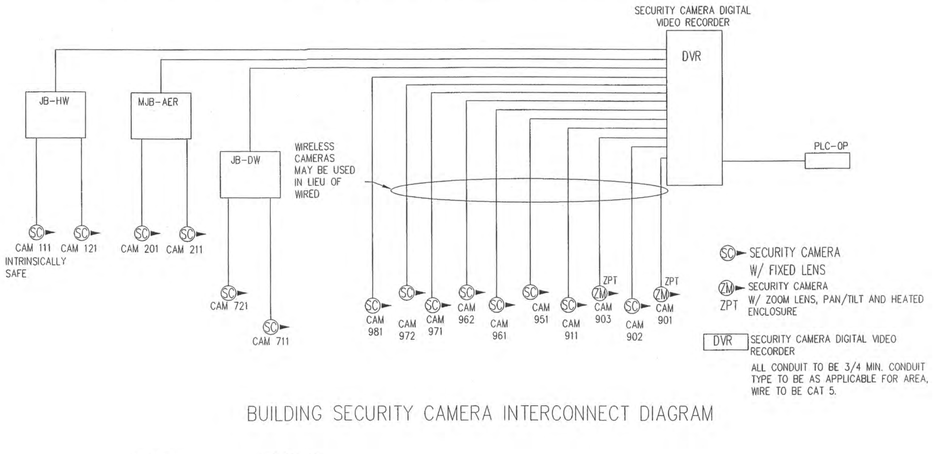
PP1-OP ONE-LINE

FOR ADDITONAL LOADS SEE PP1-OP SCHD SHT E15

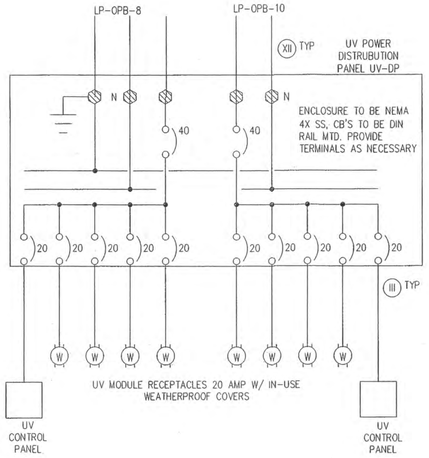
R. D. Zande & Associates	DESIGNED BY: FBA DRAWN BY: JAS CHECKED BY: APPROVED BY: DATE: JAN 13, 2006 DWG NO. 5724-01 MACK-IND-NORTHSTAR\E5-8	REVISIONS DATE: 5-2-06 REMARKS: REVISED PER DELAWARE CO. COMMENTS	FLOYD BROWNE ASSOCIATES, FBA INC. * Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.363.6792 * Marion, Ohio 740.383.2187
NORTHSTAR DEVELOPMENT WASTEWATER TREATMENTPLANT	SCALE: AS NOTED	WASTEWATER TREATMENT PLANT ELECTRICAL ONE LINE CONT. & MCC ELEV	SHEET NO. 35 E6 OF 18



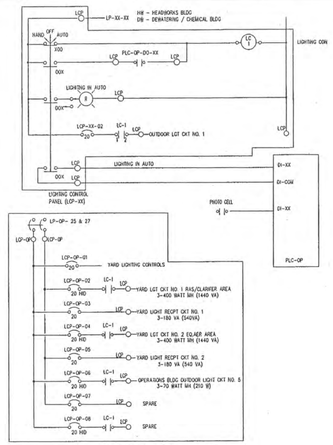
BUILDING INTRUSION DETECTION INTERCONNECT DIAGRAM



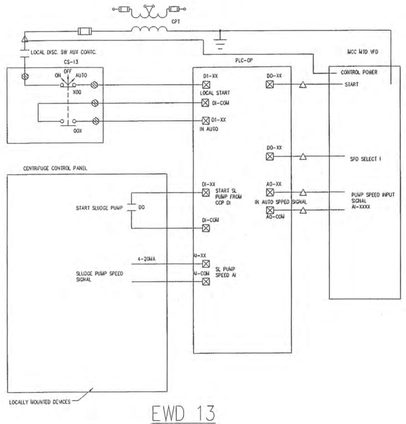
BUILDING SECURITY CAMERA INTERCONNECT DIAGRAM



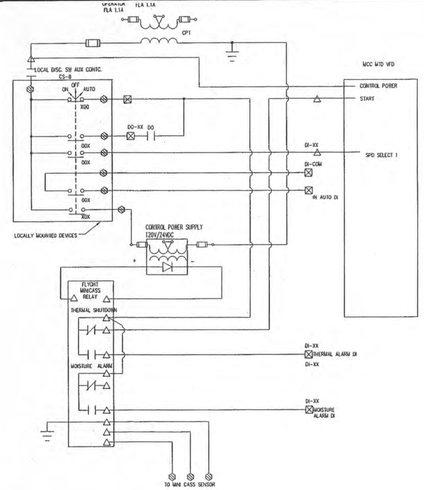
UV SYSTEM DISTRUBUTION DETAIL



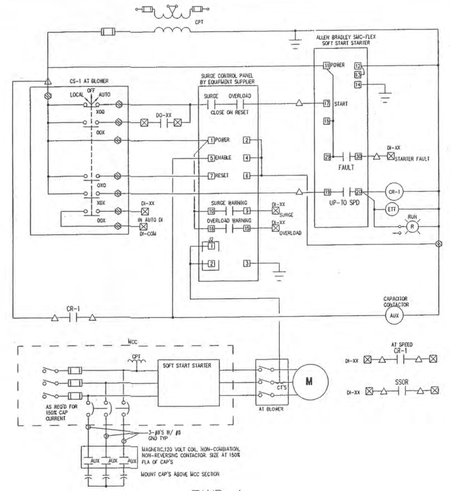
LIGHTING CONTROL PANEL (LCP-OP) EWD 12



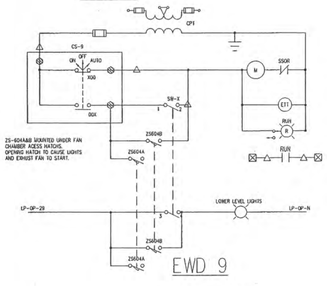
EWD 13



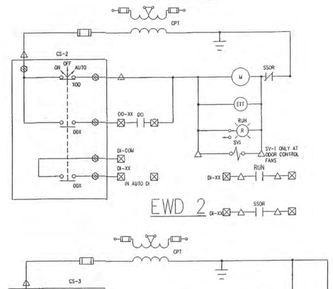
EWD 8



EWD 1

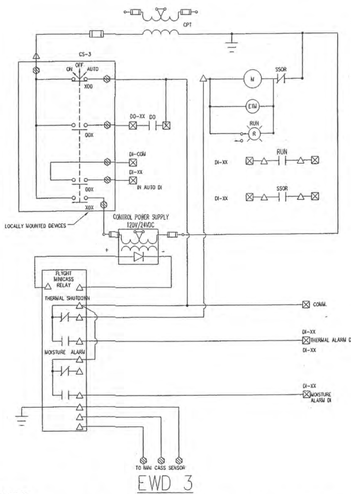


EWD 9

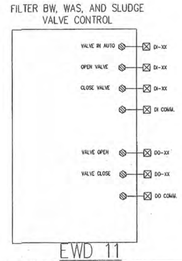


EWD 2

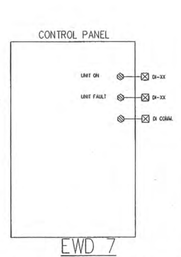
EWD 10



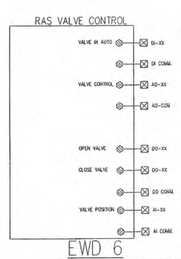
EWD 3



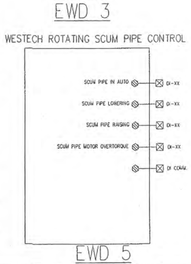
EWD 11



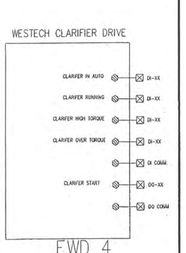
EWD 7



EWD 6

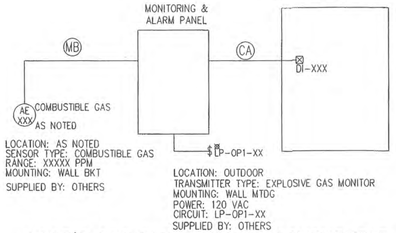


EWD 5

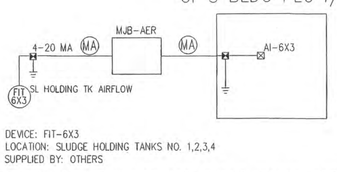


EWD 4

R. D. Zande & Associates	DESIGNED BY: FBA DRAWN BY: JAS CHECKED BY: APPROVED BY: DATE: JAN 13, 2006 DWG NO. 5724-01 MACK-IND-NORTHSTAR\ES-8	REVISIONS DATE: 5-2-06 REMARKS: REVISED PER DELAWARE CO. COMMENTS	FLOYD BROWNE ASSOCIATES, FBA INC. * Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.363.6792 * Marion, Ohio 740.383.2187
NORTHSTAR DEVELOPMENT WASTEWATER TREATMENTPLANT	SCALE: AS NOTED	WASTEWATER TREATMENT PLANT ELECTRICAL ELEM. WIRING DIAGRAMS	SHEET NO. 36 E7 OF 18

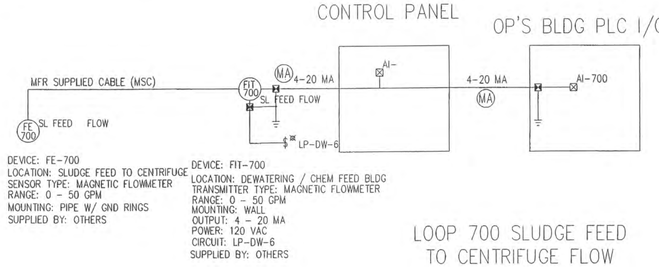


LOOP'S:605 FAN CHAMBER COMBUSTIBLE GAS, 505 RAS VALVE VAULT COMBUSTIBLE GAS MONITORING

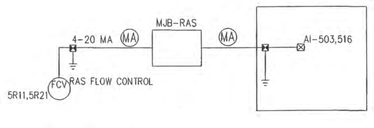


LOOP 6X3 SLUDGE HOLDIING TANK AIRFLOW

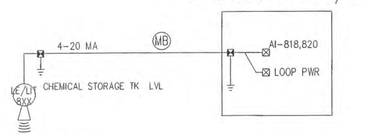
CENTRIFUGE CONTROL PANEL



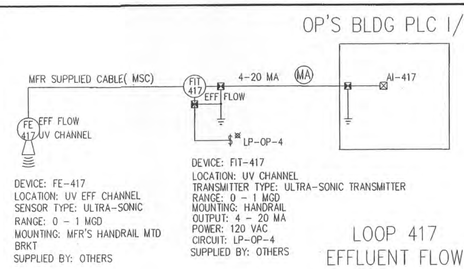
LOOP 700 SLUDGE FEED TO CENTRIFUGE FLOW



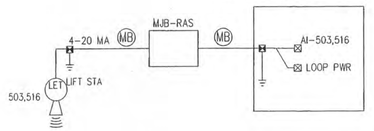
LOOP 5RX1 RAS FLOW CONTROL



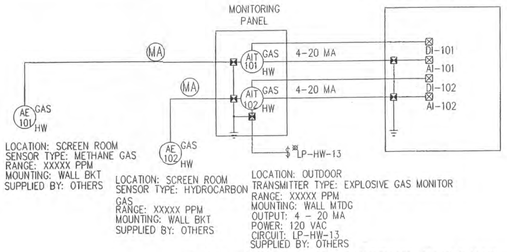
LOOP 818,820 CHEMICAL STORAGE TK LEVEL



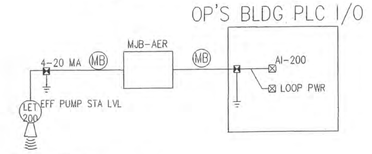
LOOP 417 EFFLUENT FLOW



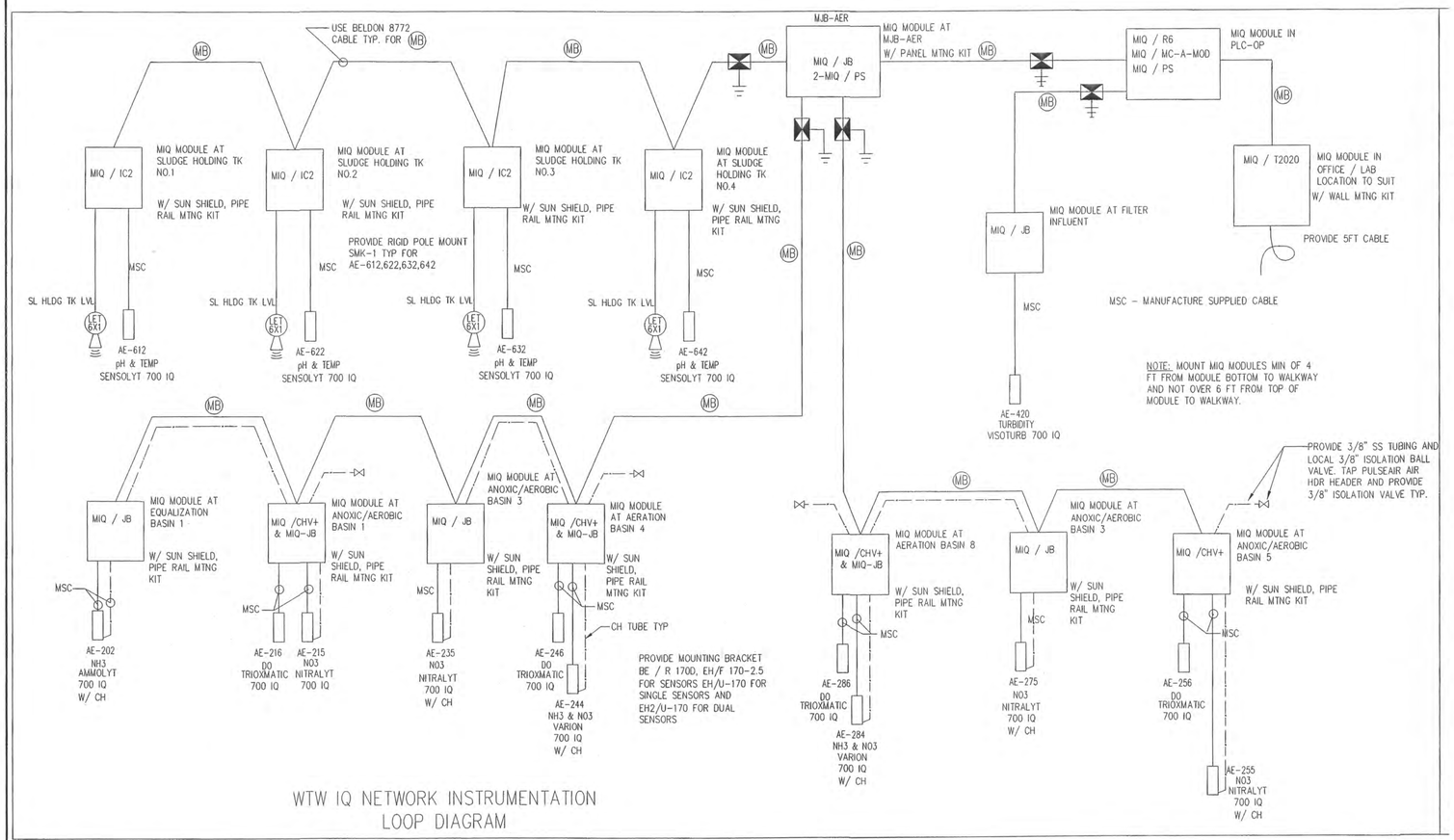
LOOP 503,516 RAS & PLANT DR LIFT STATION LEVEL



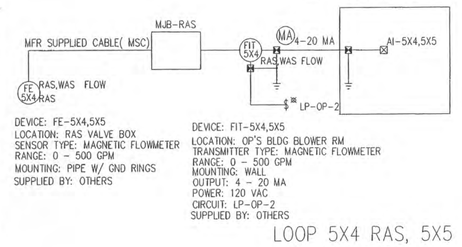
LOOP 101,102 HEADWORKS BUILDING EXPLOSIVE GAS MONITORING



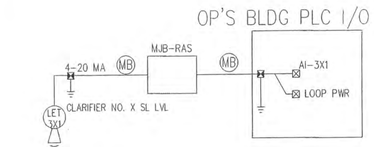
LOOP 200 FLOW EQUALIZATION BASIN LEVEL



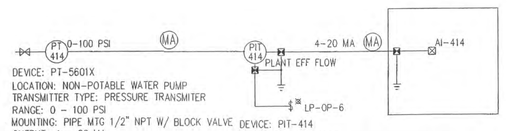
WTW IQ NETWORK INSTRUMENTATION LOOP DIAGRAM



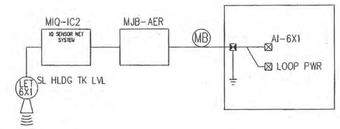
LOOP 5X4 RAS, 5X5 WAS FLOW



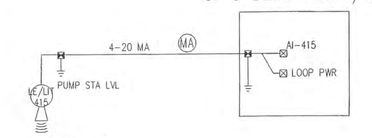
LOOP 311,12 CLARIFIER SLUDGE LEVEL



LOOP 414 NON POTABLE WATER PUMP DISCH PRESSURE



LOOP 6X1 SLUDGE HOLDING TK LEVEL



LOOP 415 EFFLUENT PUMP STATION LEVEL

R. D. Zande & Associates	DESIGNED BY: FBA DRAWN BY: JAS CHECKED BY: APPROVED BY: DATE: JAN 13, 2006 DWG NO. 5724-01 MACK-IND-NORTHSTAR\E5-8	REVISIONS DATE: 5-2-06 REMARKS: REVISED PER DELAWARE CO. COMMENTS	FLOYD BROWNE ASSOCIATES, FBA INC. *Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.363.6792 *Marion, Ohio 740.383.2187
NORTHSTAR DEVELOPMENT WASTEWATER TREATMENTPLANT	SCALE: AS NOTED	WASTEWATER TREATMENT PLANT ELECTRICAL INSTRUMENTATION LOOP DIAGRAMS	SHEET NO. 37 E8 OF 18

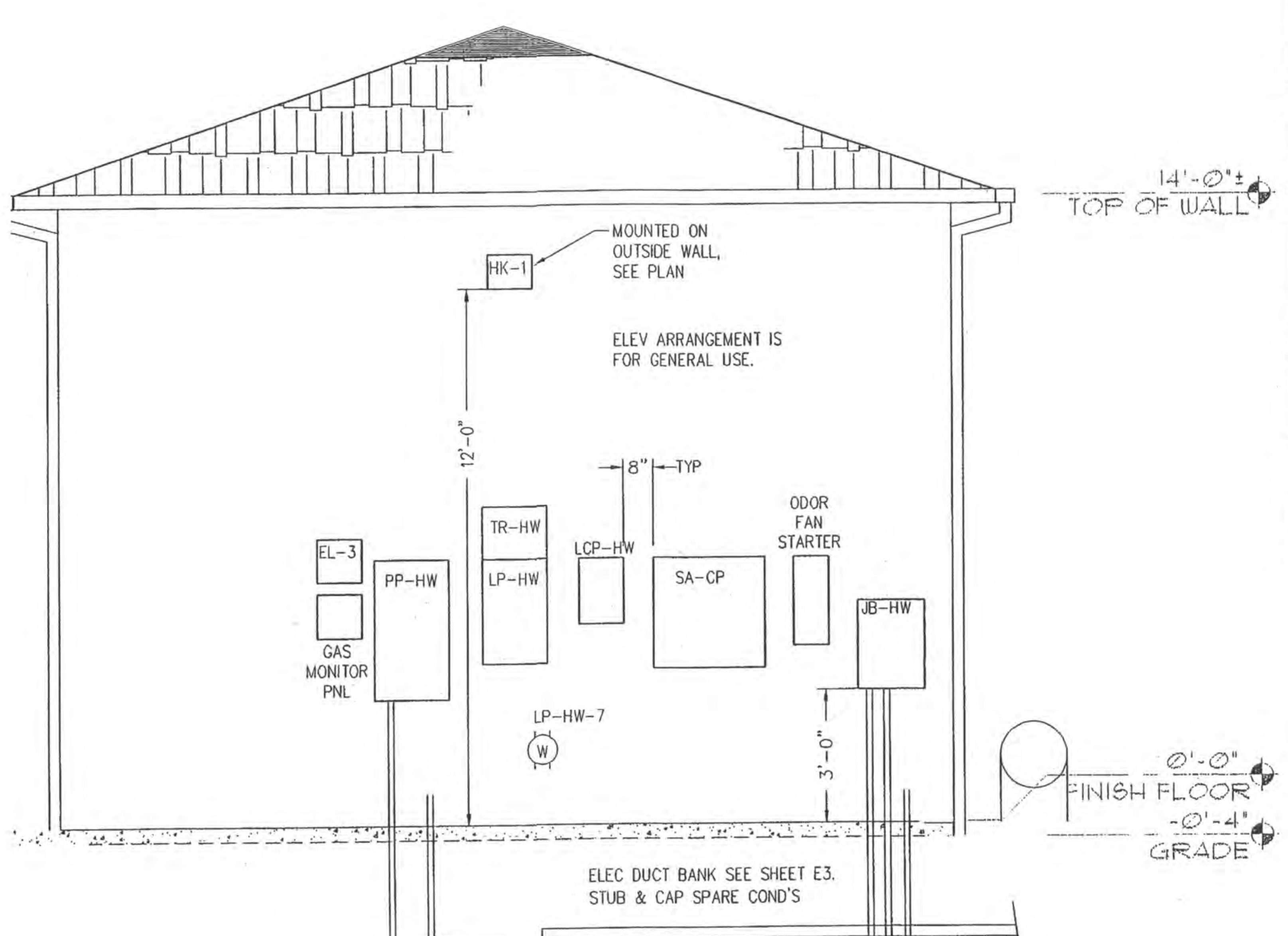
BUILDING:	HEADWORKS BUILDING
PANEL:	TR/LP--HW

120 / 240 1 Ph   3 W WITH GND   80 AMP BUS

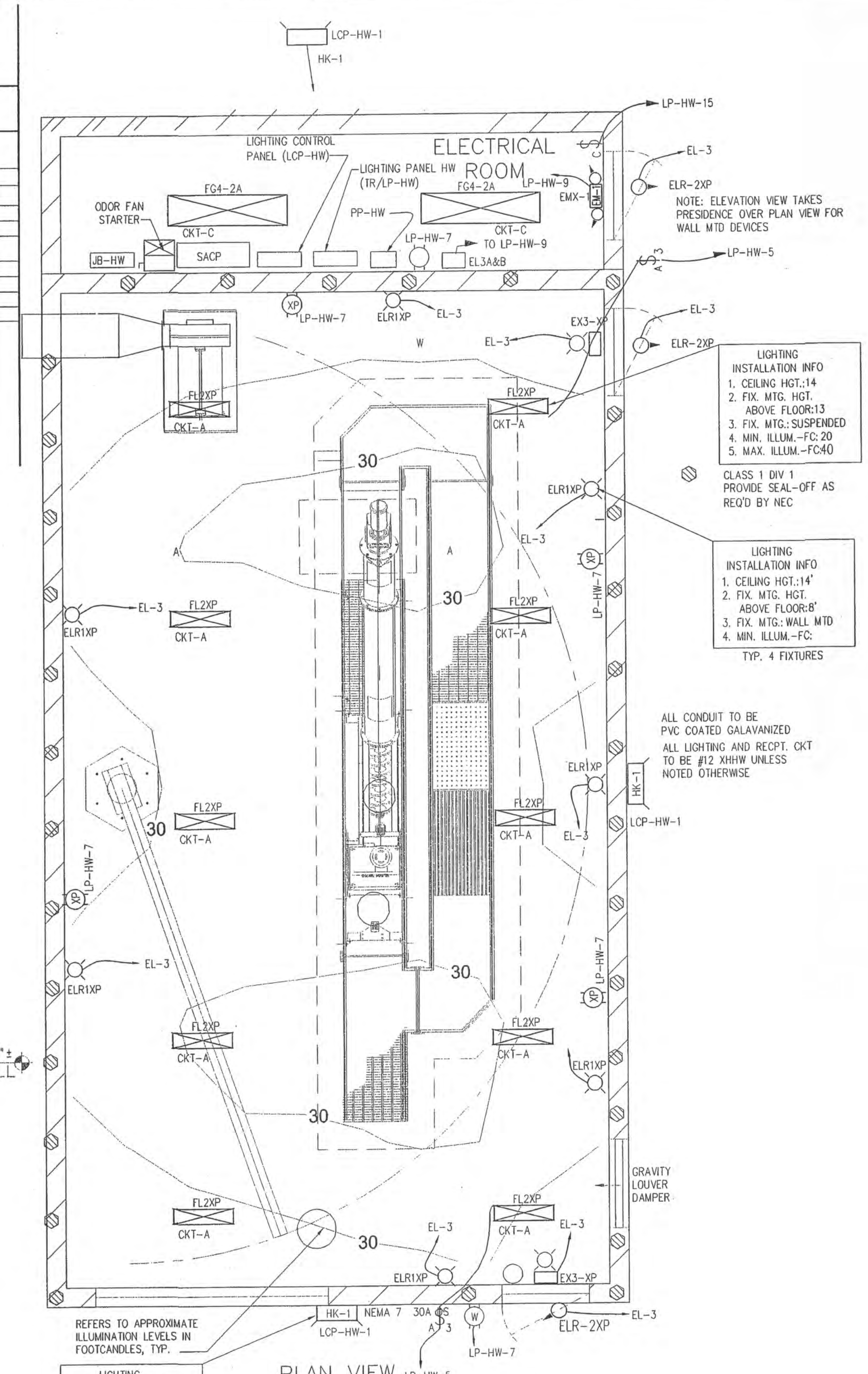
Circuit No	BKR Size	Circuit	LIGHT	RECPT	HVAC	MISC	VA L1 Load	VA L2 Load	LIGHT	RECPT	HVAC	MISC	Circuit No	BKR Size	Circuit
1	80-2P	MAIN					0						2	20-2P	ELEC RM HTR
3	"	MAIN						0					4		"
5	20	SCREEN RM LIGHTS FL2XP	620				620						6	20-2P	POND AERATOR
7	20	RECEPTACLES		1080				1080					8		"
9	20	EMERGENCY/EXIT LIGHTS	60				60						10	20	SPARE
11	20	LIGHTING CONTROL PANEL LCP-HW	400					400					12	20	SPARE
13	20	GAS MONITOR PANEL				500	500						14	20	SPARE
15	20	ELEC RM LIGHTS	128					128					16	20	SPARE
17	20	SPARE					0						18	20	SPARE
19	20	SPARE						0					20	20	SPARE
			1208	1080	0	500			0	0	0	0			
		Load					1180	1608							
		ADD 25% OF LARGEST MOTOR					0	0							
		LOAD TOTAL LOAD					1180	1608 VA / 2.79 KVA							

use a 15 KVA transformer

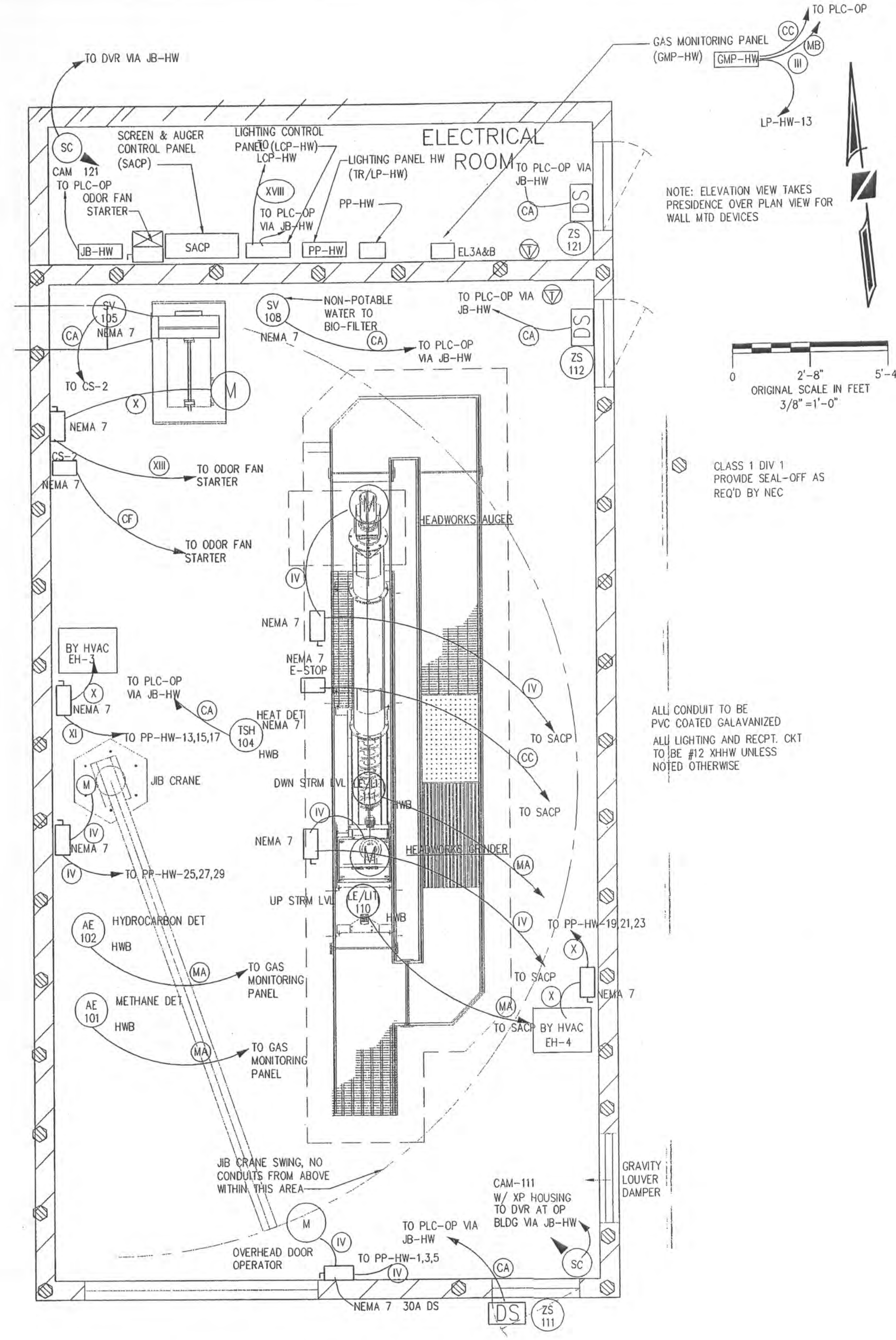
Symbol	Description
FL2XP (CKT-XX)	HAZARDOUS AREA FLUORESCENT FIXTURE CL-1 DIV-1 2-F32T8 TUBES. APPLETON ARS232BU, GRAINGER STOCK NO. 3V446 OR EQUAL
ELR-1XP	HAZARDOUS AREA CL-1 DIV1 REMOTE EMERGENCY LIGHT FIXTURE WALL OR CEILING MOUNTING. HOLOPHANE DSHR(C OR W)-A6-10, 6V, 10W HALOGEN OR EQUAL.
FG4-2A	GENERAL FLUORESCENT FIXTURE 2 LAMP 48IN. APERTURED. 120VOLT T8 LAMPS COOPER METALUX DIM232120VEB81, GRAINGER # 5U943 OR HOLOPHANE SMS04XTTTU042EP11
EX-3XP	HAZARDOUS AREA CL-1 DIV1 REMOTE EXIT LIGHT FIXTURE WALL OR CEILING MOUNTING. HOLOPHANE DSHR(C OR W)-A6-10-E 6V 10W HALOGEN OR EQUAL.
HK-1	70 WATT, 120V, METAL HALIDE OUTDOOR WALLPACK, U.L. LISTED FOR WET LOCATION – U.L.1598 HOLOPHANE WALLPACK II, WL2K70DMH00XX, OR EQUAL
ELR-2XP	HAZARDOUS AREA CL-1 DIV2 REMOTE EMERGENCY LIGHT HEAD. HOLOPHANE LR-NB-SH, 6V 18W W/ SHIELD
EL-3	EMERGENCY LIGHT 100 WATT HOLOPHANE DESOTO M60 SERIES DM6-C-100-S-NZ-2-T1 OR EQUAL
EMX-1	COMBINATION EXIT & EMERGENCY LIGHT COOPER SURE LITES MODEL CCX70RWHDH, GRANGER # 4WL63 OR LITHONIA QUANTUM LHQMSW3(R or G)120/277 GRAINGER # 4PH(19 or 20) MOUNT 8 FT ABOVE FIN FL



NORTHWALL ELEV



PLAN VIEW



PLAN VIEW

2'-8" 5'-4"
ORIGINAL SCALE IN FEET 3/8" =1'-0"

DS SECURITY DOOR SWITCH
SC SECURITY CAMERA W/ FIXED LENS

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:			
APPROVED BY:			
DATE: JAN 13, 2006			
DWG NO. 5724-01 MACK-IND-NORTHSTAR\E9			

R. D. Zande & Associates

FLOYD BROWNE ASSOCIATES, FBA INC.

* Contact Office
Dayton, Ohio 937.431.1004
Delaware, Ohio 740.363.6792
* Marion, Ohio 740.383.2187

STATE OF OHIO REGISTERED PROFESSIONAL ENGINEER

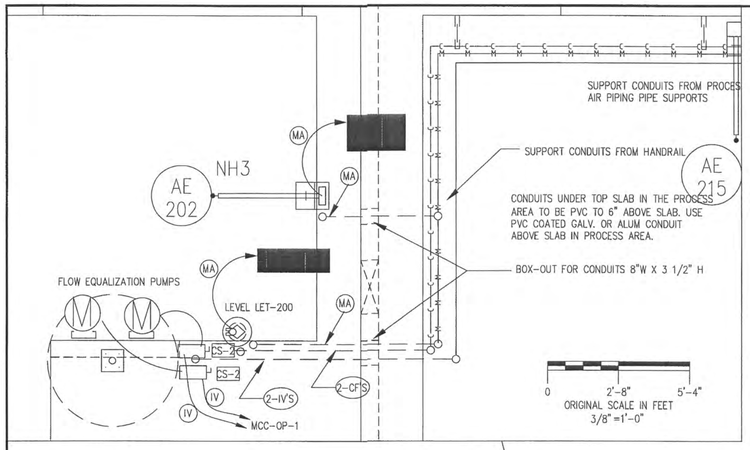
JAN 17, 2006

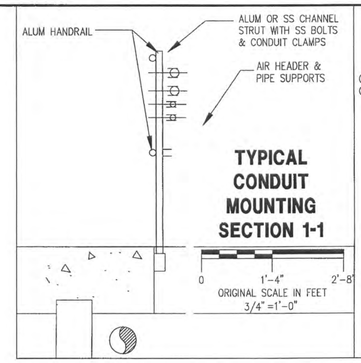
NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

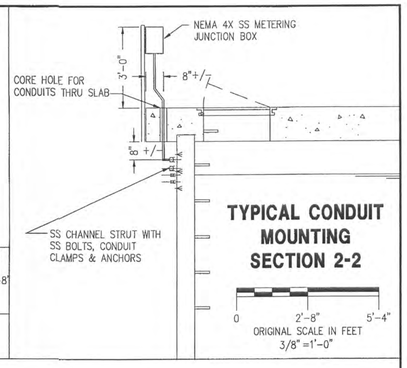
SCALE: AS NOTED

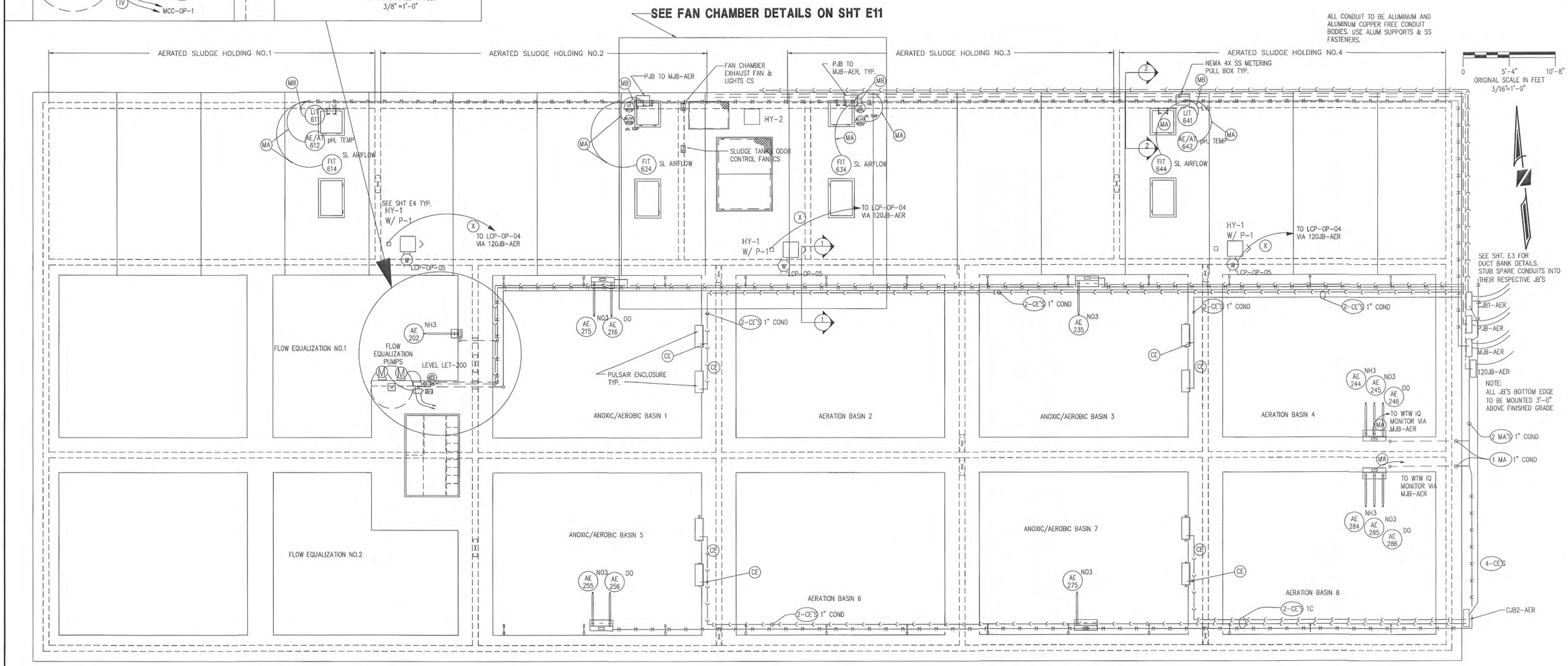
WASTEWATER TREATMENT PLANT
ELECTRICAL HEADWORKS BLDG ELECTRICAL WIRING PLANS

SHEET NO. 38
E9 OF 18









R. D. Zande & Associates

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:		5-18-06	REVISED PER DELAWARE CO. COMMENTS
APPROVED BY:			
DATE:	MAY, 2006		
DWG NO. 5724-01 MACK-IND-NORTHSTAR\E10-11			

FLOYD BROWNE ASSOCIATES, FBA INC.

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Delaware, Ohio 740.363.6792
* Marion, Ohio 740.383.2187

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENTPLANT

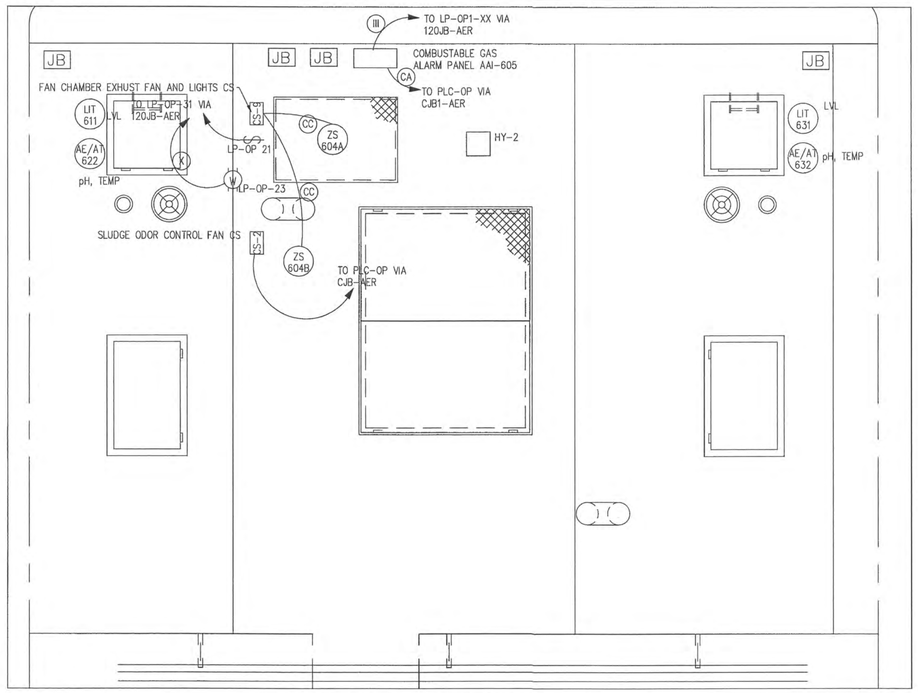
SCALE:

WASTEWATER TREATMENT PLANT

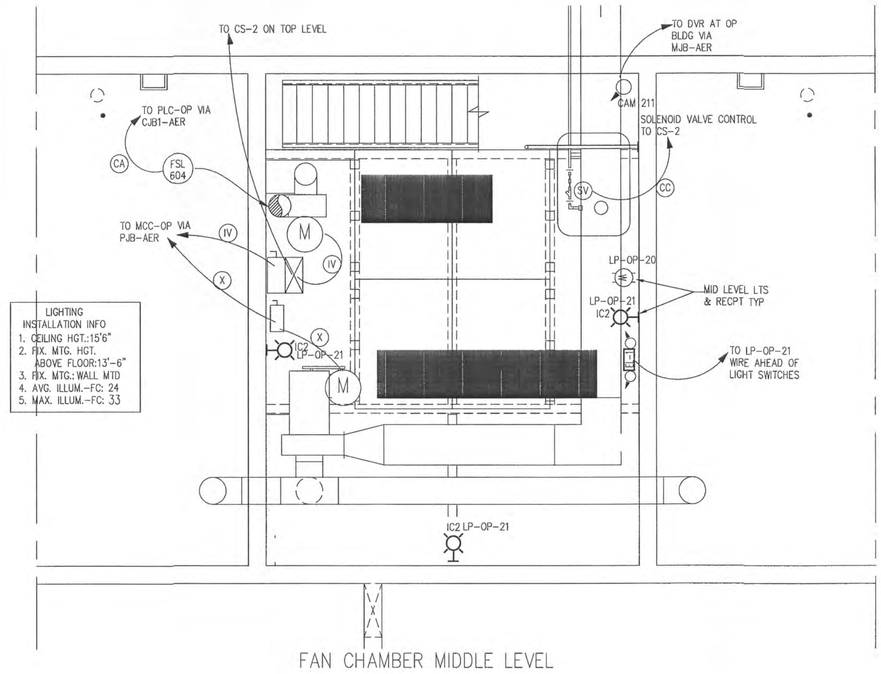
ELECTRICAL
FLOW EQ, AERATION & SLUDGE

SHEET NO. 39

E10 OF 18



FAN CHAMBER UPPER LEVEL



FAN CHAMBER MIDDLE LEVEL

NOTE:
LOCATE ALL LIGHT FIXTURES, RECEPTACLES, STARTERS, DISC SW'S 3FT FROM ALL ODOR CONTROL FAN, MOTOR AND DUCT WORK. AREA WITHIN 3FT OF LEAKAGE SOURCES ARE RATED CLASS 1 DIV. 2 PER NEC AND NFPA ITEM ITEM 24.

ALL CONDUIT TO BE ALUMINUM AND ALUMINUM COPPER FREE CONDUIT BODIES. USE ALUM SUPPORTS & SS FASTENERS.

EL-1 EMERGENCY LIGHT
COOPER SURE LITES MODEL UMB1, GRANGER # 3V897 OR LITHONIA QUANTUM ELU2X GRANGER # 4PG67
COOPER SURE LITES MODEL HR12117286, GRANGER # 5VC09 OR LITHONIA QUANTUM ELT125 GRANGER # 7D463

ELR-1 REMOTE EMERGENCY LIGHT HEAD
COOPER SURE LITES MODEL 6X-9-WGY, GRANGER # 4PH91
OR LITHONIA QUANTUM ELANX H0806 GRANGER # 4PG78

HY-2 HY-2 – 150 WATT QAURTZ FLOOD LIGHT TO BE SIMILAR TO CLARIFIER LIGHT DETAIL ON SHT. E12

LOCAL YARD LIGHT

FAN CHAMBER LOWER LEVEL

R. D. Zande & Associates	DESIGNED BY: FBA DRAWN BY: JAS CHECKED BY: APPROVED BY: DATE: JAN 13, 2006 DWG NO. 5724-01 MACK-IND-NORTHSTAR\E10-11	REVISIONS DATE: 5-18-06 REMARKS: REVISED PER DELAWARE CO. COMMENTS	FLOYD BROWNE ASSOCIATES, FBA INC. * Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.363.6792 * Marion, Ohio 740.383.2187

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENTPLANT

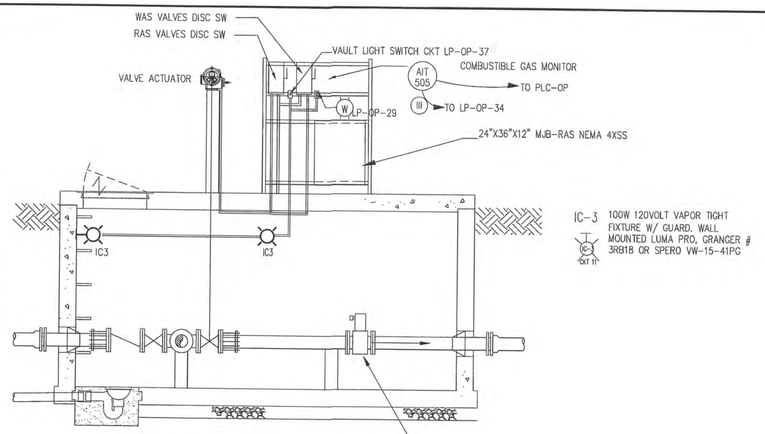
SCALE:

WASTEWATER TREATMENT PLANT

ELECTRICAL
FAN CHAMBER DETAIL PLANS

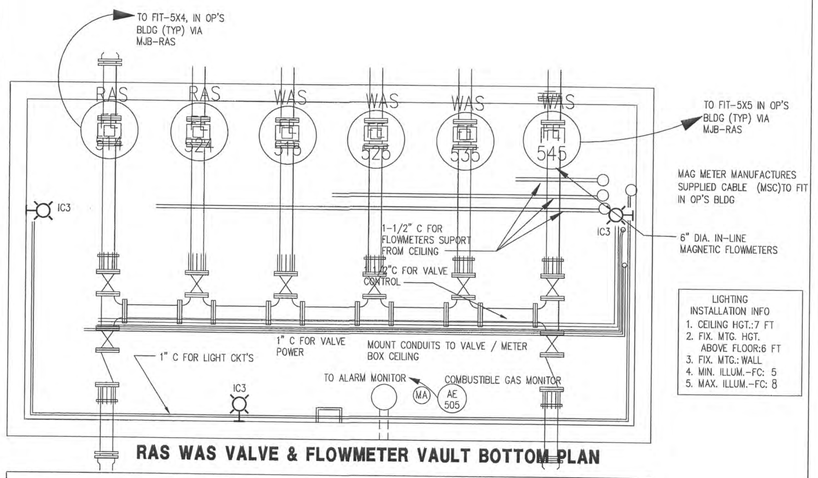
SHEET NO. 40

E11 OF 18

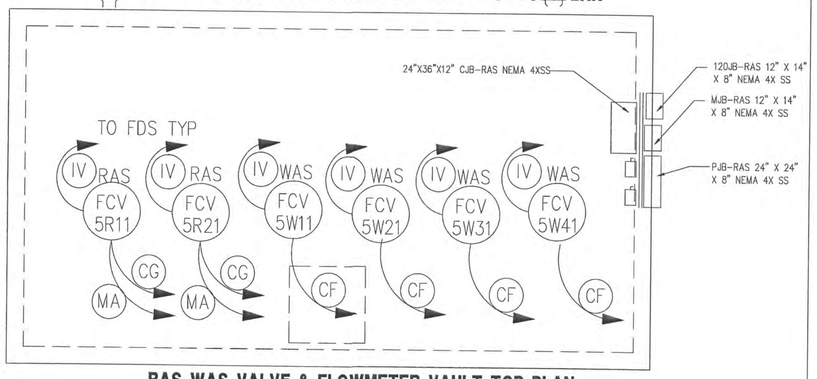


RAS WAS VALVE & FLOWMETER VAULT WEST ELEVATION

3/8" = 1'-0"

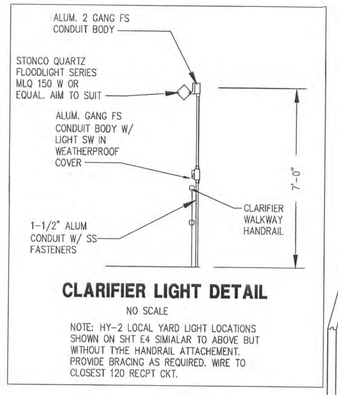


RAS WAS VALVE & FLOWMETER VAULT BOTTOM PLAN



RAS WAS VALVE & FLOWMETER VAULT TOP PLAN

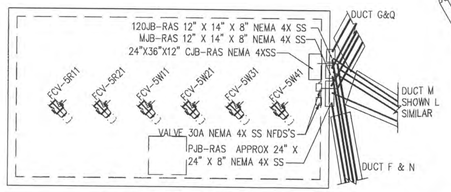
SCALE 3/8" = 1'-0"



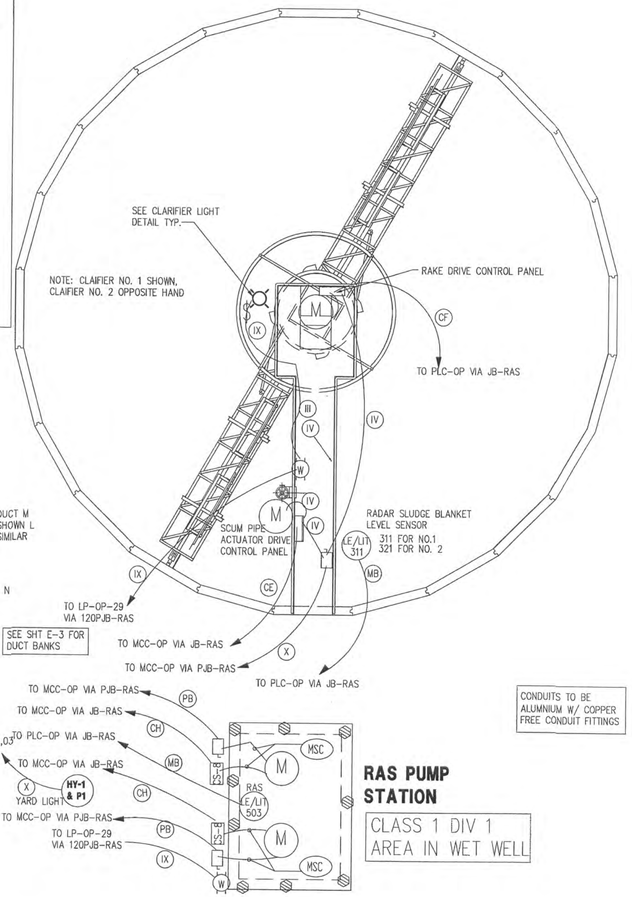
CLARIFIER LIGHT DETAIL

NO SCALE

NOTE: HY-2 LOCAL YARD LIGHT LOCATIONS SHOWN ON SHT E4 SIMIALAR TO ABOVE BUT WITHOUT TYHE HANDRAIL ATTACHEMENT. PROVIDE BRACING AS REQUIRED. WIRE TO CLOSEST 120 RECPT CKT.



RAS WAS VALVE & FLOWMETER VAULT

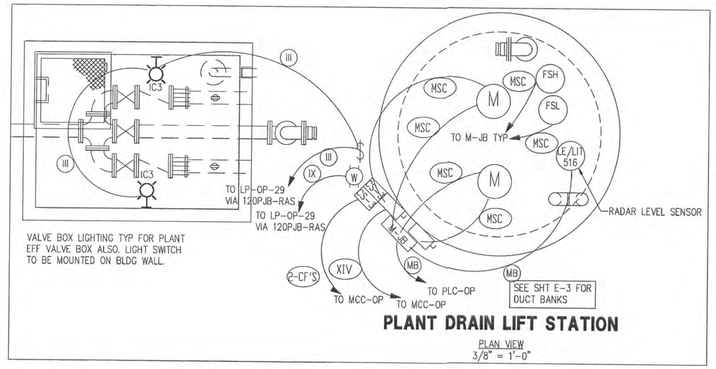


RAS PUMP STATION

CLASS 1 DIV 1
AREA IN WET WELL

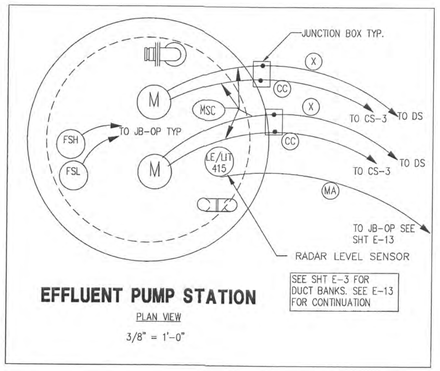
CONDUITS TO BE ALUMNIUM W/ COPPER FREE CONDUIT FITTINGS

1C-2 - 75 WATT VAPOR -TIGHT LIGHT FIXTURE WITH GUARD WALL MTD. LUMA PRO GRANGER NO. 3RB18 WIRE TO LIGHT SW ABOVE TYP



PLANT DRAIN LIFT STATION

PLAN VIEW
3/8" = 1'-0"



EFFLUENT PUMP STATION

PLAN VIEW
3/8" = 1'-0"

0 5'-4" 10'-8"
ORIGINAL SCALE IN FEET
3/16"=1'-0"
UNLESS NOTED

R. D. Zande & Associates

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:		5-18-06	REVISED PER DELWARE CO. COMMENTS
APPROVED BY:			
DATE: JAN. 13, 2006			
DWG NO. 5724-01 MACK-IND-NORTHSTAR\E12			

FLOYD BROWNE ASSOCIATES, FBA INC.

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NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

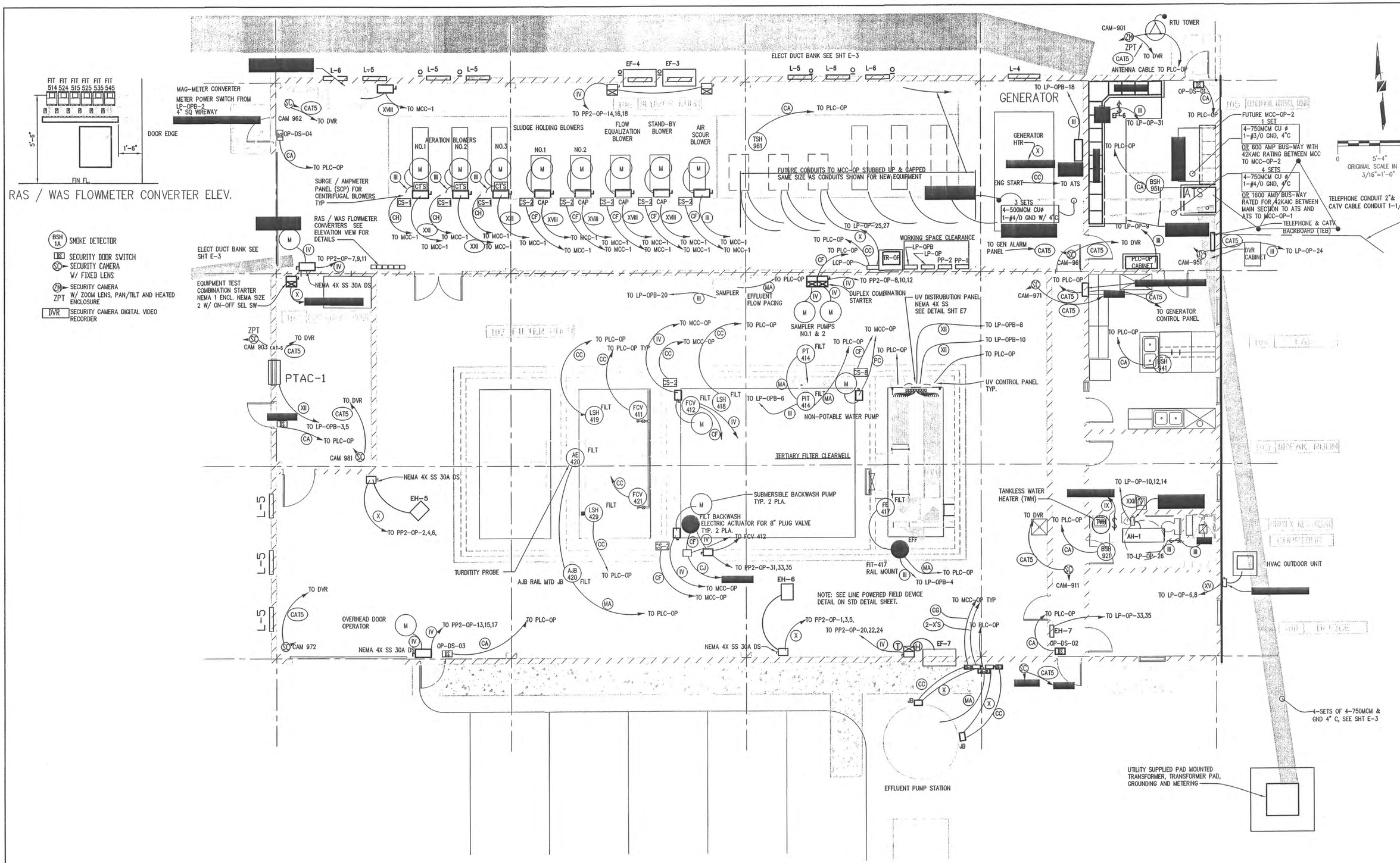
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

ELECTRICAL
CLARIFIER, RAS PS, PLANT DRAIN PS, & EFFLUENT PS PLANS

SHEET NO. 41

E12 OF 18



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DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:		5-2-06	REVISED PER DELAWARE CO. COMMENTS
APPROVED BY:			
DATE:	JAN 13, 2006		
DWG NO.5724-01 MACK-IND-NORTHSTAR\E13-15			

R. D. Zande & Associates

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NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENTPLANT

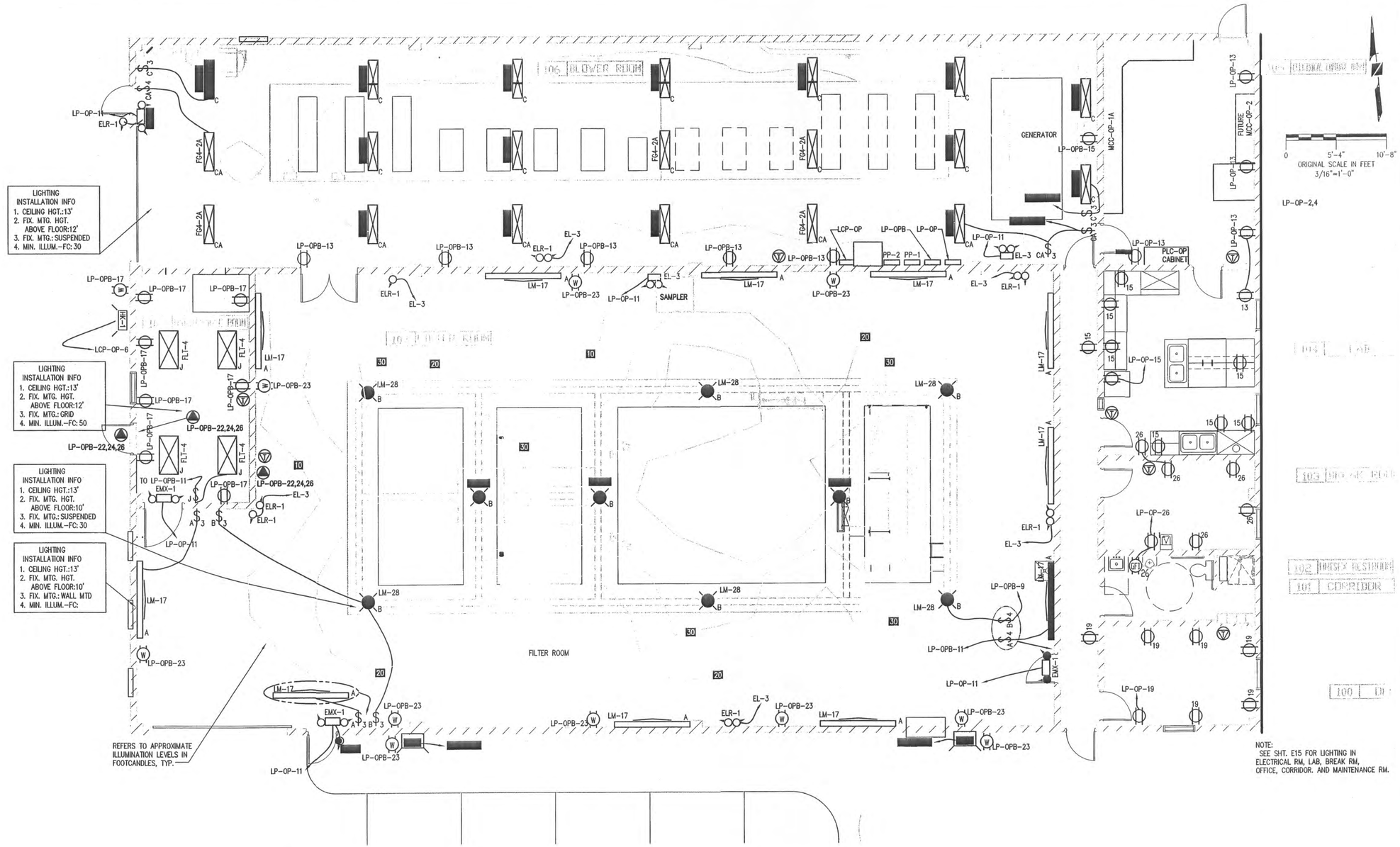
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

ELECTRICAL OPERATIONS BLDG ELECTRICAL DISTRIBUTION PLAN

SHEET NO. 42

E13 OF 18



NOTE:
SEE SHT. E15 FOR LIGHTING IN ELECTRICAL RM, LAB, BREAK RM, OFFICE, CORRIDOR. AND MAINTENANCE RM.

FG4-2A — GENERAL FLUORESCENT FIXTURE 2 LAMP 48IN. APERTURED. 120VOLT T8 LAMPS COOPER METALUX DIM232120VEB81, GRAINGER # 5U943 OR HOLOPHANE SMS04XTTTU042EP11

FLT-4 — TROFFER MTD FLORESCENT FIXTURE 4 LAMP 48IN. 120VOLT T8 LAMPS COOPER METALUX 2GR8432A120VEB82, GRAINGER # 4PH77 OR HOLOPHANE TGS24XNH55044EP21

HK-1 — 70 WATT, 120V, METAL HALIDE OUTDOOR WALLPACK, U.L. LISTED FOR WET LOCATION - U.L.1598 HOLOPHANE WALLPACK II, WL2K70DMH0OXX, OR EQUAL. MOUNT 12 FT ABOVE FIN FL

LM-28 B — 175 WATT, 120V, METAL HALIDE PENDANT MOUNTED FIXTURE, U.L. LISTED FOR DAMP LOCATION, HOLOPHANE PETROLUX II, PTA175MTP25C OR EQUAL

LM-17 A — 120V, 8' FLUORESCENT, WALL MOUNTED, ENCLOSED INDUSTRIAL FIXTURE, 2-75W T12 SLIMLINE, 96" LINEAR FLUORESCENTS, U.L. LISTED FOR DAMP LOCATION, LITHONIA DMW 2 96, OR EQUAL

EMX-1 CKT-## — COMBINATION EXIT & EMERGENCY LIGHT COOPER SURE LITES MODEL CCX70RWHDH, OR LITHONIA QUANTUM LHQMSW3(R or G)120/277 GRAINGER # 3CE34 MOUNT 8 FT ABOVE FIN FL

ELR-1 — REMOTE EMERGENCY LIGHT HEAD COOPER SURE LITES MODEL 6X-9-WGY, OR LITHONIA QUANTUM ELANX H0806 GRAINGER # 4PG78 MOUNT 8 FT ABOVE FIN FL

EL-3 — EMERGENCY LIGHT 100 WATT HOLOPHANE DESOTO M60 SERIES DM6-C-100-S-NZ-2-T1 OR EQUAL MOUNT 8 FT ABOVE FIN FL

EL-1 — EMERGENCY LIGHT COOPER SURE LITES MODEL CU1B, OR LITHONIA QUANTUM ELM2 GRAINGER # 4PH01

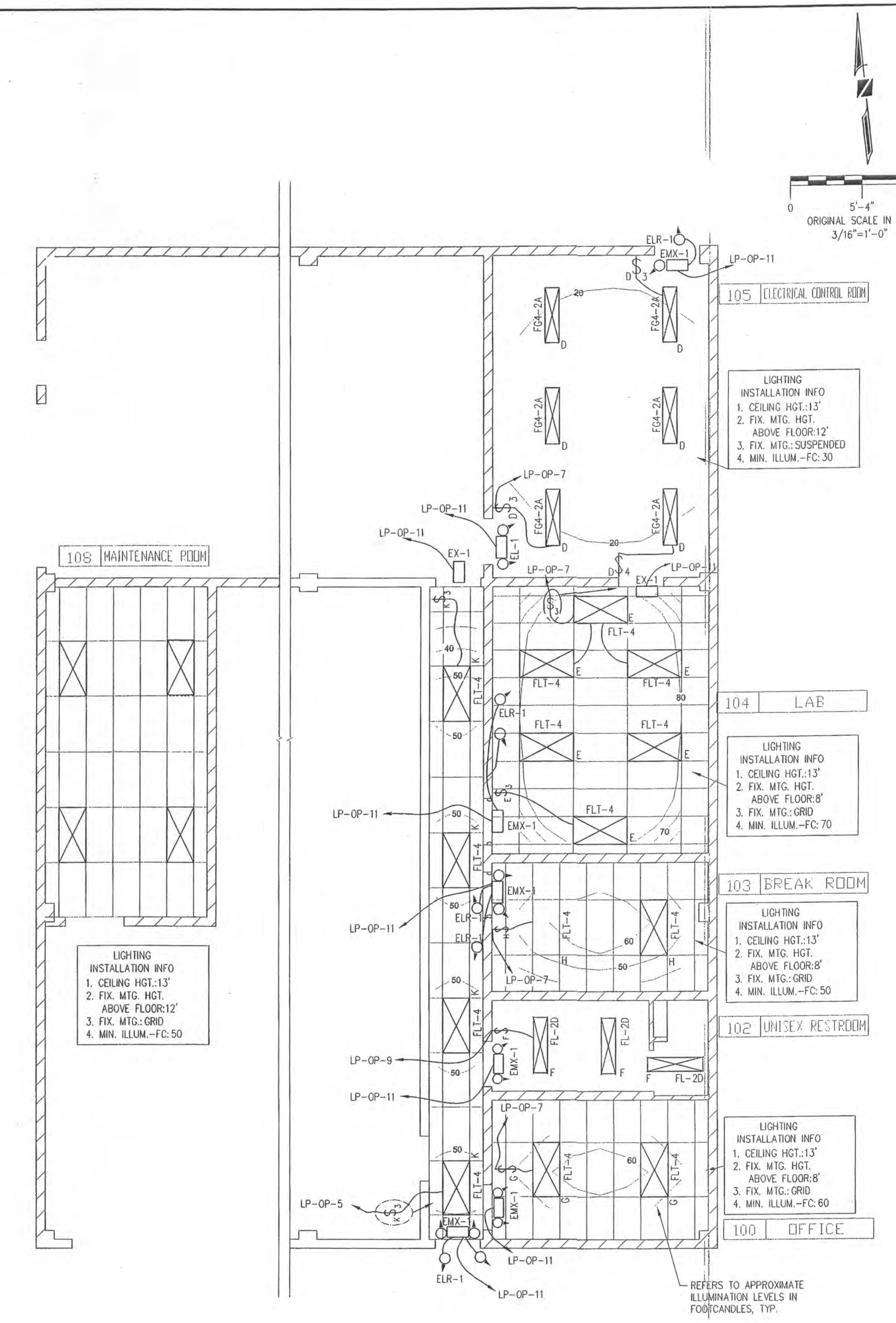
EX-1 — EXIT LIGHT LED COOPER SURE LITES MODEL LPX70(R or G)WH, OR LITHONIA QUANTUM LQMSW3(R or G) 120/277ELN GRAINGER # 3XE31

FL-2D — ENCLOSED & GASKETED, SURFACE MTG TWO LAMP 48IN. 120 VOLT T8 F32T8WW LAMPS. U.L. LISTED FOR WET LOCATIONS, CORROSION RESISTANT HIGH IMPACT PRISMATIC HOLOPHANE "CONTROLESCENT", HOLOPHANE "ES" SERIES ESS04SBBBS042EP11, COOPER METALUX "VT2" SERIES GRAINGER # 5U964 OR EQUAL

R. D. Zande & Associates	DESIGNED BY: FBA DRAWN BY: JAS CHECKED BY: APPROVED BY: DATE: JAN 13,, 2006 DWG NO.5724-01 MACK-IND-NORTHSTAR\E13-15	REVISIONS DATE / REMARKS	FLOYD BROWNE ASSOCIATES, FBA INC. * Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.363.6792 * Marion, Ohio 740.383.2187
NORTHSTAR DEVELOPMENT WASTEWATER TREATMENTPLANT	SCALE: AS NOTED	WASTEWATER TREATMENT PLANT ELECTRICAL OPERATIONS BLDG LIGHTING & RECPT PLAN	SHEET NO. 43 E14 OF 18

BUILDING	OPERATIONS BLDG															
PANEL:	LP-OPB						120 / 208 3 Ph		4 W WITH GND							
							VA									
Circuit No.	BKR Size	Circuit	LIGHT	RECPT	HVAC	MISC	L1 Load	L2 Load	L3 Load	LIGHT	RECPT	HVAC	MISC	Circuit No.	BKR Size	Circuit
1	20	SPARE					100						100	2	15	RAS & WAS FIT'S
3	40-2P	HVAC PTAC-1			3260			3296					36	4	15	EFF FLO MTR FIT-417
5					3260				3296				36	6	20	PE PIT-414
7	20	BLOWER RM, LGTS	1289				4589						3300	8	40	UV SYSTEM 1
9	20HID	FILTER RM LGTS	1575					4875					3300	10	40	UV SYSTEM 2
11	20	FILTER RM LGTS	1081						1081					12	20	SPARE
13	20	BLOWER RM RECPT		1080			2080						1000	14	20-2P	GENERATOR HTR
15	20	SPARE						1000					1000	16		"
17	20	MAINT RM RECPT		1440					1680				240	18	20	GENERATOR BATTERY CHRGR
19	20	SPARE					100						100	20	20	SAMPLER
21	20	SPARE						2900					2900	22	30-3P	MAINTENACE & FILTER RM RECPT 120 / 208 3PH 4W
23	20GFI	FILTER RM RECPT		1800					4700				2900	24		
25	20	SPARE					2900						2900	26		
27	20	SPARE						0						28	20	SPARE
29	20	SPARE							0					30	20	SPARE
			3945	4320	6520	0				0	0	0	17812			
		Totals	3945	4320	6520	####	9769	12071	10757							
		ADD 25% OF LARGEST MOTOR					0	0	0							
		LOAD	LIGHT	REC P	HVAC	MISC	9.8	12.1	10.8	KVA						
		TOTAL LOAD	3.9	4.3	6.5	17.8		32.6		KVA						

BUILDING	OPERATIONS BLDG															
PANEL:	LP-OP						120 / 208 3 Ph		4 W WITH GND 300 AMP MAIN							
							VA									
Circuit No.	BKR Size	Circuit	LIGHT	RECPT	HVAC	MISC	L1 Load	L2 Load	L3 Load	LIGHT	RECPT	HVAC	MISC	Circuit No.	BKR Size	Circuit
1	20	SPARE					0							2	20	SPARE
3	20	SPARE						0						4	20	SPARE
5	20	REST RM,OFF,HALL LTS	960						4210			3250		6	50-2P	HVAC OUTDOOR UNIT - HP-1
7	20	ELECT,BREAK RM'S,LAB LTS	1408				4658					3250		8		
9	20	PLC-OP CABINET				1000		7524				6524		10	60-3P	HVAC AIR HANDLER & MAKE-UP HTR
11	20	EMER/EXIT LGTS	344						6868			6524		12		
13	20	ELECT RM, LAB RECPT		900			7424					6524		14		
15	20	LAB RECPT		1620				2220			600			16	20	LAB INCUBATOR
17	20	SPARE							600		600			18	20	LAB REFRIG
19	20	OFFICE, RST RM RECPT		1260			1860				600			20	20	BREAK RM REFRIG
21	20	FAN CHAMBER LTS	300					900			600			22	20	BREAK RM MICROWAVE
23	20	FAN CHAMBER RECPT		610					1610				1000	24	20	DVR CABINET
25	30-2P	LIGHTING CONTROL PANEL LCP-OP		1080			2470			1260	130			26	20	BREAK RM, RST RM RECPT,EF-5
27			2625					2625						28	20	SPARE
29	20	RAS & CLARIFER LTS & RECPT	675		900				3075				1500	30	20-2P	TANKLESS WATER HTR TWH
31	20	HVAC EF-6			121		1621						1500	32		
33	20	HVAC EH-7			1500			1600					100	34	20	RAS VALVE BOX COMB. GAS MON.
35	20				1500				1500					36	20	SPARE
37	20	TVSS					9769						9769	38	100-3P	FEED TO LP-OPB
39	20	TVSS						12071					12071	40		
41	20	TVSS							10757				10757	42		
			6312	5470	4021	1000				1260	2530	26072	36697			
		Totals	7572	8000	30093	37697	27802	26940	28620							
		ADD 25% OF LARGEST MOTOR					0	0	0							
		LOAD	T	RECP	HVAC	MISC	27.8	26.9	28.6	KVA						
		TOTAL LOAD	7.6	8.0	30.1	37.7		83.4		KVA						



BUILDING	OPERATIONS BLDG											
PANEL:	PP2-OP				480 3 Ph		4 W WITH GND 150 AMP MAIN					
					KVA							
Circuit No.	BKR Size	Circuit	HVAC	MOTOR	L1 Load	L2 Load	L3 Load	HVAC	MOTOR	Circuit No.	BKR Size	Circuit
1	30-3P	EH-6 20 KW	6.7		13.4			6.7		2	30-3P	EH-6 20KW
3			6.7			13.4		6.7		4		
5			6.7				13.4	6.7		6		
7	20-3P	BLOWER RM OVERHEAD DOOR 1/2HP		0.3	0.9				0.6	8	20-3P	SAMPLER PUMPS
9				0.3		0.9			0.6	10		
11				0.3			0.9		0.6	12		
13	20-3P	FILTER RM OVERHEAD DOOR 1/2HP		0.3	3			2.7		14	20-3P	BLOWER RM EXH FANS EF-3&4 3HP EA
15				0.3		3		2.7		16		
17				0.3			3	2.7		18		
19	20-3P	SPARE			1.3			1.3		20	20-3P	FILTER RM EXH FAN EF-7 3HP
21						1.3		1.3		22		
23							1.3	1.3		24		
25	20-3P	SPARE			0					26	20-3P	SPARE
27						0				28		
29							0			30		
31	20-3P	FILTER BACKWASH VALVES		0.5	0.5					32	30-3P	MAINTENANCE RM TEST STARTER
33				0.5		0.5				34		
35				0.5			0.5			36		
37	20-3P	SPARE			0					38	20	SPARE
39						0				40	20	
41							0			42	20	
			20.1	3.3				32.1	1.8			
		Totals	52.2	5.1	19	19	19					
		ADD 25% OF LARGEST MOTOR	3		0.58	0.576	0.576					
		LOAD			20	20	20	KVA				
		TOTAL LOAD	52.2	5.1		59		KVA				

BUILDING	OPERATIONS BLDG											
PANEL:	PP1-OP				480 3 Ph		4 W WITH GND 100 AMP MAIN					
					KVA							
Circuit No.	BKR Size	Circuit	HVAC	MOTOR	L1 Load	L2 Load	L3 Load	HVAC	MOTOR	Circuit No.	BKR Size	Circuit
1	20-3P	SPARE			0					2	20-3P	SPARE
3						0				4		
5							0			6		
7	20-3P	FAN CHAMBER EXH FAN 3HP		1.2	1.2					8	20-3P	SPARE
9				1.2		1.2				10		
11				1.2			1.2			12		
13	20-3P	CLARIFIER NO. 1		0.8	0.75					14	20-3P	SPARE
15				0.8		0.75				16		
17				0.8			0.75			18		
19	20-3P	CLARIFIER NO. 2		0.8	0.75					20	20-3P	FUTURE RAS / WAS VALVES
21				0.8		0.75				22		
23				0.8			0.75			24		
25	20-3P	RAS / WAS VALVES		1.5	1.5					26	20-3P	SPARE
27				1.5		1.5				28		
29				1.5			1.5			30		
31	20-3P	SPARE			0					32	20-3P	SPARE
33						0				34		
35							0			36		
37	20-3P	SLUDGE VALVES		1.0	1					38	20	SPARE
39				1.0		1				40	20	
41				1.0			1			42	20	
			0	15.6				0	0			
		Totals	0	15.6	5	5	5					
		ADD 25% OF LARGEST MOTOR	2		0.6	0.6	0.6					
		LOAD			6	6	6	KVA				
		TOTAL LOAD	0	15.6		17		KVA				

R. D. Zande & Associates

DESIGNED BY: FBA	REVISIONS	
DRAWN BY: JAS	DATE	REMARKS
CHECKED BY:		
APPROVED BY:		
DATE: JAN 13, 2006		

DWG NO.5724-01 MACK-IND-NORTHSTAR\E13-15

FLOYD BROWNE ASSOCIATES, FBA INC.

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STATE OF OHIO WILLIAM CLIFFORD MOSS E-50390 REGISTERED PROFESSIONAL ENGINEER

JAN 17, 2006

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENTPLANT

SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

ELECTRICAL
OPERATIONS BLDG
OFFICE, LAB, BREAK RM, ELECT RM
LIGHTING PLAN

SHEET NO. 44

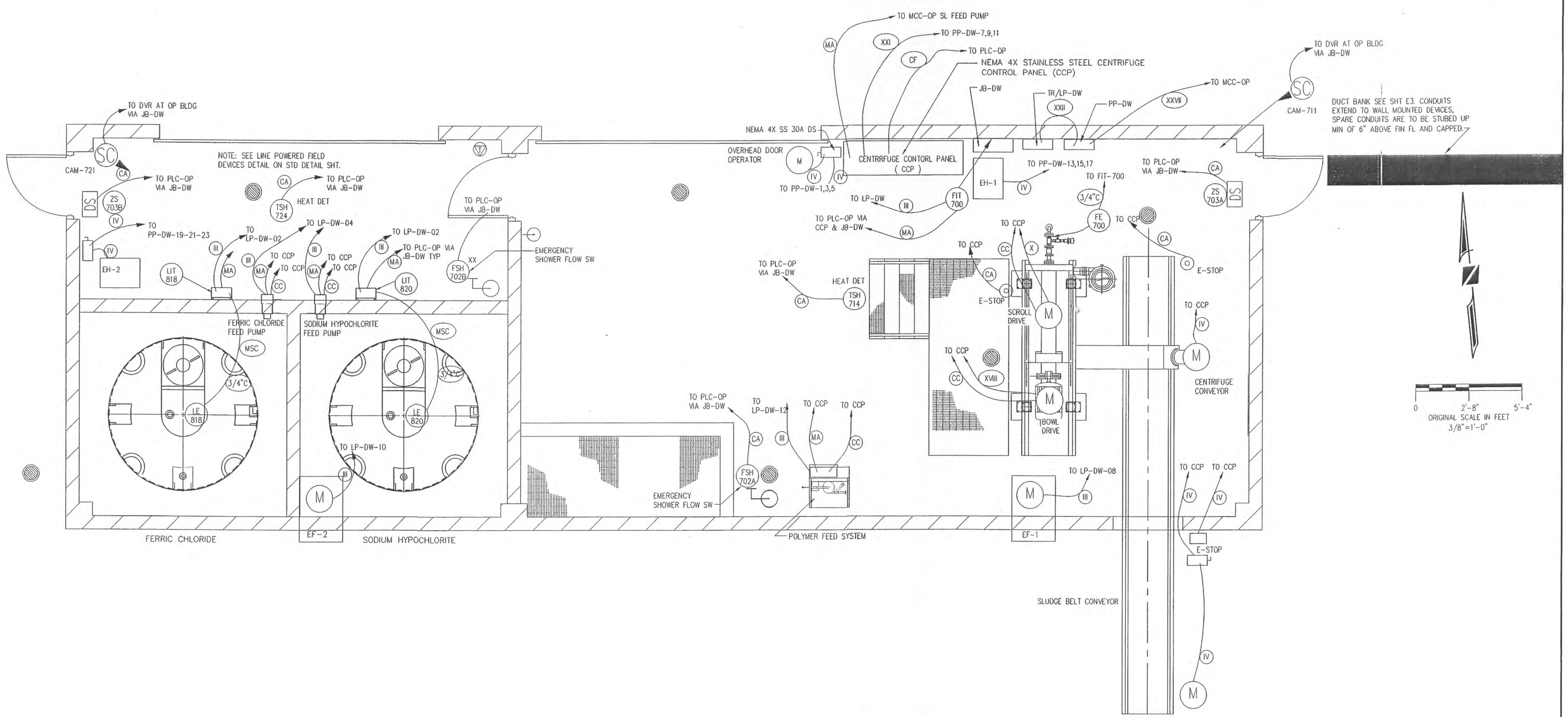
E15 OF 18

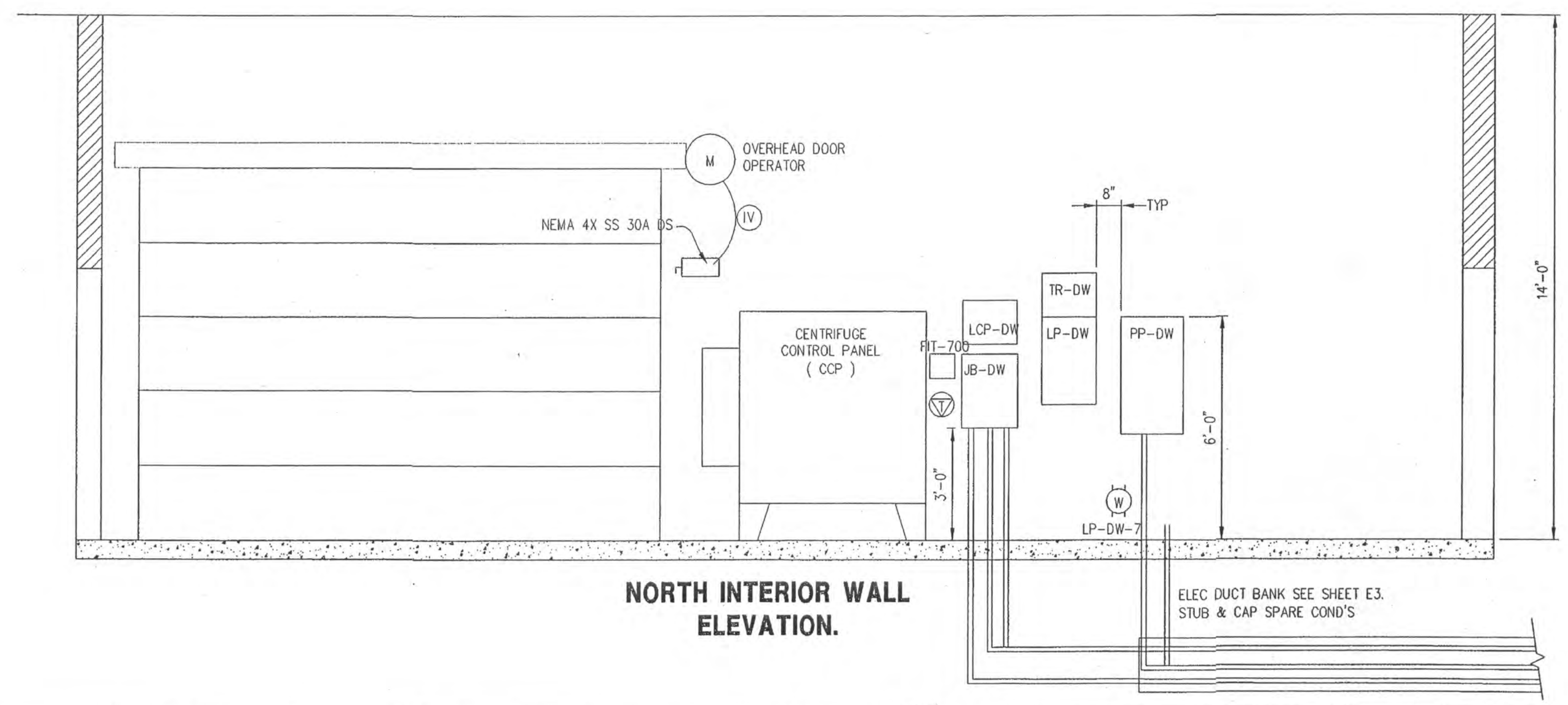
DS SECURITY DOOR SWITCH

HD HEAT DETECTOR

SC SECURITY CAMERA

CAM-XXX





NORTH INTERIOR WALL ELEVATION.

DESIGNED BY:	FBA	
DRAWN BY:	JAS	
CHECKED BY:		
APPROVED BY:		
DATE: JAN 13, 2006		

DWG NO. 5724-01 MACK-IND-NORTHSTAR\E16-17

REVISIONS	
DATE	REMARKS

R. D. Zande & Associates

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STATE OF OHIO WILLIAM CLIFFORD 48386 REGISTERED PROFESSIONAL ENGINEER

JAN 17, 2006

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENTPLANT

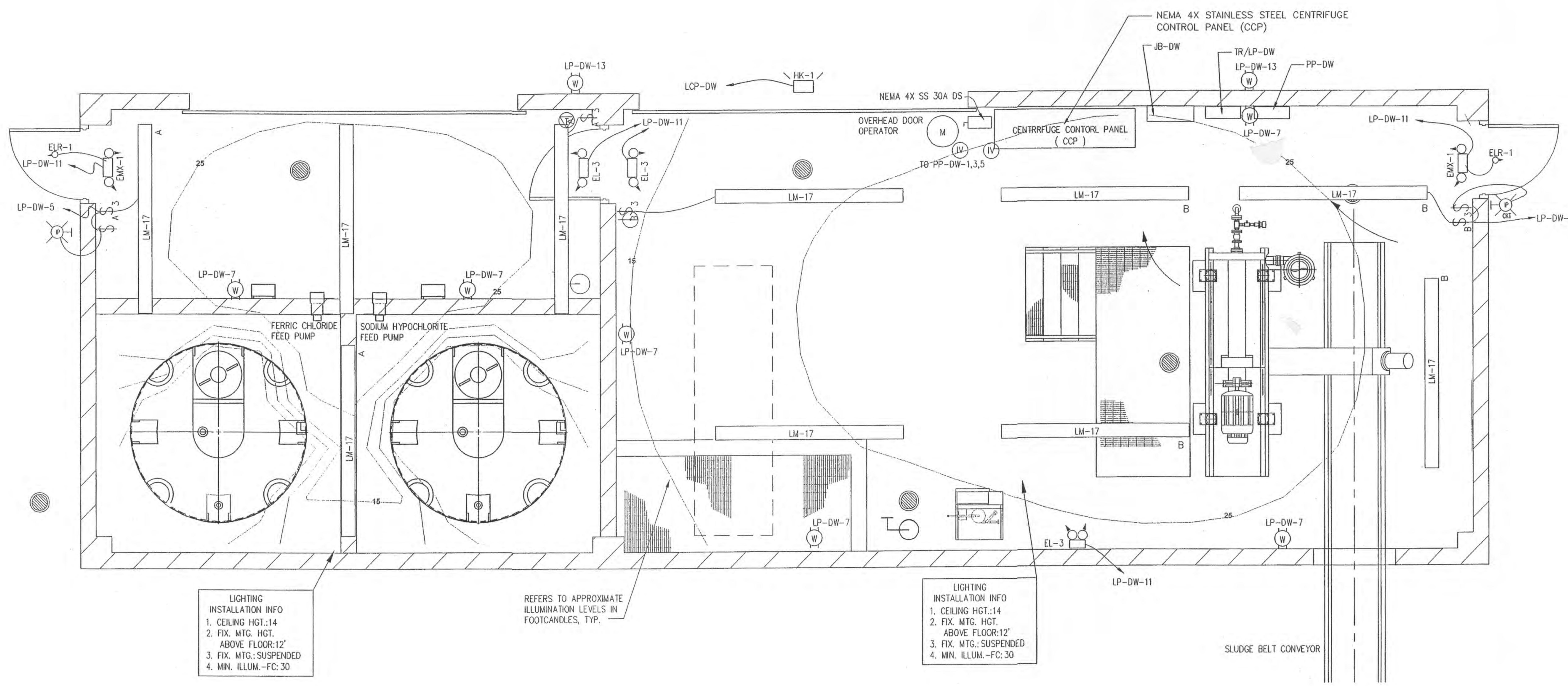
SCALE: AS NOTED

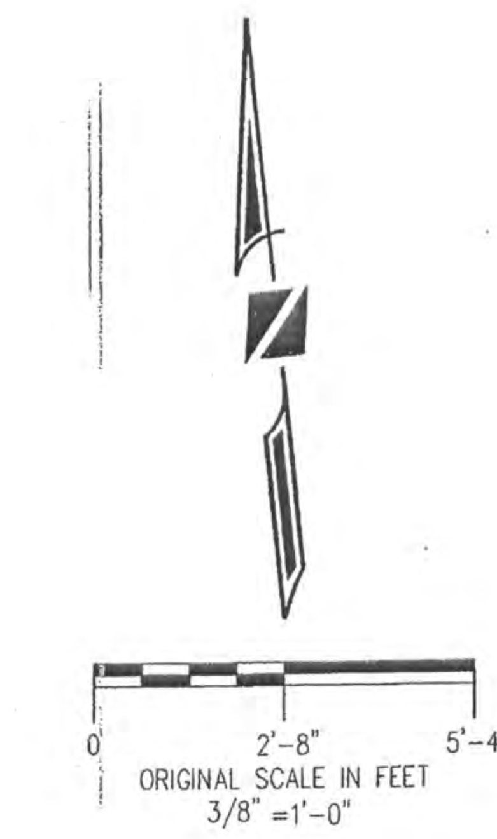
WASTEWATER TREATMENT PLANT

DEWATERING BLDG ELECTRICAL WIRING PLANS

SHEET NO. 45

E16 OF 18





LM-17 (A) — 120V, 8' FLUORESCENT, SUSPENDED MOUNTED, ENCLOSED INDUSTRIAL FIXTURE, 2-75W T12 SLIMLINE, 96" LINEAR FLUORESCENTS, U.L. LISTED FOR DAMP LOCATION, LITHONIA DMW 2 96, OR EQUAL

IP (IP-1, CKT 11) — GENERAL WALL FIXTURE. MAX WATTAGE 100W 120VOLT LUMA PRO, GRANGER # 3RB20 OR STONCO WEATHERPROFF FIXTURE DEC100S, LUMAPRO OR STONCO DEC50 W/ 50W HPS LAMP MAY ALSO BE USED GRAINGER # 5MM60. MOUNT 7 FT ABOVE FIN FL

EL-3 — EMERGENCY LIGHT 100 WATT HOLOPHANE DESOTO M60 SERIES DM6-C-100-S-NZ-2-T1 OR EQUAL MOUNT 8 FT ABOVE FIN FL

EMX-1 CKT-## (EM-1) — COMBINATION EXIT & EMERGENCY LIGHT COOPER SURE LITES MODEL CCX70RWHDH, GRAINGER # 4WL63 OR LITHONIA QUANTUM LHQMSW3(R or G)120/277 GRAINGER # 4PH(19 or 20) MOUNT 8 FT ABOVE FIN FL

HK-1 — 70 WATT, 120V, METAL HALIDE OUTDOOR WALLPACK, U.L. LISTED FOR WET LOCATION - U.L.1598 HOLOPHANE WALLPACK II, WL2K70DMH00LOW, OR EQUAL MOUNT 12 FT ABOVE FIN FL

ELR-1 — REMOTE EMERGENCY LIGHT HEAD COOPER SURE LITES MODEL 6X-9-WGY, GRAINGER # 4PH91 OR LITHONIA QUANTUM ELANX H0806 GRAINGER # 4PG78

BUILDING: DEWATERING
PANEL: TR/LP-DW
120 / 240 1 Ph 3 W WITH GND 80 AMP BUS

Circuit No.	BKR Size	Circuit	LIGHT	RECPT	HVAC	MISC	L1 Load (VA)	L2 Load (VA)	LIGHT	RECPT	HVAC	MISC	Circuit No.	BKR Size	Circuit
1	80	MAIN					100					100	2	15	CHEM TK LEVEL MTR LIT-818,820
3	80	"						1200				1200	4	15	CHEM FEED PUMPS
5	20	INTERIOR LIGHTS	1570				1610					40	6	20	FIT-700
7	20	RECEPTACLES		1080				2256				1176	8	20	EXH FAN EF-1
9	20	LIGHTING CONTROL PANEL LCP-DW	400				1576					1176	10	20	EXH FAN EF-2
11	20	EMER/EXIT LGTS	340					1000				1000	12	20	POLYMER SYSTEM
13	20	RECEPTACLES		360			360						14	20	SPARE
15	50-2P	SPARE						0					16	20	SPARE
17	"	SPARE					0						18	20	SPARE
19	20	SPARE						0					20	20	SPARE
21	20	SPARE					0						22	20	SPARE
23	20	SPARE						0					24	20	SPARE
			2310	1440	0	0			0	0	0	4692			
		Load					3646	4456							
		MOTOR					0	0							
		LOAD / TOTAL LOAD					3646	4456	VA						
								8.10	KVA						

R. D. Zande & Associates

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:			
APPROVED BY:			
DATE:	DEC. 9, 2005		

DWG NO. 5724-01 MACK-IND-NORTHSTAR\E16-17

FLOYD BROWNE ASSOCIATES, FBA INC.

* Contact Office
Dayton, Ohio 937.431.1004
Delaware, Ohio 740.363.6792
* Marion, Ohio 740.383.2187

STATE OF OHIO — WILLIAM CLIFFORD HESS — REGISTERED PROFESSIONAL ENGINEER

JAN 17, 2006

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

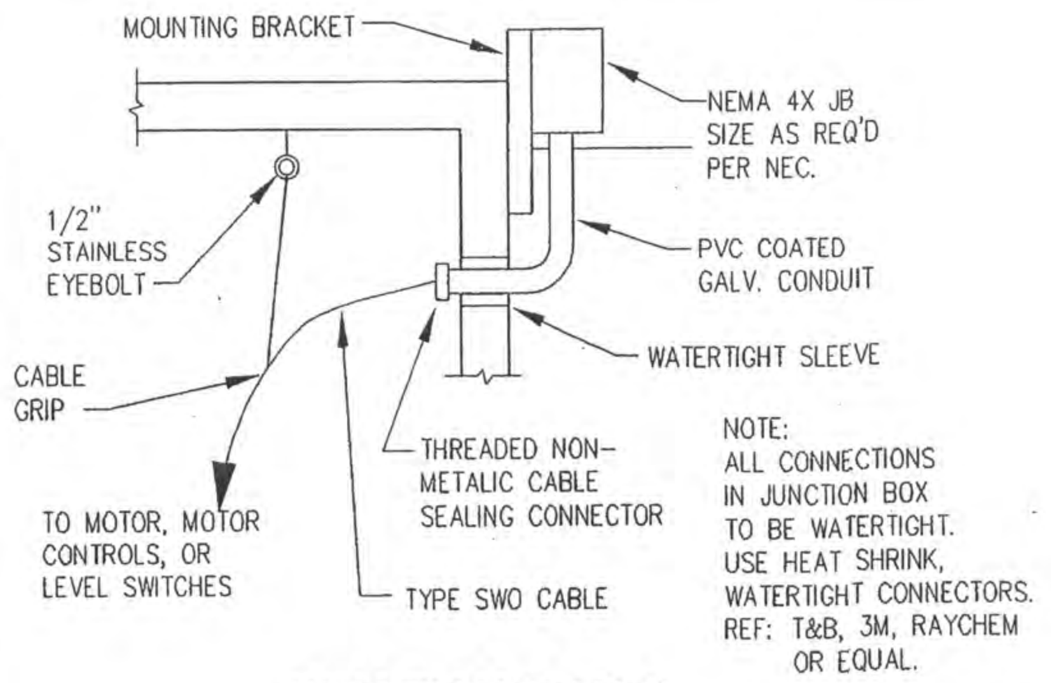
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT

ELECTRICAL
DEWATERING BLDG.
LIGHTING PLAN & RECPT

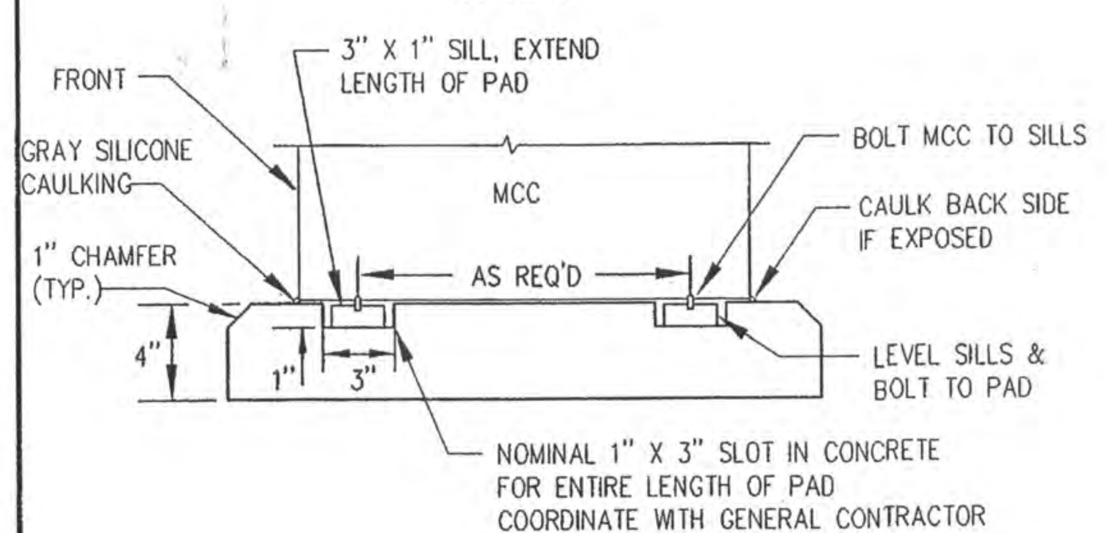
SHEET NO. 46

E17 OF 18



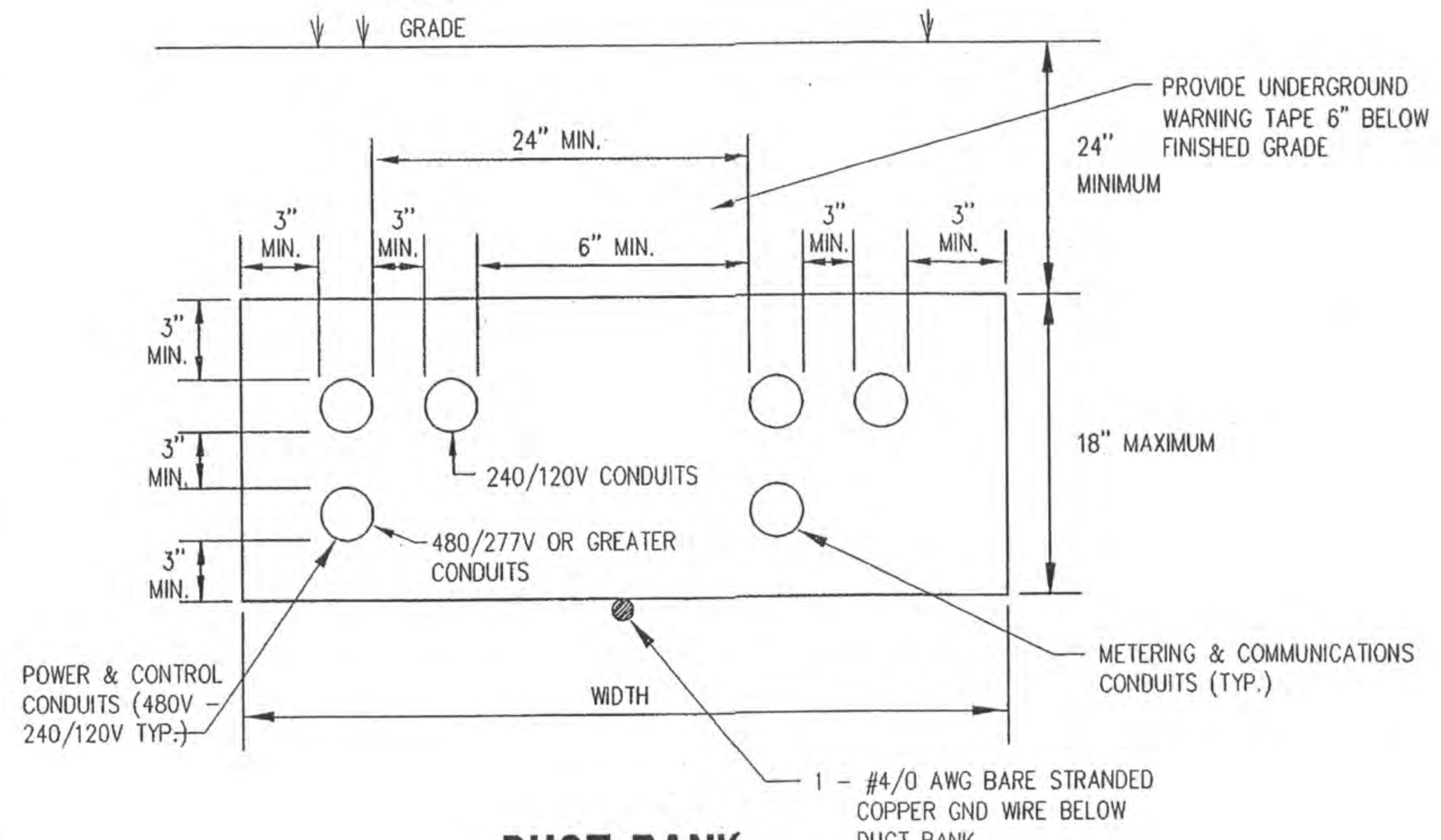
JUNCTION BOX & CABLE SUPPORT DETAIL

NO SCALE



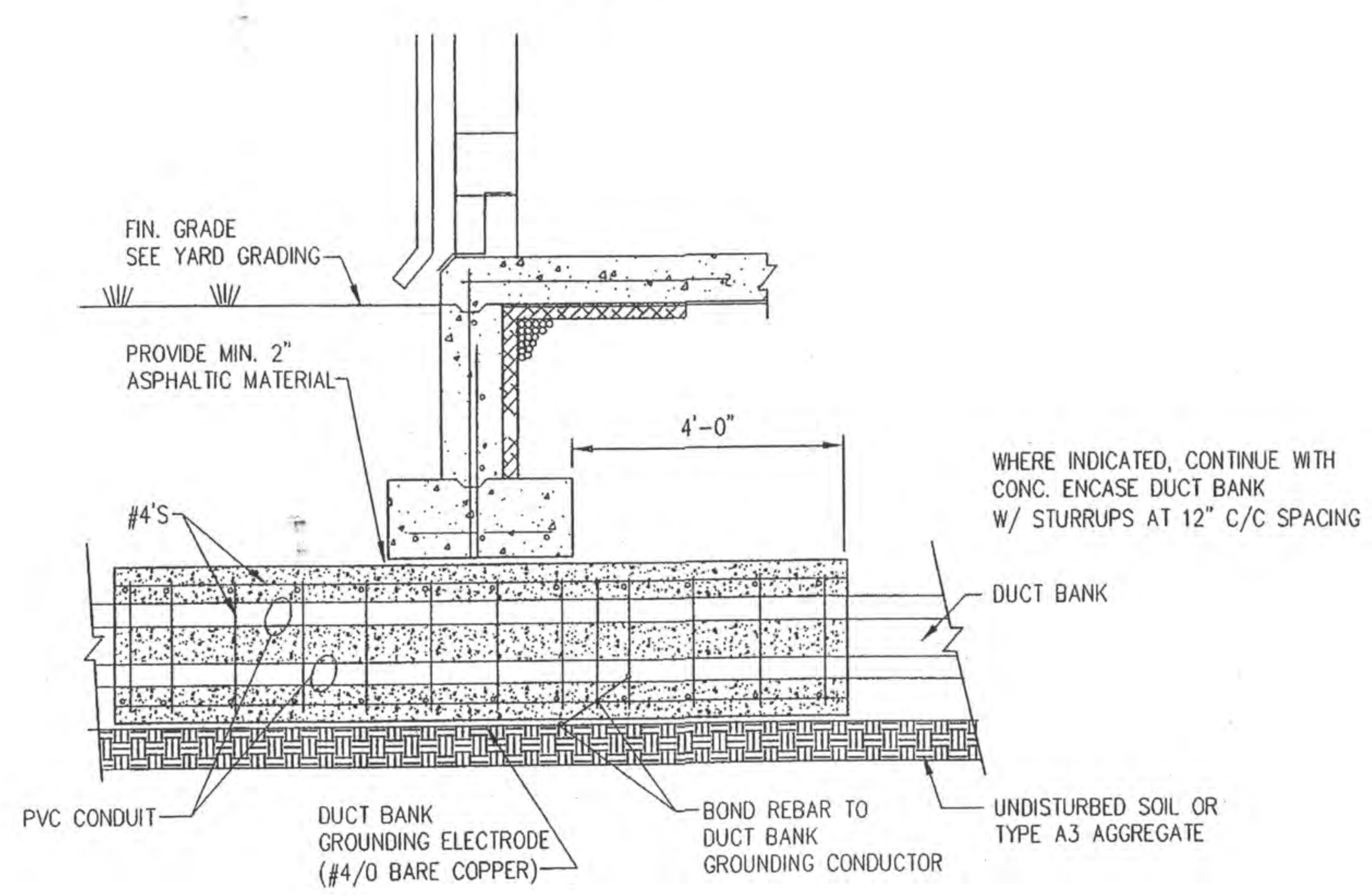
MCC - INSTALLATION

NO SCALE

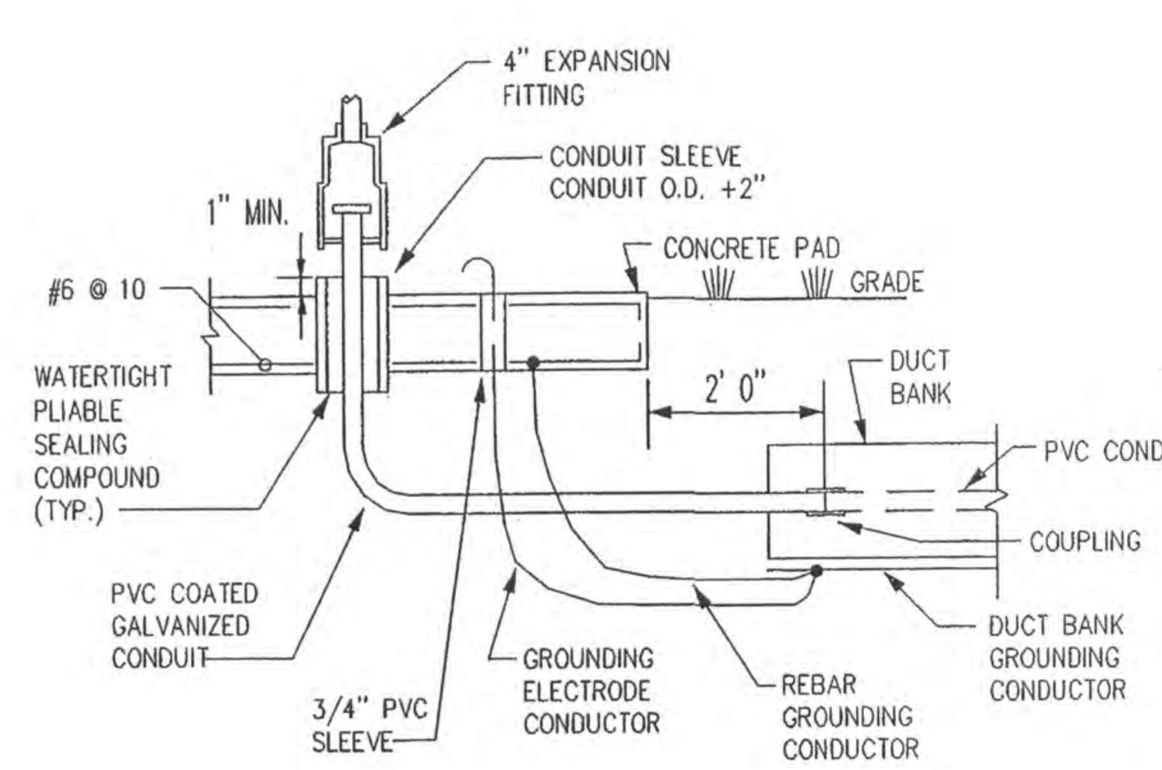


DUCT BANK TYPICAL DETAILS

NO SCALE

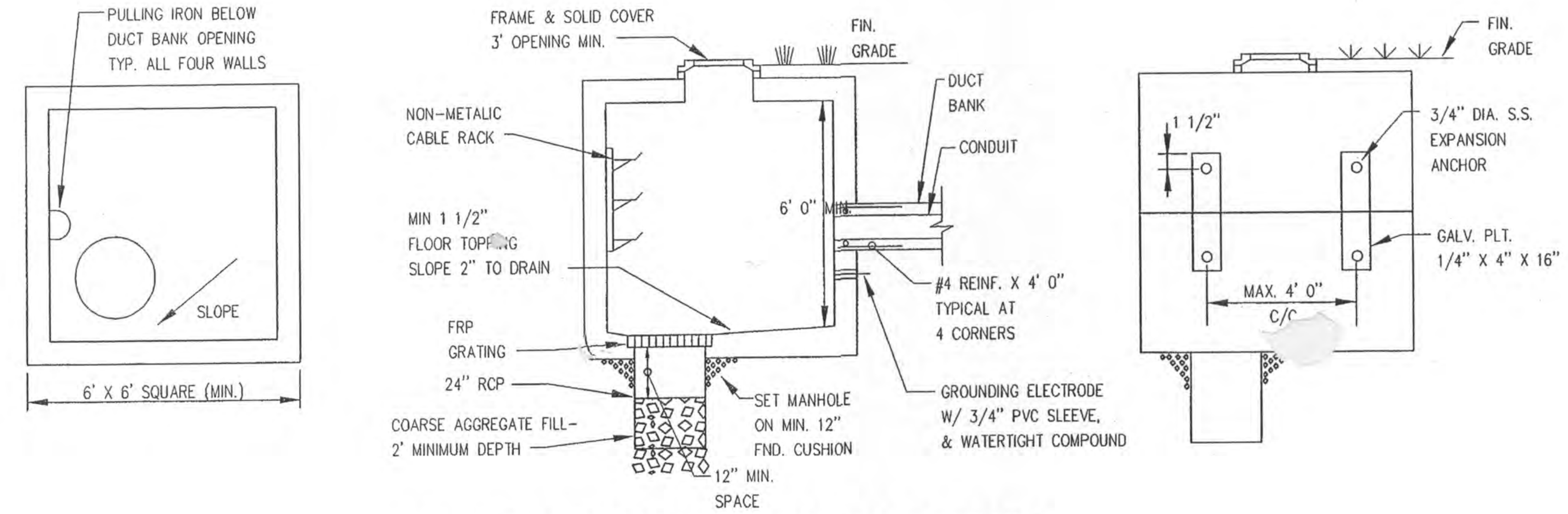


DUCT BANK BELOW FOOTER DETAIL

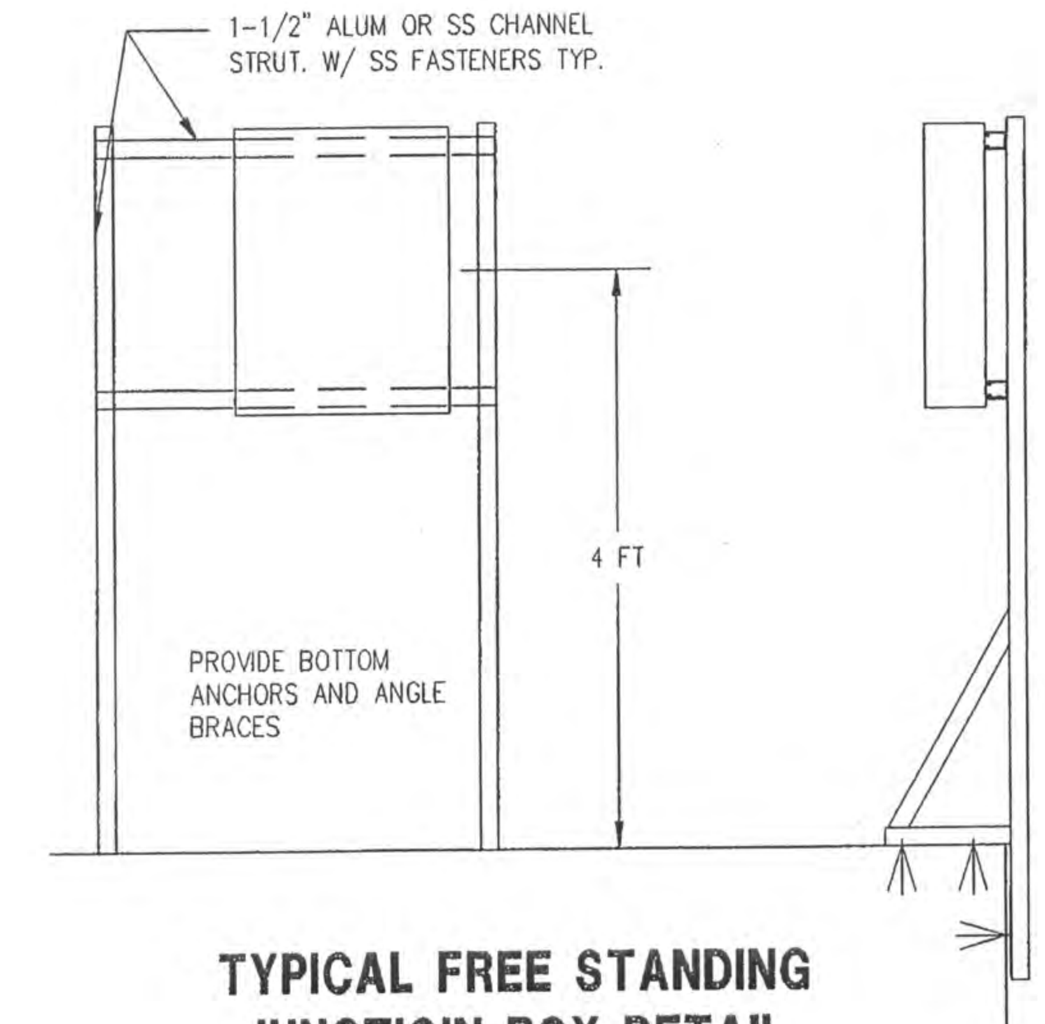


CONDUIT PENETRATION PAD DETAIL

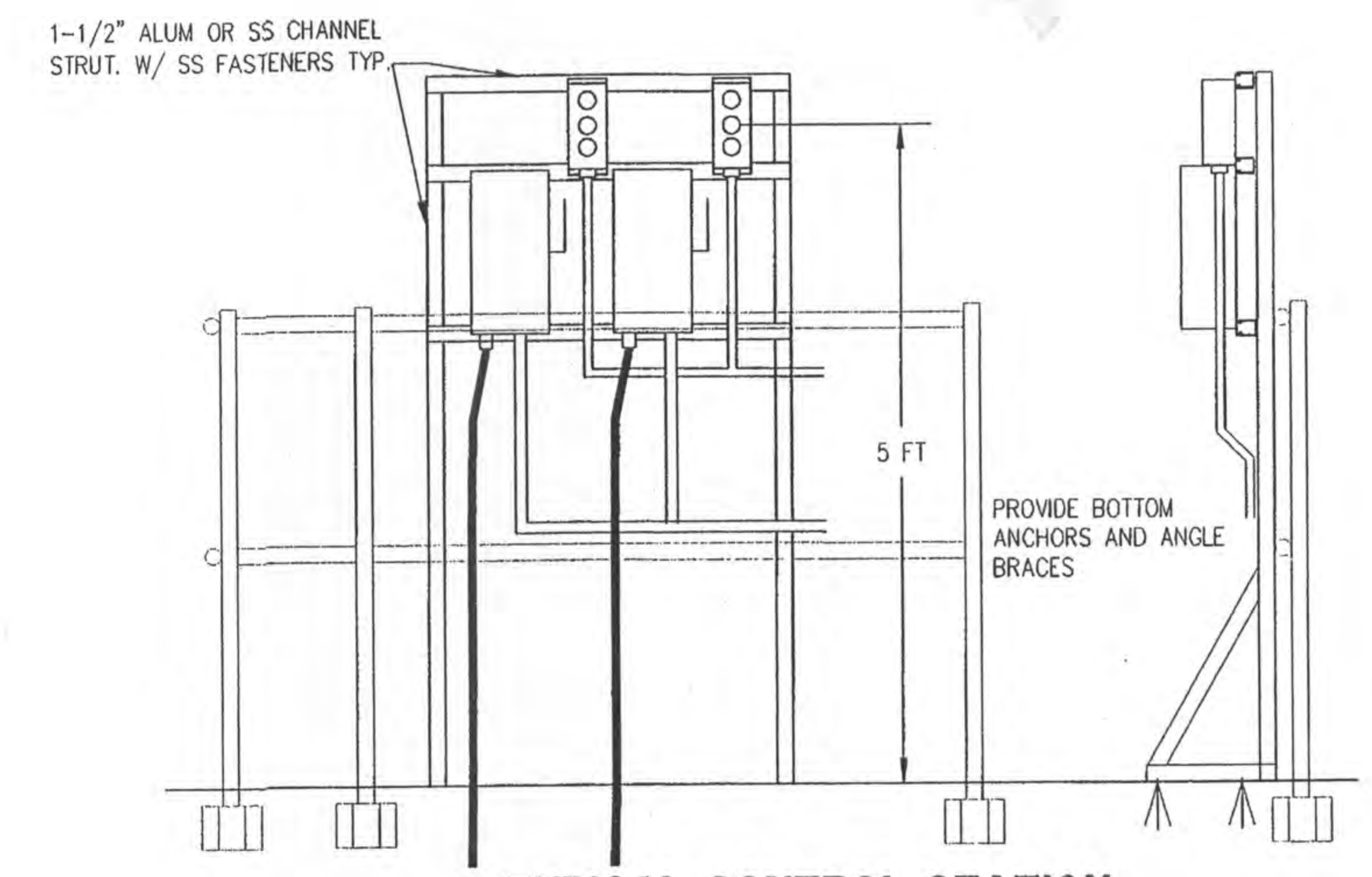
NO SCALE



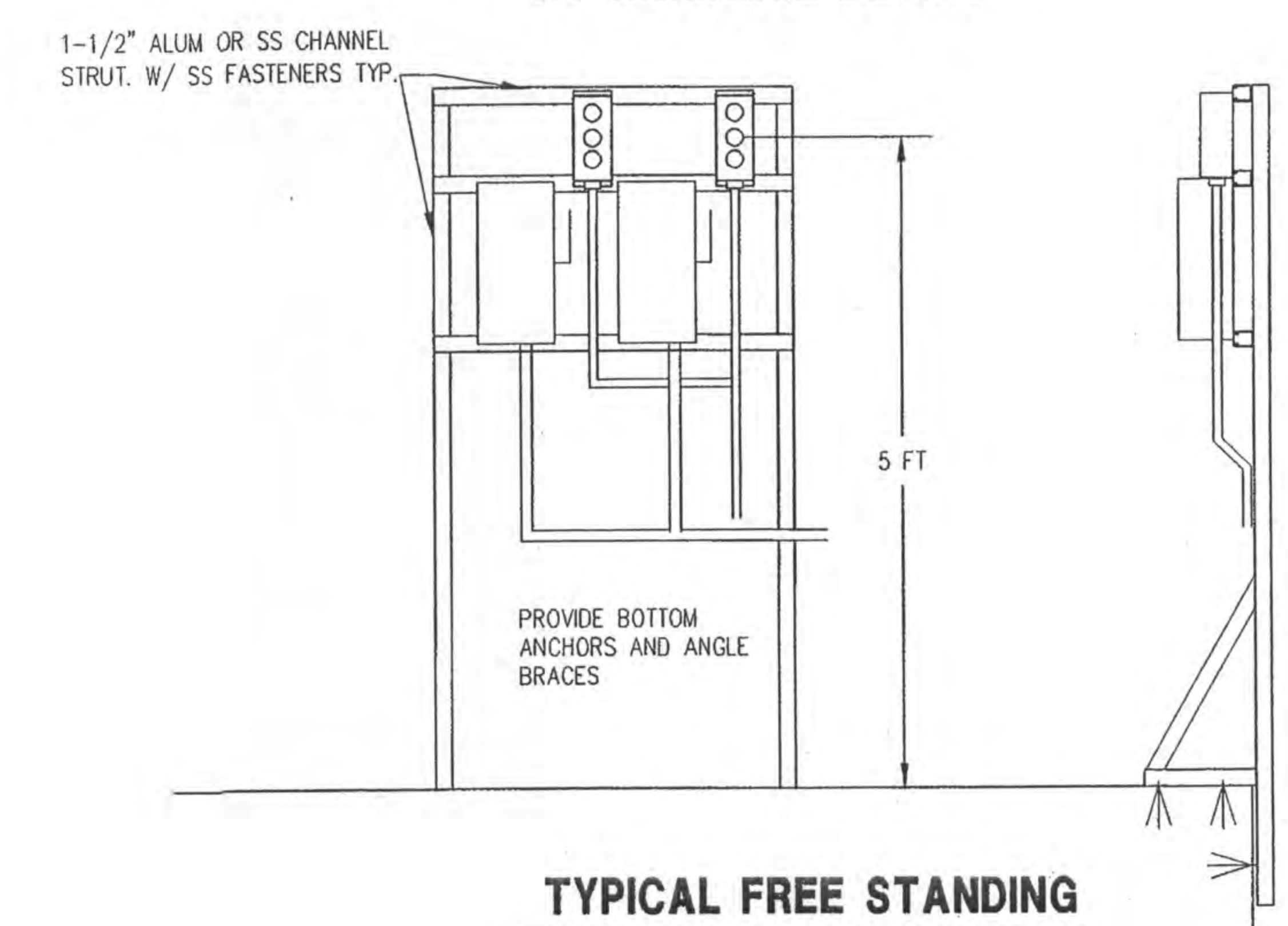
CONCRETE MANHOLE - ELECTRICAL DETAILS



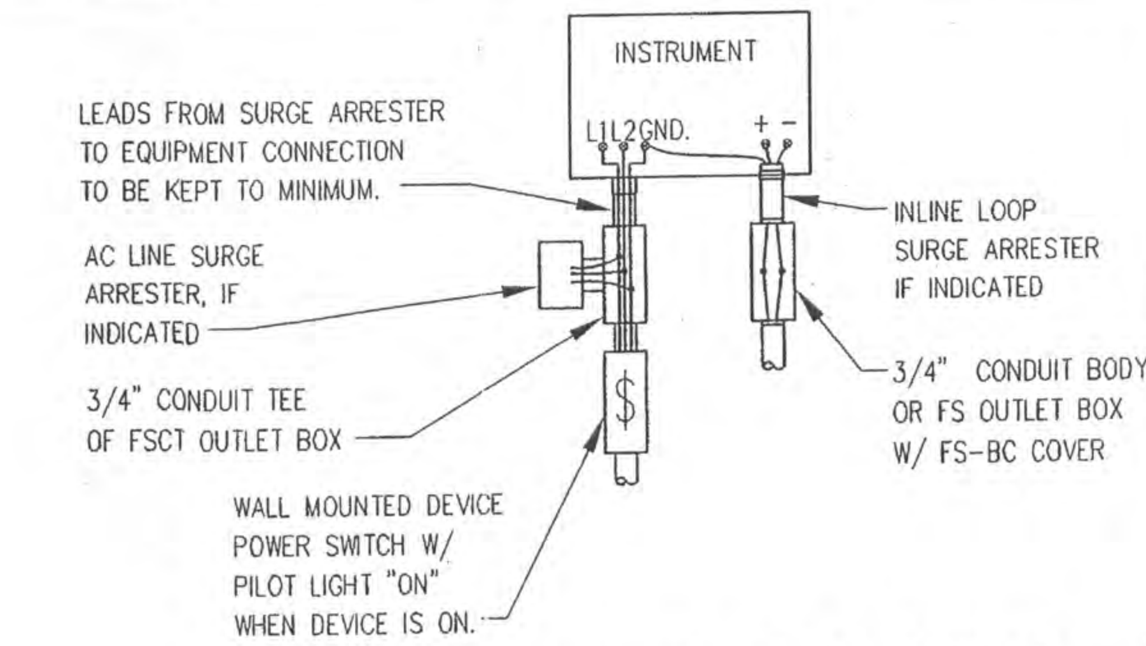
TYPICAL FREE STANDING JUNCTIOIN BOX DETAIL



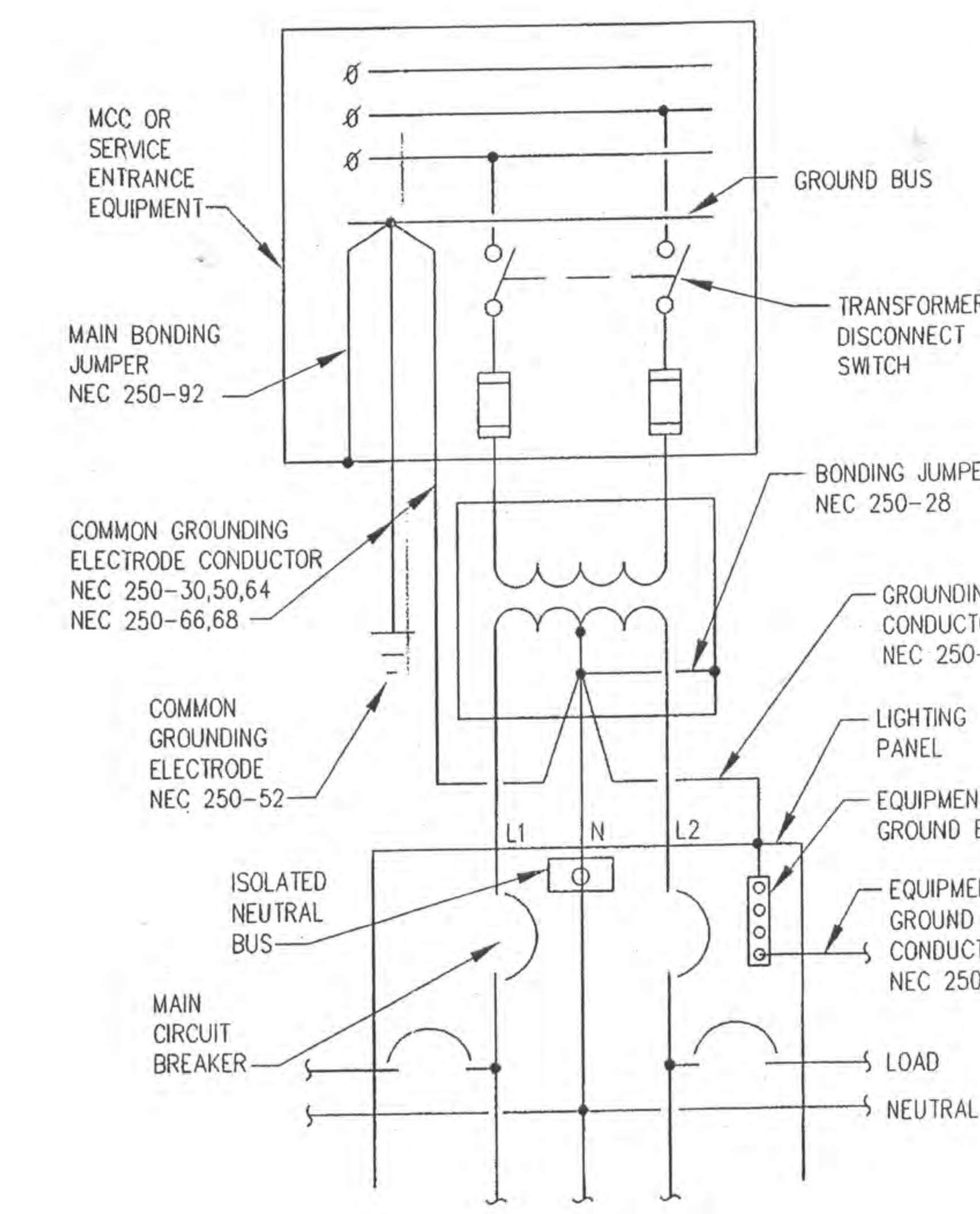
TYPICAL CONTROL STATION AT HANDRAIL DETAIL



TYPICAL FREE STANDING CONTROL STATION DETAIL



LINE POWERED FIELD DEVICE WIRING DETAIL



GROUNDING SEPARATELY DERIVED A.C. SYSTEM

NEC 250-30
TYPICAL FOR ALL 480-240/120V OR 480-208/120V

Kraft Northstar North Pointe

DESIGNED BY:	FBA	REVISIONS	
DRAWN BY:	JAS	DATE	REMARKS
CHECKED BY:			
APPROVED BY:			
DATE:	JAN 13, 2006		

R. D. Zande & Associates

DWG NO. 5724-01 MACK-IND-NORTHSTAR\E18

FLOYD BROWNE ASSOCIATES, FBA INC.

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STATE OF OHIO WILLIAM CLIFFORD MIOS REGISTERED PROFESSIONAL ENGINEER

JAN 17, 2006

NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENTPLANT

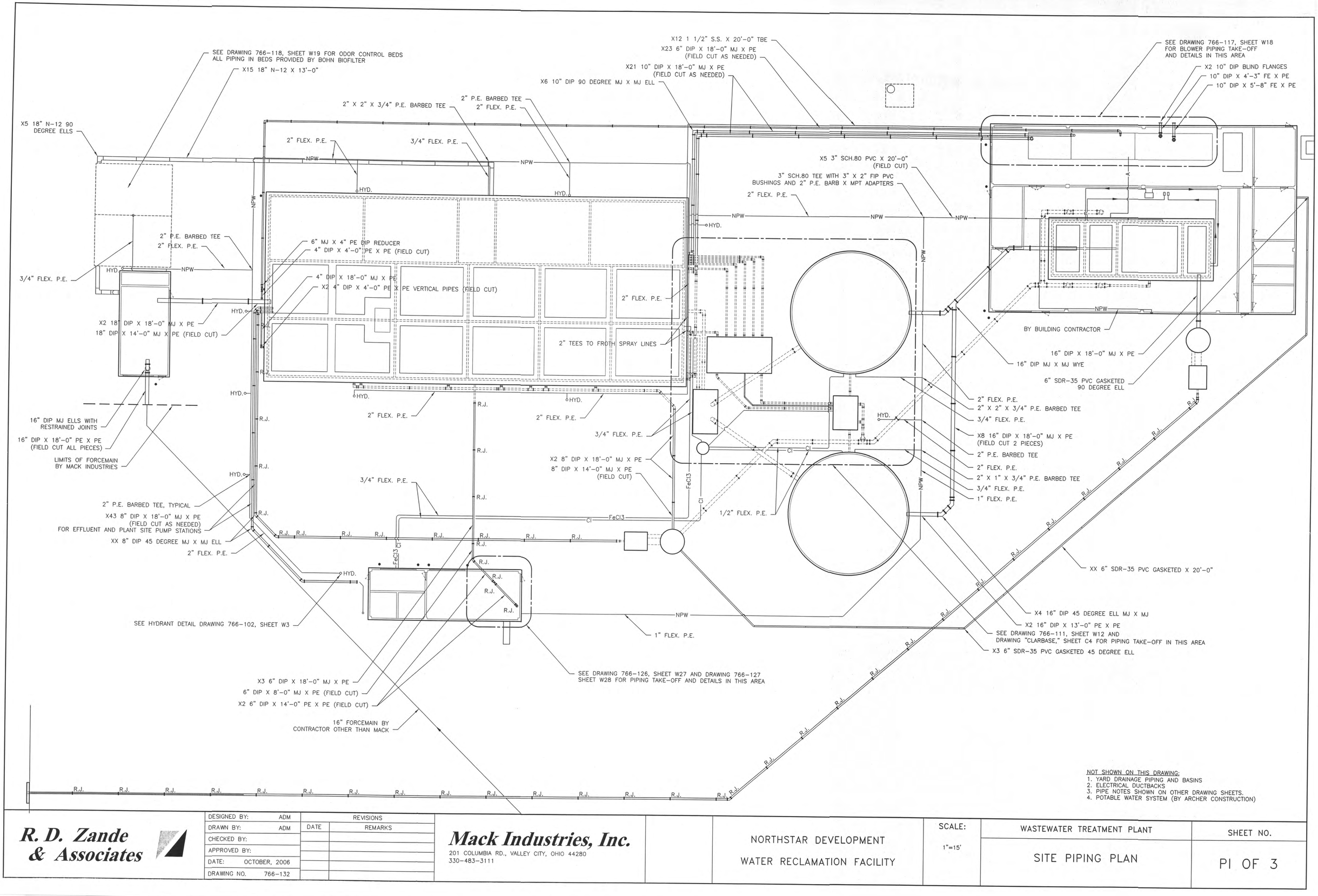
SCALE: NO SCALE

WASTEWATER TREATMENT PLANT

ELECTRICAL
ELEC MISC DETAILS

SHEET NO. 47

E18 OF 18



NOT SHOWN ON THIS DRAWING:
1. YARD DRAINAGE PIPING AND BASINS
2. ELECTRICAL DUCTBACKS
3. PIPE NOTES SHOWN ON OTHER DRAWING SHEETS.
4. POTABLE WATER SYSTEM (BY ARCHER CONSTRUCTION)

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	OCTOBER, 2006
DRAWING NO.	766-132

REVISIONS	
DATE	REMARKS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

SCALE: 1"=15'

WASTEWATER TREATMENT PLANT

SITE PIPING PLAN

SHEET NO. PI OF 3

SEE DWG. 766-119, SHEET NO. W20 FOR "TYPICAL SLUDGE HOLDING AIR DIFFUSER DETAIL"

X156 2" SCH.80 PVC CAPS
X156 2" SCH.80 PVC X 4'-8" (DRILLED AND TAPPED FOR DIFFUSERS)
X312 ENVIROQUIP DP-75, 3/4" SNAP CAP DIFFUSERS
X156 4" X 2" SCH.80 PVC FLUSH STYLE REDUCER BUSHING
X64 4" SCH.80 PVC X 3'-0 3/4"
X64 4" SCH.80 PVC CROSS
X204 STAINLESS STEEL PIPE SUPPORTS
X16 4" SCH.80 PVC X 1'-3 3/4"
X24 4" SCH.80 PVC TEE
X4 4" SCH.80 PVC 90 DEGREE ELL
X8 4" SCH.80 PVC X 5'-8 3/4"

SEE DWG. 766-107 FOR FAN AND SLUDGE WITHDRAWAL CHAMBER DETAILS

10" D.I.P. AIRLINE TO AERATION BLOWERS
10" D.I.P. AIRLINE TO SLUDGE HOLDING BLOWERS
2" FLEXIBLE P.E. NON-POTABLE WATER LINE
1 1/2" SCH.40 STAINLESS STEEL COMPRESSED AIRLINE

3'-6" C-C TYPICAL
2'-4"
3'-0"
4"
12'-4"
6'-2"
3'-6"
JB
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22
ROMAC SS1-11.10 X 8"
6" DIP X 4'-0" PE X PE
6" DIP X 18'-0" FE X FE
6" DIP X 16'-4" FE X FE
6" DIP X 8'-10" FE X FE
6" DIP X 5'-6" FE X PE
8" BUTTERFLY VALVE WITH LEVER OPERATOR
AIR FLOWMETER, SEE DETAIL 119-K
BUTTERFLY VALVE WITH LEVER OPERATOR ABOVE COVER
X76 ENVIROQUIP BRONZE QUICK FLUSH SPRAY NOZZLES (DRILL AND TAP 1/4")
SEE S.S. PIPE SUPPORT SEE DETAIL DWG. 766-119
X2 8" DIP X 14'-9" FE X PE, PRIMED
X2 8" DIP X 7'-2" FE X PE
X2 8" DIP X 15'-6" FE X PE
X2 8" DIP X 18'-0" FE X PE, PRIMED
X14 8" DIP X 18'-0" FE X FE
X2 8" DIP X 1'-6" FE X PE, PRIMED
X4 3/4" PVC BALL VALVE
X3 3/4" SCH.80 PVC X 20'-0"
FOAM SPRAY NOZZLE
2" S.S. FOAM SPRAY LINE
4'-0" C-C
1'-2"
2'-10"
1'-8"
1'-9"
2'-4"
7"
11"
2'-7"
3'-5"
3'-2 1/2"
3'-7 1/2"
ROMAC SS1-4.85 X 8"
2" S.S. BALL VALVE FOR DRAINING SPRAY LINE
4" BUTTERFLY VALVE
X2 2" S.S. X 9'-6" TOE
X2 2" S.S. X 2'-9" TBE
X4 2" S.S. X 20'-0" TOE
X2 2" S.S. X 10'-4" TBE
X2 2" S.S. X 6'-0" TBE
X10 6" D.I. FLG. 45° ELBOW, PRIMED
X5 6" DIP X 6" FE X FE
X2 2" S.S. X 20'-0" PBE
X2 2" S.S. X 13'-9" TBE
X2 2" S.S. X 2'-0" TOE
SEE DWG. 766-108 FOR FLOW EQUALIZATION DETAILS
X4 2" S.S. X 20'-0" TOE
1 1/2" S.S. X 4'-5" TBE
1 1/2" S.S. X 7'-11" TBE
X3 1 1/2" S.S. X 20'-0" TBE
X2 2" S.S. X 1'-11" TBE
2" S.S. BALL VALVE
X6 2" S.S. X 20'-0" PBE
X2 2" S.S. X 5'-10" PBE
X2 3/4" SCH.80 PVC X 3'-3"
X2 3/4" SCH.80 PVC X 1'-4"
2" S.S. PLAIN END PIPES CONNECTED WITH ROMAC SS1-2.63 X 6" REPAIR CLAMPS, TYPICAL
12" GATE VALVE WITH EXTENSION STEM
X4 8" D.I. FLG. 45° ELBOW
ROMAC SS1-7.00 X 8"
1 1/2" S.S. X 16'-1" TBE
1 1/2" S.S. X 4'-5" TBE
1 1/2" S.S. X 7'-11" TBE
X8 12" DIP X 13'-9 1/2" FE X FE
1 1/2" S.S. X 9'-10" TBE
SEE DETAIL BELOW
12" GATE VALVE WITH EXTENSION STEM
ROMAC SS1-9.00 X 8"
X2 2" S.S. X 3'-6" TOE (FIELD CUT)
3/4" S.S. X 6" NIPPLE
3/4" S.S. X 2'-2" TOE (FIELD CUT)
TBE
42" STAINLESS STEEL PIPE SUPPORTS AT 10'-0" C-C MAX.
X10 6" FLG. PLUG VALVE WITH GEAR OPERATED HANDWHEEL
18" STAINLESS STEEL PIPE SUPPORTS AT 10'-0" C-C MAX.
SEE DWG. 766-109 FOR 'PULSAIR' MIXING DETAILS TYPICAL OF FOUR CHAMBERS
SCH.10 STAINLESS STEEL PIPE PRE-FABRICATIONS ARE TYPICALLY CONNECTED WITH ROMAC TYPE SS1 STAINLESS STEEL REPAIR CLAMPS
ALL "A" PIPE DESIGNATIONS ARE SCH.10 STAINLESS STEEL PIPE PRE-FABRICATIONS

X2 DETAIL
3/4" S.S. X PLAIN END (FIELD CUT IF NECESSARY)
X2 ROMAC C-12 X 4" STAINLESS STEEL REPAIR CLAMP
X2 3/4" S.S. X 4" TOE
X2 LEGEND T-712
3/4" STAINLESS STEEL BALL VALVE
X4 3/4" S.S. CLOSE NIPPLE
X2 S & K AUTOMATION MODEL 68001, 3/4" STAINLESS STEEL CHECK VALVES
2" S.S. FROTH SPRAY LINES
X2 2" S.S. TEE WITH 2" X 3/4" S.S. BUSHING
X2 2" S.S. CLOSE NIPPLE
X2 LEGEND T-712
2" STAINLESS STEEL BALL VALVE

PIPING AND BRACING NOTES:

1. ALL AIRLINE PIPING SHALL BE TYPE 304 STAINLESS STEEL. 4" DIA. AND LARGER TO BE SCHEDULE 10 WITH BUTT WELDED FITTING. 3" AND SMALLER TO BE SCHEDULE 40 WITH THREADED FITTINGS.
2. ALL SLUDGE AND TRANSFER PIPING SHALL BE CLASS 53, DUCTILE IRON.
3. PIPE SUPPORTS, HANGERS, FASTENERS ETC. SHALL TYPE 304 STAINLESS STEEL.

R. D. Zande & Associates

DESIGNED BY:	ADM
DRAWN BY:	ADM
CHECKED BY:	
APPROVED BY:	
DATE:	JANUARY, 2007
DRAWING NO.	766-133

REVISIONS	
DATE	REMARKS

Mack Industries, Inc.
201 COLUMBIA RD., VALLEY CITY, OHIO 44280
330-483-3111

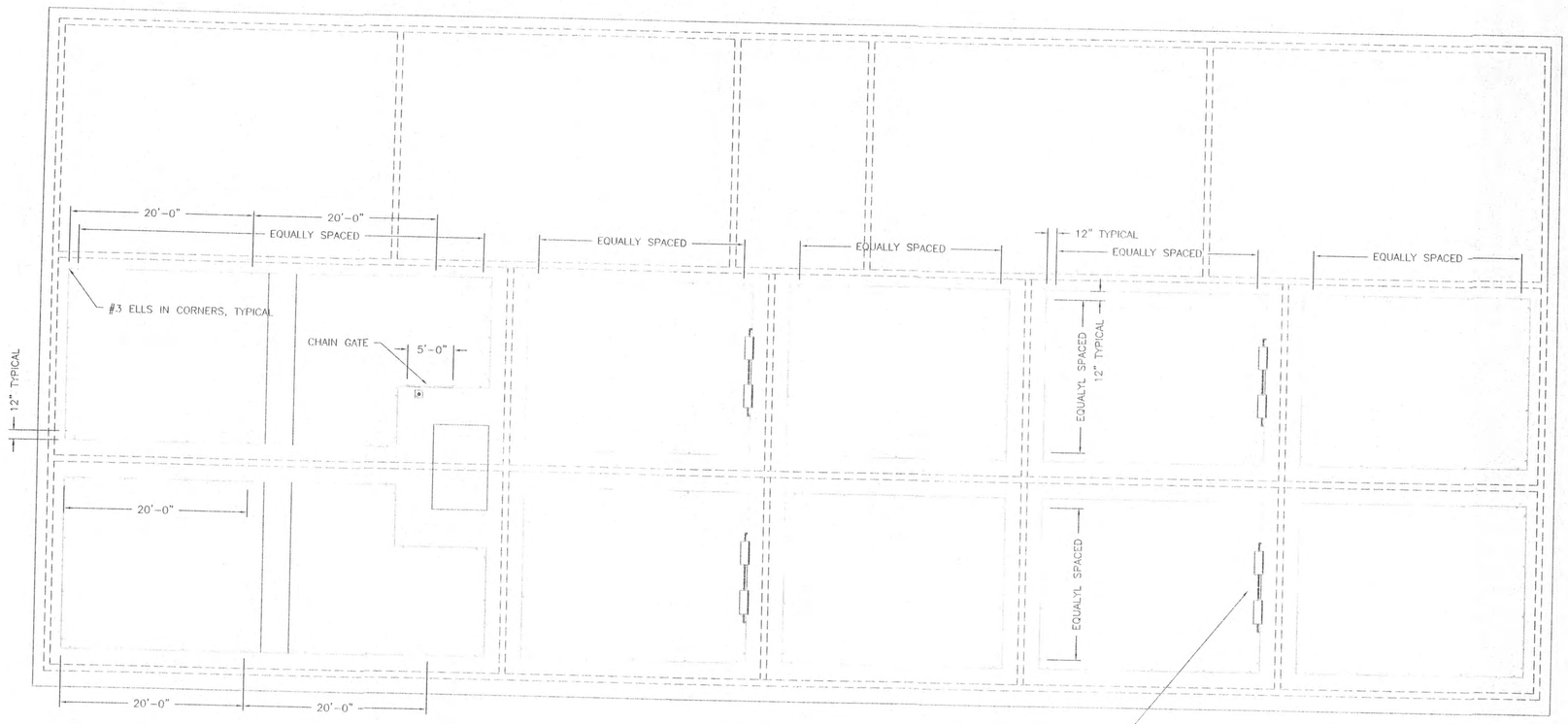
NORTHSTAR DEVELOPMENT
WATER RECLAMATION FACILITY

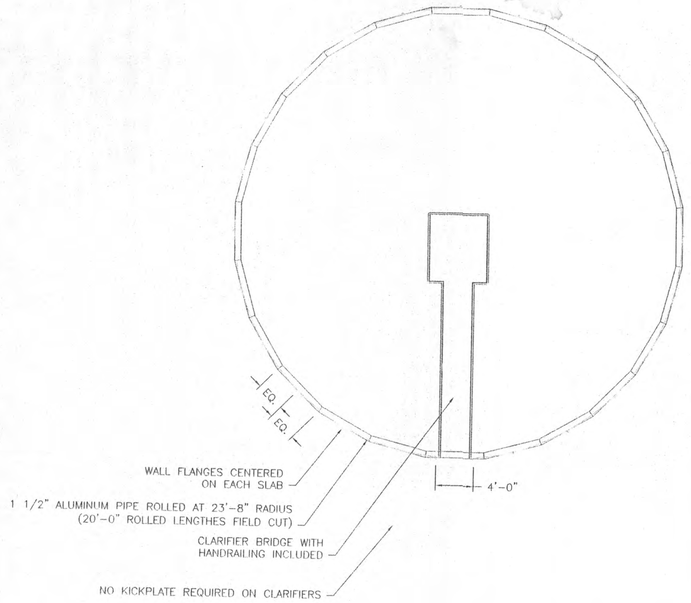
SCALE: 3/16"=1'-0"

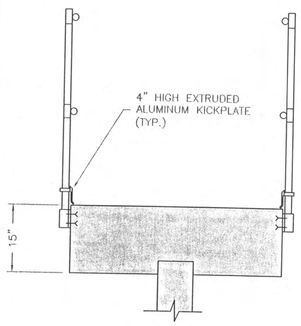
WASTEWATER TREATMENT PLANT

PIPING - MAIN PLANT

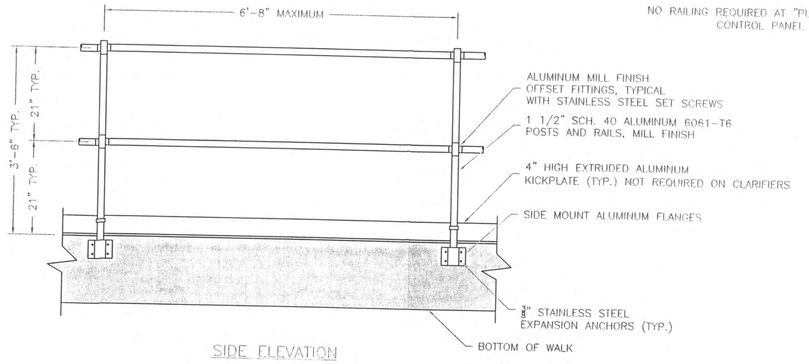
SHEET NO. P2 OF 3





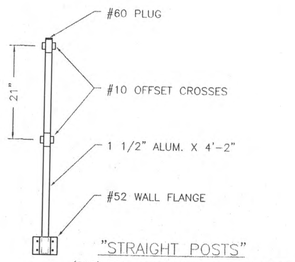


END VIEW

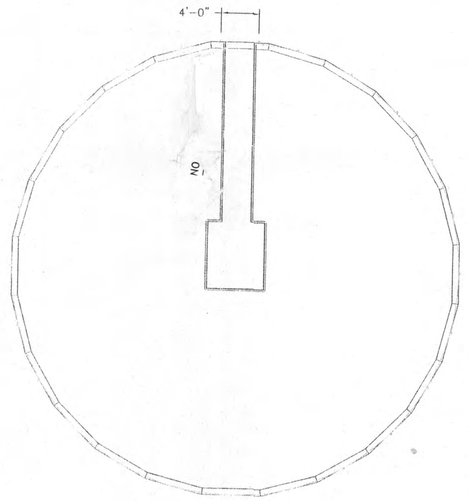


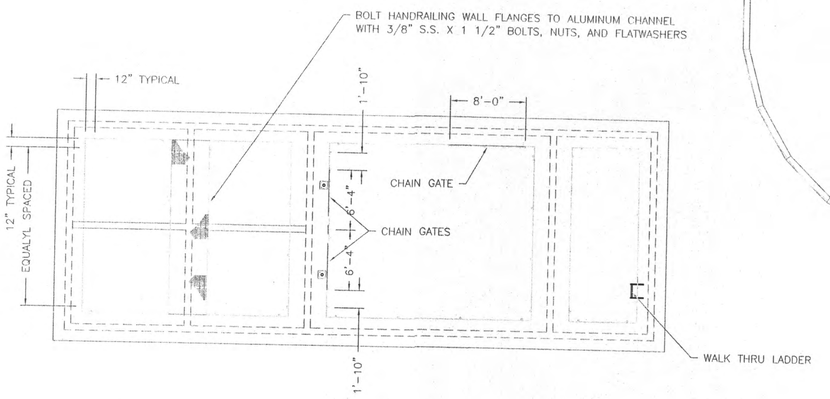
SIDE ELEVATION

TYPICAL HANDRAILNG DETAIL



"STRAIGHT POSTS"
(302) PRE-ASSEMBLED POST REQUIRED





R. D. Zande & Associates	DESIGNED BY: ADM DRAWN BY: ADM CHECKED BY: APPROVED BY: DATE: JANUARY, 2007 DRAWING NO. 766-134	REVISIONS DATE / REMARKS	**Mack Industries, Inc.** 201 COLUMBIA RD., VALLEY CITY, OHIO 44280 330-483-3111

NORTHSTAR DEVELOPMENT WATER RECLAMATION FACILITY	SCALE: NTS	WASTEWATER TREATMENT PLANT HANDRAILING PLAN	SHEET NO. P3 OF 3