

OGDEN CITY

WATER TREATMENT PLANT RECONSTRUCTION

OGDEN CITY

MIKE CALDWELL ----- MAYOR
 BART BLAIR ----- COUNCIL CHAIR
 NEIL K. GARNER ----- COUNCIL VICE-CHAIR
 CAITLIN K. GOCHNOUR ----- COUNCIL MEMBER
 SUSAN E. VAN HOOSER ----- COUNCIL MEMBER
 RICHARD HYER ----- COUNCIL MEMBER
 DOUG STEPHENS ----- COUNCIL MEMBER
 AMY WICKS ----- COUNCIL MEMBER
 JAY LOWDER ----- PUBLIC WORKS DIRECTOR
 JUSTIN ANDERSON P.E. ----- CITY ENGINEER
 KENTON MOFFETT P.E. ----- WATER UTILITY MANAGER

ENGINEERS/ARCHITECTS

SUNRISE ENGINEERING
 CLIFF LINFORD P.E. ----- CIVIL ENGINEER

 ROBERT WORLEY P.E. ----- CIVIL ENGINEER

 STEVE HANSEN P.E., S.E. ----- STRUCTURAL ENGINEER

 RANDY KNAPP P.E. ----- ELECTRICAL ENGINEER

CRSA
 JIM NIELSON, AIA ----- ARCHITECT

SPECTRUM ENGINEERING
 CHRIS KOBAYASHI P.E. ----- ELECTRICAL ENGINEER

SMD ENGINEERING
 SCOTT DEAKINS P.E. ----- MECHANICAL ENGINEER



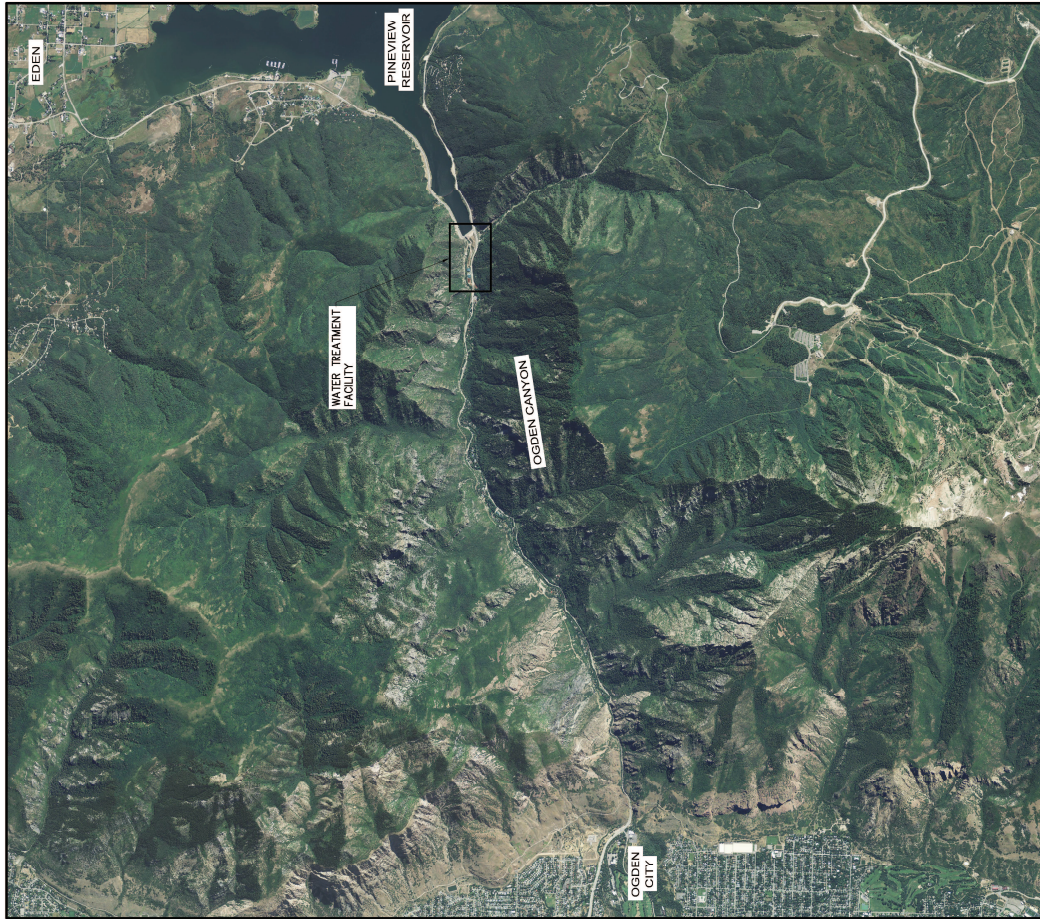
12227 S. BUSINESS PARK DR., SUITE 220
 DRAPER, UTAH 84020 FAX 801.523.0990
www.sunrise-eng.com



LOCATION MAP



AREA MAP



REV. NO.	COMMENT	DATE
SUNRISE ENGINEERING 12227 S. BUSINESS PARK DR., SUITE 220 DRAPER, UTAH 84020 FAX 801.553.0990 WWW.SUNRISE-ENG.COM		
OGDEN CITY		
WATER TREATMENT PLANT RECONST.		
AREA & LOCATION MAP		
REV. NO.	DATE	BY
04955	2/27/24	CL
DESIGNED BY: CL		CHECKED BY: CL
DRAWN BY: CL		SCALE: 2"=1"
PROJECT NO.: G2		SHEET NO.: G2

SHEET INDEX



2 - SITE ELECTRICAL SHEETS:

DWG. NO.

SHEET NO.

DWG. NO.	SHEET NO.
GE-1	231
GE-2	232
GE-3	233
GE-4	234
GE-5	235
GE-6	236
GE-7	237
GE-8	238
GE-9	239
GE-10	240
GE-11	241
GE-12	242
GE-13	243
GE-14	244

DWG. NO.	SHEET NO.
GE-1	231
GE-2	232
GE-3	233
GE-4	234
GE-5	235
GE-6	236
GE-7	237
GE-8	238
GE-9	239
GE-10	240
GE-11	241
GE-12	242
GE-13	243
GE-14	244

REV. NO.	COMMENT	DATE
		
		
SUNRISE ENGINEERING 2222 S. BUSINESS PARK DR., SUITE 220 WEAVER, NORTH CAROLINA 28686 TEL: 813.833.6990 WWW.SUNRISEENG.COM		
ODDEN CITY		
WATER TREATMENT PLANT RECONST.		
SHEET INDEX		
REV. NO.	DESCRIPTION	DATE
04955	CL	4/11/14
DRAWN BY: NC		G4

GENERAL CONSTRUCTION NOTES

GENERAL

1. THE LOCATION OF THE EXISTING UTILITIES HAVE BEEN SHOWN TO THE BEST OF THE ENGINEER'S ABILITY; CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH RESPONSIBILITY TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. ANY DISTURBED UTILITIES DURING CONSTRUCTION SHALL BE REPLACED OR REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. ALL PIPELINES SHALL BE INSTALLED AT LOCATIONS AND DEPTH REQUIRED ON THE PLANS OR AS OTHERWISE DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ANY CULMINE WITH THE PIPELINE MANUFACTURER AND OBTAIN WRITTEN CONSENT OF BOTH THE ENGINEER AND THE OWNER.
3. ALL GATE AND/OR BUTTERFLY VALVES SHALL BE THE SAME SIZE AS THE PIPELINE TO WHICH THEY CONNECT.
4. THE INSTALLATION OF VARIABLE SIZED OPENINGS IN TEES, ELBOWS, CROSSES, ETC. WHERE APPLICABLE IS AN ACCEPTABLE ALTERNATIVE TO THE USE OF REDUCERS. THE CONTRACTOR SHALL VERIFY THE ACCEPTABLE ALTERNATIVE TO THE USE OF A CROSS.
5. EXISTING WATER SERVICE SHALL BE LEFT IN OPERATION DURING CONSTRUCTION.
6. ANY DEBRIS RESULTING FROM THE PROJECT SHALL BE DISPOSED OF BY THE CONTRACTOR. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR DISPOSAL SITES AT HIS OWN EXPENSE AND AT HIS OWN RISK. FINAL GRADE OF DISTURBED AREAS IS SUBJECT TO THE ENGINEER'S AND OWNER'S APPROVAL AND IS TO BE DONE IN A NEAT AND WORKMANLIKE MANNER.
7. TRENCHES WITHIN THE PAVEMENT SURFACE SHALL BE BACKFILLED, COMPACTED TO 95% OF MAXIMUM DENSITY, AND PAVED AS SOON AS POSSIBLE AFTER THE WORK.
8. AN EFFORT HAS BEEN MADE TO SHOW THE EXISTING UTILITIES AND THE PROPOSED IMPROVEMENTS AS ACCURATELY AS POSSIBLE. ALL PIPELINE LOCATIONS, SIZES AND TYPES ARE SHOWN ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER. HOWEVER, CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL WORK MAY BE REQUIRED AND UNLESS PROPOSED WORK MAY BE ELIMINATED BASED ON ACTUAL FIELD CONDITIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE LOCATION, SIZE AND TYPE OF PIPELINES WHERE WORK IS TO BE PERFORMED.
9. PROPER SIGNING AND FLAGGING SHALL BE REQUIRED (SEE TRAFFIC CONTROL NOTES).
10. SITE DISTURBANCE SHALL BE KEPT AT A MINIMUM. WHERE POSSIBLE THE VEGETATION SHALL BE PROTECTED AND PRESERVED.
11. ALL FINISHED COLORS ARE TO BE DETERMINED BY SUBMITTAL AND APPROVED IN WRITING BY THE ENGINEER.
12. CONTRACTOR SHALL BE REQUIRED TO FOLLOW ALL APPLICABLE BUILDING CODES, CITY ORDINANCES, COUNTY ORDINANCES AND ALL APPLICABLE REGULATIONS COMING IN CONTACT WITH FINISHED (DRINKING) WATER SHALL COMPLY WITH NSF STANDARD 61.

TREATMENT PLANT EQUIPMENT

1. THE MAJORITY OF THE WATER TREATMENT PLANT EQUIPMENT (FILTER MODULES, VALVES, PUMPS, CONTROLS, ETC.) ARE TO BE SUPPLIED BY THE CONTRACTOR. ALL EQUIPMENT TO BE SUPPLIED BY THE CONTRACTOR SHALL BE SHOWN ON THE DRAWINGS (NOTED IN THE VARIOUS EQUIPMENT SCHEDULES). THE CONTRACTOR IS REQUIRED TO INSTALL ALL THE EQUIPMENT AND MATERIALS SUPPLIED TO MAKE A COMPLETE AND FUNCTIONING TREATMENT FACILITY ARE THE RESPONSIBILITY OF THE CONTRACTOR TO FURNISH AND INSTALL.
2. THE CONTRACTOR IS REQUIRED TO COORDINATE DELIVERIES OF THE SYSTEM TREATMENT EQUIPMENT WITH THE SUPPLIER. THE CONTRACTOR IS RESPONSIBLE FOR: THE REQUEST FOR DELIVERY, UNLOADING AND STORAGE OF ALL EQUIPMENT; THE SCHEDULING OF DELIVERIES; AND ANY LOSS OR DAMAGE TO SAID MATERIALS AFTER THEY HAVE BEEN DELIVERED. ALL DELIVERIES SHALL ALSO BE COORDINATED WITH THE ENGINEER AND IN ACCORDANCE WITH THE CONTRACTOR'S CONSTRUCTION SCHEDULE (AS SUBMITTED AT THE START OF THE PROJECT).
3. THE CONTRACTOR IS REQUIRED TO SCHEDULE SHIPMENT OF THE VARIOUS COMPONENT TREATMENT EQUIPMENT PARTS IN ACCORDANCE WITH THE TREATMENT BUILDING REQUIREMENTS.
4. THE CONTRACTOR SHALL BECOME FAMILIAR WITH ALL PARTS OF THE PLANS AND SPECIFICATIONS AND INSURE THAT ALL DELIVERIES OF EQUIPMENT TO THE PROJECT SECTIONS PERTAINING TO THEIR AREA OF WORK, NO DEVIATIONS FROM THE DRAWINGS WILL BE ALLOWED UNLESS AGREED UPON BY ALL PARTIES IN WRITING PRIOR TO CONSTRUCTION AND/OR FABRICATION.
5. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE SUPPLIER THE CLEANING, FLUSHING, TESTING AND START-UP OF ALL TREATMENT PLANT EQUIPMENT AFTER IT HAS BEEN INSTALLED ACCORDING TO THE DRAWINGS AND SPECIFICATIONS.
6. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL WORK BETWEEN THE VARIOUS TRADES REQUIRED OF THE TREATMENT PLANT FACILITIES AND APPROPRIATE SITE WORK IMPROVEMENTS.
7. ANY OMISSIONS OR CONFLICTS BETWEEN THE PLANS AND SPECIFICATIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER AND RESOLVED BY THE SAME BEFORE PROCEEDING WITH ANY WORK INVOLVED.
8. ALL CONSTRUCTION WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE LATEST EDITIONS OF THE INTERNATIONAL BUILDING CODES, PLUMBING CODE, ELECTRICAL CODE, AND PROJECT SPECIFICATIONS.
9. THE CONTRACTOR IS RESPONSIBLE TO VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND CONDITIONS AT THE SITE WITH THE CONSTRUCTION DRAWINGS.
10. THE CONTRACTOR SHALL BE FAMILIAR WITH APPENDIX A OF THE CONTRACT DOCUMENTS AND SPECIFICATIONS. THIS DOCUMENT PROVIDES DIRECTION FOR UNLOADING, STORING, AND INSTALLING THE EQUIPMENT PROVIDED BY PALL CORPORATION.

SAFETY NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH ALL STATE OF UTAH SAFETY STANDARDS AND OSHA REQUIREMENTS AS THEY APPLY TO THE PROJECT.
2. THE ENGINEER OR OWNER DOES NOT ACCEPT ANY RESPONSIBILITY FOR THE CONTRACTOR'S FAILURE TO COMPLY WITH THESE REQUIREMENTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE DESIGN AND CONSTRUCTION OF ALL FORMS AND SHORING REQUIRED.

TRAFFIC CONTROL NOTES

1. PROVIDE, INSTALL, AND MAINTAIN ALL ROAD CONSTRUCTION BARRICADES, CHANNELIZING DEVICES AND CONSTRUCTION SIGNS IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) TO ROAD CONSTRUCTION ZONES AND SECTION 2005 OF THE PROJECT SPECIFICATIONS.
2. MAINTAIN TRAFFIC ACCESS FOR LOCAL RESIDENTS TO PROPERTIES ALONG CONSTRUCTION BOUNDARIES.
3. REMOVE ALL CONSTRUCTION EQUIPMENT FROM THE ROADWAY DURING NIGHT AND NONCONSTRUCTION HOURS.
4. LIMIT CONSTRUCTION ACTIVITIES TO DAYLIGHT HOURS ONLY.
5. PROVIDE FULL ROADWAY TWO WAY TRAFFIC WIDTH DURING NIGHT AND NONCONSTRUCTION HOURS.

CONSTRUCTION SEQUENCE

1. THE EXISTING WATER TREATMENT PLANT IS A SEASONAL PLANT (APRIL - OCTOBER). IT MUST REMAIN IN SERVICE DURING CONSTRUCTION OF THE PROPOSED FACILITIES. AS SUCH, ANY CONSTRUCTION OF THE PROPOSED FACILITIES MUST BE ACCOMPLISHED AFTER THE PLANT IS SHUTDOWN FOR THE WINTER.

REV. NO.	COMMENT	DATE
04855		



SUNRISE ENGINEERING
 2222 S. BUSINESS PARK DR., SUITE 200
 WEAVER, UTAH 84002
 TEL: 435.633.9999
 WWW.SUNRISEENG.COM

REV. NO.	ISSUED	DATE
04855	CL	5/27/14

OSDEN CITY

WATER TREATMENT PLANT RECONSTRUCT.

CONSTRUCTION NOTES

REV. NO.	ISSUED	DATE
04855	CL	5/27/14

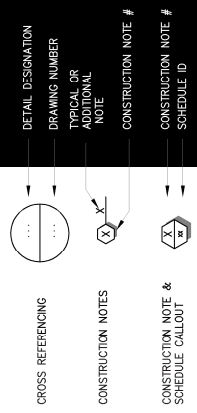
G5

ABBREVIATIONS

AA	AQUA AMMONIA	HB	HISE BIB
AB	ANCHOR BOLT	IN.	INCH
AC	ACTIVATED CARBON	ID	INSIDE DIAMETER
ACH	ALUMINUM CHLOROHYDRATE	INSUL.	INSULATION
AE	ARCHITECTURAL ALUMINUM	INV.	INVERT
ALUM.	ALUMINUM	IPS	IRON PIPE SIZE
ANG.	ANGLE	IRR	IRRIGATION
APPROX.	APPROXIMATELY	LF	LINEAR FEET
ASSY.	ASSEMBLY	MH	MANHOLE
AT	AT	MFR.	MANUFACTURER
B.M.	BENCH MARK	MAX.	MAXIMUM
B.F.	BLIND FLANGE	MECH.	MECHANICAL
B.W.	BOTH WAYS	MIN.	MINIMUM
BD	BOTTOM OF DITCH	NO. OR #	NUMBER
BOT	BOTTOM OF FOND	O.C.	ON CENTER
BTM.	BOTTOM	OBC	OUTSIDE CORNER
BLDG.	BUILDING	OD	OUTSIDE DIAMETER
C	CAST IRON	P	PIPE OR PIPING
CI	CAST IRON	PL	PLATE
Q	CENTER LINE	PE	POLYETHYLENE
CLS	CHLORINE SOLUTION	PEC	LIQUID POLYMER
OP	CLEAN IN PLACE	PP	POTASSIUM PERMANANATE
CONC.	CONCRETE	PVC	POLYVINYL-CHLORIDE
CFM	CUBIC FEET per MINUTE	LB. OR #	POUND
CFY	CUBIC FEET per SECOND	PSI	POUNDS per SQUARE INCH
CY	CUBIC YARD	PRV	PRESSURE REDUCING VALVE
DEC. OR °	DEGREE	R	RADIUS
DIA. OR Ø	DIAMETER	REQD.	REQUIRED
DWG.	DRAWING	REV.	REVISION
DIP	DUCTILE IRON PIPE	R/W	RIGHT-OF-WAY
E	ELECTRICAL	S	STRUCTURAL
EA	EDGE OF ASPHALT	SBI	SODIUM BISULFATE
ELL.	ELBOW	NaOCl	SODIUM HYPOCHLORITE
ELEV.	ELEVATION	SC	SPARE CHEMICAL
EFM	ENHANCED FLUX MAINTENANCE	SPEC.	SPECIFICATION
ETC.	ETCETERA	SQ.	SQUARE
EG	EXISTING GROUND	SF	SQUARE FEET
FT OR '	FEET	SI	SQUARE INCHES
FC	FERRIC CHLORIDE	STD.	STAINLESS STEEL STANDARD
FWW	FILTER WASTE WASHWATER	STA	STATION
FG	FINISH GRADE	TBC	TOP BACK OF CURB
FF	FINISHED FLOOR	TA	TOP OF ASPHALT
FTG.	FITTING	TD	TOP OF DITCH
FLG	FLANGE	TOP	TOP OF POND
FL	FLOORLINE	TYP.	TYPICAL
FCV	FLOW CONTROL VALVE	VERT.	VERTICAL
GALL.	GALLON	W/P	WATER TREATMENT PLANT
GALV.	GALVANIZED	W/	WITH
GSP OR GS	GALVANIZED STEEL PIPE	W/O	WITHOUT
GI	GALVANIZED IRON PIPE	YP	YARD PUMP
GA.	GAUGE		
GPM	GALLONS per MINUTE		
GV	GATE VALVE		
HEC	EDGE OF CONCRETE		
HORIZ.	HORIZONTAL		

LEGEND

EXISTING	PROPOSED
GAS	WATER LINE
WATER LINE	STORM DRAIN LINE
FIBER OPTIC	SEWER
TELEVISION	GAS
TELEPHONE	FENCE
ELECTRIC	CHEMICAL LINE
SEWER LINE	SAMPLE LINE
STORM DRAIN	DECANT WATER LINE
FENCE	SLUDGE LINE
CHEMICAL LINE	POTABLE WATER LINE
SAMPLE LINE	UTILITY WATER LINE
RETURN WASTE WASHWATER	BUTTERFLY VALVE/GATE /VALVE
SLUDGE LINE	11.25' ELBOW
POTABLE WATER LINE	22.5' ELBOW
UTILITY WATER LINE	45' ELBOW
EXISTING BUTTERFLY VALVE	90' ELBOW
STORM DRAIN MANHOLE	TEE (SIZED BY WATER LINE)
WATER MANHOLE	FIRE HYDRANT
FIRE HYDRANT	AIR VAC
IRRIGATION BOX	BLOW OFF
CATCH BASIN	
WATER METER	
SEWER MANHOLE	
POWERSPOLE	
STREET LIGHT	
ELECTRIC BOX	



REV. NO.	COMMENT	DATE
SUNRISE ENGINEERING 2222 S. BUSINESS PARK DR., SUITE 220 OKLAHOMA CITY, OKLAHOMA 73129 PHONE: (405) 833-6990 FAX: (405) 833-6999 WWW.SUNRISE-ENG.COM		
OKLAHOMA CITY		
WATER TREATMENT PLANT RECONSTR.		
ABBREVIATIONS & LEGEND		
REV. NO.	DATE	BY
04855	6/27/14	NC
G6		

DESIGN CRITERIA – MEMBRANE PLANT

A. OWNERS

OGDEN CITY
2549 WASHINGTON BLVD.
OGDEN, UT 84401
(801) 639-8860

B. MFS EQUIPMENT MANUFACTURER

PALL CORPORATION
DRIVE
2501 WASHINGTON, NY 11050
(516) 801-9106

C. ENGINEER

SUNRISE ENGINEERING, INC.
12227 S. BUSINESS PARK DR., SUITE 220
DRAPER, UT 84020
(801) 513-0100

D. OGDEN CITY TREATMENT PLANT DESIGN CRITERIA

THE RAW WATER SOURCES FOR THE OGDEN CITY WATER TREATMENT PLANT (WTP) ARE WHEELER CREEK AND PINEVIEW RESERVOIR. SOURCE WATERS ARE COMBINED UPSTREAM AND GRAVITY FED TO THE PLANT VIA 42" RCP PIPE. THIS INTAKE SYSTEM IS OWNED AND OPERATED BY OGDEN CITY.

PROCESSES & FACILITIES

	ELEVATION
PRETREATMENT BUILDING	4806.12 FT
FRETREATMENT BUILDING FLOOR	4792.72 FT
SOLIDS PUMPING ROOM FLOOR	4818.25 FT
MEMBRANE FILTER (MF) BUILDING	4810.00 FT
MF BUILDING FLOOR	4811.75 FT
NEUTRALIZATION VAULT	4811.75 FT
SOLIDS HANDLING FACILITIES	4803.72 FT
MECHANICAL Dewatering BUILDING FLOOR	4803.72 FT
SOLIDS DRYING BED FLOOR	4804.07 FT
DISTRIBUTION FACILITIES	4797.22 FT
OVERFLOW STRUCTURE PIPE	4798.47 FT
BLACK POINT WEIR PIPE INVERTS	4797.57 FT
42" TREATMENT PIPE	
36" CANYON PIPE	
24" CANYON PIPE	

E. TREATMENT PLANT DESIGN FLOW

THE EXISTING WTP ONLY OPERATES 5 TO 6 MONTHS OUT OF THE YEAR. IT IS CURRENTLY OPERATING AT A MAXIMUM FLOW RATE OF 11.250 GPM IN JANUARY, FEBRUARY, MARCH, AND APRIL, THE COLDEST MONTHS OF THE YEAR. HOWEVER, THE PROPOSED PLANT WILL HAVE THE CAPABILITY OF YEAR ROUND PRODUCTION. THE PRETREATMENT CAPACITY IS 13.5 MGD AND WILL REMAIN THE SAME, AND THE MEMBRANE PLANT WILL HAVE FUTURE CAPACITY OF 17.5 MGD.

INITIAL PLANT DAILY PRODUCTION	13.5 MGD (6,375 GPM)
FUTURE PLANT DAILY PRODUCTION	17.5 MGD (12,153 GPM)

INITIAL PEAK INSTANTANEOUS FLOW

11,250 GPM
14,517 GPM

WHEELER CREEK AND PINEVIEW RESERVOIR ARE THE WATER SOURCES FOR THE WTP. OGDEN CITY HAS THE WATER RIGHTS TO DIVERT THE FULL FLOW OF WHEELER CREEK TO THE WTP. THE WTP HAS THE CAPABILITY TO HANDLE A FLOW RATE DOES NOT EXCEED 22 CFS. THE CITY ALSO MAY REMOVE 1,054.41 ACFE-FT ANNUALLY FROM PINE VIEW RESERVOIR IF LIKE AMOUNT IS RELEASED DOWNSTREAM. THESE SOURCE AMOUNTS ARE DESIGNATED FOR THE SOLE USE OF OGDEN CITY RESIDENTS AND OGDEN CANYON RESIDENTS. THESE SOURCES ARE USED AND TRICKLE 5 TO 6 MONTHS OF THE YEAR FOR PEAKING PURPOSES.

PEAK PLANT CAPACITY

17.5 MGD (12,153 GPM)

F. RAW WATER INFLUENT PROCESS

WHEELER CREEK AND PINEVIEW RESERVOIR SOURCE WATERS COMBINE UPSTREAM AND ARE BROUGHT TO SITE VIA 42" RCP RAW WATER PIPELINE WHICH CONTAINS FEEDS INTO THE FLASH MIX INLET PIPE AND THEN ENTERS THE PRETREATMENT PROCESS.

G. EXISTING PRETREATMENT PROCESS (FROM AS-BUILTS)

THE PRETREATMENT PROCESS IS COMPOSED OF AN INLINE FLASH MIXER, A COAGULANT CONTACT BASIN, AND A CLARIFYING CHAMBER. THE COAGULANT CONTACT BASIN IS SET UP TO SEPARATE SOLIDS AT A DETENTION TIME OF ~8 MIN. THIS PROCESS WILL BE USED IN THE MEMBRANE FILTER OPTION SUGGESTED.

INLINE FLASH MIXERS:

TYPE: HIGH PRESSURE DIFFUSION

THE INLINE FLASH MIXER MEETS THE RAPID MIXING REQUIREMENT OF THE PRETREATMENT PROCESS AND WILL ALSO BE THE INJECTION POINT OF THE COAGULANT.

MIXING ENERGY	750 SEC ⁻¹
RAW WATER SOURCE PRESSURE RANGE	35--20 PSI

COAGULANT CONTACT BASIN:

NUMBER OF CONTACT BASINS	2
WATER DEPTH	5.5 X 44 FT
DETECTION TIME FOR CONTACT BASINS	3 MIN

CLARIFIERS:

NUMBER OF CLARIFIERS	2
WATER DEPTH	30.5 X 44 FT
SURFACE LOADING RATE	15 FT
DETECTION TIME FOR CLARIFIERS	1.5 GPM/SQ. FT.
	76 MIN.

H. COAGULANTS & CHEMICAL INJECTIONS:

FERRIC CHLORIDE (LIQUID 42% SOLN. 5.1 LBS./GAL)

DOSSAGE (MIN./AVG./MAX)	10/15/40 (MG/L)
FEED RATE (MAX DOSE @ DESIGN FLOW)	40 GPH
METERING PUMPS	2
CAPACITY (EACH)	20,20.20 (GPH)
TANKS NO.	2
CAPACITY (TOTAL)	12000 GAL
DAYS STORAGE (AVG DOSE @ DESIGN FLOW)	30 DAYS
LIQUID POLYMER (100% SOLN. 8.7 LBS./GAL)	
DOSSAGE-COAGULANT AID (MIN./AVG./MAX)	3/11.12 (MG/L)
LIQUID FEED RATE (MAX DOSE @ DESIGN FLOW)	1.2 GPH
POLYMER BLEND/FEED UNIT	3
CAPACITY (EACH)	3.5 GPH
TANKS NO. (TOTE TANKS)	3
DAYS STORAGE (AVG DOSE @ DESIGN FLOW)	34 DAYS

POTASSIUM PERMANGANATE (130 LBS./GAL)

DOSSAGE (MIN. AVG. MAX.)	1.2,4 (MG/L)
DAYS STORAGE (AVG DOSE @ DESIGN FLOW)	2,2 GPH
DRY STORAGE (110 LB. BARRELS)	24
DAYS STORAGE (AVG DOSE @ DESIGN FLOW)	21 DAYS

POWDER-ACTIVATED CARBON (1 LB./GAL SUIBREL)

DOSSAGE (MIN./AVG./MAX)	3/10.40 (MG/L)
LIQUID FEED RATE (MAX DOSE @ DESIGN FLOW)	200 GPH
FEEDERS	2
CAPACITY (EACH)	100 GPH
DRY STORAGE TANKS	2600 GAL
CAPACITY	15 DAYS
DAYS STORAGE (AVG DOSE @ DESIGN FLOW)	15 DAYS
MIXER TYPE	TURBINE 2 SPEED
MIXER HP	25 HP

(PROPOSED) ALUMINUM CHLOROHYDRATE:

DOSSAGE-POLYMER CARRYOVER (MIN./AVG./MAX)	2-5 PPM
LIQUID FEED RATE	37.5 GAL./DAY
METERING PUMPS	10 GPH
DRY STORAGE (EACH)	1000 LBS.
DRY STORAGE	1000 LBS.

I. ALUMINUM CHLOROHYDRATE CONTACT BASIN

REQUIRED CONTACT TIME	5-8 MIN
CLARIFIED EFFLUENT LINE CT	1.4 MIN
BASEIN (L x W x H)	48.3 x 26.7 x 9 FT
BASEIN VOLUME	54,100 GAL
CONTACT TIME	5.3 MIN

J. FINISHED WATER DISINFECTION - SODIUM HYPOCHLORITE (NaOCl GENERATION EQUIP)

CHLORINE IN THE FORM OF NaOCl WILL BE USED TO DISINFECT TREATED WATER FROM THE MEMBRANE PLANT. STORAGE TANKS WILL BE PROVIDED TO STORE NaOCl. THE NaOCl CONCENTRATION RANGE WILL BE 2 PPM TO 10 PPM. NaOCl CONCENTRATION MUST BE DETECTABLE IN THE DISTRIBUTION SYSTEM AT ALL TIMES.

THE NaOCl USED IN THE EXISTING WTP IS GENERATED ON SITE USING A SODIUM HYPOCHLORITE GENERATOR.

HISTORICAL SITE USAGE:

NaOCl CONCS	1.0 PPM
DOSING CONC.	0.8% (PROPOSED) FEHL
HISTORICAL CHLORINE RECD	251 LBS./DAY
LB OF Cl/GAL OF SOLN.	0.0668
SOLN. RECD PER DAY	3,758 GAL
NaOCl CONC.	500 PPM
DOSING CONC.	0.8%
CHLORINE RECD	46.67 LB./DAY
LB OF Cl/GAL OF SOLN.	0.0668
SOLN. RECD PER DAY	691 GAL./DAY

(PROPOSED) ClE:

NaOCl CONC.	300 PPM
DOSING CONC.	0.8%
CHLORINE RECD	14 LB./MONTH
LB OF Cl/GAL OF SOLN.	0.0668
SOLN. RECD PER MONTH	6,181 GAL

TOTAL AVAILABLE:

TOTAL CAPACITY OF NaOCl GENERATION	500 LB./DAY
STORAGE TANKS	(3) 5,000 GAL
TOTAL STORAGE	15,000 GAL
SOLN. AVAILABLE PER DAY @ 0.8% CONC.	7,500 GAL
DAYS OF STORAGE	2 DAYS

REV. NO.	COMMENT	D/E
SUNRISE ENGINEERING 22227 S. BUSINESS PARK DR., SUITE 220 DRAPER, UT 84020 (801) 513-0100 www.sunriseeng.com		
OGDEN CITY		
DESIGN CRITERIA		
WATER TREATMENT PLANT RECONSTRUCT.		
ISS. NO.	ISSUED	DATE
04955	CL	7/27/24
DESIGNED	BY	DATE
G7		

DESIGN CRITERIA – MEMBRANE PLANT

K. MICROFILTRATION MEMBRANE PLANT:

THE TREATMENT EQUIPMENT PROPOSED BY THE SUCCESSFUL EQUIPMENT BIDDER SHALL BE INSTALLED IN TWO FILTER PAKS. THE PAKS SHALL HAVE THE REQUIRED CAPACITY AND 1 PAK WILL WORK AS A REDUNDANT PAK.

- FILTER RACKS 8 + (1)
 - FILTER MODULES 51
 - TRAINS 9
 - TOTAL FILTER CAPACITY (EXPANDABLE TO) 469
 - TOTAL FILTER AREA (EXPANDABLE TO) 594
 - FLUX RATE 75 GFD
- EACH PAK WILL HAVE THE ABILITY TO TREAT 1.68 MGD UNPAULY AND WILL HAVE FOUR SLOTS TO INSTALLED NECESSARY UNLESS TO USE EACH PAK THE ABILITY TO TREAT UP TO ~2.2 MGD IN THE FUTURE OR 175 MGD TOTAL PLANT CAPACITY. THIS IS BASED UPON A PEAK FLUX RATE OF 75 GFD (GALLONS PER SQUARE FOOT OF FILTER AREA PER DAY). PRIOR TO DESIGN, THIS FLUX RATE WAS PILOTED SUCCESSFULLY.

CLEAN IN PLACE (CIP)

- FREQUENCY ONCE A MONTH
- TRAINS 9
- FILTER MODULES/TRAIN @ 13.5 MGD 9
- FILTER MODULES/TRAIN @ 17.5 MGD (BUILD-OUT) 66

AQD CYCLE:

- CITRIC ACID 50% SOLN. 228 GAL/MONTH
- REQUIRED CONC. 2%
- CITRIC ACID 2% SOLN. 5712 GAL/MONTH

CAUSTIC CYCLE:

- SODIUM HYDROXIDE (NaOH) 25% SOLN. 228 GAL/MONTH
- REQD CONC. 1%
- SODIUM HYDROXIDE (NaOH) 0.8% SOLN. 17 GAL/MONTH
- SODIUM HYPOCHLORITE (NaOCl) 0.8% SOLN. 300 PPM
- NaOCl 1% SOLN. W/NaOCl 300 PPM SOLN. 5712 GAL/MONTH

TOTAL REQD CHLORINE DOSAGE

14 LBS/MONTH

OP P/NSK: 42,680 GAL
 BACKWASH WATER VOLUME 54,104 GAL

ENHANCED FLUX MAINTENANCE (EFM):

FREQUENCY ONCE A DAY
 TRAINS 9
 MODULES/TRAIN 51
 TOTAL MODULES 459

691 GAL/DAY
 500 PPM
 11,064 GAL/DAY
 46 LBS/DAY

DECHLORINATION:

SODIUM BISULFATE PER LB. OF CHLORINE 1.46 LBS
 % DECHLORINATION OF TOTAL CP/EFM 75 %

L. FEED PUMPS:

FOUR VERTICAL TURBINE PUMPS WILL BE NEEDED TO FEED THE MICROFILTRERS. THREE PUMPS WILL OPERATE AT FULL CAPACITY WHILE THE OTHER PUMP ACTS AS A BACKUP. ALL FOUR PUMPS WILL BE EQUIPPED WITH A VFD TO ALLOW FLOW VARIATION.

- NUMBER OF PUMPS 3 + (1)
- PEAK DESIGN FLOW 4,930 GPM (PER PUMP)
- HEAD 130 FT
- MOTOR 250HP, 460V/60Hz/3PH

M. REVERSE FEED PUMPS:

TWO SPILT CASE CENTRIFUGAL PUMPS WILL BE NEEDED FOR BACKWASHING THE MICROFILTRATION PAKS. BOTH PUMPS WILL BE EQUIPPED WITH A VFD TO ALLOW FLOW VARIATION.

- NUMBER OF PUMPS 1 + (1)
- DESIGN FLOW 50 GPM (PER PUMP)
- HEAD 72 FT
- MOTOR 20 HP

N. PLANT REUSE:

BACKWASH

BACKWASHING OCCURS ON ALL FILTER TRAINS (IN USE) INDIVIDUALLY EVERY 20–25 MINUTES. THE BACKWASH WATER FROM THE MEMBRANE FILTERS IS SENT DIRECTLY BACK TO THE PRE-TREATMENT HEADWORKS. THE DESIGN REUSE RATE IS 99% BETWEEN 400 & 920 GPM.

CIP/NEUTRALIZATION & EFM WASTE

BACKWASH WATER IS ALSO USED FOR MEMBRANE CLEANING WITH DAILY EFM AND CIP/NEUTRALIZATION. WASTE FROM THESE PROCESSES WILL GRAVITY FEED TO A 90,000 GAL CIP/NEUTRALIZATION & EFM WASTE VAULT.

BOTH CIP AND EFM WASTE PRODUCTS WILL BE STORED AND NEUTRALIZED IN THIS WASTE VAULT. THE WATER IN THE VAULT WILL BE CIRCULATED VIA PUMP. THIS WATER WILL BE TREATED BY A CIP/NEUTRALIZATION TANK. THE CIP/NEUTRALIZATION CHLORINE CONCENTRATION, ACID/CAUSTIC/SODIUM BISULFATE, WILL BE INJECTED AS NEEDED INTO THE WATER. ONCE THE WATER IS NEUTRALIZED, IT WILL BE PUMPED BACK TO THE HEADWORKS.

CIP WASTE VOLUME 51,000 GAL
 EFM WASTE VOLUME 12,000 GAL
 CIP/NEUT., EFM VAULT VOLUME 63,000 GAL

REUSE PUMPS 250 GPM

NEUTRALIZATION PUMP CAPACITY (EACH)

O. MECHANICAL DEWATERING:

SOLIDS COLLECTED BY SLUDGE CONCS. DURING CLARIFICATION WILL BE TRANSPORTED TO THE EFM WASTE VAULT. DURING DRYDOWN, THE WASTE WATER WILL BE RETURNED TO THE HEAD OF THE PLANT AND DEWATERED SOLIDS WILL BE STORED AND DISPOSAL OF AS REQUIRED.

EXISTING SOLIDS ELIMINATING SYSTEM:

CONCRETE SUMP WITH SUBMERSIBLE PUMPS 8,000 GAL
 BASIN VOLUME (CLARIFIER BLOWDOWN) 2,250 GAL
 BLOWDOWN PUMPS 10 HP
 MOTOR 58 GPM

SLURRY INED AND STORAGE:

AVERAGE SURFACE WATER NTU 15
 % SOLIDS 0.5–1.5%
 STORAGE TIME OF SLURRY (0.7% SOLIDS) 2.65 DAYS
 MAX SLURRY SLUDGE VAULT VOLUME 220,000 GAL

DEWATERING FEED PUMP:

LOCATED IN SLURRY SLUDGE VAULT.

- BORGOR ROTARY LOBE FEED RUMP (PL 200) 1
- TOTAL DYNAMIC HEAD 101 FT
- PUMP CAPACITY 117 GPM
- MOTOR 7.5 HP

DEWATERING HYDRAULICS:

SCREW PRESS CAPACITY (0.5, 1.0, 1.5% SOLIDS) 290, 466, 590 LB/HR
 HYD. LOADING RATES (0.5, 1.0, 1.5% SOLIDS) 177, 107, 79 GPM
 MOTOR 28%
 CANE SOLIDS 28%
 ENCLOSED SCREW CONVEYOR (1) ANGLED (1) HORIZ.
 CONVEYOR MOTOR 1.5 HP

DECANT WATER:

DECANT WATER DRAINS INTO FLOOR DRAIN UNDERNEATH THE SCREW PRESS (ALONG WITH MICROFILTRATION BUILDING). DECANT WATER FROM THE SCREW PRESS WILL BE PLUMBED INTO THE NEUTRALIZATION VAULT UNDERNEATH THE MICROFILTRATION BUILDING.

STORAGE VAULT SURFACE PUMP 720 GAL
 TOTAL DYNAMIC HEAD 22 FT
 PUMP CAPACITY 117 GPM

P. POTABLE/UTILITY WATER:

FOUR PUMPS WILL BE NEEDED FOR ON-SITE POTABLE WATER AND UTILITY WATER. ALL FOUR PUMPS WILL BE EQUIPPED WITH A VFD TO ALLOW FLOW VARIATION.

NUMBER OF PUMPS 2 + 2
 FLOW PER PUMP (2) 500, (2) 82 GPM
 DEMAND FROM MEMBRANE BUILDING 150 GPM
 TOTAL DYNAMIC HEAD 220 FT
 TOTAL FLOW (2) 40, (2) 7.5 HP
 1,200 GPM

IN ORDER TO USE TREATED WATER AS POTABLE WATER ON-SITE THE PLANT MUST MEET STATE CONTACT TIME REQUIREMENTS.

CHLORINE CONTACT TIME REQUIREMENTS

THE STATE OF UTAH DIVISION OF DRINKING WATER HAS GIVEN THE MEMBRANE CONTACT TIME REQUIREMENT METHOD LOG REMOVAL CREDITS OF THE FOLLOWING:

- CRYPTOSPORIDIUM CREDIT OF 4 LOG REMOVAL
- VIRUSES CREDIT OF 3 LOG REMOVAL
- GIARDIA CREDIT OF 6.5 LOG REMOVAL

FOR CRYPTOSPORIDIUM AND GIARDIA, 4 LOG REMOVAL IS MET BY THE MEMBRANES. HOWEVER, THE STATE OF UTAH PUBLIC DRINKING WATER REGULATIONS REQUIRE 6.5 LOG REMOVAL FOR GIARDIA. BECAUSE THE MEMBRANES DO NOT PROVIDE VARIANCES TO THIS EXTENT, CHLORINE CONTACT TIME WILL BE REQUIRED TO INACTIVATE THEM. THE COMBINATION OF THE MEMBRANE AND CHLORINE WILL REMOVE/INACTIVATE 4 LOG.

THE RATIO OF CT/CALC/CT MUST BE GREATER THAN OR EQUAL TO 1.0. CT/CALC IS THE PRODUCT OF RESIDUAL DISINFECTANT CONCENTRATION IN MG/L DETERMINED BEFORE THE FIRST CUSTOMER, AND THE CONTACT TIME IN MINUTES FROM CHLORINATION TO THE FIRST CUSTOMER.

CT IS TAKEN FROM TABLE E-7 OF EPA "GUIDANCE MANUAL FOR COMPLIANCE WITH THE FILTRATION AND DISINFECTION REQUIREMENTS FOR PUBLIC WATER SYSTEMS USING SURFACE WATER SOURCES". BECAUSE THE WATER TEMPERATURE IN THE OGDEN RIVER VARIES FROM 15 – 20 DEGREES CELSIUS, THE CT VALUE WILL BE TAKEN FROM THE 15 DEGREE TEMPERATURE COLUMN. THE CT VALUE FOR 3.5 LOG INACTINATION OF VIRUSES USING CHLORINE IS 4.

CONTACT TIME

THERE WILL BE 2 SEGMENTS THAT WILL MAKE UP THE CONTACT TIME FROM THE INJECTION POINT TO THE FIRST HOSE BIB. THEY ARE:

- 1) STATION IN THE DEWATERING BUILDING.
- 2) STATION IN FROM THE BOOSTER STATION BACK TO THE MEMBRANE AND PRE-TREATMENT BUILDINGS

1) CHLORINE INJECTION TO BOOSTER STATION, 2) BOOSTER STATION TO USE

- PIPE DIAMETER (INCHES) 12
- PIPE SQ. FT. 12.85
- PIPE LENGTH 400
- FLOW RATE (GPM) 5,600
- FLOW RATE (GFS) 1.1

TIME (MINUTES) =
 PIPE AREA (SQ. FT.) X PIPE LENGTH (FT)/FLOW RATE (GFS)*1 (MIN)/60 (SECONDS)

SEGMENT 1) TIME (MINUTES) = 0.785 X 400 / 12.5 / 60 = 0.42 MIN
 SEGMENT 2) TIME (MINUTES) = 0.785 X 400 / 1.1 / 60 = 4.8 MIN
 TOTAL CT = 5.22 MIN

CT/CALC = 5.22 MIN * 1 M5/L = 5.22 MIN/4
 1.3 > 1.0

THEREFORE THE STATE REQUIREMENT FOR VIRUS INACTIVATION / REMOVAL HAS BEEN REACHED.

REV. NO.	COMMENT	D/E
04/9/15		

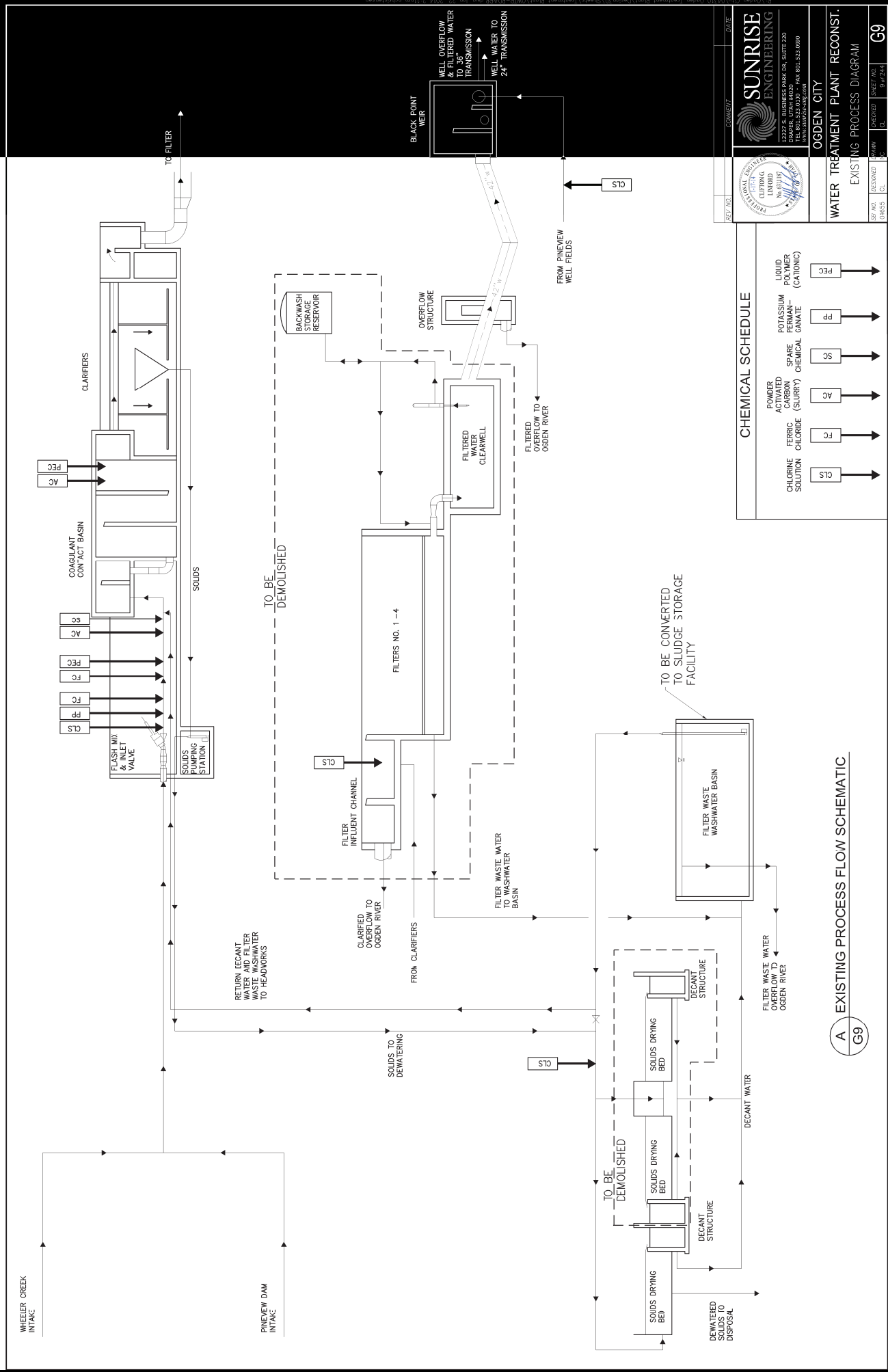
SUNRISE ENGINEERING
 2222 S. BUSINESS PARK DR., SUITE 200
 OGDEN, UTAH 84402
 TEL: 468-5000 FAX: 468-5333
 WWW.SUNRISEENG.COM

APPROVED	DATE
MC	8/17/14
DESIGNED	
MC	

OGDEN CITY

WATER TREATMENT PLANT RECONSTRUCT. DESIGN CRITERIA

G8

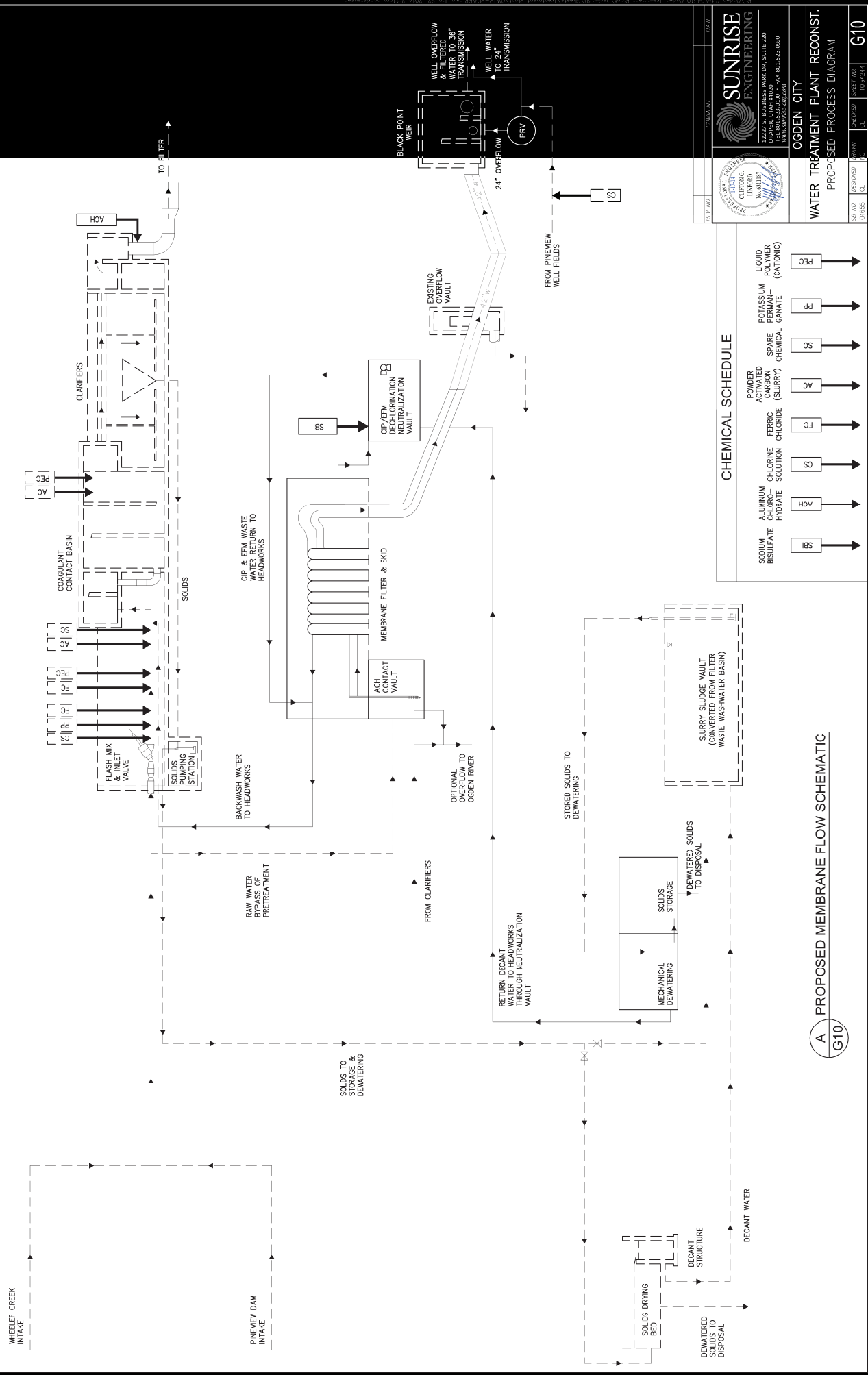


 SUNRISE ENGINEERING		2222 S. BUSINESS PARK DR. SUITE 200 OGDEN, UTAH 84403 WWW.SUNRISE-ENG.COM
OGDEN CITY	WATER TREATMENT PLANT RECONST.	EXISTING PROCESS DIAGRAM
REV. NO.	REVISION	DATE
04655	04655	04/24
G9		

CHEMICAL SCHEDULE

CHLORINE SOLUTION	CLS	→
FERRIC CHLORIDE	FC	→
ACTIVATED CARBON	AC	→
SPARE CHEMICAL	SC	→
POTASSIUM PERMANGANATE	PK	→
LIQUID POLYMER (COAGULANT)	PL	→

A EXISTING PROCESS FLOW SCHEMATIC



SUNRISE ENGINEERING
 2222 S. BUSINESS PARK DR. SUITE 200
 DUNSMITH, UTAH 84005
 (435) 633-9999
 WWW.SUNRISE-ENG.COM

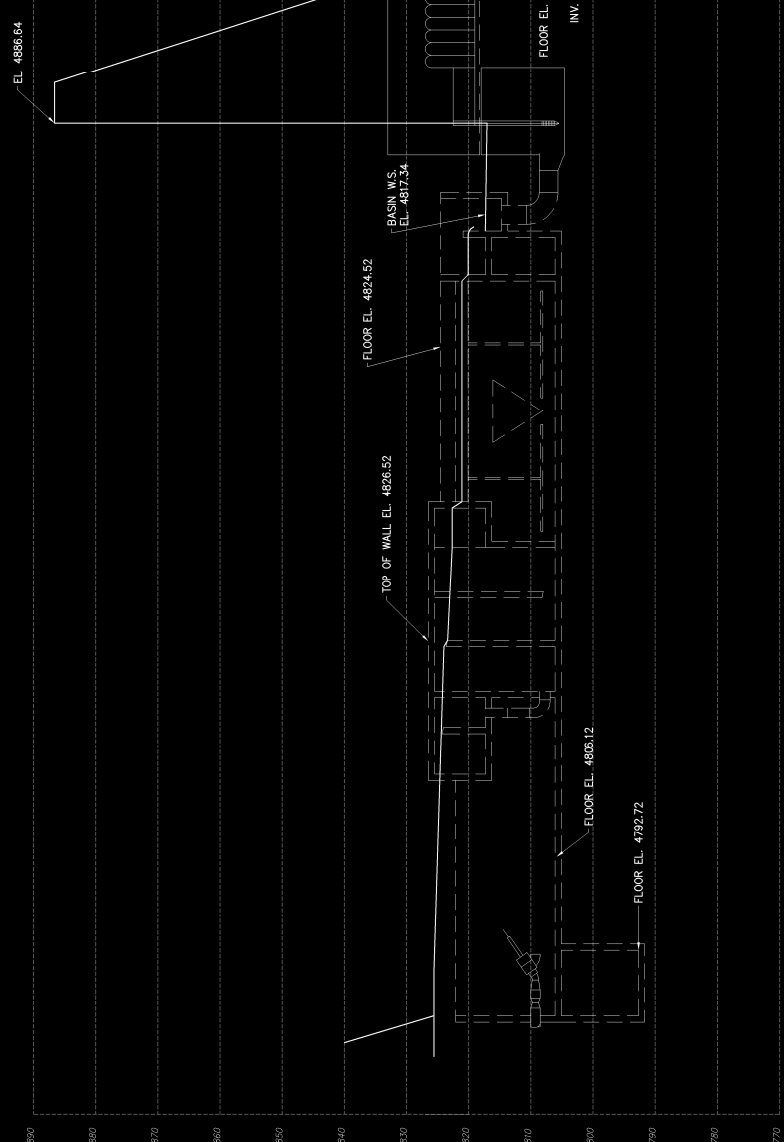
OCDEN CITY
 WATER TREATMENT PLANT RECONST.
 PROPOSED PROCESS DIAGRAM

REV. NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	10/14/24
2	REVISED	10/14/24
3	REVISED	10/14/24

CHEMICAL SCHEDULE		
SODIUM BISULFATE	IBS	→
ALUMINUM CHLORO-HYDRATE	AH	→
CHLORINE SOLUTION	CS	→
FERRIC CHLORIDE (SLURRY)	FC	→
ACTIVATED CARBON (SLURRY)	AC	→
SPARE CHEMICAL	SC	→
POTASSIUM PERMANGANATE (CATIONIC)	PB	→
LIQUID POLYMER	PL	→

A PROPOSED MEMBRANE FLOW SCHEMATIC
G10

WHEELLEF CREEK INTAKE
 PINEVIEW DAM INTAKE
 FLASH MIX & INLET VALVE
 COAGULANT CONTACT BASIN
 CLARIFIERS
 SOLIDS PUMPING STATION
 BACKWASH WATER TO HEADWORKS
 RAW WATER BYPASS OF PRETREATMENT
 FROM CLARIFIERS
 RETURN DECANT WATER TO HEADWORKS THROUGH NEUTRALIZATION VAULT
 SOLIDS TO STORAGE & DEWATERING
 SOLIDS DRYING BED
 DEWATERED SOLIDS TO DISPOSAL
 DEWATERED SOLIDS TO DISPOSAL
 DEWATERED SOLIDS TO DISPOSAL
 SOLIDS STORAGE
 MECHANICAL DEWATERING
 RETURNED SOLIDS TO DISPOSAL
 STORED SOLIDS TO DEWATERING
 SOLIDIFIED SLUDGE VAULT (CONVERTED FROM FILTER WASTE WASHWATER BASIN)
 FROM PINEVIEW WELLS
 24" OVERFLOW
 WELL OVERFLOW & FILTERED WATER TO 36" TRANSMISSION
 WELL WATER TO 24" TRANSMISSION
 PRV
 BLACK POINT WEIR
 TO FILTER



B PROPOSED MEMBRANE HYDRAULIC PROFILE
G11



DATE	COMMENT
11/14/24	
11/14/24	
11/14/24	

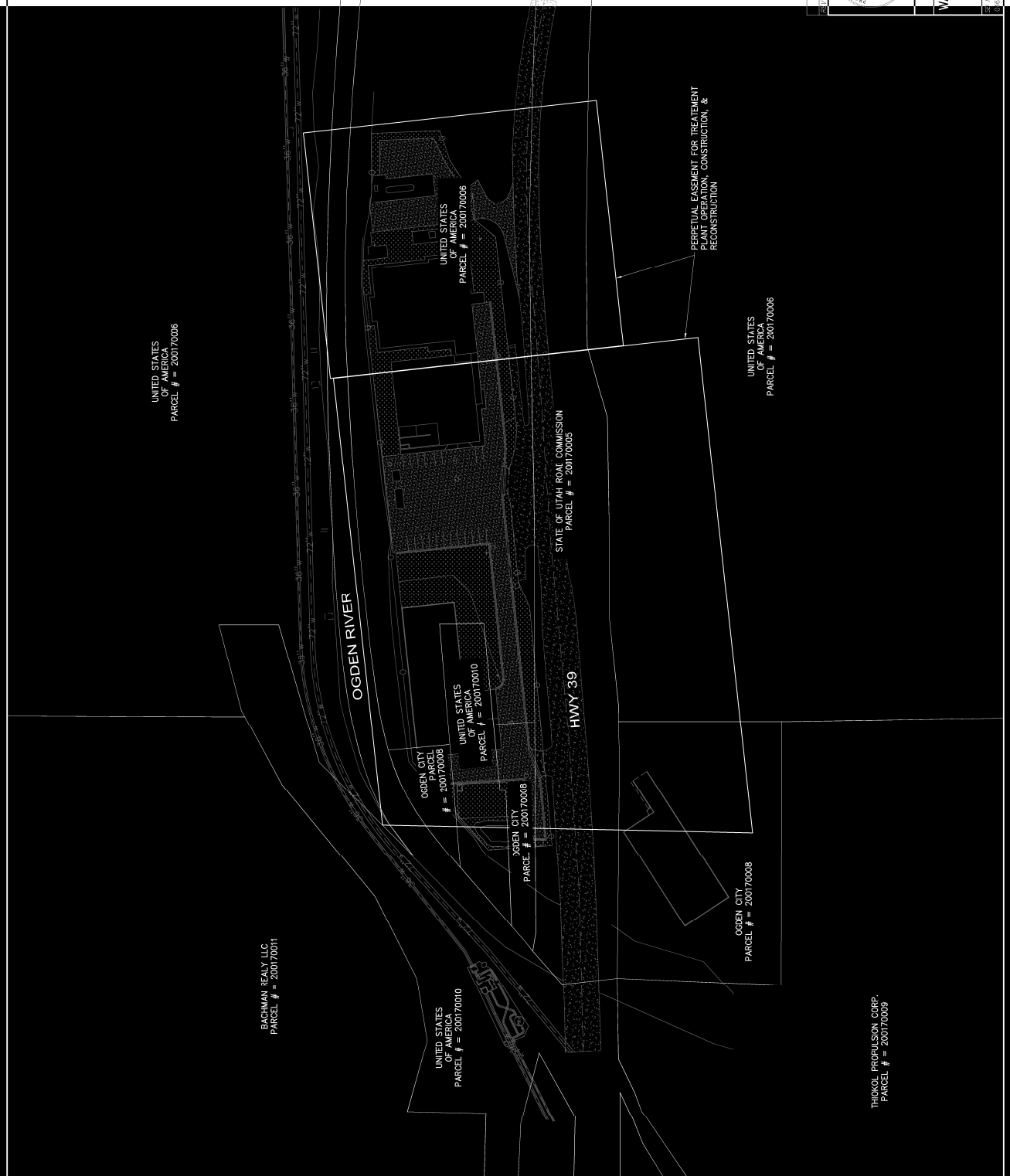
SUNRISE ENGINEERING
 2222 S. BUSINESS PARK DR. SUITE 200
 DAVIS, UTAH 84005
 (435) 353-8999
 WWW.SUNRISE-ENG.COM

OCDEN CITY	
WATER TREATMENT PLANT RECONSTRUCTION	
HYDRAULIC PROFILE SHEET	
DATE: 11/14/24	SHEET NO.: G11
BY: [Signature]	SCALE: 1" = 20'



SCALE
 0 60 120
 FEET
 1" = 60' : 1243.4
 1" = 120' : 1143.7

DATE	
COMMENT	
 SUNRISE ENGINEERING 2222 S. BUSINESS PARK DR. SUITE 200 OGDEN, UTAH 84403 WWW.SUNRISE-ENG.COM PH. 801.523.6999	
OGDEN CITY	
WATER TREATMENT PLANT RECONSTRUCTION	
PARCEL MAP	
DATE	12/24/24
PROJECT NO.	12-24-24
SCALE	AS SHOWN
PROJECT	OGDEN CITY WATER TREATMENT PLANT RECONSTRUCTION



DATE	12/24/24
PROJECT NO.	12-24-24
SCALE	AS SHOWN
PROJECT	OGDEN CITY WATER TREATMENT PLANT RECONSTRUCTION

OGDEN CITY
 WATER TREATMENT PLANT RECONSTRUCTION
 PARCEL MAP

G12