

Water System Infrastructure Improvements Merrimack Village District PFAS Treatment and CIP Wells 2, 3, 7 & 8

October 23, 2019

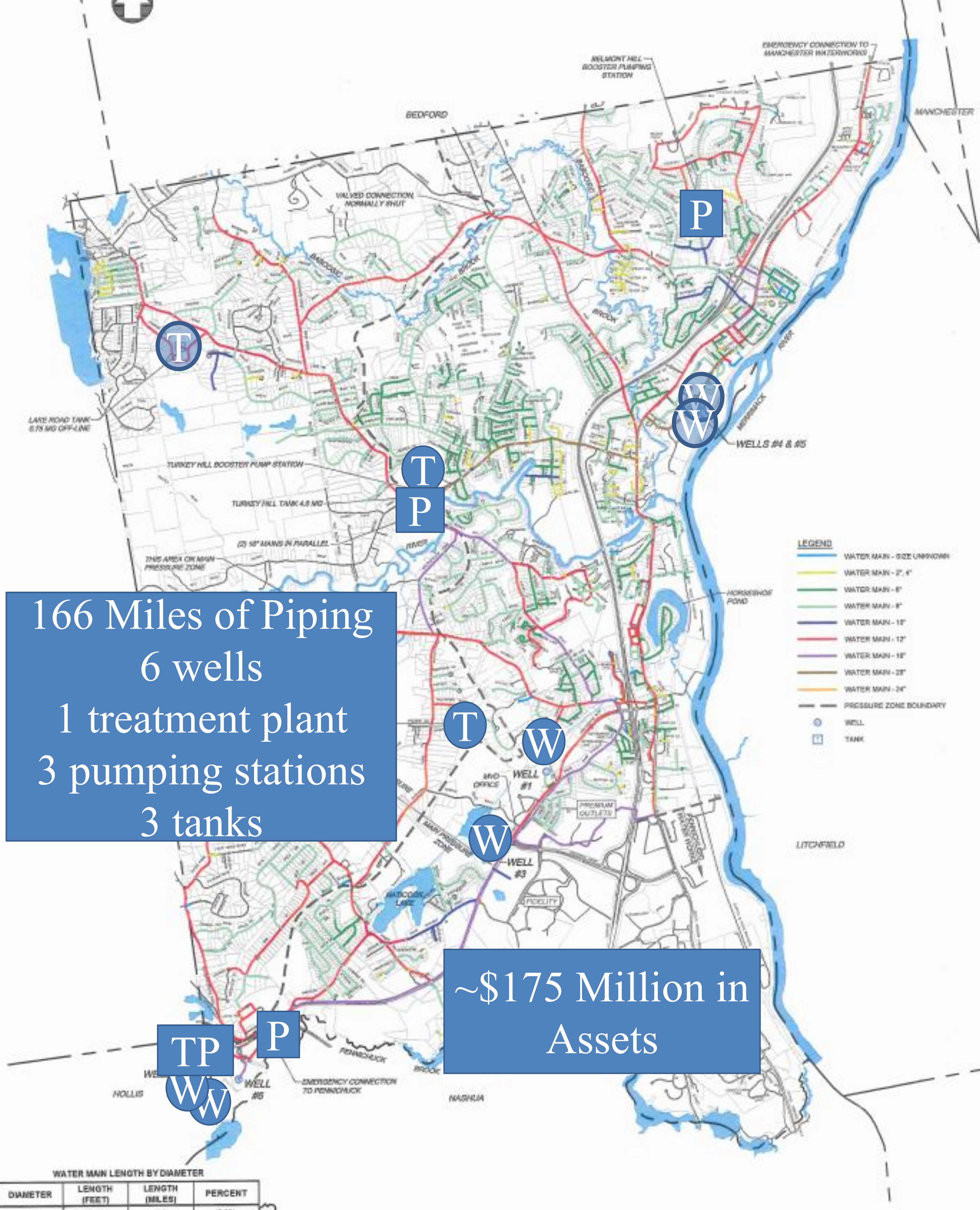
Introductions

- Don Provencher
 - Chair, Board of Commissioners
- Ron Miner
 - Superintendent, MVD
- Jill Lavoie
 - Business Manager, MVD
- Keith Pratt
 - President, Underwood Engineers, Inc.
- Mike Metcalf
 - Sr. Project Manager, Underwood Engineers, Inc.

Agenda

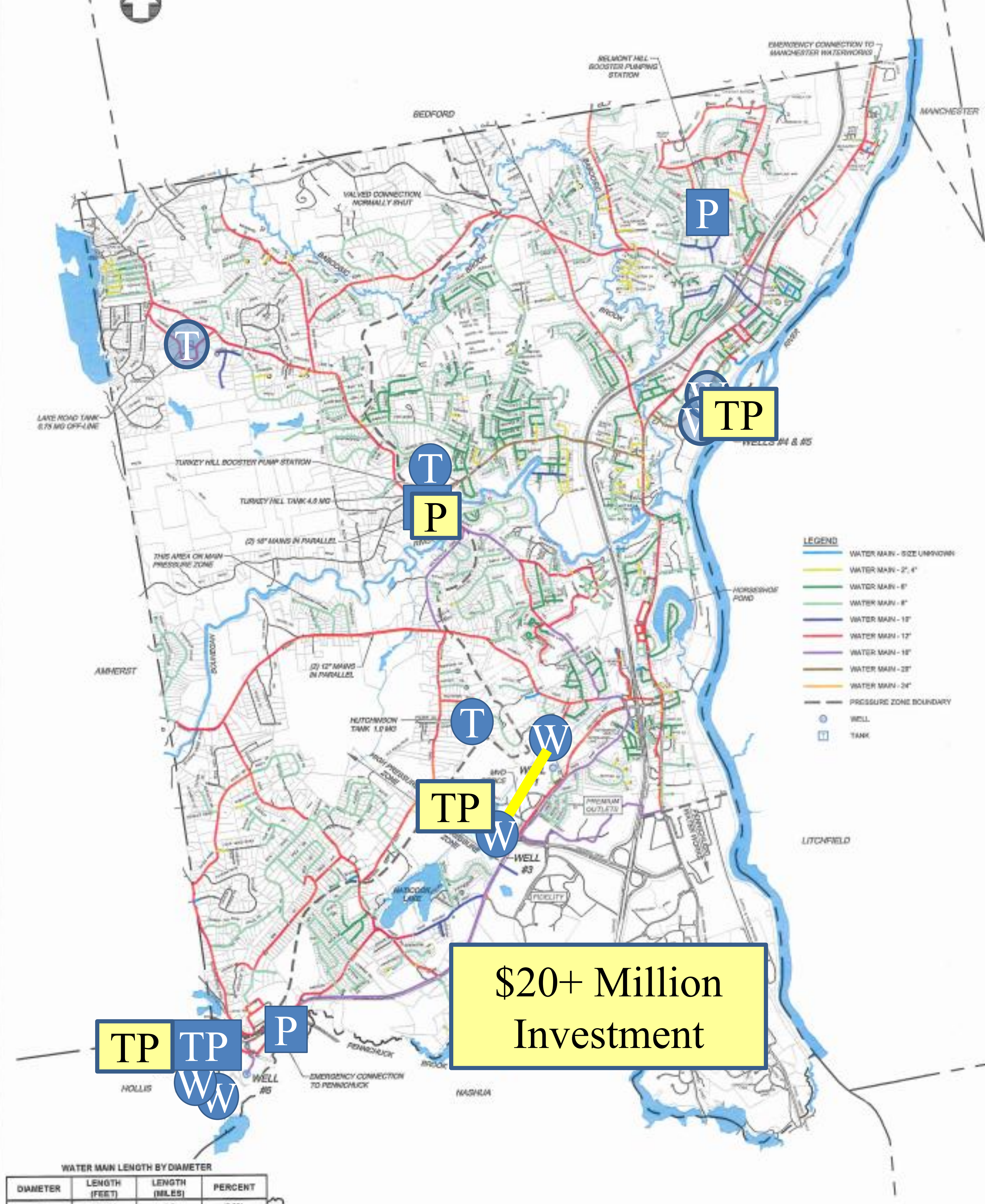
- Background
- Wells #4 and #5 Update
- Wells #7 and #8
- Wells #2 and #3
- Challenges and Opportunities
- Questions and Answers

Background



166 Miles of Piping
6 wells
1 treatment plant
3 pumping stations
3 tanks

~\$175 Million in Assets

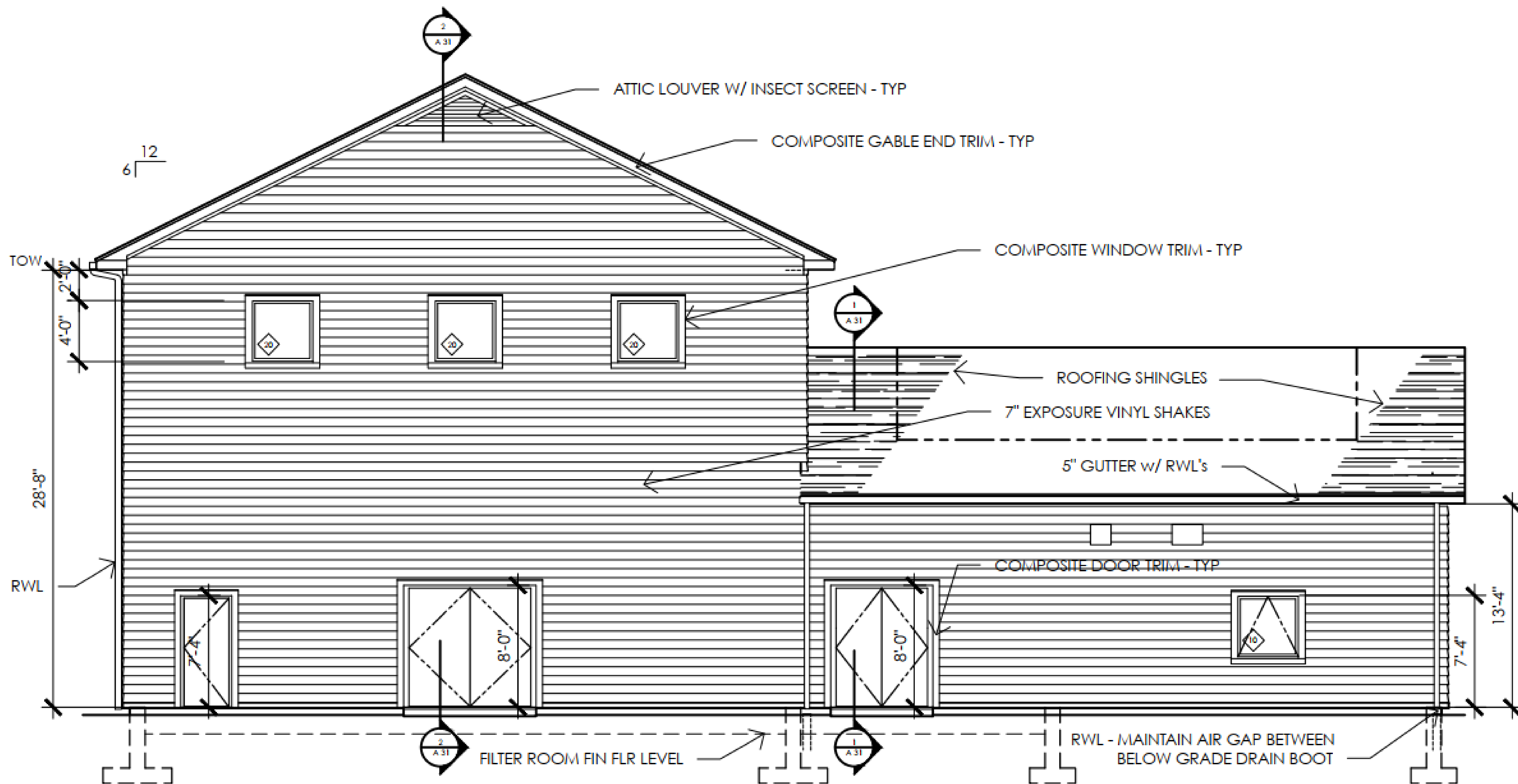


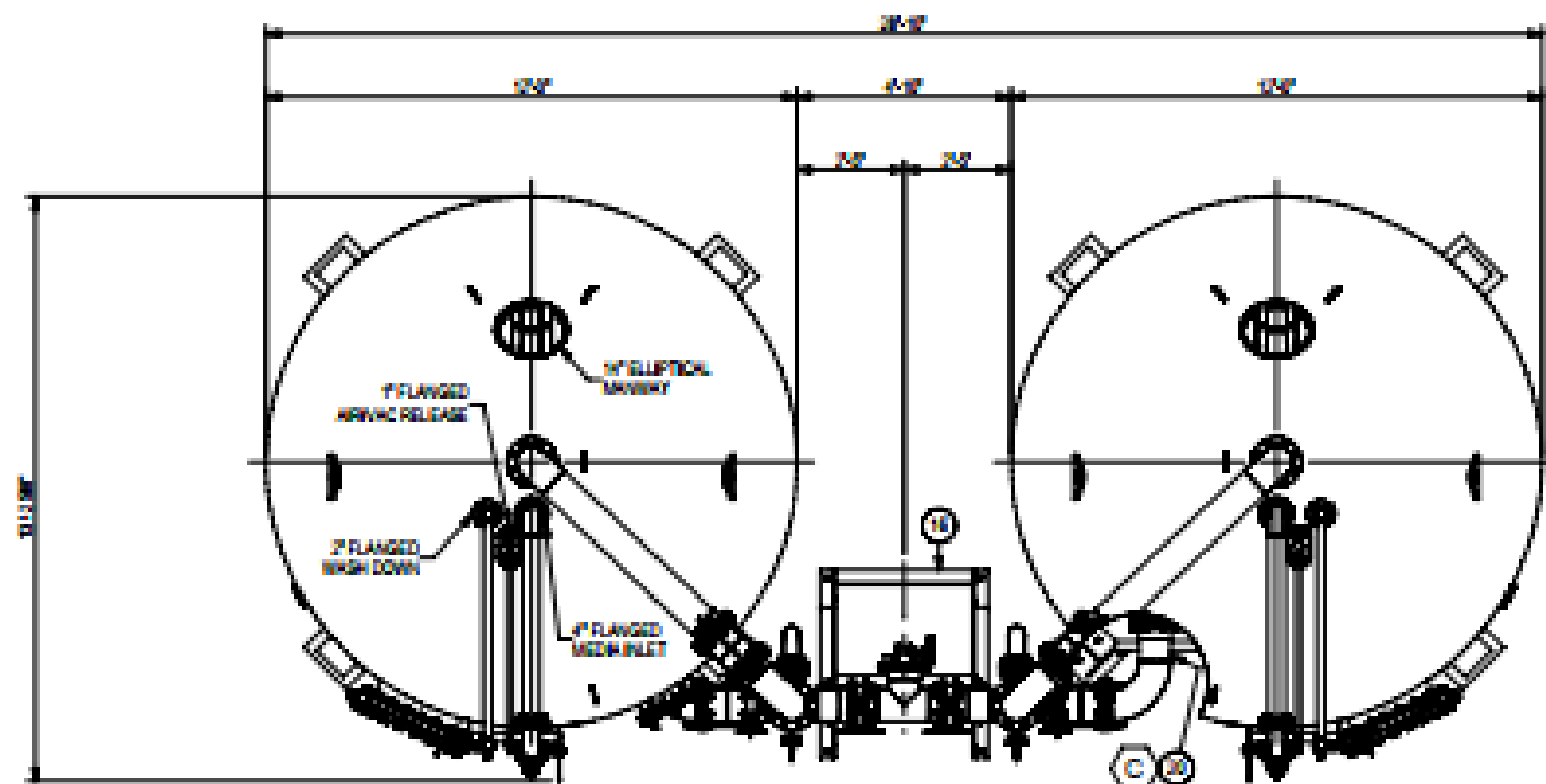
Wells #4 and #5



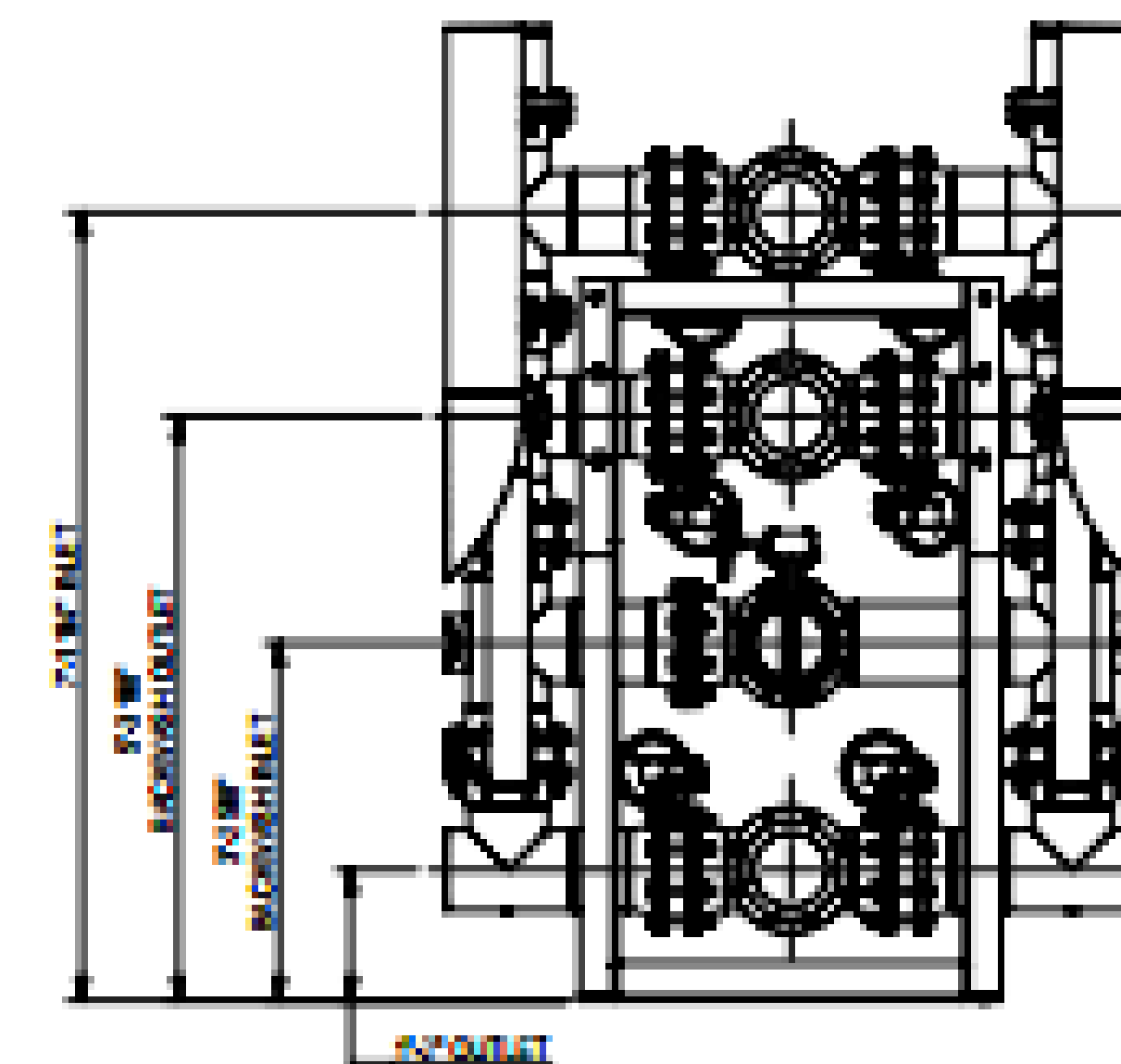




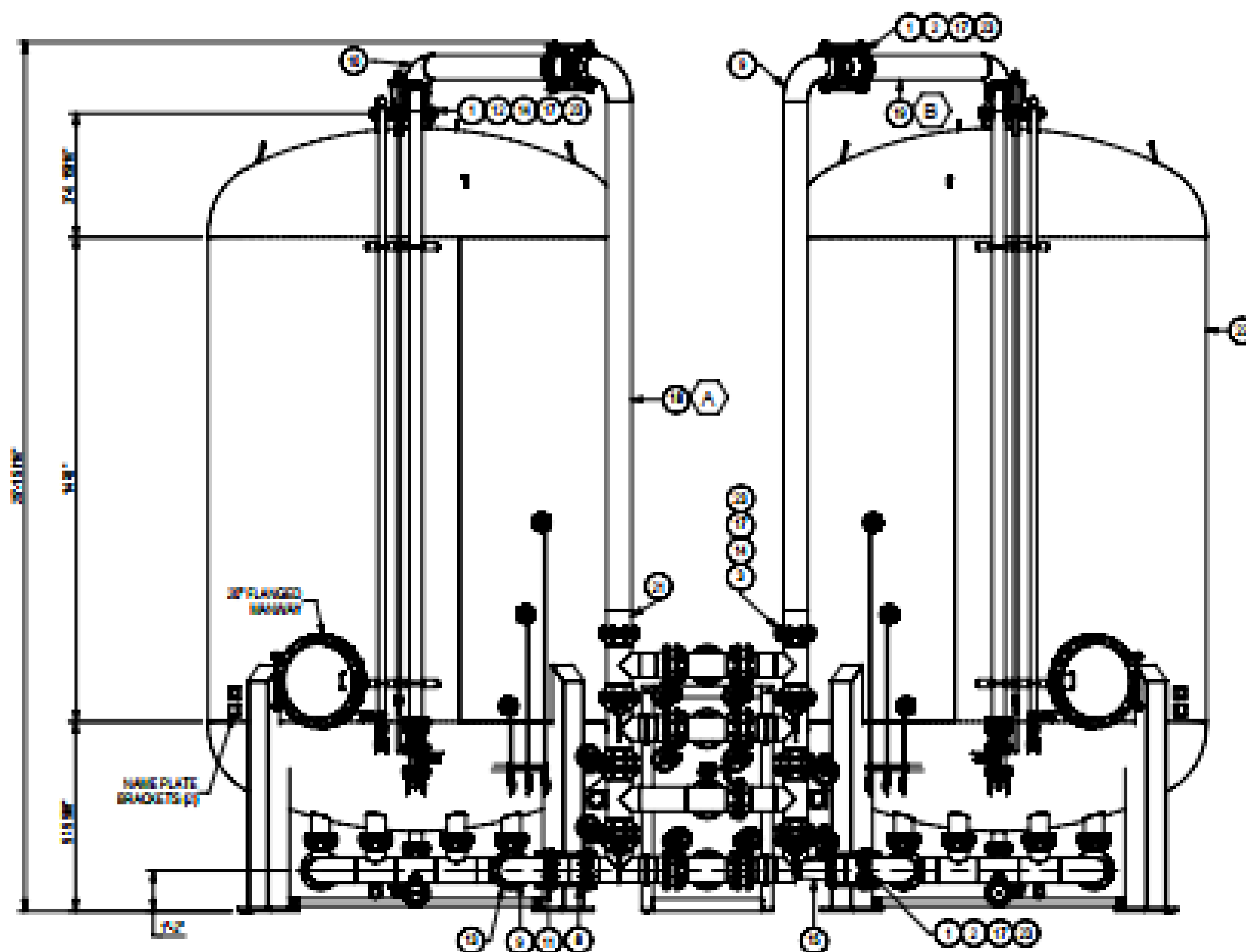




PLAN VIEW



CUSTOMER CONNECTION



ELEVATION VIEW

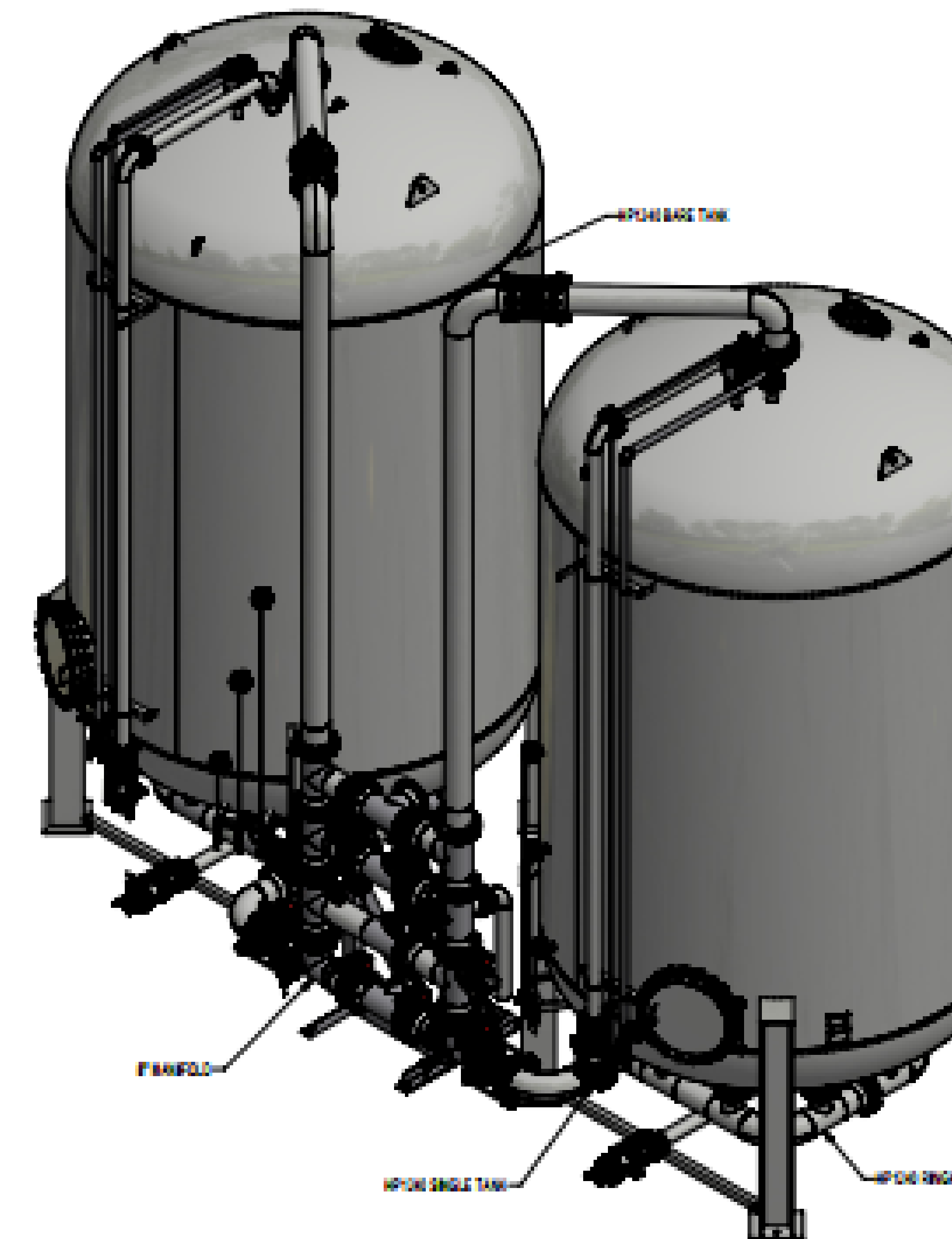
CUT LENGTH			
TAG	DESCRIPTION	CUT LENGTH (INCHES)	QTY
A	1" SCH 40 CS PIPE	178.38"	2
B	1" SCH 40 CS PIPE	55.91"	2
C	1" SCH 40 CS PIPE	51.90"	2

ADDITIONAL NOTES:

- THIS DRAWING IS TO SHOW PIPING AND EQUIPMENT FOR CUSTOMER APPROVAL.
- ALL BUTTERFLY VALVES ARE DUCTILE IRON WITH STAINLESS TRIM, STAINLESS STEEL DISK.
- PROVIDE 3/16" STAINLESS STEEL SEPTA UNDER DRAIN SCREWS.
- VESSEL SHALL BE 200 PSI, ASME CODE.
- FINISH INTERIOR WITH FLASITE 4110, PREPARE AND APPLY STRICTLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS TO MEET NSF STD 61 REQUIREMENTS.
- PIPING MATERIALS SHALL MEET: CS PIPE ASTM A-33 GRADE B (DRW); CS FITTINGS SA-234, ASME B16.3; SS THREADED FITTINGS ASTM A-321; SS PIPE ASTM A-312; SS BW FITTINGS ASTM A-402; M THREADED FITTINGS ASME B-16.3.
- FINISH EXTERIOR WITH CARBOSGUARD 123 URTANE COLOR TO BE 9225 CASHW OVER CARBOLINE 880 RUST PREVENTATIVE EPOXY PRIMER APPLIED PER MFG. RECOMMENDATIONS.
- SYSTEM ESTIMATED SHIPPING WEIGHT: 77,000 LBS.
- GRROUTING BY OTHERS IF REQUIRED.
- ± 1" TOLERANCE ON CONNECTION DIMENSIONS.
- NSF LISTED CS PROCESS PIPING SCOTCHKOTE 124.
- MEDIA SLURRY LINES TO BE INTERNALLY COATED WITH SCOTCHKOTE 208L.
- FLEX COUPLER IS NSF.

BILL OF MATERIAL					
POS	UNIT QTY	ITEM CODE	DESCRIPTION	MATERIAL	LE
1	48	W21303916	BOLT 3/8"x1-1/2" HOG GR A325	STL, GALV, A325	
2	48	W21303917	BOLT HEX 1/2"x1-1/2" HOG GR A325	STL, GALV, A325	
3	18	W21551971	BOLT HH 5/8"x4.25" UNC A325 CS HOG RH	STL, GALV, A325	
4	1	W21815494	COAT PRIMER CARBOSGUARD 880 PART B	Generic	
5	1	W21815495	COAT PRMR CARBOSGUARD 880 GREY PT A	Generic	
6	1	W21882267	COATING FLASITE 4110 CL 890 12 NSF	Generic	
7	1	W21888332	COATING SCOTCHKOTE 134H	Generic	
8	4	W21531394	CPUNG-FLEX 13 IN FLANGED-13 IN LG-EPDM	DELIN, BLACK	
9	4	W2184925	ELBW PIPE 90DEG 90 1/2 IN LG-EPDM	STL, MILD	
10	2	W2184941	ELBW PIPE 90DEG 90 1/2 IN LG-EPDM	STL, MILD	
11	2	W2184985	FLANGE 8 IN CS 150LB SO RF W ASTM A1	STL, A38	
12	4	W21531843	FLANGE, 8" SPUR 150LB 2P CS 2PC BRUP	STL, A38	
13	8	W2187444	FLG WELONK 8 IN 150LB 2PC 405A105	STL, A38	
14	8	W21888338	GASKET FLG 8 RED RUBBER RING 0.125THK 150#	Rubber	
15	2	W21408830	MACK MON STRAINER, 8" X 10" LG 316SS	STN STL, 316	
16	1	W21408838	MANFOLD 8 IN CS 340 4 TIER ASSY PM S		
17	112	NAB	NUT HH 5/8 IN DIA-STEEL-GALV DR (INCLUDED W/ BOLT)	STL, GALV	
18	2	W2184217	PIPE 3/4 SCH 40CS ASS-A-RAN LG	STL, MILD	
19	2	W2184217	PIPE 3/4 SCH 40CS ASS-A-RAN LG	STL, MILD	
20	2	W2184217	PIPE 3/4 SCH 40CS ASS-A-RAN LG	STL, MILD	
21	4	W21534831	STRAND PIPE 1/2 IN 150LB 2PC 405A105	STL, A38	
22	2	W2188484	VESSEL 12FT 20K LB HP 300PSI ST	STL, MILD	
23	224	W21311789	WASHER-FLAT STRUCTURAL 5/8 IN GALVANIZED	STL, GALV	

TOTAL WEIGHT



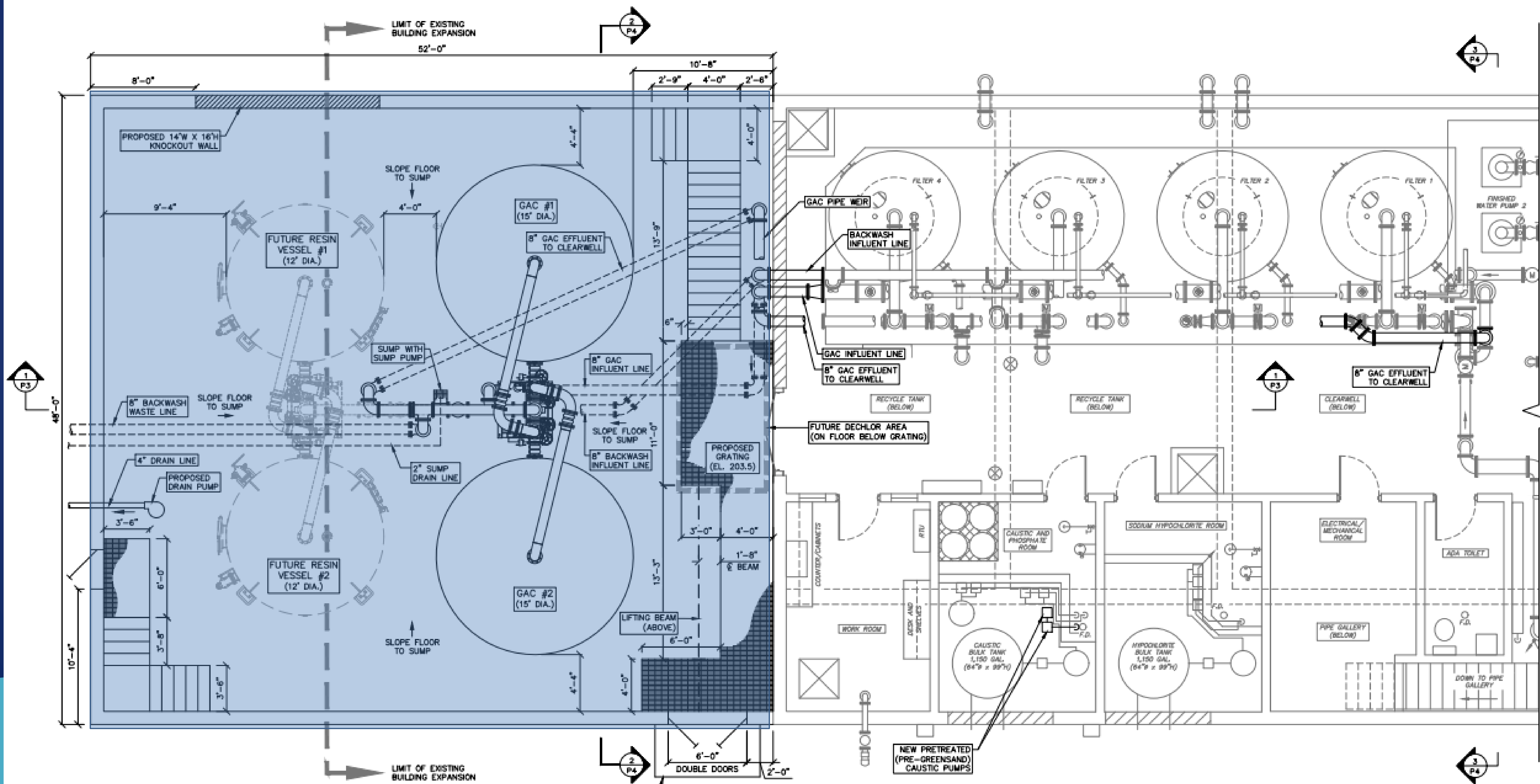
ISOMETRIC VIEW

Wells #7 and #8

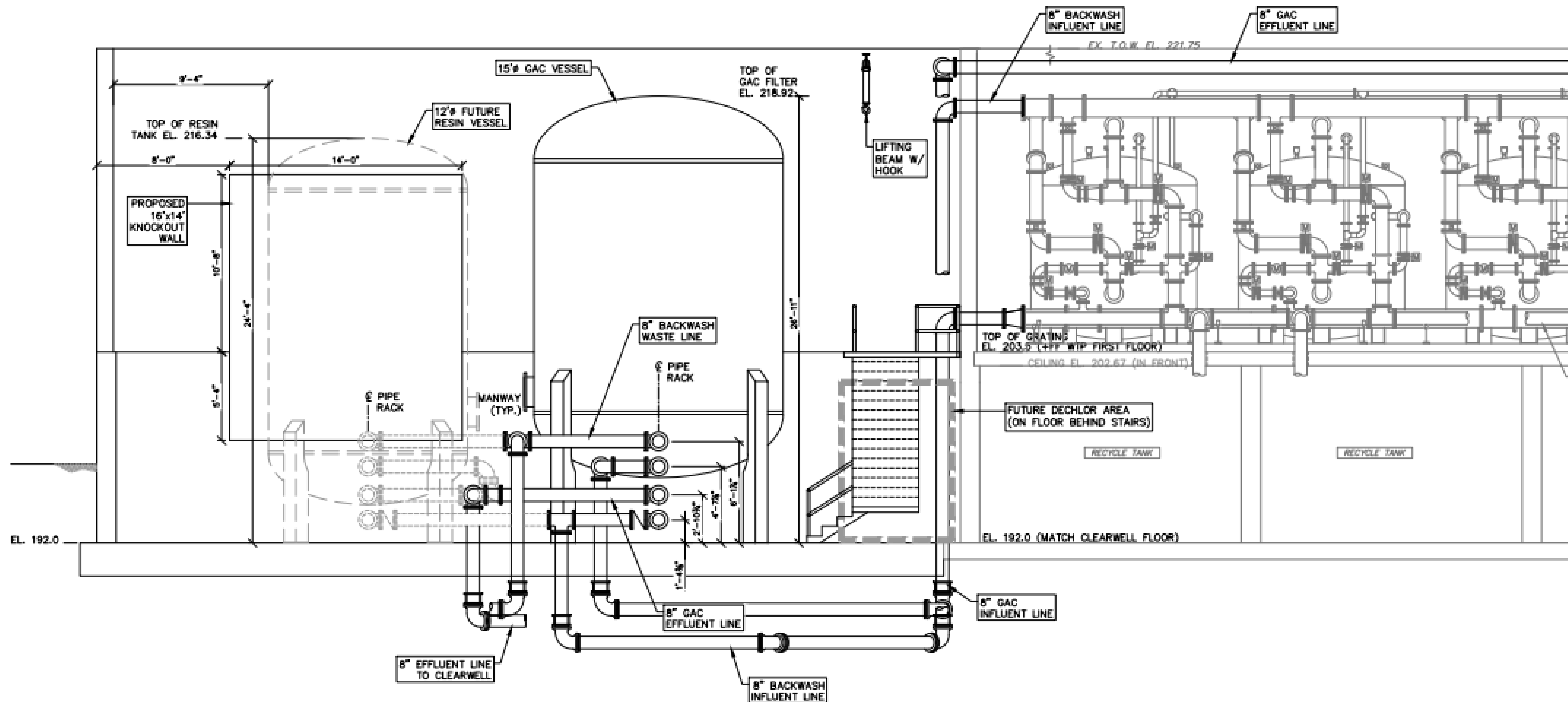
Existing Treatment Plant - #7/#8



Well 7 & 8 Addition

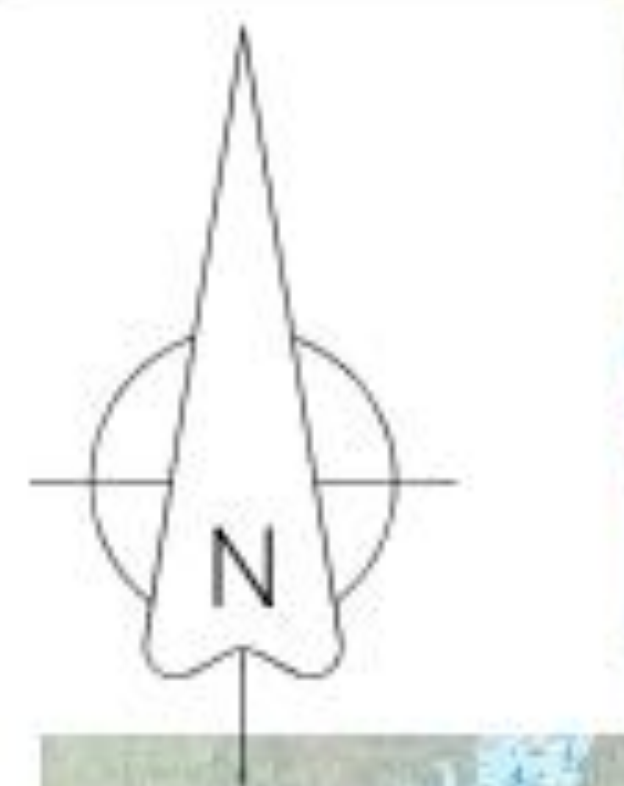


Well 7 & 8 Addition

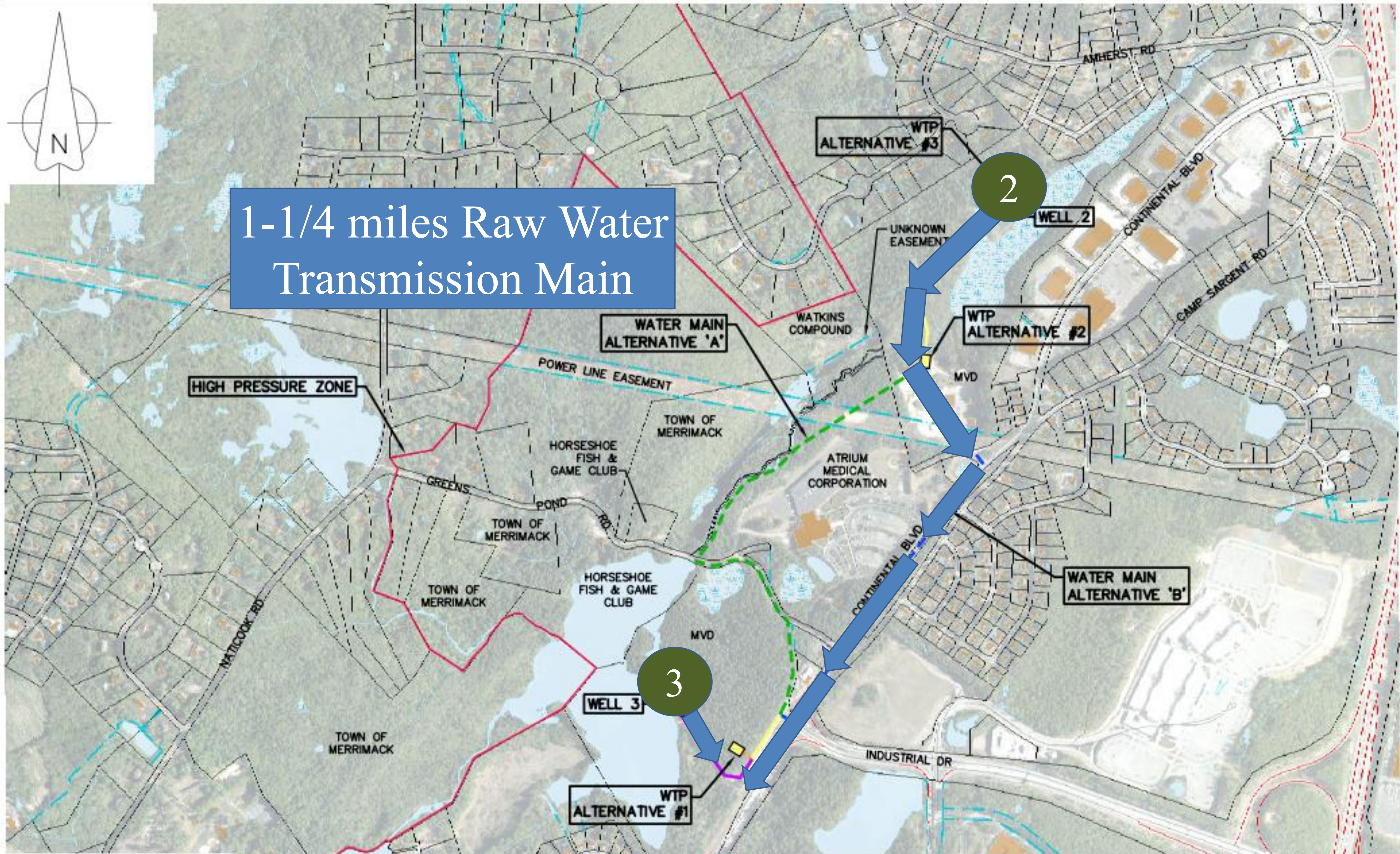


SECTION
SCALE: 1/4"=1'-0"

Wells #2 and #3



1-1/4 miles Raw Water Transmission Main



- LEGEND:**
- EXISTING WATER MAIN
 - NEW WATER MAIN (BOTH ALTERNATIVES)
 - PROPOSED WATER MAIN ALTERNATIVE 'A'
 - PROPOSED WATER MAIN ALTERNATIVE 'B'

SCALE: NOT TO SCALE

DATE MAY 2019	 UNDERWOOD engineers 99 North State Street, Concord, N.H. 03301 Tel. 603-230-9898 Fax. 603-230-9899	CONCEPTUAL WORK PLAN WELL 2/3 WTP MERRIMACK VILLAGE DISTRICT MERRIMACK, NEW HAMPSHIRE	FIG. 1
PROJECT N2805			

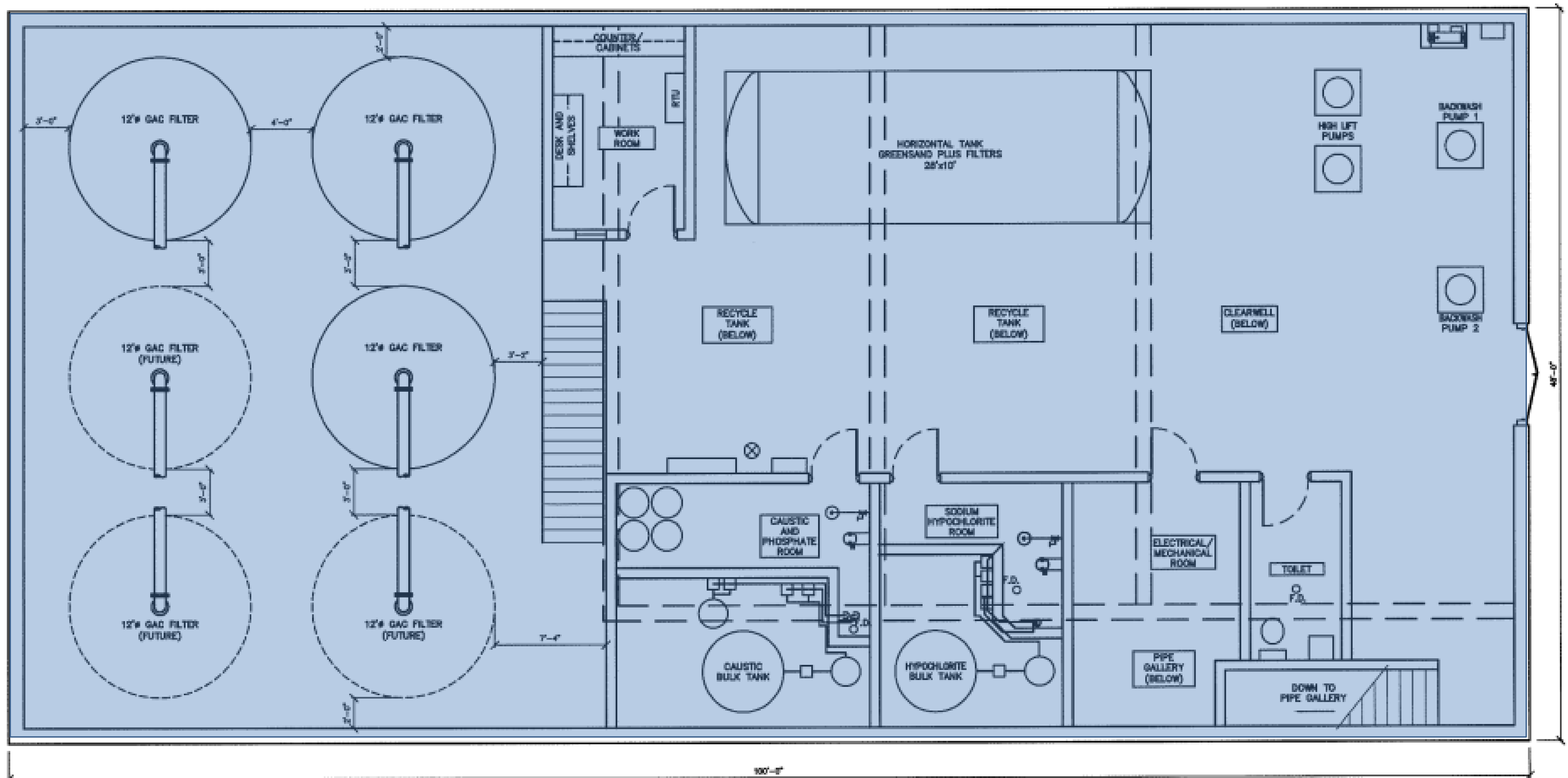
Well #2



Well #3

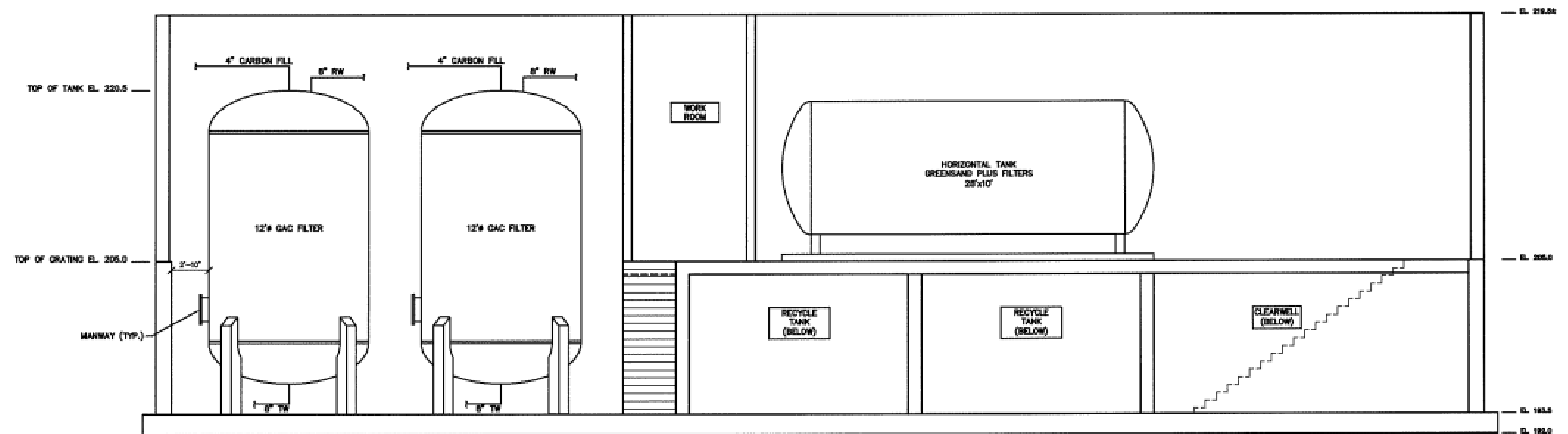


Well #2 & #3 Fe/Mn & PFAS Removal



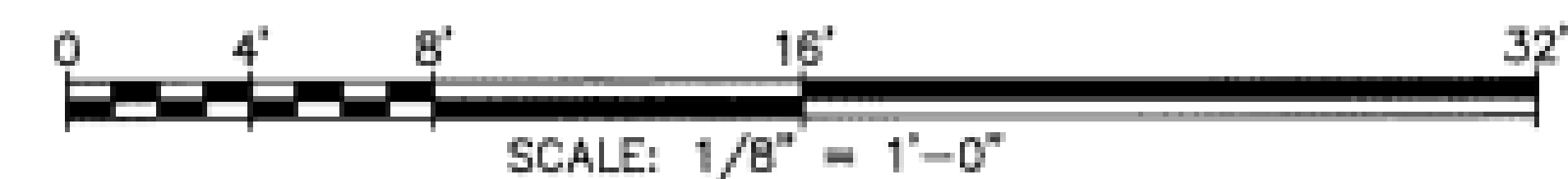
GAC PFAS TREATMENT OPTION

Well #2 & #3 Fe/Mn & PFAS Removal



GAC PFAS TREATMENT OPTION

SCALE: 1/8"=1'-0"

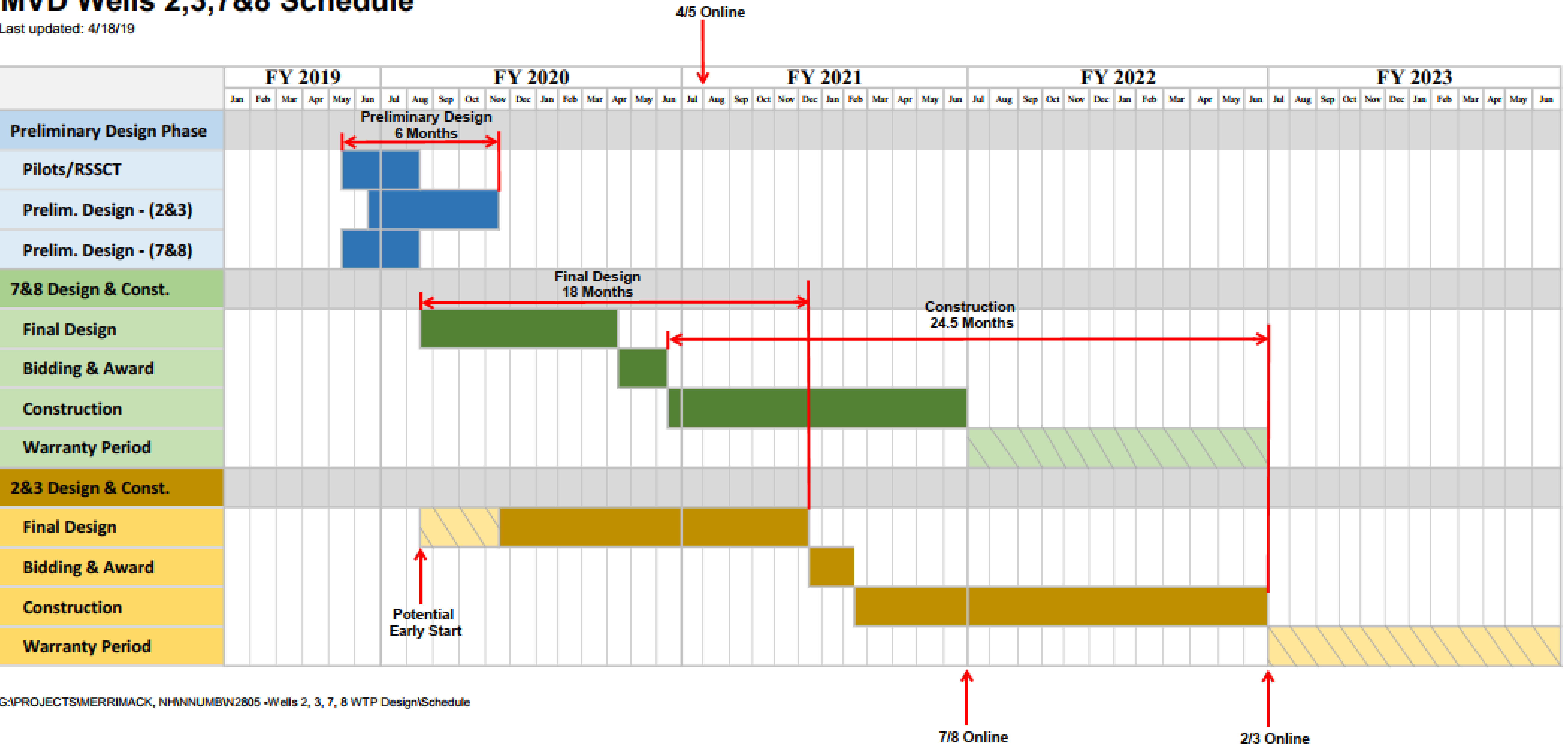


Schedule

Master Schedule

MVD Wells 2,3,7&8 Schedule

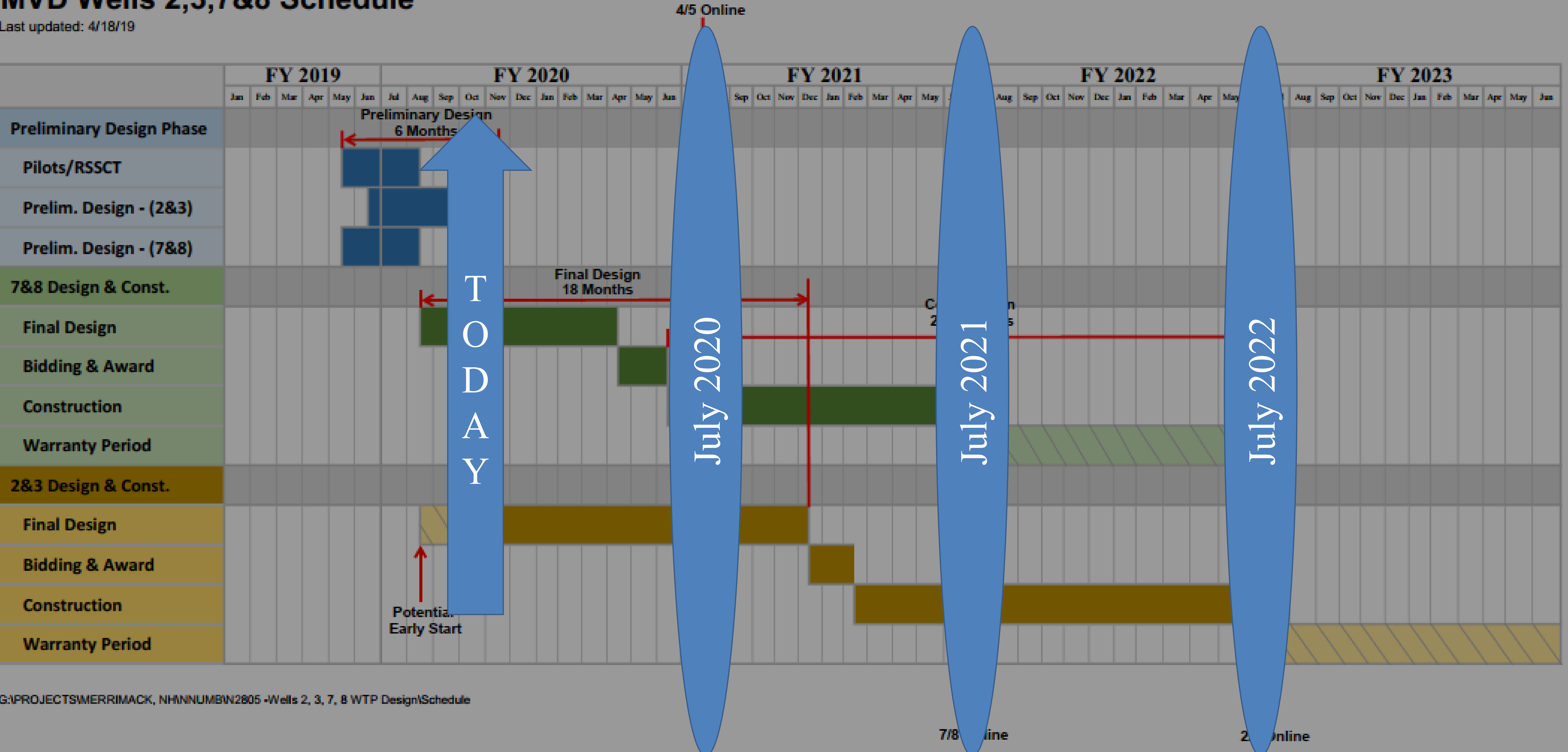
Last updated: 4/18/19



Systems Online - Target

MVD Wells 2,3,7&8 Schedule

Last updated: 4/18/19



Challenges and Opportunities

Funding

Wells #2/#3 and #7/#8

Funding Request – May 2019

#2, #3, #7, and #8

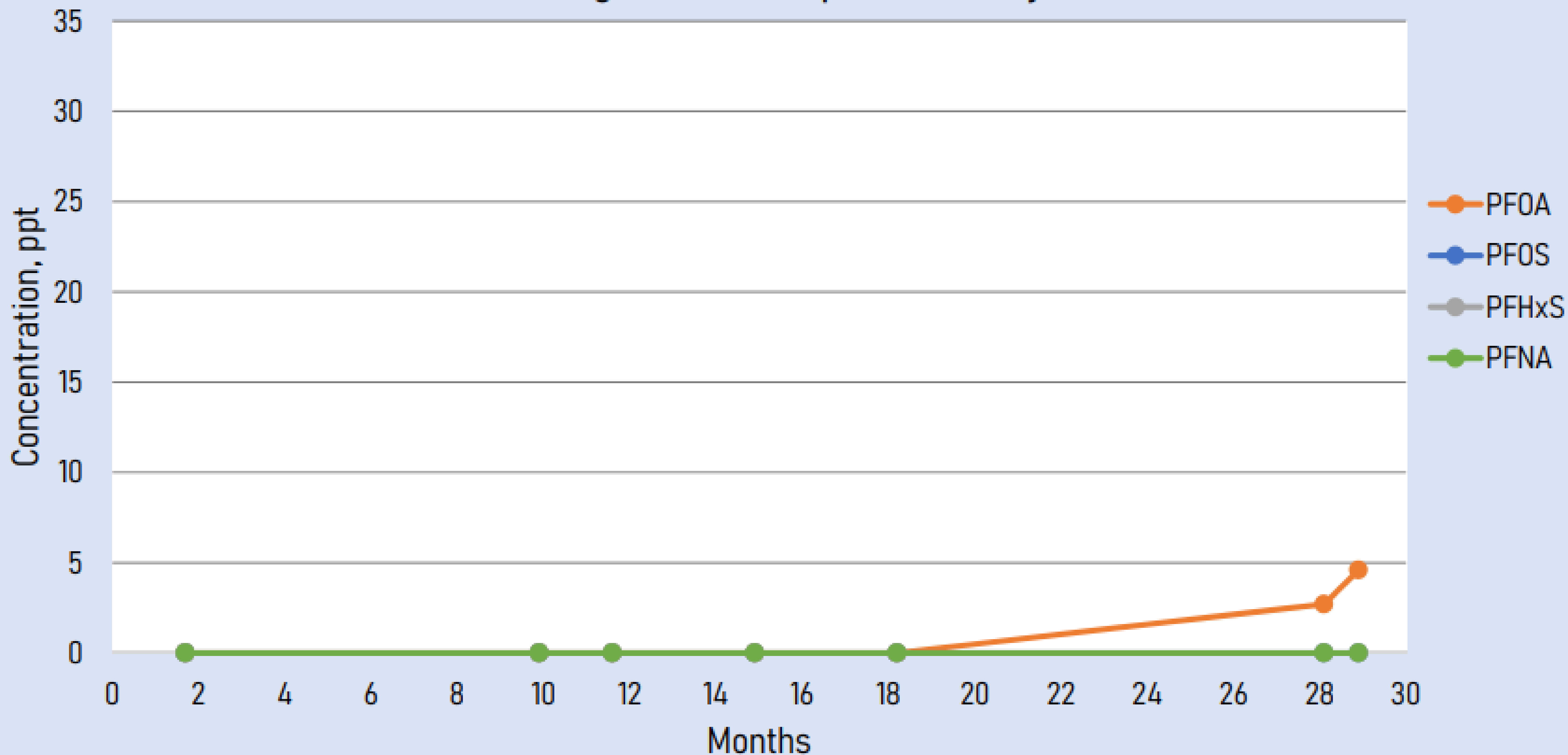
Source	Request
DWGWTF Loan	\$6,264,500
DWGWTF Grant	\$1,450,000
DWSRF or NH Municipal Bond Bank	\$6,500,000
MVD Capital Reserves	\$285,500
TOTAL	\$14,500,000

Piloting and RSSCT

Fe/Mn and GAC



MVD Well 7/8 RSSCT October 2019
Calgon F400AR (bituminous)
Regulated Compounds Only



Evaluating Short Chain Too

1. Perfluorobutane sulfonic acid	PFB S
2. Perfluoroheptanoic acid	PFHpA
3. Perfluorohexanesulfonic acid	PFHxS
4. Perfluorononanoic acid	PFNA
5. Perfluorooctanesulfonic acid	PFOS
6. Perfluorooctanoic acid	PFOA
7. Perfluorohexanoic Acid	PFHxA
8. Perfluorobutanoic Acid	PFBA
9. Perfluoropentanoic Acid	PFPeA
10. Perfluoropentane Sulfonic Acid	PFPeS

GAC Conditioning

GAC Conditioning

GAC Arsenic Leaching Tests, ppb

Merrimack Village District

2018-2019

Wells 4&5

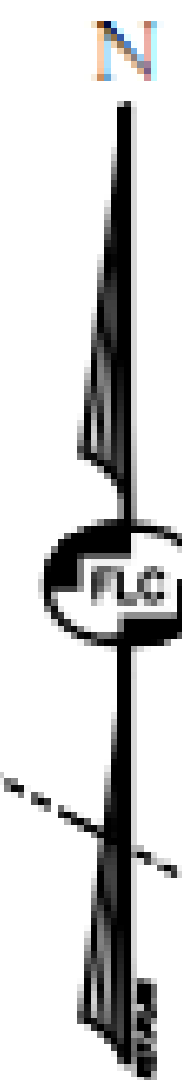
Hours	GAC 1	GAC 2	GAC 3	GAC 4
0	0	0	0	0
24	58.3	438	0.689	1.74
36	40.3	134	0.689	4.07

Wells 7&8

Hours	GAC 1A	GAC 2A	GAC 5	GAC 4
0	0	0	0	0
24	6.14	17.1	34.8	1.42
36	8.38	4.81	23	2.43

Wells 2&3

Hours	GAC 1A	GAC 2A	GAC 3	GAC 4
0	0	0	0	0
24	8.65	11.9	0.689	2.65
36	13.5	5.83	0.689	2.72
24	9.06	6.34	0.689	1.88



18.75 AC.
ON FRONT STREET

MERRIMACK VILLAGE DISTRICT
2 GREENS POND ROAD,
MERRIMACK, NH 03054

ADD PROTECTIVE WELL RADIUS (TYP.)

EXISTING 24" RCP
TOWN OF
MORRIS
INTERCEPT

NOTE:
SEE DWG C3 FOR
ADDITIONAL WORK.

TOWN OF MERRIMACK
19 FRONT ST.
MERRIMACK, NH 03054

**ENGINEER'S
JOB TRAILER**

**CONTRACTORS
FOR TRAINING**

**NOVA
PARKING AREA**

NEW 10' WIDE GRAVEL ACCESS
ROAD. SEE DETAIL DND-04

NEW 20' WIDE DOUBLE BAR
GATE. EXACT LOCATION TO BE
DETERMINED BY THE OWNER IN
THE FIELD. SEE DETAIL DWG. CR.

NEW 30' WIDE DOUBLE BAR
GATE. SEE DETAIL DWG. C8.

REMOVE EXISTING PAVEMENT. BOX OUT FOR
NEW GRAVELS AND CONSTRUCT A NEW
ENTRANCE IN ACCORDANCE WITH THE TYPICAL
PAVED DRIVE SECTION NOTED ON DWG C8.

CLEAR BRUSH AND TREES TO A
POINT 8' BEYOND NEW EDGE OF
PAVEMENT (TYP. BOTH SIDES)

TAPER FROM STA. 101+10.5
TO STA. 101+25

END OF NEW PAVEMENT
RECONSTRUCTION STA. 101+26

EXISTING 14'± PAVED
DRIVE TO REMAIN

THE INTO EXISTING

TAPER FROM
STA. 103+05.8
TO STA. 103+50

WIDEN PAVEMENT IN
ACCORDANCE WITH
THE TYPICAL PAVED
DRIVE SECTION NOTE
044 0000 000

APPROX. LOCATION
OF FUTURE ARTIFICIAL
RECHARGE BASINS

basin



FUTURE RESIN SYSTEM
BUILDING ADDITION
DIMENSIONS TBD

NEW 86' X 34'
TREATMENT PLANT
BUILDING

LIMITED CLEARING
ALONG SEWER LINE.
ONLY AS NECESSARY.

New MCL's

Wells #2/#3 and #7/#8

New MCL's

Adopt Env-Dw 705.06 to read as follows:

Env-Dw 705.06 MCLs and MCLGs for Per- and Polyfluoroalkyl Substances (PFAS) Contaminants.

(a) The MCLs and MCLGs for the per- and polyfluoroalkyl substances contaminants specified in (b), below, shall apply to community water systems and non-transient non-community water systems.

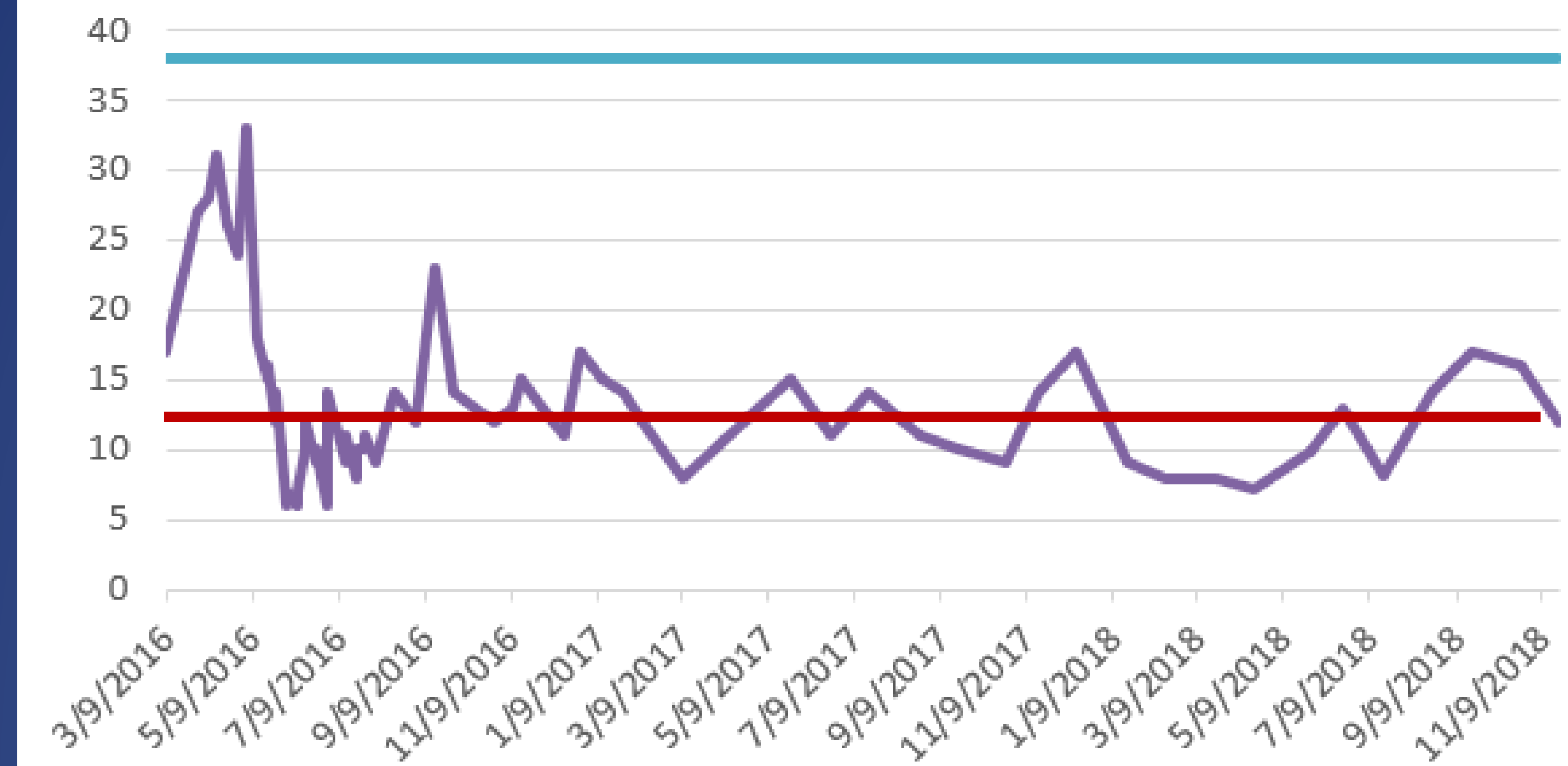
(b) The MCLs and MCLGs for PFAS contaminants shall be as specified in Table 705-7, below:

Table 705-7: PFAS Contaminant MCLs and MCLGs

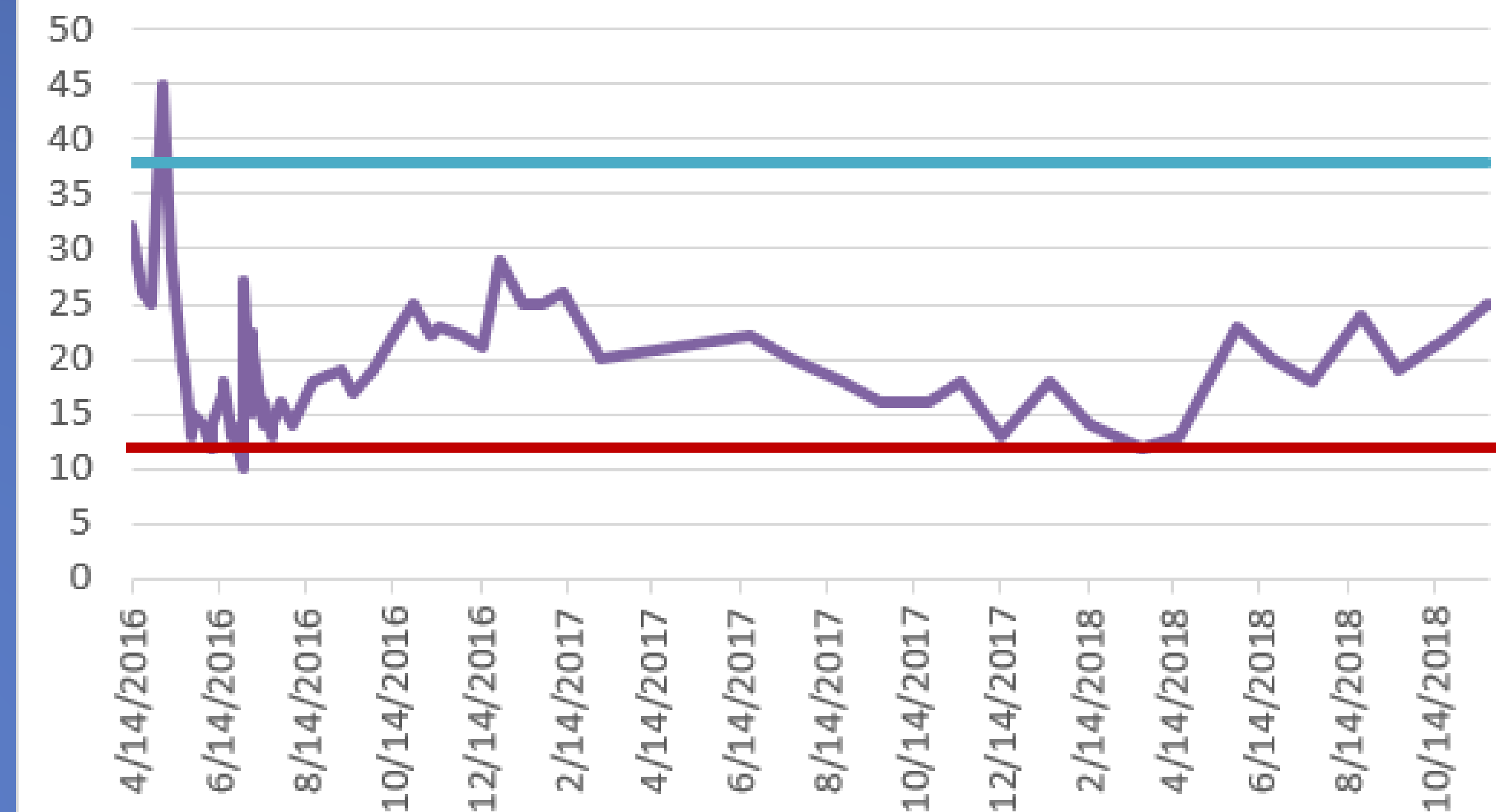
PFAS Contaminant	MCL (mg/L)	MCLG (mg/L)
Perfluorohexane sulfonic acid (PFHxS)	0.000018	0
Perfluorononanoic acid (PFNA)	0.000011	0
Perfluorooctane sulfonic acid (PFOS)	0.000015	0
Perfluorooctanoic acid (PFOA)	0.000012	0

PFOA Concentration History

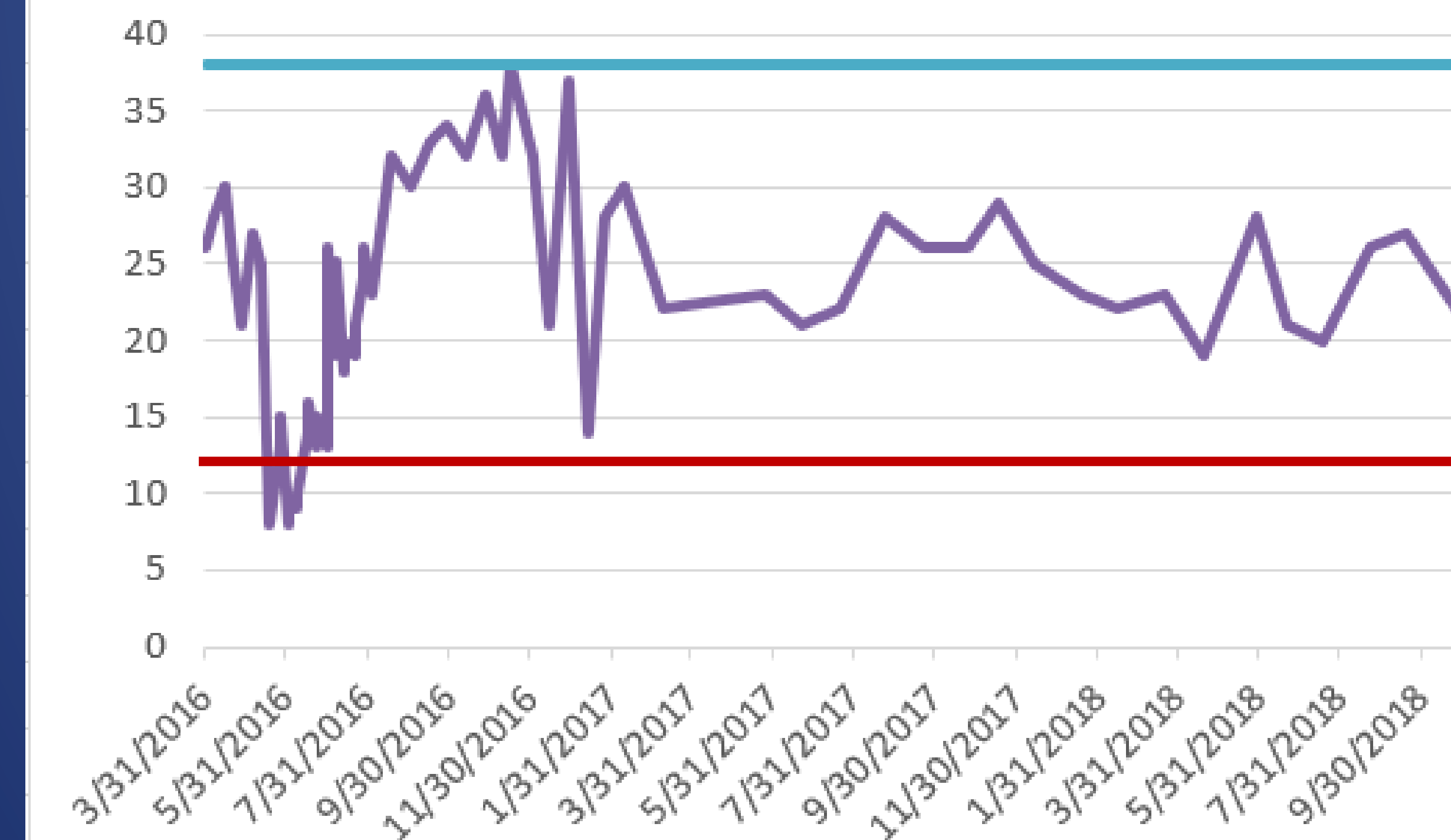
Well 2 PFOA (ppt)



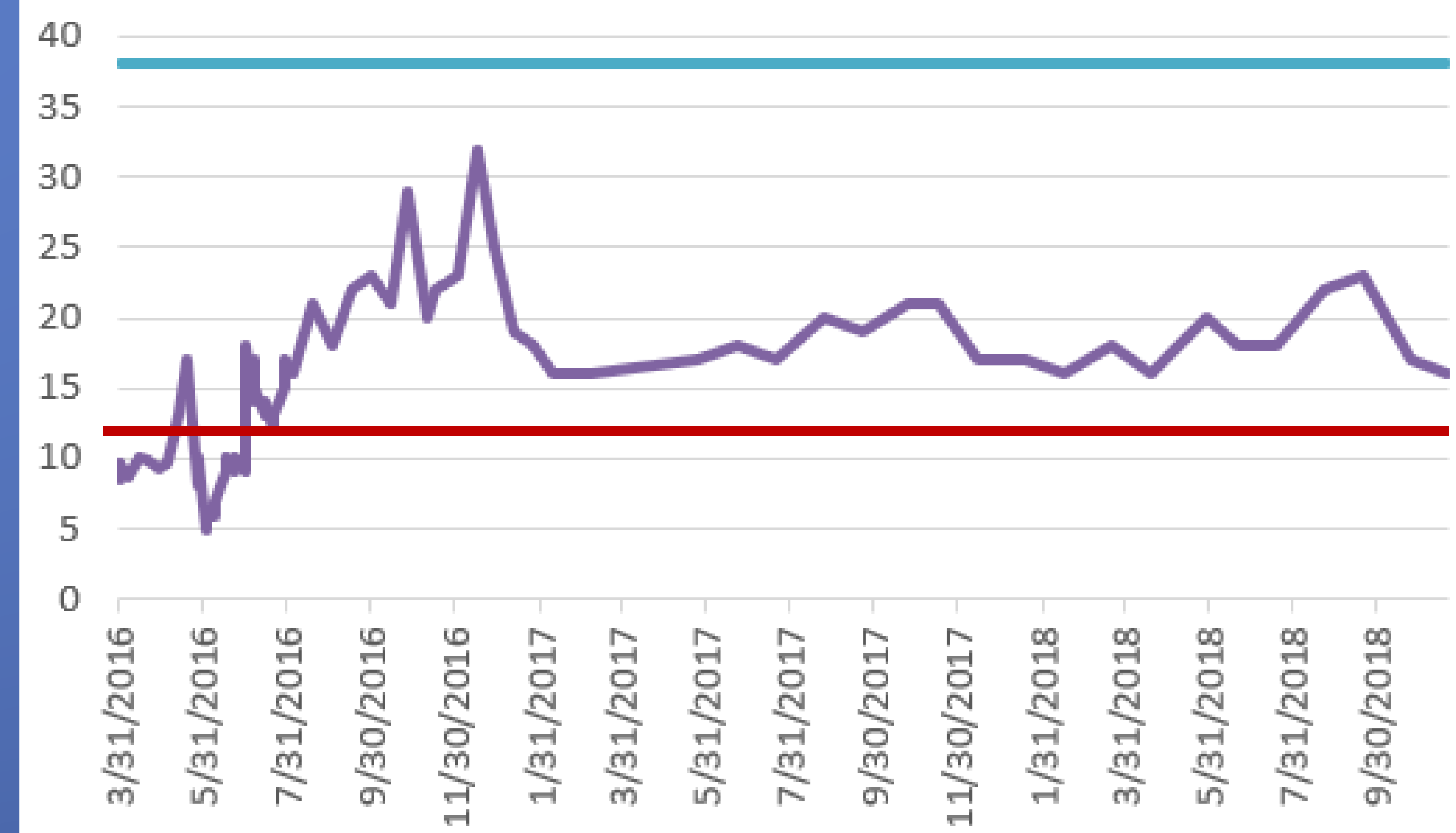
Well 3 PFOA (ppt)



Well 7 PFOA (ppt)



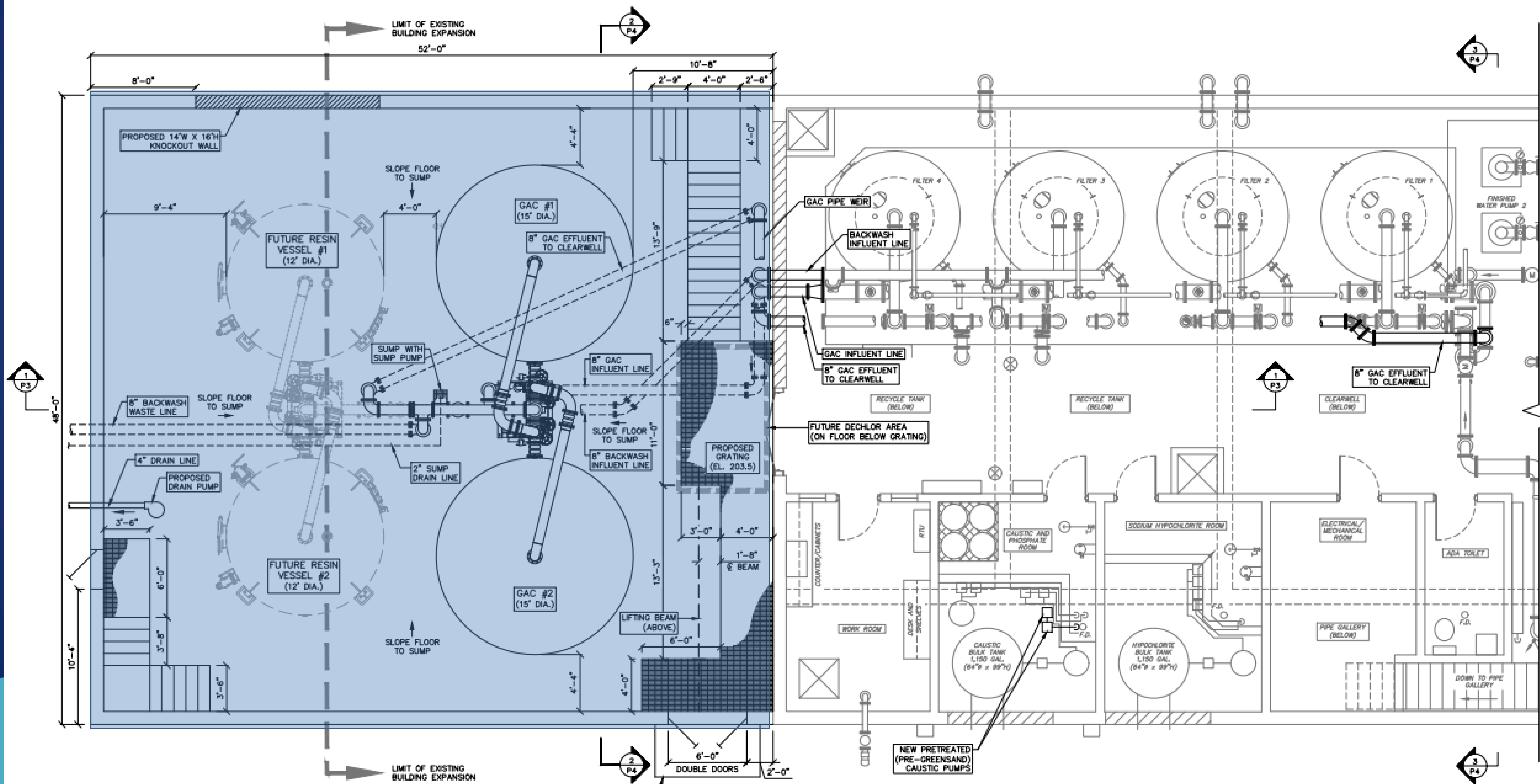
Well 8 PFOA (ppt)



Impact of New Standards

- Now a regulatory requirement to treat
 - Lag Vessels Required
 - Larger WTP's
 - Preliminary estimate – add \$3 million

Well 7 & 8 Addition



Current Capital Projects - Increases

Project	Budget	Additional
Turkey Hill Booster	\$1,300,000	
Wells #4 and #5 PFAS	\$4,160,000	\$1,000,000
Wells #7 and #8 PFAS	\$3,600,000	\$1,500,000
Wells #2 and #3 PFAS	\$6,400,000	\$1,500,000
Wells #3 Fe/Mn	\$4,500,000	
TOTAL	\$19,960,000	\$4,000,000

Total = \$24.0 M
PFAS = \$18.2 M

Technical Review

UNH

Commissioner Comments

Questions?

