BELDEN PLACE P.U.D.

PRELIMINARY PLAT SUBMITTAL

South Minturn Addition: Lots 29, 31 & 32

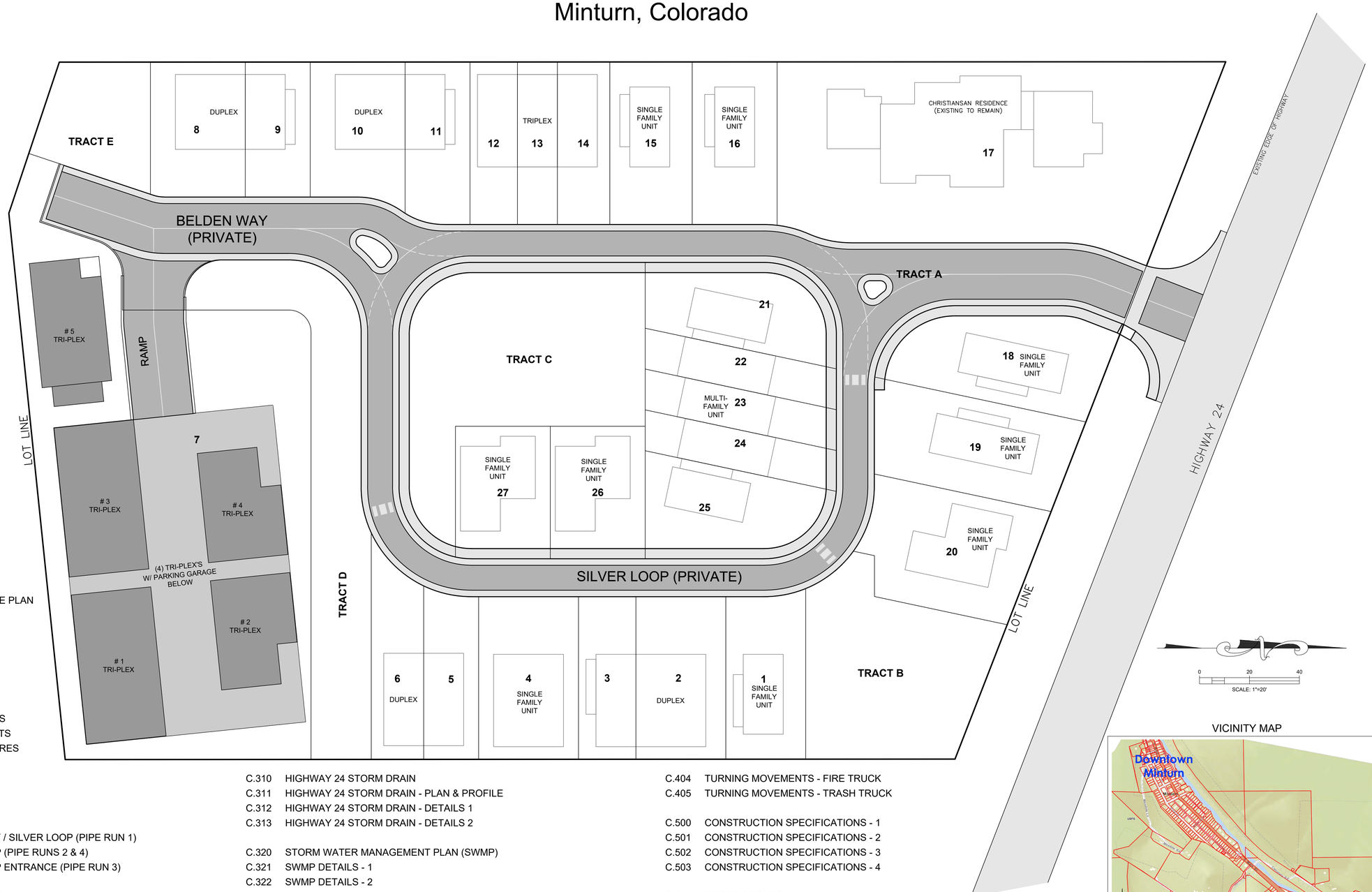
Minturn, Colorado

CONTACTS:

OWNER:
Don Barnes
Miner's Base Camp, LLC.
PO Box 1794
Edwards, CO 81632

OWNER'S REPRESENTATIVE:
Alison Perry
Vail Land Company
PO Box 4691
Eagle County, CO 81631
970 306-2264
vailland.com
perry@vailland.com

PLANNER:
Jena Skinner, AICP
JS Designs
PO Box 116
Minturn, CO 81645-0116
www.jsdvail.com
jsdesign@outlook.com
970 331-9791



SHEET INDEX:

C.000 COVER SHEET

C.100 EXISTING SITE PLAN
C.101 DEMOLITION PLAN

C.110 PROPOSED SITE PLAN
C.111 SNOW REMOVAL & STORAGE PLAN

C.120 LANDSCAPE PLAN
C.121 LANDSCAPE NOTES
C.122 LANDSCAPE DETAILS

C.130 PARCEL MAP
C.131 PARCEL MAP W/ BUILDINGS
C.132 PARCEL MAP W/ EASEMENTS
C.133 WATER & SEWER EASEMENTS
C.134 EASEMENTS W/ SITE FEATURES

C.200 OVERALL UTILITY PLAN
C.201 SHALLOW UTILITY PLAN
C.202 WATER & SEWER PLAN

C.210 WATER P & P - BELDEN WAY / SILVER LOOP (PIPE RUN 1)
C.211 WATER P & P - SILVER LOOP (PIPE RUNS 2 & 4)
C.212 WATER P & P - SILVER LOOP ENTRANCE (PIPE RUN 3)

C.220 SEWER P & P - BELDEN WAY
C.221 SEWER P & P - SILVER LOOP

C.300 GRADING & DRAINAGE PLAN

C.310 HIGHWAY 24 STORM DRAIN
C.311 HIGHWAY 24 STORM DRAIN - PLAN & PROFILE
C.312 HIGHWAY 24 STORM DRAIN - DETAILS 1
C.313 HIGHWAY 24 STORM DRAIN - DETAILS 2

C.320 STORM WATER MANAGEMENT PLAN (SWMP)
C.321 SWMP DETAILS - 1
C.322 SWMP DETAILS - 2

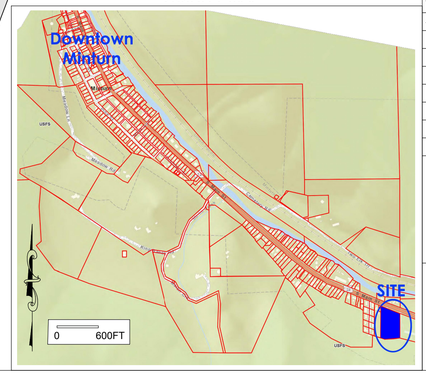
C.400 ROAD P & P - SILVER LOOP ENTRANCE
C.401 ROAD P & P - SILVER LOOP
C.402 ROAD P & P - BELDEN WAY
C.403 ROAD P & P - GARAGE ENTRANCE

C.404 TURNING MOVEMENTS - FIRE TRUCK
C.405 TURNING MOVEMENTS - TRASH TRUCK

C.500 CONSTRUCTION SPECIFICATIONS - 1
C.501 CONSTRUCTION SPECIFICATIONS - 2
C.502 CONSTRUCTION SPECIFICATIONS - 3
C.503 CONSTRUCTION SPECIFICATIONS - 4

C.510 WATER DETAILS - 1
C.511 WATER DETAILS - 2
C.512 SEWER DETAILS

VICINITY MAP



TIMBERLINE ENGINEERING llc CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JAGNOW 39276

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

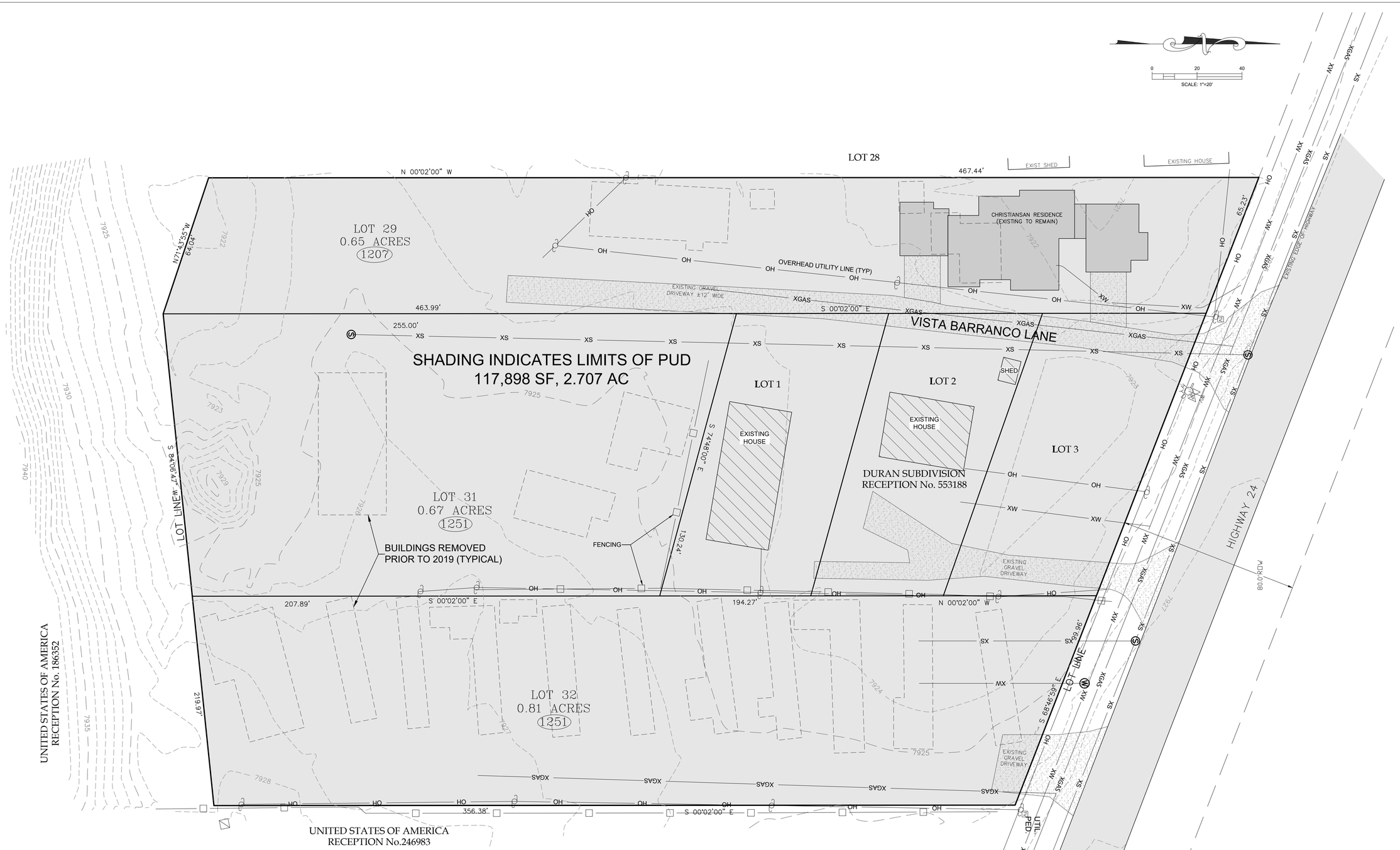
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title: COVER SHEET

Sheet: C.000



CONTOUR LEGEND:

EXISTING 1' CONTOUR — 7929 —

EXISTING 5' CONTOUR — 7930 —

EXISTING UTILITIES LINE KEY:

WATER	XW
SEWER	XS
OVERHEAD ELEC, TELE, CATV	OH
GAS	XGAS

EXISTING UTILITIES SYMBOL KEY:

- WATER VAULT
- WV WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- TV CABLE TV PEDESTAL

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39276

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

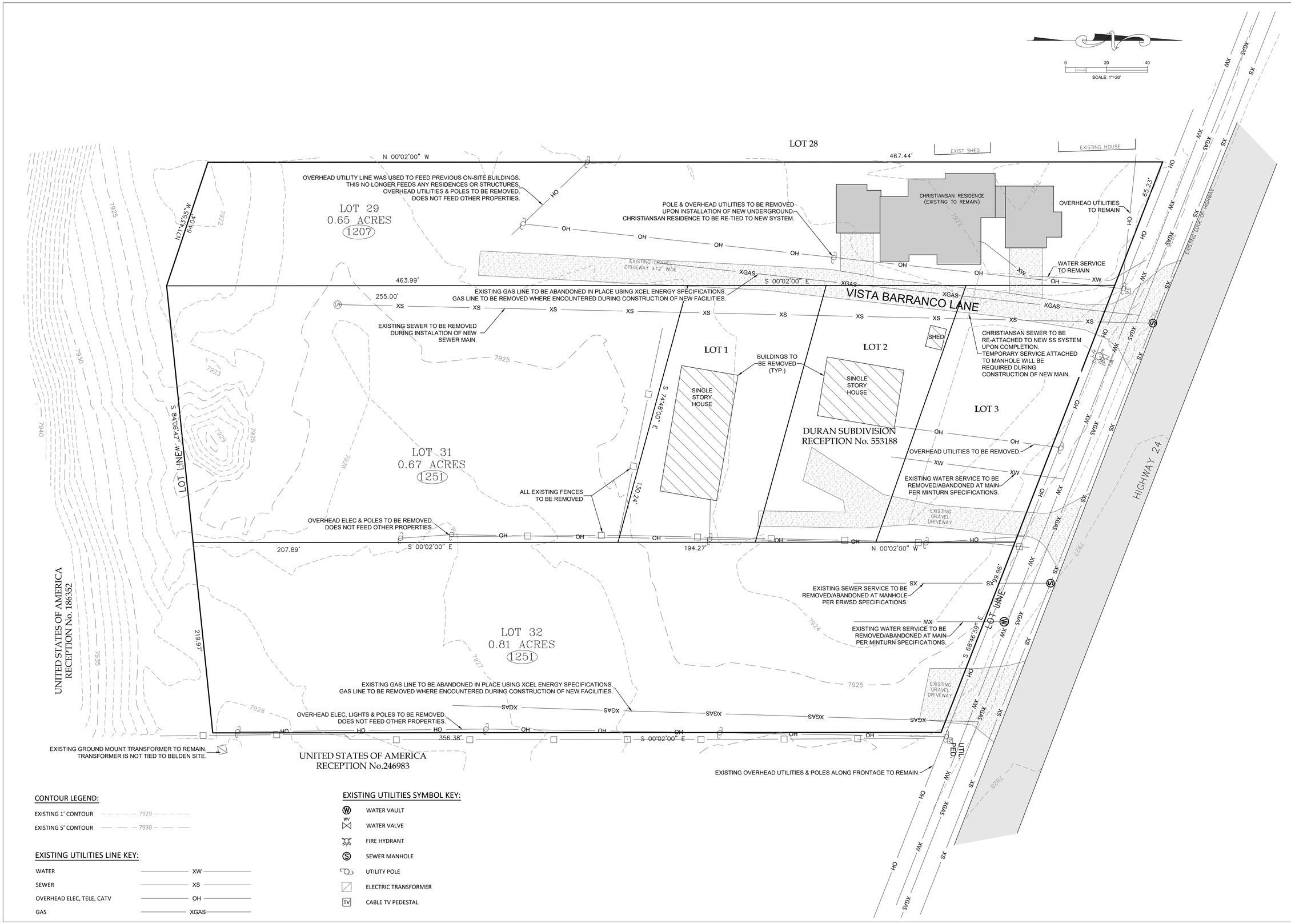
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

EXISTING SITE PLAN

Sheet:

C.100



CONTOUR LEGEND:

EXISTING 1' CONTOUR — 7929

EXISTING 5' CONTOUR — 7930

EXISTING UTILITIES LINE KEY:

WATER	XW
SEWER	XS
OVERHEAD ELEC, TELE, CATV	OH
GAS	XGAS

EXISTING UTILITIES SYMBOL KEY:

- WATER VAULT
- WV WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- TV CABLE TV PEDESTAL

TIMBERLINE ENGINEERING LLC CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JAGNOW 39276

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

DEMOLITION PLAN

Sheet:

C.101

CONTOUR LEGEND:

EXISTING 1' CONTOUR	7929
EXISTING 5' CONTOUR	7930
PROPOSED 1' CONTOUR	7929
PROPOSED 5' CONTOUR	7930

EXISTING UTILITIES LINE KEY:

WATER	XW
SEWER	XS
OVERHEAD ELEC, TELE, CATV	OH
GAS	XGAS

EXISTING UTILITIES SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL

PROPOSED UTILITY SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL
- ELECTRIC SPLICE VAULT
- STREET LIGHT

TRAFFIC CIRCULATION KEY

TRAFFIC FLOW

PARKING NOTES:

PARKING SPACES 9' X 18' MIN.

PROPOSED UTILITY LINE KEY:

WATER	W
SEWER	S

EARTHWORK:
3762 CYD CUT
7020 CYD FILL
3257 CYD NET <FILL>
(DOES NOT INCLUDE ONSITE HAUL-IN ±1000 CYD)

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39276

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

PROPOSED SITE PLAN

Sheet:

C.110

CONTOUR LEGEND:

- EXISTING 1' CONTOUR — 7929
- EXISTING 5' CONTOUR — 7930
- PROPOSED 1' CONTOUR — 7929
- PROPOSED 5' CONTOUR — 7930

PROPOSED UTILITY SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL
- ELECTRIC SPLICE VAULT
- STREET LIGHT

SNOW SYMBOL KEY:

- SNOW STORAGE AREAS
- SNOW REMOVAL ROUTE
- HAND SHOVEL LOCATION

COMMON AREA SNOW STORAGE TABLE

SNOW REMOVAL AREA ID	SNOW REMOVAL AREA	SNOW STORAGE AREA REQUIRED 5%	SNOW STORAGE AREA PROVIDED
	SF	SF	SF
ROAD 1	10695	535	954
ROAD 2	5923	296	608
ROAD 3	2820	141	392
PARKING 1	694	35	50
PARKING 2	1010	51	60
PARKING 3	815	41	50
WALK 1	312	16	25
WALK 2	1296	65	75
WALK 3	268	13	22
TRI-PLEX	4805	240	310

LOT SNOW STORAGE TABLE

LOT ID	PARKING SPACES	AVG. LENGTH	WIDTH	SNOW REMOVAL AREA	SNOW STORAGE AREA REQUIRED 5%	SNOW STORAGE AREA PROVIDED
	QTY	FT	FT	SF	SF	SF
1	2	24	9	436	22	22
2	2	23	9	414	21	22
3	1	23	9	207	10	11
4	2	23	9	414	21	22
5	1	24	9	217	11	11
6	1	34	9	308	15	22
7	0	0	0	0	0	0
8	3	19	9	513	26	26
9	2	19	9	342	17	19
10	3	20	9	540	27	31
11	2	26	9	473	24	28
12	1	23	9	207	10	11
13	1	23	9	207	10	11
14	1	23	9	207	10	11
15	2	23	9	414	21	23
16	2	23	9	414	21	23
17	2	34	16	1094	55	68
18	2	26	9	461	23	25
19	2	25	9	455	23	25
20	2	25	9	456	23	25
21	1	25	9	225	11	13
22	1	24	9	219	11	11
23	1	24	9	219	11	11
24	1	24	9	219	11	11
25	3	27	9	726	36	41
26	2	20	9	351	18	19
27	2	20	9	351	18	19

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JAGNOW 39276

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title: SNOW REMOVAL & STORAGE PLAN

Sheet: C.111

TRACT USES

	TRACT A	TRACT B	TRACT C	TRACT D	TRACT E	LOT 17 EASEMENT
DRAINAGE	X	X	X	X	X	X
ACCESS	X					
OPEN SPACE		X	X	X	X	X
PARKING			X	X		
UTILITIES	X	X	X	X	X	X
SNOW STORAGE		X	X	X	X	X

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39876

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

PARCEL MAP

Sheet:

C.130

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com
p 970.963.9869

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39876

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

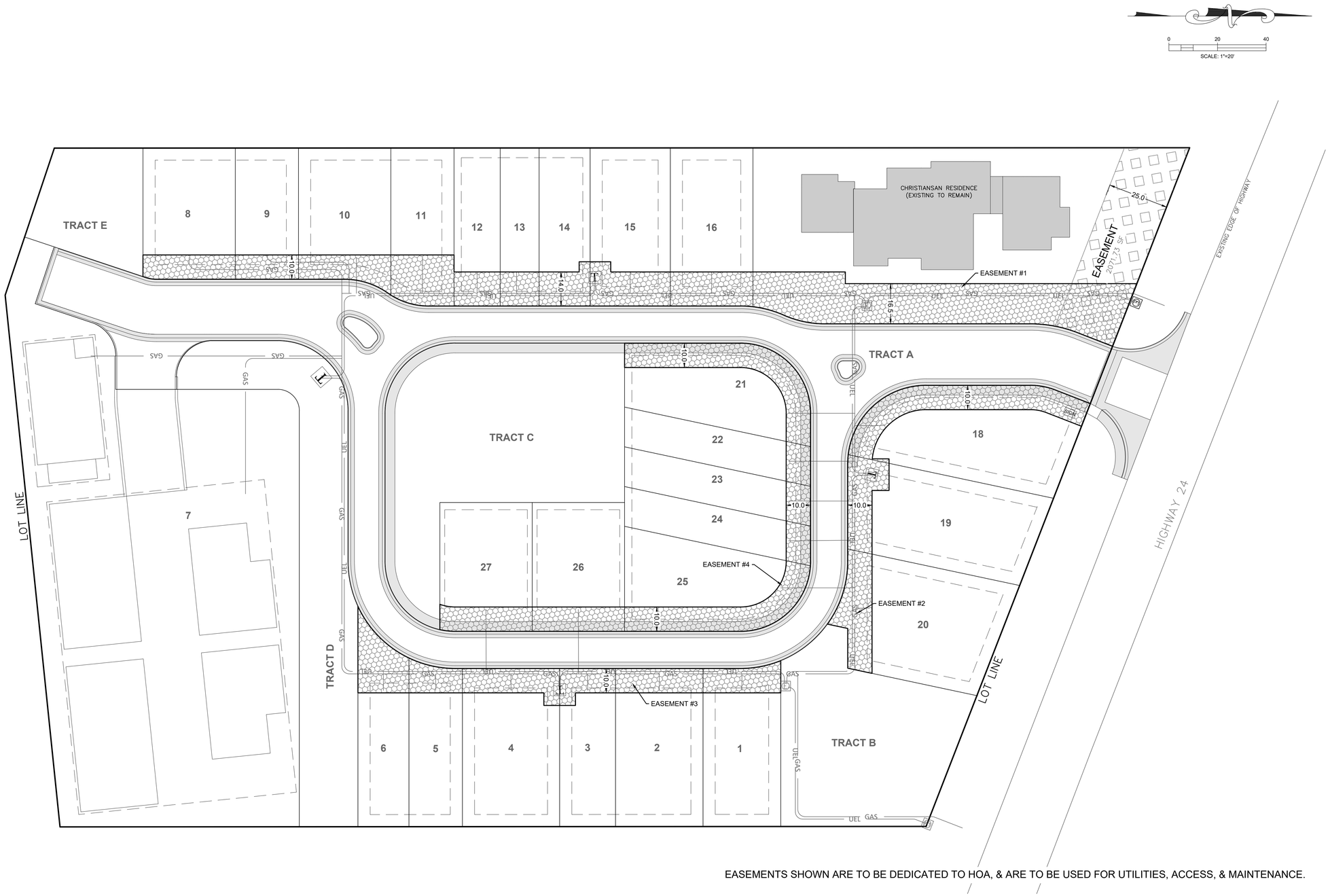
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

PARCEL MAP W/ BUILDINGS

Sheet:

C.131



EASEMENTS SHOWN ARE TO BE DEDICATED TO HOA, & ARE TO BE USED FOR UTILITIES, ACCESS, & MAINTENANCE.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39876

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

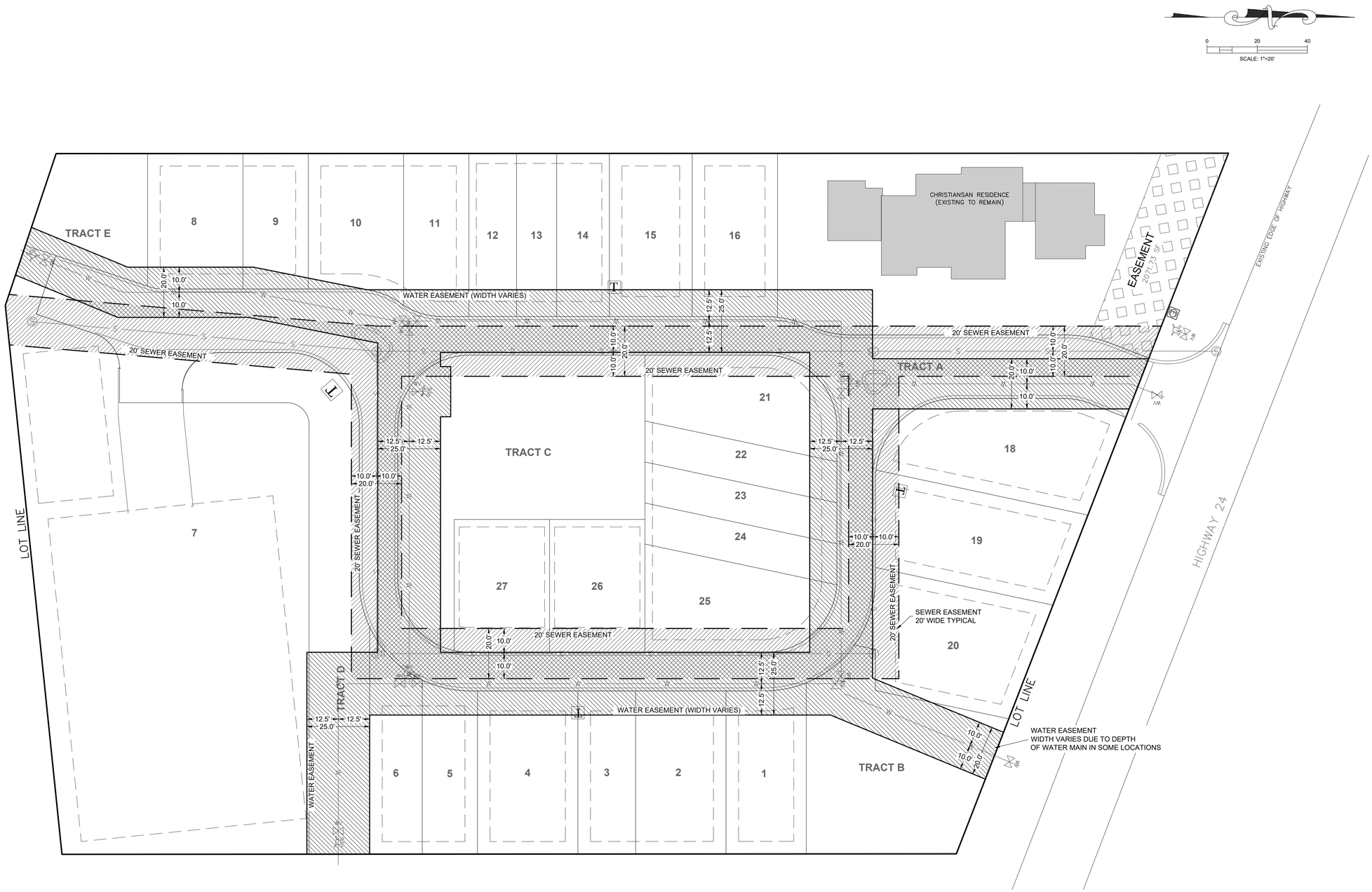
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

PARCEL MAP W/ EASEMENTS

Sheet:

C.132



A NON-EXCLUSIVE WATER EASEMENT, AS SHOWN, IS TO BE DEDICATED TO THE TOWN OF MINTURN FOR MAINTENANCE & OPERATION OF THE WATER SYSTEM.
A NON-EXCLUSIVE SEWER EASEMENT, AS SHOWN, IS TO BE DEDICATED TO THE EAGLE RIVER WATER & SANITATION DISTRICT FOR MAINTENANCE & OPERATION OF THE SEWER SYSTEM.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com
p 970.963.9869

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAMESON
39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

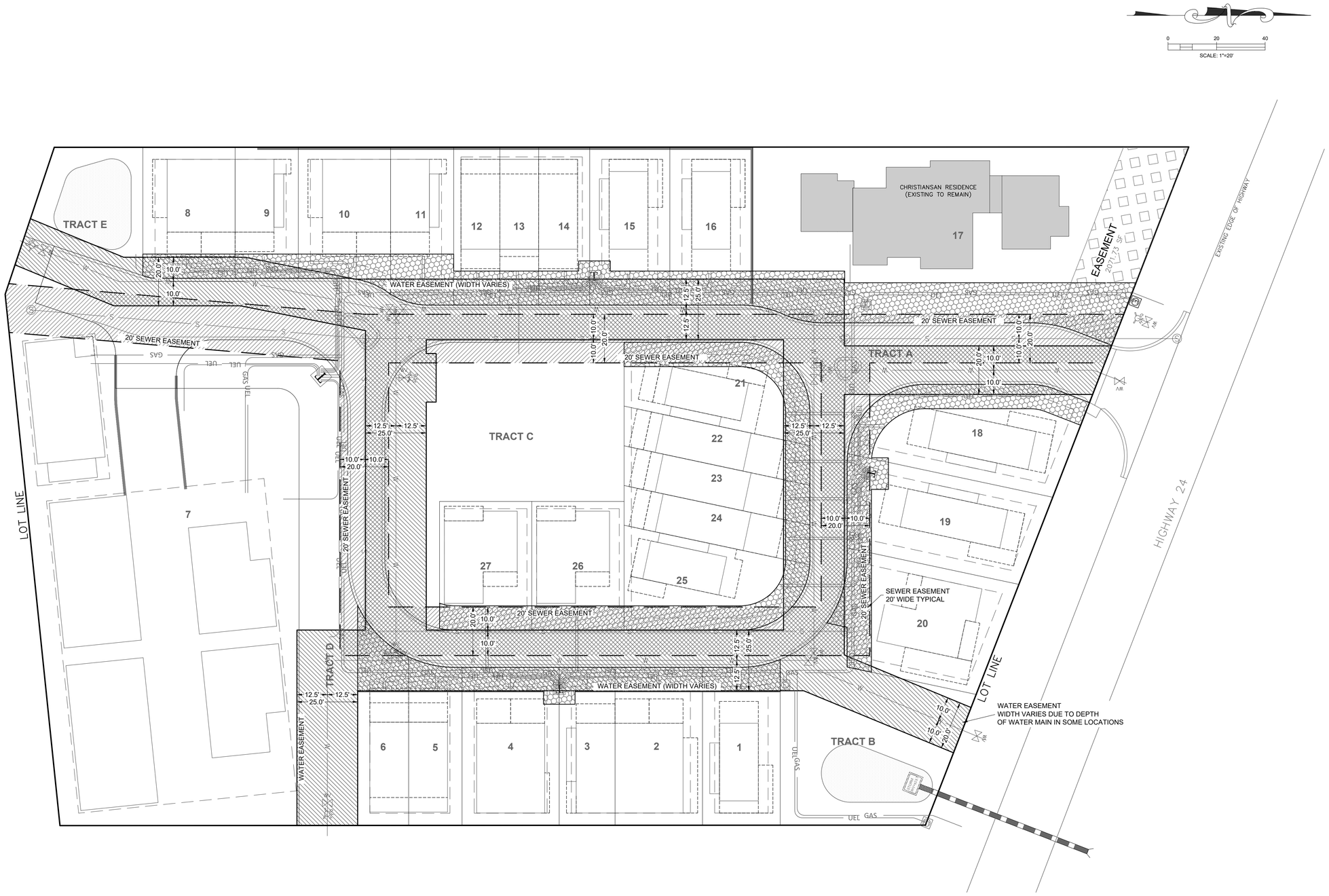
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

WATER & SEWER EASEMENTS

Sheet:

C.133



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAMESON
39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

EASEMENTS WITH SITE FEATURES

Sheet:

C.134

CONTOUR LEGEND:

EXISTING 1' CONTOUR	7929
EXISTING 5' CONTOUR	7930
PROPOSED 1' CONTOUR	7929
PROPOSED 5' CONTOUR	7930

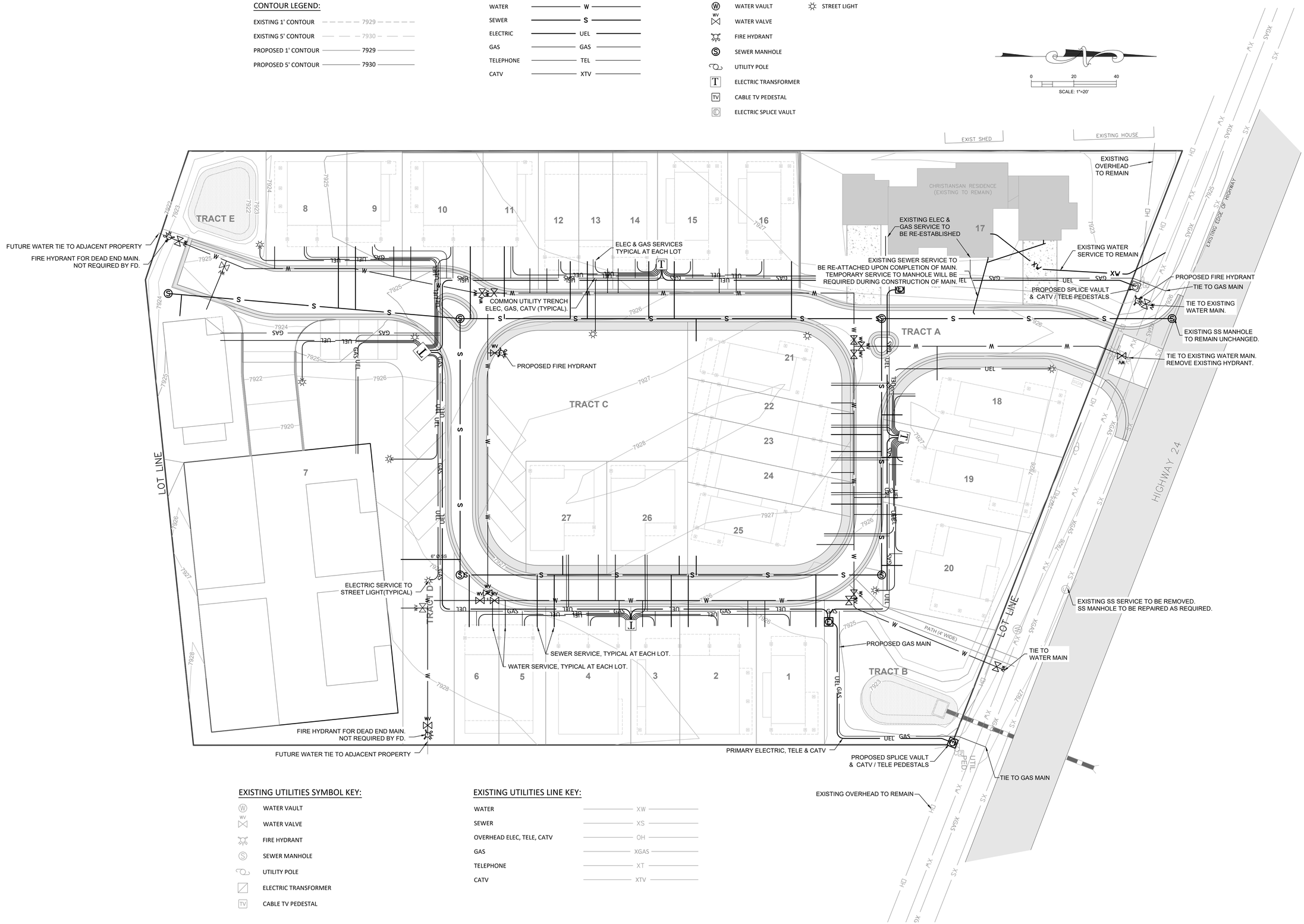
PROPOSED UTILITY LINE KEY:

WATER	W
SEWER	S
ELECTRIC	UEL
GAS	GAS
TELEPHONE	TEL
CATV	XTV

PROPOSED UTILITY SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL
- ELECTRIC SPLICE VAULT
- STREET LIGHT

0 20 40
SCALE: 1"=20'



EXISTING UTILITIES SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL

EXISTING UTILITIES LINE KEY:

WATER	XW
SEWER	XS
OVERHEAD ELEC, TELE, CATV	OH
GAS	XGAS
TELEPHONE	XT
CATV	XTV

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39876

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

OVERALL UTILITY PLAN

Sheet:

C.200

CONTOUR LEGEND:

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- PROPOSED 1' CONTOUR — 7929
- PROPOSED 5' CONTOUR — 7930

PROPOSED UTILITY LINE KEY:

- WATER — W
- SEWER — S
- ELECTRIC — UEL
- GAS — GAS
- TELEPHONE — TEL
- CATV — CTV

PROPOSED UTILITY SYMBOL KEY:

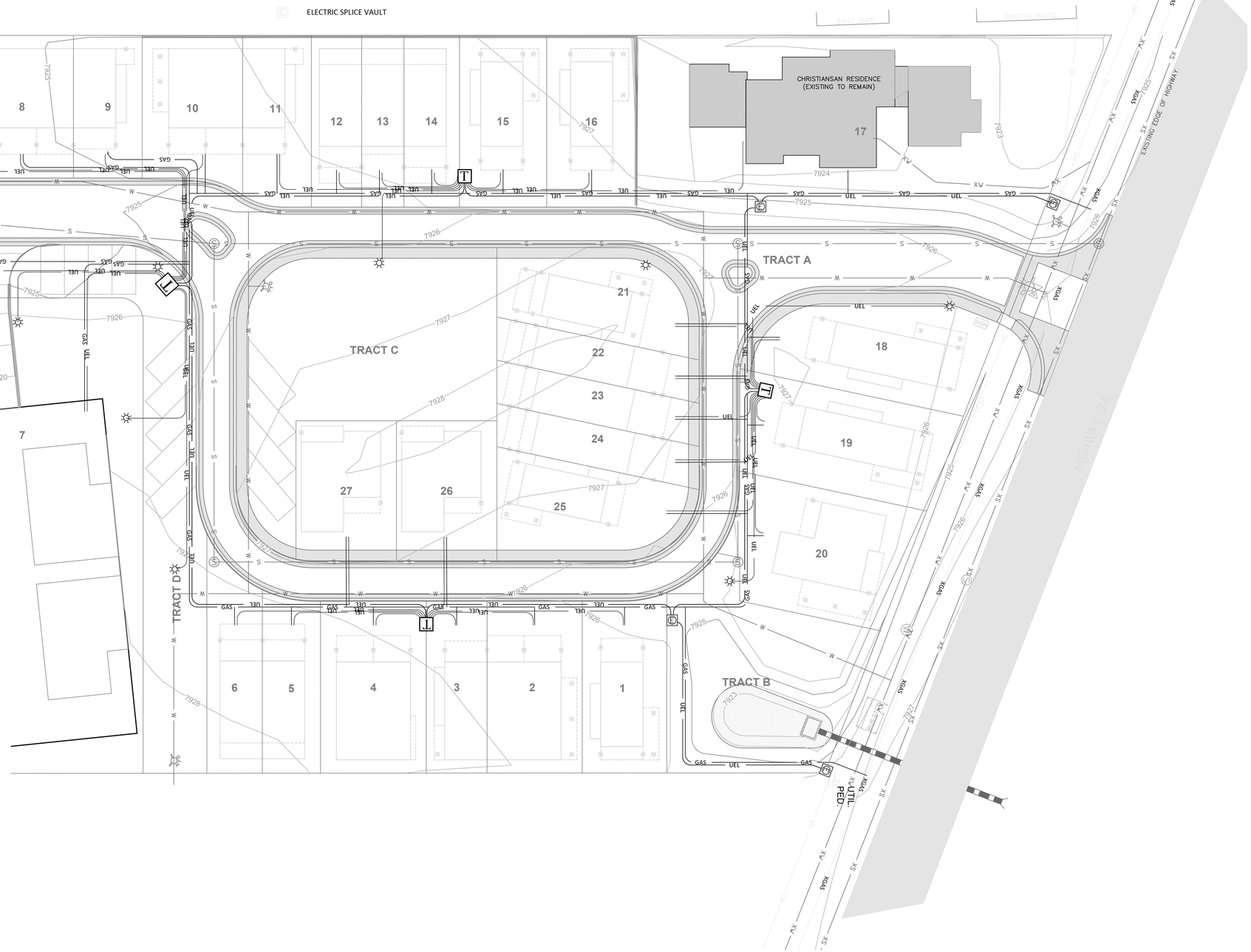
- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL
- ELECTRIC SPLICE VAULT
- STREET LIGHT

EXISTING UTILITIES LINE KEY:

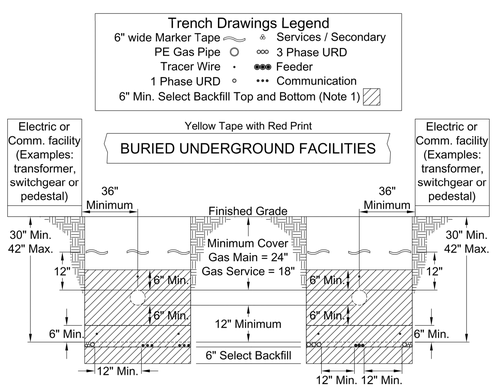
- WATER — XW
- SEWER — XS
- OVERHEAD ELEC, TELE, CATV — OH
- GAS — XGAS
- TELEPHONE — XT
- CATV — XTV

EXISTING UTILITIES SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL



JOINT TRENCH CROSS-SECTION PRIMARY AND SECONDARY CABLES WITH GAS AND/OR COMMUNICATION



Notes:

1. Where large rock or gravel is encountered, select backfill is required in the bottom of the trench. Select backfill must be a minimum of 6" deep from the top and bottom of the cable and gas pipe.
2. All trench backfill is to be compacted. All local codes must be followed.
3. For ease of construction and future maintenance, primary cable should be 12-24" from communication cables.
4. Electric cables must be separated from communication cables by a minimum of 12" horizontal (Reference NESC 354.D.3.a).
5. 30" minimum trench width should be used when all four types of utilities (Electric, Gas, TV, Phone) are included.
6. Steel gas pipe or steel duct is not allowed for joint trench construction.
7. Steel gas lines and buried electric lines installed in separate, parallel trenches should be separated by 24".
8. When parallel circuits are installed in any trench wider than 18", a separate buried marker tape shall be installed.
9. 600 A electric distribution (feeder) cable shall not be installed in the same trench with gas.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal
4/19/21	

Title:

SHALLOW UTILITY PLAN

Sheet:

C.201

CONTOUR LEGEND:

EXISTING 1' CONTOUR	7929
EXISTING 5' CONTOUR	7930
PROPOSED 1' CONTOUR	7929
PROPOSED 5' CONTOUR	7930

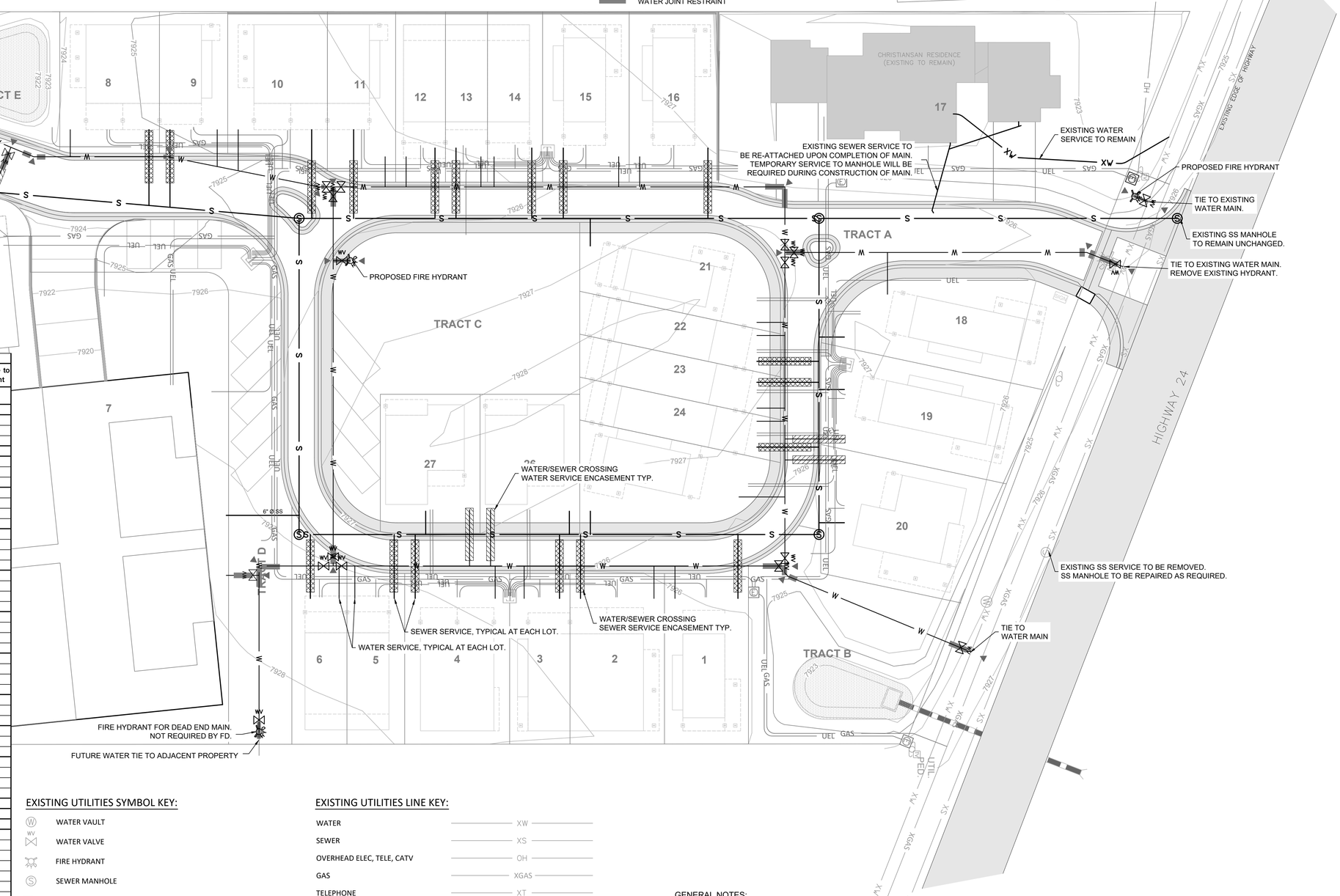
PROPOSED UTILITY LINE KEY:

WATER	W
SEWER	S
ELECTRIC	UEL
GAS	GAS

PROPOSED UTILITY SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL
- ELECTRIC SPLICE VAULT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- STREET LIGHT

SCALE: 1"=20'



Belden Fireflow Calculations

Unit Number	Residence Classification	Area	Building Type	Fire-Flow Required	Distance to Hydrant
		SF		GPM @ 20 psi Residual	FT
Lot 1	Single Family	1,849	V	1,500	190
Lot 2	Duplex	2,998	V	1,500	166
Lot 3	Duplex	1,684	V	1,500	158
	Total	4,682		1,750	
Lot 4	Single Family	2,998	V	1,500	145
Lot 5	Duplex	1,536	V	1,500	142
Lot 6	Duplex	1,536	V	1,500	142
	Total	3,072		1,500	
Lot 7 - Unit 1	Multi Family Unit	1,018	V	1,500	91
Lot 7 - Unit 2	Multi Family Unit	1,018	V	1,500	91
Lot 7 - Unit 3	Multi Family Unit	1,525	V	1,500	91
	Total	3,561		1,500	
Lot 7 - Unit 4	Multi Family Unit	1,525	V	1,500	123
Lot 7 - Unit 5	Multi Family Unit	1,268	V	1,500	123
Lot 7 - Unit 6	Multi Family Unit	1,268	V	1,500	123
	Total	4,061		1,750	
Lot 7 - Unit 7	Multi Family Unit	1,732	V	1,500	128
Lot 7 - Unit 8	Multi Family Unit	1,732	V	1,500	128
Lot 7 - Unit 9	Multi Family Unit	1,268	V	1,500	128
	Total	4,732		1,750	
Lot 7 - Unit 10	Multi Family Unit	1,268	V	1,500	129
Lot 7 - Unit 11	Multi Family Unit	1,908	V	1,500	129
Lot 7 - Unit 12	Multi Family Unit	1,908	V	1,500	129
	Total	5,084		2,000	
Lot 7 - Unit 13	Multi Family Unit	1,428	V	1,500	160
Lot 7 - Unit 14	Multi Family Unit	1,284	V	1,500	160
Lot 7 - Unit 15	Multi Family Unit	1,140	V	1,500	160
	Total	3,852		1,750	
Lot 8	Duplex	2,400	V	1,500	95
Lot 9	Duplex	1,556	V	1,500	83
	Total	3,956		1,750	
Lot 10	Duplex	2,400	V	1,500	61
Lot 11	Duplex	1,556	V	1,500	60
	Total	3,956		1,750	
Lot 12	Triplex	1,436	V	1,500	57
Lot 13	Triplex	1,408	V	1,500	65
Lot 14	Triplex	1,536	V	1,500	75
	Total	4,380		1,750	
Lot 15	Single Family	1,849	V	1,500	97
Lot 16	Single Family	1,849	V	1,500	127
Lot 17 W/ ADU	Single Family	2,120	V	1,500	44
Lot 18	Single Family	2,120	V	1,500	63
Lot 19	Single Family	2,120	V	1,500	96
Lot 20	Single Family	2,063	V	1,500	129
Lot 21	Multi-Family	1,849	V	1,500	105
Lot 22	Multi-Family	1,888	V	1,500	105
Lot 23	Multi-Family	1,888	V	1,500	109
Lot 24	Multi-Family	1,888	V	1,500	115
Lot 25	Multi-Family	1,849	V	1,500	120
	Total	15,665		3,500	
Lot 26	Single Family	1,410	V	1,500	79
Lot 27	Single Family	1,410	V	1,500	61

Hydrant Test Results Location - 1251 E. Main St.

Static Pressure 70 psi — Measured Flow Rate 843 gpm

Residual Pressure 60 psi — Calculated Flow Rate @ 20 psi 2011 gpm

Tested by: John Volk, WQPC, LLC. 970 389-4491

EXISTING UTILITIES SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL

EXISTING UTILITIES LINE KEY:

WATER	XW
SEWER	XS
OVERHEAD ELEC, TELE, CATV	OH
GAS	XGAS
TELEPHONE	XT
CATV	XTV

GENERAL NOTES:

1. ALL SS SERVICES ARE TO BE 4" Ø UNLESS NOTED OTHERWISE.
2. ALL SS & WATER SERVICES TO BE WET TAPPED AFTER CONSTRUCTION & ACCEPTANCE OF THE MAIN LINES.
3. ALL WATER MAINS TO BE 8" DUCTILE IRON PIPE PRESSURE CLASS 350 PSI - SEE SHEETS C.210-C.212.
4. SEE C.220-C.221 FOR SEWER PLANS & PROFILES.
5. ALL WATER & SEWER CONSTRUCTION TO ADHERE TO EAGLE RIVER WATER & SEWER DISTRICT (ERWSD) STANDARDS.

TIMBERLINE ENGINEERING LLC — CIVIL STRUCTURAL
PO Box 842 Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER — DAVID JOHN JAGNOW — 39876

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title: WATER & SEWER PLAN

Sheet: C.202

SCALE: 1"=20'

PROPOSED UTILITY LINE KEY:

WATER — W —

SEWER — S —

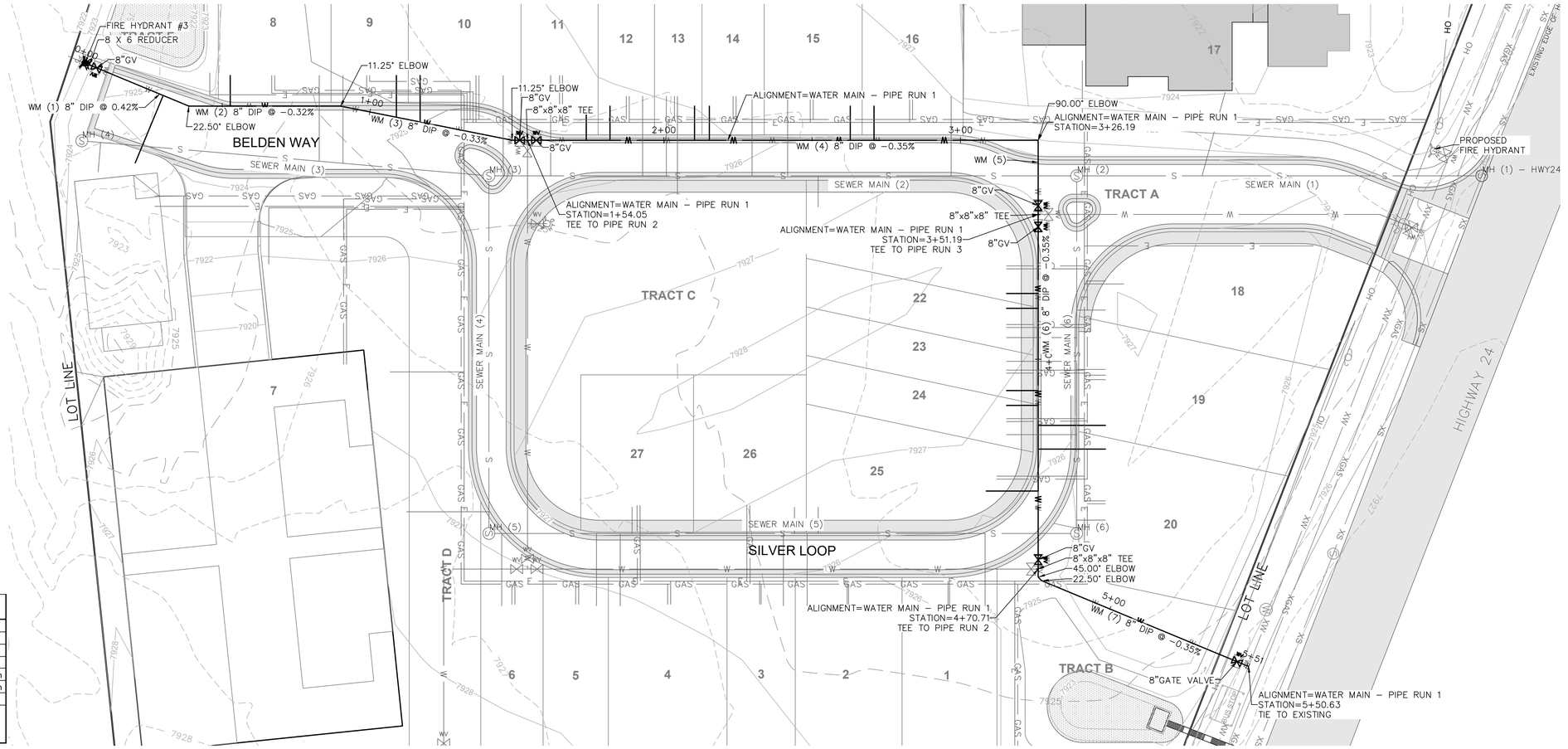
PROPOSED UTILITY SYMBOL KEY:

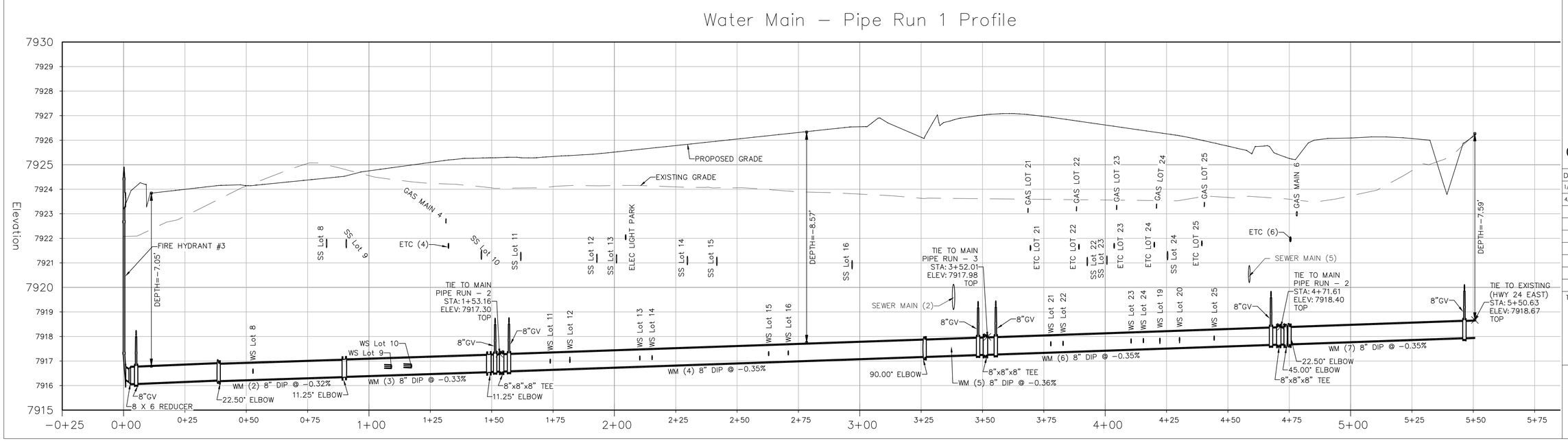
- WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

CONTOUR LEGEND:

- EXISTING 1' CONTOUR — 7929
- EXISTING 5' CONTOUR — 7930
- PROPOSED 1' CONTOUR — 7929
- PROPOSED 5' CONTOUR — 7930

Fitting Type	Nominal Size (inch)	Branch Size (inch)	Restraint Length (Ft)	Notes
11 1/4° Horizontal Bend	8	-	1	
22 1/2° Horizontal Bend	8	-	2	
45° Horizontal Bend	8	-	3	
90° Horizontal Bend	8	-	7	
T	8	8	14	on branch
T	8	6	11	on branch
Reducer	8	6	6	on 8"
Fire Hydrant	RESTRAIN ALL JOINTS ON HYDRANT TEE, HYDRANT VALVE, AND HYDRANT LEAD. THRUST BLOCKS REQUIRED AT ALL LOCATIONS			





TIMBERLINE ENGINEERING LLC CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JAGNOW 39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

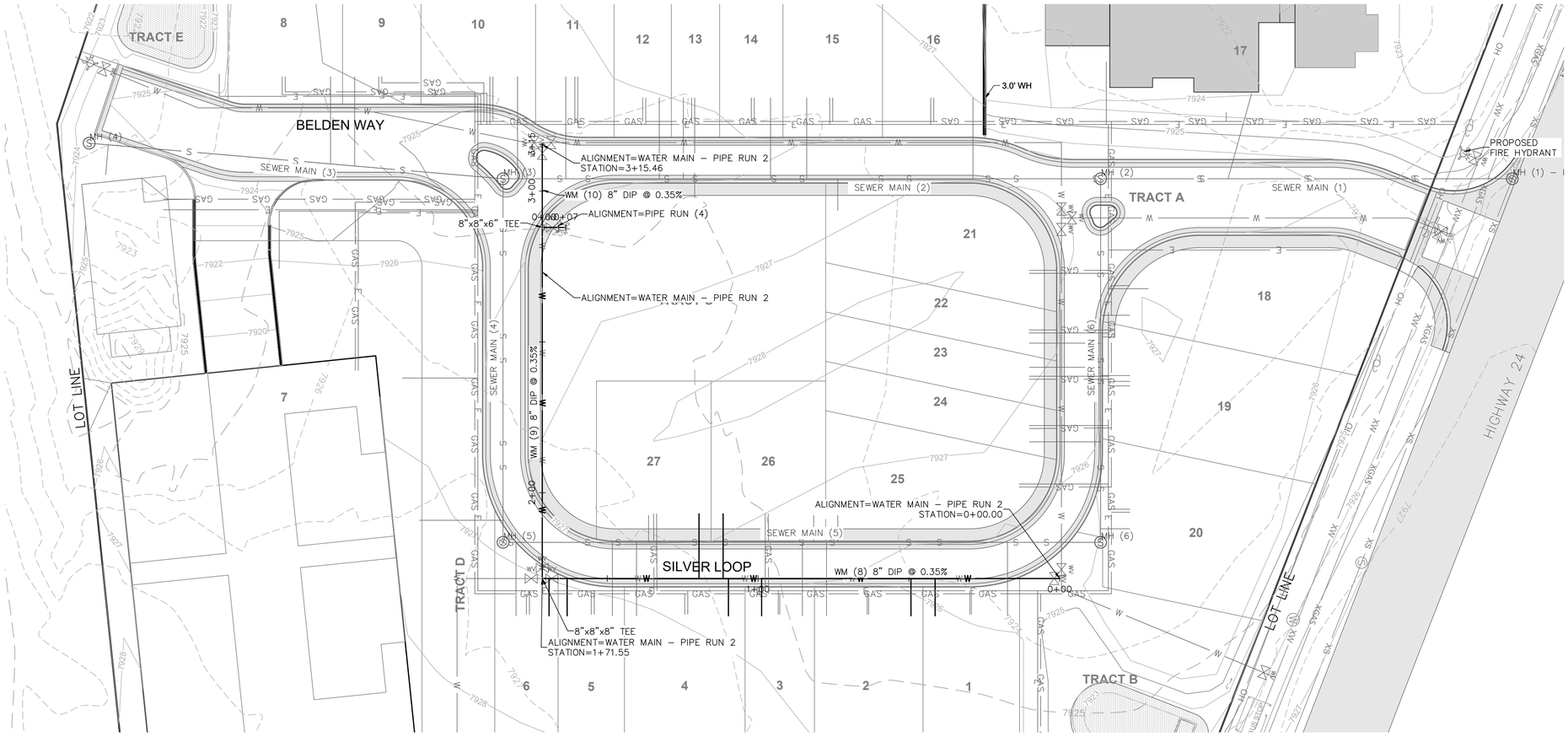
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title: WATER P & P BELDEN WAY / SILVER LOOP (PIPE RUN 1)

Sheet: C.210



SCALE: 1"=20'

PROPOSED UTILITY LINE KEY:

WATER — W —

SEWER — S —

PROPOSED UTILITY SYMBOL KEY:

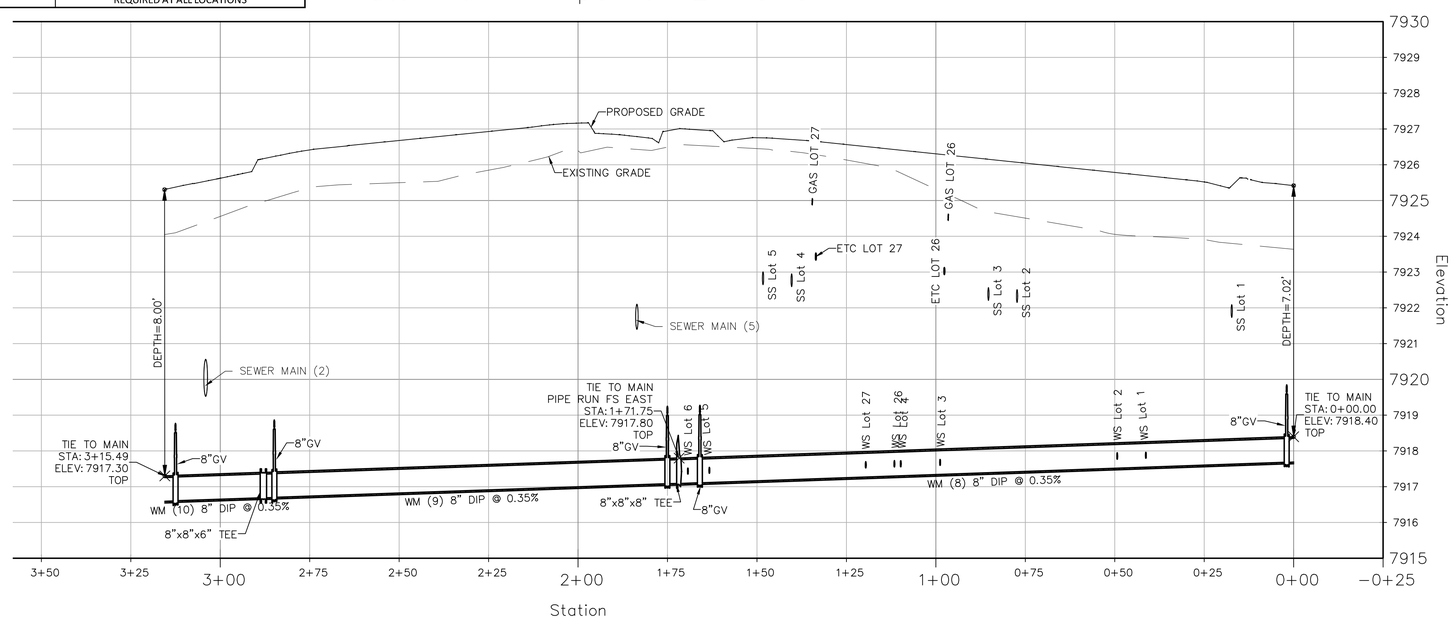
- WV — WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

CONTOUR LEGEND:

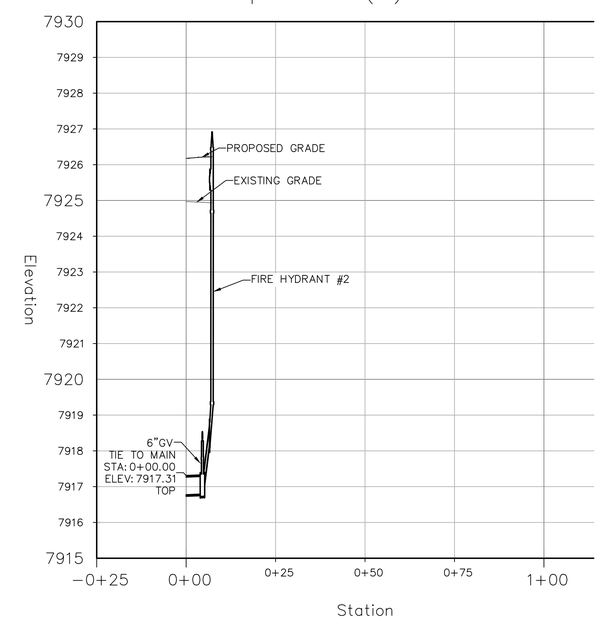
- EXISTING 1' CONTOUR — 7929
- EXISTING 5' CONTOUR — 7930
- PROPOSED 1' CONTOUR — 7929
- PROPOSED 5' CONTOUR — 7930

Fitting Type	Nominal Size (inch)	Branch Size (inch)	Restraint Length (Ft)	Notes
11 1/4° Horizontal Bend	8	-	1	
22 1/2° Horizontal Bend	8	-	2	
45° Horizontal Bend	8	-	3	
90° Horizontal Bend	8	-	7	
T	8	8	14	on branch
T	8	6	11	on branch
Reducer	8	6	6	on 8"
Fire Hydrant	RESTRAIN ALL JOINTS ON HYDRANT TEE, HYDRANT VALVE, AND HYDRANT LEAD. THRUST BLOCKS REQUIRED AT ALL LOCATIONS			

Water Main – Pipe Run 2 Profile



Pipe Run (4) Profile



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

WATER P & P
SILVER LOOP
(PIPE RUNS 2 & 4)

Sheet:

C.211

SCALE: 1"=20'

PROPOSED UTILITY LINE KEY:

WATER — W —

SEWER — S —

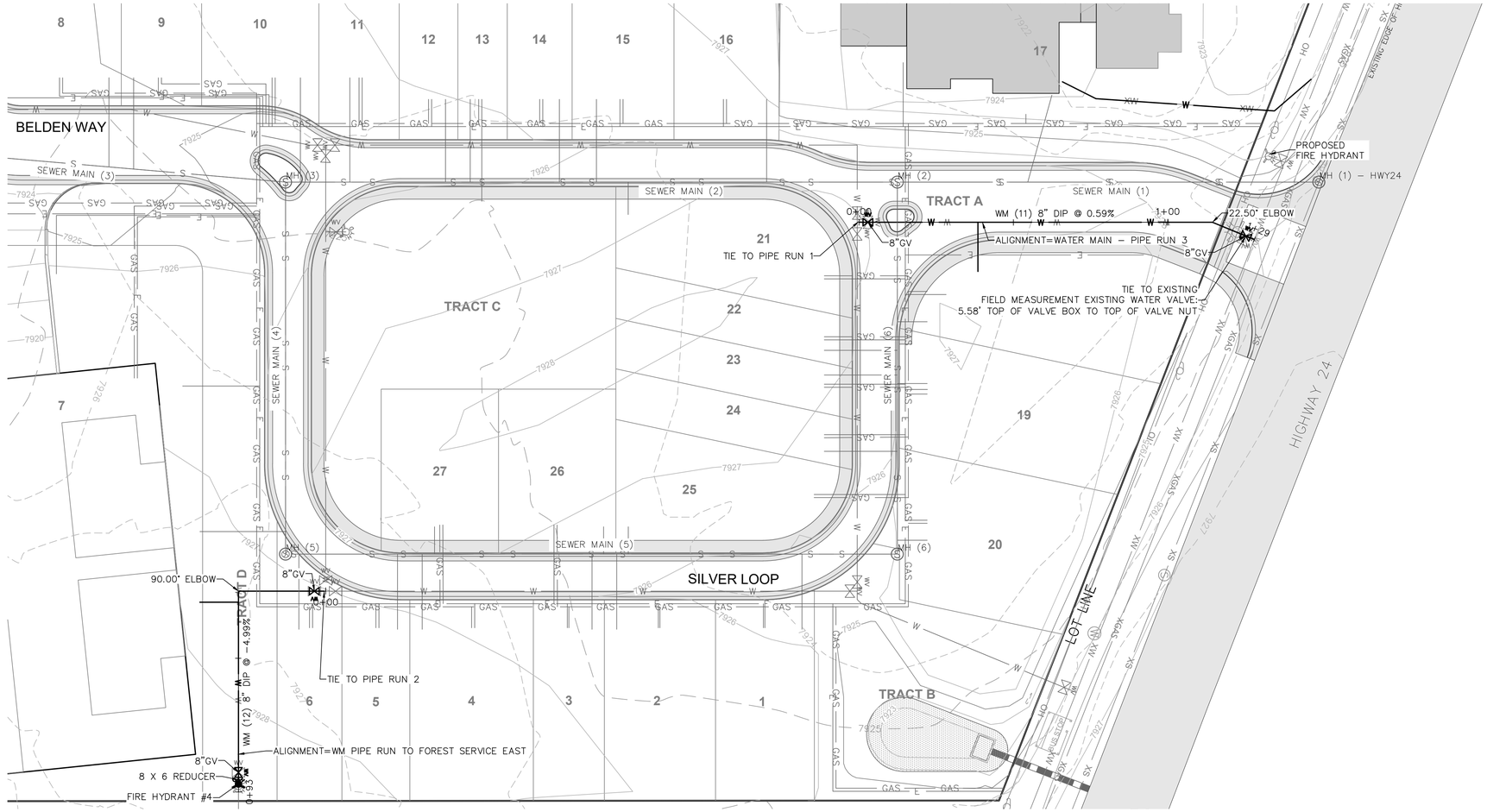
PROPOSED UTILITY SYMBOL KEY:

- WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

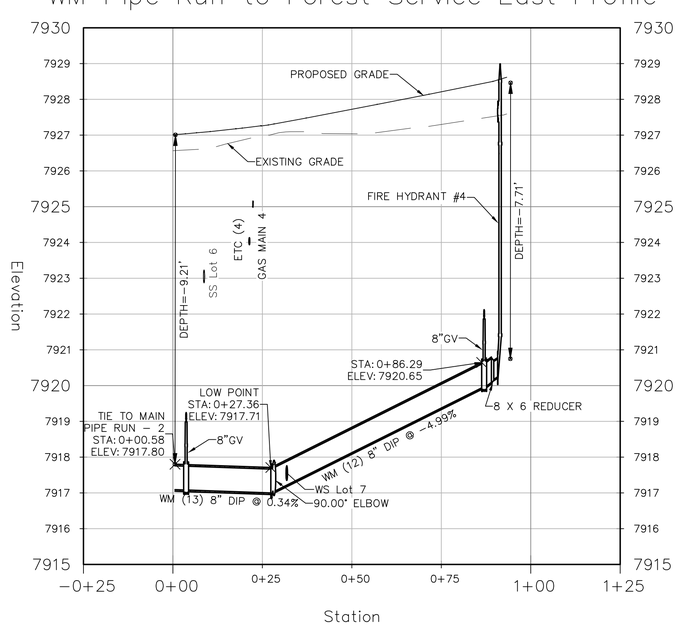
CONTOUR LEGEND:

- EXISTING 1' CONTOUR — 7929
- EXISTING 5' CONTOUR — 7930
- PROPOSED 1' CONTOUR — 7929
- PROPOSED 5' CONTOUR — 7930

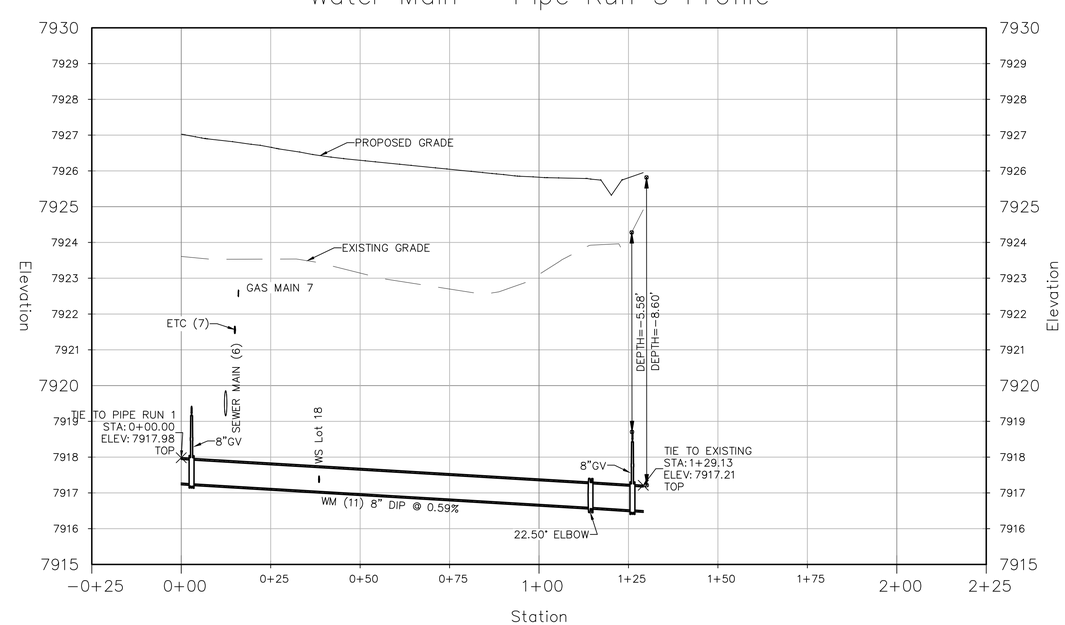
Fitting Type	Nominal Size (inch)	Branch Size (inch)	Restraint Length (Ft)	Notes
11 1/4° Horizontal Bend	8	-	1	
22 1/2° Horizontal Bend	8	-	2	
45° Horizontal Bend	8	-	3	
90° Horizontal Bend	8	-	7	
T	8	8	14	on branch
T	8	6	11	on branch
Reducer	8	6	6	on 8"
Fire Hydrant	RESTRAIN ALL JOINTS ON HYDRANT TEE, HYDRANT VALVE, AND HYDRANT LEAD. THRUST BLOCKS REQUIRED AT ALL LOCATIONS			



WM Pipe Run to Forest Service East Profile



Water Main – Pipe Run 3 Profile



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JACKSON
39275

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

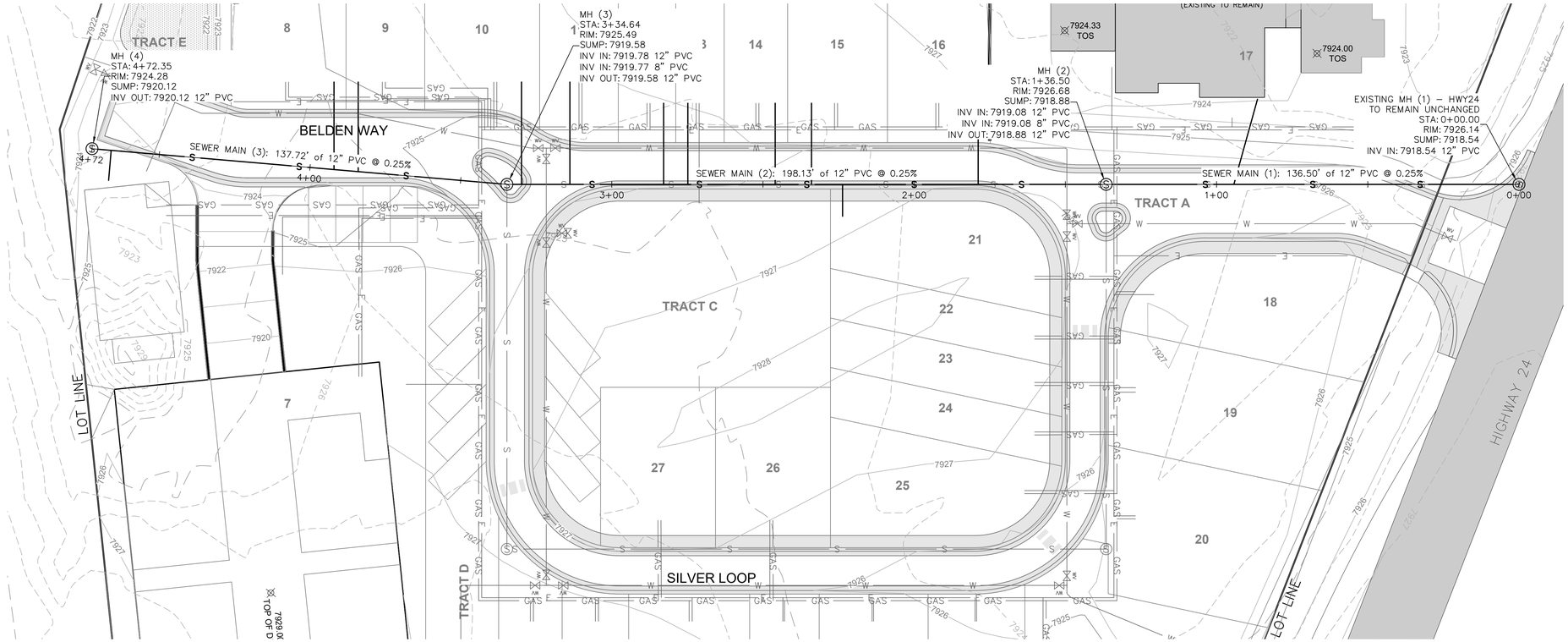
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
WATER P & P
SILVER LOOP
ENTRANCE
(PIPE RUN 3)

Sheet:
C.212



PROPOSED UTILITY LINE KEY:

WATER — W —

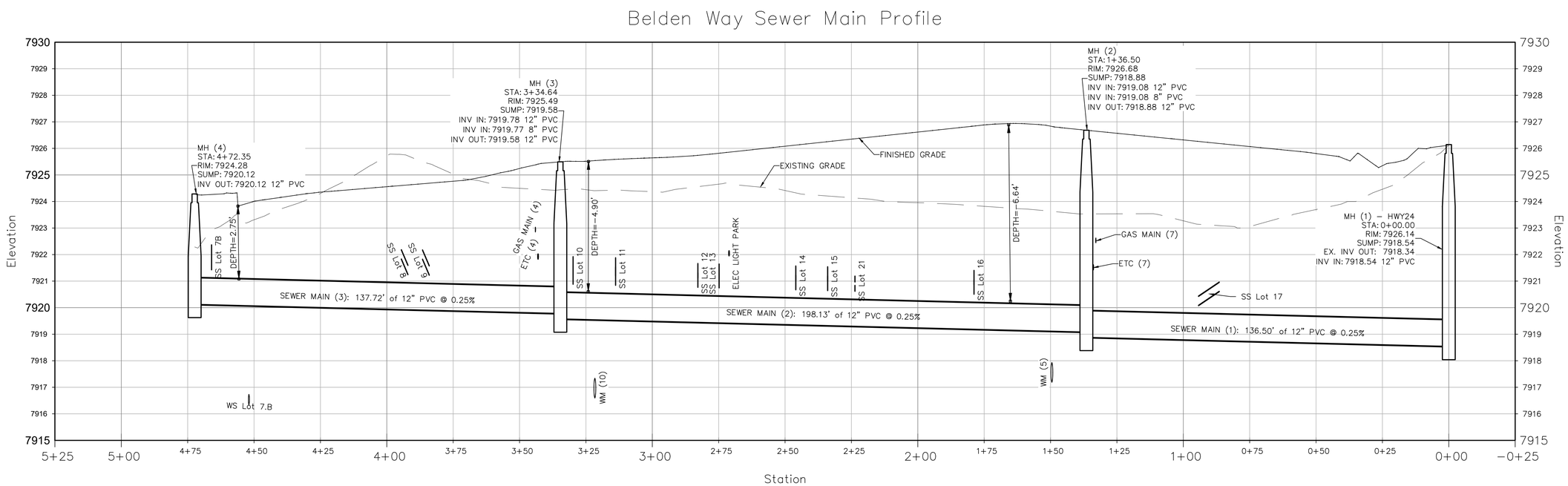
SEWER — S —

PROPOSED UTILITY SYMBOL KEY:

- WV — WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

CONTOUR LEGEND:

- EXISTING 1' CONTOUR — 7929
- EXISTING 5' CONTOUR — 7930
- PROPOSED 1' CONTOUR — 7929
- PROPOSED 5' CONTOUR — 7930



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JACKSON
39976

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

SEWER P & P
BELDEN WAY

Sheet:

C.220

SCALE: 1"=20'

PROPOSED UTILITY LINE KEY:

WATER — W —

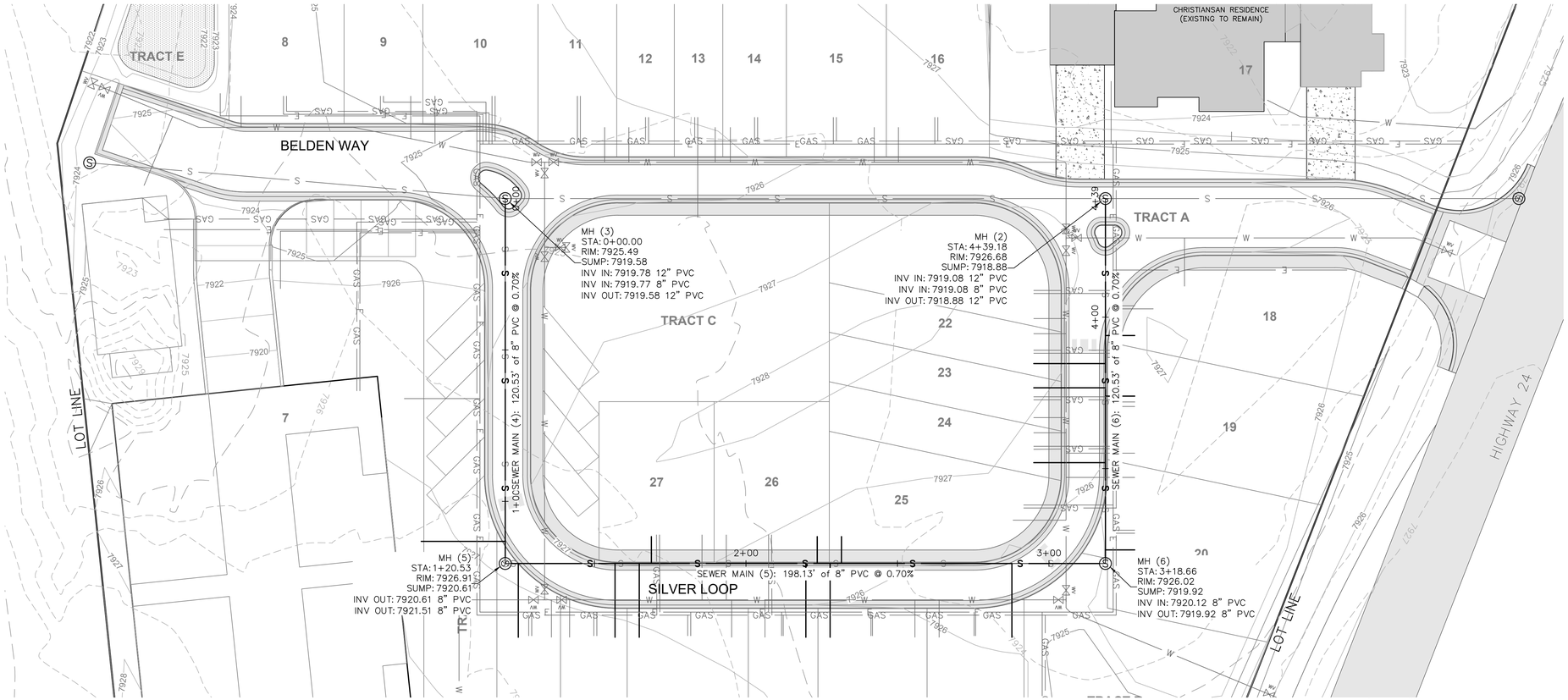
SEWER — S —

PROPOSED UTILITY SYMBOL KEY:

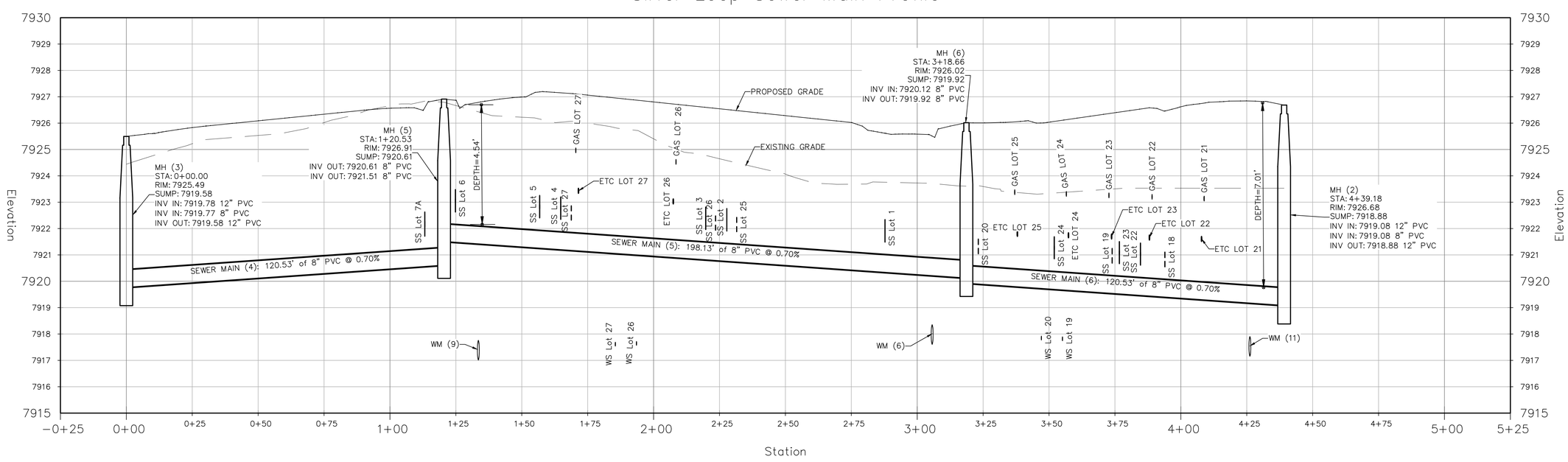
- WV WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

CONTOUR LEGEND:

- EXISTING 1' CONTOUR — 7929 —
- EXISTING 5' CONTOUR — 7930 —
- PROPOSED 1' CONTOUR — 7929 —
- PROPOSED 5' CONTOUR — 7930 —



Silver Loop Sewer Main Profile



TIMBERLINE ENGINEERING LLC CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JACKSON 39976

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

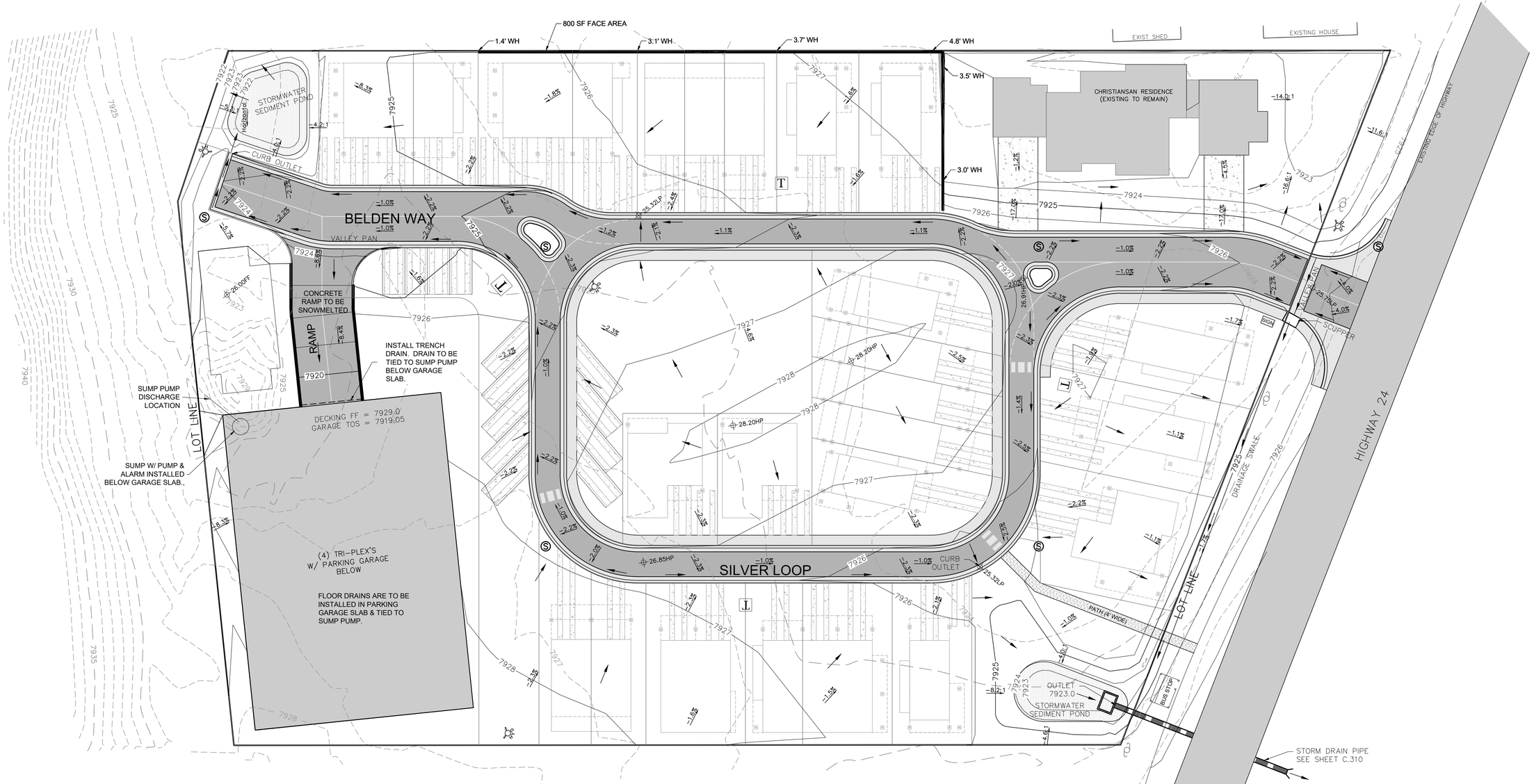
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

SEWER P & P
SILVER LOOP

Sheet:

C.221



PROPOSED UTILITY SYMBOL KEY:

- WATER VAULT
- WATER VALVE
- FIRE HYDRANT
- SEWER MANHOLE
- UTILITY POLE
- ELECTRIC TRANSFORMER
- CABLE TV PEDESTAL
- ELECTRIC SPLICE VAULT
- STREET LIGHT

ABBREVIATION KEY

AD	= AREA DRAIN
CFS	= CUBIC FEET PER SECOND
CONC	= CONCRETE
EC	= EDGE OF CONCRETE
EOA	= EDGE OF ASPHALT
EP	= EDGE OF PAVEMENT
EX	= EXISTING
FF	= FINISHED FLOOR
FG	= FINISHED GRADE
FL	= FLOW LINE
GD	= GRADE/GROUND
HP	= HIGH POINT
LP	= LOW POINT
TBC	= TOP BACK OF CURB
TD	= TRENCH DRAIN
TOS	= TOP OF SLAB
TOW	= TOP OF WALL
TYP	= TYPICAL
WH	= WALL HEIGHT

CONTOUR LEGEND:

EXISTING 1' CONTOUR	7929
EXISTING 5' CONTOUR	7930
PROPOSED 1' CONTOUR	7929
PROPOSED 5' CONTOUR	7930

INDICATES DIRECTION OF SURFACE DRAINAGE

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39276

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

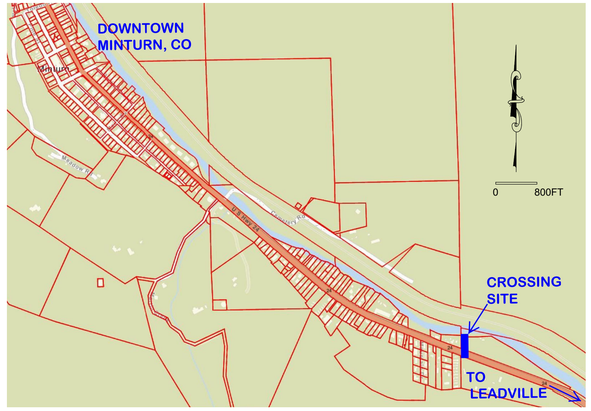
Title:

GRADING & DRAINAGE PLAN

Sheet:

C.300

HIGHWAY 24 STORM DRAIN - Minturn, Colorado



VICINITY MAP

SHEET INDEX:

C.310 HWY 24 CROSSING COVER SHEET
C.311 HWY 24 STORM DRAIN PLAN & PROFILE
C.312 HWY 24 STORM DRAIN CROSSING DETAILS 1
C.313 HWY 24 STORM DRAIN CROSSING DETAILS 2

CONTOUR LEGEND:

EXISTING 1' CONTOUR	7929
EXISTING 5' CONTOUR	7930
PROPOSED 1' CONTOUR	7929
PROPOSED 5' CONTOUR	7930

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAMESON
39976

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden - Highway 24 Storm Drain
1251 East Main Street,
Minturn, Colorado, 81645

NOT FOR CONSTRUCTION

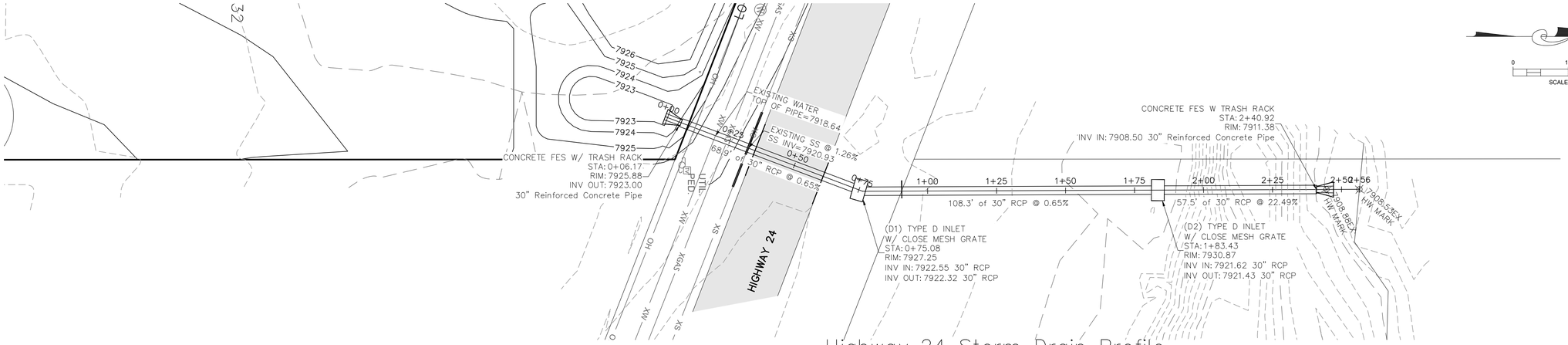
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	Preliminary Storm Crossing

Title:

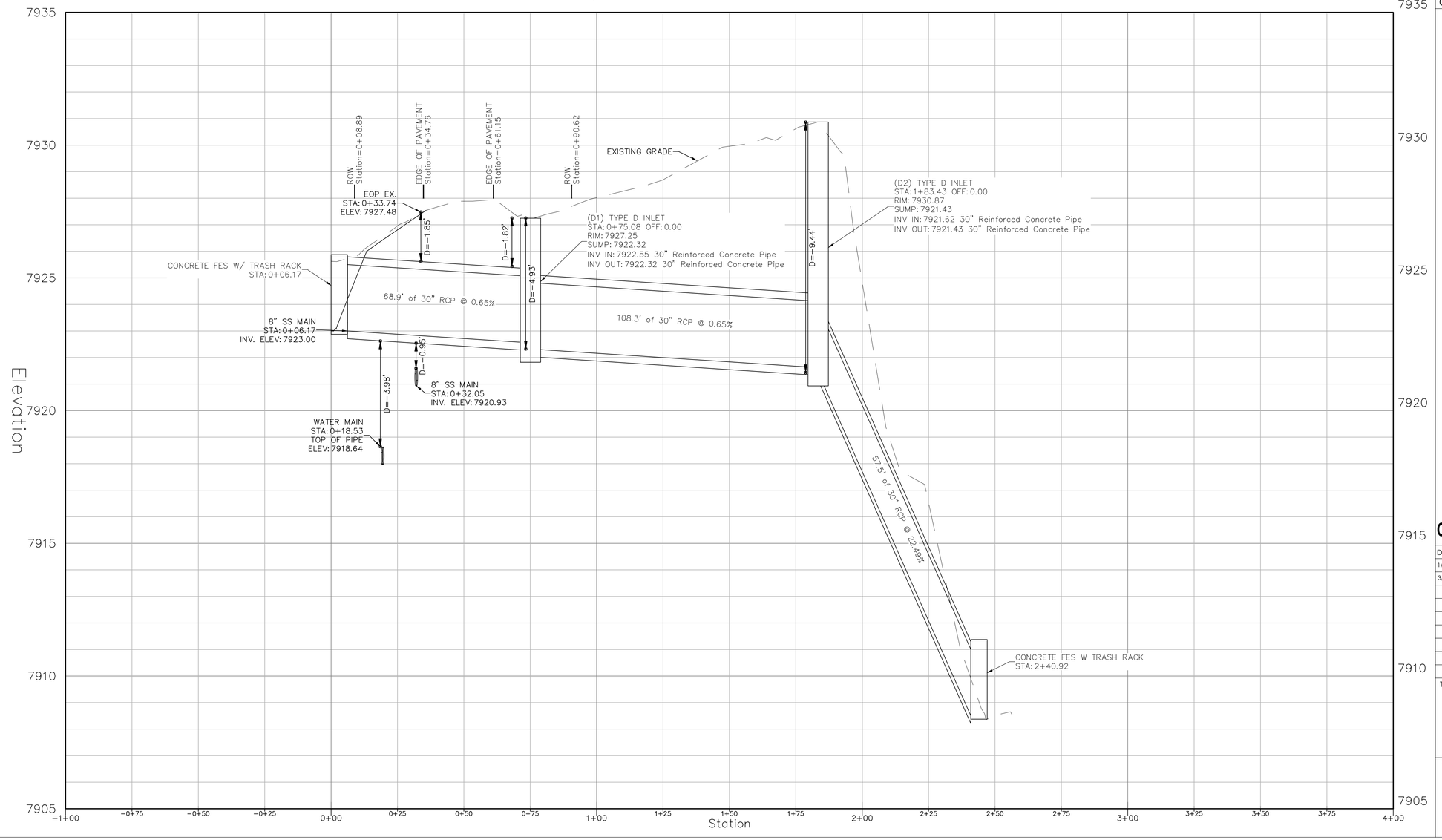
HIGHWAY 24
STORM DRAIN
COVER SHEET

Sheet:

C.310



Highway 24 Storm Drain Profile



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39276
Xref: 1-Belden Blvd Sec 6-7 Base.dwg

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden - Highway 24 Storm Drain

1251 East Main Street,
Minturn, Colorado, 81645

NOT FOR CONSTRUCTION

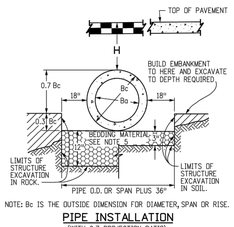
DATE	REVISION
1/15/21	Preliminary Plat Submittal
3/23/21	Preliminary Storm Crossing

Title:

HIGHWAY 24
STORM DRAIN
PLAN & PROFILE

Sheet:

C.311



NOTE: Bc IS THE OUTSIDE DIMENSION FOR DIAMETER, SPAN OR RISE.

PIPE INSTALLATION
(WITH 0.7 PROJECTION RATIO)

CIRCULAR (CIR) △ PIPE SIZE= Ba (INSIDE DIA)	WALL THICKNESS	0.3 Bc (OUTSIDE DIA)	VERTICAL ELLIPTICAL (VE) SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE	HORIZONTAL ELLIPTICAL (HE) SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE
IN.		FT.	IN.			FT.	IN.			FT.
12	2	0.40								
15	2-1/4	0.49								
18	2-1/2	0.58					23	14	2-3/4	0.49
21	2-3/4	0.66								
24	3	0.75					30	19	3-1/4	0.66
27	3-1/4	0.84					34	22	3-1/2	0.73
30	3-1/2	0.92					38	24	3-3/4	0.79
33	3-3/4	1.01								
36	4	1.10	29	45	4-1/2	1.35	45	29	4-1/2	0.95
42	4-1/2	1.28	34	53	5	1.58	53	34	5	1.10
48	5	1.45	38	60	5-1/2	1.78	60	38	5-1/2	1.23
54	5-1/2	1.62	43	68	6	2.00	68	43	6	1.38
60	6	1.80	48	76	6-1/2	2.23	76	48	6-1/2	1.53
66	6-1/2	1.97	53	83	7	2.43	83	53	7	1.68
72	7	2.15	58	91	7-1/2	2.65	91	58	7-1/2	1.83
78	7-1/2	2.32	63	98	8	2.85	98	63	8	1.98
84	8	2.50	68	106	8-1/2	3.08	106	68	8-1/2	2.13
90	8-1/2	2.68	72	113	9	3.28	113	72	9	2.25
96	9	2.85	77	121	9-1/2	3.50	121	77	9-1/2	2.40
102	9-1/2	3.02	82	128	9-3/4	3.69	128	82	9-3/4	2.54
108	10	3.20	87	136	10	3.90	136	87	10	2.68

△ ALSO EQUIVALENT ROUND DIMENSION FOR ELLIPTICAL PIPE.

DIMENSIONS FOR REINFORCED CONCRETE PIPE
(FOR INFORMATION ONLY)

GENERAL NOTES

REINFORCED CONCRETE PIPE

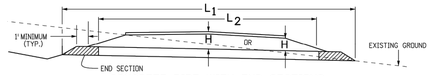
1. FILL HEIGHTS GREATER THAN MAXIMUM ALLOWED IN THE HEIGHTS OF FILL TABLE ON THIS SHEET REQUIRE SPECIAL DESIGN OF STRUCTURE.
2. PIPE DESIGN IS BASED ON SAFETY FACTOR OF 1.33 ON ULTIMATE STRENGTH.
3. THE HEIGHTS OF FILL OVER TOP OF PIPE ARE BASED ON UNIT WEIGHT OF SOIL AT 135 LBS. PER CUBIC FT.
4. PIPE CLASS IS DETERMINED FROM 0.01 IN. CRACK D-LOAD.
5. BEDDING IS CLASS B (MODIFIED) (FROM CONCRETE PIPE DESIGN MANUAL-AMERICAN CONCRETE PIPE ASSOCIATION) WITH SETTLEMENT RATIO R = 0.0 $_{SE}$ (YIELDING BED). BEDDING MATERIAL FOR RIGID PIPE IN SOIL SHALL BE 3 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 2. BEDDING MATERIAL FOR RIGID PIPE IN ROCK SHALL BE 12 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 1.
6. CHANGES IN DESIGN FACTORS REQUIRE COMPENSATING CHANGES IN PIPE DESIGN.
7. MINIMUM WALL THICKNESS DIMENSIONS ARE BASED ON AASHTO M 170 (WALL B) FOR CIRCULAR PIPE, AND AASHTO M 207 FOR ELLIPTICAL PIPE.
8. SPACING FOR MULTIPLE PIPE INSTALLATIONS SHALL CONFORM TO THE DETAILS SHOWN ON STANDARD PLAN M-206-1.
9. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL PIPE INSTALLATION SHALL BE USED.

NONREINFORCED CONCRETE PIPE

1. AT THE OPTION OF THE CONTRACTOR, NONREINFORCED CONCRETE PIPE CONFORMING TO AASHTO M 86 MAY BE USED IN LIEU OF REINFORCED CONCRETE PIPE FOR ALL SIZES 36 INCHES IN DIAMETER AND SMALLER. THE NONREINFORCED CONCRETE PIPE SHALL MEET THE SAME D-LOAD TO PRODUCE THE ULTIMATE LOAD UNDER THE THREE-EDGE BEARING METHOD AS SPECIFIED FOR REINFORCED CONCRETE PIPE IN CONFORMANCE WITH AASHTO M 170. THE CONTRACTOR SHALL PROVIDE WRITTEN CERTIFICATION OF CONFORMANCE. THE WALL THICKNESS OF THE NONREINFORCED PIPE MAY BE INCREASED AS REQUIRED TO MEET D-LOAD REQUIREMENT.
2. ALL REQUIREMENTS FOR REINFORCED CONCRETE PIPE, EXCEPT THOSE REFERRING TO REINFORCEMENT, SHALL APPLY TO NONREINFORCED CONCRETE PIPE.

GENERAL NOTES

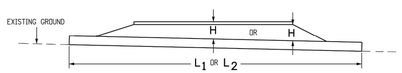
1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL PIPE REQUIRED TO PROVIDE THE DESIGN LENGTH SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. THE INSIDE CONFIGURATION AND THE JOINT OF CONCRETE END SECTION AND PIPE SHALL MATCH.
5. END SECTIONS FOR CMP ARCH PIPE SHALL MATCH THE DIMENSIONS OF THE PIPE SHOWN ON THE PLANS.
6. GALVANIZED TOE PLATE AS SHOWN IS REQUIRED ON END SECTIONS FOR CORRUGATED STEEL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH 3/8 IN. GALVANIZED BOLTS, NUTS AND WASHERS.
7. GALVANIZED STEEL SHALL CONFORM TO AASHTO M 111, M 218 OR M 232.
8. CONCRETE PIPE JOINT FASTENERS, WHERE SHOWN ON PLANS, SHALL BE INSTALLED SO THAT A MINIMUM OF 15 LINEAR FEET OF THE OUTLET END OF THE PIPE ARE MECHANICALLY LOCKED TOGETHER. END SECTION LENGTHS WHEN USED, SHALL BE INCLUDED IN THE 15 LF REQUIREMENT.
9. CONNECTIONS OF METAL END SECTIONS TO PLASTIC PIPE SHALL BE APPROVED BY THE ENGINEER. PLASTIC END SECTIONS SHALL NOT BE USED.
10. THE END SECTION STYLE, EITHER REGULAR OR SAFETY, SHALL BE AS SHOWN ON THE PLANS.
11. AT THE OPTION OF THE CONTRACTOR AND APPROVAL OF THE CDOT PROJECT ENGINNER, REINFORCED CONCRETE END SECTIONS MAY BE MADE WITH SYNTHETIC FIBERS INSTEAD OF STEEL FOR PIPES 36 INCHES IN DIAMETER AND SMALLER, AND CONFORM TO AASHTO M 86 AND SUBSECTION 601.03.



CONCRETE PIPE WITH END SECTIONS

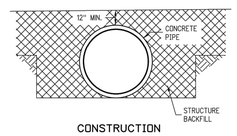
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

H = HEIGHT OF FILL OVER TOP OF PIPE, INCLUDING PAVEMENT THICKNESS.
L_1 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 624.
L_2 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.



CONCRETE PIPE WITHOUT END SECTIONS

NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

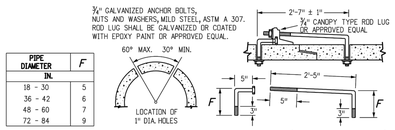


CONSTRUCTION
MINIMUM COVER FOR RIGID PIPE

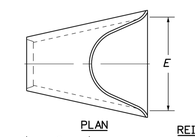
TYPE OF PIPE	HEIGHT OF FILL OVER TOP OF PIPE, H (FEET) — CLASS OF PIPE (0.01 IN. CRACK D-LOAD)				
	CLASS CIR II / CLASS VE II / CLASS HE II / 1000 D	CLASS CIR III / CLASS VE III / CLASS HE III / 1350 D	CLASS CIR IV / CLASS VE IV / CLASS HE IV / 2000 D	CLASS CIR V / CLASS VE V / 3000 D	CLASS VE VI / 4000 D
CIRCULAR (CIR)	1 TO 18	1 TO 25	± 25 TO 37	± 37 TO 45	
VERTICAL ELLIPTICAL (VE)	1 TO 18	1 TO 25	± 25 TO 37	± 37 TO 45	± 45 TO 62
HORIZONTAL ELLIPTICAL (HE)	1 TO 18	1 TO 25	± 25 TO 37		

ALLOWABLE RANGE OF HEIGHTS FOR FILL
OVER REINFORCED CONCRETE PIPE
(ALL SIZES)

PIPE DIAMETER IN.	F
18 - 30	5
36 - 42	6
48 - 60	7
72 - 84	9



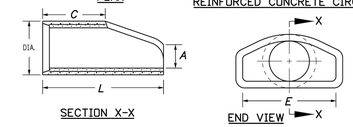
CONCRETE JOINT FASTENER (TWO PER JOINT)



PLAN

PIPE I.D.	DIMENSIONS A	C	L	E
	IN.			
18	10	48	78	36
24	10	48	78	48
30	14	36	96	60
36	18	36	96	72
42	24	36	96	78
48	28	24	96	84
54	30	36	96	90
60	36	36	96	96
72	34	20	96	108

REINFORCED CONCRETE CIRCULAR PIPE

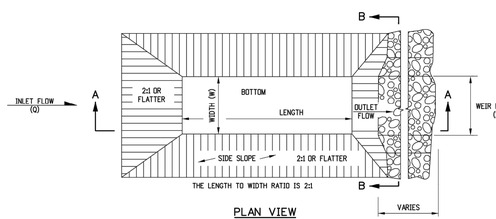


SECTION X-X

END VIEW

END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE

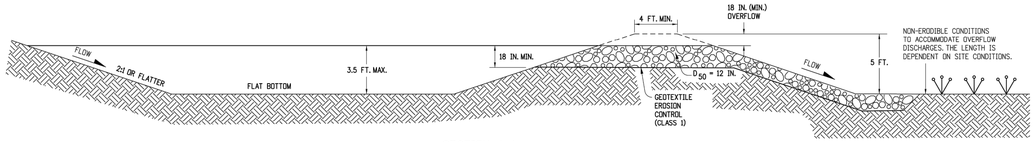
REINFORCED CONCRETE PIPE DETAIL



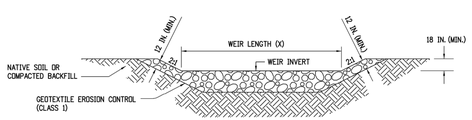
PLAN VIEW

NOTES

1. THE MAXIMUM DRAINAGE AREA IS 5 ACRES.
2. THE MAXIMUM STRUCTURE LIFE IS 2 YEARS.
3. THE STORAGE AREA IS 1800 CUBIC FEET PER ACRE.
4. THE MAXIMUM EMBANKMENT HEIGHT SHALL BE 5 FT. MEASURED ON THE DOWNSTREAM SIDE.
5. THE LENGTH/WIDTH RATIO MAY BE ADJUSTED TO MEET SITE CONDITIONS WHEN APPROVED BY THE ENGINEER.
6. WIDTH (W) OF SEDIMENT TRAP IS APPROXIMATELY EQUAL TO THE WEIR LENGTH (X).
7. SEDIMENT TRAP DESIGN SHALL BE APPROVED BY THE ENGINEER.
8. THE DOWN GRADE FROM WEIR SHALL BE STABLE AND NON-ERODIABLE.
9. THE PAY ITEM NUMBER FOR SEDIMENT TRAP (LF) IS 208-00033.



SECTION A-A

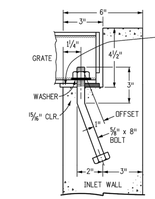


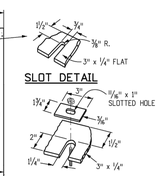
SECTION B-B

DRAINAGE AREA (ACRES)	WEIR LENGTH (FEET)
1	4
2	6
3	8
4	10
5	12

WEIR LENGTH TABLE

SEDIMENT TRAP DETAIL

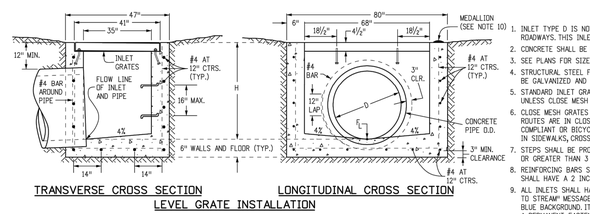




SLOT DETAIL

ALTERNATE SLOT AND HOLD DOWN PLATE DETAIL

GRATE INSTALLATION DETAIL

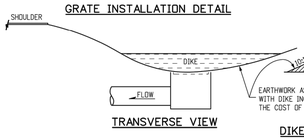


TRANSVERSE CROSS SECTION
LEVEL GRATE INSTALLATION

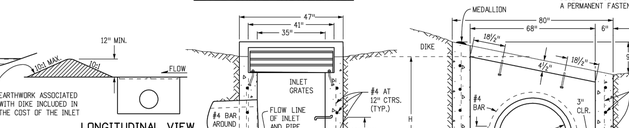
LONGITUDINAL CROSS SECTION

GENERAL NOTES

1. INLET TYPE D IS NOT HS-20 RATED AND SHALL NOT BE PLACED IN PAVED ROADWAYS. THIS INLET SHALL BE USED ONLY OUTSIDE PAVED ROADWAYS.
2. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
3. SEE PLANS FOR SIZE AND LOCATION OF PIPE.
4. STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
5. STANDARD INLET GRATES SHALL BE USED ON ALL TYPE D INLETS UNLESS CLOSE MESH GRATES ARE SPECIFIED ON THE PLANS.
6. CLOSE MESH GRATES ARE RECOMMENDED WHERE FOOT TRAFFIC OR BICYCLE ROUTES ARE IN CLOSE PROXIMITY TO GRATE. THIS GRATE IS NOT ADA COMPLIANT OR BICYCLE FRIENDLY AND SHALL NOT BE PLACED DIRECTLY IN SIDEWALKS, CROSSWALKS OR BIKE PATHS.
7. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FEET-6 INCHES AND SHALL CONFORM WITH AASHTO M 199.
8. REINFORCING BARS SHALL BE GRADE 60, EPOXY COATED, AND DEFORMED #4, AND SHALL HAVE A 2 INCH MIN. CLEARANCE, CUT OR BEND BARS AROUND PIPE AS REQUIRED.
9. ALL INLETS SHALL HAVE A 4 INCH DIA. METAL MEDALLION WITH A "NO DUMPING DRAINS TO STREAM" MESSAGE ON IT. THE MEDALLION SHALL HAVE A FISH SYMBOL WITH A BLUE BACKGROUND. IT SHALL BE FIRMLY ATTACHED TO THE INLET'S SURFACE WITH A PERMANENT FASTENER.



TRANSVERSE VIEW



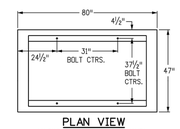
DIKE

LONGITUDINAL VIEW

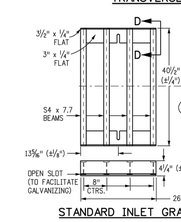
TRANSVERSE CROSS SECTION

LONGITUDINAL CROSS SECTION

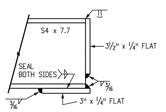
SLOPING GRATE INSTALLATION



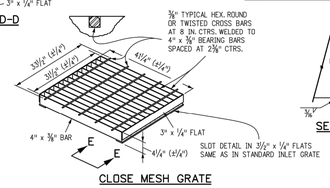
PLAN VIEW
(SHOWING ANCHOR BOLT LAYOUT)



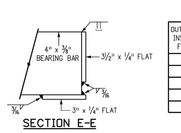
STANDARD INLET GRATE



SECTION D-D



CLOSE MESH GRATE



SECTION E-E

OUTLET PIPE INSIDE DIA. FT. - "D"	MIN. "H" FT.
1.5	3.0
2.0	3.5
2.5	4.0
3.0	4.5
3.5	5.0

NO. PIECES	DESCRIPTION	LENGTH	LBS PER FT.	WEIGHT (LBS.)
8	S4 x 7.7 BEAM	40"	7.70	206
4	3 1/2" x 1/4" FLAT	26 5/16"	2.98	26
4	3" x 1/4" FLAT	26 5/16"	2.55	24
TOTAL LBS. - 256				

STANDARD INLET GRATE
TWO STEEL GRATE PER INLET QUANTITIES

"H" FT.	CONCRETE CU. YDS.	STEEL LBS.	CIRCULAR PIPE RANGE INSIDE DIA., IN. - "D"
3.0	1.5	127	18
3.5	1.7	149	18-24
4.0	1.9	157	18-30
4.5	2.0	179	18-36
5.0	2.2	187	18-42
5.5	2.4	208	18-42
6.0	2.6	215	18-42
6.5	2.8	236	18-42
7.0	2.9	243	18-42
7.5	3.1	264	18-42
8.0	3.3	271	18-42
8.5	3.5	292	18-42
9.0	3.6	299	18-42
9.5	3.8	320	18-42
10.0	4.0	327	18-42

▼ CONCRETE AND STEEL QUANTITIES ARE FOR ONE ENTIRE INLET BEFORE DEDUCTION FOR VOLUME OCCUPIED BY PIPE. WEIGHT OF STEEL INCLUDES A RING FOR THE MAXIMUM PIPE DIAMETER.

QUANTITIES FOR ONE INLET

TYPE D INLET DETAIL

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842 Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JACKSON 39276

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

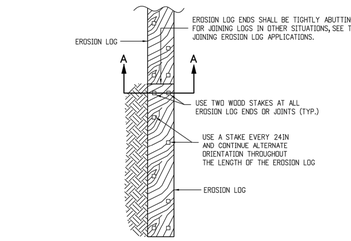
Belden - Highway 24 Storm Drain
1251 East Main Street,
Minturn, Colorado, 81645

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	Preliminary Storm Crossing

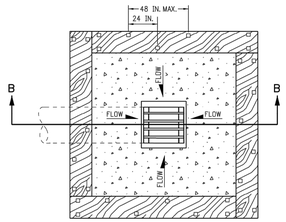
Title:
HIGHWAY 24 STORM DRAIN DETAILS 1

Sheet:
C.312



PLAN VIEW

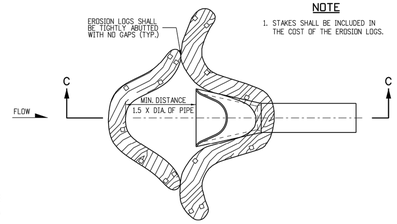
EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)



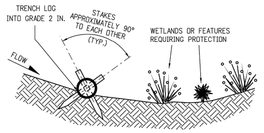
PLAN VIEW

NOTE

1. STAKES SHALL BE INCLUDED IN THE COST OF THE EROSION LOGS.



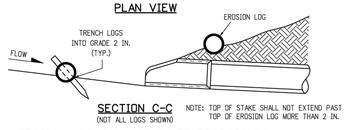
PLAN VIEW



SECTION A-A

TYPICAL STAKE INSTALLATION

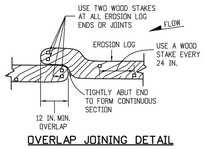
NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.



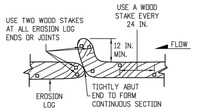
SECTION C-C
(NOT ALL LOGS SHOWN)

NOTE: TOP OF STAKE SHALL NOT EXTEND PAST TOP OF EROSION LOG MORE THAN 2 IN.

EROSION LOG CULVERT INLET PROTECTION

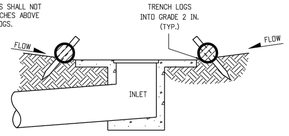


OVERLAP JOINING DETAIL



J-HOOK JOINING DETAIL

JOINING EROSION LOG APPLICATIONS

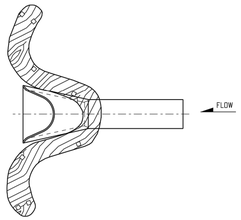


SECTION B-B

NOTE: LOCATE EROSION LOGS AT THE OUTSIDE EDGE OF THE CONCRETE APRON.

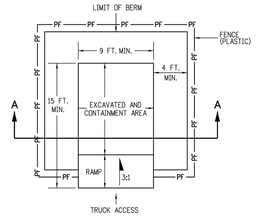
EROSION LOG FILTER AT DROP INLET

EROSION LOG APPLICATIONS

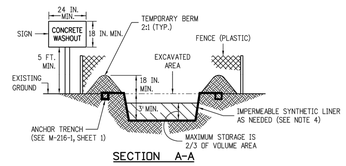


EROSION LOG CULVERT OUTLET PROTECTION

EROSION LOG DETAIL



PLAN VIEW

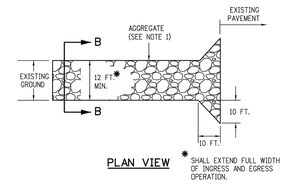


SECTION A-A

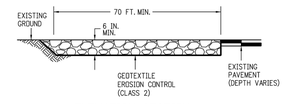
NOTES:

1. A FENCE (PLASTIC) CONFORMING TO SECTION 607 SHALL BE INSTALLED AROUND THE CONCRETE WASHOUT AREA, EXCEPT AT THE OPENING.
2. THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH AND CONFORM TO SUBSECTION 630.02.
3. ALL MATERIALS AND LABOR TO COMPLETE THE CONCRETE WASHOUT STRUCTURE SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
4. THE BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF FIVE FEET ABOVE GROUND WATER. IF NOT, THE BOTTOM OF EXCAVATION SHALL BE IN ACCORDANCE WITH 208.02 (j).
5. THE PAY ITEM NUMBER FOR CONCRETE WASHOUT STRUCTURE (EACH) IS 208-00045.

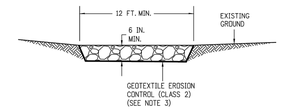
CONCRETE WASHOUT DETAIL



PLAN VIEW



ELEVATION SECTION



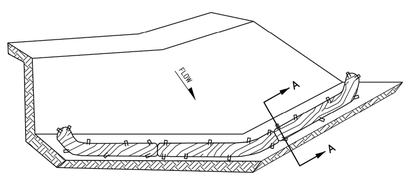
SECTION B-B

NOTES:

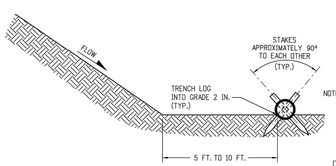
1. AGGREGATE SHALL CONFORM TO SUBSECTION 208.02 (1).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE, WHILE NOT BLOCKING FLOW OF WATER THRU STRUCTURE. PROTECTION OF THE CURB AND GUTTER SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
3. GEOTEXTILE SHALL CONFORM TO SUBSECTION 712.08.
4. ALL MATERIALS AND LABOR TO COMPLETE THE VEHICLE TRACKING PAD SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
5. THE PAY ITEM NUMBER FOR VEHICLE TRACKING PAD (EACH) IS 208-00070.

VEHICLE TRACKING PAD

VEHICLE TRACKING DETAIL



ISOMETRIC VIEW



SECTION A-A

NOTE: THE TOPS OF ALL STAKES SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE THE TOPS OF EROSION LOGS.

EROSION LOGS PAY ITEMS	
NUMBER	DESCRIPTION
208-00012	TYPE 1 (9 IN.)
208-00002	TYPE 1 (12 IN.)
208-00013	TYPE 1 (20 IN.)
208-00007	TYPE 2 (8 IN.)
208-00008	TYPE 2 (12 IN.)
208-00009	TYPE 2 (18 IN.)
208-00022	TYPE 3 (9 IN.)
208-00023	TYPE 3 (12 IN.)
208-00024	TYPE 3 (20 IN.)

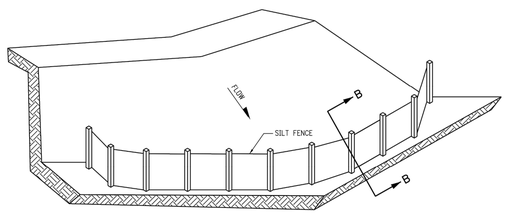
NOTES:

1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

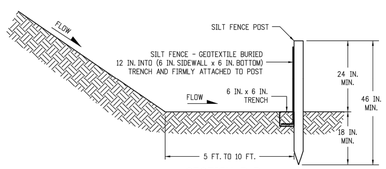
EROSION LOG TOE OF SLOPE PROTECTION

NOTES

1. SILT FENCE SHALL HAVE A MAXIMUM DRAINAGE AREA OF ONE-QUARTER ACRE PER 100 FEET OF SILT FENCE LENGTH; MAXIMUM SLOPE LENGTH BEHIND BARRIER IS 100 FEET.
2. SILT FENCE USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
3. SILT FENCE SHALL BE PLACED PARALLEL TO THE CONTOUR WITH ENDS FLARED UP SLOPE.
4. THE MAXIMUM LENGTH OF EROSION LOGS OR SILT FENCES WITHOUT A FLARED END TURNING UPSLOPE IS 150 FEET.



ISOMETRIC VIEW



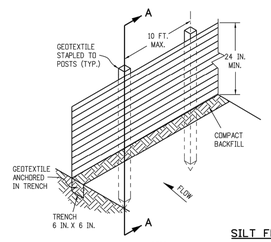
SECTION B-B

SILT FENCE TOE OF SLOPE PROTECTION

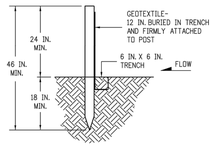
NOTE: THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.

TOE OF SLOPE PROTECTION APPLICATIONS

SLOPE PROTECTION DETAIL



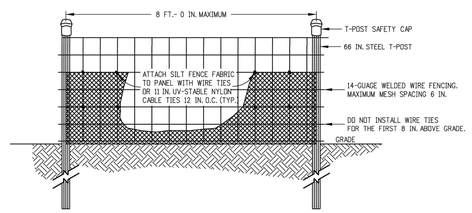
SILT FENCE



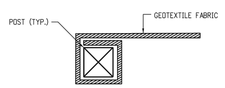
SECTION A-A

NOTES:

1. GEOTEXTILE SHALL BE ATTACHED TO WOOD POSTS WITH THREE OR MORE STAPLES PER POST. STAPLES SHALL BE HEAVY DUTY WIRE AND AT LEAST 1 INCH LONG.
2. WOOD POST SHALL BE 1 IN. X 1 IN. NOMINAL.
3. THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.
4. THE SILT FENCE SHALL BE PLACED ON THE CONTOUR (AT THE SAME ELEVATION ±6 IN.). THE ENDS SHALL BE FLARED UP SLOPE (MINIMUM ELEVATION GAIN OF 18 IN.).



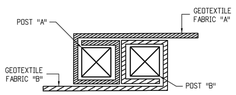
ELEVATION VIEW



END SECTION DETAIL (PLAN VIEW)

NOTE:

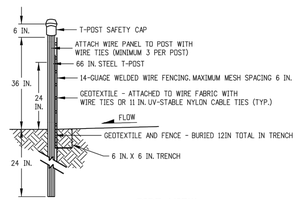
1. THE END OF THE SILT FENCE FABRIC SHALL BE WRAPPED APPROX. 6 INCHES AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.



JOINING SECTION DETAIL (PLAN VIEW)

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.



SIDE VIEW

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A STEEL T-POST, THEN SECURED ALONG THE POST WITH WIRE TIES (MINIMUM 3 PER POST).
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.
3. SILT FENCES SHALL NOT BE USED FOR CHECK DAMS.
4. THE PAY ITEM NUMBER FOR SILT FENCE (REINFORCED) (LF) IS 208-00021.

SILT FENCE (REINFORCED)

SILT FENCE APPLICATIONS

SILT FENCE DETAIL

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842 Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden - Highway 24 Storm Drain
1251 East Main Street,
Minturn, Colorado, 81645

NOT FOR CONSTRUCTION

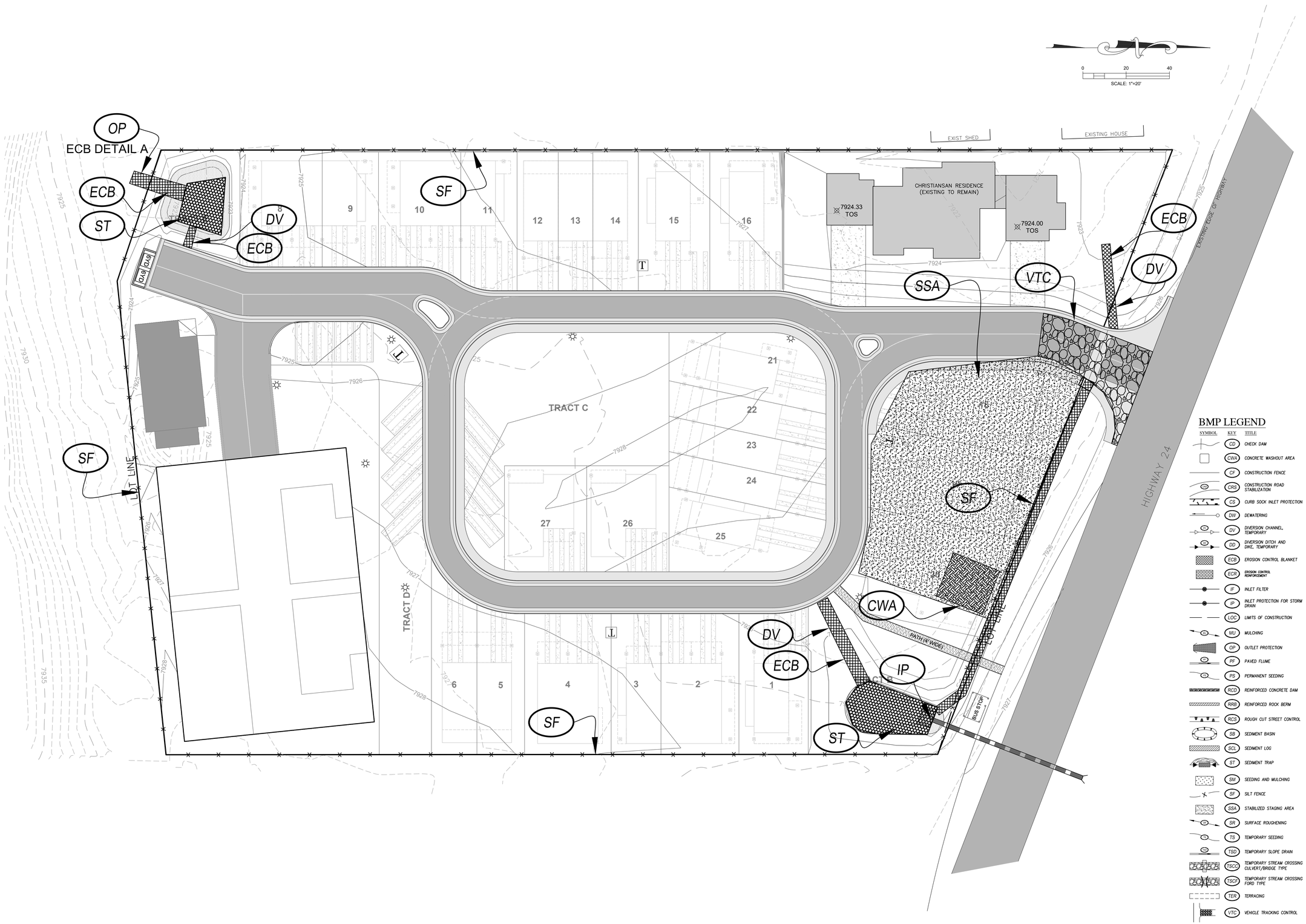
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	Preliminary Storm Crossing

Title:

HIGHWAY 24 STORM DRAIN DETAILS 2

Sheet:

C.313



BMP LEGEND

SYMBOL	KEY	TITLE
	CD	CHECK DAM
	CWA	CONCRETE WASHOUT AREA
	CF	CONSTRUCTION FENCE
	CRS	CONSTRUCTION ROAD STABILIZATION
	CS	CURB SOCK INLET PROTECTION
	DW	DEWATERING
	DV	DIVERSION CHANNEL, TEMPORARY
	DD	DIVERSION DITCH AND DIKE, TEMPORARY
	ECB	EROSION CONTROL BLANKET
	ECR	EROSION CONTROL REINFORCEMENT
	IF	INLET FILTER
	IP	INLET PROTECTION FOR STORM DRAIN
	LOC	LIMITS OF CONSTRUCTION
	MU	MULCHING
	OP	OUTLET PROTECTION
	PF	PAVED FLUME
	PS	PERMANENT SEEDING
	RCD	REINFORCED CONCRETE DAM
	RRB	REINFORCED ROCK BERM
	RCS	ROUGH CUT STREET CONTROL
	SB	SEDIMENT BASIN
	SCL	SEDIMENT LOG
	ST	SEDIMENT TRAP
	SM	SEEDING AND MULCHING
	SF	SILT FENCE
	SSA	STABILIZED STAGING AREA
	SR	SURFACE ROUGHENING
	TS	TEMPORARY SEEDING
	TSD	TEMPORARY SLOPE DRAIN
	TSCC	TEMPORARY STREAM CROSSING CULVERT/BRIDGE TYPE
	TSCF	TEMPORARY STREAM CROSSING FORD TYPE
	TER	TERRACING
	VTC	VEHICLE TRACKING CONTROL
	WR	VEHICLE TRACKING CONTROL WITH WASH RACK

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAGNOW
39876

DRAWN BY:	DAP
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

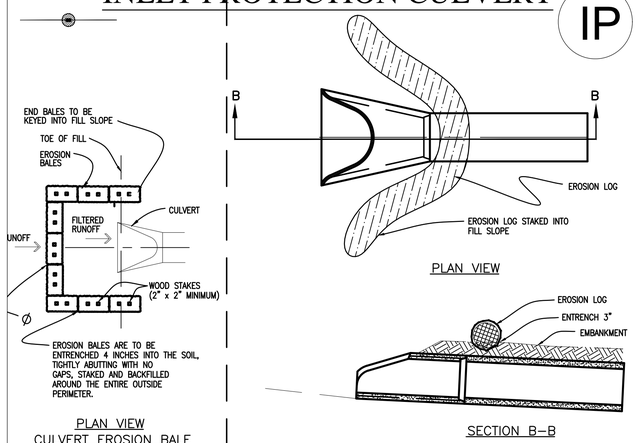
STORM WATER MANAGEMENT PLAN (SWMP)

Sheet:

C.320

INLET PROTECTION CULVERT

IP



PLAN VIEW
CULVERT EROSION BALE INLET PROTECTION

PLAN VIEW

SECTION B–B

CULVERT EROSION LOG INLET PROTECTION

Ø SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY FOR PROPER FUNCTION.

INLET PROTECTION INSTALLATION NOTES

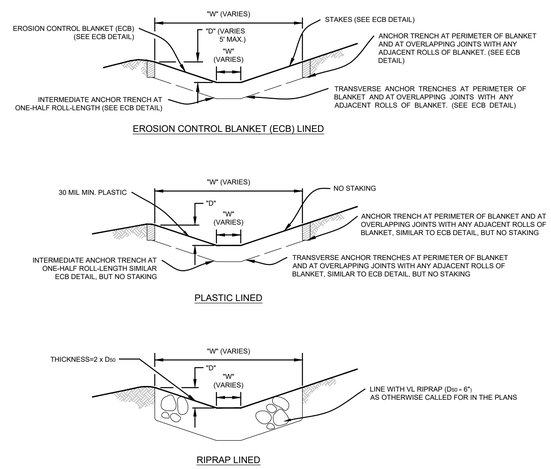
1. INLET PROTECTION AFTER INLET CONSTRUCTION OF AFTER PAVEMENT SHALL BE INSTALLED WITHIN 48 HOUR AFTER INLET CONSTRUCTION OR PAVING IS COMPLETED.

INLET PROTECTION MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT INLET PROTECTION WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY. INSPECT MORE FREQUENTLY DURING WINTER CONDITIONS DUE TO FREEZE/THAW PROBLEMS. REPAIRS AS NEEDED.
2. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF ROCK BERM IS WITHIN 2-1/2 INCHES OF THE CREST.
3. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
4. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, DRILL SEEDED AND CRIMP MULCHED, OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

DIVERSION CHANNEL

DV



CHANNEL DIVERSION INSTALLATION NOTES:

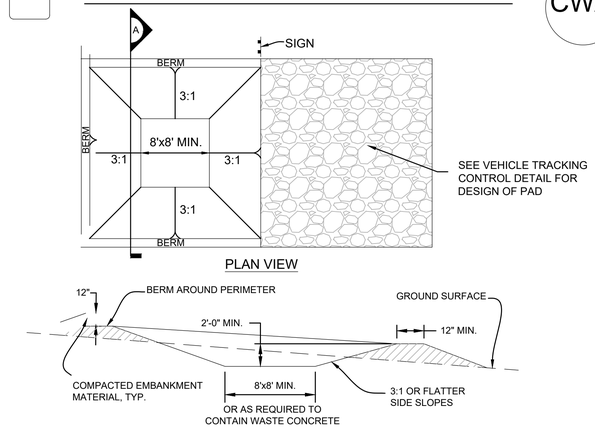
1. SEE PLAN VIEW FOR:
   - LOCATION OF DIVERSION CHANNEL.
   - TYPE OF CHANNEL (UNLINED, ECB LINED, PLASTIC LINED OR RIPRAP LINED).
   - LENGTH OF EACH TYPE OF CHANNEL.
   - DEPTH, "D", AND WIDTH, "W" DIMENSIONS.
   - FOR RIPRAP LINED CHANNEL, SIZE OF RIPRAP, "D 50 ", SHALL BE SHOWN ON PLANS.
2. SEE DRAINAGE PLANS FOR DETAILS OF ANY PERMANENT CONVEYANCE FACILITIES.
3. DIVERSION CHANNELS INDICATED ON THE SWMP PLAN SHALL BE INSTALLED PRIOR TO ANY WORK IN THE NATURAL CHANNEL.
4. FOR ECB LINED CHANNELS, INSTALLATION OF EROSION CONTROL BLANKET SHALL CONFORM TO THE REQUIREMENTS OF THE ECB DETAIL, FOR PLASTIC LINED CHANNELS, INSTALLATION OF EROSION CONTROL LINER SHALL CONFORM TO THE ECB DETAILS.
5. WHERE CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION CHANNEL, THE PERMITTEE SHALL INSTALL A TEMPORARY CULVERT WITH A MINIMUM CAPACITY SPECIFIED FOR THE DIVERSION CHANNELS, FULLY ACCOUNT FOR HEADWATER REQUIREMENTS OF THE CULVERT.

DIVERSION CHANNEL MAINTENANCE NOTES:

1. THE SWMP MANAGER SHALL INSPECT DIVERSION CHANNELS WEEKLY AND DURING AND AFTER ANY STORM. MAKE REPAIRS AS NECESSARY.
2. DIVERSION CHANNELS ARE TO REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION, OR IF APPROVED BY LOCAL JURISDICTION MAY BE LEFT IN PLACE.
3. IF DIVERSION CHANNELS ARE REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, DRILL SEEDED, HAY CRIMPED MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

CONCRETE WASHOUT AREA

CWA



PLAN VIEW

SECTION A

CONCRETE WASHOUT AREA INSTALLATION NOTES

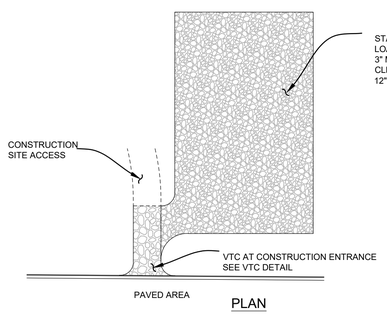
1. SEE PLAN VIEW FOR LOCATIONS OF CONCRETE WASHOUT AREA
2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
3. VEHICLE TRACKING CONTROL IS REQUIRED AT THE ACCESS POINT.
4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
5. EXCAVATED MATERIAL SHALL BE UTILIZED IN PERIMETER BERM CONSTRUCTION

CONCRETE WASHOUT AREA MAINTENANCE NOTES

1. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
2. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AN APPROVED WASTE SITE.
3. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, DRILL SEED AND CRIMP MULCH OR OTHERWISE STABILIZE IN A MANNER APPROVED BY THE LOCAL JURISDICTION.
4. INSPECT WEEKLY, DURING AND AFTER ANY STORM EVENT.

STABALIZED STAGING AREA

SSA



PLAN

STABILIZED STAGING AREA INSTALLATION NOTES

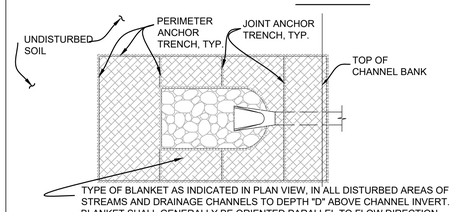
1. SEE PLAN VIEW FOR GENERAL LOCATION OF STAGING AREA. CONTRACTOR MAY MODIFY LOCATION AND SIZE OF STABILIZED STAGING AREA WITH APPROVAL FROM LOCAL JURISDICTION.
2. STABILIZED STAGING AREA SHALL BE LARGE ENOUGH TO FULLY CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
3. IF REQUIRED BY THE LOCAL JURISDICTION, SITE ACCESS ROADS SHALL BE STABILIZED IN THE SAME MANNER AS THE STAGING AREA.
4. STAGING AREA SHALL BE STABILIZED PRIOR TO ANY OTHER OPERATIONS ON THE SITE.
5. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM OF 3" OF GRANULAR MATERIAL (GRAVEL OR CLEAN RECYCLED CONCRETE).

STABILIZED STAGING AREA MAINTENANCE NOTES

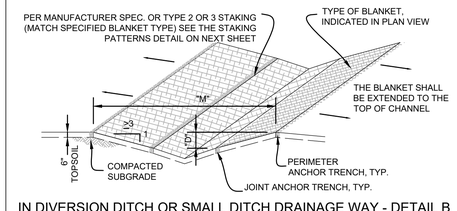
1. THE SWMP MANAGER SHALL INSPECT THE STABILIZED STAGING AREA WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SWMP MANAGER SHALL PROVIDE ADDITIONAL THICKNESS OF GRANULAR MATERIAL IF ANY RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.
3. STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
4. ANY ACCUMULATED DIRT OR MUD SHALL BE REMOVED FROM THE SURFACE OF THE STABILIZED STAGING AREA.
5. THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

EROSION CONTROL BLANKET 1 of 2

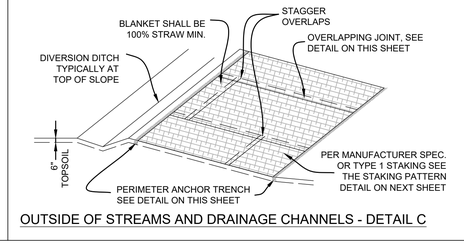
ECB



AT PIPE OUTLET AREAS OF STREAMS AND DRAINAGE CHANNELS - DETAIL A

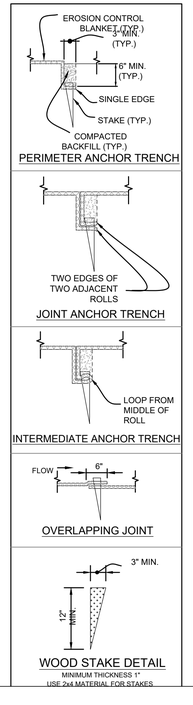


IN DIVERSION DITCH OR SMALL DITCH DRAINAGE WAY - DETAIL B



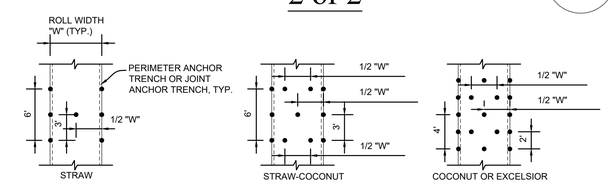
OUTSIDE OF STREAMS AND DRAINAGE CHANNELS - DETAIL C

ANCHOR DETAILS



EROSION CONTROL BLANKET 2 of 2

ECB



STAKING PATTERNS

SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. IF NO MANUFACTURER'S SPECIFICATION IS AVAILABLE USE THE ACCEPTABLE STAKING PATTERN (AS SHOWN ABOVE)

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
   - TYPE OF BLANKET (STRAW, STRAW-COCONUT, COCONUT, OR EXCELSIOR).
   - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL; NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE, NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKETS EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.
9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEEDED AND MULCHED.
10. DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM ONES SHOWN HERE

TABLE 7.1 - EROSION CONTROL BLANKET TYPE

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	NETTING MIN.
STRAW*	-	100%	-	DOUBLE/NATURAL
STRAW-COCONUT	30% MIN.	70% MAX.	-	DOUBLE/NATURAL
COCONUT	100%	-	-	DOUBLE/NATURAL
EXCELSIOR	-	-	100%	DOUBLE/NATURAL

* FOR OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

EROSION CONTROL BLANKET MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT EROSION CONTROL BLANKETS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS REQUESTED TO BE REMOVED BY THE LOCAL JURISDICTION.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
P.O. Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

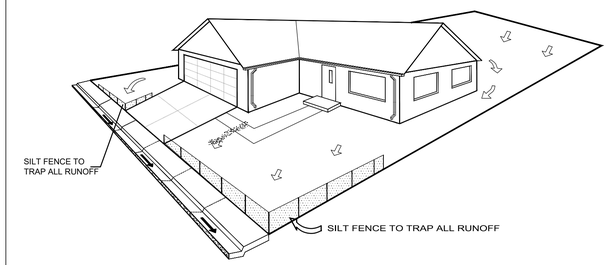
SWMP DETAILS 1

Sheet:

C.321

SILT FENCE RESIDENTIAL

SF



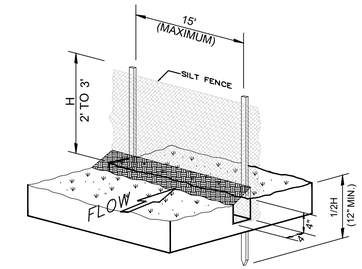
NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES AS DIRECTED BY LOCAL JURISDICTION

SILT FENCE BARRIER

RESIDENTIAL INSTALATION

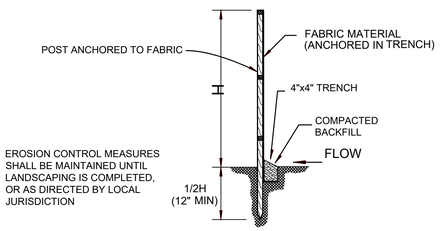
SILT FENCE INSTALLATION

SF



SILT FENCE INSTALLATION

-NTS-



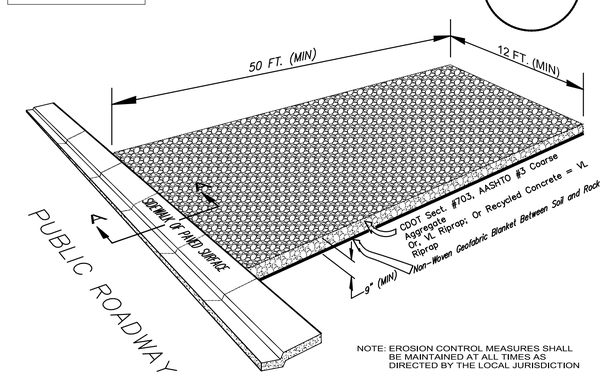
NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL LANDSCAPING IS COMPLETED, OR AS DIRECTED BY LOCAL JURISDICTION

SECTION

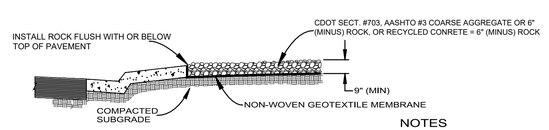
-NTS-

TEMPORARY VEHICLE TRACKING CONTROL

VTC



NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES AS DIRECTED BY THE LOCAL JURISDICTION



SECTION A-A

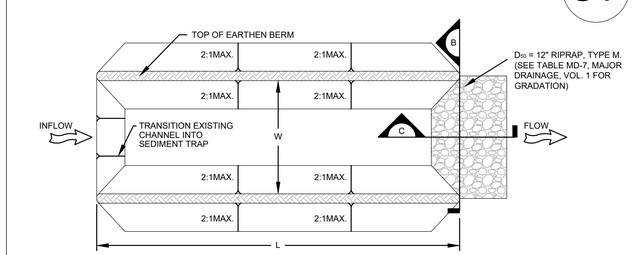
-NTS-

NOTES

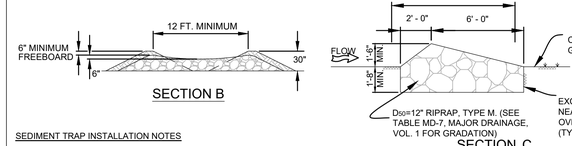
1. ALL ROCK TO BE REMOVED UPON COMPLETION OF CONSTRUCTION.
2. PUBLIC ROADWAY TO BE KEPT CLEAN AND FREE OF MUD, DIRT AND DEBRIS AT ALL TIMES.

SEDIMENT TRAP

ST



PLAN VIEW



SECTION B

SECTION C

SEDIMENT TRAP INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION, LENGTH AND WIDTH OF SEDIMENT TRAP.
2. SEDIMENT TRAPS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
3. SEDIMENT TRAP BERM SHALL BE CONSTRUCTED FROM MATERIAL FROM EXCAVATION. THE BERM SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
4. RIPRAP OUTLET SHALL BE CONSTRUCTED WITH D_{50} =12" RIPRAP (TYPE M, SEE TABLE MD-7, MAJOR DRAINAGE, VOL. 1 FOR GRADATION) WITH A MINIMUM OVERFLOW OF 6".
5. THE TOP OF THE EARTHEN BERM SHALL BE A MINIMUM OF 6" HIGHER THAN THE TOP OF THE RIPRAP OUTLET STRUCTURE.
6. THE ENDS OF THE RIPRAP OUTLET STRUCTURE SHALL BE MINIMUM OF 6" HIGHER THAN THE CENTER OF THE OUTLET STRUCTURE.

SEDIMENT TRAP MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT SEDIMENT TRAPS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF RIPRAP SHALL BE REMOVED WHEN THE UPSTREAM DEPTH IS WITHIN ½ THE HEIGHT OF THE RIPRAP OUTLET STRUCTURE.
3. SEDIMENT TRAPS SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVERAGE IS APPROVED BY THE LOCAL JURISDICTION.
4. WHEN SEDIMENT TRAPS ARE REMOVED THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, DRILLED SEEDED AND CRIMP MULCHED OR STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JACKSON
39276

DRAWN BY:	DAP
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

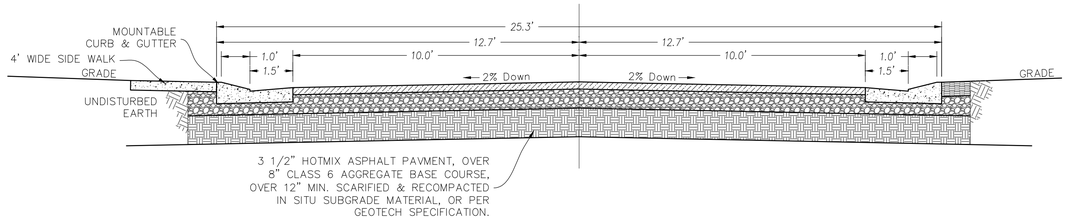
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

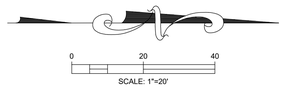
SWMP DETAILS 2

Sheet:

C.322



SILVER LOOP ENTRANCE ROAD SECTION
BEGIN TO END



PROPOSED UTILITY LINE KEY:

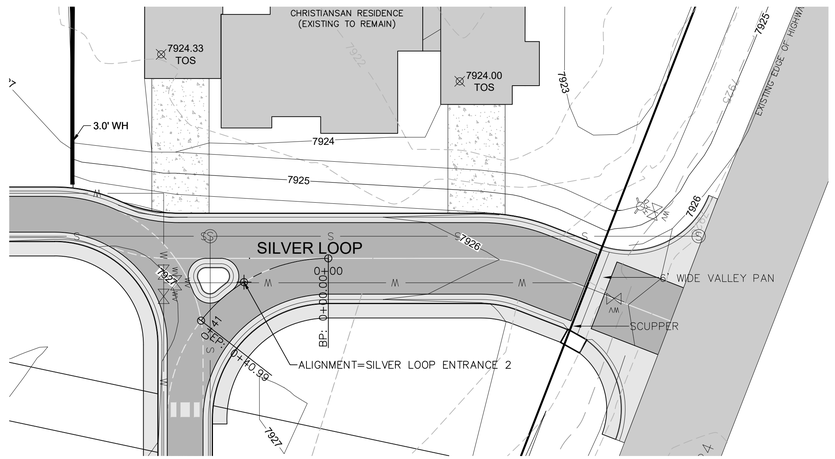
WATER	W
SEWER	S

PROPOSED UTILITY SYMBOL KEY:

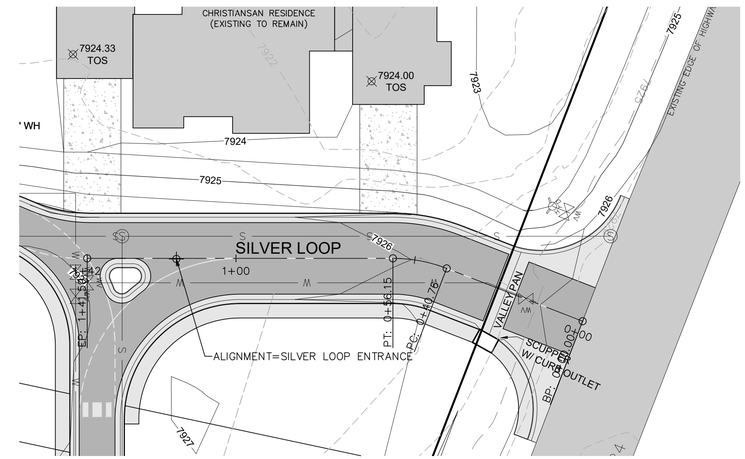
- WV — WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

CONTOUR LEGEND:

EXISTING 1' CONTOUR	7929
EXISTING 5' CONTOUR	7930
PROPOSED 1' CONTOUR	7929
PROPOSED 5' CONTOUR	7930

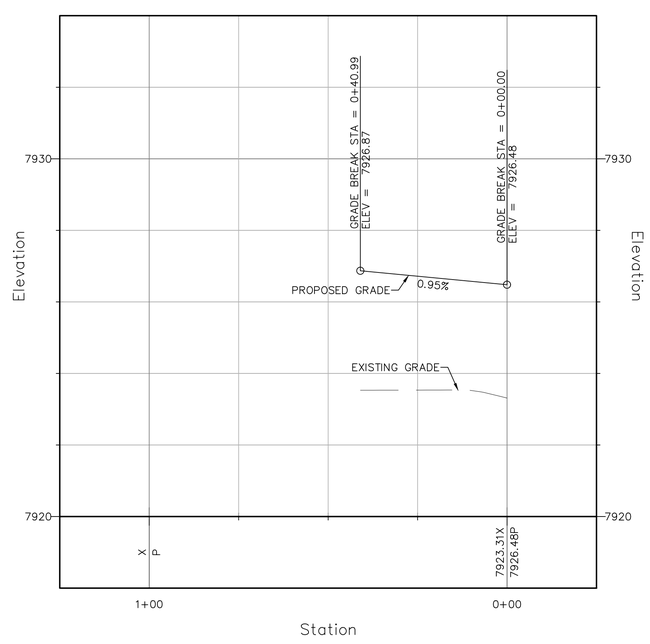


SILVER LOOP ENTRANCE 2 PLAN

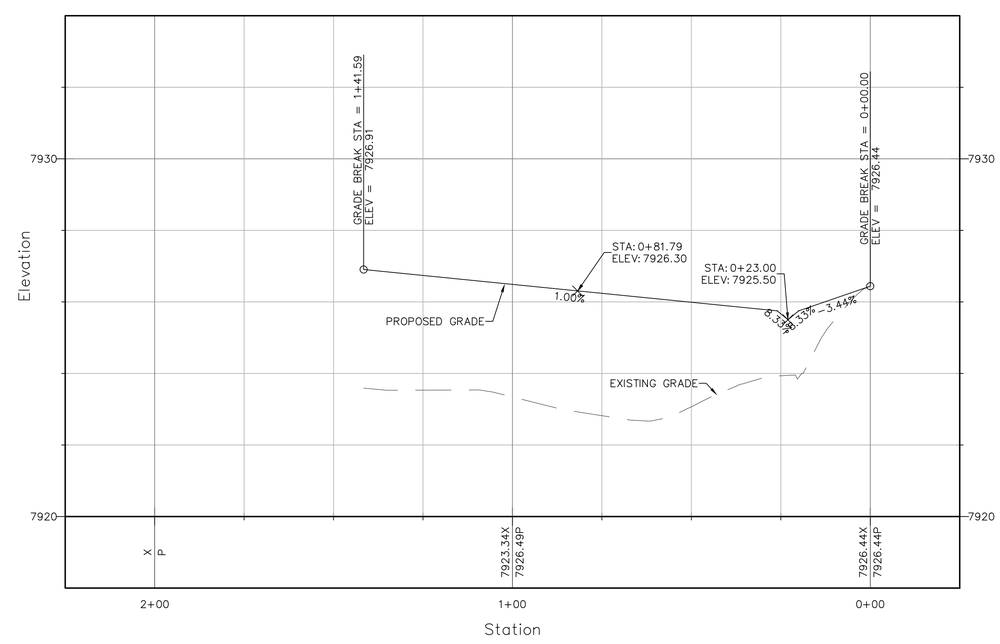


SILVER LOOP ENTRANCE PLAN

SILVER LOOP ENTRANCE 2 PROFILE



SILVER LOOP ENTRANCE PROFILE



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JACKSON 39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

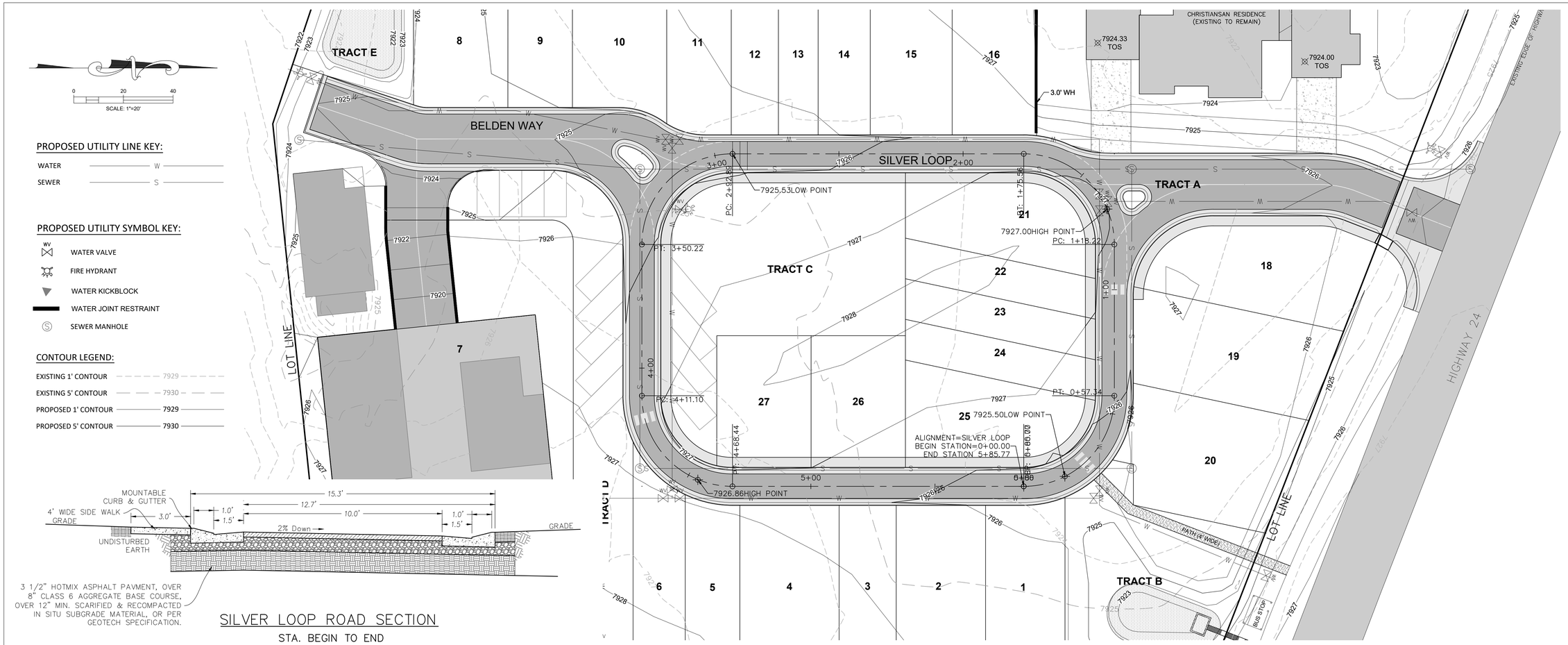
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
ROAD P & P
SILVER LOOP
ENTRANCE

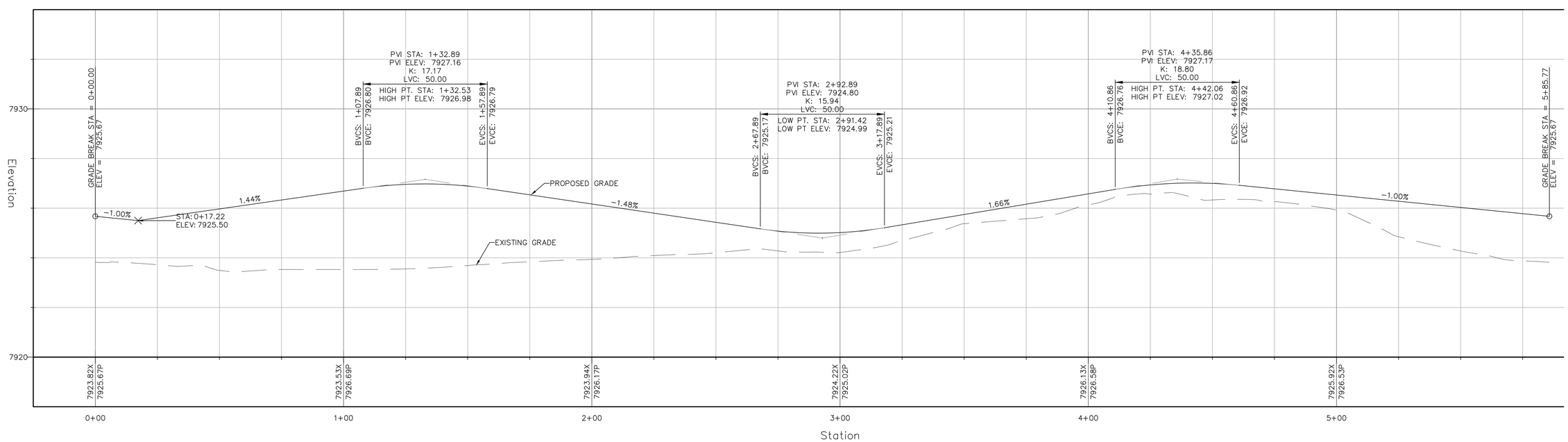
Sheet:
C.400



SILVER LOOP ROAD SECTION

STA. BEGIN TO END

SILVER LOOP PROFILE



TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY: DJA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

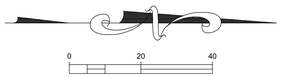
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

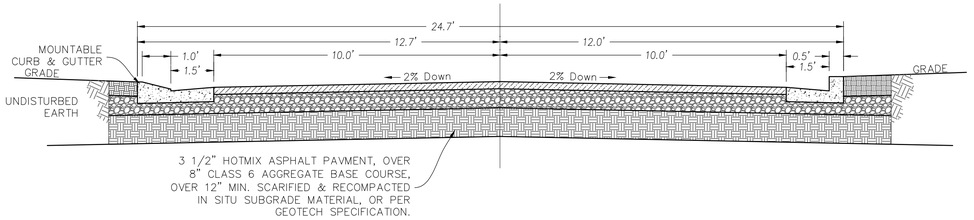
Title:

ROAD P & P
SILVER LOOP

Sheet:

C.401





BELDEN WAY ROAD SECTION

STA. BEGIN TO END

PROPOSED UTILITY LINE KEY:

WATER — W —

SEWER — S —

PROPOSED UTILITY SYMBOL KEY:

- WV WATER VALVE
- FIRE HYDRANT
- WATER KICKBLOCK
- WATER JOINT RESTRAINT
- SEWER MANHOLE

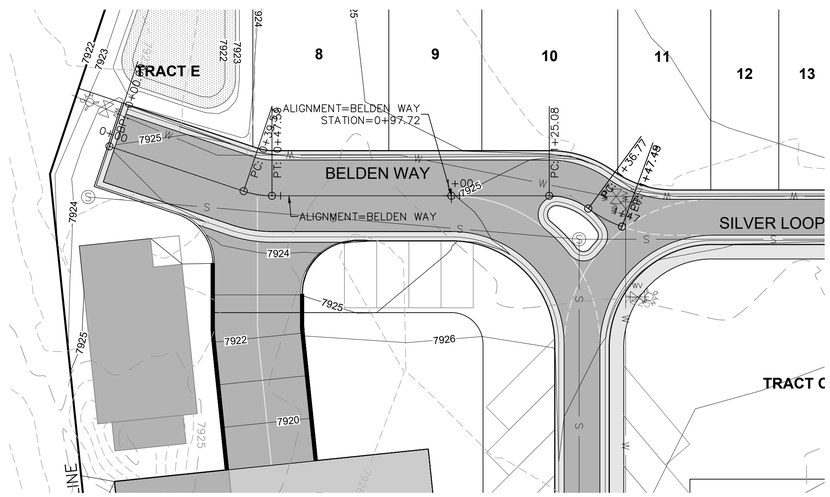
CONTOUR LEGEND:

EXISTING 1' CONTOUR — 7929 —

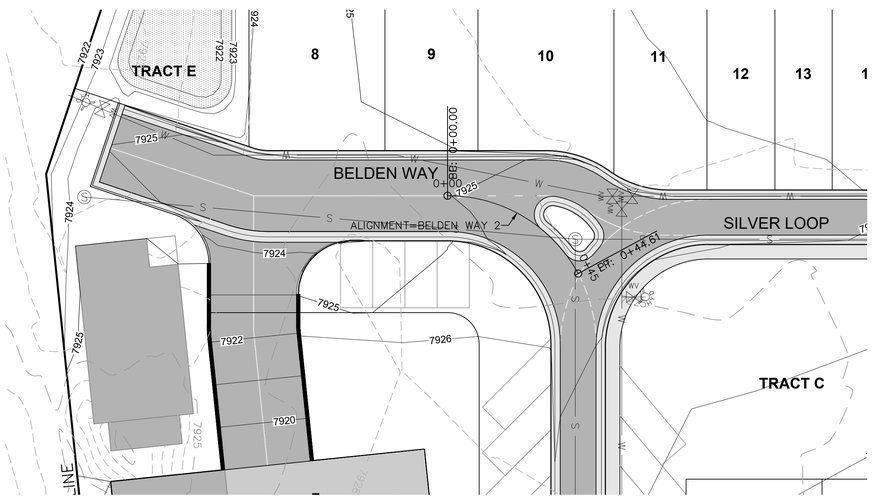
EXISTING 5' CONTOUR — 7930 —

PROPOSED 1' CONTOUR — 7929 —

PROPOSED 5' CONTOUR — 7930 —

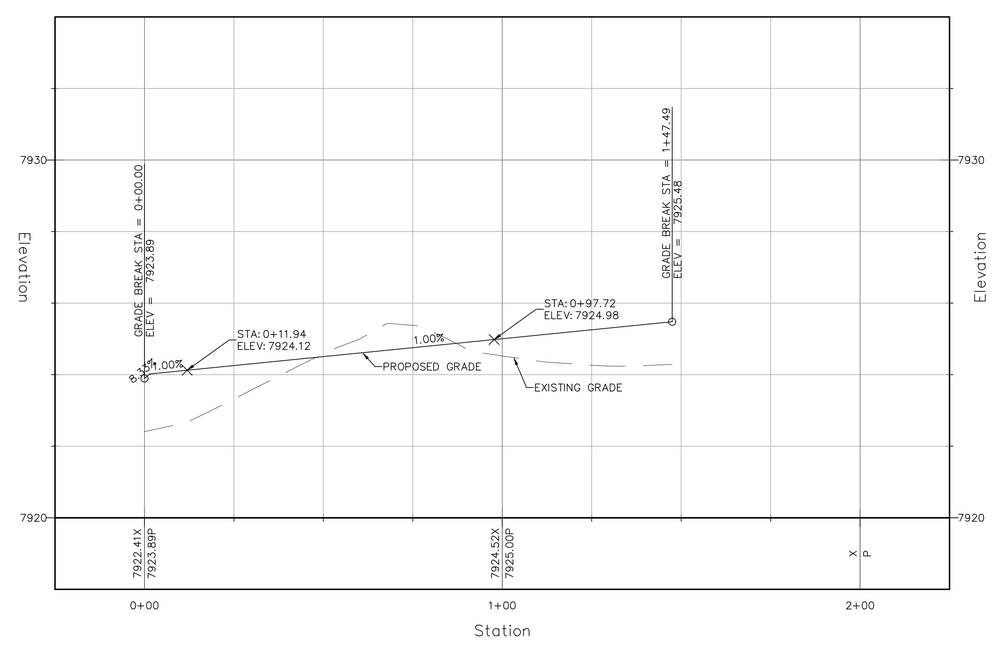


BELDEN WAY PLAN

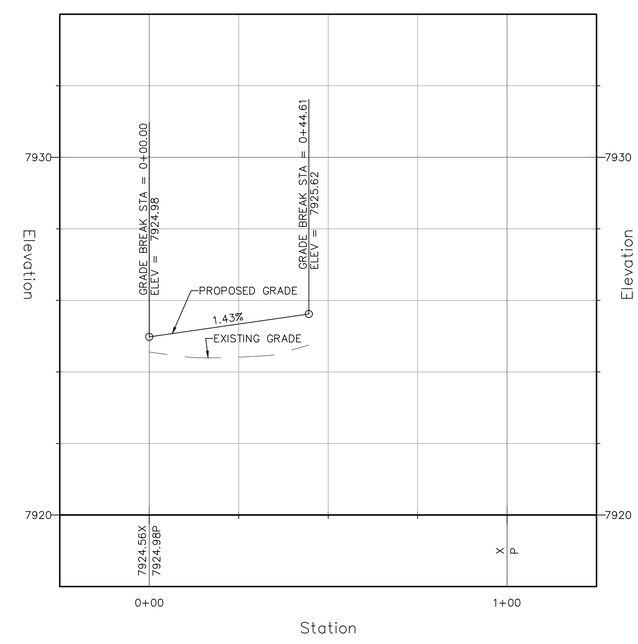


BELDEN WAY 2 PLAN

BELDEN WAY PROFILE



BELDEN WAY 2 PROFILE



TIMBERLINE ENGINEERING, LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JACKSON
39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

ROAD P & P
BELDEN WAY

Sheet:

C.402

0 20 40

SCALE: 1"=20'

PROPOSED UTILITY LINE KEY:

WATER — W —

SEWER — S —

PROPOSED UTILITY SYMBOL KEY:

WV WATER VALVE

FIRE HYDRANT

WATER KICKBLOCK

WATER JOINT RESTRAINT

SEWER MANHOLE

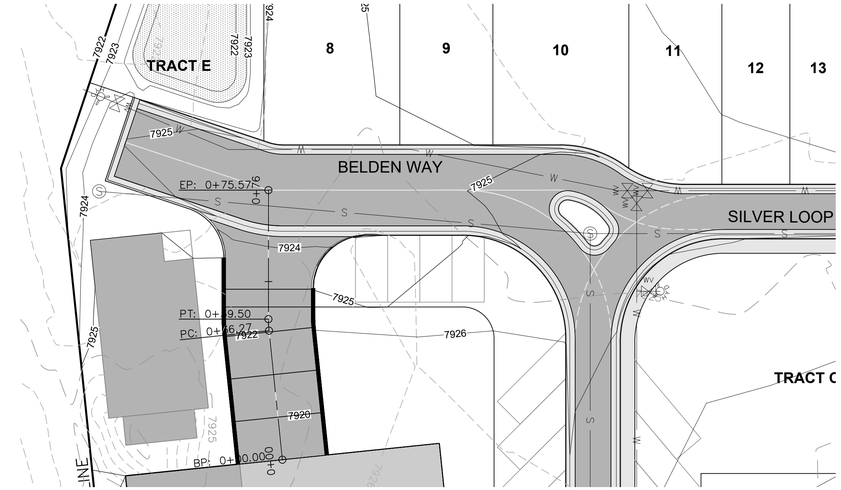
CONTOUR LEGEND:

EXISTING 1' CONTOUR — 7929 —

EXISTING 5' CONTOUR — 7930 —

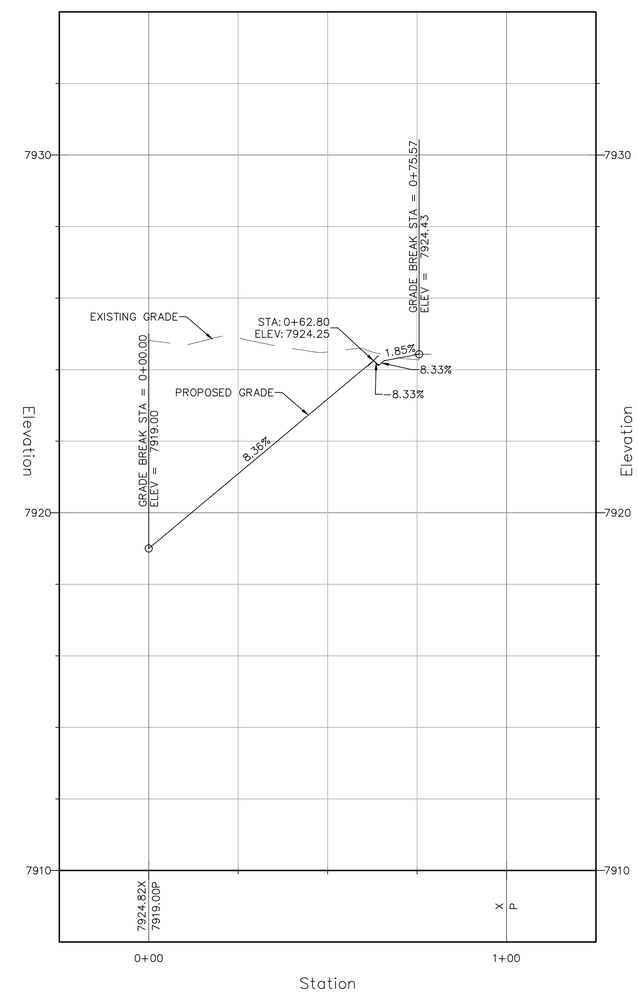
PROPOSED 1' CONTOUR — 7929 —

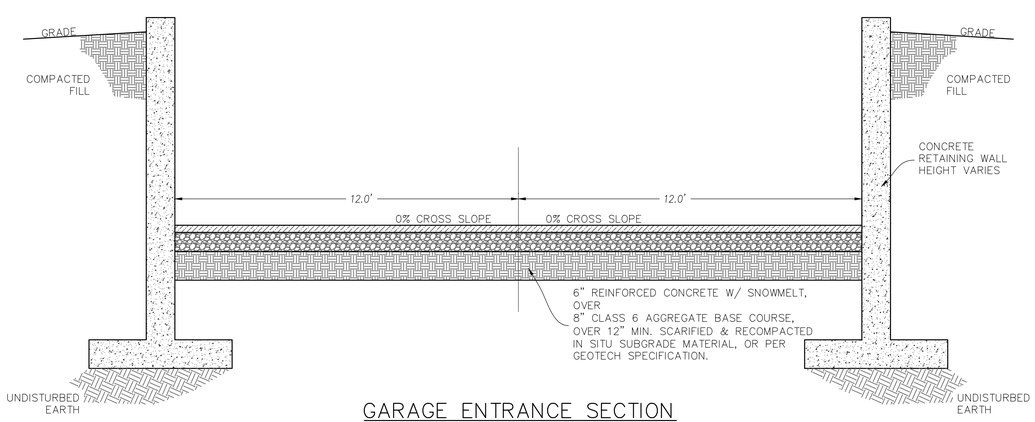
PROPOSED 5' CONTOUR — 7930 —



GARAGE ENTRANCE PLAN

GARAGE ENTRANCE PROFILE





GARAGE ENTRANCE SECTION

STA. BEGIN TO END

TIMBERLINE ENGINEERING LLC CIVIL STRUCTURAL

PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JAGNOW 39276

DRAWN BY:	DJA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

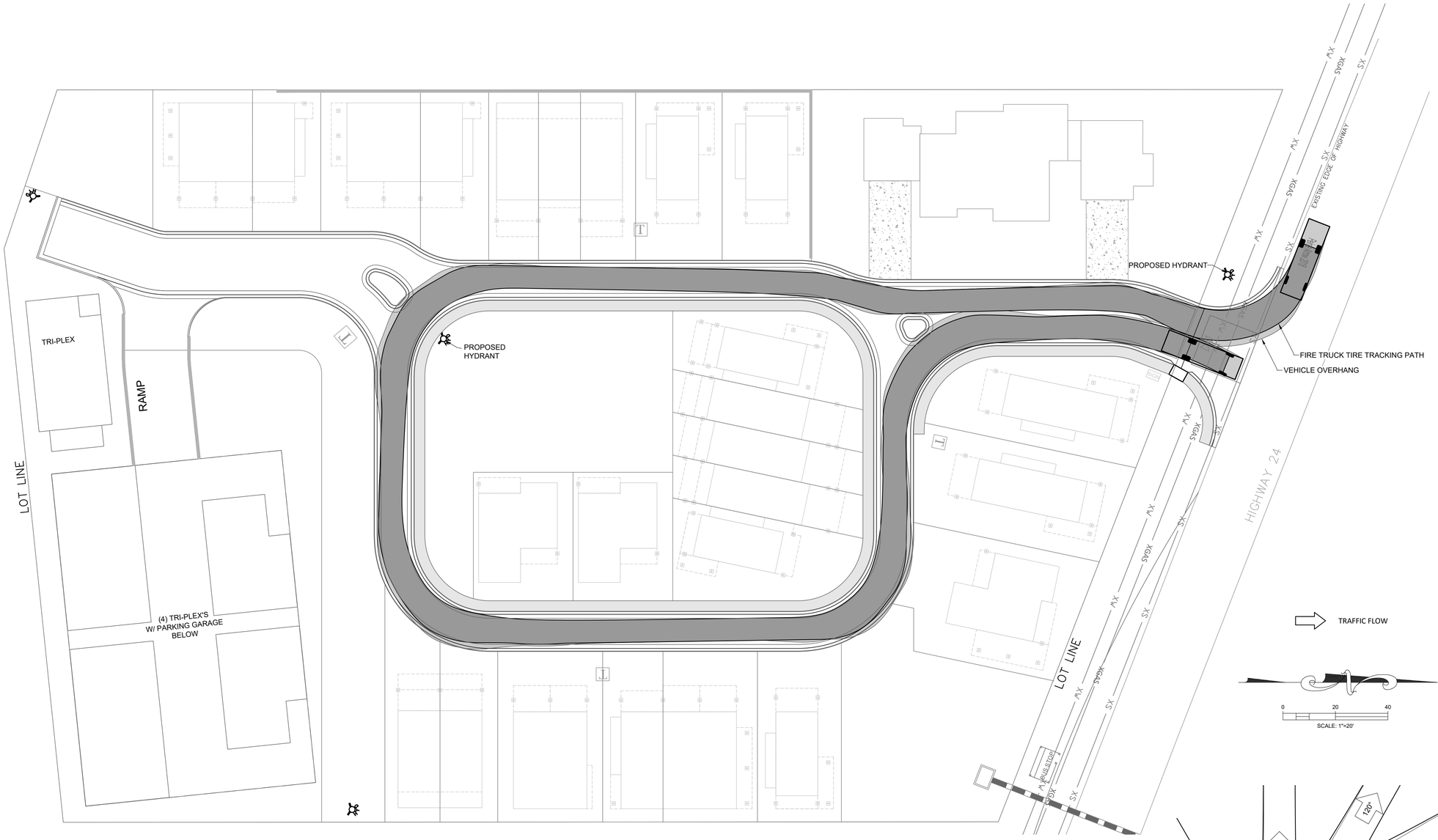
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

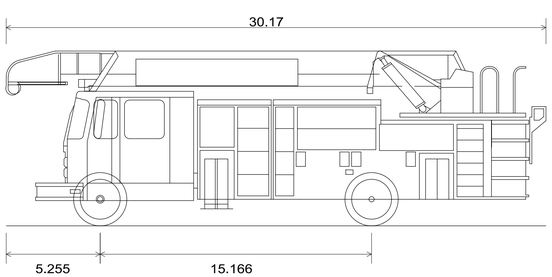
Title:

ROAD P & P
GARAGE
ENTRANCE

Sheet:

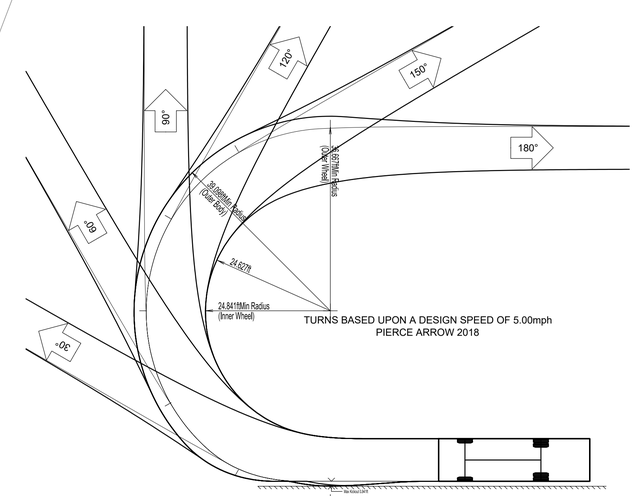
C.403





DESIGN VEHICLE

Pierce Arrow 2018	
Overall Length	30.170ft
Overall Width	8.499ft
Overall Body Height	9.771ft
Min Body Ground Clearance	0.950ft
Track Width	8.500ft
Lock-to-lock time	5.00s
Curb to Curb Turning Radius	36.667ft



TURN TEMPLATE

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

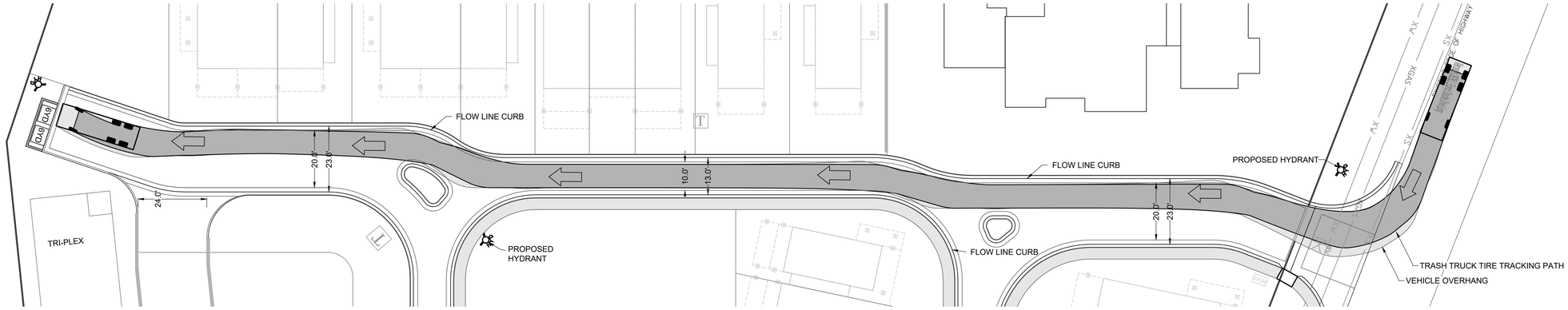
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

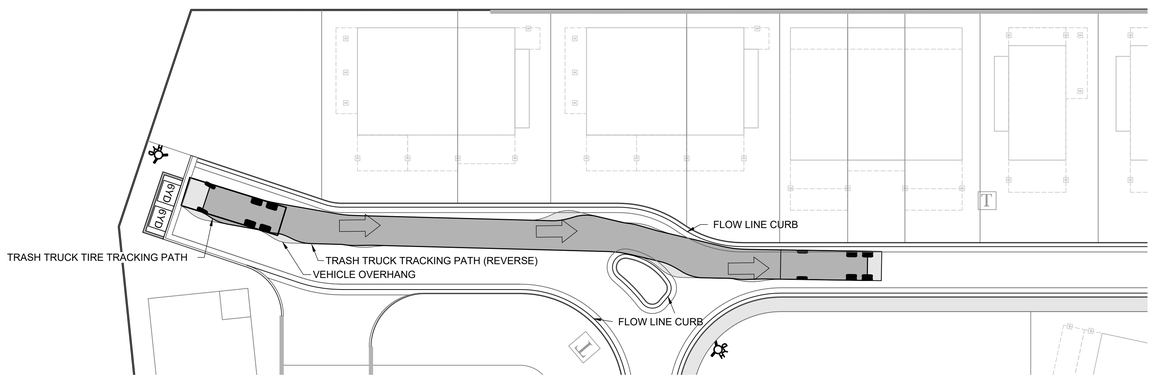
TURNING MOVEMENTS FIRE TRUCK

Sheet:

C.404



TRASH TRUCK TURN MOVEMENT 1

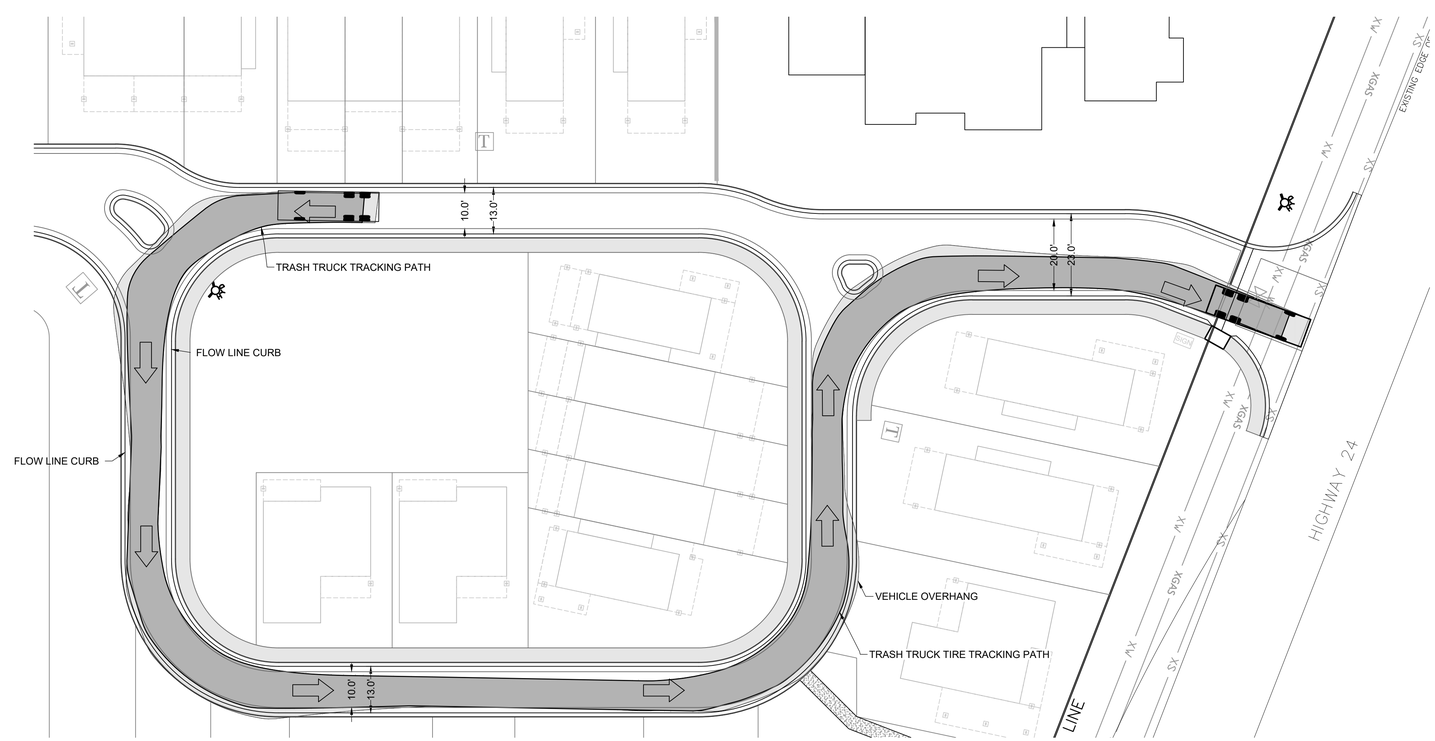


TRASH TRUCK TURN MOVEMENT 2

TRAFFIC FLOW

0 20 40

SCALE: 1"=20'



TRASH TRUCK TURN MOVEMENT 3

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842 p 970.963.9869
Carbondale, Colorado 81623-0842
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER DAVID JOHN JACKSON 39876

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

TURNING MOVEMENTS TRASH TRUCK

Sheet:

C.405

WATER SPECIFICATIONS

THE FOLLOWING APPLICABLE CONSTRUCTIN SPECIFICATIONS ARE A PORTION OF THE TOWN OF MINTURN ENGINEERING STANDARDS. TABLES, DRAWINGS, DETAILS AND EXHIBITS REFERENCED BELOW ARE INCLUDED IN THE TOWN STANDARDS.

SECTION 1 - DISTRIBUTION SYSTEM DESIGN AND LAYOUT

1.01 - Fire Protection

The number and location of fire hydrants in a given area must be approved by the Eagle River Fire Protection District. Fire hydrant branch lines shall be set at right angles to street mains. The fire hydrant shall be set at the end of the branch line and shall face the direction as dictated per the Eagle River Fire Protection District. No horizontal bends or offsets shall be used in installing fire hydrant branch lines unless approved by the Eagle River Fire Protection District. Under no circumstances shall any size or manner of tap be made on a fire hydrant branch line between the hydrant and hydrant valve. The maximum length of 6-inch main line shall not exceed 50 feet. All fire hydrant valves shall be attached to the tee off of the main line. A fire hydrant shall be installed at the end of all dead end water mains. The Applicant shall install an approved fire hydrant marker on all fire hydrants. The Applicant shall perform all fire hydrant "flow tests." Results of flow tests shall be provided to the Town and to the Eagle River Fire Protection District. All costs associated with the "flow test" shall be borne by the Applicant. The Town shall witness and oversee the "flow test" in conjunction with other appropriate governmental agencies.

1.02 - Layout of the Distribution System

A. Fire Hydrants: Fire hydrant depths shall be 7-feet to 9.5-feet. All fire hydrants will be installed within dedicated streets, right-of-ways, or easements as herein above defined. Fire hydrants shall be installed at locations approved by the Eagle River Fire Protection District and at the end of all dead-end line extensions.

SECTION 2 - MATERIAL SPECIFICATIONS

2.01 - Pipe and Fittings

All pipe and fittings used in the Town's System shall meet or exceed the latest AWWA Specifications and follow the guideline lines set forth below:

A.Tapping Sleeves: Wet taps shall only be made with the use of a tapping sleeve. The Town will allow epoxy-coated Mueller H304 (250 psi working pressure) or equivalent. No tapping sleeves will be allowed for any application with a working pressure of 150 psi or higher. For those applications where working pressure exceeds 150 psi, the Town will require the use of a tee.

2.02 - Fire Hydrants

A.Fire Hydrants: Fire hydrants shall be Mueller Centurion A423 Mountain Hydrant, which conforms to AWWA Standard C502 with a working pressure of 250 psi. They also shall be six-inch (6") mechanical joint inlet, minimum 5¼ inches, compression-type main valve that closes with pressure, two 2½-inch hose nozzles, one 4½-inch pump nozzle, nozzle threads ANSI B26. Nozzles must be easily replaceable in the field with standard tools. Operating and cap nuts must be 1½-inch, Number 17 National Standard hex main valve that open to the left. An arrow cast on top of hydrant shall indicate direction of opening. There shall be a breakable section that permits clean break at or near ground level, preventing water loss in case of breakage. Working parts must be removable for maintenance or repair without excavation. Also required are operating mechanism non-wetting, oil reservoir lubricated, with O-ring seals and barrel drain bronze mounted with at least two (2) outlets, which operate automatically with main valve. Fire hydrants must be installed at the end of all main lines. Finish grade around the fire hydrant shall be a minimum of six inches (6") to a maximum of twelve inches (12") below the flange for the final grade and paving inspection.

B.Fire Hydrant Extension Sections: New Installations: Defined as new main extensions throughout the one-year (1) warranty period. All new installations shall be installed at the standard 7-foot to 9.5-foot of cover measured from the top of the pipe to finish grade. All fire hydrants shall consist of a single solid shaft. No fire hydrant extensions will be allowed. Any special circumstance will require written approval from the Town prior to installation.
Existing Fire Hydrants: No more than one (1), two-foot (2') long, fire hydrant grade extension (extension section) shall be used or installed on fire hydrant assemblies. All hydrants shall be installed with a guard valve to isolate the hydrant for repair while maintaining service to main. No service line taps will be allowed between the guard valve and hydrant. Guard valves shall be installed on the tee off of the water main. The maximum distance from the guard valve to the fire hydrant shall not exceed fifty feet (50'). Fire hydrants shall be installed at the end of all dead-end mains.

C.Fire Hydrant Marker Flags: The Applicant shall purchase and install fire hydrant marker flags for all newly constructed fire hydrants. The required flag is a Nordic Flex Flag, FF2-72 inches.D.Fire Hydrant Depth of Bury: Fire hydrant depth of bury will conform to Manufacturer's requirements.

2.03 - Service Lines

The following represents the requirements for service line construction:

A.Copper Tubing: Copper Tubing Shall be Type K, soft copper. Connections are to be compression or silver-soldered.

B.Corporation Stops: Mueller 300 Ball Valve Number B-25008 or B25028, AWWA C800 constructed of all brass construction with compression connection.
McDonald Number 4701 BT, AWWA C800.

Ford cc/comp FB-1000-G

Ford IPS/Comp FB-1100-G

C.Curb Stops: Mueller 300 Ball Curb Valve No. B25209, Ford B44, or McDonald 6100 T. Curb stops must have compression end connections, AWWA C800.

D.Curb Boxes: For curb stops up to 1": Mueller H10314 with 89982 lid or McDonald 5601 with 5601L lid. For curb stops larger than 1": Mueller H10314 with 89982 lid and Tyler 6500 Series Enlarged Base #144809 or McDonald 5603 with 5601L lid. Shaft diameter shall be 1" and the top of the shaft shall be a minimum of 18" from final grade and lid.

E.Saddles: Ductile Iron Saddle: Mueller DE2A, JCM-402, Smith & Blair 313, Ford F202, McDonald 3825, 3826 or equal and approved by the District. The saddle must have a double flat strap design with ductile iron body. Said saddle must conform to AWWA C800.

F.Turn-On/Turn-Off of Service: All routine turn-on and turn-off of water service at a curbstop shall be performed only by Town personnel. During emergencies, a customer may turn-off the water service at the curb stop valve. The Town shall be notified of the turn-off and the circumstances at the earliest time. Only Town personnel shall turn-on the water service.

G.Repair of Service Line: Leaks, breaks and general maintenance of the water service line shall be the responsibility of the customer. The customer shall be given notice by first- class mail, that the water service line is defective and in need of repair. Customer shall institute repair or maintenance immediately. If satisfactory progress toward repairing the service line has not been completed in a timely manner or the Town determines that environmental or property damage is being caused, the Town shall shut off the water service until the service line has been repaired. In addition, the Town shall have the right to affect the repair, and the costs therefore shall constitute a lien on the property as provided for by C.R.S., 32-1-1001.

2.04 - Granular Bedding

Two types of bedding material are allowed: Screened rock and soil or select imported material, meeting the following gradation specification table:

TABLE 5.01

Sieve Size	Total Percent Passing by Weight	Screened Rock	Soil or Select Import
1½ inch maximum,			
and maximum of 10% of pipe diameter to ½ inch	100	100	
No. 4	0 to 10	30 to 100	
No. 200	0 to 10	0 to 50	
Minimum compaction requirement			
Tamp to spring line to fill voids below pipe haunches	90% of Standard Proctor placed at ± 3% of Optimum Moisture		

The maximum particle size of pipe bedding should generally not exceed 1½ inches or 10 percent of the nominal pipe diameter, whichever is less. Bedding for small pipe such as service lines should generally have a maximum particle size not exceeding ¾ inch.

Screened rock used for waterline or sewer pipe bedding should be crushed, angular material that meets the requirements of ASTM D 2321, Class IA bedding material. The material should have not more than 10 percent passing the No. 4 (4.75 millimeter) screen, and less than 5 percent passing the No. 200 (75 micrometer) screen. The bedding should be tamped under the haunches of the pipe to spring line. Where future excavation is anticipated, the sloughing properties of screened rock when unconfined should be taken into consideration. The Town may require soil or select import. Where groundwater may be present, the use of screened rock for bedding is prohibited.

Compacted pipe bedding should meet the requirements of ASTM D 2321, Class IB, Class II, or Class III bedding material. The material should have a minimum of 30 percent passing the No. 4 screen and less than 50 percent passing the No. 200 screen. Class 6 aggregate base course per CDOT Table 703.2 conforms to this gradation criteria. The bedding should be compacted to a minimum of 90 percent at +/- 3 percent of optimum moisture content, referencing Standard Proctor (ASTM D698, AASHTO T99). Material containing 10 to 30 percent passing the No. 4 screen can be used with the following considerations: materials in this range can be expected to possess properties similar to screened rock except that compaction will be required and materials in this range may be too free-draining to be testable for compaction by ASTM D698. Flow-fill, a ½ sack (50 pounds) per cubic yard lean concrete mix as defined in the CDOT 1999 Standard Specifications for Road and Bridge Construction, Section 206.02, may be used as bedding where a combination of ease of placement, low permeability, and unconfined stability is desired.

Additional Requirements:

•Bedding materials shall be free of topsoil, organic materials, frozen matter, debris, or other deleterious materials.

•Flow-fill as specified by CDOT 1999 Standard Specifications, Section 206.02, may be used with Town approval.

•Ductile Iron Pipe may be required to be encased in loose polyethylene in conformance with ANSI/AWWA C105/A21.5 installation methods, unless site soils and proposed bedding materials are determined to be non-corrosive to iron pipe when evaluated according to Appendix A of ANSI/AWWA C105/A21.5.

•Materials not meeting these requirements shall be used only with prior written approval of the Town.

In specific areas, such as where access is extremely limited, the use of on-site materials may be allowed, and, when used, must be on-site 1½ inches minus well-graded screened material, free from organic materials, chunks of soil, frozen material, debris, or other suitable materials. Use of on-site bedding material must have prior written Town approval.

2.05 - Marking Tape

The installation of "blue" marking tape is required on all water mains and service lines. The tape shall be installed approximately twenty-four inches (24") above the main or line. The tape shall meet the following specifications:

1.Four (4) mil thick PVC material.2.Solid "blue" color with black lettering.3.Six inches (6") in width.

SECTION 3 - PIPE INSTALLATION

3.01 - Fire Hydrants

A.Installation: The location of all hydrants shall be staked. Final location and grade shall be in accordance with the approved drawings. Offset stakes not farther than 12 feet from the fire hydrant are acceptable. All hydrants shall stand plumb. Each hydrant shall be connected to the main by a six-inch (6") branch line. An independent six-inch (6") gate valve shall be installed on the tee off of the water main. It is the intention of the Town to limit the length of the six-inch (6") branch line servicing the fire hydrant to 50 feet. If the length of the branch line extends beyond 50 feet, an eight-inch (8") main with an eight-inch (8") by six-inch (6") concentric reducer shall be used from the main until a point 50 feet from the hydrant is reached. At that point, a six-inch (6") branch line may be extended to the fire hydrant. No service line connections shall be installed between the fire hydrant and the fire hydrant guard valve. No service line connections shall be made on the six-inch (6") branch line servicing the fire hydrant.

B.Anchorage: The shoe of each hydrant shall be well braced against the un-excavated earth at the end of the trench with a concrete thrust block. Care shall be taken not to cover the weep holes with concrete. The bottom of the hydrant bowl and the hydrant valve shall be supported with minimum 18 x 8 x 4-inch precast concrete blocking slabs or a Town approved equal. The hydrant assembly shall require megalug restraints.

C.Drainage: Wherever a hydrant is set, drainage shall be provided at the base of the hydrant by placing approved granular bedding material from the bottom of the trench, to at least 12 inches above the barrel flange of the hydrant, and as shown on the typical fire hydrant detail. The minimum distance from the bottom of the trench to the bottom of the hydrant elbow shall be six inches (6"). The minimum of approved granular bedding material placed therein shall be 1/3 cubic yards.D.Clearances: The minimum clearances around all fire hydrants shall be: ten feet (10') in the front, seven feet (7') on the sides, four feet (4') on the back, and 20 feet above.

E.Operation of Fire Hydrant: The required operational position of a fire hydrant is either fully opened or fully closed. The guard valve shall control any restriction of flow. The restriction of flow, through a fire hydrant, by means of the "operating nut" is strictly prohibited.

3.02 - Connection to the Town System

A.Connections: Connections to the Town system shall be in a neat and workmanlike manner. The connection shall be inspected and approved by the Town. Under no circumstances shall a non-disinfected main, which cannot be isolated, be connected to an existing distribution main in service.

B.Tapping Existing Mains: Main Line Connections: Unless otherwise approved by the Town, all main line connections shall be made by means of a tee.

Service Taps/Stubouts: During new main line construction, service line stubouts may only be installed after the required tests have been completed and approved by the Town. Stubouts shall be installed by the main line Contractor. Stubouts shall terminate at the curb stop valve. Curb stop valves shall be installed at the property line or edge of easement. The minimum separation distance between service line taps on the main shall be 18 inches.

The Contractor shall install all new service line taps. All tees/taps shall be witnessed and approved by the Town. Any tap preformed without a Town inspection and approval shall be considered "illegal system tampering" and punished in accordance with the provisions of Section 1-4-20 of this Code for each offense. Each day any person is in violation of Chapter 13 of the Minturn Municipal code and shall constitute a separate offense. (Ord. 7-2018 , §4)

SECTION 4 - CONSTRUCTION ACCEPTANCE

4.01 - Requirements

A.Field Maintenance Inspections

1.Fire Hydrant (To Grade and Operated). The fire hydrant shall be straight and plumb, and shall be operated with proper drainage. See Fire Hydrant Assembly detail.

2.Rough Grade Inspection. Above-ground attributes are to be in a reasonable grade so as not to allow standing water to accumulate on top of or allow drainage into the attributes of the system. All attributes within the road right-of-way/easement shall be protected from traffic, equipment, etc.

3.Warranty Period. During the 1-year warranty period that begins at Construction Acceptance, the Town will test the integrity of the telemetry and cathodic protection systems. Remedial repair and subsequent testing will be made by the applicant.

4.Redline Submittal. A redline submittal will be required to be made from the contractor to the engineer in order to facilitate the completion of as-builts in a timely manner.

SECTION 5 - FINAL ACCEPTANCE

5.01 - Requirements

The following items shall be required to be submitted to the Town for approval prior to Final Acceptance. Once these items have been received, reviewed, and approved by the Town Administrator, Final Acceptance may occur.

A.Final Grade and Paving Inspection: All system attributes shall be fully operational and meet Town Standards. Back lot access shall meet Town Standards. The ring and cover shall be centered over the cone section. All system attributes shall meet or exceed Town Standards.

B.Drawings of Record: Field measured Drawings of Record shall be submitted to the Town in the specific format as required by the Town. The Drawings of Record shall include, but not be limited to, all attribute information including main lengths, all bends (horizontal and vertical), valves, hydrants, materials, pipe diameters, encasement, insulation, pipe deflections, and service line information which shall include size, location of line, tap and curb stop. Water and Sewer Drawings of Record shall be submitted on the same drawing. The submittal will contain the swing ties for service lines. The Town requires a digital format using District formatting (AutoCAD Release 14 or newer), and three (3) black line copies of the field-measured Drawings of Record. The Drawings of Record shall also depict the established easement for each line segment with reference to the specific Town of Minturn recording information. Construction drawings will not be accepted as Drawings of Record.

C.Final Inspection: The District shall perform a final walk-through inspection prior to Final Acceptance. The purpose of this inspection is to determine if any changes have occurred since the final grade and paving inspection that would negatively effect the operation of the system. The owner or the owner's designated representative is required to accompany the Town's Inspector during this final inspection

SEWER SPECIFICATIONS

THE FOLLOWING APPLICABLE CONSTRUCTIONS SPECIFICATIONS ARE A PORTION OF THE THE EAGLE RIVER WATER & SANITATION DISTRICT ("DISTRICT") RULES AND REGULATIONS FOR WATER AND WASTEWATER SERVICE.
TABLES, DRAWINGS, DETAILS AND EXHIBITS REFERENCED BELOW ARE INCLUDED IN THE APPENDICES OF THE DISTRICTS' RULES AND REGULATIONS

SECTION I – GENERAL REQUIREMENTS

1.1 Authority
The Standard Specifications for Sewer Mains (the "Specifications") are promulgated by the Eagle River Water & Sanitation District ("District"). The interpretation and enforcement of the Specifications is hereby delegated to the District Regulations Administrator.

SECTION II – COLLECTION SYSTEM DESIGN AND LAYOUT

2.5.10 Manhole Connections
Any new main connection eight inches (8") or greater within a manhole shall match the crown of pipe to crown of pipe at the highest existing main currently within the manhole.

2.5.11 Location/Marking Tape
All lines connected to District mains in any way shall be marked with the appropriate marking tape per Section 3.6 and shall be placed twenty four inches (24") above the pipe.

2.6.3 Horizontal and Vertical Separation from Potable Water Mains
Refer to detail D-11.

(a) Parallel Main Installations and Appurtenances:

Sewer mains and sewer service lines shall be installed at least ten feet (10') horizontally from any existing or proposed water main. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot (10') separation, the District may allow installation of the sewer main closer to a water main utilizing encasement or pressure rated joints, provided that the water main is on a separate trench or on an undisturbed earth shelf located on one side of the main and at an elevation so the bottom of the water main is at least eighteen inches (18") above the top of the sewer main. The District requires a ten-foot (10') separation between water and sewer appurtenances including manholes. If a manhole is installed, it will be measured from outside of manhole to outside of water attribute.

(b) Perpendicular Crossings – Sewer under Water:

If the sewer pipe crosses under the water main but less than eighteen inches (18") of clear space will exist, either the water main or sewer main must be installed with secondary containment. Acceptable options include a pipe casing extending no less than nine feet (9') each side of the crossing. The pipe casing shall be of watertight material with no joints. The casing pipe materials may be steel, ductile iron, fiberglass, fiberglass reinforced polymer mortar (FRPM), or polyvinylchloride (PVC) with suitable carrier pipe supports and casing pipe end seals. Alternatively, concrete or Controlled Low Strength Material (ex. flowable fill) encasement of either pipe extending no less than ten-feet (10') each side of the crossing may be used.

(c) Perpendicular Crossings – Water under Sewer:

If the sewer pipe will cross above or over the water main, either the sewer pipe or water pipe shall be installed with secondary containment unless the vertical distance exceeds five feet (5'). Acceptable options include a pipe casing extending no less than 9- feet each side of the crossing. The casing must be a single section of steel or ductile iron pipe. The design must include a means to support the interceptor or sewer main to prevent settlement and permit maintenance of the water main without damage to the sewer pipe. Alternatively, concrete or Controlled Low Strength Material (ex. flowable fill) encasement of either pipe extending no less than 10-feet each side of the crossing may be used. Crossings involving jointless pipe such as HDPE, fusible PVE or welded steel do not require installation of secondary containment.

SECTION III – MATERIAL SPECIFICATIONS

3.1 General Requirements
All materials must conform to these Material Specifications and shall be new and undamaged. Acceptance of materials, or the waiving of inspection thereof, shall in no way relieve the Applicant of the responsibility for furnishing materials that meet the requirements of these Specifications.

3.2 Pipe and Fittings
The following materials are approved for District mains:

3.2.1 Polyvinyl Chloride (PVC) gravity pipe
Main installations from eight to fifteen inches (8" to 15") in diameter shall conform to ASTM D3034, and shall be either SDR-35/PS46 or SDR-26/PS115.
Main installations from eighteen to twenty-seven inches (18" to 27") in diameter shall conform to ASTM F679 and shall be SDR-26/P115. Push on joints and molded rubber gaskets shall conform to ASTM D3212.
Maximum pipe segment lengths shall be twenty feet (20'). Joint lubricant shall be nontoxic and water-soluble and supplied by the pipe manufacturer.

3.2.2 Polyvinyl Chloride (PVC) pressure pipe

(a) Yelomine
Yelomine pipe shall be SDR-21, restrained joint PVC pressure pipe and fittings having a minimum cell classification of 12454 as defined in ASTM D1784 and materials in conformance with ASTM D2241.

(b) C-900
AWWA C-900 pipe may be used for 8 " through 12" diameter pipe, and shall be pressure class 235 psi, DR18, with push-on joints and flexible elastomeric seals ASTM D3139/ASTM F477. All spigot ends shall be beveled to manufacturer's specifications with gaskets meeting ASTM F477 and joints in compliance with ASTM D3139.

3.2.3 Ductile Iron Pipe (DIP)
Ductile Iron Pipe shall be per ASTM A746, Class 52, 350 psi, AWWAC151. Push-on joints shall be ANSI/AWWA C111/A21.11. Factory applied Protecto 401, or equivalent, ceramic epoxy interior lining for DIP & fittings. Manufactured by U.S. Pipe and Foundry Company/Griffin Pipe Products or approved equal.

3.2.4 Service Line Taps
Factory wyes shall be used for all service line connections with new main installations See Appendix B for requirements for new service line connections to existing mains.

3.2.5 Transition Adapter
If permitted on a case-by-case basis, Harco transition adapters or Shear Guard couplers may be used for pipe material transitions with prior approval. Fernco couplers shall not be permitted.

3.3 Manholes

3.3.1 Manhole
Manhole sections, base, riser, conical top sections, flat slab tops, and joint sealants between manhole sections shall be in accordance with ASTM C 478. Concrete used in cast in place manhole bases shall be per Section 3.3.10. All cone sections shall be the eccentric type. Openings through manhole risers shall be cored or cast-in, and access opening shall be twenty four-inch (24") diameter. Flat lid slabs are required on manholes with a depth of less than five feet (5') and must be eccentric.

3.3.2 Water Tightness
Manholes shall be watertight and constructed of precast concrete. Barrel sections, cones and frame joints shall all be sealed with a double Rub R Nek, or other equivalent material approved by the District. In areas of high groundwater or otherwise required by the District, a bituminous coating, or approved equal waterproofing material, shall be applied to the exterior of the manhole. Manhole vacuum testing shall be required by the District on all manholes in all areas of high groundwater.

3.3.3 Rings and Covers
Manhole rings and covers shall be heavy duty castings ASTM A 536 or gray cast iron per ASTM A 48 and all components shall be traffic rated to AASHTO HS-20. Ring and cover combined weight shall be greater than 245 pounds and machined to fit securely with a non-rocking cover. Manhole covers shall be twenty-four inch (24") in diameter and have a minimum of twenty-two and one-eighth inches (22-1/8") diameter clearance, have a waffle pattern with a flat lid and the lettering "SEWER" cast on the cover. Covers shall be D & L brand model A-1043 or accepted equal. Precision Cover Systems, Inc. (PCSI) fully-adjustable manhole covers with variable grade rings shall be installed in roadways.

3.3.4 Grade Rings
Grade rings shall be in accordance with ASTM C 478 and the maximum height of grade rings shall not exceed eleven inches (11").

3.3.5 Manhole steps
Steps shall be comprised of grade 60 deformed rebar encased in a polypropylene copolymer plastic with a tread width of fourteen inches (14"). The steps shall be M.A. Industries No. PS2-PF or PS2-PF-DF or approved equal. Steps shall be cast in place during manufacturing of the manhole sections and shall be six inches (6") from face of manhole. The top most step shall be installed between eighteen (18") and twenty-four inches (24") from the rim of the manhole. Manhole steps shall be vertically aligned and plumb. Steps shall be typically spaced at twelve inches on-center vertically with a maximum spacing of sixteen inches (16"). Steps shall not be installed in the "chimney" portion of the manhole. Entry steps shall be located in the barrel and cone sections of the manhole. See Standard Manhole Detail D-01.

3.3.6 Joint Sealant
Joints shall be sealed with Rub-R-Nek LTM or approved equal installed on the inner and outer ring. Sealant shall be a flexible gasket-type of Butyl rubber, Federal Specifications SS-S-210 (210-A), per ASTM C990-09, AASHTO M-198 75 1. Sealant shall be applied on all surfaces between precast concrete adjusting ring and casting, individual precast concrete adjusting rings, and precast concrete adjusting ring and cone joints. A compatible primer or solvent as recommended by manufacturer of butyl base material shall be used to prepare surfaces prior to application of butyl base
material and riser rings. Two gaskets with a minimum cross sectional area equivalent to one inch (1") in diameter are required per joint on forty-eight inch (48") diameter manholes. Gaskets for manholes greater than forty-eight inches (48") in diameter shall have a minimum cross sectional area of one and one-half inches (1 ½").

3.3.7 Pipe to Manhole Seal
KOR-N-Seal, A-Lok, or approved equal flexible rubber boot in a cored hole per ASTM C 923 shall be used for installations in pre-cast bases.
For installations in cast-in-place bases (upon approval and on existing mains only), all pipe-to-manhole connections shall use two elastomeric Kor-N-Seal, or approved equal, "O"-ring water stops minimum per ASTM F477.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
P.O.Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
CONSTRUCTION SPECIFICATIONS 1

Sheet:
C.500

SEWER SPECIFICATIONS - CONTINUED

3.3.8 Flow Channel
The flow channel straight through a manhole should be made to conform as closely as possible in shape and slope to that of the connecting mains and shall have two tenths of a foot (0.2') minimum fall through the channel for a standard manhole. Channel depth and width shall equal the largest pipe diameter. The channel walls should be formed or shaped to the full height of the crown of the outlet main in such a manner as to not obstruct maintenance, inspection or flow in the sewers.

3.3.9 Bench
All manholes shall be constructed with a full bench configuration, in which the top of the invert channel walls shall match the crown of pipe elevation. The horizontal bench surface shall be sloped at a minimum of one-half inch (½") per foot, maximum of one inch (1") per foot with a medium broomed finish, perpendicular to the main direction of flow.

3.3.10 Manhole Base
The foundation for each manhole base shall be prepared by replacing unsuitable material with sub grade stabilization material in accordance with Appendix E-Earthwork. The manhole base shall be precast (in accordance with ASTM C478) unless the manhole ties into an existing main, in which case a cast-in-place base may be used. The invert shall be formed and smoothly finished to match the shape and elevation of all pipes connected to the manhole. Where the sewer line is designed with a continuous grade through the manhole, the pipe shall be laid through the manhole location, the top half of the pipe cut out and the manhole base formed around the bottom half of the pipe.
All concrete used in construction of cast-in-place manholes and bases shall be CDOT Class D. Concrete reinforcement shall be epoxy-coated steel reinforcing bars in accordance with ASTM A-615, Grade 60. In instances where a manhole ties into an existing main and a cast-in-place base is used, the first pre-cast manhole section shall be placed on the concrete base structure before the base has taken initial set, or the section shall be grouted into a suitable groove formed in the top of the manhole base.
The first section shall be adjusted to the proper grade and alignment so that it is uniformly supported by the base concrete and not bearing on any of the pipes. The manhole steps shall be located one-foot left or right of the main inflow pipe.
The remaining pre-cast sections shall be placed and aligned to provide vertical sides and alignment of the ladder rungs. Plumbness shall be checked as each barrel section is added. A bitumastic or other approved sealer shall be placed between pre-cast sections so that the completed manhole is rigid and watertight. The sealer shall be placed both on the inside lip as well as the outside lip of each section.

3.3.11 Interior Coatings
For drop manholes (or other applications as identified by the District), manhole interiors shall be coated with a Polyamidoamine Epoxy Primer with Polyamidoamine Epoxy Top Coat such as Tnemec Epoxoline Series L69 or equivalent. Preparation and application shall be per manufacturers' recommendations.

3.4 Concrete/Grout

3.4.1 General Requirements
Contractor shall provide the District Inspector with a specification sheet or mix design from the concrete supplier.

3.4.2 Concrete
All concrete used in construction of cast-in-place manholes and bases shall be CDOT Class D. Construction shall be in conformance with the Detail D-01.

3.4.3 Mortar and Grout
Non-shrink mortar and grout used in the shaping of inverts, grade ring gaps, sealing penetrations, or setting and anchoring cast iron shall consist of one part Type II Portland Cement and two parts of fine, clean sand. Only sufficient water shall be added to provide a stiff, workable cement mixture for proper troweling. Hydrate lime or masonry cement shall not be used. Where relatively thin portions of grout are to be applied (to a flow channel or top of bench) an approved epoxy bonding coat shall be applied to the exposed concrete surfaces prior to grouting.

3.5 Locating Disk
The District will provide green 3M brand Full-Range Disk Marker locating disks to the contractor for stub outs. The contractor shall ensure their correct installation.

3.6 Marking Tape
The installation of green marking tape is required on all sewer mains and service lines.
The tape shall be installed approximately 24 inches (24") above the main or line. The tape shall meet the following specifications:

(a) Five (5)-mil thick Polyethylene material.

(b) Solid green color with black lettering.

(c) Six inches (6") in width.

3.7 Casing Material and Spacers
Carrier pipes to be installed inside casings shall be installed with self-restraining casing spacers. Casing spacers shall provide axial thrust restraint to prevent pipe joint deflection during and after installation. They shall also provide dielectric insulation between the carrier pipe and the casing and facilitate installation of the carrier pipe into the casing. See Sewer Main Casing Detail D-5. Pipe casing shall be smooth wall welded steel ASTM A-53 Grade B cylinder fabricated in accordance with AWWA C200. External loading shall be AASHTO HS-20 highway or E-80 railroad loading, railroad loading plus jacking load. Casing joints shall have ends beveled for field welding, be butt welded with complete joint penetration welds around the entire circumference of the pipe, and be formed and accurately manufactured so that when pipes are placed together and welded they form a continuous casing with a smooth and uniform interior surface. Interlocking joints shall be Permalok Interlocking Pipe Joining System.
Casing spacers shall be stainless steel, two piece bolt-on style, minimum fourteen (14) gauge thickness and a minimum length of eleven inch (11"); casing spacers shall be installed every six feet (6') of the pipeline to support the pipe barrel and the weight of its contents, or at an appropriate spacing as determined by the engineer. The four runners shall be eleven inches (11") long at a minimum and manufactured of high abrasion resistant, low coefficient of friction, glass filled polymer. Runner heights shall be set to center the carrier pipe in the casing. Risers shall be ten (10) gauge maximum, and the coating shall be fusion-bonded epoxy or heat fused PVC. Casing spacer models shall be Uni-Flange Series UFRCS1300, Advance Products and Systems, Inc. SI-12; Pipeline Seal and Insulator, Inc. C12G or approved equivalent. Restrained casing spacers shall be provided at all pipe joints. Restrained casing spacers shall be UniFlange Series UFRCS1390 P or approved equivalent.
Casing end seals shall be preformed and designed to prevent entry of water or loss of material from casing. The end seals shall be made of one-eighth inch (1/8") thick 60 durometer EPDM or neoprene rubber held together with mastic strips to seal the edges.
The seals shall overlap the casing pipe by two inches (2") and shall be held on with AISI 304L stainless steel worm gear clamps. Casing end seals shall be Advance Products and Systems, Inc. AC or AW; Pipeline Seal and Insulator, Inc. C or W; or approved equivalent.

3.8 Tracer Wire (REQUIRED)
See Appendix E

SECTION IV – PIPE INSTALLATION & CONSTRUCTION

4.1 Safety
Job site safety shall be the responsibility of the contractor. The District Inspector may refuse to enter a jobsite if deemed unsafe by Occupational Health and Safety Act (OSHA) standards. Failure to provide a safe jobsite may prevent the District from conducting an inspection.

4.2 Handling of Materials
Pipe and fittings shall be loaded and unloaded by lifting so as to avoid shock or damage. Under no circumstances shall material be dropped. If, however, any part of the pipe is damaged, the replacement or repair of the damaged pipe shall be done to the satisfaction of the District. Any pipe or fittings that are not acceptable to the District shall be removed from the job site immediately. All pipe-handling equipment and pipe handling methods shall be in accordance with the methods and equipment recommended by the manufacturer.
Under NO circumstance shall forks be inserted into any pipe and or fitting.
Pipe shall be stored and handled in accordance with manufacturer's recommendations.
Any pipe with UV degradation or bowing may be rejected by the District Inspector. All pipe shall be delivered to the project site and stored with factory applied end caps intact.

4.3 Inspection and Preparation of Pipe and Fittings
Before placing pipe in the trench, each pipe or fitting shall be thoroughly cleaned of all foreign material, kept clean at all times thereafter, and carefully examined for cracks, warping, or any other defects before installation. Bell ends and spigot ends are to be examined and free of defects. Following the inspection, end caps shall be replaced prior to placing the pipe in the trench.
All lumps, blisters and excess coatings shall be removed from the pipe and fitting, and the outside of the spigot and the inside of the bell shall be wiped clean, dry and free from oil and grease before the pipe or fitting is installed. Dirt and any other material must be removed from the barrel of the pipe before installation.

4.4 Cutting and Fitting of Pipe
Pipe shall be cut in accordance with manufacturer's recommendations, whenever necessary, to conform to location of fittings, line, or grade. All cuts, when required, shall be straight, true and beveled and may be made with plastic pipe cutters or completed per the DIPRA Guidelines for Field Welding and Cutting Ductile Iron Pipe (August 2015). All burrs shall be removed from the ends of cut pipe and the ends of the pipe lightly rasped or filed.

4.5 Pipe Alignment and Grade
Manholes shall be installed at staked locations and elevations. Main installation stakes for alignment and grade shall be set by a surveyor under the guidance of a Professional Land Surveyor who is registered in the State of Colorado.
Pipe shall be installed at a constant grade from manhole to manhole. No grade breaks or low spots will be accepted. Pipe shall be installed with the bell ends facing in the direction of installation, unless directed otherwise by the District. Where pipe is to be installed on a grade of ten percent (10%) or greater, the installation shall start at the bottom and shall proceed upward with the bell ends of the pipe up grade.

4.6 Temporary Plugs
A mechanical pipe plug shall be used as a temporary plug during line installation to isolate the mainline extension from the existing collection system. All temporary plugs shall be provided by the Contractor.

4.7 Frost
No pipe or appurtenant structure shall be installed upon a foundation into which frost has penetrated, or if at any time there is danger of ice formation. No pipe or appurtenant structure shall be installed unless backfilling can be completed before the formation of ice and frost.

4.8 Lowering of Material into the Trench
Proper implements, tools and facilities satisfactory to the District shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, manholes, and accessories shall be carefully lowered into the trench piece by piece by means of suitable tools and equipment, in such a manner as to prevent damage to the materials. Under no circumstances shall the materials be dropped or dumped into the trench.
If damage occurs to any pipe, manholes or main accessories in handling, the District inspector may reject the damaged material at the discretion of the inspector.

4.9 Installation of Pipe

4.9.1 General Requirements
Factory applied end caps shall remain installed on the pipe while it is being placed in the trench to prevent foreign material from entering the pipe. The end cap shall be left in place until the connection is to be made to the adjacent pipe. During installation, no debris, tools, clothing or other foreign materials shall be placed in the pipe. As each length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe inserted to the manufacturer's recommended depth with a slow steady pressure without jerky or jolting movements and brought to correct line and grade. The pipe shall be secured in place with bedding material tamped under it, except at the bells. Precautions shall be taken to prevent dirt from entering the joint space. No wooden blocking shall be left at any point under the pipeline. All pipe joints shall be uniform and smooth transitions shall exist from joint to joint or fitting.
See Appendix E for bedding, backfill and compaction requirements.

4.9.2 Ductile Iron Pipe
Push-On Joints: The inside of the bell, the outside of the spigot end, and the rubber gasket shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter. The rubber gasket shall be flexed inward and inserted into the gasket recess of the bell socket. NSF-61 approved gasket lubricant per the manufacturers recommendations shall be applied to either the inside face of the gasket, and the spigot end of the pipe, per the manufacturer's recommendations.
The spigot end of the pipe shall be placed in the bell end with care to prevent the joint from contacting the ground. Pipe furnished without a depth mark on the spigot end shall be marked before assembly to ensure insertion to the manufacturer's recommended depth. The pipe shall be kept in straight alignment and the joint shall be completed by inserting the pipe to the manufacturer's recommended depth with a slow, steady pressure by using a long pry bar, jack, lever puller, or backhoe bucket. A timber header should be used between the pipe and the jack or backhoe bucket to avoid damage to the pipe.
Upon completion of joining push-on joint pipe, an inspection shall be made to ensure that the gasket is correctly aligned in the gasket recess of the bell socket and not twisted or turned.

4.9.3 Polyvinyl Chloride Pipe
Elastomeric Gasket Joints: Immediately before joining two (2) lengths of PVC pipe, the inside of the bell or coupling, the outside of the spigot and the elastomeric gasket shall be thoroughly cleaned to remove all foreign material.
Lubrication of the joint and rubber gasket shall be done in accordance with the pipe manufacturer's specifications.
Care shall be taken that the correct elastomeric gasket, compatible with the annular groove of the bell, is used. Insertion of the elastomeric gasket in the annular groove of the bell or coupling must be in accordance with the manufacturer's recommendations.
The spigot and bell or coupling shall be aligned and inserted to the manufacturer's recommended depth or reference line. Installation or pushing shall be done in a smooth, steady motion. Upon completion of joining the pipe, an inspection shall be made to assure that the gasket is correctly aligned in the gasket recess of the bell socket and not twisted or turned. NO deflection will be allowed at a joint of PVC pipe.

4.9.4 Yelomine Pipe
Installation of Yelomine pipe shall be in accordance with the manufacturer's recommendations and specifications. Cleanout caps shall be installed with nonpermanent gaskets where applicable.

4.9.5 Job-Mixed Concrete
Job-mixed concrete shall be thoroughly mixed to combine aggregates, cement, and water into a uniform mass.

4.9.6 Ready-Mixed Concrete
Said materials must be proportioned, mixed and transported in accordance with ASTM C94. Any concrete not plastic and workable when it reaches project shall be rejected.
See Section 3.4 for material specifications.

4.10 Manholes
Manholes shall be precast, watertight and constructed in accordance with the District's standard details and per Section 3.3. For precast manhole bases, the area underneath the manhole base shall be excavated and bedding material shall be placed and compacted to 95% Modified Proctor the required elevation. The manhole base shall then be lowered into the trench and checked for proper bearing on the subgrade, proper elevation and orientation to receive the incoming and outgoing sewers at the designated invert elevation. If the invert elevation varies by more than plus or minus one half inch (1/2") from the designated invert elevation, the base shall be removed and reset. The concrete invert channel and bench shall be constructed following the connection of all sewer pipes to the manhole. The flow channel shall be smooth and true to the sewer pipe invert elevations, with uniform cross section and slope, either straight or with a continuous curve between inlet and outlet of pipes. To eliminate free fall conditions in a manhole resulting from invert elevation differentials between incoming and outgoing pipes, the Contractor shall form and construct suitable channels in the bottom of the manhole connecting the inverts. Shape channel base and bench per Sections 3.3.8 and 3.3.9, respectively. New manholes shall have pre-formed holes for pipe installation and existing manholes shall be cored to install pipe and connector. Chip existing concrete
bench inside manhole and shape smooth continuous invert for connections to existing manholes. All pipe-to-manhole connections and grade adjustment rings shall be sealed and grouted with non-shrink materials and be watertight. All lift holes shall be filled with non-shrink grout.
All dimensions, locations and elevations shall be coordinated by the Applicant and Contractor and meet the requirements of the District. Cast-in-place manhole bases will only be allowed when connecting to an existing main.

4.11 Service Lines
Refer to Appendix B, Section II.

SECTION V – TESTING AND ACCEPTANCE

5.1 General Requirements for Connections
Connections to the District system shall be inspected and approved by the District prior to backfilling.

5.1.1 Service Connections
Refer to Appendix B.

5.1.2 Connections to Manholes
All connections shall match the crown of pipe to crown of pipe at the highest existing main or per the direction of the District. All new main installations shall require reformed benches that meet all District standards.

5.2 Testing – Sewer Mains

5.2.1 Alignment
Straight alignment shall be checked by using either a laser beam or lamping.

5.2.2 Low Pressure Air Testing – General Requirements
The air test shall, as a minimum, conform to the test procedure described in ASTM F 1417 Standard Practice for Installation Acceptance of Plastic Non-Pressure Sewer Lines Using Low-Pressure Air. Deflection testing should occur prior to air test.

5.2.3 Low Pressure Air Testing Procedure

(a) Lines must be cleaned by flushing or by other means before the low pressure air test is to begin.

(b) Isolate the sewer line to be tested and ensure that all other outlets from which air could escape are properly sealed. In this step of the procedure, it is necessary to inspect the manhole invert being plugged to be sure that it has no damage which will be covered by the plug and not detected with the low-pressure air test.

(c) Determine the duration of the test by using the accompanying tables at the end of this section.

(d) Begin the test by connecting the air source to the inlet tap. Slowly add air until the internal pressure of the test section reaches a pressure 4.0 psig. If ground water back pressure exists, it must be quantified by the Engineer prior to testing.

(e) After the constant pressure of 4.0 psig is obtained, regulate the air supply so that the pressure is maintained between 3.5 to 4.0 psig for at least 2 min. Depending on air/ground temperature conditions, the internal air temperature will stabilize in equilibrium with the temperature of the pipe walls. The pressure will normally drop slightly until equilibrium is obtained; however, a minimum of 3.5 psig is required.

(f) Once the pressure has stabilized to 4.0 psig (plus the average ground water back pressure, if applicable) disconnect the air supply from the control panel. Observe the continuous monitoring gauge and decrease the internal pressure to no less than 3.5 psig. At a reading of 3.5 psig or within the range of 3.5 to 4.0 psig, stop decreasing the pressure and commence timing with a stopwatch or watch with a second hand or digital readout in minutes and seconds with an accuracy of 0.1.s.

(g) Once the predetermined time period from the formula or table above has elapsed, observe the continuous monitoring gauge to obtain the amount of pressure lost during the test duration. If the pressure drop is found to be less than 1.0 psig (or 0.5 psig in circumstances where a shorter test duration is desired), the section is presumed to be free of any leaks or defective joints. If the pressure drop is 1.0 psig or greater (0.5 psig or greater in circumstances where a shorter test duration is desired), the test section has failed due to excessive pressure loss. When low-pressure air testing of a sewer line results in a failure the Contractor, at his/her own expense, shall detect the leak or defect and repair or replace whatever is necessary to remedy such defect in a manner acceptable to the Owner.

See TABLE D-3 for Minimum Time for a 1.0 psig Pressure Drop for Size and Length of Pipe for Q = 0.0015
See Table D-4 for Minimum Time for a 0.5 psig Pressure Drop for Size and Length of Pipe for Q = 0.0015

5.3 Manhole Testing – General Requirements

Manhole vacuum testing shall be required by the District on all manholes in all areas of high groundwater via the vacuum test per ASTM C1244, "Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) prior to backfill.

5.3.1 Manhole Testing Procedure

(a) Plug all inlets and outlets.

(b) Install the vacuum tester head assembly on the manhole.

(c) Attach the vacuum pump assembly to the proper connection on the test head assembly. Make sure the vacuum inlet/outlet valve is in the closed position.

(d) Inflate the sealing element to twice the test pressure to be used. Do not over inflate.

(e) Start the vacuum pump assembly engine and allow preset RPMs to stabilize.

(f) Open the inlet/outlet ball valve and evacuate the manhole to ten-inch (10") Hg (mercury) that is equivalent to approximately 5 PSIG (0.3 bar) backpressure.

(g) Close the vacuum inlet/outlet ball valve, disconnect the vacuum pump and monitor the vacuum for one (1) minute.

(h) Allowable leakage - less than one-inch (1") Mercury (Hg) in one (1) minute.

(i) All manholes that do not meet the minimum amount for the leakage rests must be repaired and re-tested.

5.4 Television Inspection – General Requirements

Prior to construction/final acceptance of any sanitary sewer line by the District, the main shall be inspected internally by television as outlined in this Section. Leakage testing shall be performed prior to televising. The complete job is ready for television inspection when the following work has been completed.

(a) All sewer pipelines are installed and backfilled.

(b) All attributes are in place, all inverts are complete and pipelines are accessible.

(c) All other underground facilities, utility piping and conduits are installed.

(d) Pipelines have been jet cleaned.

(e) Final air test has been completed.

When the above work is complete, the Contractor shall arrange for the television inspection. The Contractor of the project will notify the District in writing as to the scheduled date of the television inspection.
After conditions a through e as outlined above, are met, the entire job will be televised.

(a) A video. accompanied by Standard Form 6.3 shall document defects requiring correction.

(b) If no deficiencies are observed, the work will be considered satisfactory.

There is no acceptance tolerance for defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, dimples or bumps in the pipe, or groundwater infiltration.

5.4.1 Inspection Format
Sanitary sewer lines shall be inspected by means of remote CCTV. All CCTV work shall conform to current NASSCO-PACP standards. Contractor shall provide the District with CCTV inspections (video and data collected) entirely in electronic format. Mains shall be tested with three and a half (3.5) gallons of water per minute flowing during televising and shall follow the direction of flow. The camera must be centered in the pipe and the speed of travel shall be slow enough to inspect each pipe joint, and tee connection, and should not, at any time, be faster than 30 feet per minute. The documentation of the work shall consist of PACP CCTV Reports, PACP database, logs, electronic reports, etc. noting important features encountered during the inspection. All CCTV video observations shall be identified by audio and recorded on the District Standard Form 6.3 and is required to accompany each submittal.

5.4.2 CCTV Video Content
Submitted CCTV videos shall include:

(a) Footage indicator

(b) Running time

(c) Date

(d) Location

(e) Beginning (upstream) and ending (downstream) manhole numbers for each run. Manhole numbers corresponding with the District's GIS mapping system shall be obtained by the District field inspector.

5.4.3 District Review
The Contractor will be notified in writing of any deficiencies revealed by the television inspection that require repair. If corrective work is indicated and the Contractor wishes to view CCTV videos, he shall contact the District to set a time for the viewing.

5.4.4 Correction of Deficiencies
Those segments of the pipeline system that have been corrected must be re-televised. The procedure outlined in above will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the District. Prior to submittal to the District, the CCTV videos shall be reviewed by the Engineer, Applicant, and Contractor for any defect that may be visible. If CCTV videos and cut sheets are submitted to the District that are deemed "unacceptable," the Contractor shall be charged for the time taken by District personnel to review the CCTV videos. The minimum charge shall be one hundred dollars ($100).

5.5 Sewer Main Repairs
All proposed repairs must be approved by the District Inspector prior to actual repair. Once repair has been made, inspection will be required by a District Inspector. There will be no exception to this requirement. If a repair and/or correction is made in a sewer line segment, the entire line segment shall be required to be re-televised with water flowing. A line segment is defined as the entire length of sewer line from manhole to manhole.

5.6 Protection of Existing Sewer System
On the outlet of the connection point to the existing District sewer main, a mechanical plug shall be installed to prevent any flow, debris and or material from the newly constructed main line from entering the District's system. The plug shall be normally set on the downstream outlet of the manhole. Plugs shall be installed per the direction of the District's Inspector. The plug shall be a mechanical-type device and is to be secured to the existing manhole to prevent loss of plug. The plug shall not be removed until Construction Acceptance has occurred. The Contractor shall be required to make routine inspections of the mechanical plug to insure that no leaking is occurring. If a leak is found, the Contractor shall immediately notify the District and take corrective action. The District may perform a video inspection of existing sewer mains that could potentially be impacted by construction activities prior to the start of construction and after the completion of construction. Any damage to existing facilities caused by the Contractor shall be repaired at the Contractor's expense.

5.7 Manhole Abandonment
Manholes to be abandoned in place shall have all pipes entering or exiting the structure plugged with lean concrete or controlled low strength material backfill (Flo-Fill). For manholes with existing pipes too large to plug with fill, a bulkhead shall be constructed on the inside of the manhole to prevent the fill from entering the pipes. Manhole tops or cone section shall be removed to the top of the full barrel diameter section or to a point not less than eighteen (18) inches below final grade. The structure shall then be backfilled with lean concrete or Flo-Fill. Surface restoration shall be completed to match the surrounding areas.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY:	KRA
CHECKED BY:	DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
CONSTRUCTION SPECIFICATIONS 2

Sheet:
C.501

CONSTRUCTION SPECIFICATIONS

THE FOLLOWING APPLICABLE CONSTRUCTION SPECIFICATIONS ARE A PORTION OF THE TOWN OF MINTURN ENGINEERING STANDARDS. TABLES, DRAWINGS, DETAILS AND EXHIBITS REFERENCED BELOW ARE INCLUDED IN THE TOWN STANDARDS.

CHAPTER 2 - SITE WORK/EARTHWORK/GRADING
SECTION 1 - SCOPE
All site work and earthwork shall comply with the requirements of these STANDARDS AND SPECIFICATIONS and any special criteria established by the Town of Minturn. Site work shall be completed as shown on the approved engineering plans. Site work shall consist of demolition, removal, and abandonment; clearing and grubbing; overlot grading; removal of topsoil; site preparation; embankment subgrade preparation; embankment fill; excavation, trenching, bedding and backfill of pipelines and service lines; excess excavation; structure backfill; roadway excavation, backfill and compaction; borrow; and restoration and cleanup. All workmanship and materials shall be in accordance with the requirements of these STANDARDS AND SPECIFICATIONS and shall conform to the lines, grades, quantities, and the typical cross-sections shown on the approved plans, or as directed by the Town Engineer or as directed by the Engineer-of-Record (EOR).

1.01 -Inspections

A Grading Permit shall be required for all construction activities. Construction activities shall be subject to inspection by the Town Engineer, and certain types of construction shall have continuous inspection.

It shall be the responsibility of the person performing the work authorized by a permit to notify the Town Engineer or his authorized representative that such work is ready for inspection. Every request for inspection shall be filled at least one (1) working day before such inspection is desired unless otherwise stated in these STANDARDS AND SPECIFICATIONS. An inspection request may be in writing or by telephone, at the option of the Town Engineer.

It shall be the responsibility of the person requesting an inspection required by these STANDARDS AND SPECIFICATIONS to provide access to and means for proper inspection of all work. All work shall be inspected by the Town Engineer or his designated representative. The Town Engineer has the authority to halt construction when, in his opinion, these STANDARDS AND SPECIFICATIONS and/or standard construction practices are not being followed, or the work is otherwise defective. Whenever any portion of these STANDARDS AND SPECIFICATIONS are violated, the Town Engineer shall give the Contractor written notice listing deficiencies to be corrected and may order further construction stopped until all deficiencies are Corrected. If the deficiencies are not corrected within the time limit specified in the notice, the Town Engineer may invoke enforcement options authorized by the Minturn Municipal Code and/or draw upon performance guarantees under which the work is being performed.

For small commercial developments, Minturn may require the development to hire a qualified private contract inspection professional or a Colorado Registered Professional Engineer at the developer's cost to certify to Minturn that the work was completed in accordance with these STANDARDS AND SPECIFICATIONS.

Landscaping that is privately owned and maintained by a Homeowners Association (HOA) or other property management entity shall be designed and constructed in accordance with these STANDARDS AND SPECIFICATIONS. Compliance to these STANDARDS AND SPECIFICATIONS shall be certified by a qualified third party approved by Minturn and paid by the developer. Minturn shall assist with inspection of the irrigation system for the landscaping.

Adequate inspections assure compliance to the Town of Minturn requirements and are the basis for the town's recommendation that said improvements be accepted for maintenance and for release of performance guarantees. It is the responsibility of the Contractor to contact the Town Engineer a minimum of one (1) full working day (twenty-four [24] hours) in advance of the required inspections. Required inspections shall include:

A. Erosion Control: Ensure that the Erosion Control Plan is adhered to and Best Management Practices (BMP's) are properly installed and maintained.

B. Geotechnical Testing: Verify that a Colorado Registered Professional Engineer (or designated representative), who practices the field of Geotechnical Engineering, is onsite and that adequate testing is performed. Full-time observation and testing is required for over-excavation work.

C. Grade Certification: Verify that the extent and depths of proposed work is certified. Verify the final grade.

The Contractor shall provide access to all Minturn Inspectors/Representatives, and all other project quality control (QC) and/or quality assurance (QA) personnel throughout the earthwork process for observation and testing purposes. The Contractor shall not proceed with work until the project Soils Engineer has performed adequate observations and testing, unless approved by the Town Engineer.

All testing and retesting to meet requirements and specifications shall be at the Contractor's or owner's expense.

SECTION 2 - DEMOLITION, REMOVAL AND ABANDOMENT

The Contractor shall remove—wholly or in part—and satisfactorily dispose of all foundations, structures, fences, old pavements, abandoned pipelines, and any other obstructions which are not designated on the approved plans or allowed to remain.

Where portions of structures shall be removed, the remaining parts shall be prepared to accommodate the new construction. The work shall be performed in such a manner that materials left in place shall be protected from damage. All damage to portions of structures to remain shall be repaired at the Contractor's expense.

2.01 - Disposal

The Contractor shall make all necessary arrangements for obtaining suitable disposal locations. If disposal shall be at other than established dumpsites, the EOR may require the Contractor to furnish written permission from the property owner on whose property the materials and debris is proposed to be placed. Materials and debris shall be disposed of in a manner approved by the Town Engineer. Burning shall not be allowed without prior written approval of the Town of Minturn.

2.02 - Salvage
All salvageable material shown on the approved plans and any additional salvageable material marked by the EOR shall be removed without unnecessary damage in sections or pieces which may be readily transported and shall be stored by the Contractor in locations approved by the EOR. The Contractor shall be required to replace any materials lost from improper storage methods or damaged by negligence. These materials include, but shall not be limited to, manhole frames and covers; inlet grates; valves and)re hydrants; landscape plant materials; fence materials; handrails; culverts; guardrail; walkway; roadway and traffic appurtenances (traffic signals and attached hardware, including mast arms and span wire) and irrigation systems and appurtenances.

2.03 - Pipe and Appurtenances

All pipe and appurtenances to be taken out of service shall be completely removed or abandoned in place, as required by the EOR.

Pipe designated to be reused shall be removed and stored, when necessary, to prevent loss or damage before re-laying.

Excavation required to remove pipe or appurtenances shall be back filled and compacted in accordance with Section 5 - TRENCHING, BACKFILLING AND COMPACTING of these STANDARDS AND SPECIFICATIONS.

When pipe is to be abandoned in place, it shall be completely filled with fly ash slurry composed of approximately sixty-five (65) percent Class C Fly ash and thirty-five (35) percent water, unless otherwise approved by the EOR. Each end of the pipe shall be capped with concrete.

When removing appurtenances such as manholes, catch basins, inlets etc., any live lines connected to these appurtenances shall be properly bypassed and shall remain in operation until abandonment is complete.

When appurtenances are to be abandoned in place, the remaining structure shall be lowered to a minimum of three (3) feet below finished grade, and shall be filled with concrete with a minimum compressive strength of 3000 psi (at 28 days) to the top of the remaining structure and then backfilled and compacted to the required grades.

2.04 - Pavement and Concrete Flatwork

All concrete or asphalt to remain shall have a straight, true break line and a vertical face. Concrete or asphalt may be cut with a cutting wheel, jackhammer, or saw. The EOR may require that saw-cutting be performed. Any damage to adjacent concrete or asphalt to remain in place shall be repaired at the Contractor's expense. The minimum depth of saw cuts in concrete shall be two (2) inches.

If areas cut for future placement of concrete or asphalt adjacent to existing asphalt or concrete are left exposed for longer than thirty (30) days or are subjected to inclement weather, the areas shall be evaluated by a Geotechnical Engineer and a recommendation shall be provided to the EOR. An additional cut of at least six (6) inches behind and/or below the existing structure—or until competent subgrade is encountered—may be required by the EOR.

SECTION 3 - SITE PREPARATION

SECTION 3 - SITE PREPARATION

3.01 - Clearing

All sites to receive fill shall be cleared of organic materials, including root structures, at the Contractor's expense. Vegetation shall be pulled or grubbed in such a manner as to assure complete and permanent removal. Branches of trees extending over the roadbed shall be trimmed to give a clear height of twenty (20) feet above the road bed surface. All surface objects and trees, stumps, roots and other protruding obstructions not designated to remain shall be cleared and/or grubbed as required. Non-biodegradable, solid objects located at least two (2) feet below the final subgrade surface may remain at the discretion of the EOR.

The EOR may establish clearing lines and designate items and materials to remain. The Contractor shall preserve all materials and items to remain. Paint used for cut or scarred surfaces of trees or shrubs to remain shall be an approved asphalt base paint formulated especially for tree surgery.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable material and compacted in accordance with these STANDARDS AND SPECIFICATIONS.

The Contractor shall scalp areas where excavation or embankment shall be made. Scalping shall include the removal of organic material such as brush, roots, sod, grass, residue of agricultural crops, sawdust, and vegetable matter from the surface of the ground.

An overlot grading summary report prepared by the project Soils Engineer which states that fill placement is in conformance to approved plans and reports and includes locations and elevations of field density tests (referenced from a permanent landmark or permanent control point), summaries of field and laboratory tests and any other substantiating data and comments regarding deviations from the approved plans and reports and how they relate to or affect recommendations in the approved Geotechnical Engineering Report and grading plan.

SECTION 4 - EARTHWORK

Earthwork shall consist of excavation, disposal, shaping and compaction of all material encountered within the limits of the project, including but not limited to excavation of ditches and channels, surface boulders, muck, rock, concrete foundations, slabs, stripping, etc. Excavation shall be performed to the line and grade and typical cross-sections shown on the approved plans or as required by the EOR.
Free-running water shall be drained from all earthwork materials prior to construction of structures, utilities, or concrete 4atwork construction.

4.01 - Definitions

A. **Suitable Material**: Any earthen material that consists of onsite or similar non-organic sands, gravels, clays, silts and mixtures thereof with a maximum size of six (6) inches. Claystone fragments exceeding three (3) inches in particle size are not to be incorporated in embankment material unless specifically approved by the project Soils Engineer and the EOR.

B. **Bedrock:** Bedrock that breaks down to specified soil types and sizes during excavation, hauling and placement may be considered as suitable material.

C. **Rock Excavation:** Igneous, metamorphic or sedimentary rock formations that cannot be excavated with a D-9 tractor in good repair with a single hydraulic ripper.

4.02 - Borrow

It shall be the Contractor's responsibility to stockpile suitable materials for use in the project. Only after the Contractor estimates that sufficient suitable back#ll material is stockpiled to complete all earthwork operations of the project, shall excavated material be removed from the project site.

If the Contractor fails to preserve onsite, su1cient suitable material, and removes or disposes of suitable material, suitable material shall be recovered at the Contractor's expense.

4.03 - Embankment Construction

Embankment construction shall include placement, processing and compaction of all embankment material, and all related work required to ensure proper bond of materials with previously placed embankment material.

A. Preparation of Embankment Subgrade: The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drain systems shall be installed to intercept or divert surface water that may affect the work.

Where an embankment shall be constructed, unsuitable material shall be removed from the surface. The cleared surface shall be plowed or scarified to a minimum depth of six (6) inches. The embankment area shall adhere to the density and moisture content requirements shown in the following table, unless otherwise approved by the project Soils Engineer and the EOR:

TABLE 2.01

Soil Classification AASHTO M145	*Relative Compaction by Standard Proctor ASTM D698 or AASHTO T99 (percent compaction)*	*Relative Compaction by Modified Proctor ASTM D1557 or AASHTO T180 (percent compaction)*	*Moisture Content Range (with respect to Optimum Moisture Content)*
A-1, A-2, A-3	—	95	-2 to +2 (based on AASHTO T180)
A-4, A-5, A-6	95	—	-1 to +3 (based on AASHTO T99)

If equipment is deemed inadequate, the project Soils Engineer and/or the EOR may recommend the use of larger or different types of equipment.

After subgrade is properly prepared, the embankment filling operation shall begin in the deepest part of the area to be filled. Embankment material shall be placed and compacted in parallel layers until the finished rough grade is reached. Temporary gaps through the embankment shall not be allowed without approval of the EOR. All temporary slopes shall not be steeper than 4:l (horizontal:vertical).

The thickness of each layer shall not exceed six (6) inches before compacting.

B. Embankments Greater Than Twelve (12) Feet in Height

Compaction operations shall continue until each layer of embankment material for embankments greater than twelve (12) feet in height is compacted to the moisture and density requirements shown in the following table, unless otherwise required by the project Soils Engineer and the EOR.

TABLE 2.02

Soil Classification AASHTO M145	*Relative Compaction by Standard Proctor ASTM D698 or AASHTO T99 (percent compaction)*	*Relative Compaction by Modified Proctor ASTM D1557 or AASHTO T180 (percent compaction)*	*Moisture Content Range (with respect to Optimum Moisture Content)*
A-1, A-2, A-3	—	96	-2 to +2 based on AASHTO T180)
A-4, A-5, A-6	100	—	-1 to +2 (based on AASHTO T99)

4.04 - Excavation

It is the sole responsibility of the Contractor to become familiar with the existing conditions and potential excess excavation at each project site. Geotechnical reports or other data provided by Minturn may be used to assist in determining general site and soil characteristics.

4.05 - Structure Backfill

Structure backfill shall comply with Section 4.01 De5nitions of these STANDARDS AND SPECIFICATIONS. Structure backfill material shall have a liquid limit not exceeding thirty-5ve (35) and a plasticity index less than fifteen (15), as determined by AASHTO T 89 and T 90, unless otherwise approved by the project Soils Engineer and the EOR.

Areas adjacent to structures and other areas inaccessible to mobile compaction equipment shall be compacted with suitable power-driven hand tampers or other approved devices. Backfilling shall consist of placing materials in horizontal, uniform layers brought up uniformly on all sides of the structure. **The thickness of each layer of back ll shall not exceed SIX (6) inches before compacting to the required density.**

Backfill material shall not be deposited against the back of concrete abutments, concrete retaining walls, or the outside of cast-in-place concrete structures until the concrete has developed a strength of not less than eighty (80) percent of the required design strength. Backfill placed within two (2) feet of any structure shall be placed evenly on all sides to avoid unequal lateral pressures.

In the event that suitable backfill material is not available on the site, the Contractor shall import Class 1 structure backfill materials as defined in Section 4.01 De5nitions of these STANDARDS AND SPECIFICATIONS, or other material approved by the project Soils Engineer and the EOR. The Contractor shall not be required to excavate below the depths of excavation indicated on the approved plans to provide structure backfill material.

The Contractor shall uniformly process, maintain proper moisture in, and properly compact each lift throughout the backfilling process. All testing shall comply with Section 5.07 Compaction Testing of these STANDARDS AND SPECIFICATIONS.

SECTION 5 - TRENCHING, BACKFILLING AND COMPACTION

This work shall consist of furnishing all labor, materials, tools and equipment for trenching, bedding, backfill and compaction for all underground utilities (inclusive of "dry" utility trenches located under roadways or within roadway R.O.W.) as specified herein and shown on the approved plans. The excavation shall be made to lines and grades shown on the approved plans and as established by the EOR. Except where shown otherwise on the approved plans and except where the EOR gives written permission to do otherwise, all trench excavation shall be made by open cut to the depth required to construct the pipelines as shown on the approved plans. All excavation shall be 'unclassified', as defined in Section 4.01 Definitions of these STANDARDS AND SPECIFICATIONS. All trenching shall be performed in accordance with all Occupational Safety and Health Administration (OSHA) requirements. These regulations are described in Subpart P, Part 1926 of the Code of Federal Regulations.

All excavated material which meets the requirements for backfill materials shall be stockpiled in a manner which shall not contaminate the excavated material, and shall be located a sufficient distance from the trench to avoid overloading, to avoid obstructing sidewalks, driveways, or streets, and to provide the least possible interference with traffic

5.01 - Special Conditions

A. Subsurface Investigation: Prior to the connection of any planned utility line to an existing line, the Contractor shall expose the existing utility at the points of connection in order to verify the elevations and materials of construction. The EOR shall be notified a minimum of two (2) working days before such an investigation is performed. The Contractor shall also expose utilities as they cross each other to allow for verification of elevation and materials of construction. The EOR shall evaluate this information and provide revisions, if required, within three (3) working days of the completion of the investigation.

B. Underground Wire, Cable, Fiber Optic, or Similar Lines: Where underground wire, cable, fiber optic or similar lines are encountered, they shall be relocated as directed by the telephone service provider and in accordance with their speci5cations. The Contractor shall coordinate this work with all other phases of construction to avoid further conflicts.

C. Gas and Electric Lines: Where underground gas and electric lines are encountered, they shall be relocated as directed by the gas and electric service provider and in accordance with their specifications. The Contractor shall coordinate this work with all other phases of construction to avoid further conflicts.

5.02 - Removal of Water

The Contractor shall provide and maintain adequate equipment to properly remove and dispose of all surface or ground water that enters the trench. Water shall be disposed of without damage to adjacent property and without being a nuisance to public health and convenience. The use of any sanitary sewer to dispose of trench water shall not be allowed. The trench shall be dry at all times during pipe installation. Dewatering shall be accomplished by well points, sumping or any other method approved by the Engineer.

5.03 Trench Excavation for Pipelines and Service Lines

The width of the trench shall comply with the requirements set forth in these STANDARDS AND SPECIFICATIONS and shall be sufficient to allow pipe to be installed and backfill placed and compacted. The allowable trench width, regardless of the type of soil encountered, the depth of excavation or method of bedding densification, shall not exceed the outside diameter of the pipe barrel plus twenty-four (24) inches, or be less than the outside diameter of the pipe barrel plus twelve (12) inches when measured at any point below the top of the pipe bell, flange or collar.

Where the width of the lower portion of the trench exceeds the maximum width herein stated, the Contractor shall furnish and install special pipe embedment or concrete encasement to protect the pipe from the additional loading. The type and quantities of special pipe embedment shall be determined by the pipe supplier, using trench loading criteria based upon saturated backfill weighing one-hundred twenty (120) pounds per cubic foot and allowance for other superimposed live loads.

A. Preparation of Foundation for Pipe Laying: When the excavation is in firm earth, care shall be taken to avoid excavation below the established grade plus the required specified over-depth to accommodate the pipe bedding material.

In case soft or otherwise unsuitable foundation material is encountered in the bottom of the trench, the project Soils Engineer and/or the EOR may require removal and replacement with stabilization material to provide a suitable foundation for the pipe. If the trench bottom is wet, the project Soils Engineer shall determine whether it is stable. The bottom of sumps utilized for dewatering shall be two (2) inches minimum below the bottom of the trench excavation to prevent the upward flow of water into the excavation, which may result in unstable bottom conditions.

5.04 - Bedding for Pipelines and Service Lines

See Sheets C.500 and C.501 for Specifications for Bedding Requirements for Water Mains, Sewer Mains and water and sewer Service Lines.

Bedding material type and placement for storm sewer pipe shall be that specified in the latest version of the "Standard Plans M&S Standards" Plan No. 5 M-603-1 through M-603-3 for metal, plastic, and reinforced concrete pipe.

5.05 - Backfill for Pipelines and Service Lines

Suitable backfill shall be as defined in Section 4.01 Definitions of these STANDARDS AND SPECIFICATIONS. Clay and similar material with a liquid index in excess of thirty-five (35) and a plasticity index in excess of six (6), as determined in accordance with AASHTO T89 and T90, shall not be considered suitable for backfilling in trenches located in improved streets, roads, highways and thoroughfares, unless approved by the Town Engineer.

When the excavated material is unsuitable for compaction, import material shall be approved by the project Soils Engineer and the EOR prior to placement.

A. Backfill Compaction: Trench back5ll shall be placed in loose six (6) inch lifts, processed and moisture-conditioned, and each lift thoroughly consolidated by tamping, vibrating, or a combination thereof, until the moisture content and the relative compaction complies with the values shown in the Moisture and Density Requirements for Embankment Materials table in Section 4.03 Embankment Construction of these STANDARDS AND SPECIFICATIONS for the various soil classifications and relative compaction.

For new landscape areas with trees, compaction shall be between eighty-five (85) and ninety (90) percent of the maximum Standard Proctor dry density in the top two (2) feet of soils below finished grade.

Where sidewalk or concrete trail will be constructed, soils shall be scarified, moisture treated and recompacted two (2) feet wider than the footprint of the sidewalk or trail until the moisture content and the relative compaction complies with the values shown in the table in Section 4.03 Embankment Construction.

Backfill of utilities, pipes, culverts, or other miscellaneous structures located in areas that will not have a hard surface shall be placed in six (6) inch lifts at ninety (90) percent of the maximum Standard Proctor dry density and within two (2) percent of the optimum moisture content. All other requirements for particle size and processing shall be met.

5.06 - Compaction Testing

Testing shall be performed at various depths and locations, and at all vertical structures. The project Soils Engineer and/or the EOR may require additional testing around structures, manholes, valve boxes, etc.

Field test results shall be submitted to the EOR within twenty-four (24) hours of the test or on the next working day. In no case shall fill or backfill be placed on materials that did not pass moisture and density testing.

Moisture and density testing shall be performed by a qualified technician who works under the direct supervision of a Colorado Registered Professional Engineer. Final soil compaction reports shall be prepared and signed by a Colorado Registered Professional Engineer, and who is qualified to prepare such reports. Reports shall be submitted to the EOR within one (1) week of the test.

SECTION 6 - RESTORATION AND CLEANUP

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN JAMESON
39276

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
CONSTRUCTION SPECIFICATIONS 3

Sheet:
C.502

CONSTRUCTION SPECIFICATIONS

THE FOLLOWING APPLICABLE CONSTRUCTION SPECIFICATIONS ARE A PORTION OF THE TOWN OF MINTURN ENGINEERING STANDARDS AND OTHER STANDARDS. TABLES, DRAWINGS, DETAILS AND EXHIBITS REFERENCED BELOW ARE INCLUDED IN THE TOWN STANDARDS.

SECTION 6 - RESTORATION AND CLEANUP

At all times during construction, the Contractor shall maintain the site, including partially finished structures, material stockpiles and other like areas, in a reasonable state of order and cleanliness.

The grade and condition of all unsurfaced areas shall be restored to a condition equal to or better than the grade and condition immediately prior to construction, unless otherwise shown in the approved plans and approved by the Town of Minturn. The Contractor shall restore or replace all seeded areas, sod, trees, landscaping materials, landscape irrigation systems, fences, and any other items, to a condition equal to or better than before the work began and to the satisfaction of the EOR.

All pavement and concrete flatwork shall be restored or replaced to a condition equal to or better than before the work began and to the satisfaction of the EOR.

CH**APTER 3 - EROSION CONTROL AND SEDIMENTATION**

3.01 - Infiltration Practices
Infiltration practices include measures to percolate runoff into soils. Typical practices include rock-filled trenches or basins (dry wells) and diversion of storm runoff into vegetated areas. Directing water from impervious areas and allowing it to percolate reduces sediment transported off-site.

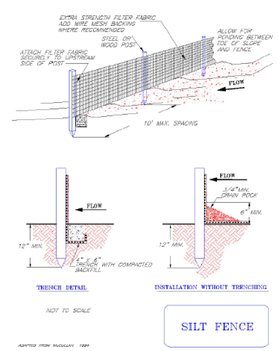
A. Maintenance
1. Clean out accumulated sediment and debris before the system fails to infiltrate storm runoff. It may be necessary to replace the upper layer of stone.
2. If rapid clogging occurs and pre-sedimentation BMP's cannot be placed upstream, install surface-maintained BMP's
3. Monitor observation well to evaluate whether soil is clogging or infiltration device is not performing as designed

4.01 - Silt Fences
Silt Fences are temporary barriers constructed of woven synthetic material, buried at the bottom, stretched and supported by posts. The goal of this BMP is to reduce velocity and pool sheet 6ow from an eroding area, allowing the sediment to settle. Silt fences can be used along the base of slopes, around stockpiles and at other discrete areas where erosion is likely to occur

A. Installation/ Design Guidelines
1. Use only in areas of dispersed low-velocity runoff. Less than 1/4 acre should drain to each 100 foot of fence.
2. Anchor fences along the contour below the toe of disturbed slopes. Place fences to pond, not lter, runoff. A minimum of five feet of potential ponding area is recommended between the fence and the toe of the slope.
3. Avoid placing silt fences in ditches, except where erosion potential is low
4. To properly install silt fence:
   4.1. Excavate a trench at least 6" deep, the length of the proposed barrier
   4.2. Place the bottom 6" to 1' of the fence material into the trench (see diagram).
   4.3. Drive posts at least 12" into the ground at intervals of 10' or less on the down gradient side of the trench
   4.4. Backfill and compact soil over the fence material in the trench.
   4.5. Secure the fence to the posts.
5. Minimize the number of joints between fences and overlap joints where they are unavoidable.
6. Silt fences should remain in place until vegetation has been established.

B. Special Considerations in Mountain Areas
1. Thin, rocky soils may preclude the use of this BMP.
2. Sediment traps, check dams, or berms are often better alternatives in rocky soils, especially where depth to bedrock is shallow.
3. Wire mesh and steel posts are recommended to reinforce the fence where rockfalls may occur, grading may place soils against fence, or near environmentally sensitive areas.
4. Leave enough area up gradient of the fence for runoff to pond and sediment to settle. Excavating up gradient of fence may be necessary to pond sufficient water to cause sediment deposition.
5. Silt fence often must be installed several times during construction due to changing slopes and hydrology of the site.

C. Maintenance
1. Check fences weekly and after rain or snowmelt.
2. Ensure silt fence material remains entrenched and anchored.
3. Look for rills under or around fences.
4. Replace torn or damaged sections of fence.
5. Remove excess sediment periodically, at a minimum when sediment reaches a depth of 8 inches.
6. Silt fences may only detain sediment for a period of weeks or months. Remove fabric, stakes, and accumulated sediments when there are has been successfully revegetated.



CHAPTER 4 - ROADWAY DESIGN & TECHNICAL CRITERIA
SECTION 1 - SIDEWALKS, CURBS AND GUTTERS, DRIVEWAYS, RAMPS, AND TRAILS
Curbs, gutters, and walks shall be constructed to comply with the approved details and Specifications.

1.01- Sidewalks
A. Minimum Width: All sidewalks used in conjunction with vertical curb and gutter shall have a minimum width per the approved plans. Tooled or saw cut joints are required at 10 foot intervals.
B. Minimum Thickness: All sidewalks used in conjunction with vertical curb and gutter shall have a minimum thickness of six (6) inches. All sidewalks shall consist of air-entrained (5%-7%), reinforced concrete (4000 psi) over a compacted six (6) inches of CDOT Class 6 ABC.
C. Drainage and Grading: Sidewalks shall have a positive drainage towards the street flowline.

1.02 - Curb and Gutter
Curbs, gutters, and ramps shall be constructed to comply with the approved plans. All material for construction of driveway, drive ramp, curb and gutter, and drainage pan must be made with CDOT's concrete designation Class and minimum strength of 4000 psi, in 28 consecutive days.

1.03 - Driveways
All material for construction of driveway, drive ramp, curb and gutter, and drainage pan must be made with CDOT's concrete designation Class and minimum strength of 4000 psi, in 28 consecutive days.

9.00 SHALLOW UTILITIES (UNDER GROUND ELECTRIC, TELEPHONE, CABLE TELEVISION, NATURAL GAS & IRRIGATION)
9.01 SCOPE
Shallow utilities are defined as any wire, pipe conduit or cable and shall include but not be limited to underground electric, telephone, cable television, natural gas and irrigation water systems.

9.02 SPECIAL CONDUIT ENCASEMENT
Any shallow utility which crosses under or is within 5 feet horizontally of any road or street structure, including, pavement, curb and gutter, sidewalk, bike path, or bridge shall be encased in conduit so that repair or replacement of the utility may be accomplished without disturbing the road or street structure.
For natural gas and irrigation water systems, the carrier pipes for the natural gas and irrigation water shall be installed inside of a second pipe having strength equal to or greater than the carrier pipe and of sufficient diameter to allow free movement of the carrier pipe in the event that replacement is required.
It is recommended that consideration be given to the potential for future increase in size/capacity of the respective utility when sizing the conduit.

9.03 SHALLOW UTILITY INSTALLATION
A. Electric system underground facilities shall be buried a minimum of 4.0 feet below finished grade. Electric system vaults and transformers shall be designed to be located and installed in areas that will not be subject to concentrated surface drainage flow.
B. Telephone system underground facilities shall be buried a minimum of 2.0 feet below finished grade. Telephone pedestals shall be designed to be located and installed in areas that will not be subject to concentrated surface drainage flow.
C. Cable television system underground facilities shall be buried a minimum of 2.0 feet below finished grade. Cable television risers and surface facilities shall be designed to be located and installed in areas that will not be subject to concentrated surface drainage flow.
D. Natural gas system underground facilities shall be buried a minimum of 3.5 feet below finished grade.
E. Whenever any shallow utility parallels or generally parallels a domestic water or sewer utility, a minimum horizontal separation of 4 feet shall be maintained between the domestic water or sewer main or service and the shallow utility. Where it must cross domestic water it must cross above and with a 1' minimum separation. Nonpotable water tape.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

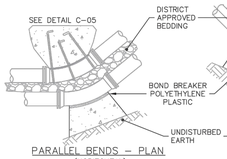
South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

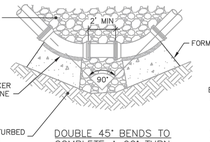
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
CONSTRUCTION SPECIFICATIONS 4

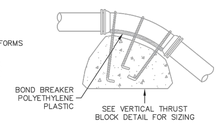
Sheet:
C.503



PARALLEL BENDS – PLAN
(HORIZONTAL)
SEE C-04 PARALLEL BENDS DETAIL

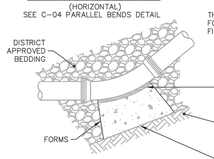


DOUBLE 45° BENDS TO COMPLETE A 90° TURN

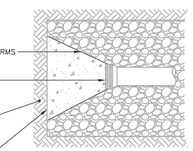


VERTICAL THRUST BLOCK – SECTION
SEE DETAIL C-05

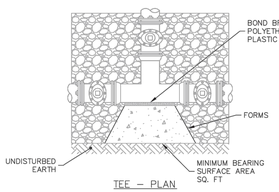
THESE DETAILS ARE TO BE FOLLOWED FOR EVERY FITTING IN THE INSTALLATION



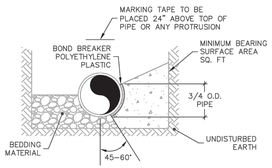
BEND – PLAN



DEAD END – PLAN



TEE – PLAN



TYPICAL CROSS SECTION

	REQUIRED MINIMUM BEARING SURFACE AREA (SF)					
	SIZE OF PIPE	BENDS				TEE OR DEAD END
		11-1/4°	22-1/2°	45°	90°	
200 PSI WORKING	4"-8"	1.2	2.5	4.8	8.9	6.3
	10"	1.9	3.8	7.5	13.9	9.8
	12"	2.8	5.5	10.8	20.0	14.1
	16"	4.9	9.8	19.2	35.5	25.1
	18"	6.2	12.4	24.3	45.0	31.8
	20"	7.7	15.3	30.1	55.5	39.3
	24"	11.1	22.1	43.3	80.0	56.5

THE MINIMUM BEARING SURFACE AREAS ARE PROVIDED FOR 200 PSI WORKING PIPE PRESSURE + 50 PSI SURGE (250 PSI TOTAL) AND 2,000 PSF SOIL BEARING CAPACITY. IF PRESSURE IS HIGHER OR SOIL BEARING POTENTIAL LOWER, CONSULT DISTRICT.

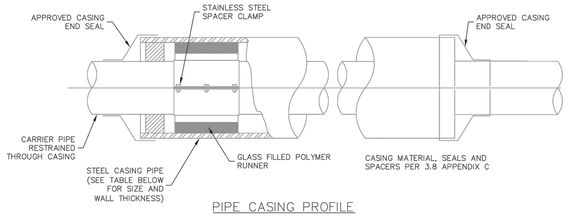
	REQUIRED MINIMUM BEARING SURFACE AREA (SF)					
	SIZE OF PIPE	BENDS				TEE OR DEAD END
		11-1/4°	22-1/2°	45°	90°	
250 PSI WORKING	4"-8"	1.5	2.9	5.8	10.7	7.5
	10"	2.3	4.6	9.0	16.7	11.8
	12"	3.3	6.6	13.0	24.0	17.0
	16"	5.9	11.8	23.1	42.7	30.2
	18"	7.5	14.9	29.2	54.0	38.2
	20"	9.2	18.4	36.1	66.6	47.1
	24"	13.3	26.5	51.9	96.0	67.9

THE MINIMUM BEARING SURFACE AREAS ARE PROVIDED FOR 250 PSI WORKING PIPE PRESSURE + 50 PSI SURGE (300 PSI TOTAL) AND 2,000 PSF SOIL BEARING CAPACITY. IF PRESSURE IS HIGHER OR SOIL BEARING POTENTIAL LOWER, CONSULT DISTRICT.

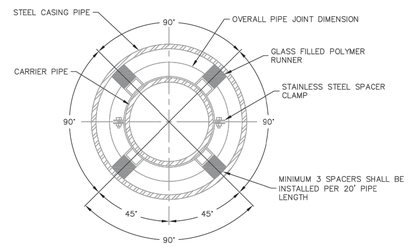
GENERAL NOTES

1. MEGALUGS SHALL BE USED IN CONJUNCTION WITH ALL FITTINGS THAT REQUIRE THE USE OF THRUST BLOCK.
2. REFER TO DISTRICT STANDARDS IN APPENDIX C SECTION 3.6 FOR REQUIREMENTS.
3. THRUST BLOCKS SHALL BE INSTALLED SO THAT ALL JOINTS ARE ACCESSIBLE. POLYWRAP FITTINGS PRIOR TO POURING THRUST BLOCK, EXTEND WRAP TO ENCLOSE ALL FITTINGS AND BOLTS.
4. THRUST BLOCKS SHALL BE FORMED AGAINST UNDISTURBED SOIL & FORMS PER APPENDIX C 4.14.
5. BLOCK HEIGHT SHALL BE ESTABLISHED SUCH THAT THE CALCULATED BLOCK WIDTH IS BETWEEN ONE AND TWO TIMES THE HEIGHT.
6. BOND BREAKER PER APPENDIX C 3.2.10.

DETAIL
CONCRETE THRUST BLOCKS



PIPE CASING PROFILE



PIPE CASING CROSS SECTION

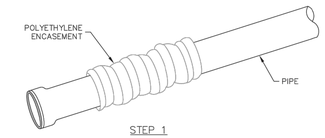
GENERAL NOTES

1. FOLLOW MANUFACTURER'S RECOMMENDATION, IF IN CONFLICT WITH ERWSD STANDARDS, USE MORE RESTRICTIVE SPECIFICATION.
2. CARRIER PIPE SHALL BE CENTERED AND ALL JOINTS RESTRAINED IN & THROUGH THE CASING PIPE.
3. WATER MAINS SHALL BE ENCASED SEPARATELY FROM OTHER UTILITIES.
4. ALL FASTENERS SHALL BE T-304 STAINLESS STEEL.
5. ALL CAD WELDS SHALL BE CONNECTED TO PIPE.
6. MAXIMUM DISTANCE BETWEEN SPACERS SHALL BE 6 FEET ON CENTER.

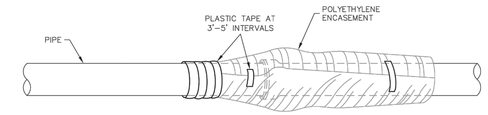
CARRIER PIPE NOMINAL ø	CASING PIPE	
	MIN OD	MIN WALL THICKNESS
4"	12"	0.25"
6"	16"	0.3125"
8"	18"	0.3125"
12"	22"	0.375"
16"	28"	0.500"
20"	32"	0.500"

DETAIL
WATER CASING

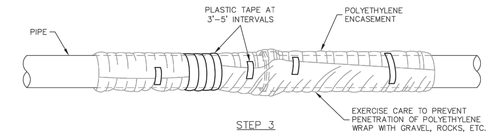
USE OF POLYETHYLENE WRAP FOR CORROSIVE SOILS



STEP 1



STEP 2



STEP 3

FIELD INSTALLATION – POLYETHYLENE WRAP

STEP 1 – PLACE POLYETHYLENE MATERIAL ON PIPE PRIOR TO LOWERING IT INTO PLACE.

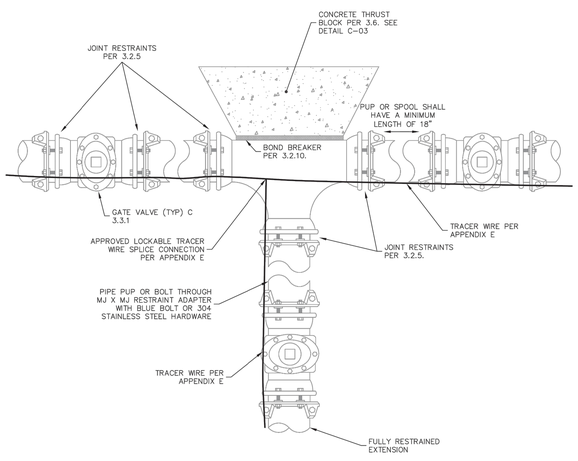
STEP 2 – PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD THE POLYETHYLENE ENCASEMENT IN PLACE.

STEP 3 – OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE SHALL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED ON TOP OF PIPE AND TAPED IN PLACE.

GENERAL NOTES:

1. ALL DUCTILE IRON PIPE REQUIRES THE USE OF POLYETHYLENE WRAP UNLESS APPLICANT SUBMITS A SOILS TEST INDICATING THAT NO CORROSIVE SOILS ARE PRESENT.
2. POLYETHYLENE ENCASEMENT PER APPENDIX C 3.2.10.

DETAIL
POLYETHYLENE WRAP

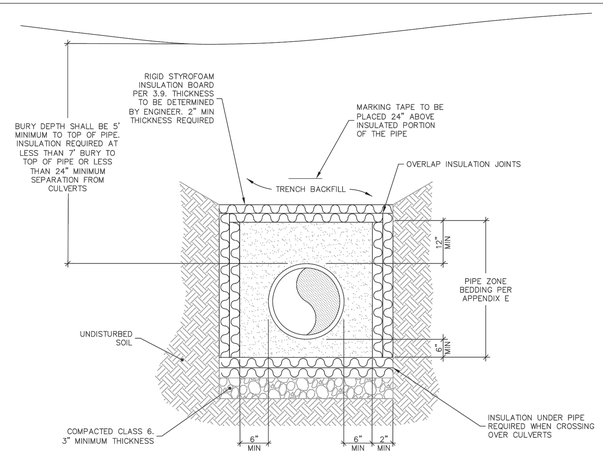


TOP VIEW

DETAIL
TEE

GENERAL NOTES

1. TEES SHALL BE CONSIDERED ON AN INDIVIDUAL BASIS. ALL USES OF THIS APPLICATION SHALL REQUIRE PRIOR DISTRICT APPROVAL.
2. JOINT RESTRAINT DEVICES SHALL BE REQUIRED ON ALL TEE APPLICATIONS.
3. THRUST BLOCKS ALONE WILL NOT BE ACCEPTED AS A RESTRAINT.

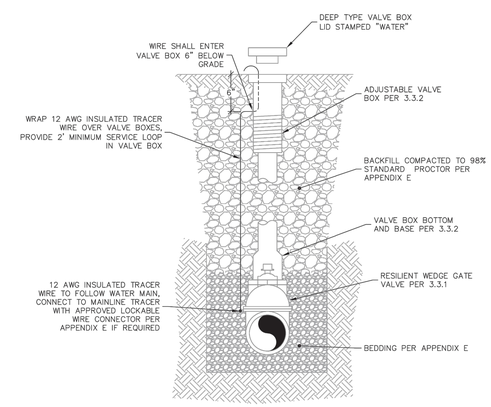


ELEVATION

DETAIL
MINIMUM COVER & CULVERT CROSSING INSULATION

GENERAL NOTES

1. CONDITION OF LESS THAN MINIMUM BURY DEPTH ALLOWED ONLY WITH WRITTEN APPROVAL FROM THE DISTRICT PRIOR TO CONSTRUCTION. INSULATION SHALL BE INSTALLED ON ALL PIPE THAT DOES NOT MEET MINIMUM BURY REQUIREMENTS.
2. SEE SEWER AND WATER PIPE BEDDING DETAIL AND APPENDIX E FOR BACKFILL MATERIAL AND COMPACTION SPECIFICATIONS.
3. INSULATION SHALL BE INSTALLED ON ALL PIPES THAT DO NOT HAVE A MINIMUM OF 7' OF EFFECTIVE COVER. EFFECTIVE COVER SHALL BE DEFINED AS SEPARATION FROM COLD AIR SOURCES, INCLUDING STORM SEWERS. 1" OF INSULATION BOARD MAY BE SUBSTITUTED FOR EACH 1' OF SOIL COVER (MIN. 2" INSULATION) REQUIRED TO MEET THE MINIMUM COVER REQUIREMENT.
4. INSULATION SPECIFICATIONS PER APPENDIX C 3.9.



DETAIL
GATE VALVE &
VALVE BOX ASSEMBLY

GENERAL NOTES

1. VALVE BOX IS TO BE INSTALLED PLUMB, LEVEL, AND CENTERED ON 2" NUT.
2. IF THE DISTANCE FROM THE TOP OF THE OPERATING NUT TO THE TOP OF THE VALVE COVER IS GREATER THAN 9', A CENTERING RING AND EXTENSION STEM IS REQUIRED. THE EXTENSION MUST BE SECURED TO THE VALVE OPERATING NUT.

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

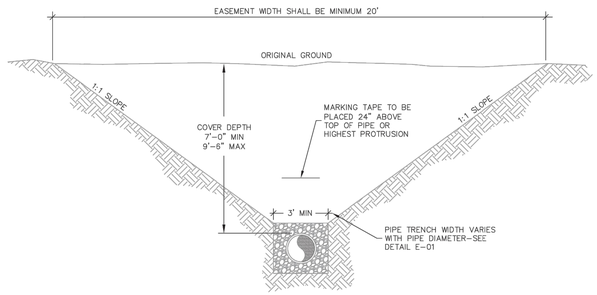
NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:
WATER DETAILS 1

Sheet:
C.510

WATER MAIN COVER DEPTH	MINIMUM EASEMENT WIDTH REQUIRED
7'–0" TO 8'–6"	20'
8'–7" TO 9'–6"	25'



MINIMUM EASEMENT WIDTH

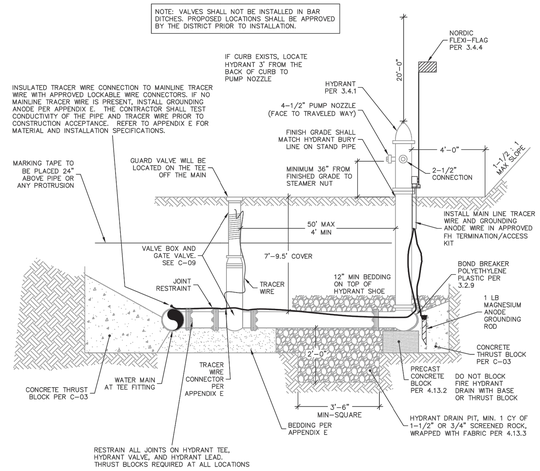
GENERAL NOTES

1. PIPE SHALL BE CENTERED IN EASEMENT.
2. CALCULATE EASEMENT WIDTH AS FOLLOWS:
   W = DEPTH TO TOP OF PIPE X 2 + 3 FEET
   (ROUND UP IN 5 FOOT INCREMENTS)

EXAMPLE:
9 FOOT DEEP PIPE = 9 X 2 + 3 = 21 FEET
W = 25 FOOT WIDE EASEMENT (ROUNDED UP)

DETAIL
EASEMENT WIDTH

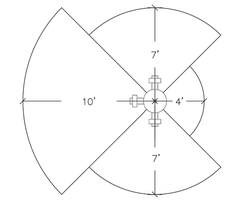
NOTE: VALVES SHALL NOT BE INSTALLED IN BAR DITCHES. PROPOSED LOCATIONS SHALL BE APPROVED BY THE DISTRICT PRIOR TO INSTALLATION.



DETAIL
FIRE HYDRANT ASSEMBLY

HYDRANT CLEARANCE DIAGRAM

NO ABOVE GROUND OBSTRUCTIONS ALLOWED IN THESE AREAS



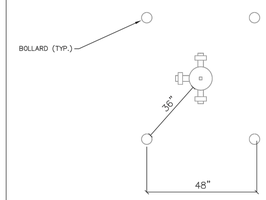
FRONT---10 FEET OF CLEARANCE

SIDES---7 FEET OF CLEARANCE

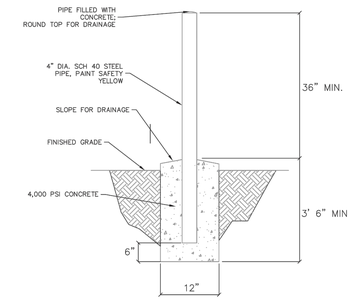
REAR---4 FEET OF CLEARANCE

ABOVE---20 FEET OF CLEARANCE

HYDRANT BOLLARD DIAGRAM



BOLLARDS REQUIRED WHEN LESS THAN 3' OF HORIZONTAL CLEARANCE EXISTS BETWEEN HYDRANT AND BACK OF CURB/EDGE OF ROAD



DETAIL
FIRE HYDRANT CLEARANCES & BOLLARDS

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

COLORADO REGISTERED PROFESSIONAL ENGINEER
DAVID JOHN ANDERSON
39276

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

South Minturn Addition
Lots 29, 31 & 32
Minturn, Colorado

NOT FOR CONSTRUCTION

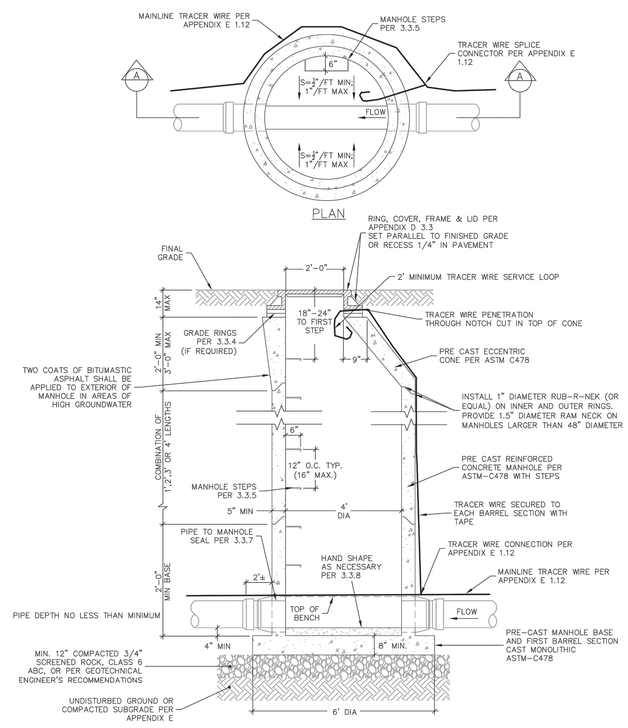
DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title:

WATER DETAILS 2

Sheet:

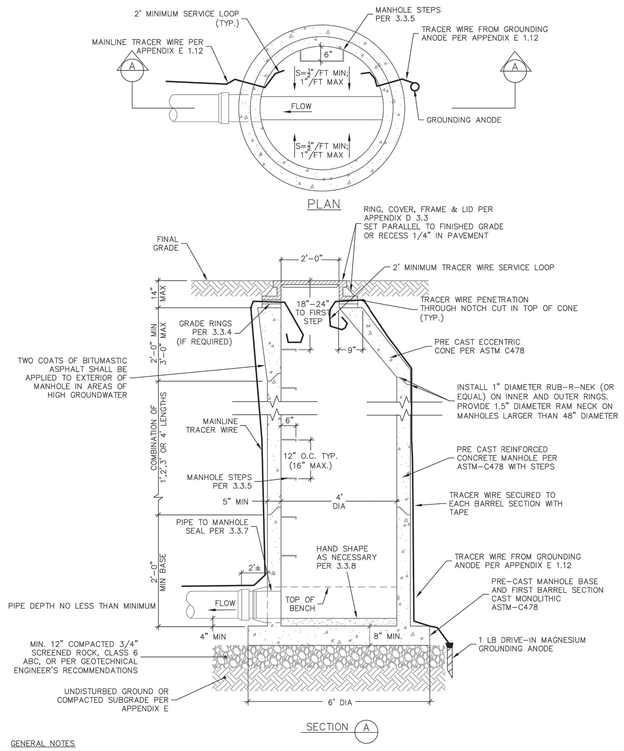
C.511



GENERAL NOTES

1. ALL CONCRETE WORK SHALL COMPLY WITH LATEST ACI-318 SPECIFICATIONS.
2. MANHOLE TROUGH SHALL HAVE A MINIMUM OF 0.2' DROP FROM ENTRANCE THROUGH EXIT.
3. FLOW CHANNEL TO BE SHAPED AS TO NOT ALLOW STANDING WATER PER 3.3.8.
4. MANHOLE SHALL CONFORM TO ASTM C478 AND ALL APPLICABLE DISTRICT STANDARDS (APPENDIX D).

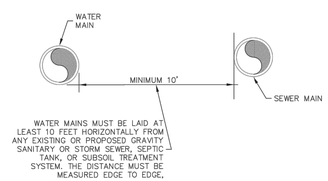
DETAIL
STANDARD MANHOLE



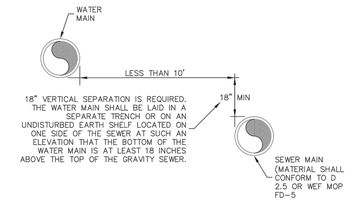
GENERAL NOTES

1. ALL CONCRETE WORK SHALL COMPLY WITH LATEST ACI-318 SPECIFICATIONS.
2. TRACER WIRE SHOWN ENTERING OPPOSITE SIDES FOR CLARITY, WIRES MAY BE INSTALLED PARALLEL THROUGH SAME NOTCH IN PRECAST CONE SECTION.
3. FLOW CHANNEL TO BE SHAPED AS TO NOT ALLOW STANDING WATER PER 3.3.8.
4. MANHOLE SHALL CONFORM TO ASTM C478 AND ALL APPLICABLE DISTRICT STANDARDS (APPENDIX D).

DETAIL
DEAD END MANHOLE

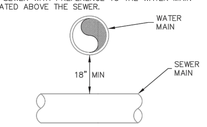


REQUIRED SEPARATION FOR PARALLEL INSTALLATIONS

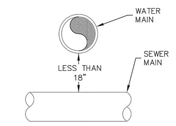


EXCEPTION—REQUIRED SEPARATION FOR PARALLEL INSTALLATION CAN NOT BE ACHIEVED

WATER MAINS CROSSING SEWERS MUST BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS MUST BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER WITH PREFERENCE TO THE WATER MAIN LOCATED ABOVE THE SEWER.

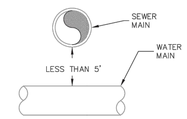


REQUIRED SEPARATION FOR PERPENDICULAR INSTALLATIONS



INSTALL SECONDARY CONTAINMENT ON EITHER THE WATER OR SEWER MAIN. PIPE CASING EXTENDING NO LESS THAN 9-FEET EACH SIDE OF THE CROSSING OR CONCRETE/CONTROLLED LOW STRENGTH MATERIAL (EX. FLOWABLE FILL) ENCASEMENT EXTENDING NO LESS THAN 10-FEET EACH SIDE OF THE CROSSING MAY BE USED. SEE GENERAL NOTE 3.

EXCEPTION A— SEWER UNDER WATER—REQUIRED SEPARATION FOR PERPENDICULAR INSTALLATION CANNOT BE ACHIEVED



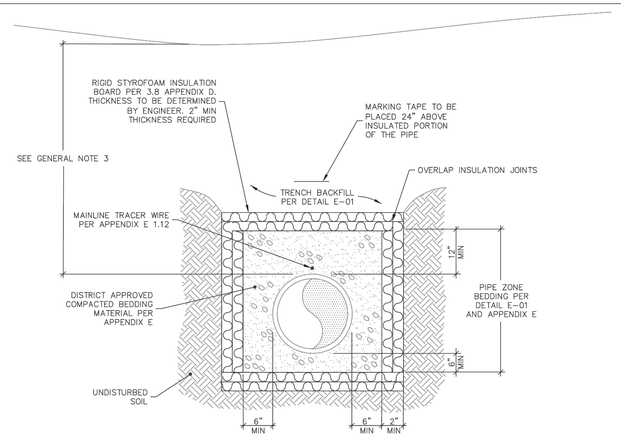
INSTALL SECONDARY CONTAINMENT ON EITHER THE WATER OR SEWER MAIN. PIPE CASING EXTENDING NO LESS THAN 9-FEET EACH SIDE OF THE CROSSING OR CONCRETE/CONTROLLED LOW STRENGTH MATERIAL (EX. FLOWABLE FILL) ENCASEMENT EXTENDING NO LESS THAN 10-FEET EACH SIDE OF THE CROSSING MAY BE USED. SEE GENERAL NOTE 4.

EXCEPTION B— SEWER OVER WATER—REQUIRED SEPARATION FOR PERPENDICULAR INSTALLATION CANNOT BE ACHIEVED

GENERAL NOTES

1. WATER PIPES MUST NOT PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER MANHOLE. WATER MAIN SHOULD BE LOCATED AT LEAST 10 FEET FROM SEWER MANHOLES.
2. PIPE SEPARATION MUST COMPLY WITH STATE OF COLORADO DESIGN CRITERIA FOR POTABLE WATER SYSTEMS, SECTION 8.8 (ALL DETAILS REGARDING SEPARATION BETWEEN WATER AND SEWER).
3. SECONDARY CONTAINMENT-THE PIPE CASING MUST BE OF WATERTIGHT MATERIAL WITH NO JOINTS. THE CASING PIPE MATERIALS MAY BE STEEL, DUCTILE IRON, FIBERGLASS, FIBERGLASS REINFORCED POLYMER MORTAR (FRPM), OR POLYVINYLCHLORIDE (PVC) WITH SUITABLE CARRIER PIPE SUPPORTS AND CASING PIPE END SEALS.
4. SECONDARY CONTAINMENT REQUIRED UNLESS THE VERTICAL DISTANCE EXCEEDS 5 FEET. THE CASING MUST BE A SINGLE SECTION OF STEEL OR DUCTILE IRON PIPE. THE DESIGN MUST INCLUDE A MEANS TO SUPPORT THE INTERCEPTOR OR SEWER MAIN TO PREVENT SETTLEMENT AND PERMIT MAINTENANCE OF THE WATER MAIN WITHOUT DAMAGE TO THE SEWER PIPE. CROSSINGS INVOLVING JOINTLESS PIPE SUCH AS HDPE, FUSIBLE PVC OR WELDED STEEL DO NOT REQUIRE INSTALLATION OF SECONDARY CONTAINMENT.

DETAIL
WATER & SANITARY SEWER SEPARATION

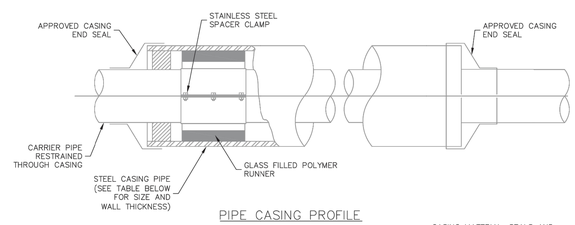


ELEVATION

GENERAL NOTES

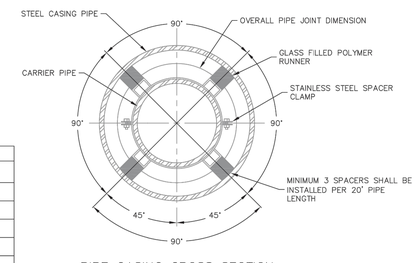
1. CONDITION OF LESS THAN MINIMUM BURY DEPTH IS ALLOWED ONLY WITH WRITTEN APPROVAL FROM THE DISTRICT PRIOR TO CONSTRUCTION. INSULATION SHALL BE INSTALLED ON ALL PIPE THAT DOES NOT MEET MINIMUM BURY REQUIREMENTS.
2. THE USE OF INSULATION MUST BE APPROVED BY THE DISTRICT PRIOR TO INSTALLATION.
3. INSULATION SHALL BE INSTALLED ON ALL PIPES THAT DO NOT HAVE A MINIMUM OF 4.5' OF EFFECTIVE COVER. EFFECTIVE COVER SHALL BE DEFINED AS SEPARATION FROM COLD AIR SOURCES, INCLUDING STORM SEWERS. 1" OF INSULATION BOARD MAY BE SUBSTITUTED FOR EACH 1' OF SOIL COVER (MINIMUM 2" OF INSULATION) REQUIRED TO MEET THE MINIMUM COVER REQUIREMENT.
4. INSULATION SHALL BE DOW HIGHLOAD 100, OWENS CORNING FOAMULAR 1000, OR APPROVED EQUAL. HIGH COMPRESSIVE STRENGTH FOAM BOARD INSULATION IS REQUIRED WITHIN ALL RIGHT OF WAY AND PAVED AREAS.

DETAIL
SEWER PIPE INSULATION



PIPE CASING PROFILE

CASING MATERIAL, SEALS AND SPACERS PER 3.7 APPENDIX D



PIPE CASING CROSS SECTION

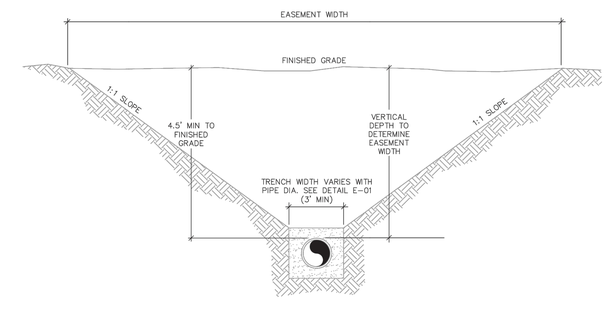
CARRIER PIPE NOMINAL ø	CASING PIPE	
	MIN OD	MIN WALL THICKNESS
4"	12"	0.25"
6"	16"	0.3125"
8"	18"	0.3125"
12"	22"	0.375"
16"	28"	0.500"
20"	32"	0.500"

GENERAL NOTES

1. FOLLOW MANUFACTURER'S RECOMMENDATION, IF IN CONFLICT WITH ERWSD STANDARDS, USE MORE RESTRICTIVE SPECIFICATION.
2. CARRIER PIPE SHALL BE CENTERED AND ALL JOINTS RESTRAINED IN & THROUGH THE CASING PIPE.
3. SEWER MAINS SHALL BE ENCASED SEPARATELY FROM OTHER UTILITIES.
4. ALL FASTENERS SHALL BE T-304 STAINLESS STEEL.
5. MAXIMUM DISTANCE BETWEEN SPACERS SHALL BE 6 FEET ON CENTER.

DETAIL
SEWER MAIN CASING

SEWER PIPE COVER DEPTH	MINIMUM EASEMENT WIDTH REQUIRED
4'6" TO 8'6"	20'
8'7" TO 11'0"	25'
11'1" TO 13'6"	30'
13'7" TO 16'0"	35'
16'1" TO 18'6"	40'
18'7" TO 21'0"	45'
21'1" TO 23'6"	50'



MINIMUM EASEMENT WIDTH

GENERAL NOTES

1. PIPE SHALL BE CENTERED IN EASEMENT.
2. ANY PROPOSED SEWER MAIN DEPTH GREATER THAN 14' DEEP REQUIRES AN ALTERNATIVES ANALYSIS AND DISTRICT APPROVAL.
3. CALCULATE EASEMENT WIDTH AS FOLLOWS:
   W = DEPTH TO TOP OF PIPE X 2 + 3 FEET
   (ROUNDED UP IN 5 FOOT INCREMENTS)

EXAMPLE:
10 FOOT DEEP PIPE = 10 X 2 + 3 = 23 FEET
W = 25 FOOT WIDE EASEMENT ROUNDED

DETAIL
SEWER EASEMENT WIDTH

TIMBERLINE ENGINEERING LLC
CIVIL STRUCTURAL
PO Box 842
Carbondale, Colorado 81623-0842
p 970.963.9869
timberlineengineering@gmail.com

DRAWN BY: KRA
CHECKED BY: DJA

COPYRIGHT

Belden Place PUD

South Mintum Addition
Lots 29, 31 & 32
Mintum, Colorado

NOT FOR CONSTRUCTION

DATE	REVISION
1/15/21	Preliminary Plat Submittal
4/12/21	PP Revision Resubmittal

Title: SEWER DETAILS

Sheet: C.512