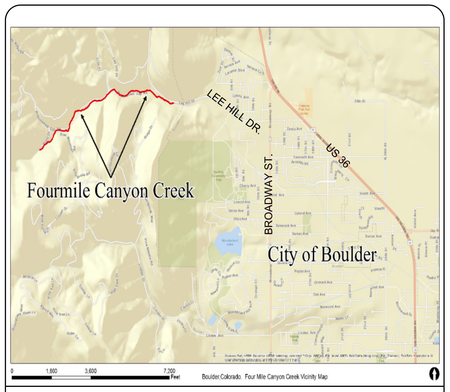
STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
CO	138200	1	38

FOURMILE CANYON CREEK

LOCATION: *WAGONWHEEL GAP ROAD AND LEE HILL DRIVE TO ANNE U WHITE TRAIL HEAD*

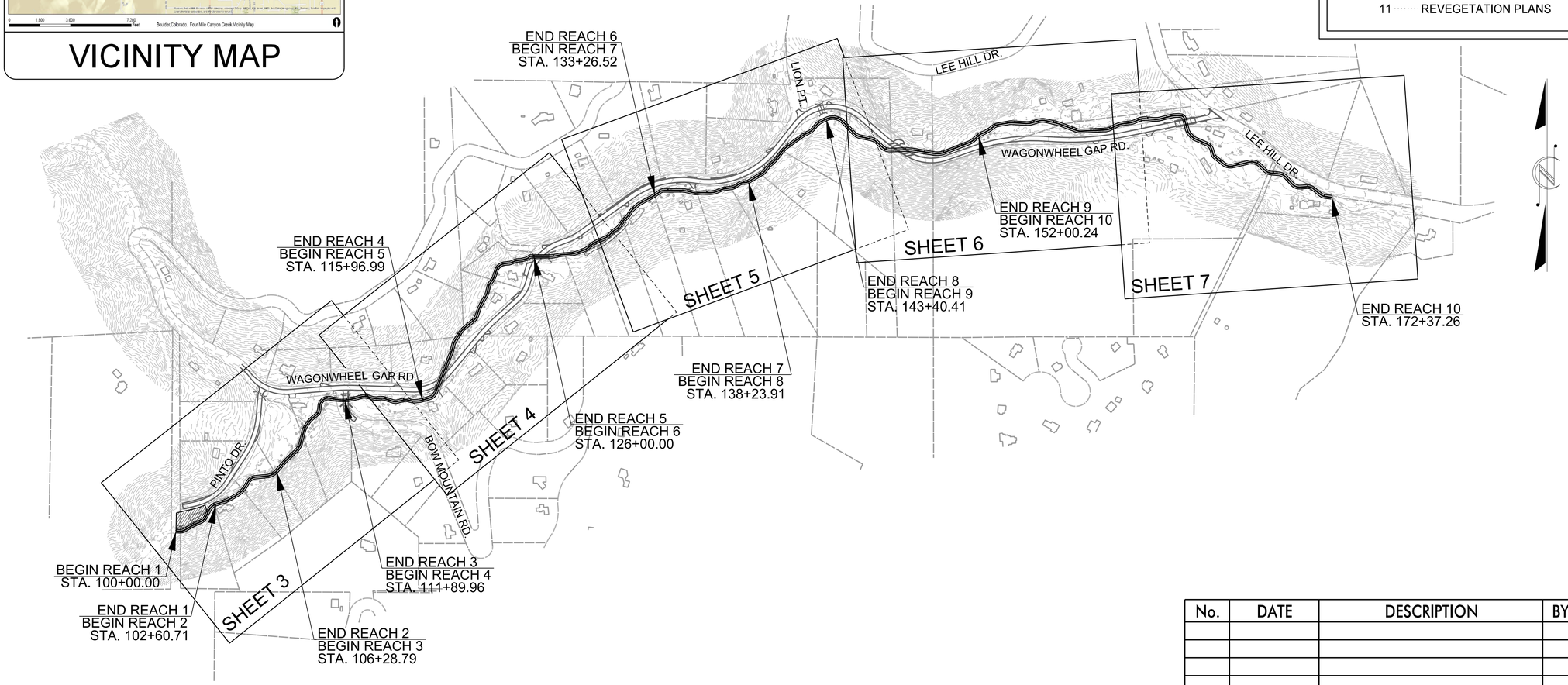
TYPE OF WORK: *30% STREAM RESTORATION PLANS*



VICINITY MAP

INDEX OF SHEETS

1 ..... TITLE SHEET
1-A ..... STREAM CONVENTIONAL SYMBOLS GENERAL NOTES
2 - 2D ..... DETAILS
3 - 7 ..... PLAN SHEETS
8 - 10 ..... PROFILE SHEETS
X-1 - X-22 ..... CROSS SECTIONS
11 ..... REVEGETATION PLANS



No.	DATE	DESCRIPTION	BY	APPROVED

PROJECT: 138200 FOURMILE CANYON CREEK

GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

10 0 10 20
PROFILE (VERTICAL)

PRELIMINARY DESIGN DATA

		UPSTREAM OF LION POINT	DOWNSTREAM OF LION POINT	
DESIGN REACH LENGTH	=	4,340	2,897	ft
BANKFULL XSEC AREA	=	21.4	24.3	sq ft
BANKFULL WIDTH	=	18.5	19.5	ft
AVERAGE BANKFULL DEPTH	=	1.2	1.2	ft
W/D RATIO	=	16	15.7	
DRAINAGE AREA	=	4.97	7.19	sq mi

PREPARED FOR
BOULDER COUNTY
DEPARTMENT OF TRANSPORTATION

Boulder County

CONTACT: CLARISSA HAGEMAN, PE

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

TBD
LETTING DATE:

LUCAS BABBITT, PE, CFM
PROJECT ENGINEER

PROJECT ENGINEER

SIGNATURE: *P.E.*

GENERAL NOTES

1. THE CONTRACTOR IS REQUIRED TO INSTALL INSTREAM STRUCTURES USING A EXCAVATOR OR EQUIVALENT WITH A HYDRAULIC THUMB OF SUFFICIENT SIZE TO PLACE BOULDERS, LOGS, AND ROOTWADS.

2. WORK IS BEING PERFORMED AS AN ENVIRONMENTAL RESTORATION PLAN. THE CONTRACTOR SHOULD MAKE ALL REASONABLE EFFORTS TO REDUCE SEDIMENT LOSS AND MINIMIZE DISTURBANCE OF THE SITE WHILE PERFORMING THE CONSTRUCTION WORK.

3. CONTRACTOR SHALL CALL UTILITY NOTIFICATION CENTER OF COLORADO 2 - BUSINESS DAYS IN ADVANCE BEFORE DIGGING, GRADING, OR EXCAVATION FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

4. PROPOSED CHANNEL ALIGNMENT IS INTENDED TO CAUSE MINIMAL DISTURBANCE TO THE EXISTING TREES AND VEGETATION. THE ENGINEER RESERVES THE RIGHT TO MAKE FIELD-FIT CHANGES TO THESE PLANS AND DETAILS TO FURTHER REDUCE DISTURBANCE.

5. NO FIELD FIT CHANGES SHALL BE MADE WITHOUT ENGINEER BEING PRESENT ON-SITE AND WITHOUT APPROVAL.

6. THIS IS A PRELIMINARY PLAN SET THAT WAS COMPLETED TO EVALUATE MAJOR DESIGN FEATURES PRIOR TO ADVANCING TO THE DESIGN-BUILD PHASE. CONSTRUCTION SHALL NOT BEGIN, OR CONTINUE, WITHOUT ENGINEER BEING PRESENT. AS SUCH, THE ENGINEER RESERVES THE RIGHT TO MAKE DESIGN MODIFICATIONS TO IMPROVE STREAM FUNCTION AND/OR CONSTRUCTABILITY. MODIFICATIONS COULD INCLUDE, BUT ARE NOT LIMITED TO, GRADING MODIFICATIONS, CHANGE IN MATERIAL TYPE, CHANGE IN MATERIAL SIZE, CHANGE IN MATERIAL PLACEMENT, ETC.

7. CONSTRUCTION SHALL BEGIN AT THE UPSTREAM END OF THE PROJECT AT STA 100+00 AND CONTINUE TO THE DOWNSTREAM END AT STA 172+37.26 IN ORDER TO AVOID DAMAGING PREVIOUSLY COMPLETED WORK.

8. THE CONTRACTOR SHALL CONFIRM THE RECEIPT OF ALL NECESSARY PERMITS AND APPROVALS BEFORE THE START OF CONSTRUCTION.

9. THE CONTRACTOR SHALL CONDUCT THEIR OPERATIONS IN SUCH A WAY THAT THE AREA OF DISTURBANCE IS MINIMIZED. ALL EXISTING TREES, SHRUBS AND VEGETATION SHALL BE PROTECTED UNLESS OTHERWISE NOTED ON THE DRAWINGS. NO TREES SHALL BE REMOVED WITHOUT APPROVAL FROM LANDOWNER, ENGINEER, AND BOULDER COUNTY.

10. FOR ALL SITE GRADING, SMOOTH, PARABOLIC TRANSITIONS SHALL BE MADE BETWEEN CHANGES IN SLOPE.

11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING STABLE EXCAVATIONS AND TEMPORARY SLOPES AND FOR SATISFYING ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

12. CONSTRUCTION OF THE PROPOSED WORK WILL TAKE PLACE WITHIN THE CHANNEL AND WATER CONTROL MEASURES WILL BE REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCEPTANCE AND CONTROL OF DRAINAGE WATER FROM AREAS ADJACENT TO FOURMILE CANYON CREEK AND ITS TRIBUTARIES INCLUDING STORMWATER OUTFALLS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ESTABLISHING MEANS AND METHODS OF GROUND AND SURFACE WATER CONTROL APPROPRIATE FOR CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROJECT DRAWINGS AND SPECIFICATIONS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS AND ALL PERMITS.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING AND MAINTAINING IN CONTINUOUS OPERATION, ALL EXISTING STRUCTURES, NOT ALL POTENTIALLY IMPACTED STRUCTURES MAY BE SHOWN ON THE DRAWINGS AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY AND PROTECT ALL STRUCTURES INCLUDING BUT NOT LIMITED TO STREETS, CURB AND GUTTER, BRIDGE PIERS AND ABUTMENTS, CREEK BANK PROTECTION OF VARIOUS TYPES, CREEK DROP STRUCTURES, SIGNS, PEDESTRIAN WALKS, RETAINING WALLS AND FENCING. IN THE EVENT THAT A STRUCTURE OR UTILITY IS DAMAGED DURING CONSTRUCTION THE CONTRACTOR SHALL IMMEDIATELY NOTIFY BOULDER COUNTY IN WRITING AND MAKE REPAIRS IN ACCORDANCE WITH BOULDER COUNTY REQUIREMENTS.

14. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS OF BOULDER COUNTY UNLESS SPECIFICALLY DETAILED OTHERWISE ON THESE PLANS AND ASSOCIATED SPECIFICATIONS.

15. THE CONTRACTOR SHALL MAINTAIN AT THE SITE AT ALL TIMES ONE SIGNED COPY OF THE PROJECT DRAWINGS AND SPECIFICATIONS, ONE COPY OF BOULDER COUNTY STANDARDS, AND ONE COPY OF ALL REQUIRED PERMITS.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING AND SUBMITTING AS-BUILT DRAWINGS TO BOULDER COUNTY.

17. THE CONTRACTOR SHALL PREPARE AND MAINTAIN THE STORMWATER MANAGEMENT PLAN AND OBTAIN THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT THROUGH THE COLORADO DEPARTMENT OF PUBLIC HEALTH (CDPHE).

18. THE CONTRACTOR SHALL PROVIDE DAILY ON-SITE SURVEY CONTROL TO THE LEVEL OF DETAIL REQUIRED TO EVALUATE CONSTRUCTION VERSUS THESE DESIGN PLANS.

GROUND COORDINATE TABLE:

PT#	NORTHING	EASTING	ELEVATION	DESCRIPTION
401	266,824.52	56,029.71	5780.4	#5 REBAR w/1-1/4" ORANGE PLASTIC CAP
402	265,571.50	56,625.58	N/A	#5 REBAR w/1-1/4" ORANGE PLASTIC CAP
403	266,345.15	51,185.07	N/A	#5 REBAR w/1-1/4" ORANGE PLASTIC CAP

NOTES:
1. THE BASIS OF COORDINATES FOR THIS MAP IS THE NORTH AMERICAN DATUM OF 1983-2011 (NAD 83 (2011)) U.S. SURVEY FEET, BASED LOCALLY UPON THE DAVID EVANS AND ASSOCIATES, INC. CONTROL POINT DEA CP 402 FOR GROUND COORDINATE SCALE FACTOR DETERMINATION.
2. THE BASIS OF ELEVATIONS FOR THIS MAP IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), BASED LOCALLY UPON THE CP 401.
3. TO MODIFY GROUND CONTROL TO COLORADO STATE PLANE NORTH ZONE; ADD 1,000,000 FEET TO NORTH COORDINATE, ADD 3,000,000 FEET TO EAST COORDINATE AND MULTIPLY BY 1/CFS (COMBINED SCALE FACTOR = 1/1.000319292 = 0.999680809.
4. FIELDWORK FOR CONTROL WAS COMPLETED NOVEMBER 2013.
5. SET 18" LONG #5 REBAR w/1-1/4"

19. THE PROJECT ENGINEER SHALL BE ON-SITE DURING CONSTRUCTION TO HELP INTERPRET DESIGN PLANS.

20. THE PROPOSED PLANS WERE BASED ON NOVEMBER 2013 LiDAR INFORMATION AND NOT DETAILED SURVEY DATA. AS A RESULT, EXISTING TOPOGRAPHY INFORMATION SHOWN ON THIS PLAN SET IS APPROXIMATE ONLY AND ACTUAL CONDITIONS MAY VARY.

21. FLOOD DEBRIS REMOVAL IS PART OF THIS PROJECT AND CONSISTS OF WOODY MATERIAL AND ALLUVIUM. THE LOCATION AND QUANTITY OF FLOOD DEBRIS REMOVAL HAS NOT BEEN DETERMINED. FLOOD DEBRIS REMOVAL WILL BE DETERMINED BY THE ENGINEER DURING CONSTRUCTION.

22. SOME SECTIONS OF CREEK HAVE BEGUN, AND WILL CONTINUE TO HEAL AND WILL NOT REQUIRE RESOTRATION. THESE LOCATIONS HAVE BEEN IDENTIFIED ON THE PLANS. THESE LOCATIONS WILL BE IDENTIFIED BY ENGINEER DURING CONSTRUCTION.

STREAM CONVENTIONAL SYMBOLS

- OUTLET PROTECTION
- ROCK CROSS VANE
- CONSTRUCTED RIFFLE
- ROOT WAD
- STREAM REALIGNMENT REQUIRED AS A RESULT OF ROADWAY IMPROVEMENTS
- EXISTING STREAM ALIGNMENT
- BANKFULL CHANNEL EXTENTS
- EXISTING PROPERTY BOUNDARY
- EXISTING STRUCTURE / HOMES
- EXISTING ROAD CROSSING
- PROPOSED ROAD CROSSING
- POOL
- EXISTING RIGHT OF WAY
- LOG STEP POOL
- BOULDER STEP POOL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- LOG J-HOOK VANE
- BOULDER J-HOOK VANE
- CONVERGING BOULDER CLUSTER
- BOULDER BANK PROTECTION
- TOE WOOD BANK PROTECTION

**NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	1A

PROJECT ENGINEER

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

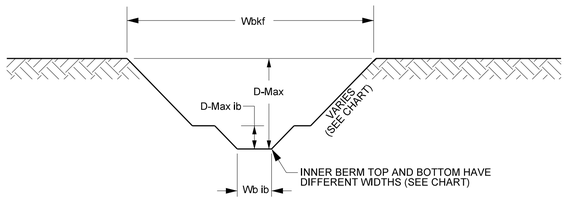
R:\138200_Fourmile_Canyon_Creek\Design\Plans\138200_PSH_01A.dgn

BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	2

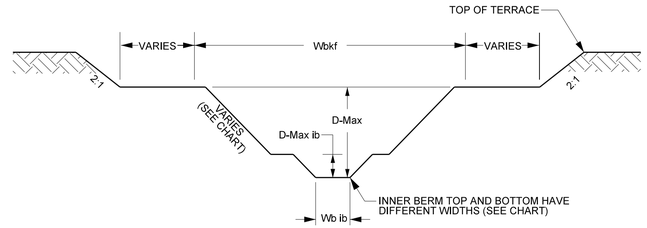
Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

TYPICAL RIFFLE, POOL, AND BANKFULL BENCH CROSS SECTIONS

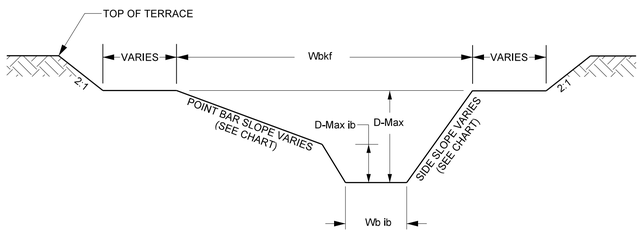
NTS



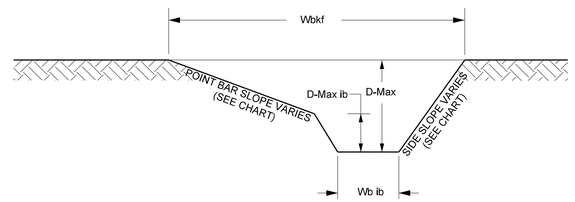
RIFFLE A-A



RIFFLE WITH BANKFULL BENCH



POOL B-B



POOL WITH BANKFULL BENCH

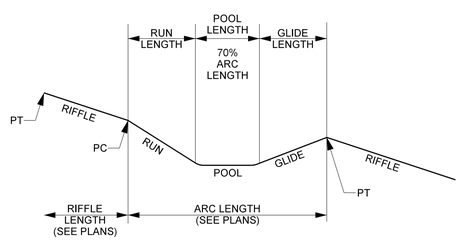
NOTES:

1. DURING CONSTRUCTION CORNERS OF DESIGN CHANNEL WILL BE ROUNDED AND A THALWEG WILL BE SHAPED PER DIRECTION OF ENGINEER.
2. POOL SHOWN ABOVE IS RIGHT BANK POOL ONLY.

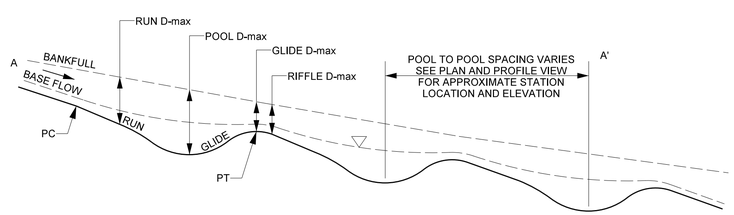
RIFFLE				POOL			
XS 1 UPSTREAM OF LION POINT STA 100+00 to 111+90 and 115+97 to 143+40	XS 2 UPSTREAM OF LION POINT STA 111+90 to 115+97	XS 3 DOWNSTREAM OF LION POINT 143+90 to 152+00	XS 4 DOWNSTREAM OF LION POINT 152+00 to 172+37	POOL - MIN AREA	POOL - MAX AREA	POOL WITH BOULDERS	
18.50	16.50	19.50	17.50	18.0	19.0	18.0	WIDTH BANKFULL (Wbkf)
1.16	1.17	1.24	1.27	1.4	1.5	1.5	AVERAGE DEPTH (D)
1.80	1.80	1.90	1.90	2.5	2.7	2.6	MAXIMUM DEPTH (D-Max)
16.02	14.06	15.68	13.83	13.0	12.3	12.0	WIDTH TO DEPTH RATIO (Wbkf/D)
2.50	2.50	2.50	2.50	0.5	0.5	2.0	SIDE SLOPE
0.75	0.75	0.80	0.80	3.0	3.1	1.8	INNER BERM SIDE SLOPE
21.37	19.37	24.25	22.15	25.0	29.4	27.0	BANKFULL XSEC AREA
2.38	1.38	2.25	1.25	-	-	-	INNER BERM BENCH WIDTH (Wbnch)
8.50	8.50	9.50	9.50	9.0	10.0	9.5	INNER BERM WIDTH TOP (W ib)
6.50	6.50	7.50	7.50	4.5	5.0	4.5	INNER BERM WIDTH BOTTOM (Wb ib)
0.61	0.61	0.67	0.67	1.0	1.1	1.0	INNER BERM AVERAGE DEPTH (D ib)
0.75	0.75	0.80	0.80	1.3	1.4	1.3	INNER BERM MAX DEPTH (D-max ib)
13.89	13.89	14.27	14.27	9.2	9.5	9.9	INNER BERM W/D RATIO (W ib/D ib)
5.20	5.20	6.33	6.33	8.8	10.5	9.1	INNER BERM AREA (A ib)

TYPICAL PROFILE SECTION

NTS



STREAM FACET	RANGE OF FACET SLOPE RATIOS *AVG. WATER SURFACE SLOPE VARIES BY REACH (SEE PLANS) RATIO OF AVG. SLOPE TO FACET SLOPE	
	MIN	MAX
RIFFLE	SEE PLANS & PROFILE	
RUN	1.30	4.00
POOL	0.001	0.003
GLIDE	0.200	0.600



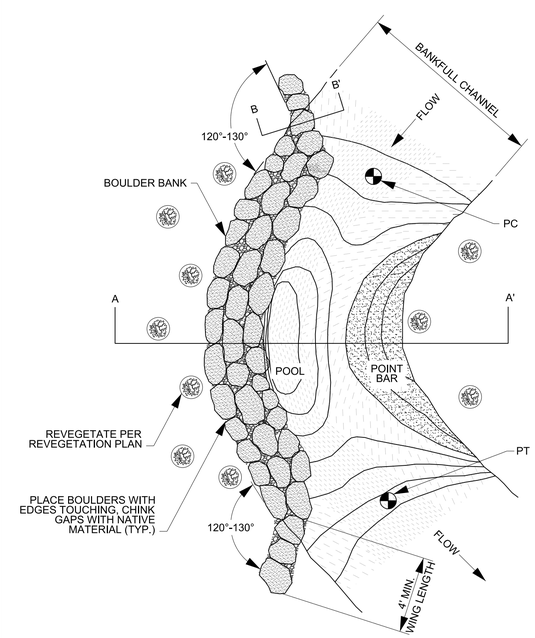
STREAM FACET	RANGE OF MAX DEPTHS			
	UPSTREAM OF LION POINT		DOWNSTREAM OF LION POINT	
	MIN	MAX	MIN	MAX
RIFFLE	1.8		1.9	
RUN	1.8	2.3	1.9	2.6
POOL	2.4	2.7	2.7	2.9
GLIDE	1.4	1.7	1.5	1.8

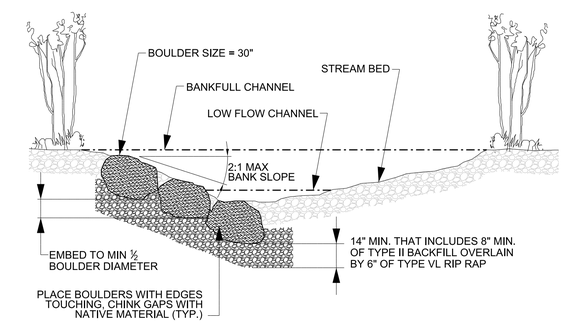
BOULDER BANK PROTECTION

NTS

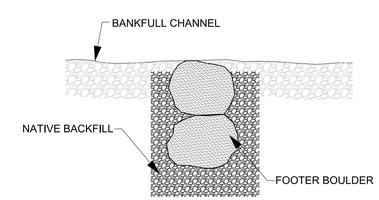
NOTE:

1. BANK PROTECTION SHALL BE EXTENDED A MINIMUM OF 10 FEET UPSTREAM OF PC AND10 FEET DOWNSTREAM OF PT UNLESS OTHERWISE NOTED.





CROSS SECTION A - A'



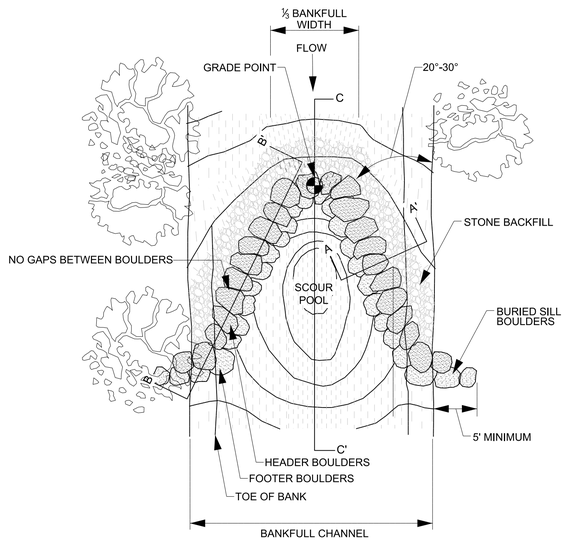
CROSS SECTION B - B'

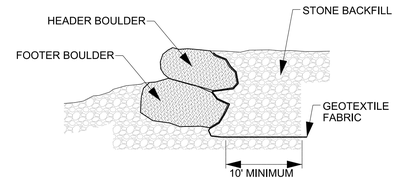
R:\138200_Fourmile_Canyon_Creek\Design\Plans\138200_PSH_02.dgn

BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	2A

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

ROCK CROSS VANE
NTS





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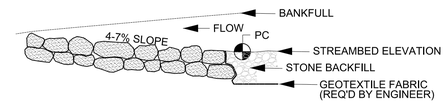
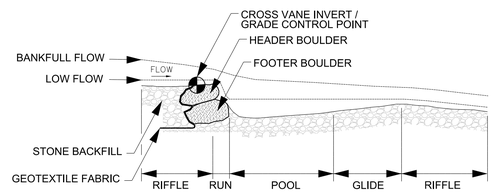
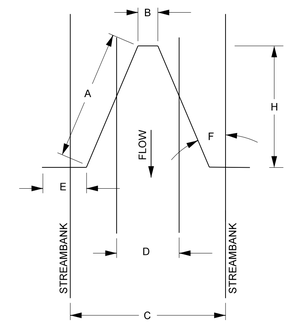


CROSS SECTION B - B'



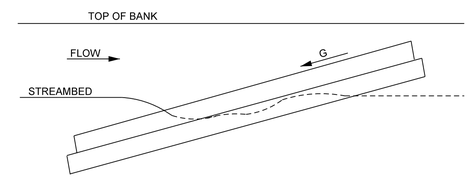
PROFILE C - C'

CROSS VANE TYPICAL
NTS



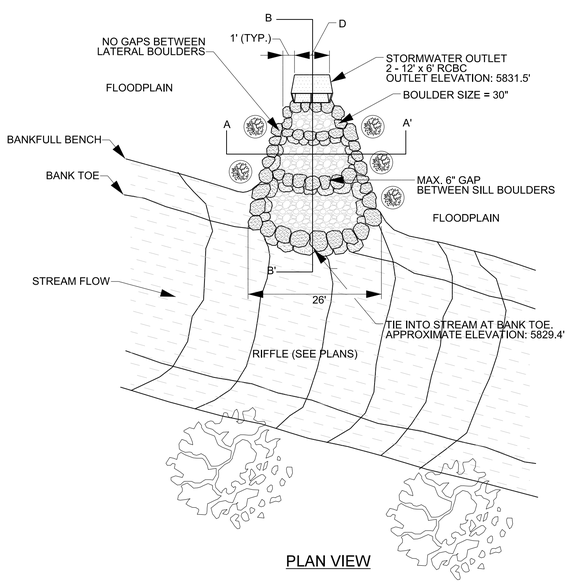
PLAN VIEW

		UPSTREAM OF LION POINT		DOWNSTREAM OF LION POINT	
		XS1	XS2	XS3	XS4
A	VANE ARM LENGTH	16.5 ft	14.8 ft	17.4 ft	15.6 ft
B	INVERT LENGTH	6.1 ft	5.4 ft	6.4 ft	5.8 ft
C	BANKFULL WIDTH	18.5 ft	16.5 ft	19.5 ft	17.5 ft
D	BOTTOM WIDTH	8.5 ft	8.5 ft	9.5 ft	9.5 ft
E	SILL LENGTH	5.0 ft	5.0 ft	5.0 ft	5.0 ft
F	VANE ARM ANGLE	22.0°	22.0°	22.0°	22.0°
G	VANE ARM SLOPE	10.9%	12.2%	10.9%	12.1%
H	STRUCTURE LENGTH	15.3 ft	13.7 ft	16.2 ft	14.5 ft

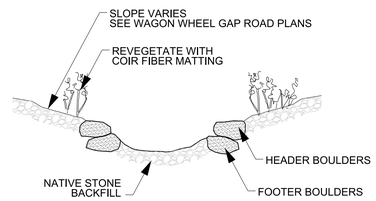


PROFILE VIEW

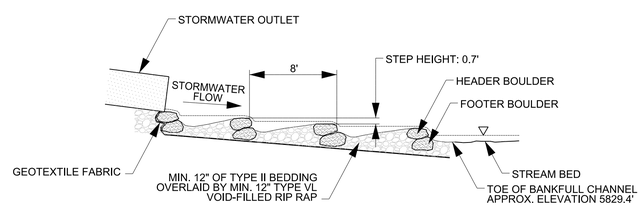
OUTLET PROTECTION
NTS



PLAN VIEW

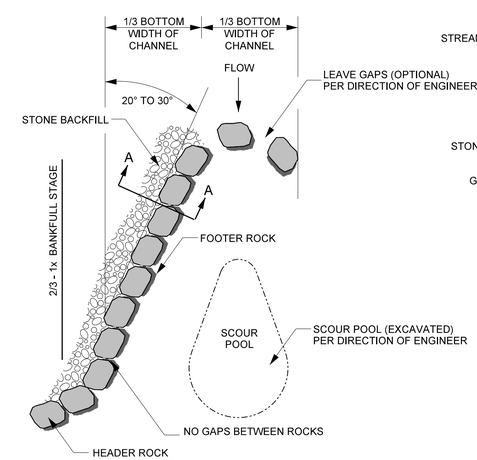


CROSS SECTION A - A'

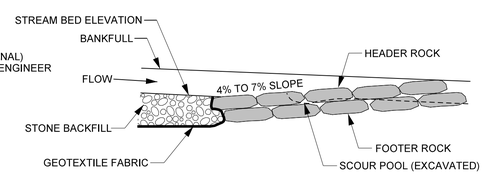


PROFILE B - B'

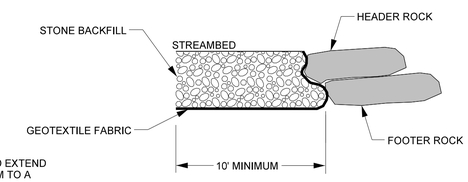
BOULDER J-HOOK VANE
NTS



PLAN VIEW



PROFILE VIEW



SECTION A - A

NOTES FOR ALL VANE STRUCTURES:

1. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF TEN FEET.
2. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS AND PLACE FILL ON UPSTREAM SIDE OF VANE ARM, BETWEEN THE ARM AND STREAMBANK.
3. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
4. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
5. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
6. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER ROCK.

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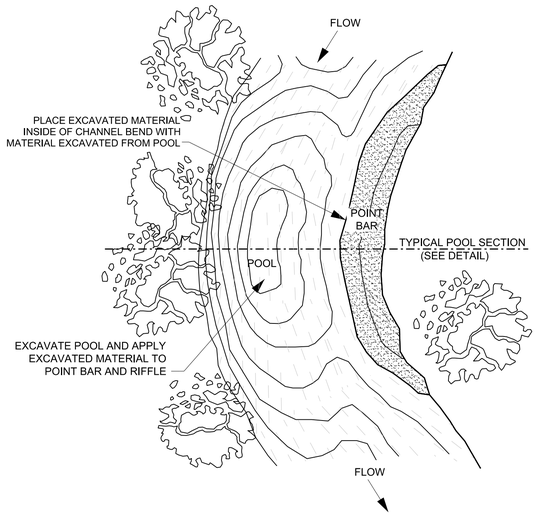
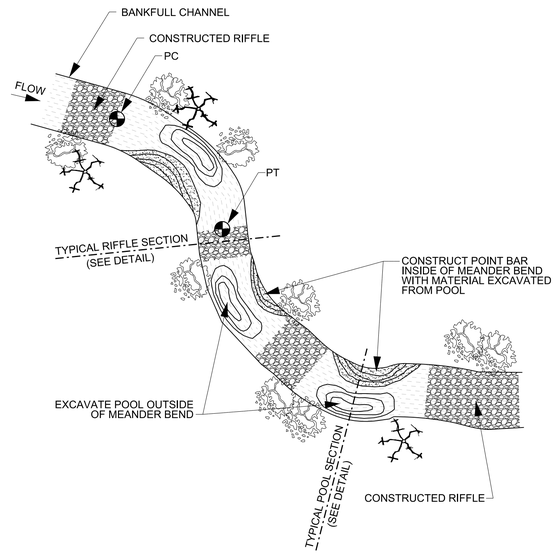
BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	2B

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

CONSTRUCTED POOL AND POINT BAR

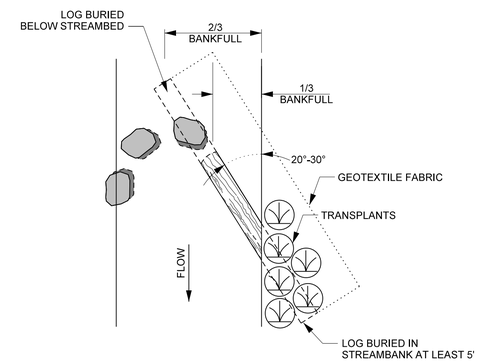
NTS



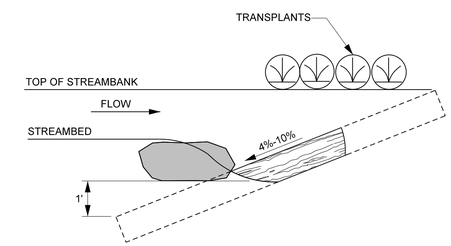


LOG J-HOOK VANE

NTS



PLAN VIEW



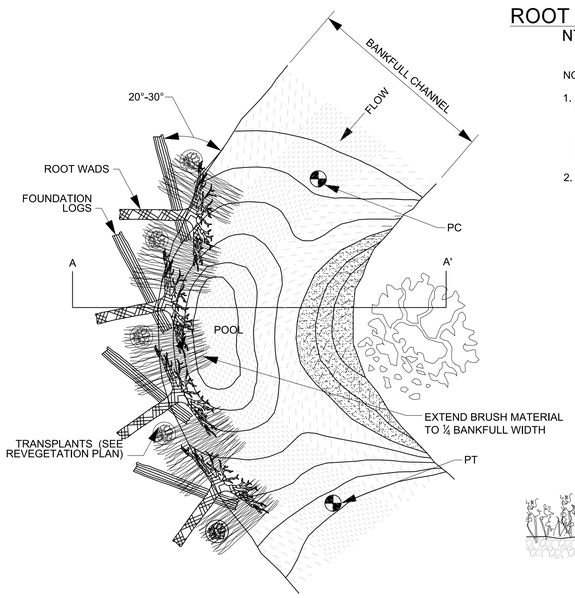
PROFILE VIEW

NOTES:

1. LOGS SHOULD BE AT LEAST 10" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED.
2. SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOG.
3. TRANSPLANTS ARE PLACED ALONG THE TOP OF THE BANK OVER THE BURIED LOG VANE TO PROTECT AGAINST EROSION DURING HIGH FLOWS.
4. BOULDERS TO BE PLACED 1 TO 2 FEET APART.

ROOT WADS

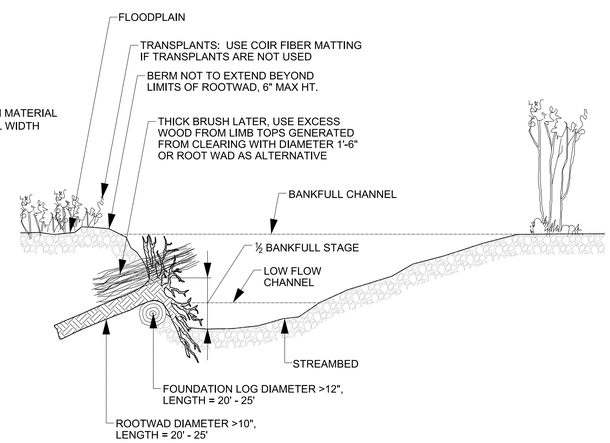
NTS



PLAN VIEW

NOTES:

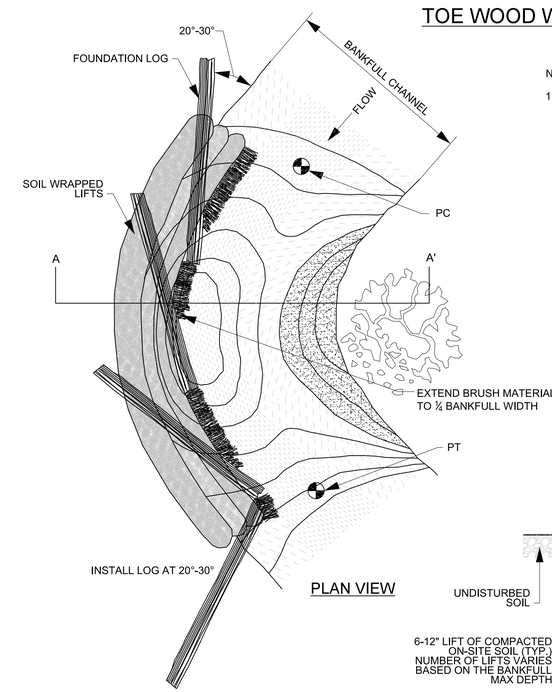
1. IF THE ROOT WAD CANNOT BE DRIVEN INTO THE BANK OR THE BANK NEEDS TO BE RECONSTRUCTED, THE TRENCHING METHOD SHOULD BE USED. THIS METHOD REQUIRES THAT A TRENCH BE EXCAVATED FOR THE LOG PORTION OF THE ROOT WAD. IN THIS CASE, A FOOTER LOG SHOULD BE INSTALLED UNDERNEATH THE ROOT WAD IN A TRENCH EXCAVATED PARALLEL TO THE BANK AND WELL BELOW THE STREAMBED. ONE-THIRD OF THE ROOT WAD SHOULD REMAIN BELOW NORMAL BASE FLOW CONDITIONS.
2. BANK PROTECTION SHALL BE EXTENDED A MUNIMUM OF 10 FEET UPSTREAM OF PC 10 FEET DOWNSTREAM OF PT UNLESS OTHERWISE NOTED.



CROSS SECTION A - A'

TOE WOOD WITH SOIL WRAPPED LIFT

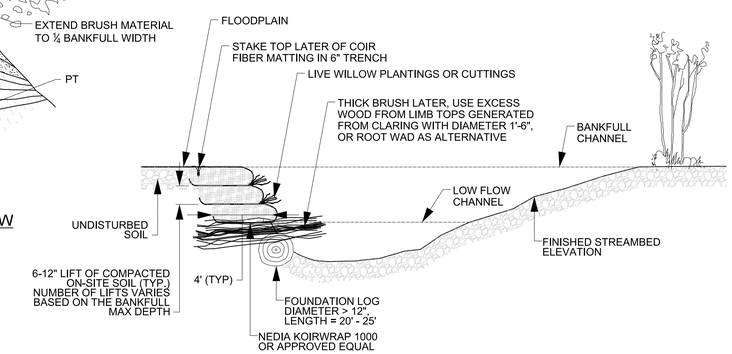
NTS



PLAN VIEW

NOTES:

1. BANK PROTECTION SHALL BE EXTENDED A MUNIMUM OF 10 FEET UPSTREAM OF PC 10 FEET DOWNSTREAM OF PT UNLESS OTHERWISE NOTED.



CROSS SECTION A - A'

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138200	2C

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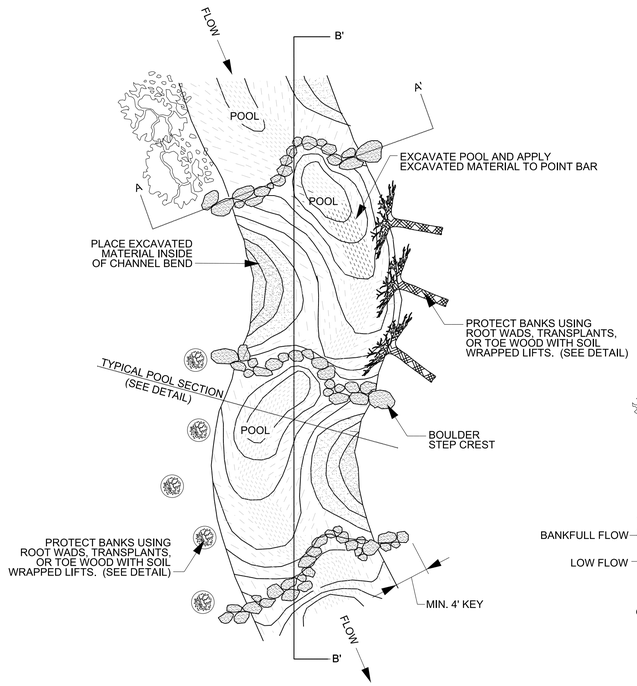
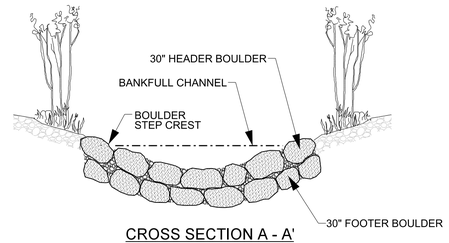
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

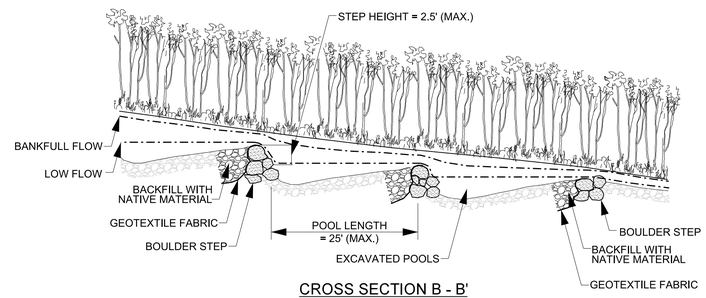
ROCK STEP POOL

NTS





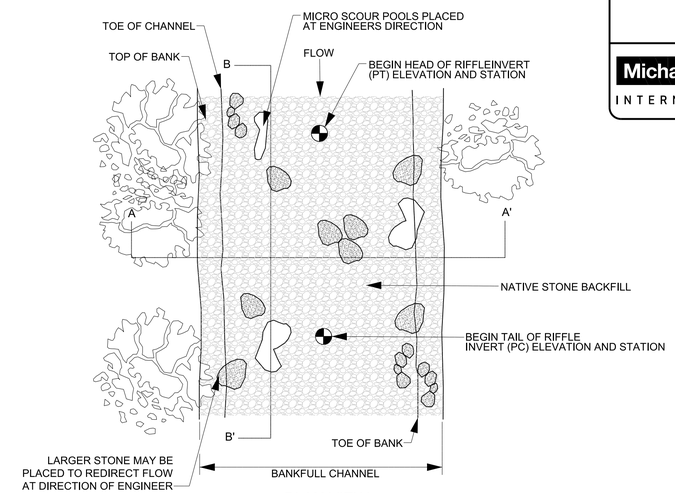
CROSS SECTION A - A'



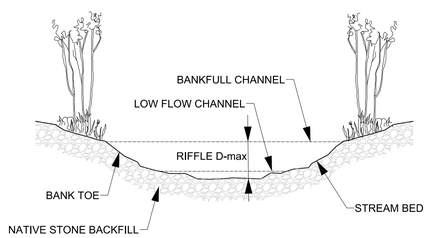
CROSS SECTION B - B'

CONSTRUCTED RIFFLE / CASCADE

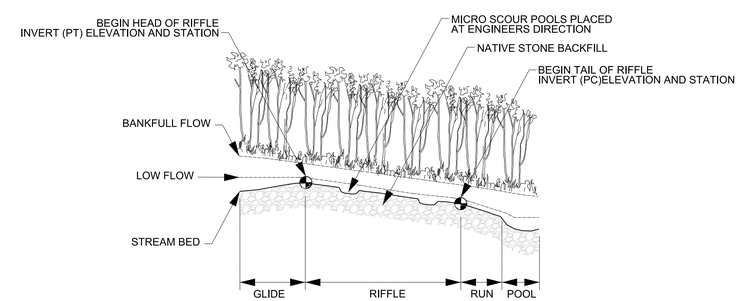
NTS



PLAN VIEW



CROSS SECTION A - A'



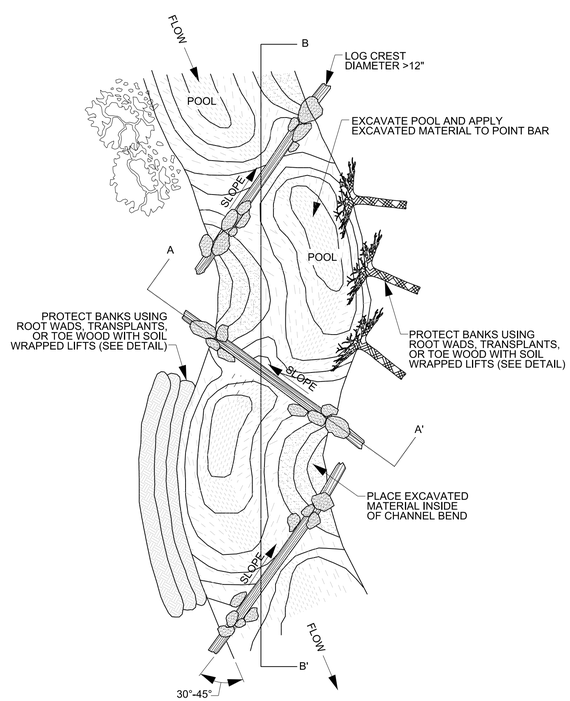
PROFILE B - B'

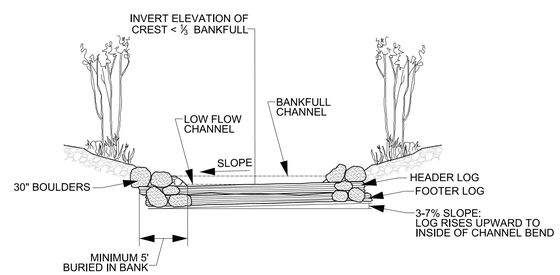
NOTES:

1. UNDERCUT CHANNEL BED ELEVATION AS NEEDED TO ALLOW FOR LAYERS OF STONE TO ACHIEVE FINAL GRADE.
2. INSTALL STONE BACKFILL, COMPACTED TO GRADE.
3. FINAL CHANNEL BED SHAPE SHOULD BE ROUNDED, SMOOTH, AND CONCAVE, WITH THE ELEVATION OF THE BED 0.2 FT DEEPER IN THE CENTER THAN AT THE EDGES.
4. NOT ALL RIFFLE LOCATIONS SHOWN ON PLANS NEED TO BE COMPLETELY RECONSTRUCTED, SOME JUST NEED TO BE RESHAPED.

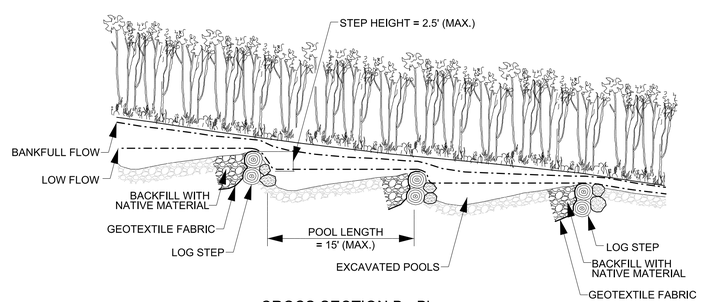
ROCK AND LOG STEP POOL

NTS





CROSS SECTION A - A'



CROSS SECTION B - B'

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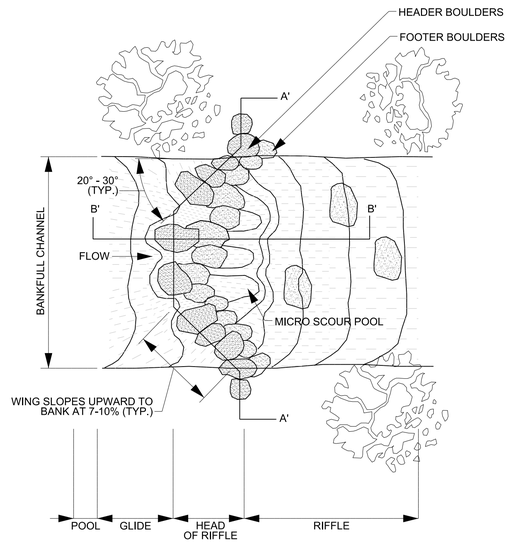
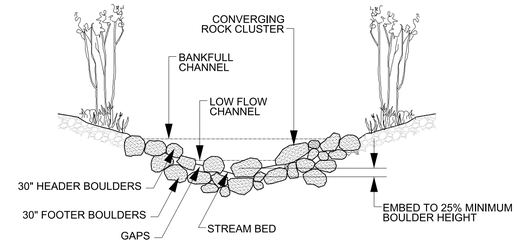
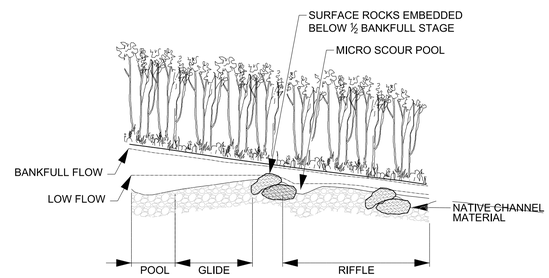
Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

CONVERGING BOULDER CLUSTER
NTS



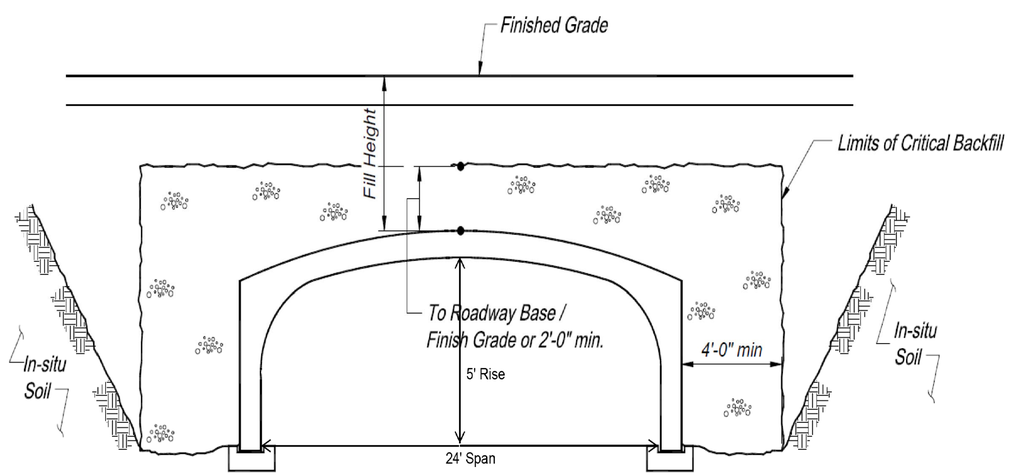


CROSS SECTION A - A'



PROFILE B - B'

CONSPAN PRECAST BRIDGE
NTS



CON/SPAN B-Series Precast Bridge Unit with i-Series Invert

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BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	3

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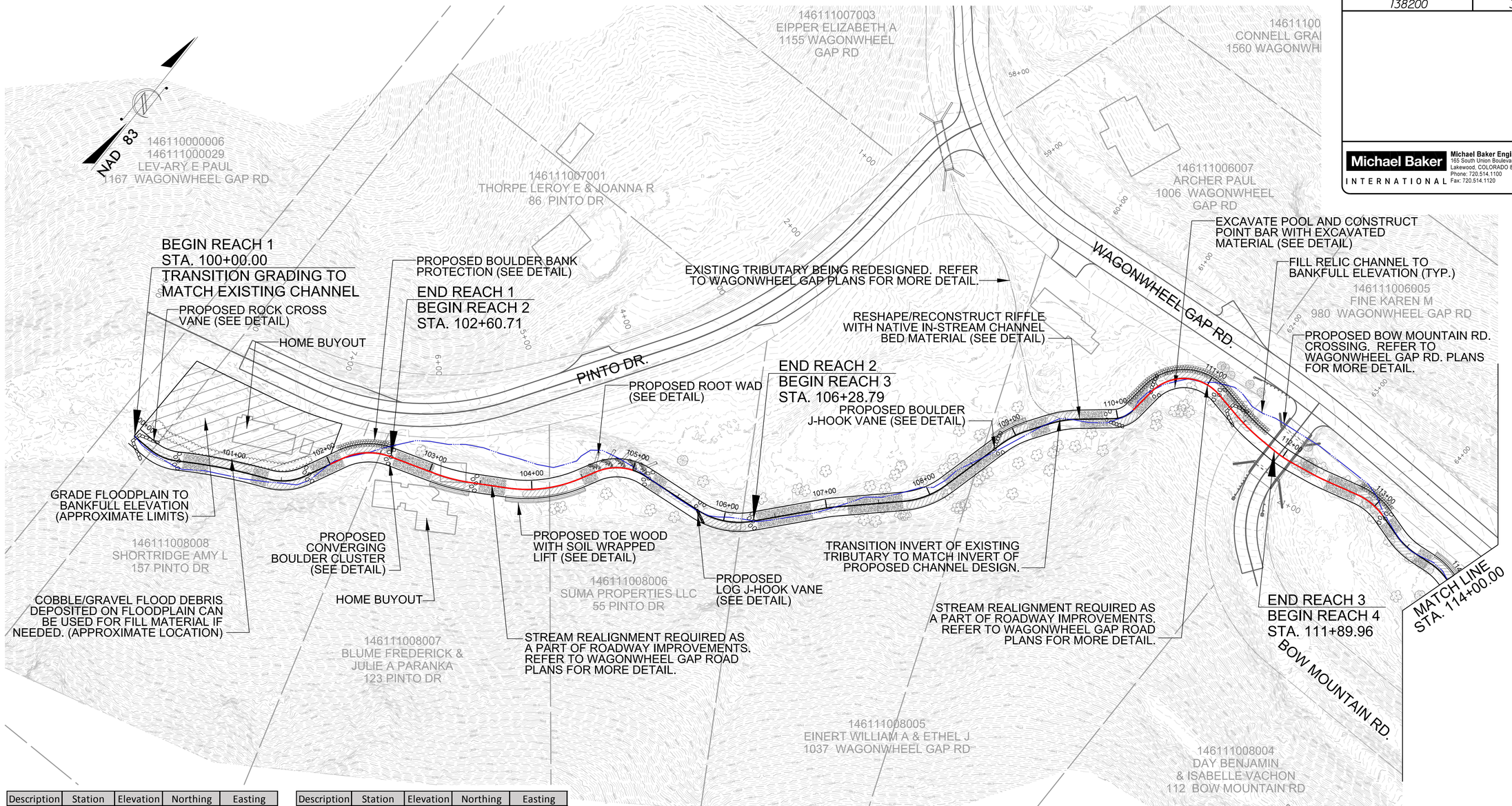
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



Description	Station	Elevation	Northing	Easting
BEGIN	100+00.00	6022.50	264815.57	51403.97
PC	100+19.10	6021.95	264815.17	51423.07
PT	100+49.09	6021.09	264823.08	51451.55
PC	101+37.59	6018.55	264863.89	51529.97
PT	101+74.20	6016.43	264888.62	51555.93
PC	102+12.32	6014.22	264922.81	51572.79
PT	102+60.71	6011.42	264953.63	51608.42
PC	103+04.39	6008.89	264967.08	51649.98
PT	103+40.80	6006.78	264981.91	51683.15
PC	103+76.09	6004.74	264999.68	51713.64
PT	104+48.06	6000.57	265050.79	51763.02
PC	104+64.02	5999.64	265064.84	51770.58
PT	105+13.46	5996.78	265091.18	51810.11
PC	105+72.27	5994.75	265096.94	51868.64
PT	106+28.79	5992.79	265122.18	51917.72
PC	106+98.02	5990.40	265174.26	51963.32
PT	107+08.02	5990.05	265181.47	51970.25
PC	107+73.64	5987.78	265226.55	52017.94
PT	108+18.33	5986.23	265264.51	52040.40

Description	Station	Elevation	Northing	Easting
PC	108+81.74	5984.04	265325.88	52056.38
PT	109+13.77	5982.93	265354.92	52069.51
PC	109+33.58	5982.25	265371.34	52080.60
PT	109+62.87	5981.23	265392.93	52100.23
PC	109+95.58	5980.10	265413.73	52125.49
PT	110+17.02	5979.36	265432.15	52135.37
PC	110+40.88	5977.59	265455.88	52137.84
PT	111+14.94	5972.09	265494.92	52190.81
PC	111+38.46	5970.35	265490.32	52213.87
PT	111+74.17	5967.69	265486.49	52249.32
PC	111+89.96	5966.52	265486.20	52265.12
PT	112+10.47	5965.00	265487.72	52285.54
PC	112+30.17	5964.83	265491.00	52304.96
PT	112+47.79	5964.68	265494.69	52322.18
PC	112+79.90	5964.40	265502.80	52353.26
PT	113+12.25	5964.12	265502.34	52385.21
PC	113+34.25	5963.46	265496.18	52406.33
PT	113+61.09	5962.67	265493.65	52432.89

FOURMILE CANYON CREEK PLAN VIEW

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SCALE (FT)

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138200	4

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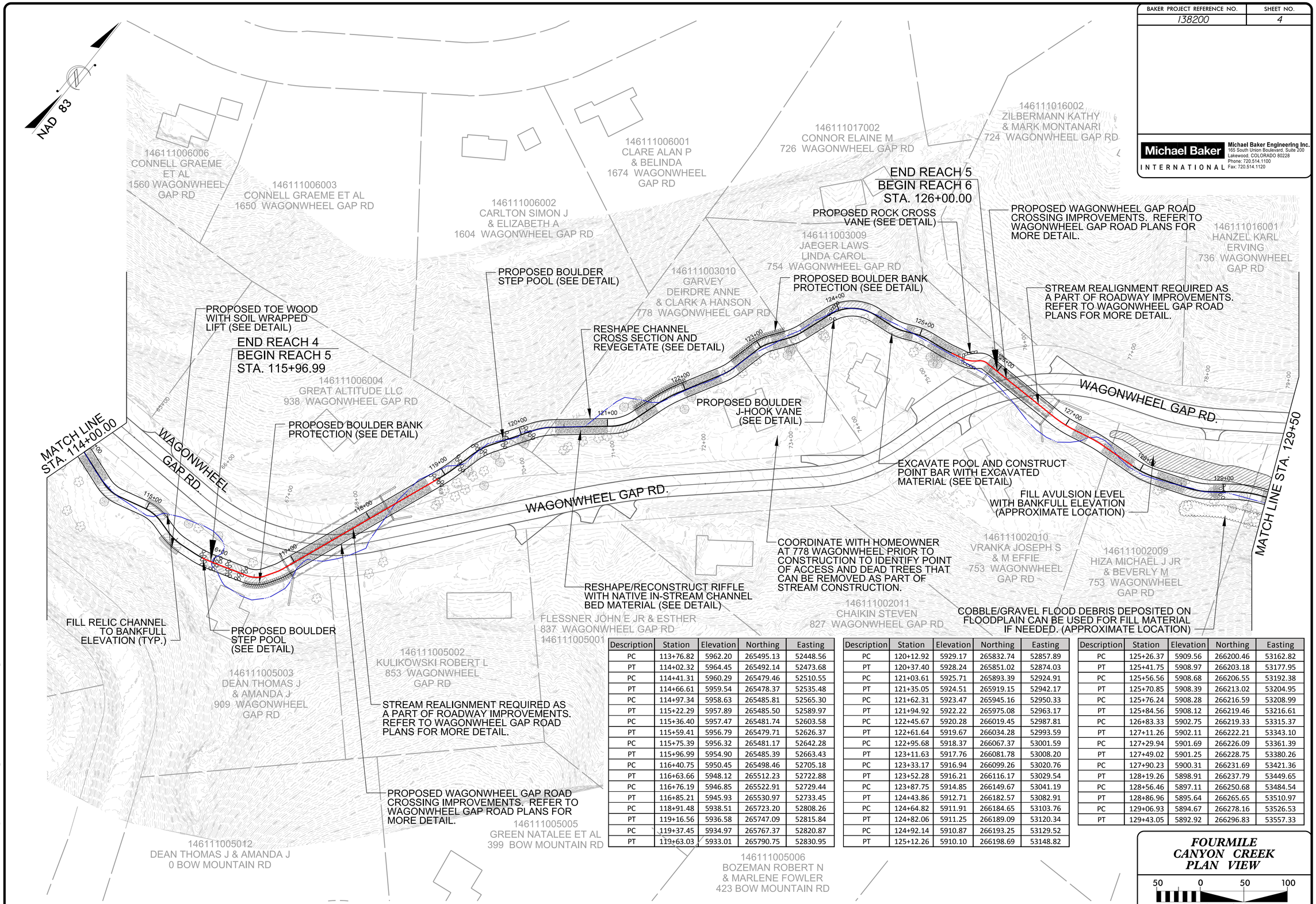
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



Description	Station	Elevation	Northing	Easting
PC	113+76.82	5962.20	265495.13	52448.56
PT	114+02.32	5964.45	265492.14	52473.68
PC	114+41.31	5960.29	265479.46	52510.55
PT	114+66.61	5959.54	265478.37	52535.48
PC	114+97.34	5958.63	265485.81	52565.30
PT	115+22.29	5957.89	265485.50	52589.97
PC	115+36.40	5957.47	265481.74	52603.58
PT	115+59.41	5956.79	265479.71	52626.37
PC	115+75.39	5956.32	265481.17	52642.28
PT	115+96.99	5954.90	265485.39	52663.43
PC	116+40.75	5950.45	265498.46	52705.18
PT	116+63.66	5948.12	265512.23	52722.88
PC	116+76.19	5946.85	265522.91	52729.44
PT	116+85.21	5945.93	265530.97	52733.45
PC	118+91.48	5938.51	265723.20	52808.26
PT	119+16.56	5936.58	265747.09	52815.84
PC	119+37.45	5934.97	265767.37	52820.87
PT	119+63.03	5933.01	265790.75	52830.95

Description	Station	Elevation	Northing	Easting
PC	120+12.92	5929.17	265832.74	52857.89
PT	120+37.40	5928.24	265851.02	52874.03
PC	121+03.61	5925.71	265893.39	52924.91
PT	121+35.05	5924.51	265919.15	52942.17
PC	121+62.31	5923.47	265945.16	52950.33
PT	121+94.92	5922.22	265975.08	52963.17
PC	122+45.67	5920.28	266019.45	52987.81
PT	122+61.64	5919.67	266034.28	52993.59
PC	122+95.68	5918.37	266067.37	53001.59
PT	123+11.63	5917.76	266081.78	53008.20
PC	123+33.17	5916.94	266099.26	53020.76
PT	123+52.28	5916.21	266116.17	53029.54
PC	123+87.75	5914.85	266149.67	53041.19
PT	124+43.86	5912.71	266182.57	53082.91
PC	124+64.82	5911.91	266184.65	53103.76
PT	124+82.06	5911.25	266189.09	53120.34
PC	124+92.14	5910.87	266193.25	53129.52
PT	125+12.26	5910.10	266198.69	53148.82

Description	Station	Elevation	Northing	Easting
PC	125+26.37	5909.56	266200.46	53162.82
PT	125+41.75	5908.97	266203.18	53177.95
PC	125+56.56	5908.68	266206.55	53192.38
PT	125+70.85	5908.39	266213.02	53204.95
PC	125+76.24	5908.28	266216.59	53208.99
PT	125+84.56	5908.12	266219.46	53216.61
PC	126+83.33	5902.75	266219.33	53315.37
PT	127+11.26	5902.11	266222.21	53343.10
PC	127+29.94	5901.69	266226.09	53361.39
PT	127+49.02	5901.25	266228.75	53380.26
PC	127+90.23	5900.31	266231.69	53421.36
PT	128+19.26	5898.91	266237.79	53449.65
PC	128+56.46	5897.11	266250.68	53484.54
PT	128+86.96	5895.64	266265.65	53510.97
PC	129+06.93	5894.67	266278.16	53526.53
PT	129+43.05	5892.92	266296.83	53557.33

FOURMILE CANYON CREEK PLAN VIEW

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SCALE (FT)

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Description	Station	Elevation	Northing	Easting
PC	129+87.18	5890.79	266314.51	53597.76
PT	130+14.45	5889.57	266330.24	53619.80
PC	130+29.34	5888.96	266341.19	53629.88
PT	130+45.53	5888.30	266351.71	53642.14
PC	130+63.68	5887.56	266361.83	53657.21
PT	130+80.31	5886.88	266373.62	53668.77
PC	130+97.07	5886.19	266387.72	53677.84
PT	131+19.46	5885.28	266404.97	53692.02
PC	131+39.62	5884.45	266418.95	53706.55
PT	131+56.71	5883.75	266432.24	53717.23
PC	131+71.09	5883.17	266444.50	53724.74
PT	131+90.07	5882.39	266459.06	53736.81
PC	132+21.15	5881.12	266479.92	53759.85
PT	132+45.58	5880.12	266493.92	53779.80
PC	133+08.84	5877.79	266523.57	53835.67
PT	133+26.52	5877.14	266532.77	53850.77

Description	Station	Elevation	Northing	Easting
PC	133+56.71	5876.03	266549.96	53875.57
PT	133+78.90	5875.22	266556.55	53896.42
PC	134+64.88	5872.05	266557.10	53982.40
PT	134+96.65	5870.88	266553.34	54013.86
PC	135+30.94	5869.62	266545.05	54047.13
PT	135+47.90	5869.00	266543.65	54063.96
PC	135+64.17	5868.39	266544.91	54080.18
PT	135+85.43	5867.58	266545.44	54101.42
PC	136+12.73	5866.55	266544.66	54128.72
PT	136+52.00	5865.07	266551.61	54167.08
PC	136+73.36	5864.26	266559.67	54186.86
PT	136+97.30	5863.07	266565.77	54209.94
PC	137+27.13	5861.25	266569.61	54239.52
PT	137+52.23	5859.62	266578.21	54262.88
PC	137+76.40	5858.14	266591.40	54283.13
PT	137+93.24	5857.12	266596.52	54298.98
PC	138+07.78	5856.23	266597.21	54313.50
PT	138+23.91	5855.24	266601.75	54328.81

Description	Station	Elevation	Northing	Easting
PC	139+01.65	5850.49	266641.00	54395.91
PT	139+25.83	5849.02	266657.06	54413.77
PC	139+44.88	5847.85	266672.40	54425.07
PT	139+65.95	5846.94	266687.93	54439.26
PC	139+87.78	5846.00	266702.40	54455.59
PT	140+06.65	5845.18	266716.03	54468.61
PC	140+59.10	5842.91	266756.83	54501.56
PT	140+94.84	5841.36	266781.30	54527.47
PC	141+80.82	5837.64	266831.43	54597.32
PT	142+04.63	5836.61	266843.78	54617.66
PC	142+26.40	5835.67	266853.62	54637.08
PT	142+58.46	5834.28	266873.70	54661.76
PC	142+76.38	5833.50	266887.69	54672.94
PT	143+10.00	5832.05	266908.46	54699.02
PC	143+40.41	5830.73	266921.65	54726.43
PT	144+34.84	5826.59	266905.73	54813.30

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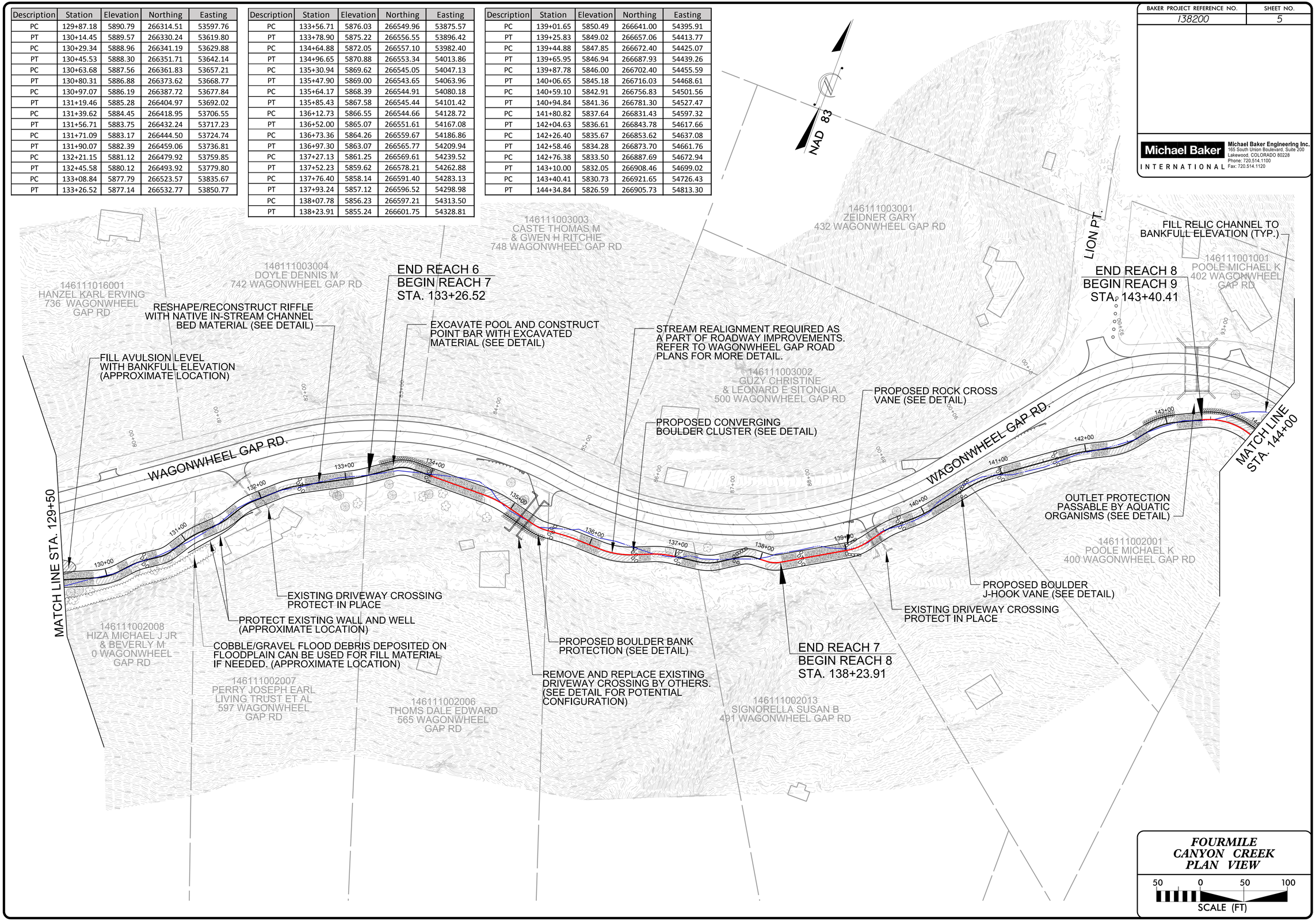
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



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138200	6

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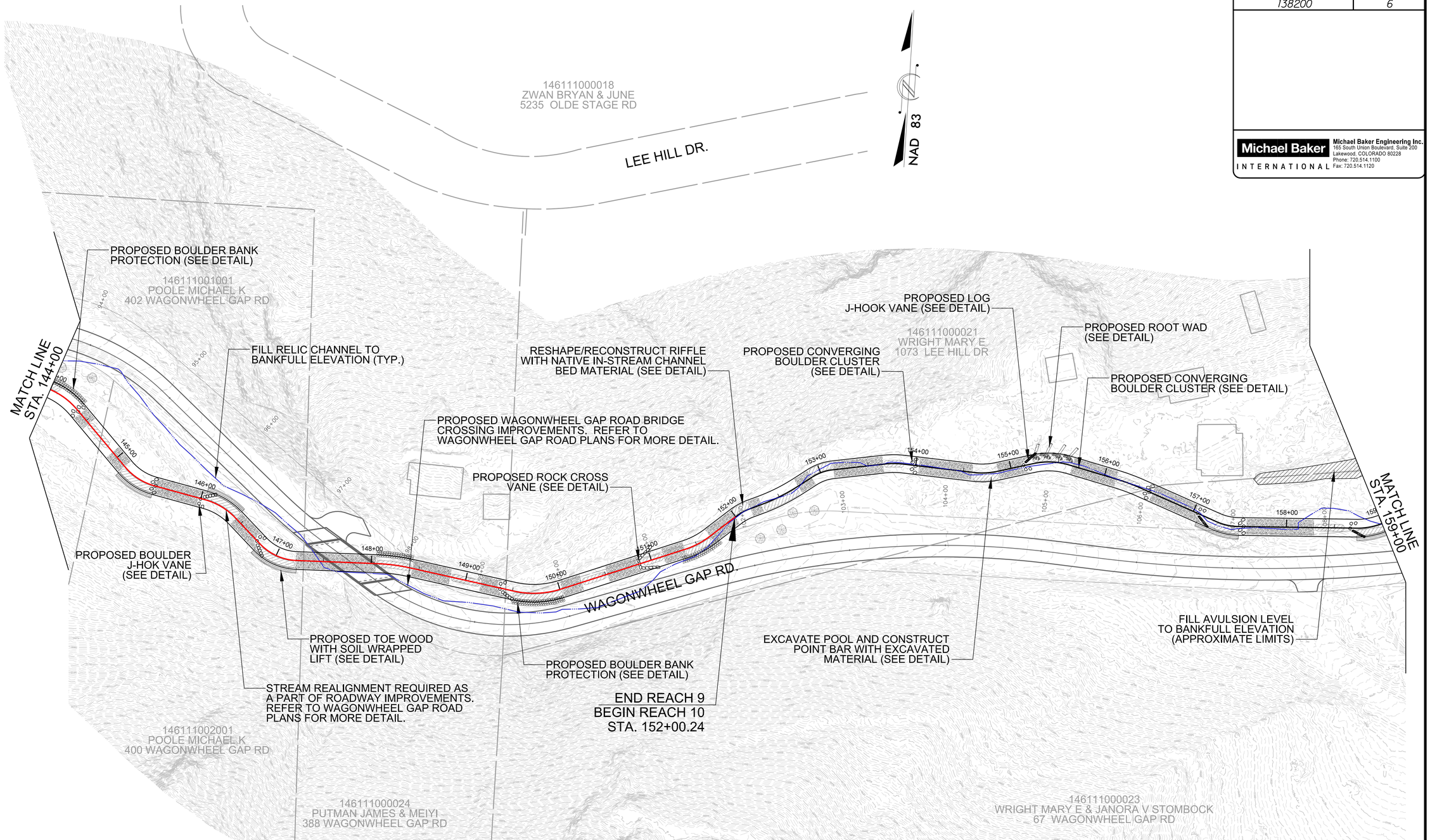
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



Description	Station	Elevaton	Northing	Easting
PC	145+13.36	5823.14	266848.83	54867.40
PT	145+49.68	5821.54	266831.43	54898.65
PC	146+04.78	5819.13	266820.20	54952.59
PT	146+41.82	5817.50	266803.38	54985.08
PC	146+79.44	5815.91	266777.74	55012.61
PT	147+22.03	5814.11	266763.00	55051.43
PC	148+05.47	5810.59	266765.02	55134.86
PT	148+41.87	5809.05	266762.60	55171.13
PC	149+51.54	5804.42	266745.38	55279.43
PT	150+01.70	5802.30	266750.71	55328.72

Description	Station	Elevaton	Northing	Easting
PC	151+37.21	5796.58	266800.10	55454.91
PT	151+65.62	5795.38	266814.72	55479.11
PC	152+00.24	5793.92	266837.37	55505.29
PT	152+17.23	5793.25	266846.43	55519.58
PC	152+29.10	5792.78	266851.23	55530.44
PT	152+72.61	5791.07	266873.02	55568.01
PC	152+90.13	5790.39	266883.40	55582.13
PT	153+13.08	5789.48	266892.33	55603.04
PC	153+66.99	5787.37	266901.62	55656.15
PT	153+87.45	5786.56	266902.82	55676.52

Description	Station	Elevaton	Northing	Easting
PC	154+60.69	5783.68	266898.76	55749.66
PT	154+85.41	5782.71	266901.44	55774.11
PC	155+24.05	5781.19	266911.90	55811.31
PT	155+61.70	5779.72	266912.76	55848.56
PC	156+13.33	5777.69	266901.09	55898.85
PT	156+38.59	5776.69	266893.85	55923.03
PC	157+26.31	5773.25	266863.42	56005.31
PT	157+49.99	5772.32	266859.84	56028.55
PC	158+73.37	5767.47	266865.84	56151.79
PT	159+01.84	5766.35	266873.15	56179.08

FOURMILE CANYON CREEK PLAN VIEW

50 0 50 100
SCALE (FT)

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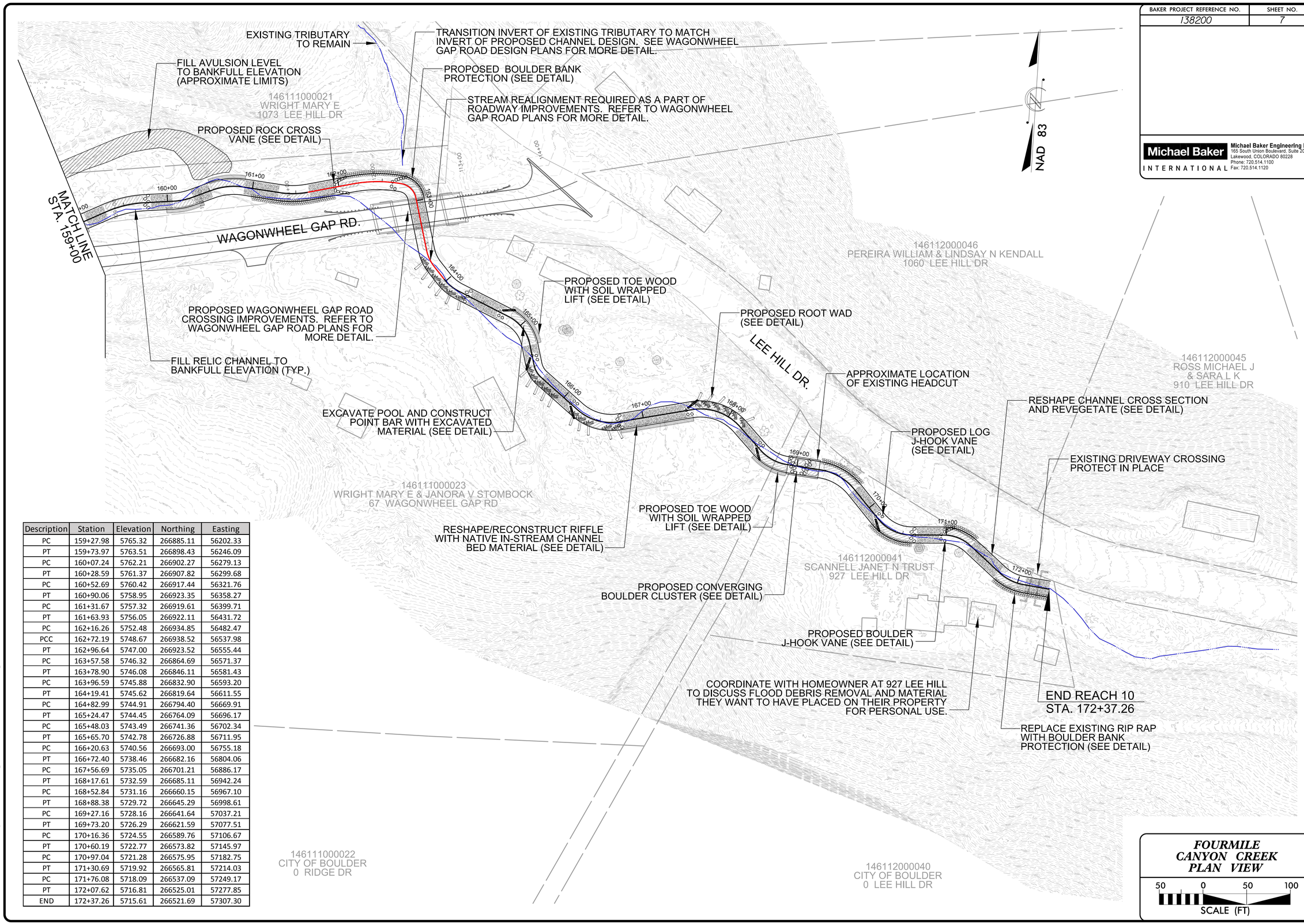
BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	7

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



Description	Station	Elevation	Northing	Easting
PC	159+27.98	5765.32	266885.11	56202.33
PT	159+73.97	5763.51	266898.43	56246.09
PC	160+07.24	5762.21	266902.27	56279.13
PT	160+28.59	5761.37	266907.82	56299.68
PC	160+52.69	5760.42	266917.44	56321.76
PT	160+90.06	5758.95	266923.35	56358.27
PC	161+31.67	5757.32	266919.61	56399.71
PT	161+63.93	5756.05	266922.11	56431.72
PC	162+16.26	5752.48	266934.85	56482.47
PCC	162+72.19	5748.67	266938.52	56537.98
PT	162+96.64	5747.00	266923.52	56555.44
PC	163+57.58	5746.32	266864.69	56571.37
PT	163+78.90	5746.08	266846.11	56581.43
PC	163+96.59	5745.88	266832.90	56593.20
PT	164+19.41	5745.62	266819.64	56611.55
PC	164+82.99	5744.91	266794.40	56669.91
PT	165+24.47	5744.45	266764.09	56696.17
PC	165+48.03	5743.49	266741.36	56702.34
PT	165+65.70	5742.78	266726.88	56711.95
PC	166+20.63	5740.56	266693.00	56755.18
PT	166+72.40	5738.46	266682.16	56804.06
PC	167+56.69	5735.05	266701.21	56886.17
PT	168+17.61	5732.59	266685.11	56942.24
PC	168+52.84	5731.16	266660.15	56967.10
PT	168+88.38	5729.72	266645.29	56998.61
PC	169+27.16	5728.16	266641.64	57037.21
PT	169+73.20	5726.29	266621.59	57077.51
PC	170+16.36	5724.55	266589.76	57106.67
PT	170+60.19	5722.77	266573.82	57145.97
PC	170+97.04	5721.28	266575.95	57182.75
PT	171+30.69	5719.92	266565.81	57214.03
PC	171+76.08	5718.09	266537.09	57249.17
PT	172+07.62	5716.81	266525.01	57277.85
END	172+37.26	5715.61	266521.69	57307.30

FOURMILE CANYON CREEK PLAN VIEW

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SCALE (FT)

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BAKER PROJECT REFERENCE NO.	SHEET NO.
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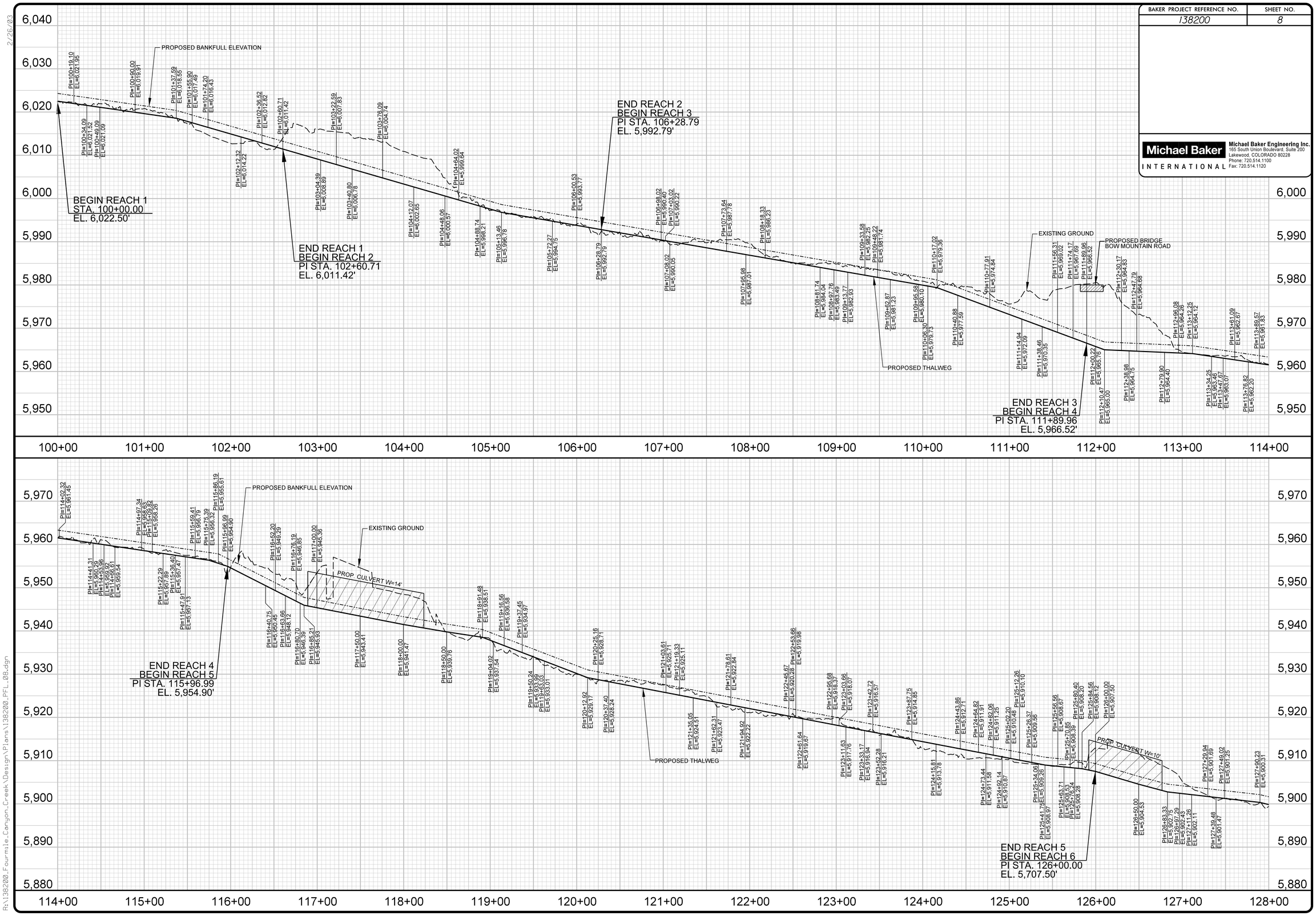
Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



2/26/03

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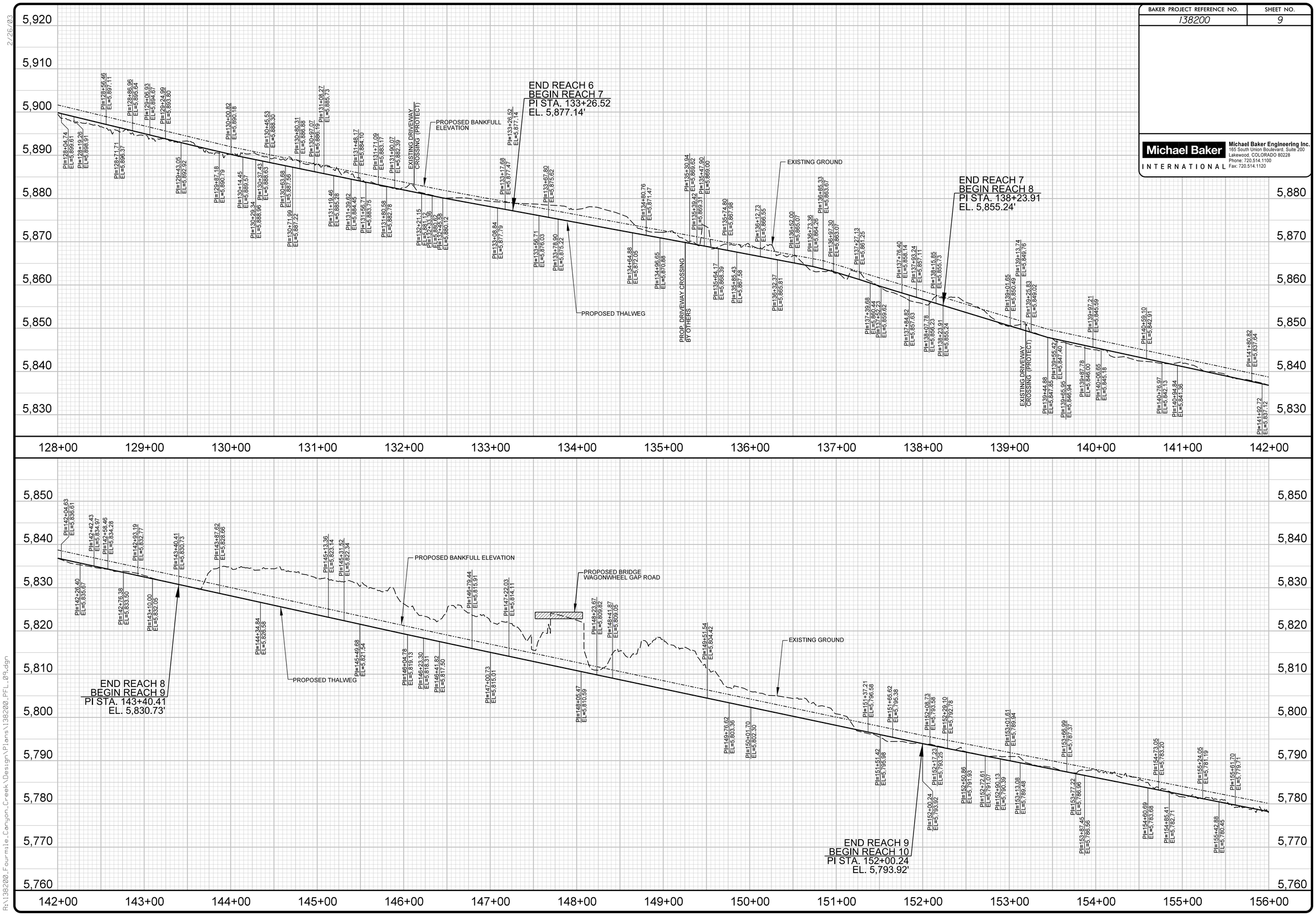
BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	9

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



2/26/03

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BAKER PROJECT REFERENCE NO.	SHEET NO.
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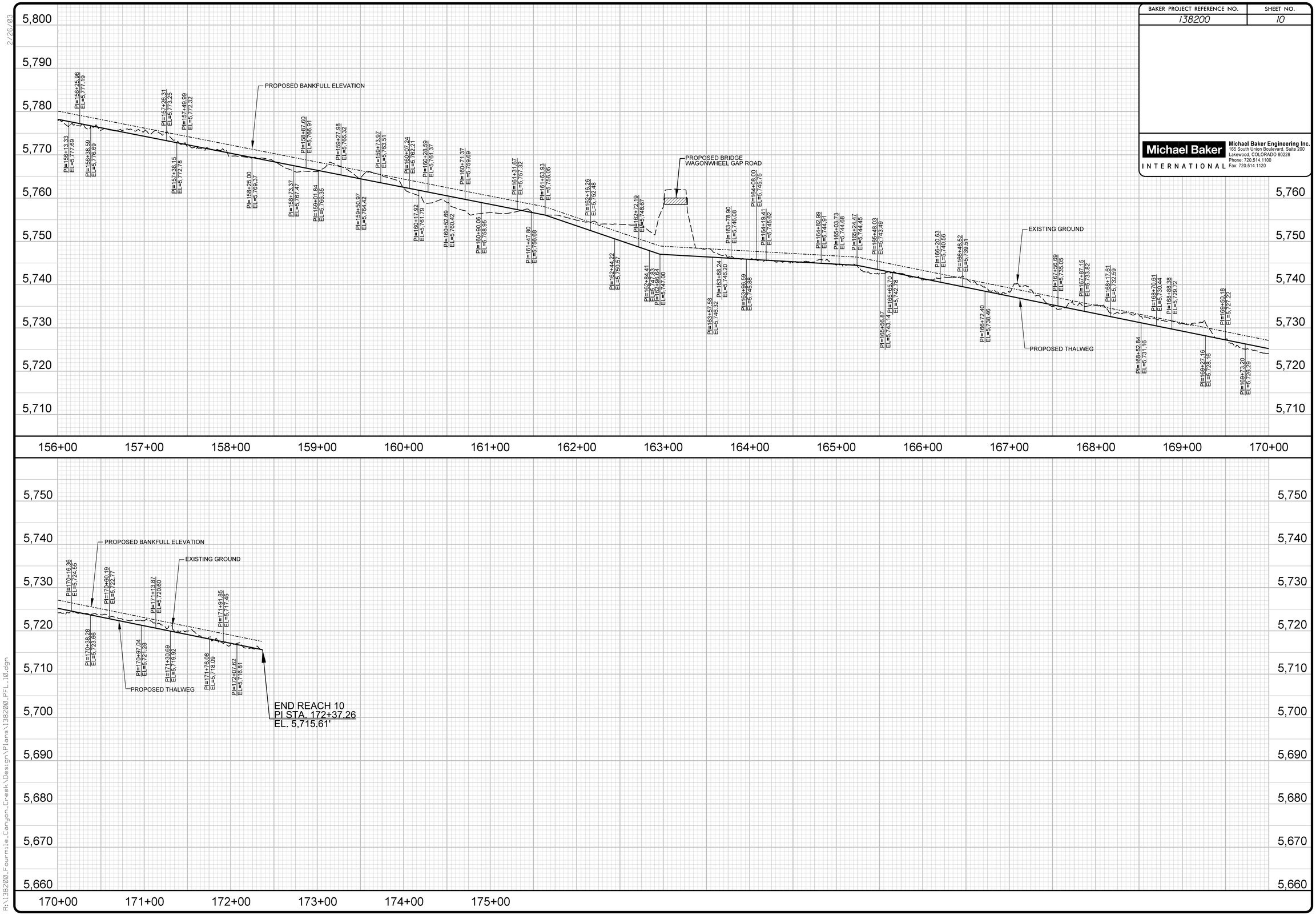
Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120



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BAKER PROJ. REFERENCE NO.	SHEET NO.
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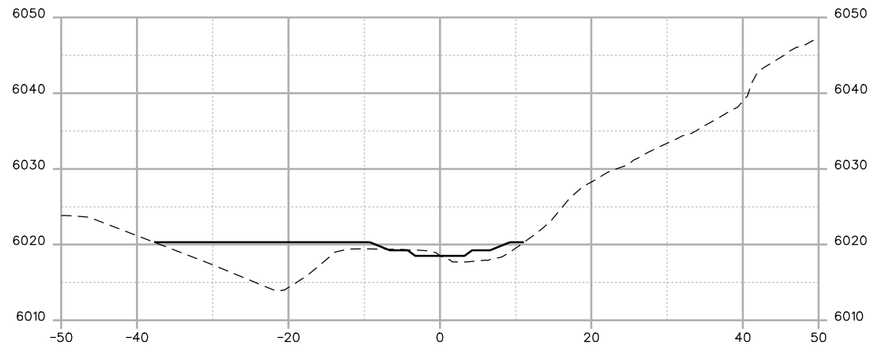

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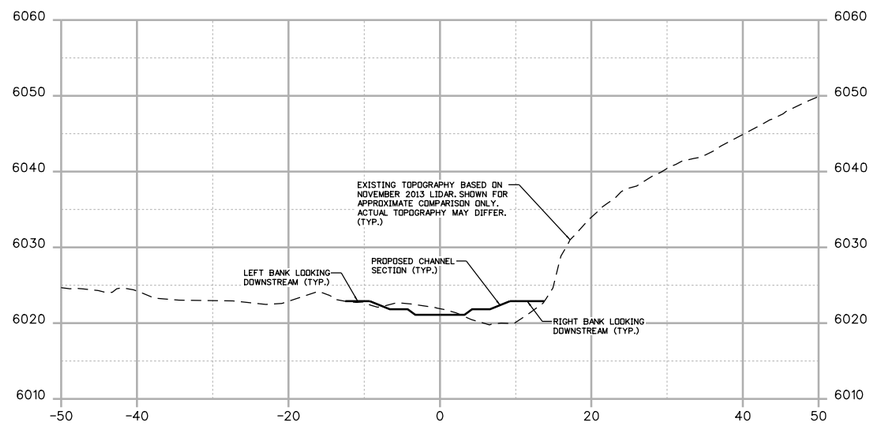

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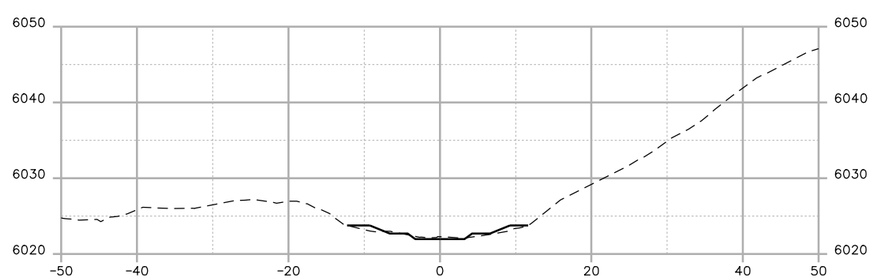
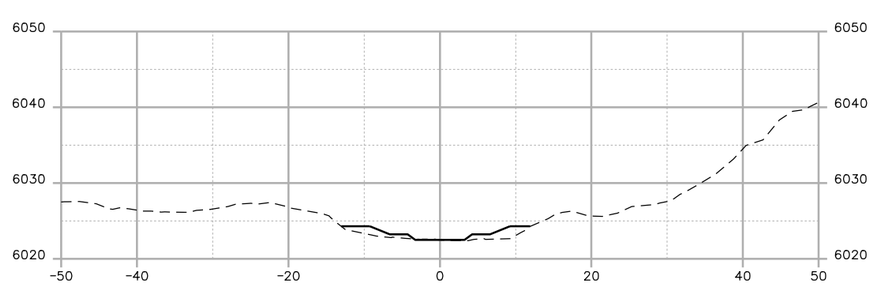


STA. 100+19.10



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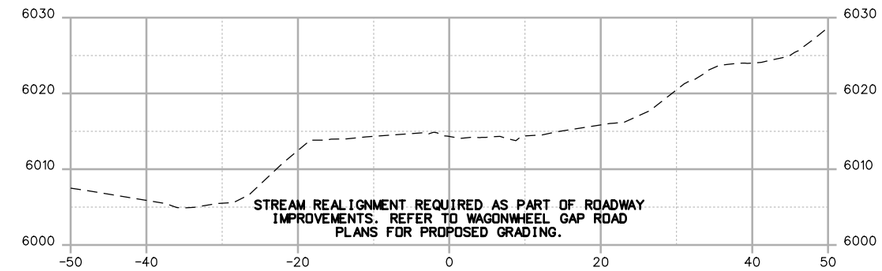

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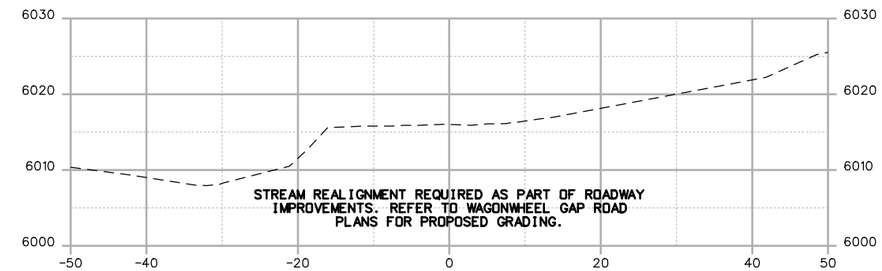

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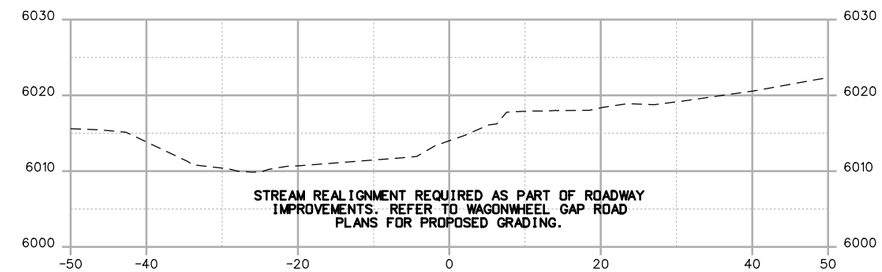

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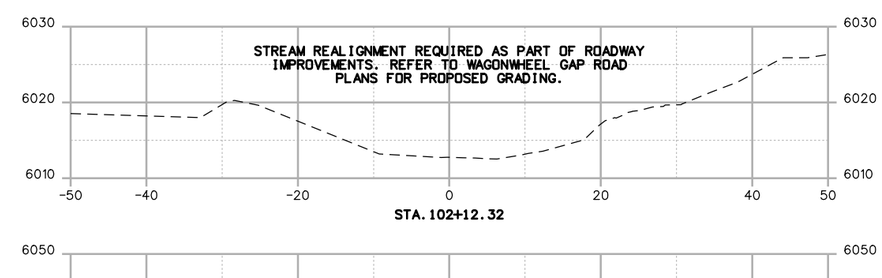

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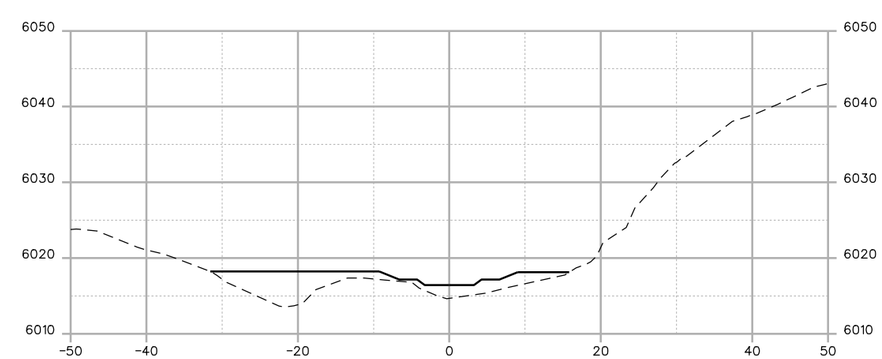

STA. 101+74.20

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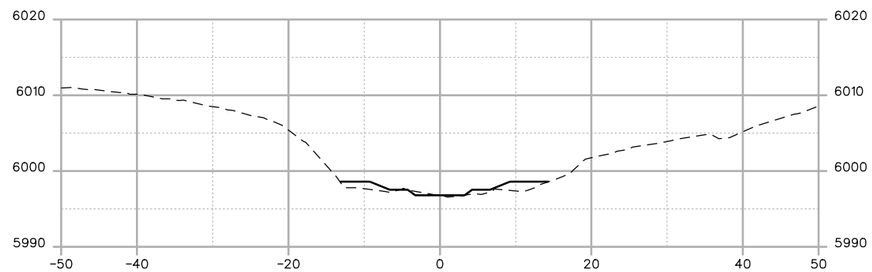
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-2



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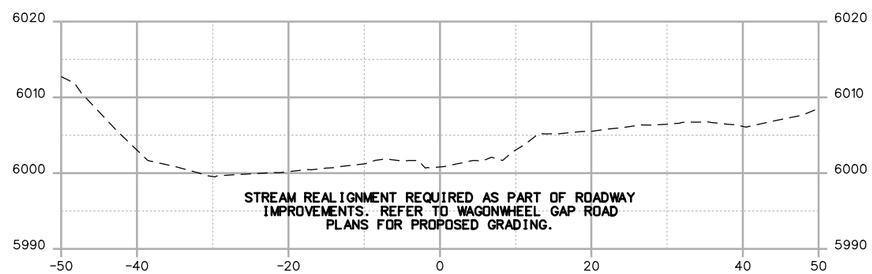
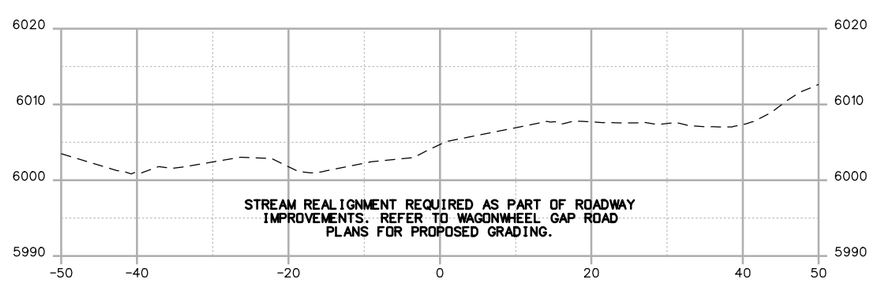


STA. 104+64.02



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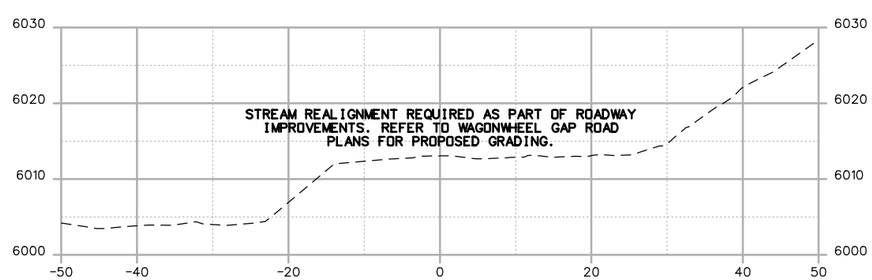

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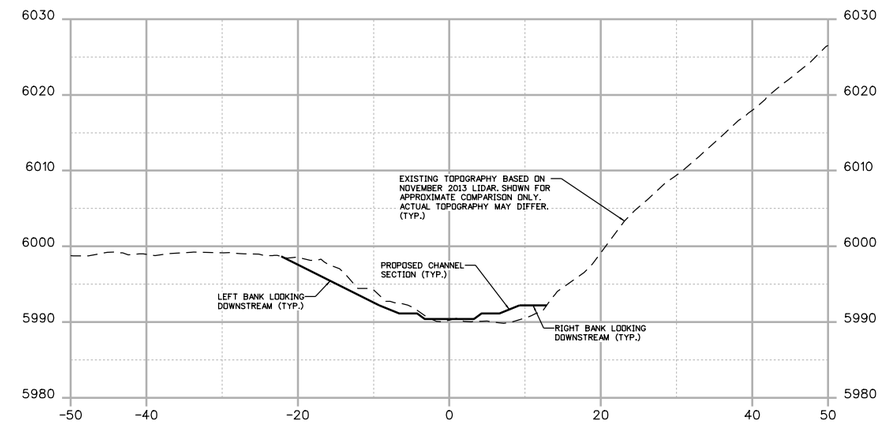

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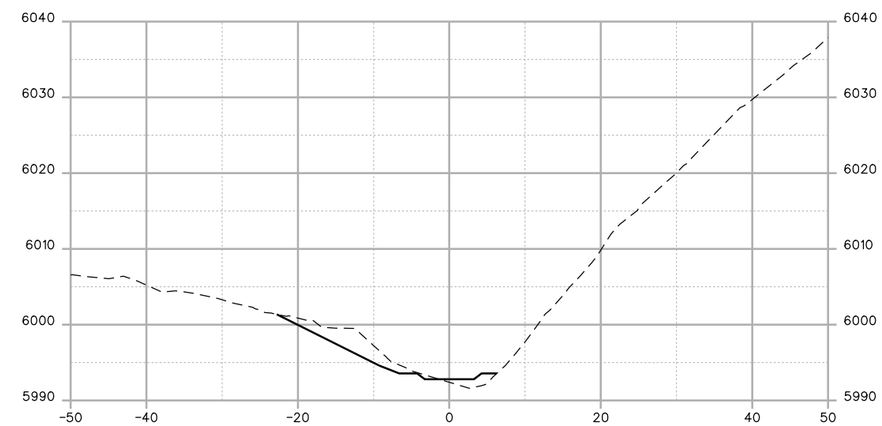
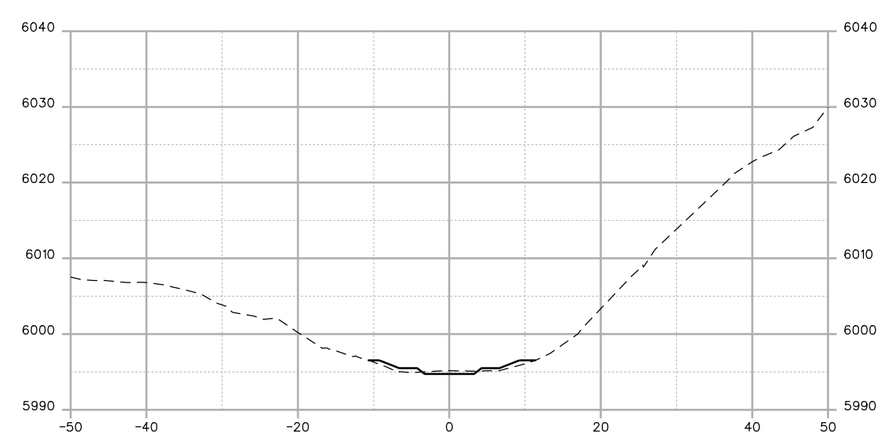


STA. 106+28.79



STA. 105+72.27

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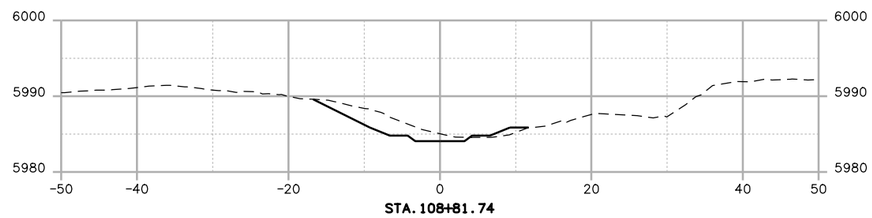
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-3



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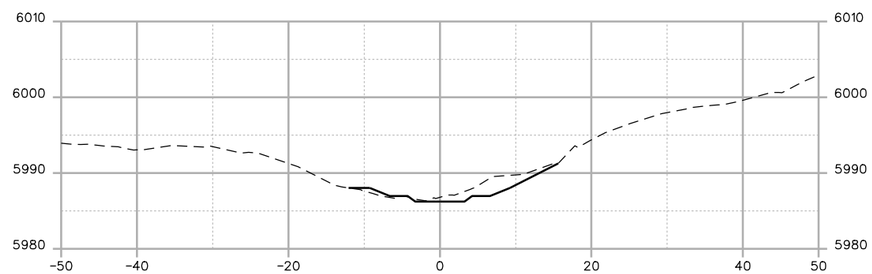

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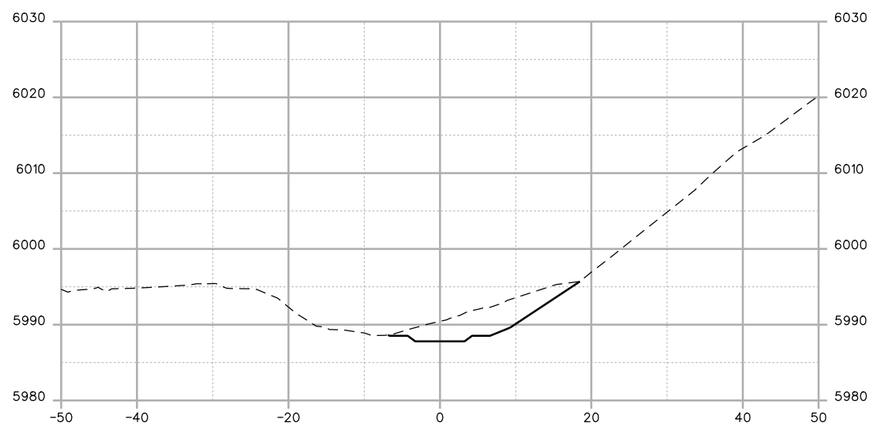

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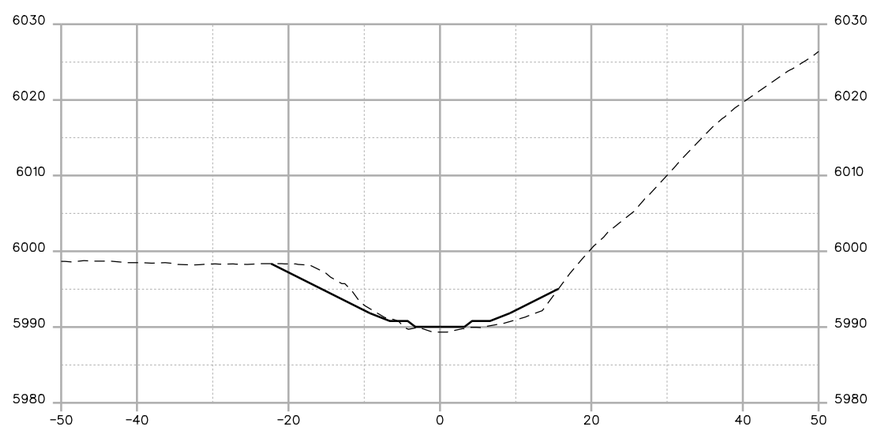

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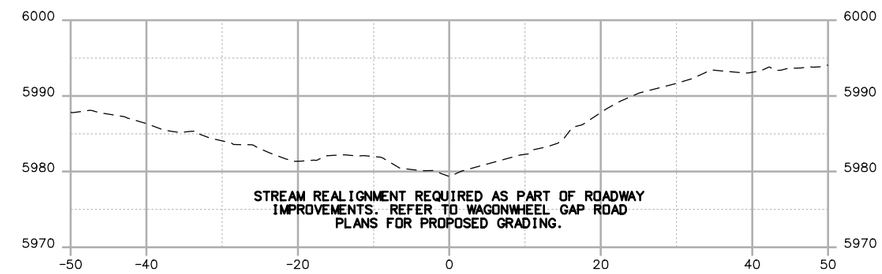
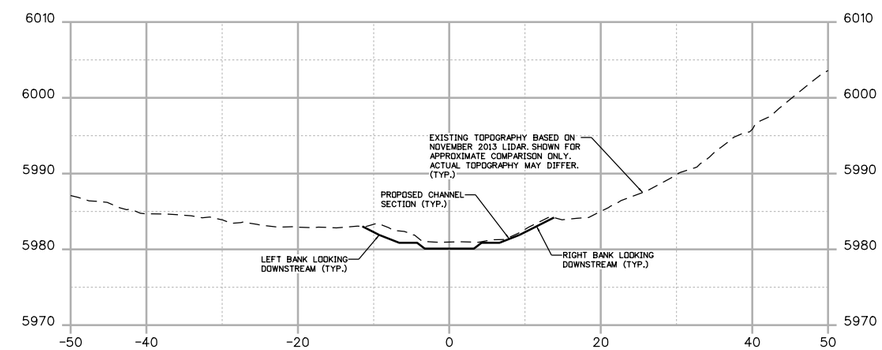


STA. 110+17.02



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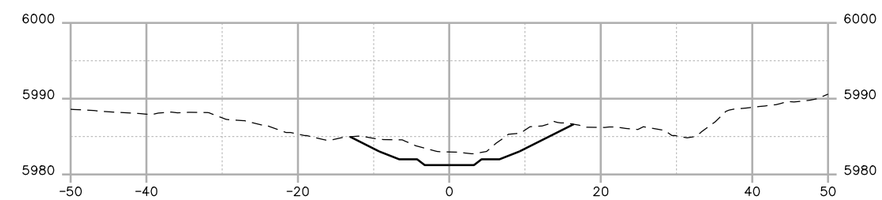

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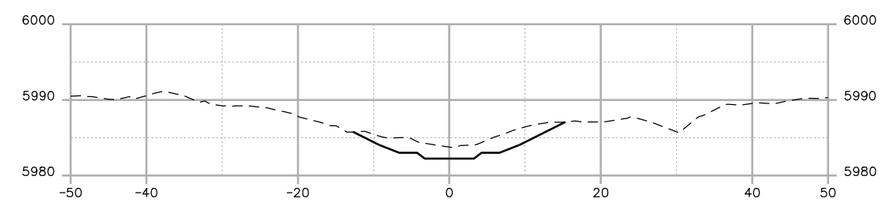

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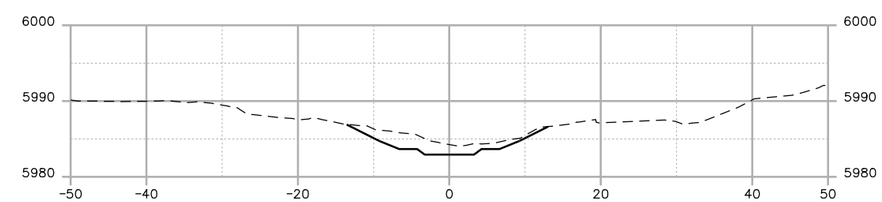

STA. 109+13.77

JR.Mills 10:43:07 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

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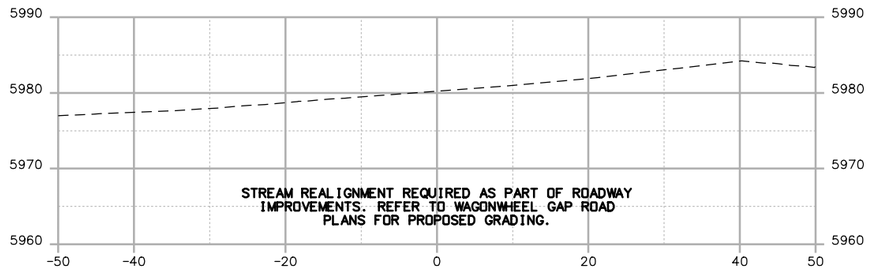
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-4



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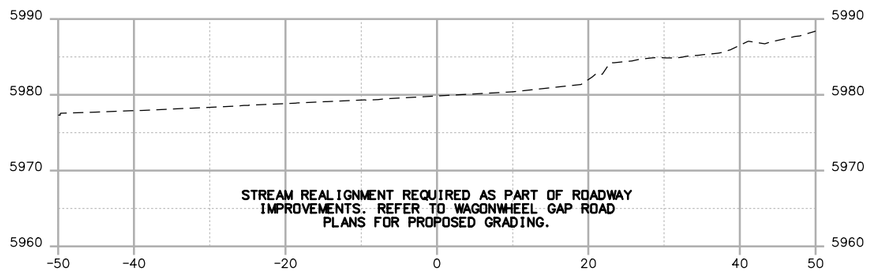
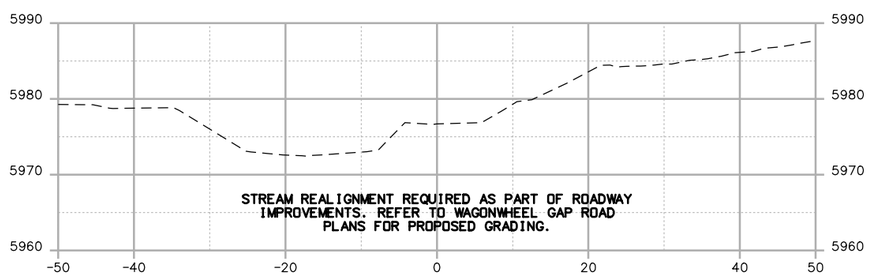


STA. 111+74.17



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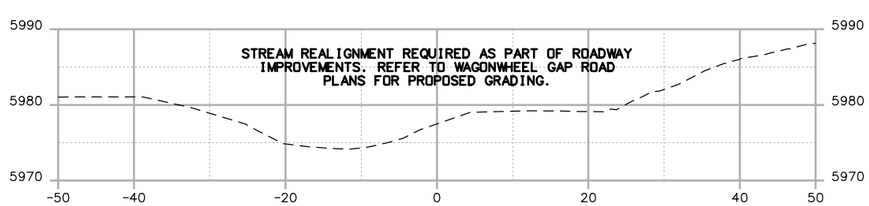

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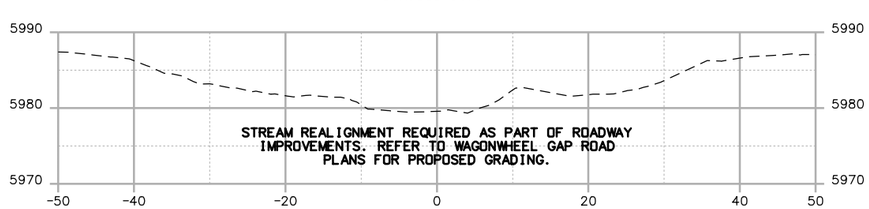

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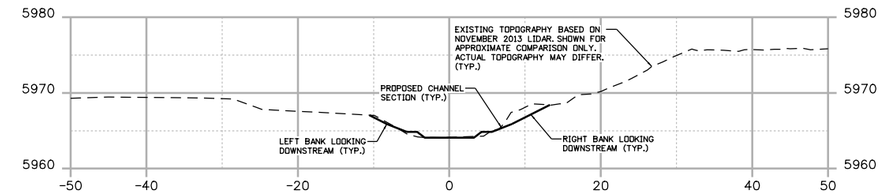
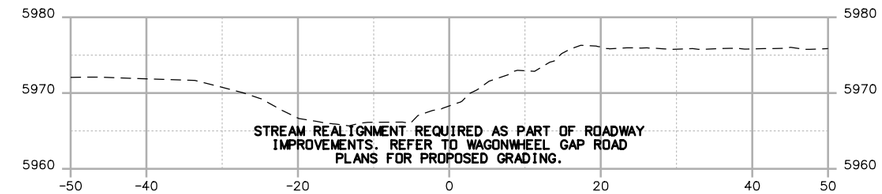


STA. 113+12.25



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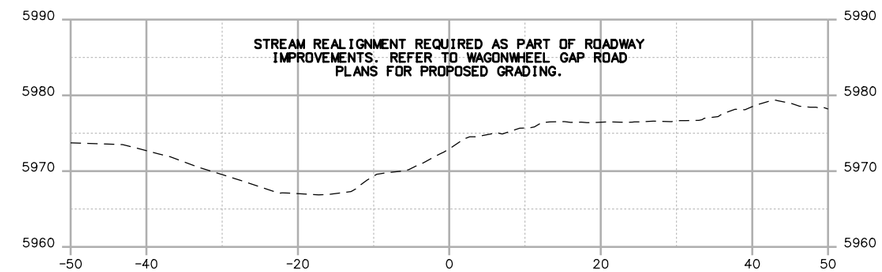

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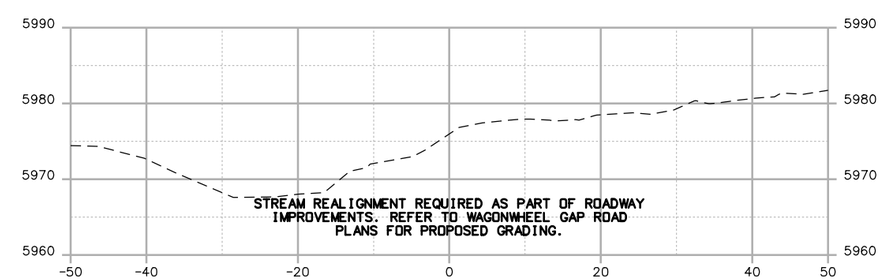

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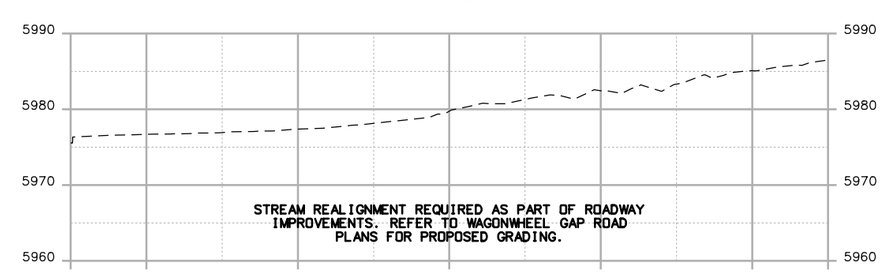

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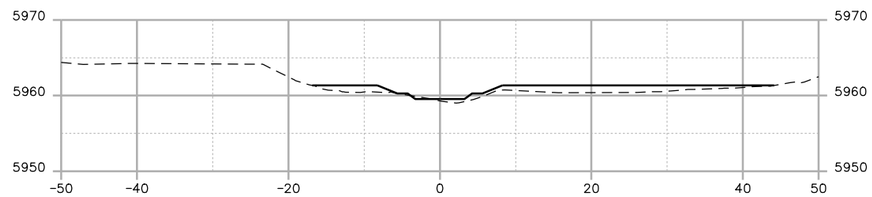
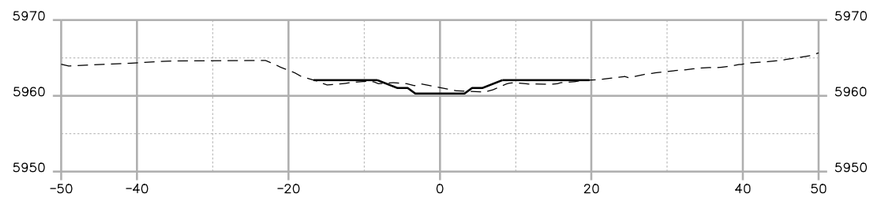
JR.Mills 8:00:32 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

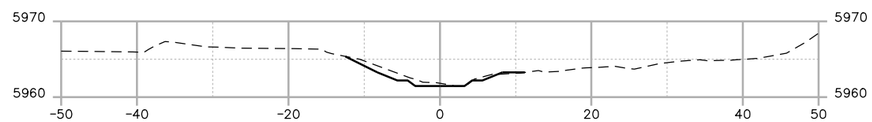
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-5



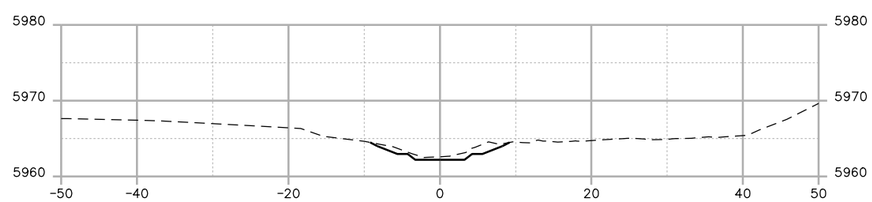
STA. 114+66.61



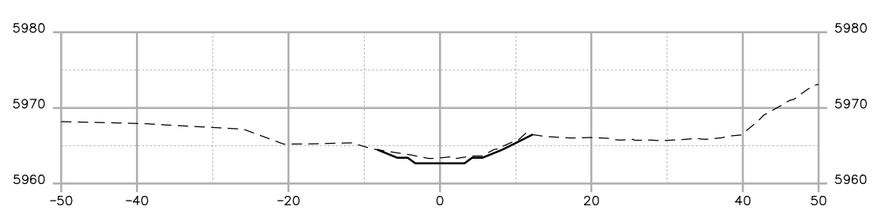
STA. 114+41.31



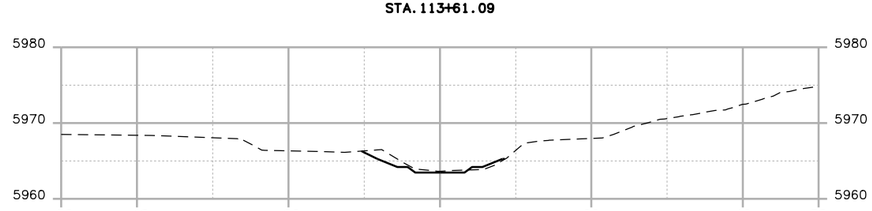
STA. 114+02.32



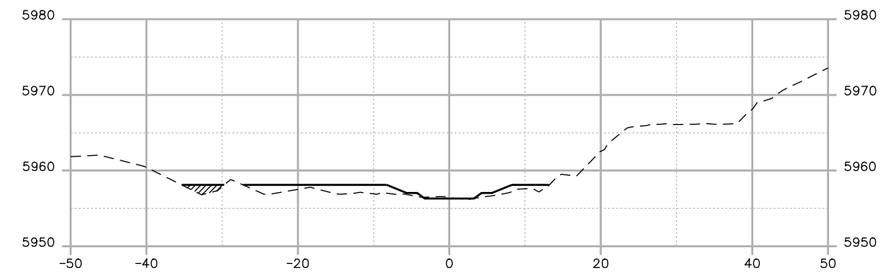
STA. 113+76.82



STA. 113+61.09



STA. 113+34.25



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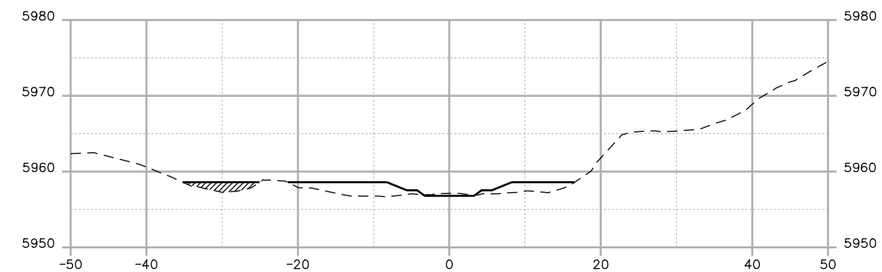

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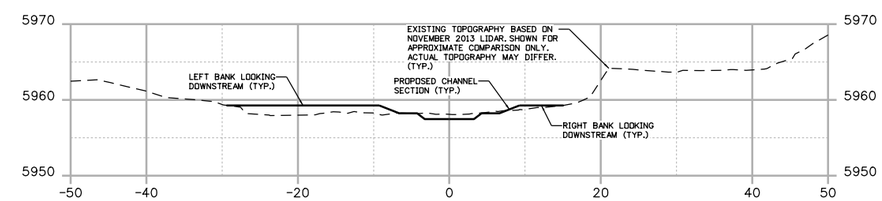
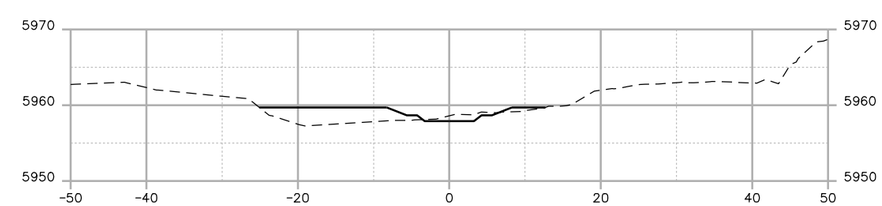
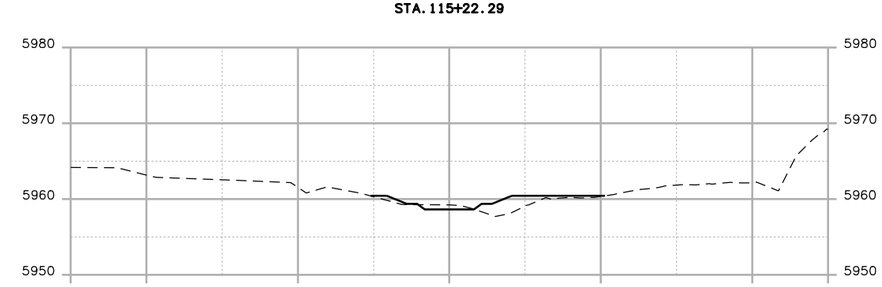


STA. 115+36.40



STA. 115+22.29

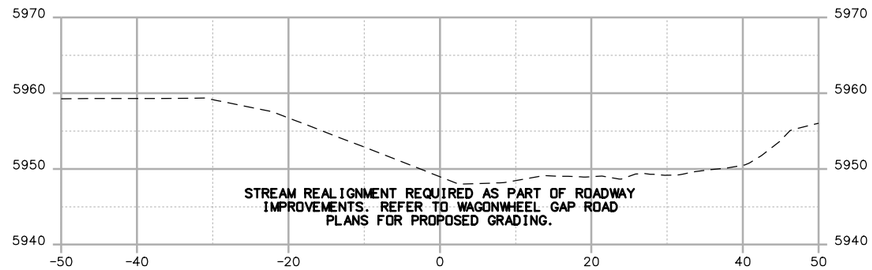


STA. 114+97.34

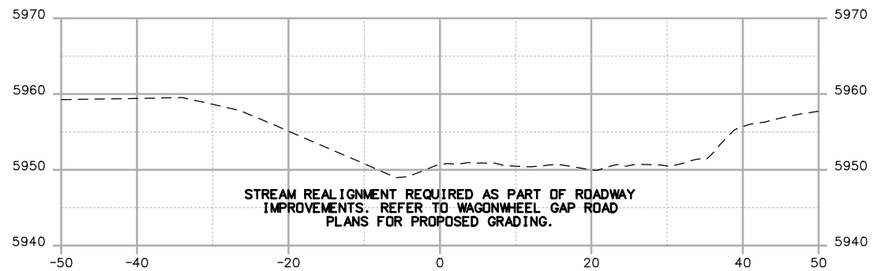
JR.Mills 10:43:58 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\D5_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

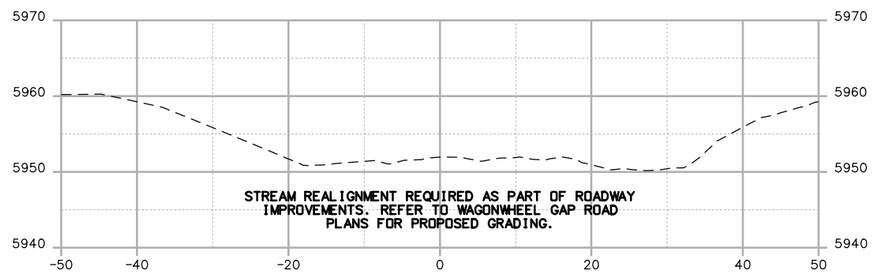
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-6



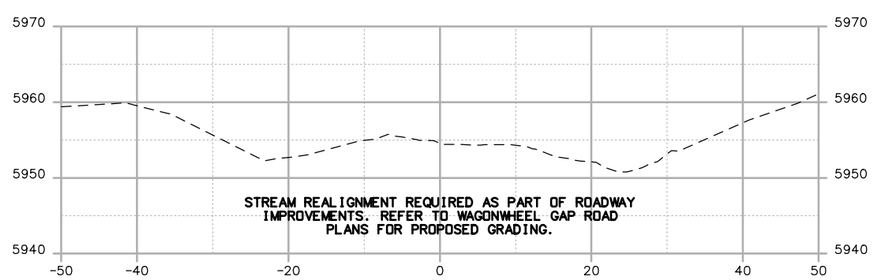
STA. 116+85.21



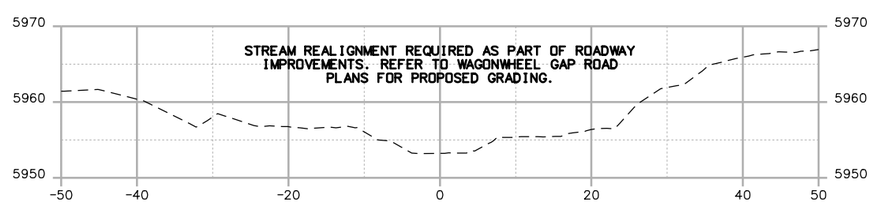
STA. 116+76.19



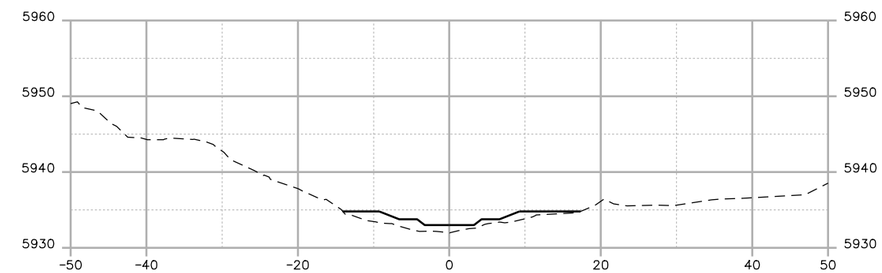
STA. 116+63.66



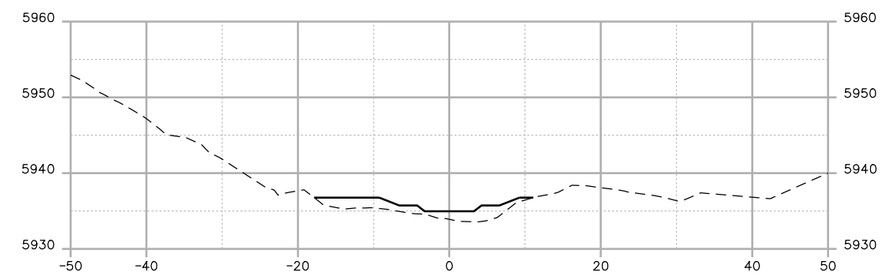
STA. 116+40.75



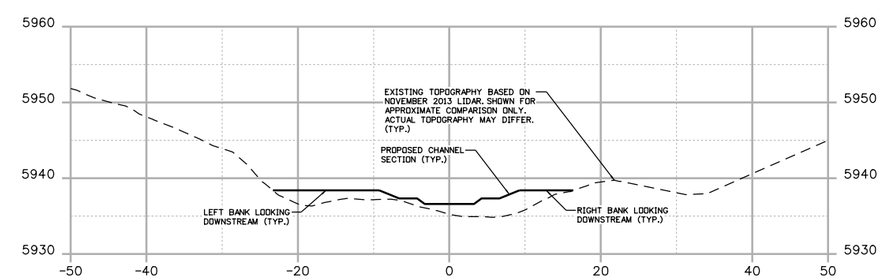
STA. 115+96.99



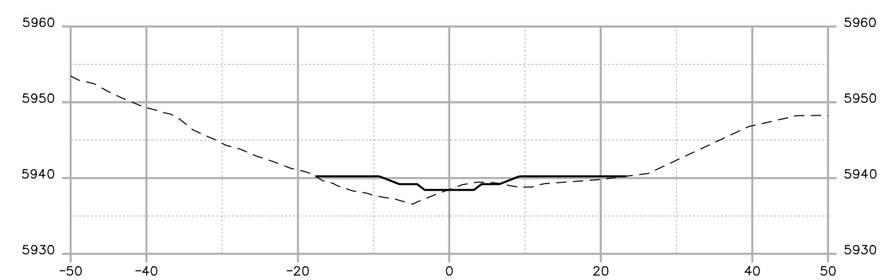
STA. 119+63.03



STA. 119+37.45



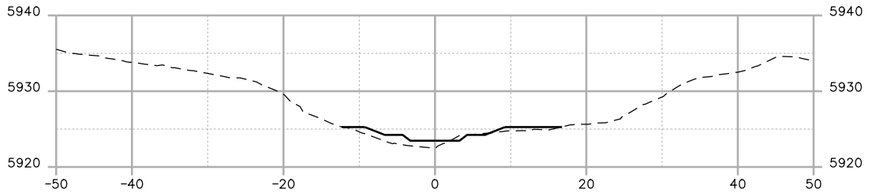
STA. 119+16.56



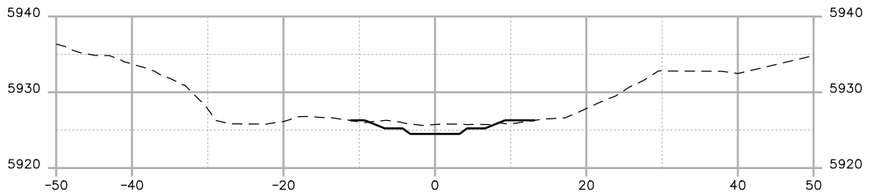
STA. 118+91.48

JR.Mills 8-03-10 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

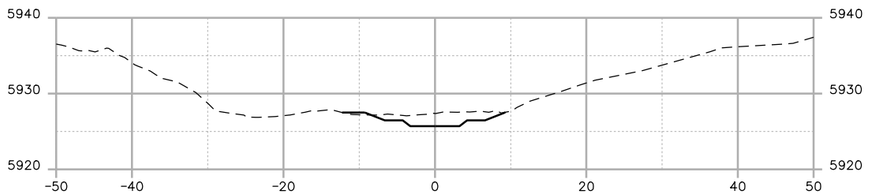
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-7



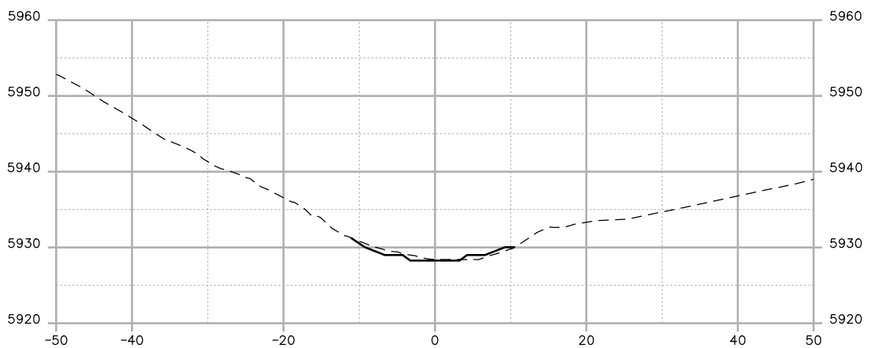
STA. 121+62.31



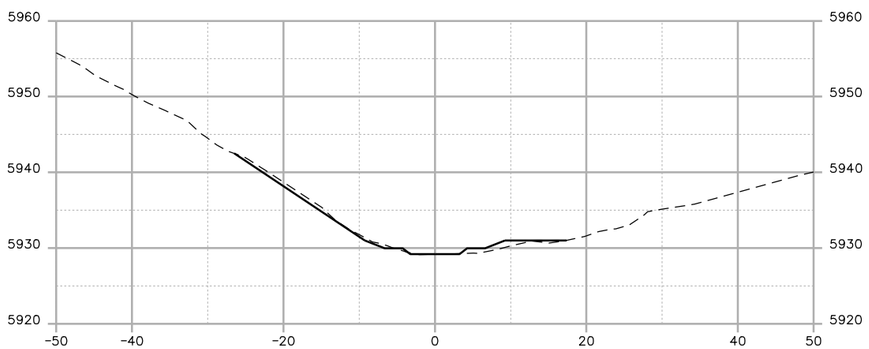
STA. 121+35.05



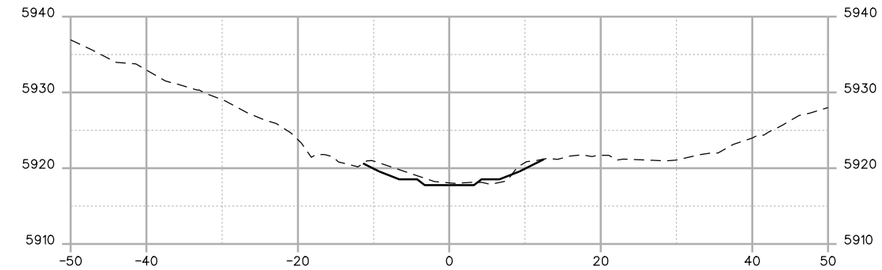
STA. 121+03.61



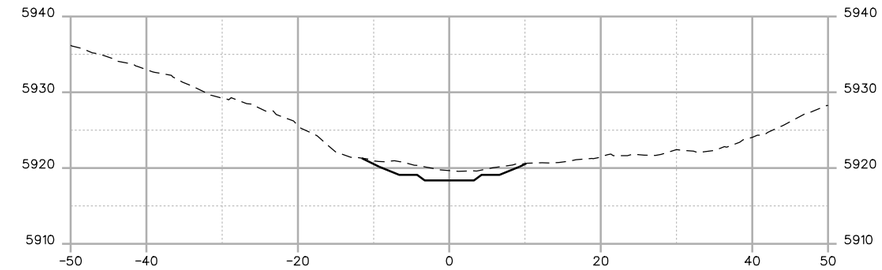
STA. 120+37.40



STA. 120+12.92



STA. 123+11.63



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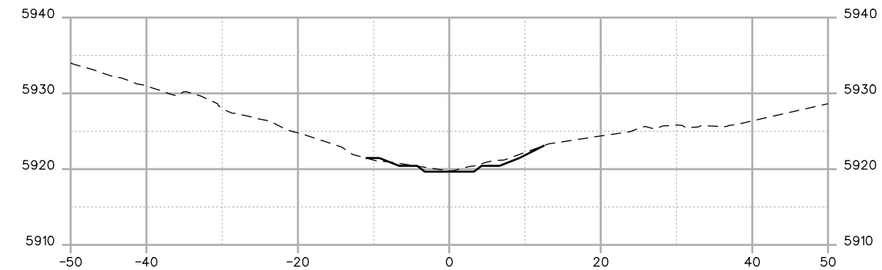

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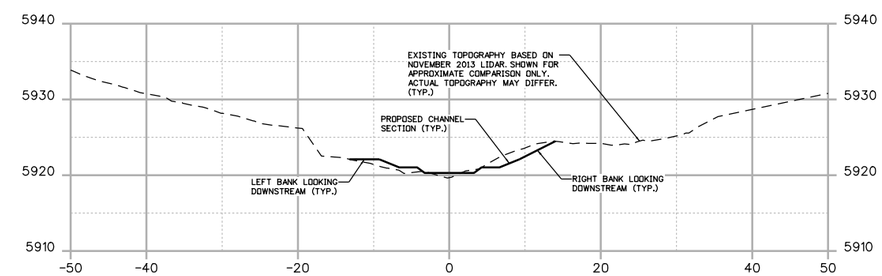
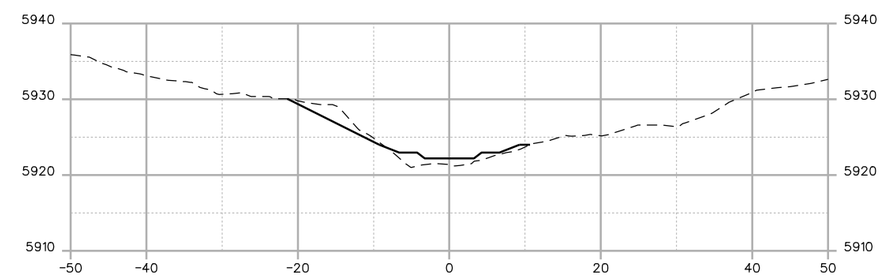


STA. 122+45.67

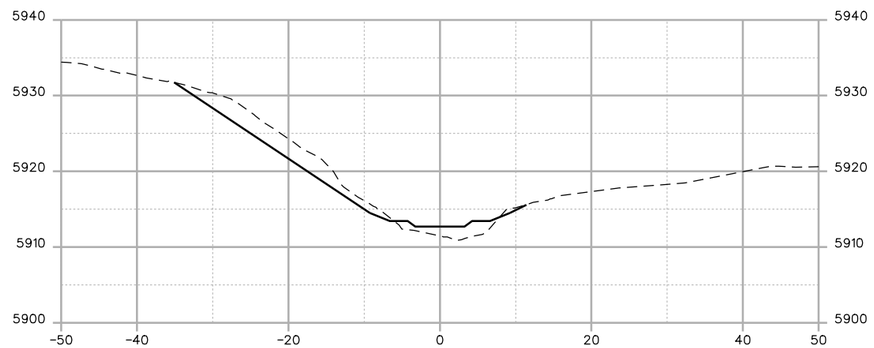


STA. 121+94.92

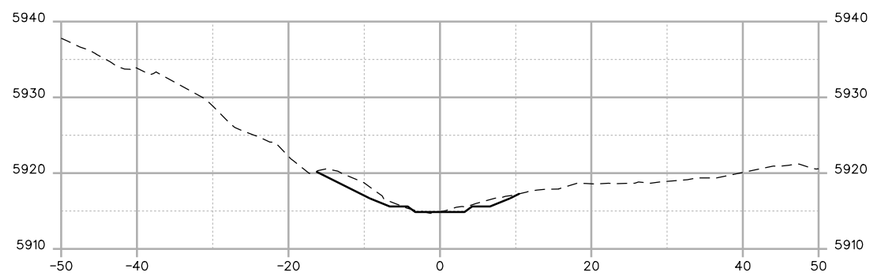
JR.Mills 10:44:43 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

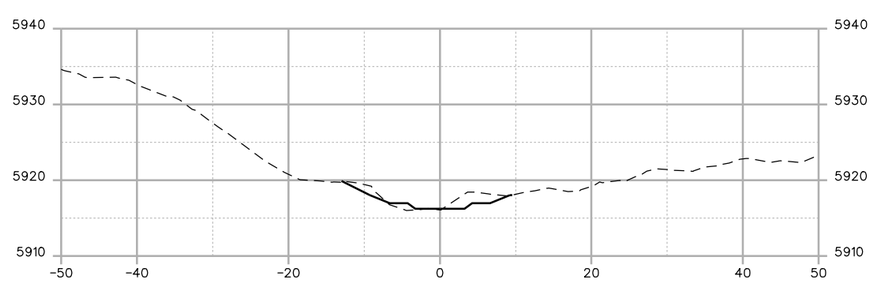
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-8



STA. 124+43.86



STA. 123+87.75



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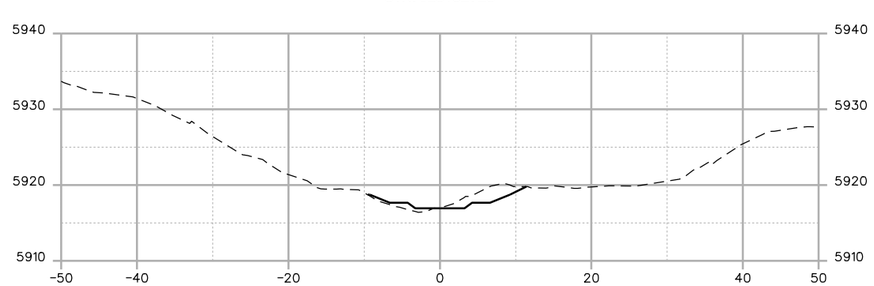
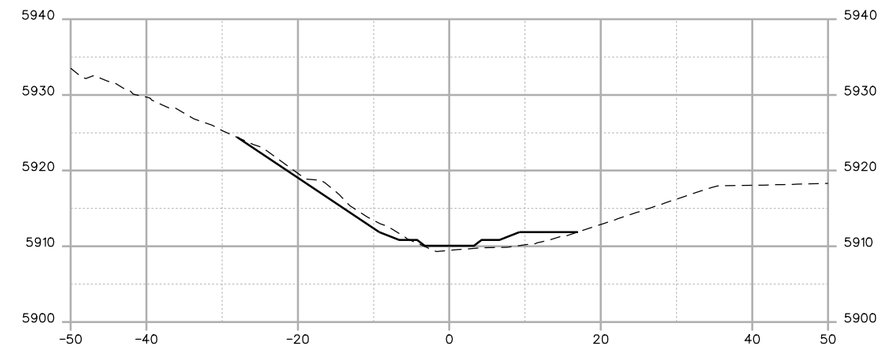


STA. 123+33.17



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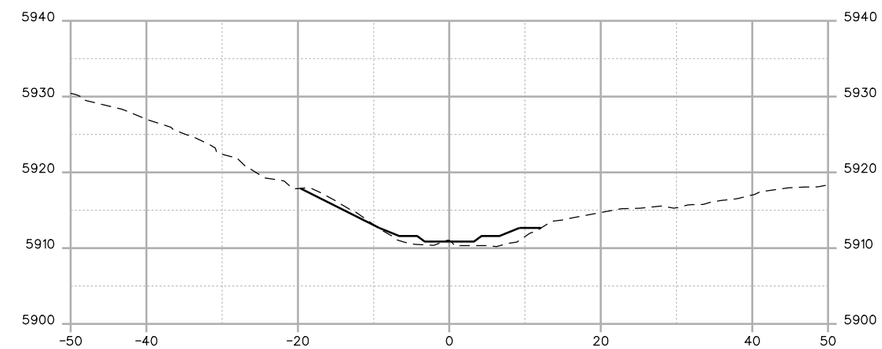
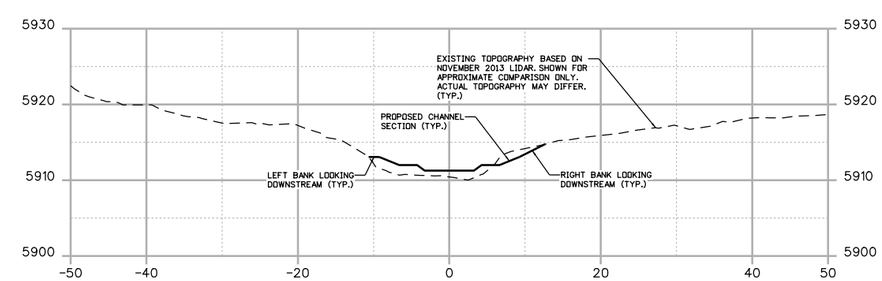
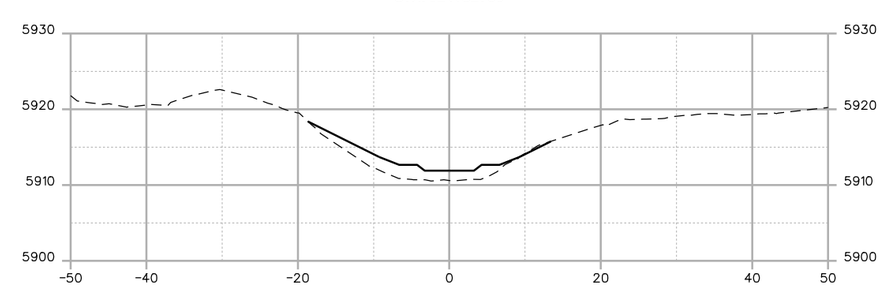


STA. 124+92.14



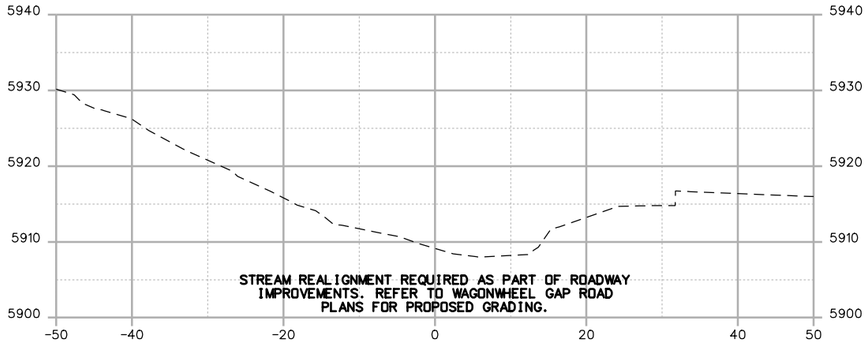
STA. 124+82.06



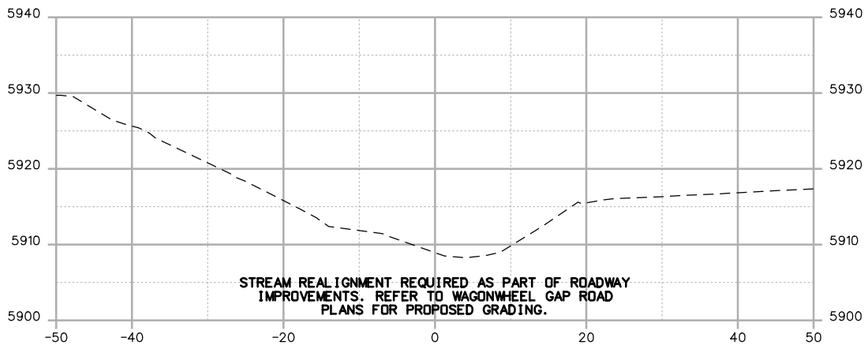
STA. 124+64.82

JR.Mills 10:45:31 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

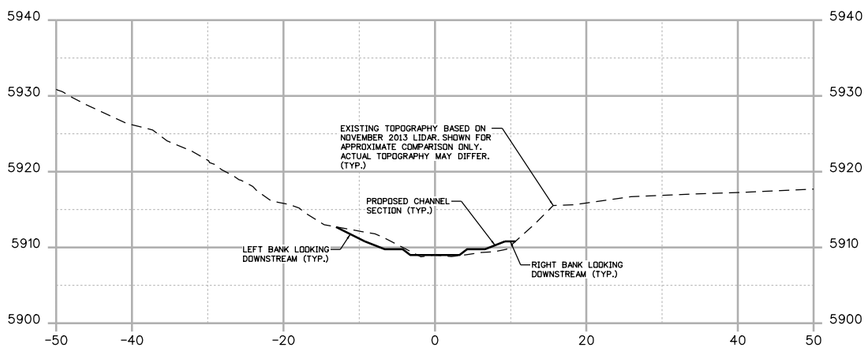
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-9



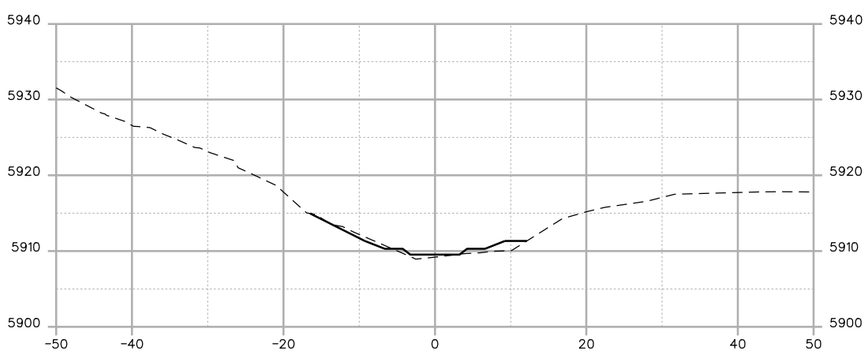
STA. 125+70.85



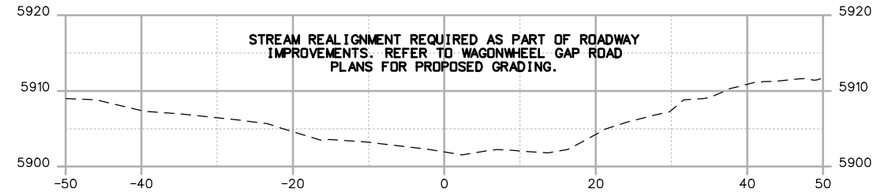
STA. 125+56.56



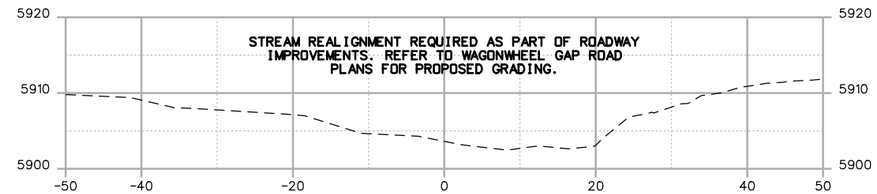
STA. 125+41.75



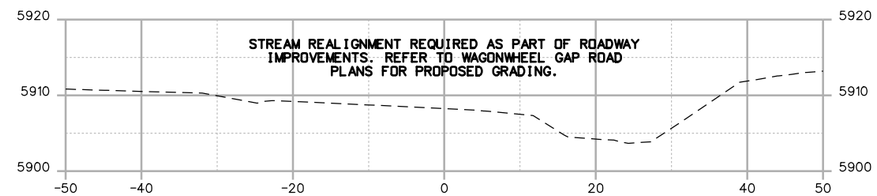
STA. 125+26.37



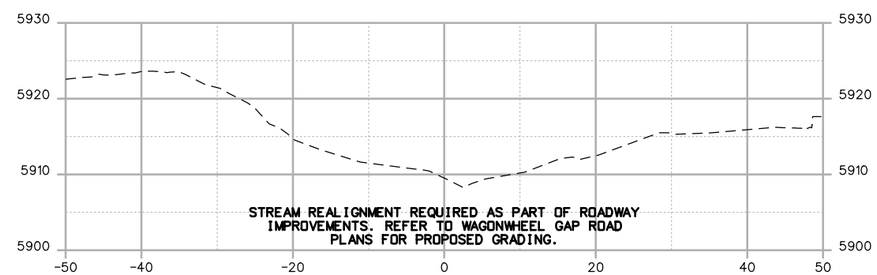
STA. 127+29.94



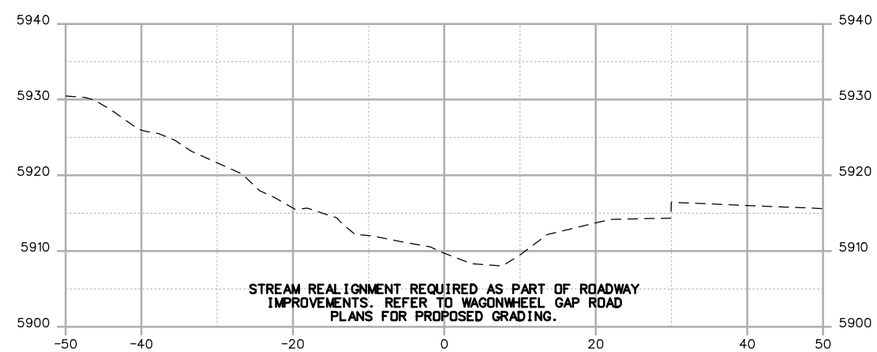
STA. 127+11.26



STA. 126+83.33



STA. 125+84.56

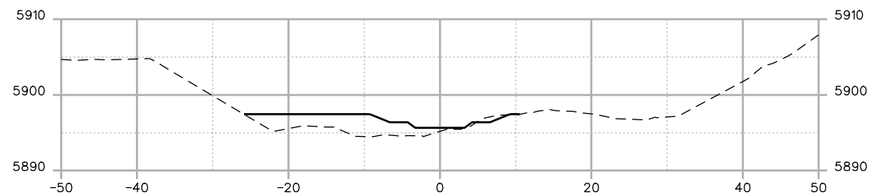


STA. 125+76.24

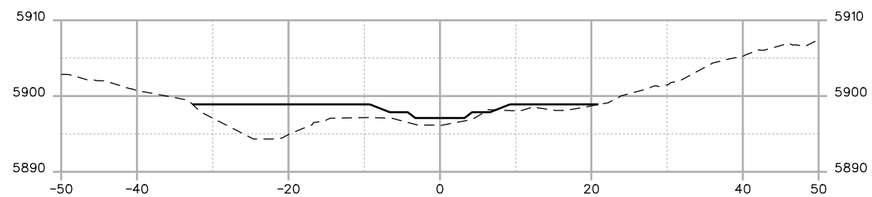
JR.Mills 8:04:01 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-10



STA. 128+86.96



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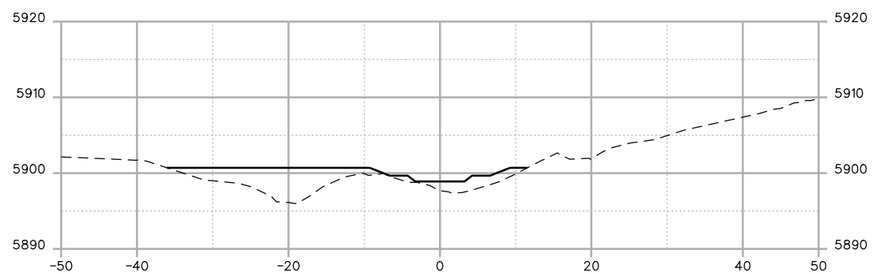
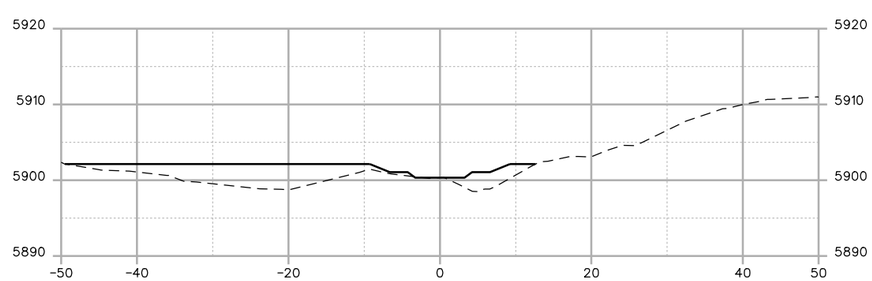


STA. 128+19.26



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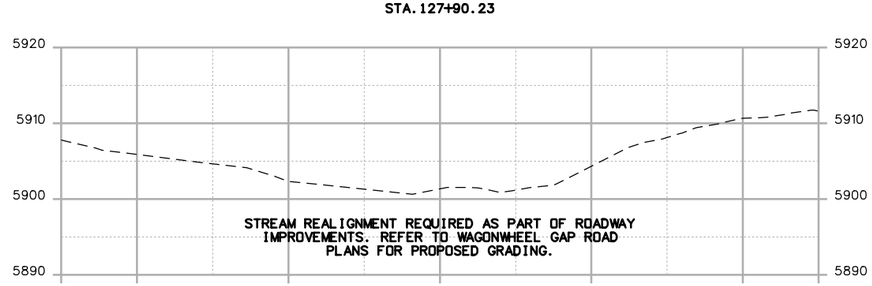

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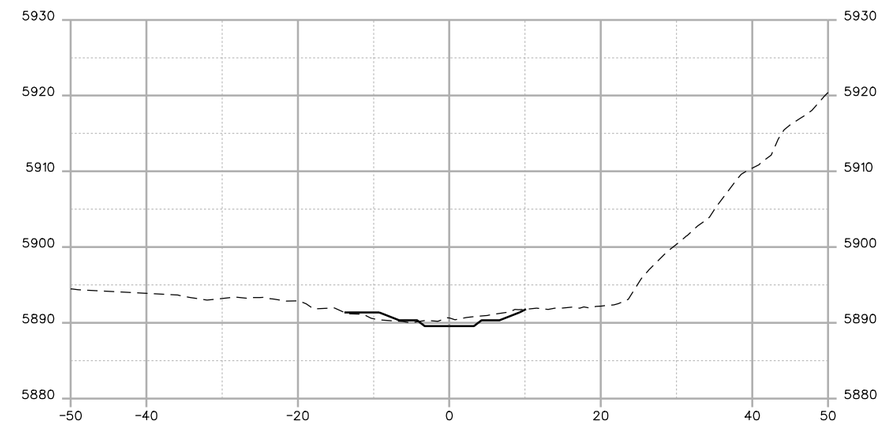
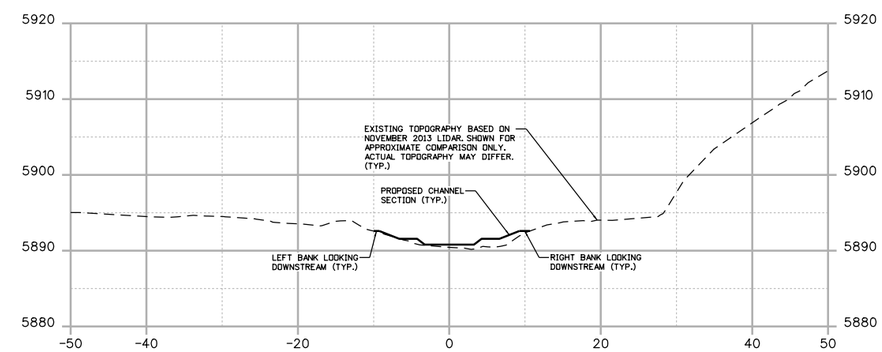
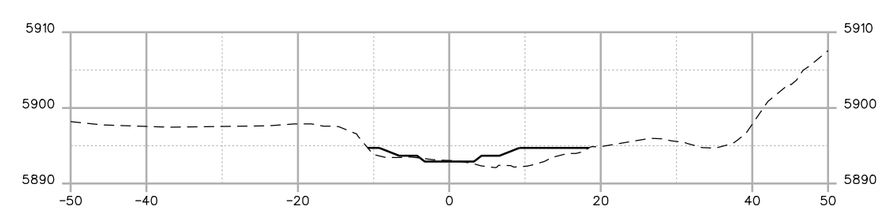


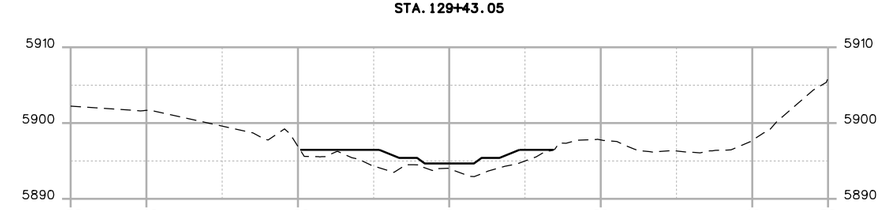
STA. 130+14.45



STA. 129+87.18



STA. 129+43.05

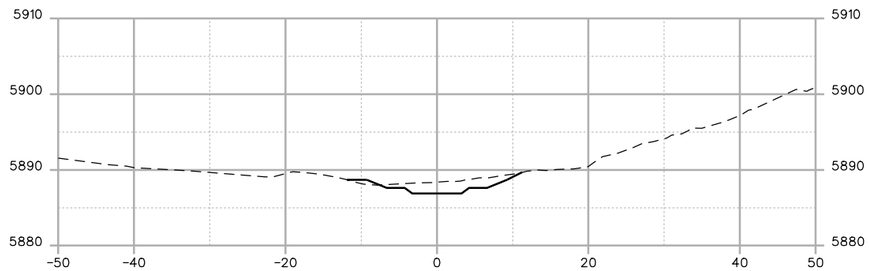


STA. 129+06.93

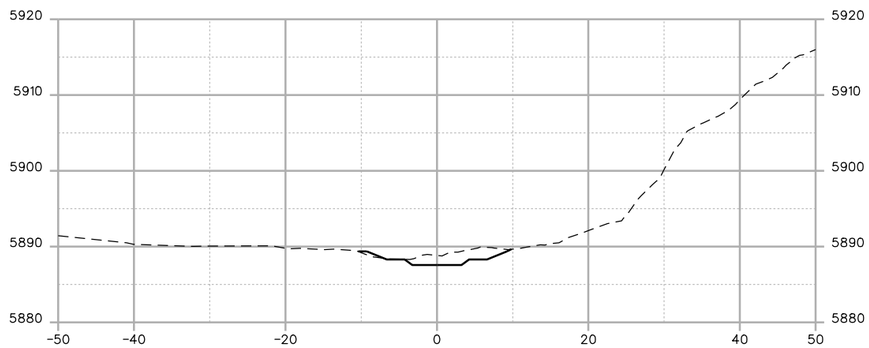
JR.Mills 8:04:22 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

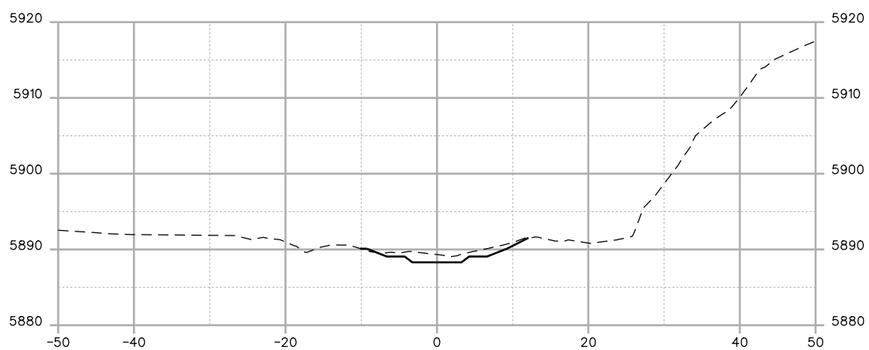
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-11



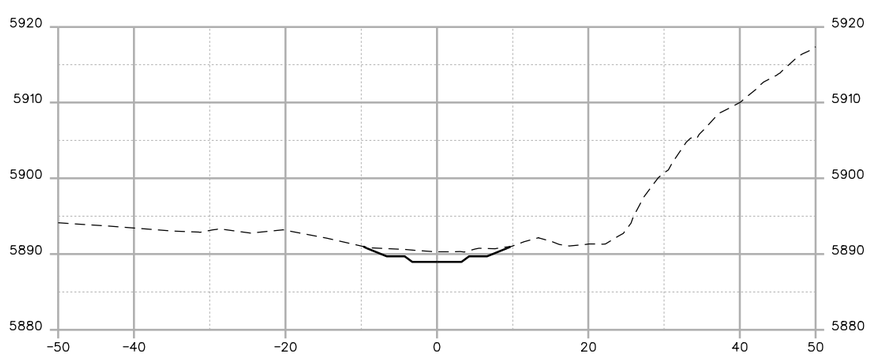
STA. 130+80.31



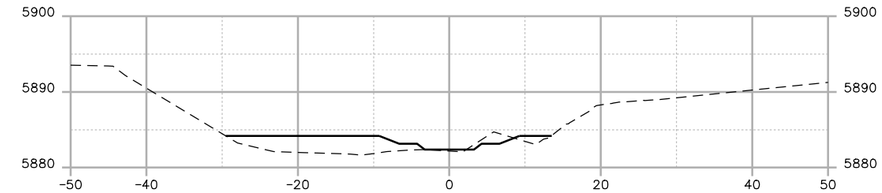
STA. 130+63.68



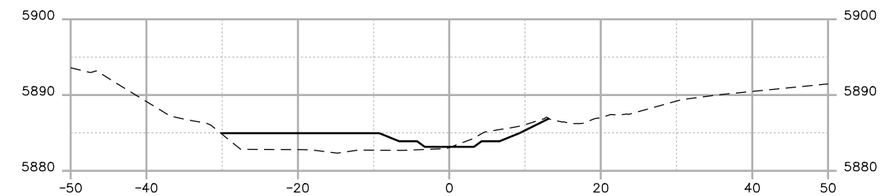
STA. 130+45.53



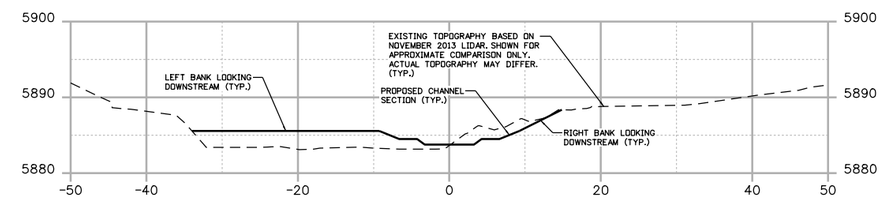
STA. 130+29.34



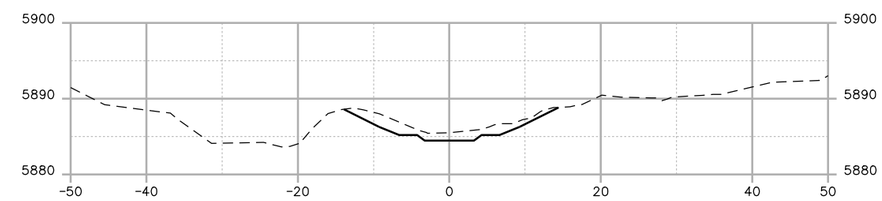
STA. 131+90.07



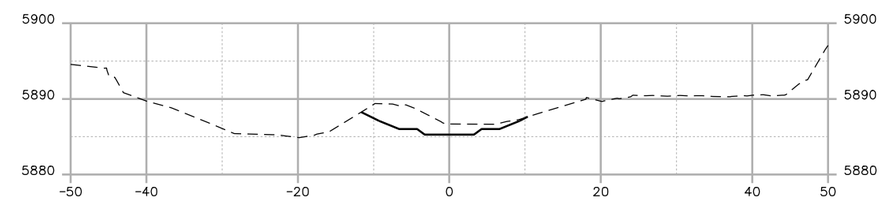
STA. 131+71.09



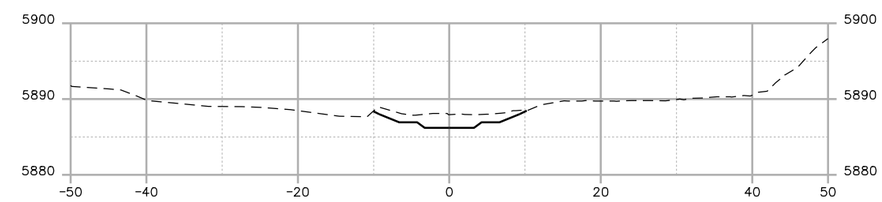
STA. 131+56.71



STA. 131+39.62



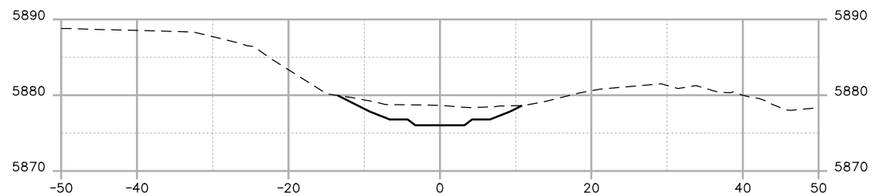
STA. 131+19.46



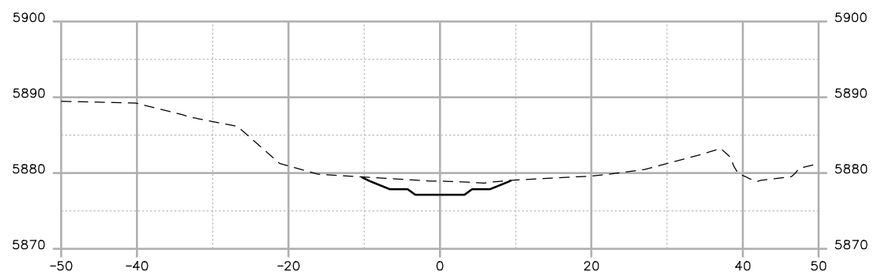
STA. 130+97.07

JR.Mills 8:04:39 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

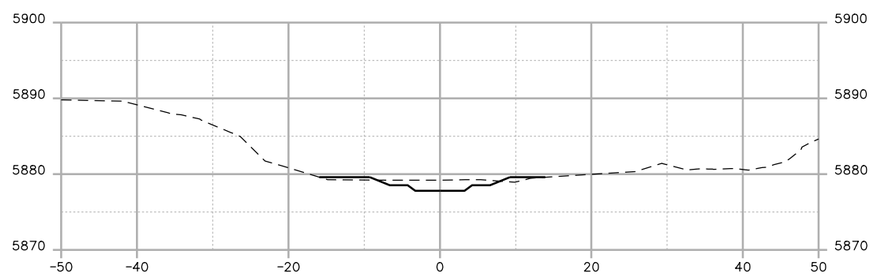
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-12



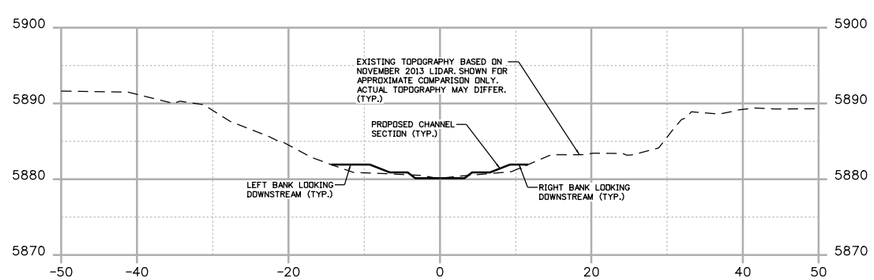
STA. 133+56.71



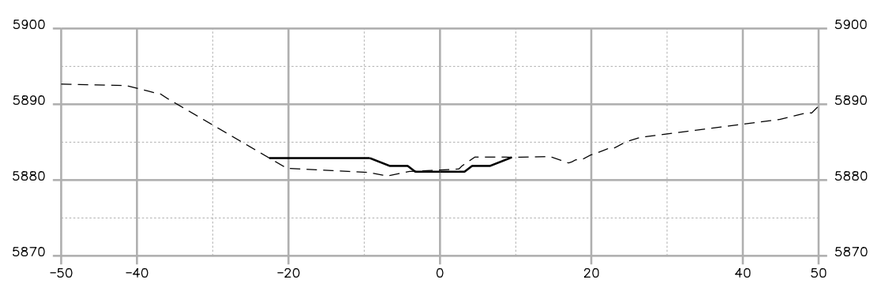
STA. 133+26.52



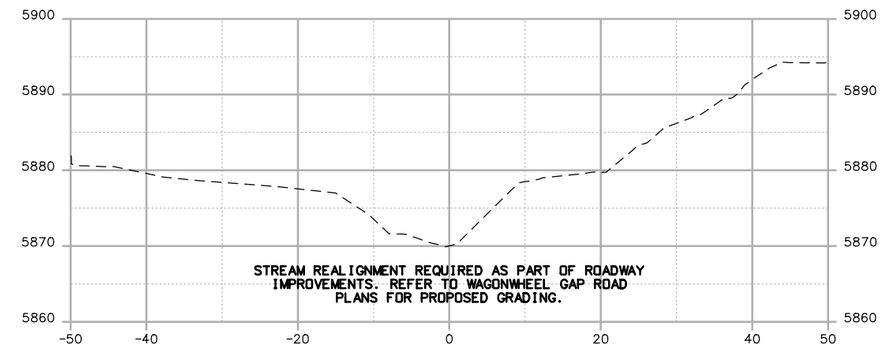
STA. 133+08.84



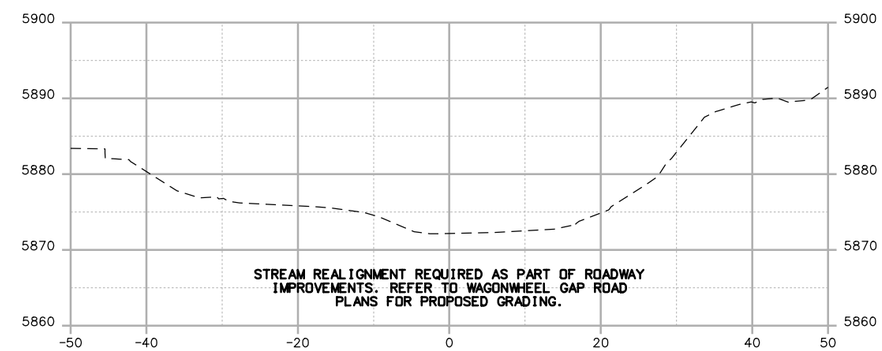
STA. 132+45.58



STA. 132+21.15



STA. 135+30.94



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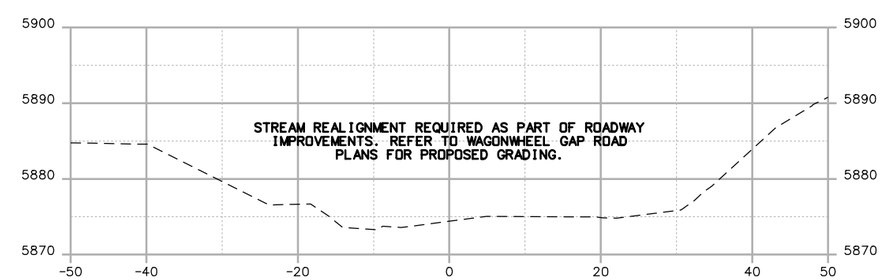

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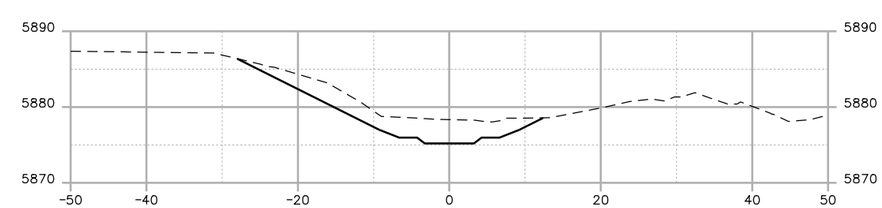
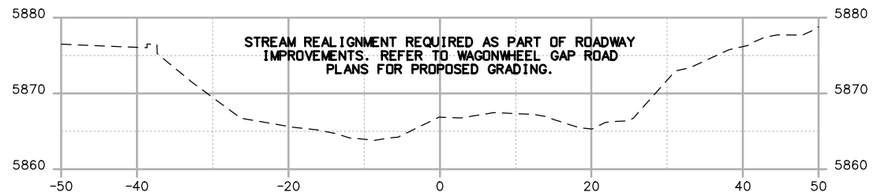


STA. 133+78.90

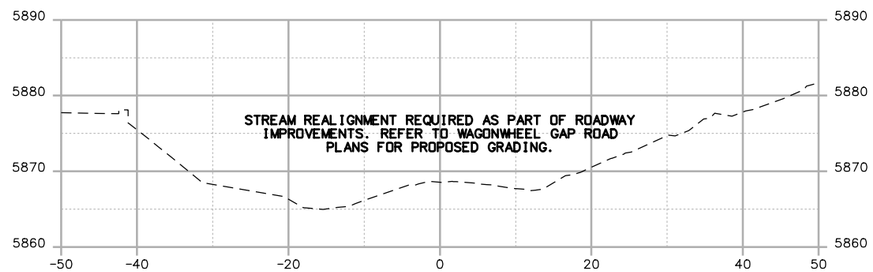
JR.Mills 8:05:19 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-13

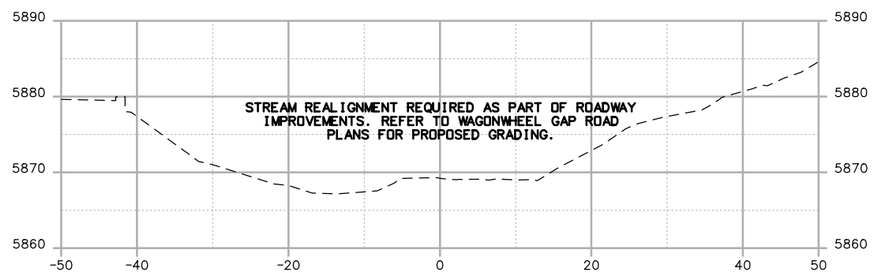
0 5 10



STA. 136+52.00



STA. 136+12.73



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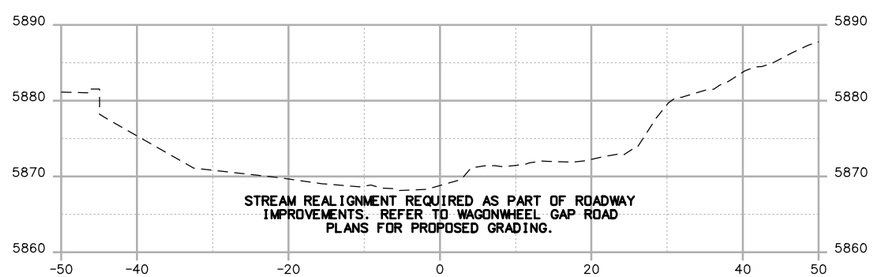
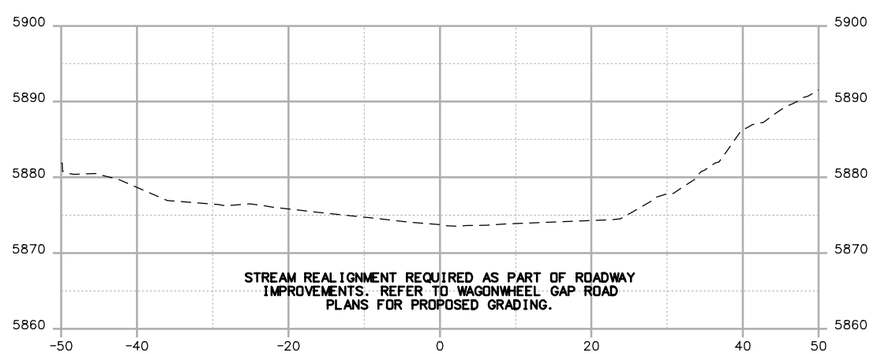
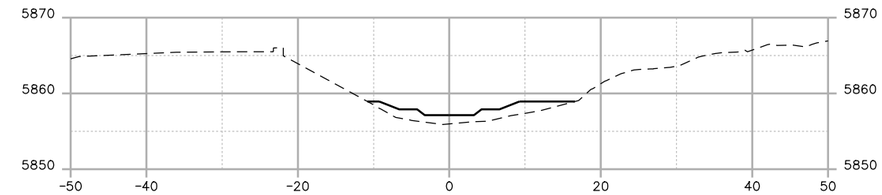


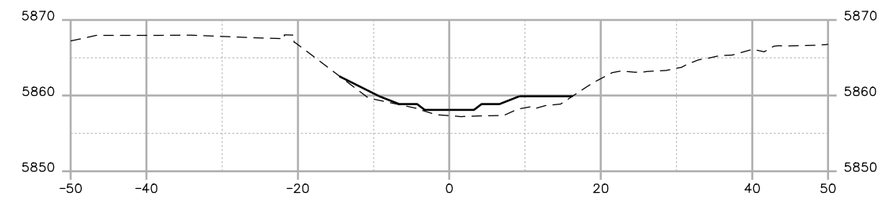
STA. 135+64.17



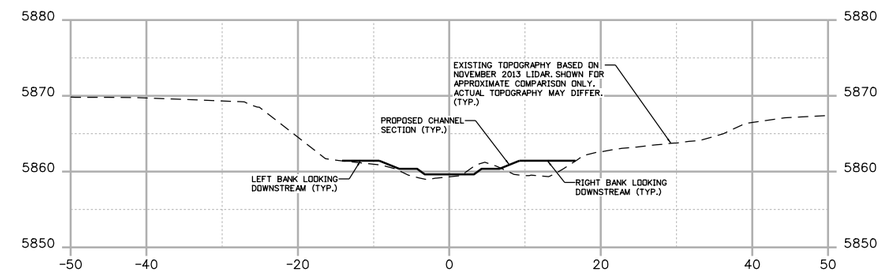
STA. 135+47.90



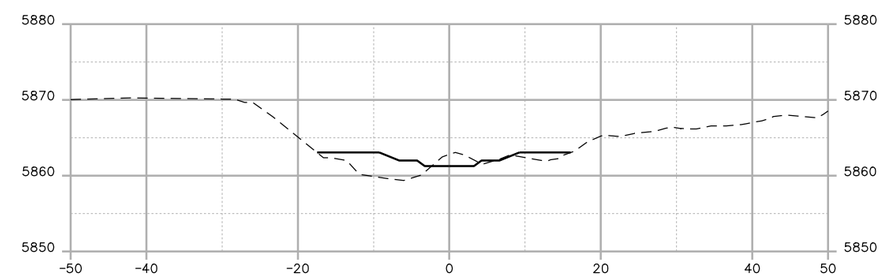
STA. 137+93.24



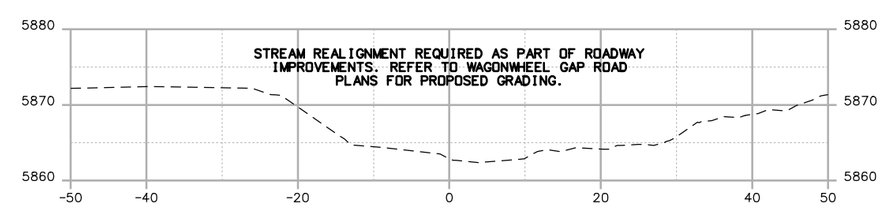
STA. 137+76.40



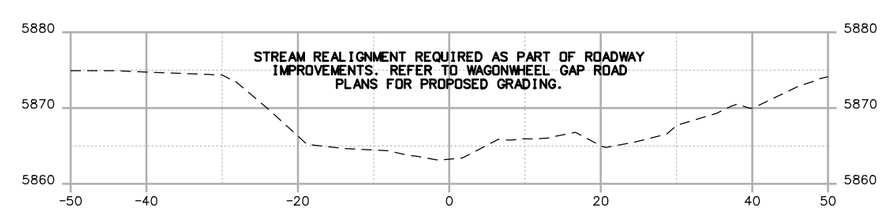
STA. 137+52.23



STA. 137+27.13



STA. 136+97.30

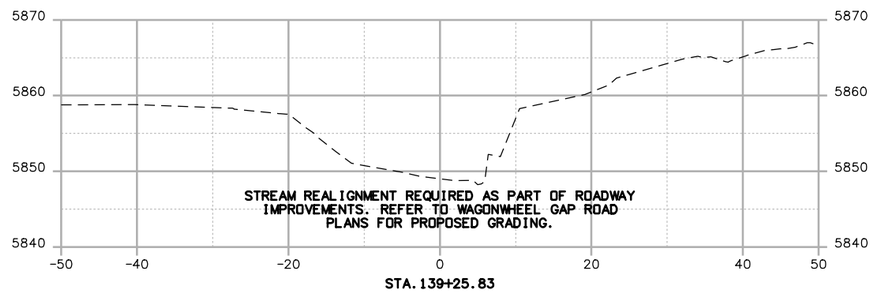


STA. 136+73.36

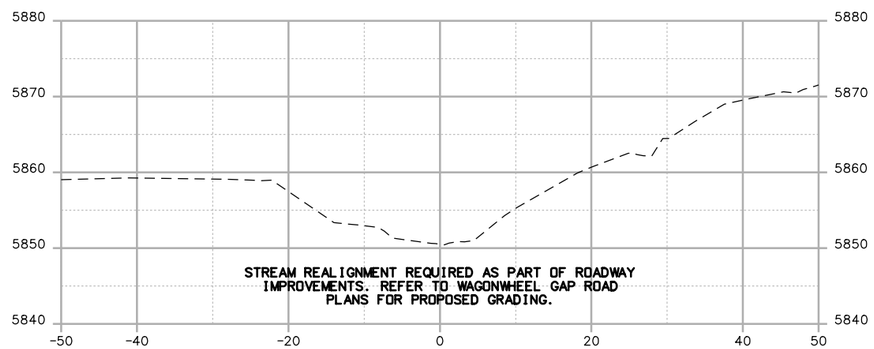
JR.Mills 11:09:38 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

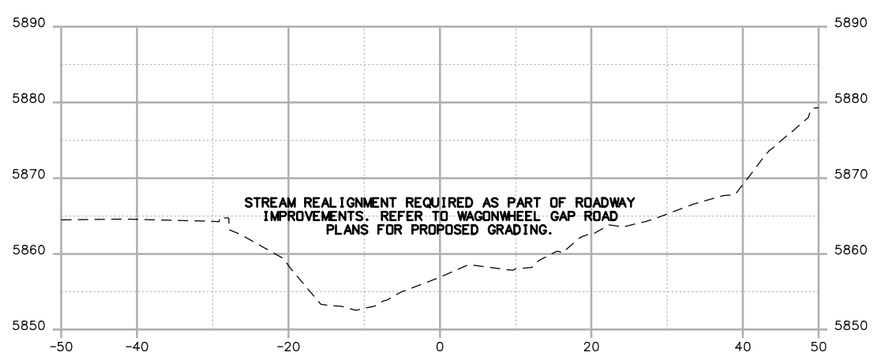
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-14



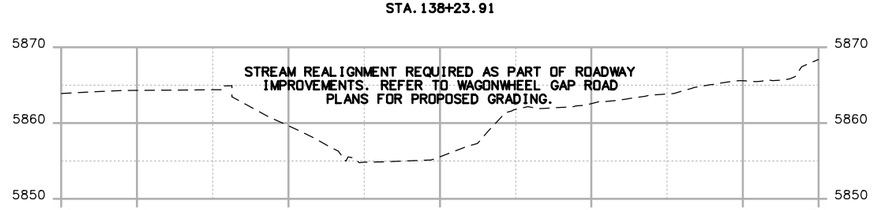
STA. 139+25.83



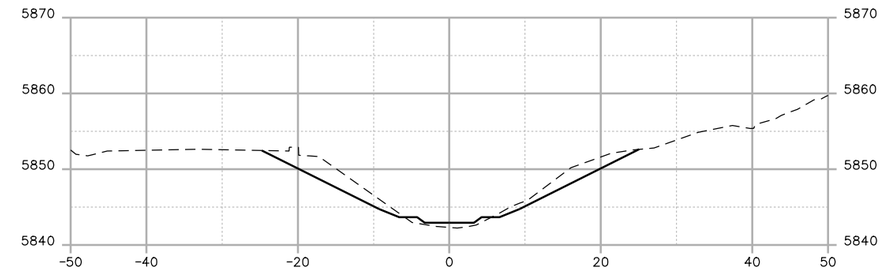
STA. 139+01.65



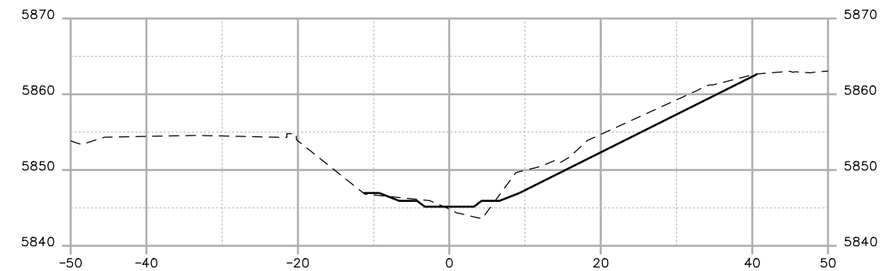
STA. 138+23.91



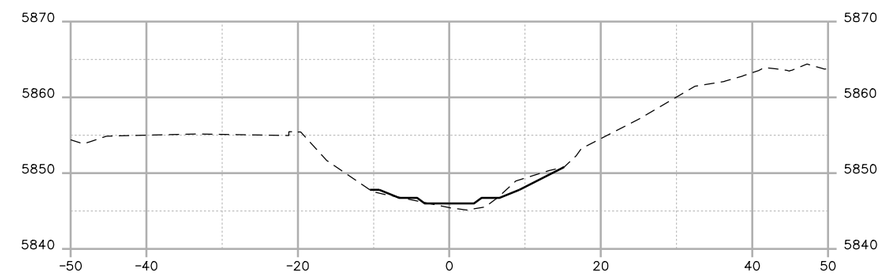
STA. 138+07.78



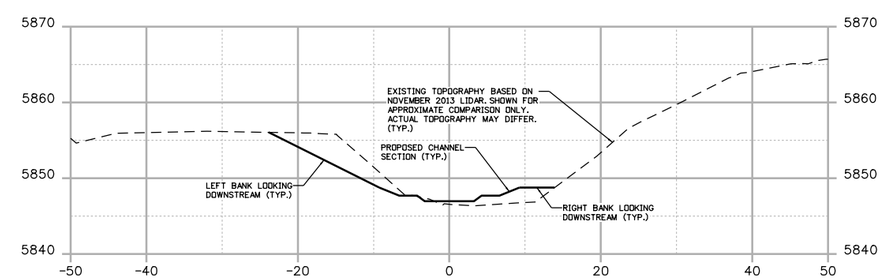
STA. 140+59.10



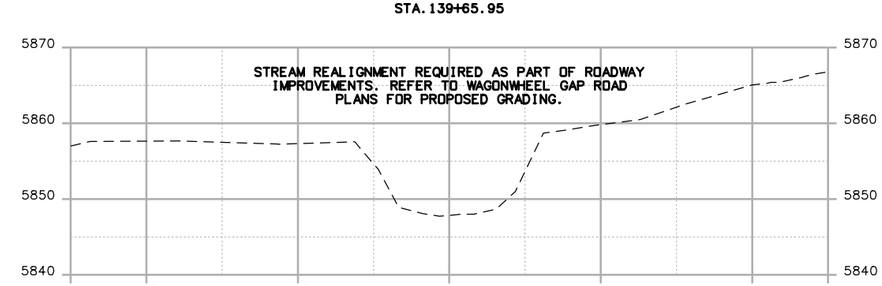
STA. 140+06.65



STA. 139+87.78



STA. 139+65.95

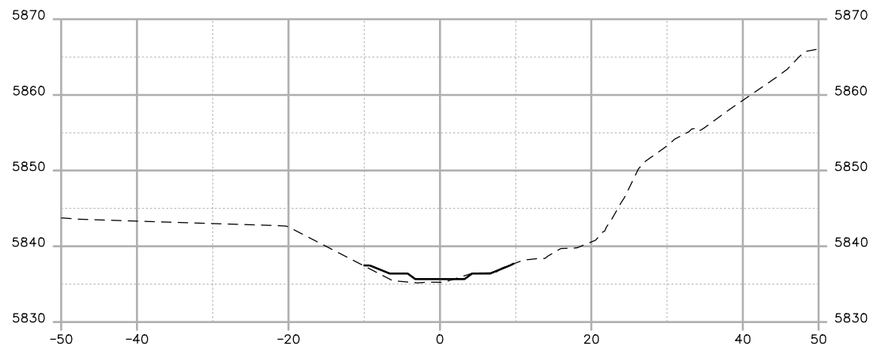


STA. 139+44.88

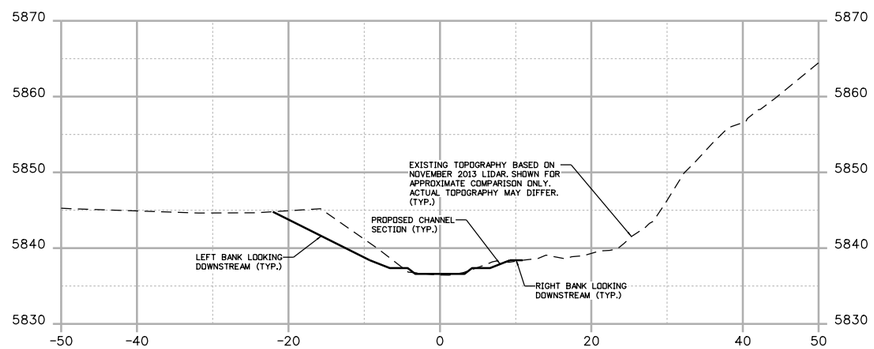
JR.Mills 11:10:16 AM pw:\\DCPWAPP1.bkr.mbokercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

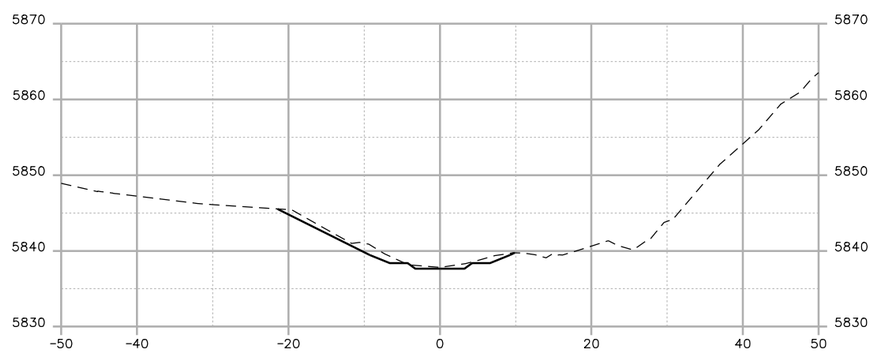
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-15



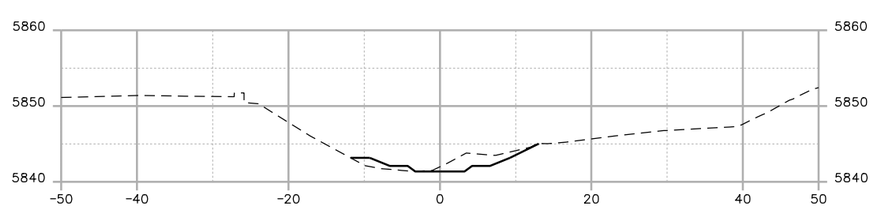
STA. 142+26.40



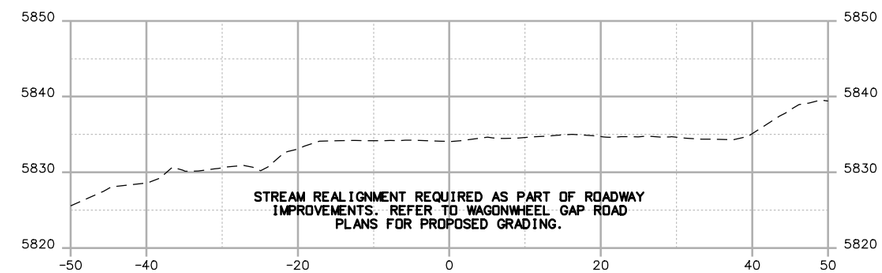
STA. 142+04.63



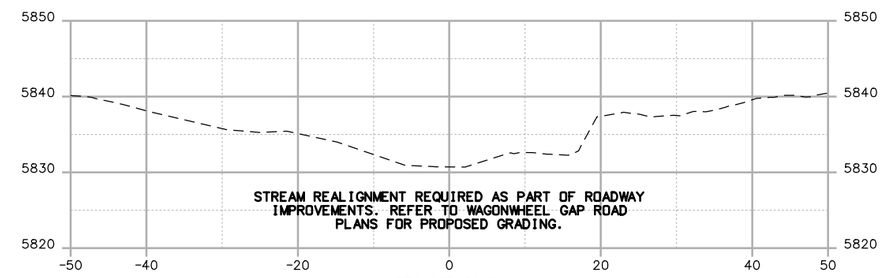
STA. 141+80.82



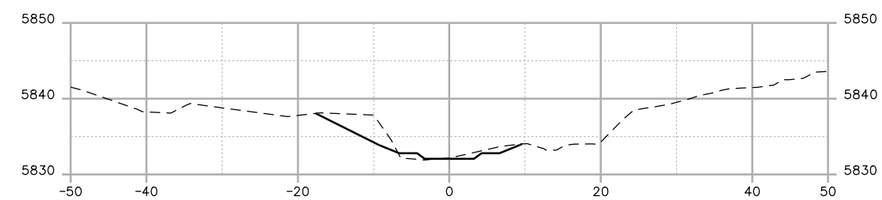
STA. 140+94.84



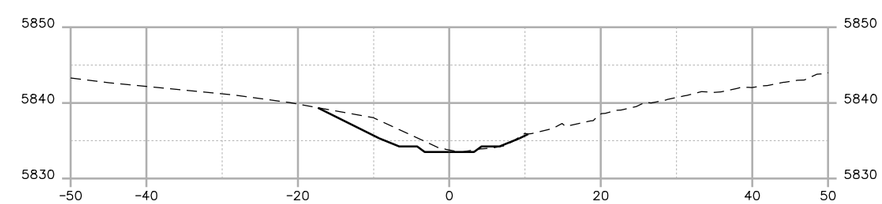
STA. 144+34.84



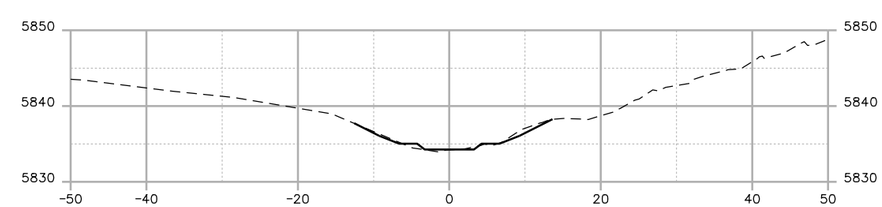
STA. 143+40.41



STA. 143+10.00



STA. 142+76.38

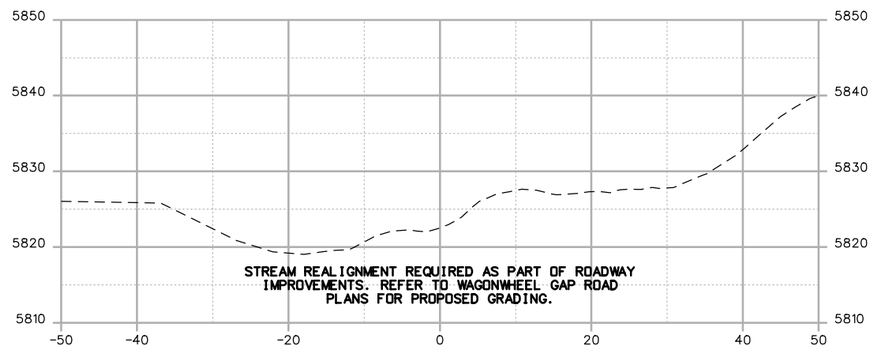


STA. 142+58.46

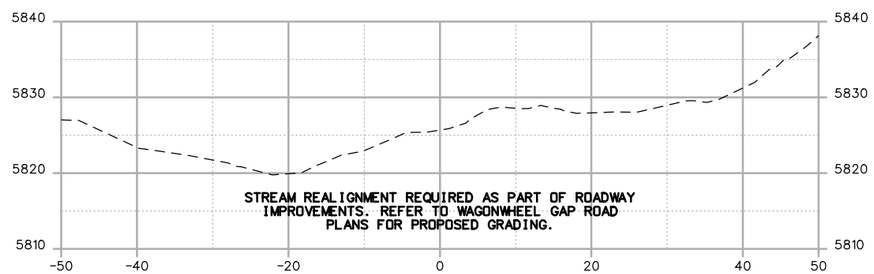
JR.Mills 11:10:57 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\104\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

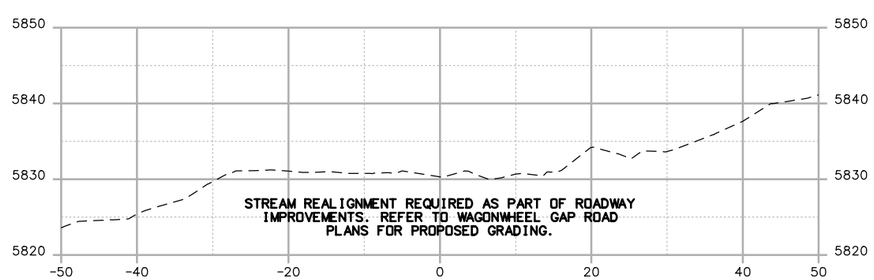
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-16



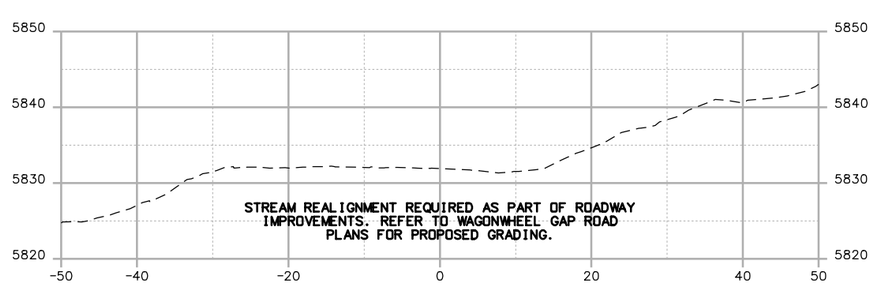
STA. 146+41.82



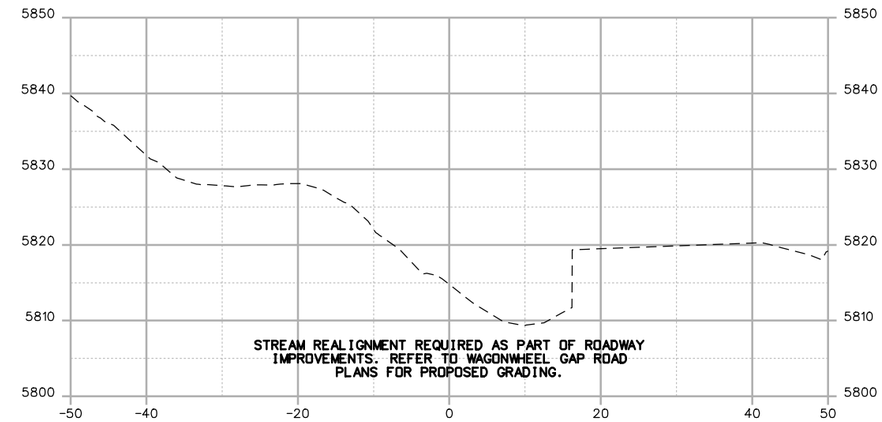
STA. 146+04.78



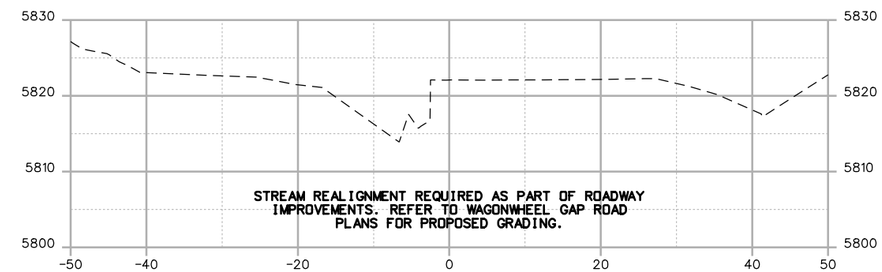
STA. 145+49.68



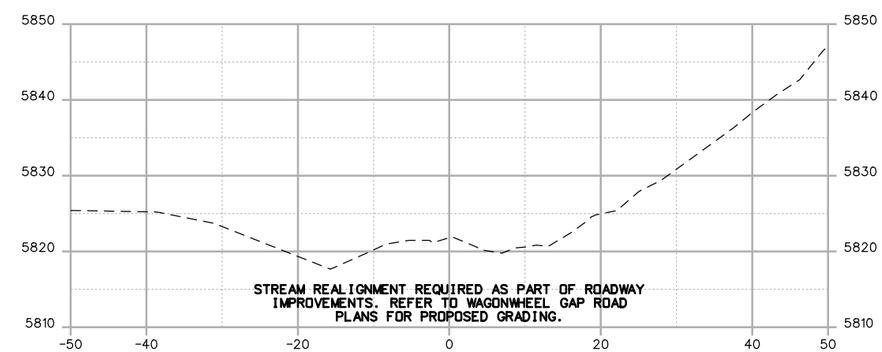
STA. 145+13.36



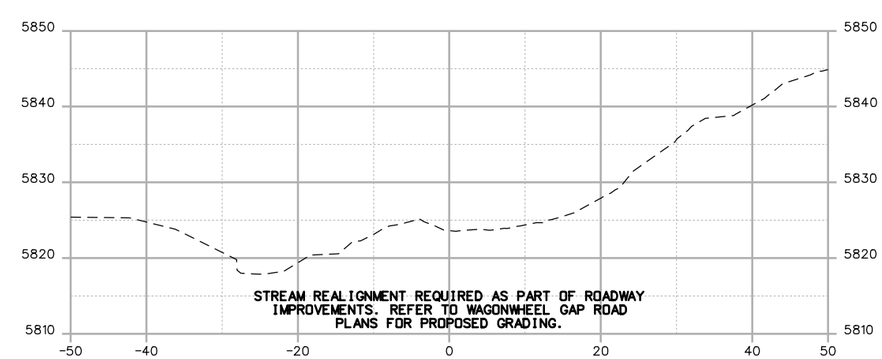
STA. 148+41.87



STA. 148+05.47



STA. 147+22.03

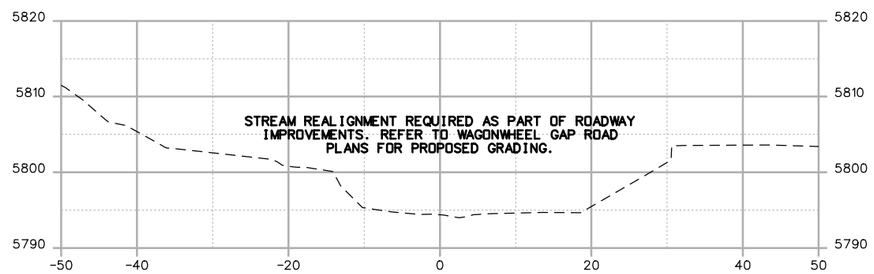


STA. 146+79.44

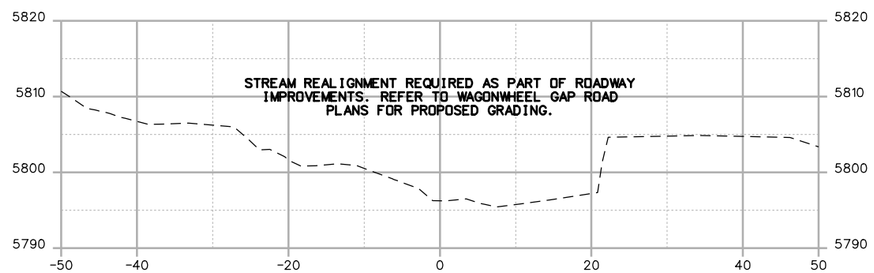
JR.Mills 9:32:44 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

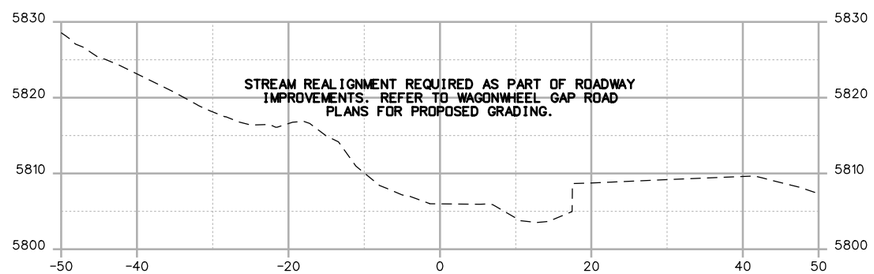
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-17



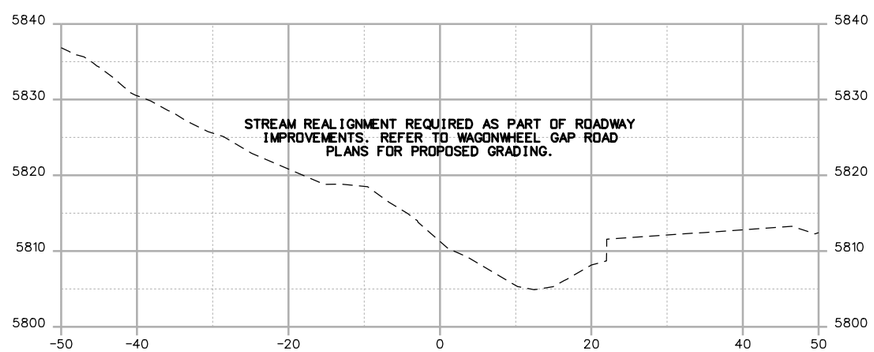
STA. 151+65.62



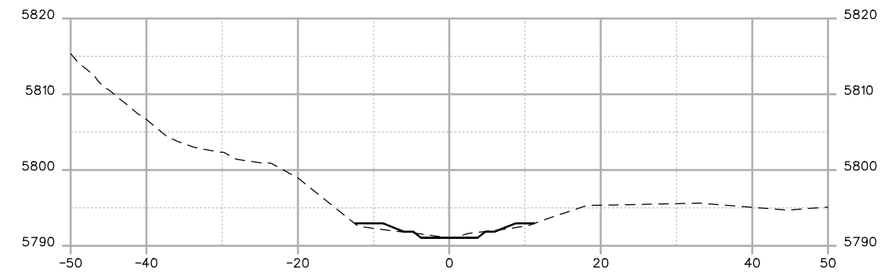
STA. 151+37.21



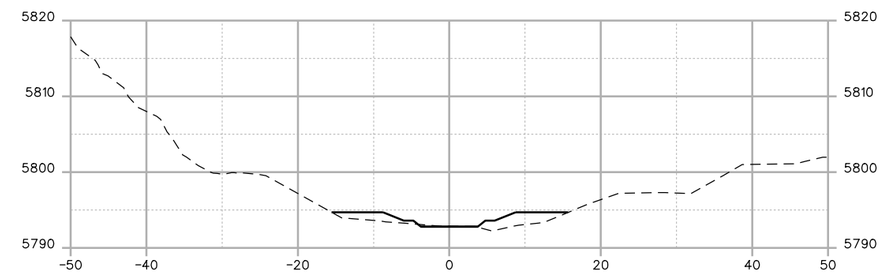
STA. 150+01.70



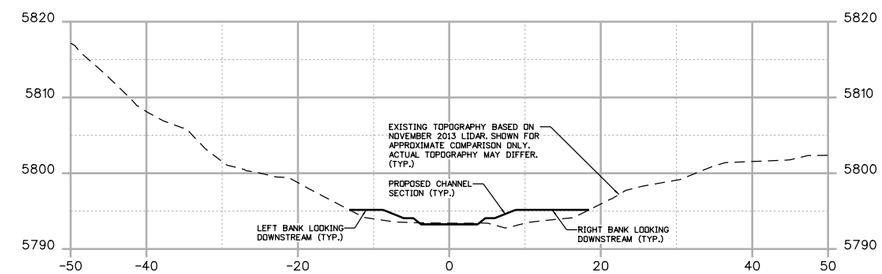
STA. 149+51.54



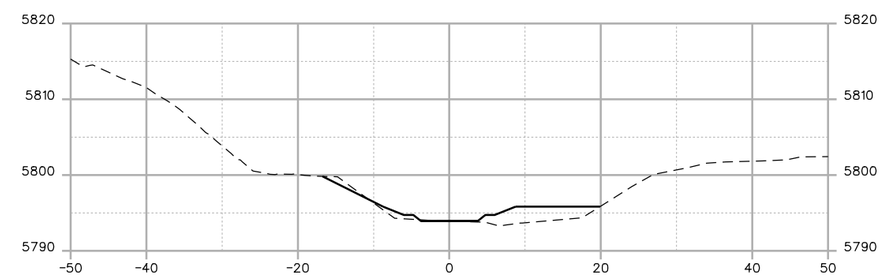
STA. 152+72.61



STA. 152+29.10



STA. 152+17.23

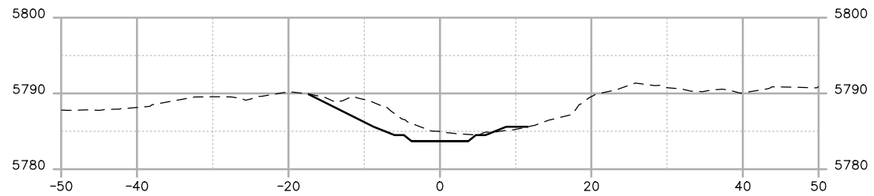


STA. 152+00.24

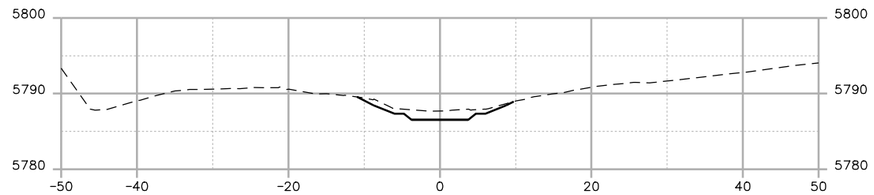
JR.Mills 9:33:05 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-18

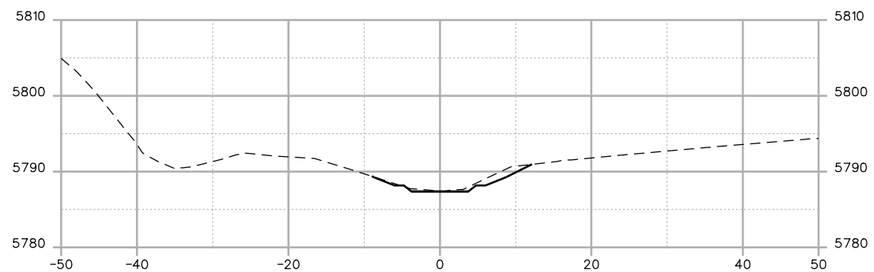
0 5 10



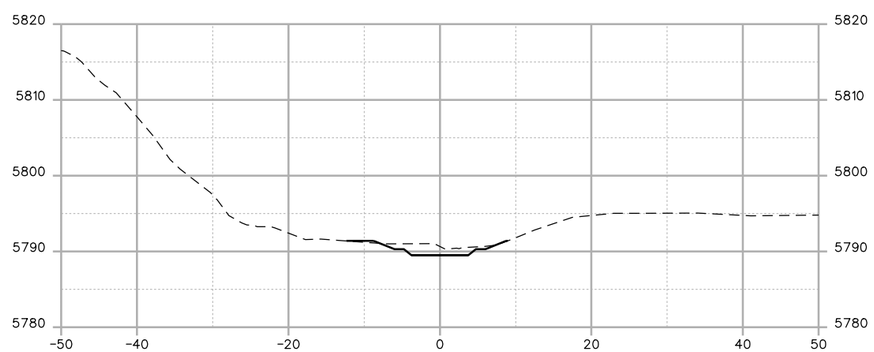
STA. 154+60.69



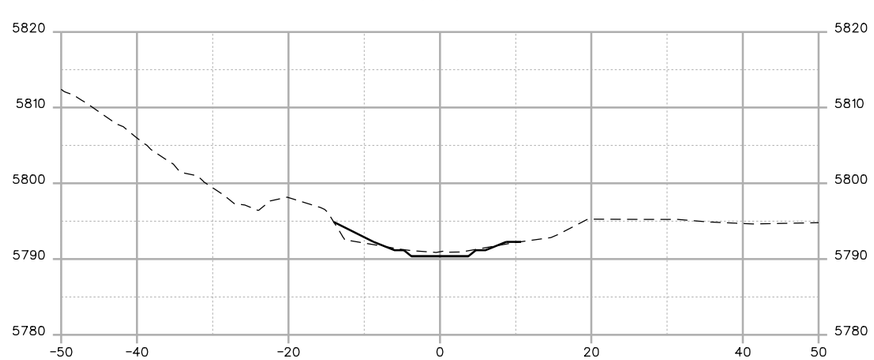
STA. 153+87.45



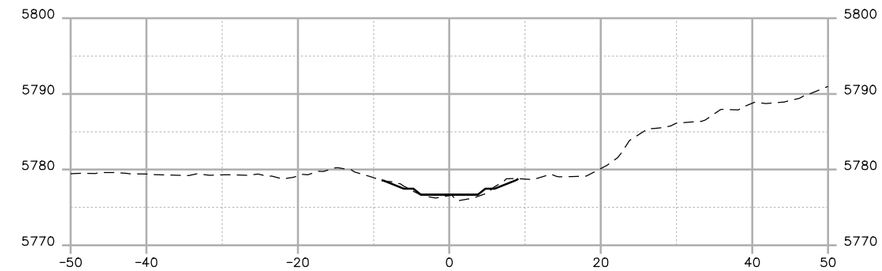
STA. 153+66.99



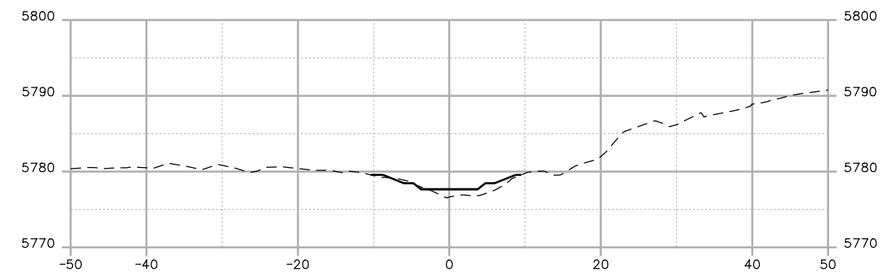
STA. 153+13.08



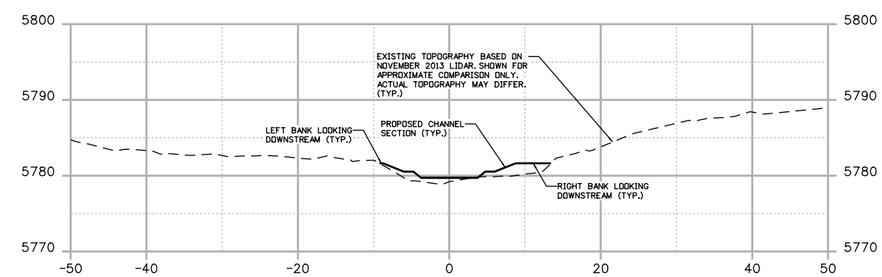
STA. 152+90.13



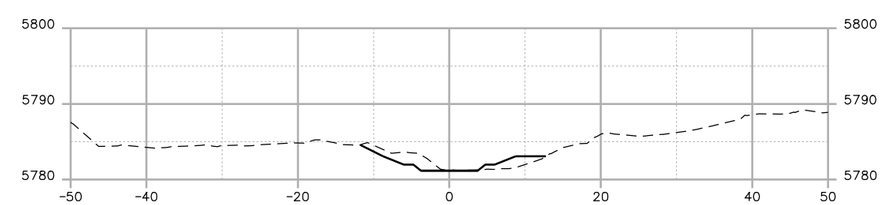
STA. 156+38.59



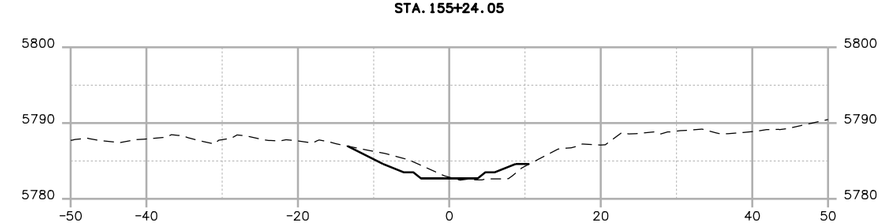
STA. 156+13.33



STA. 155+61.70



STA. 155+24.05

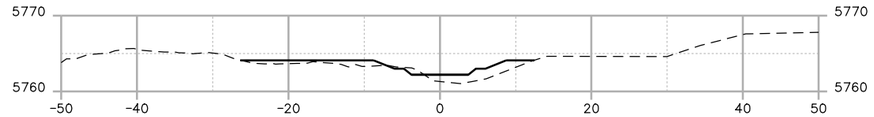


STA. 154+85.41

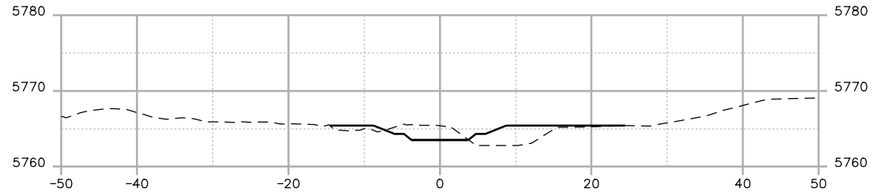
JR.Mills 9:33:27 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-19

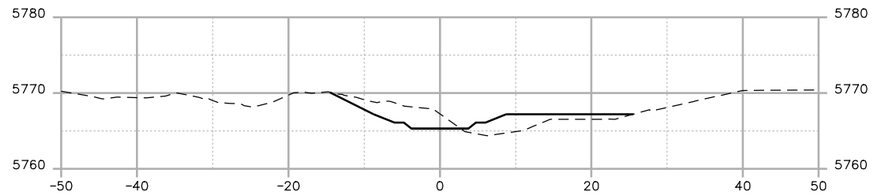
0 5 10



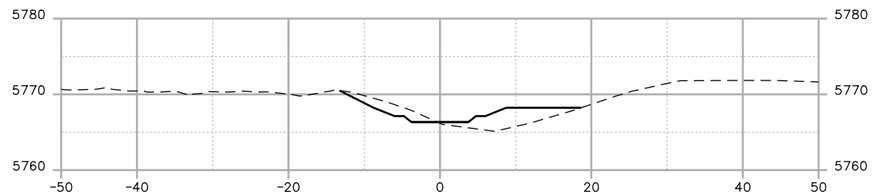
STA. 160+07.24



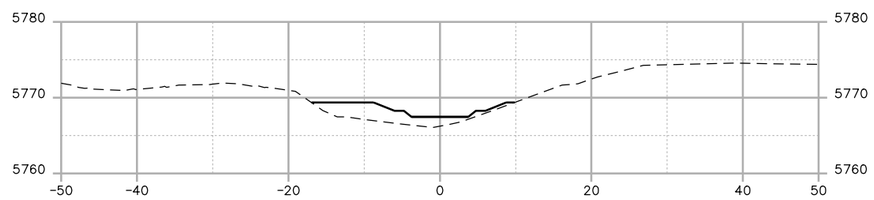
STA. 159+73.97



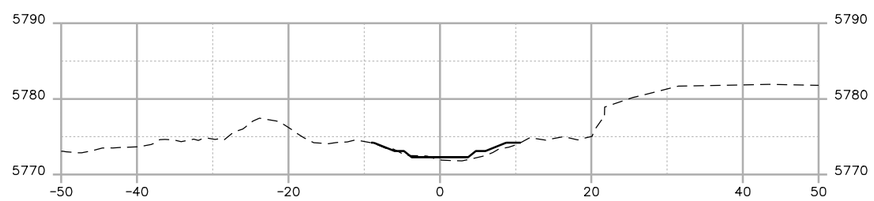
STA. 159+27.98



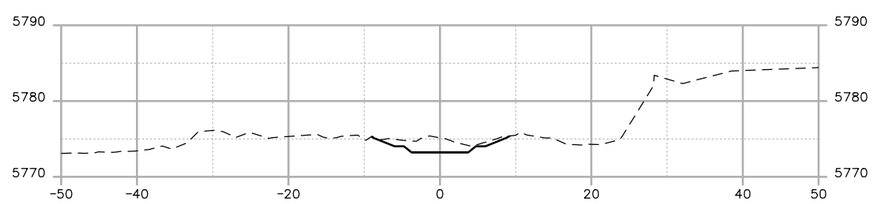
STA. 159+01.84



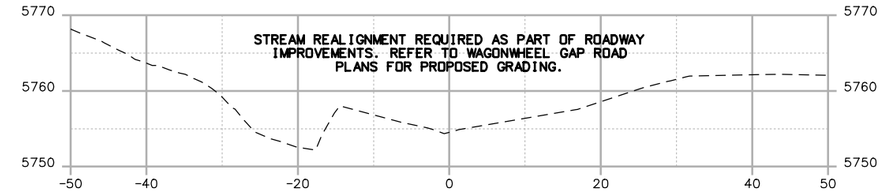
STA. 158+73.37



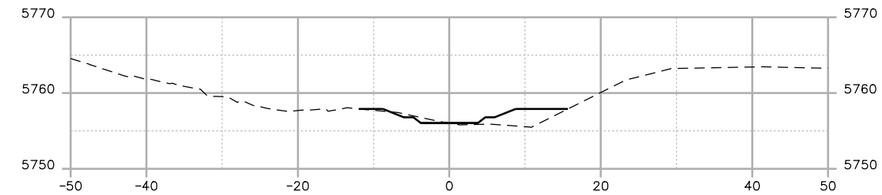
STA. 157+49.99



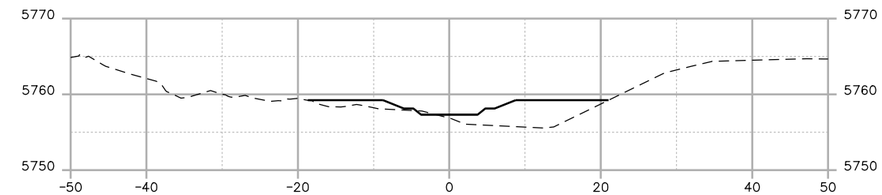
STA. 157+26.31



STA. 162+16.26



STA. 161+63.93



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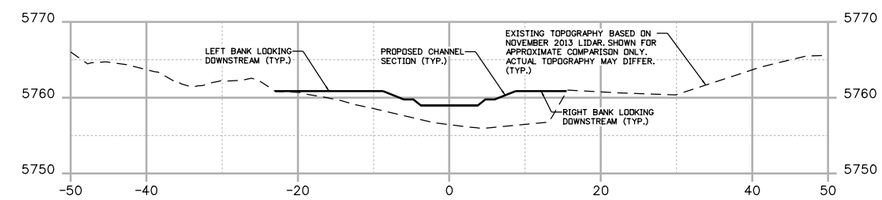
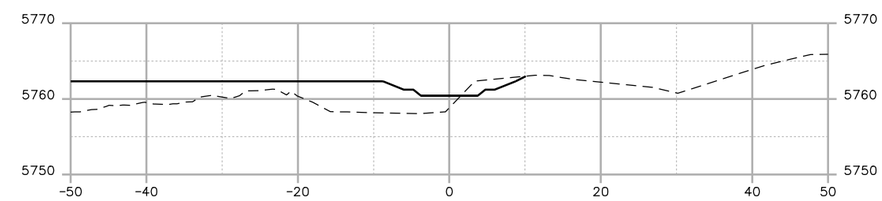
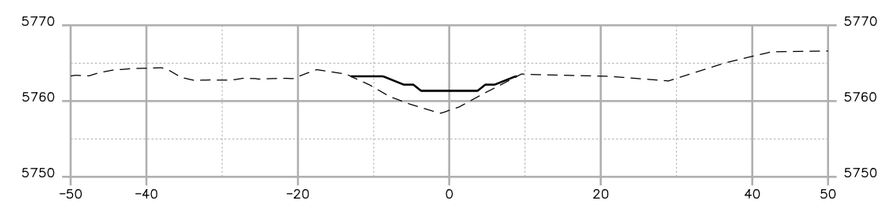


STA. 160+90.06



STA. 160+52.69

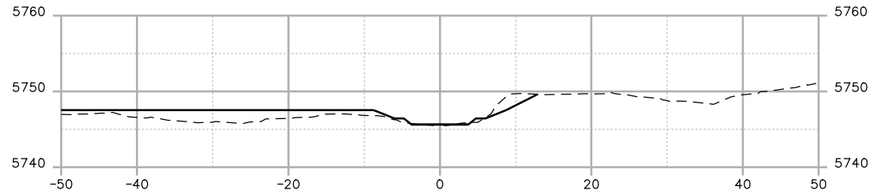


STA. 160+28.59

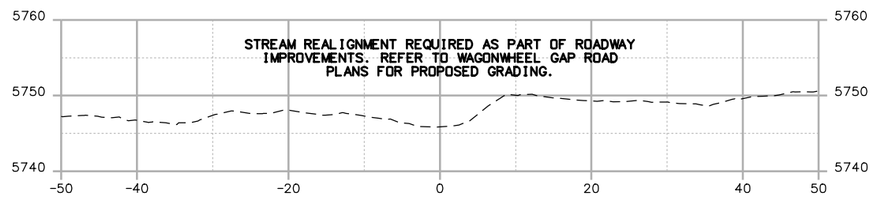
JR.Mills 9:33:48 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-20

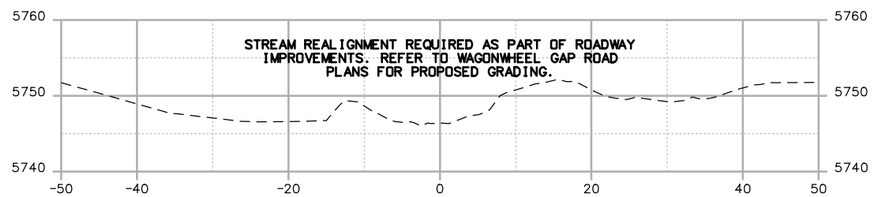
0 5 10



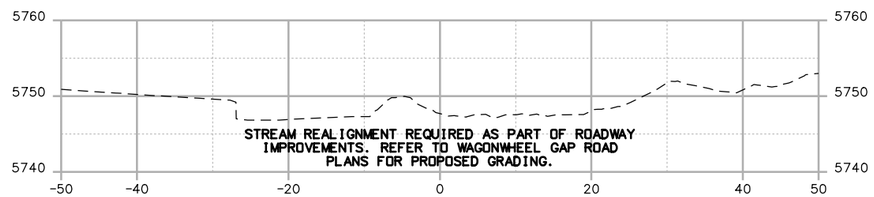
STA. 164+19.41



STA. 163+96.59



STA. 163+78.90



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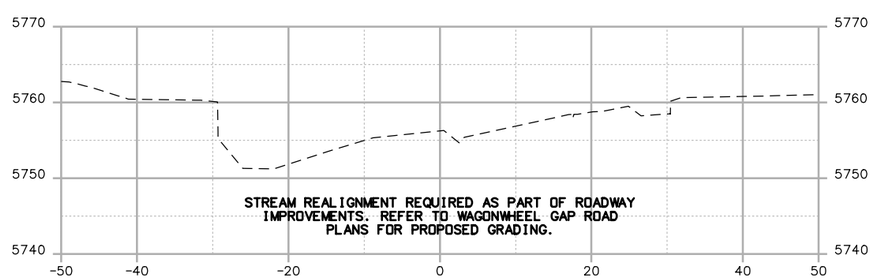
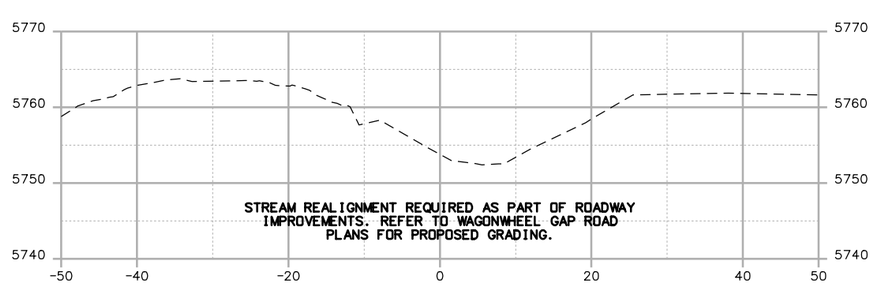
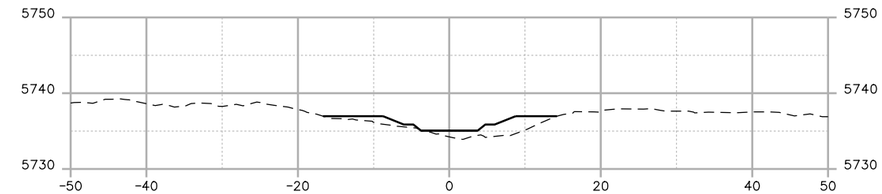


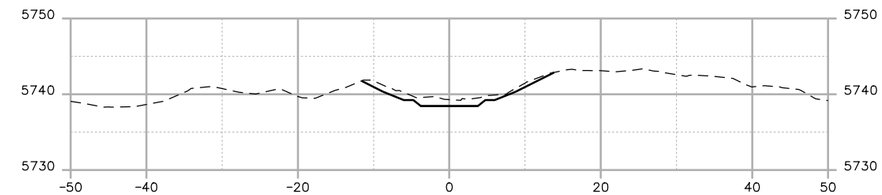
STA. 162+96.64



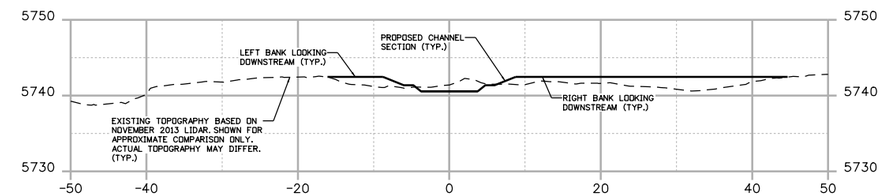
STA. 162+72.19



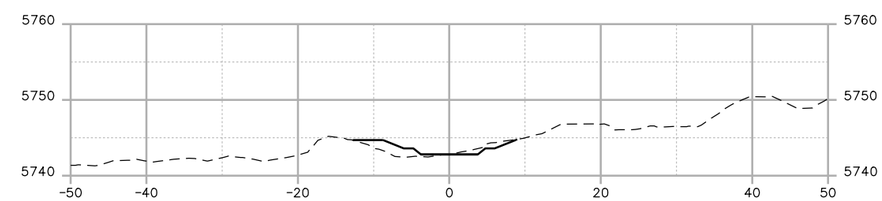
STA. 167+56.69



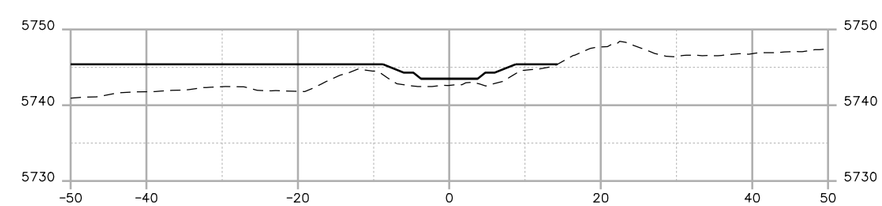
STA. 166+72.40



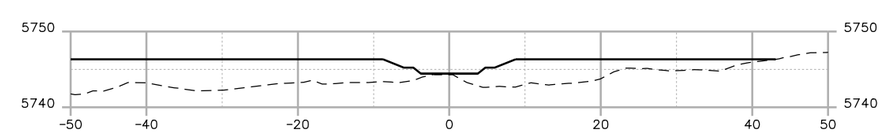
STA. 166+20.63



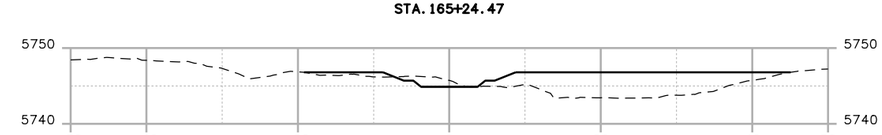
STA. 165+65.70



STA. 165+48.03



STA. 165+24.47

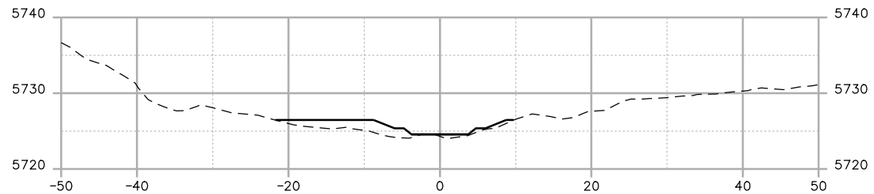


STA. 164+82.99

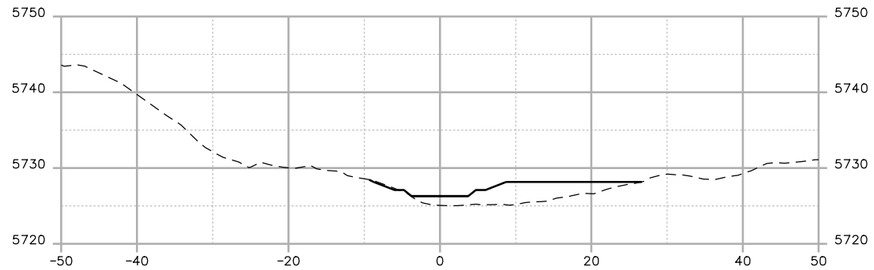
JR.Mills 9:34:12 AM pw:\\DCPWAPP1.bkr.mbakercorp.com:pwprod\Documents\Projects\Lakewood_Office\Boulder_County_Emergency_Transportation\T04\05_Design\13_Stream Restoration\Cross Sections\138200_XS-Sheets.dgn

0 5 10

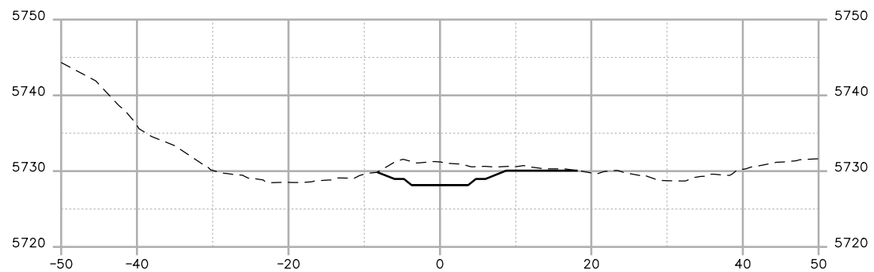
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-21



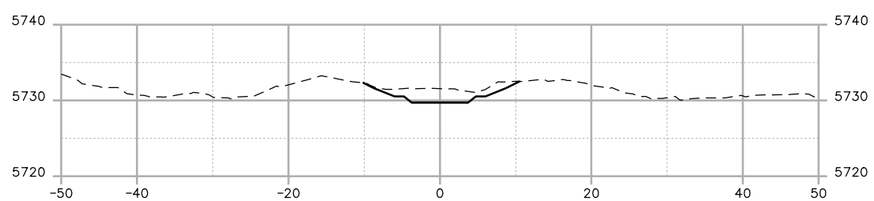
STA. 170+16.36



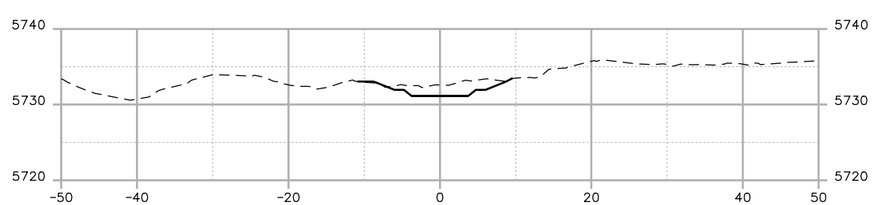
STA. 169+73.20



STA. 169+27.16



STA. 168+88.38



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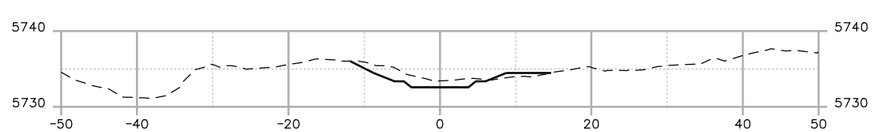

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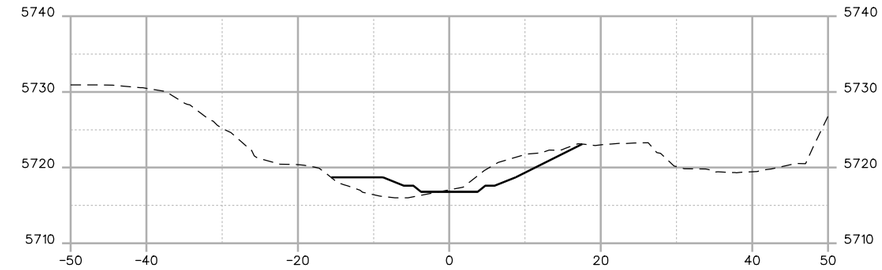

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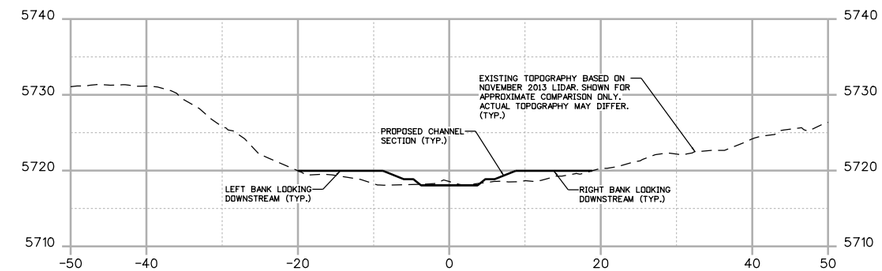

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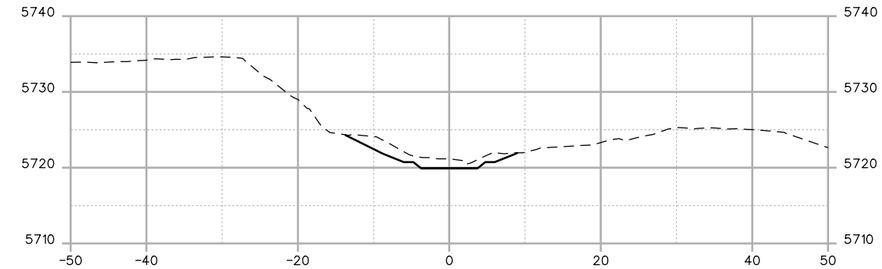

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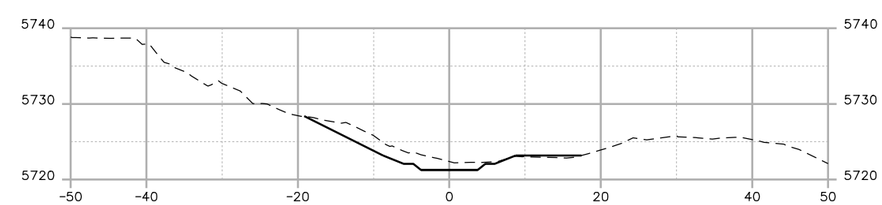

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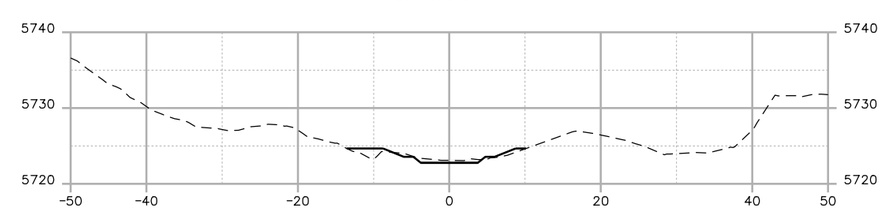

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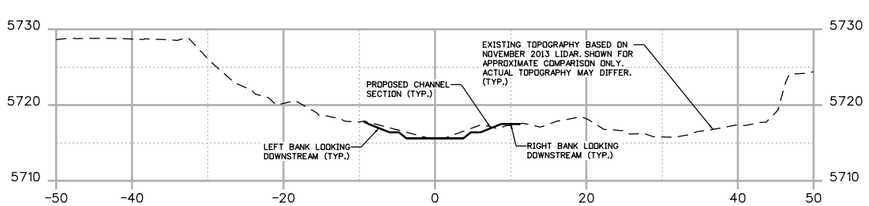
BAKER PROJ. REFERENCE NO.	SHEET NO.
138200	X-22



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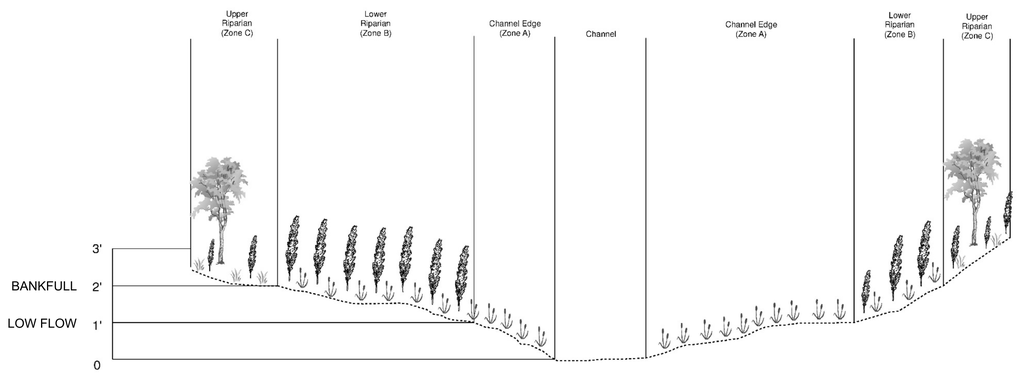
BAKER PROJECT REFERENCE NO.	SHEET NO.
138200	11

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
165 South Union Boulevard, Suite 200
Lakewood, COLORADO 80228
Phone: 720.514.1100
Fax: 720.514.1120

Typical Cross Section



REVEGETATION PLANTING ZONES FOR DESIGN REACHES

REACH	CHANNEL EDGE ZONE A	LOWER RIPARIAN ZONE B	UPPER RIPARIAN ZONE C	RIPARIAN SEED
1		X	X	X
2		X	X	X
3		X	X	X
4	X	X	X	X
5	X	X	X	X
6	X	X	X	X
7	X	X	X	X
8	X	X	X	X
9	X	X	X	X
10	X	X	X	X

X = INDICATES TYPE OF PLANTINGS TO BE APPLIED TO EACH REACH

Table 1: Plants Needed for Restoration[1]

Common Name	Scientific Name	Plant Size (cubic inch)	Plants per Acre
Zone A: Channel Edge[2]			
Nebraska sedge	*Carex nebrascensis*	10	882
Emory's sedge	*Carex emoryi*	10	1,470
Creeping spikerush	*Eleocharis palustris*	10	882
Baltic rush	*Juncus balticus*	10	1,470
Red-tinge bulrush	*Scirpus microcarpus*	10	882
		Total	**5,586**
Zone B: Lower Riparian[2]			
Peachleaf willow	*Salix amygdaloides*	40	1,000
Peachleaf willow	*Salix amygdaloides*	3' cutting	500
Narrowleaf willow	*Salix exigua*	40	2,500
Narrowleaf willow	*Salix exigua*	3' cutting	500
Dewystem willow	*Salix irrorata*	40	2,000
Dewystem willow	*Salix irrorata*	3' cutting	500
		Total	**7,000**
Zone C: Upper Riparian[3]			
Rubber rabbitbrush	*Ericameria nauseosus*	40	50
Narrowleaf cottonwood	*Populus angustifolia*	40	500
Plains cottonwood	*Populus deltoides*	40	500
American plum	*Prunus americana*	40	75
Chokecherry	*Prunus virginiana*	40	75
Common snowberry	*Symphoricarpos alba*	40	75
Golden current	*Ribes aureum*	40	50
Woods' rose	*Rosa woodsii*	40	75
		Total	**1,400**

[1]Zone A is 0-1', Zone B is 1-2', and Zone C is 2-2.5' above channel; planting will only occur in discrete pockets based on final grading
[2]Based on approximately 3-foot centers
[3]Based on approximately 6-foot centers

Table 2: Riparian Seed Mix[1]

[1]Nomenclature follows PLANTS Database (NRCS 2015); seeding rate based on hand-broadcasting; any substitutions must be native to Colorado and from a US or Canada seed source.

Type	Common Name	Scientific Name	Variety[2]	Seeds per Pound[3]	Seeds per Square Foot	Pounds of Pure Live Seed/Acre
Graminoids	Indian ricegrass	*Acnatherum hymenoides*	Paloma	141,000	3.9	1.2
	Sideoats grama	*Bouteloua curtipendula*	Butte or Pierre	191,000	5.3	1.2
	Blue grama[3]	*Bouteloua gracilis*[3]	Birds Eye, Alma, or Lovington	825,000	11.4	0.6
	Slender wheatgrass	*Elymus trachycaulus*	White River or San Luis	159,000	4.4	1.2
	Idaho fescue[3]	*Festuca idahoensis*[3]	Winchester	450,000	8.3	0.8
	Fowl mannagrass	*Glyceria striata*	-	180,000	8.3	2.0
	Needle and thread	*Hesperostipa comata*	-	115,000	5.3	2.0
	Prairie junegrass[3]	*Koeleria macrantha*[3]	-	2.3 million	5.3	0.1
	Baltic rush[3]	*Juncus balticus*[3]	-	10.9 million	25.0	0.1
	Torrey's rush[3]	*Juncus torreyi*[3]	-	12.3 million	28.2	0.1
	Green needlegrass	*Nassella viridula*	Cucharas or Lodorm	181,000	4.2	1.0
	Western wheatgrass	*Pascopyrum smithii*	Arriba	110,000	10.1	4.0
	Fowl bluegrass[3]	*Poa palustris*[3]	-	3.2 million	7.3	0.1
	Sandberg bluegrass[3]	*Poa secunda*[3]	Sims Mesa or High Plains	1 million	6.9	0.3
	Bluebunch wheatgrass	*Pseudoroegneria spicata*	P7	140,000	6.4	2.0
	Little bluestem	*Schizachyrium scoparium*	Pastura, Cimarron, or Camper	260,000	6.0	1.0
	Prairie cordgrass	*Spartina pectinata*	-	197,000	4.5	1.0
Forbs	Common yarrow[3]	*Achillea millefolium*[3]	-	2.7 million	6.2	0.1
	Rocky Mountain bee plant	*Cleome serrulata*	-	66,000	3.0	2.0
	Golden tickseed[3]	*Coreopsis tinctoria*[3]	-	1.4 million	3.2	0.1
	Blanketflower	*Gaillardia aristata*	Meriweather	132,000	1.5	0.5
	Showy goldeneye[3]	*Heliomeris multiflora*[3]	-	1 million	2.3	0.1
	Rocky Mountain penstemon	*Penstemon strictus*	Bandera	490,000	2.2	0.2
	American vetch	*Vicia americana*	-	33,000	0.8	1.0
Bulk	Rice hulls	-	-	-	-	2.3
				Total	**170.0**	**25.0**

[2]Sources: NRCS 2015, Granite Seed 2015, Western Native Seed 2015, NSN 2015
[3]Bag separately if drill-seeding

Notes:

- All planting zones will be seeded with the Riparian Seed Mix (Table 2). Seeding will only be performed between September 1 and when the ground is frozen, and when the ground is thawed and June 1, unless approved by a qualified ecologist.
- Woody plants (Zones B and C) will be installed in discrete pockets. The exact locations will be based on the final grading and determined after grading is complete.
- Compost (300 cubic yards per acre) will be mixed with native soil in discrete pockets within the restoration areas. Exact locations will be determined by the presence of adequate native soil.
  - Compost will have the following characteristics:
    a. pH: 5.5-8.0
    b. Moisture content: 35-55 percent
    c. Particle size: pass through 1-inch screen or smaller
    d. Stability: stable to highly stable, providing nutrients for plant growth
    e. Maturity/growth screening: demonstrate ability to enhance plant growth
    f. Soluble salt concentration: 2.5 dS (mmhos/cm) or less preferred
    g. Organic matter content: 30-70 percent
  - Suggested compost source: A-1 Organic, Eaton, Colorado 970-454-3492 or an approved equal.
- All willow cuttings must be harvested while dormant and planted within 3 to 14 days (after soaking—completely submerged)
- All containerized plants will be inspected by a qualified ecologist prior to planting. Any dead, dying, stressed, or badly "rootbound" plants will be rejected.
- A qualified ecologist will direct and supervise all plantings
- All seed will be hand-broadcast and lightly raked by hand to encourage contact with the soil
- All seeded areas will be mulched with certified weed-free straw and tackified with a cellulose-based tackifier (or hydromulched). No hay mulch will be used on the site.
- No fertilizers will be used on the site
- In an attempt to avoid the continued spreading of noxious weeds, all discrete populations of Colorado List A or B noxious weeds found in or within 100 feet of the restoration area will be sprayed with the appropriate herbicide(s) prior to construction
- All finish grades will be rough (plus or minus 4 inches), and all straight edges and right angles will be avoided
- No equipment will be allowed in the restoration area after seeding or planting.
- Any trees to be removed for the project will be removed during the non-nesting season for migratory birds (between September 1 and March 31)
- All best management practices (BMPs) used shall be selected, installed, implemented, and maintained according to good engineering, hydrologic and pollution control practices.
- The use of chemicals such as soil stabilizers, dust palliatives, herbicides, growth inhibitors, fertilizers, deicing salts, etc., shall be in accordance with the manufacturer's recommended application rates, frequency, and instructions. These chemicals shall not be used, stored, or stockpiled within 50 horizontal feet of Fourmile Canyon Creek.
- Construction equipment, fuels, lubricants, and other petroleum distillates shall not be stored or stockpiled within 50 horizontal feet of Fourmile Canyon Creek. Equipment fueling and servicing shall occur only within approved designated areas.

FOURMILE CANYON CREEK REVEGETATION PLAN

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