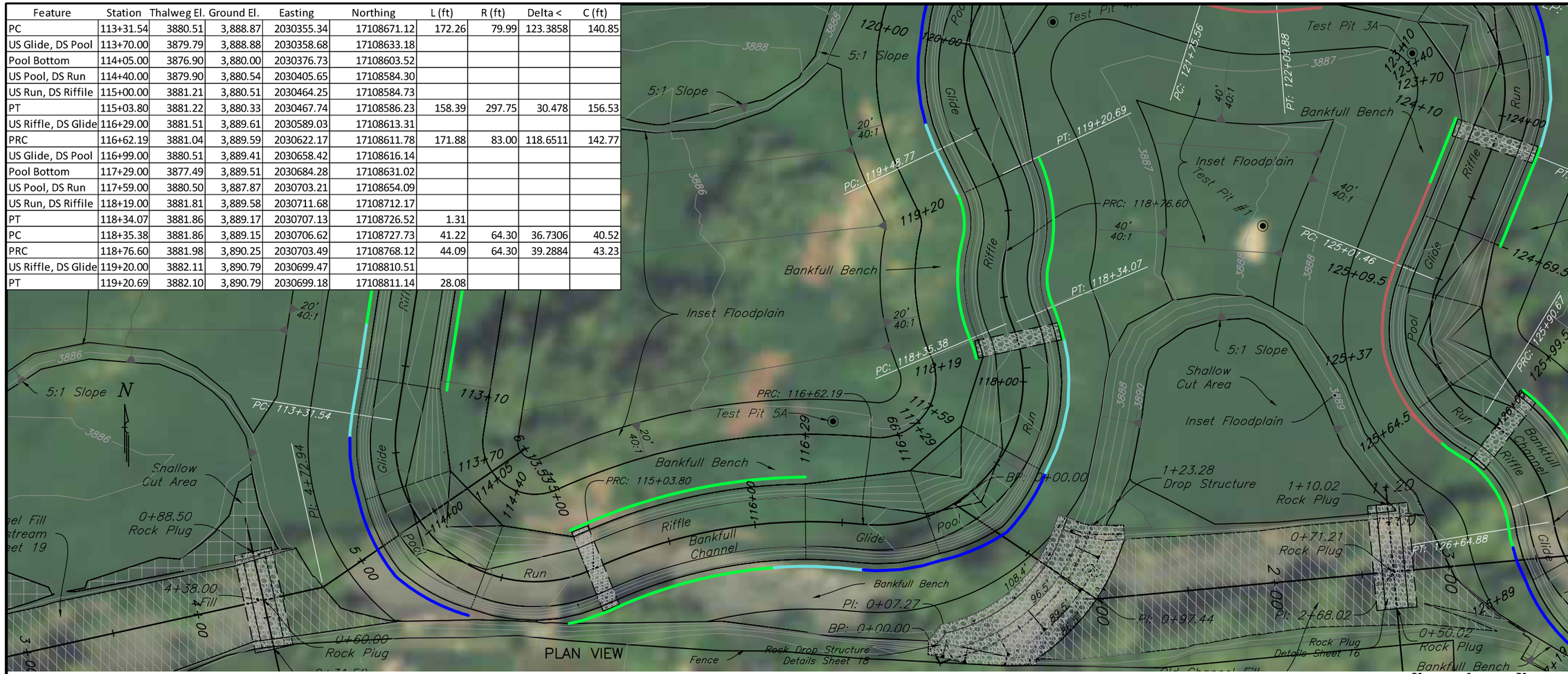
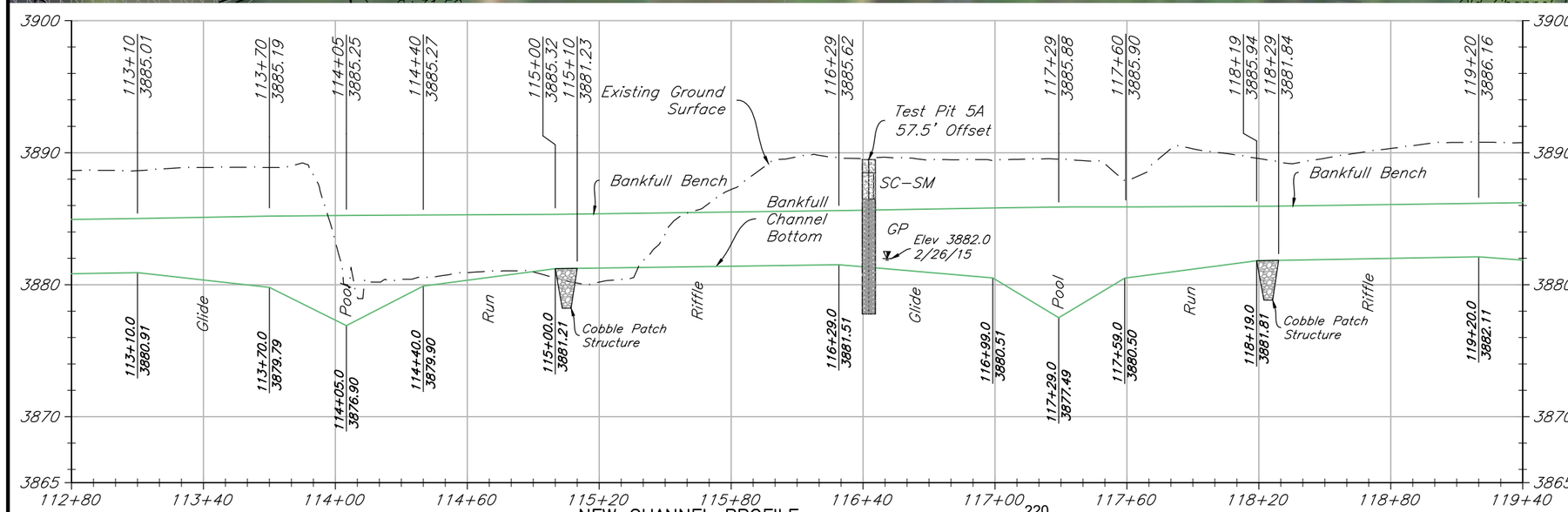
| Feature | Station | Thalweg El. | Ground El. | Easting | Northing | L (ft) | R (ft) | Delta < | C (ft) |
|---|---|---|---|---|---|---|---|---|---|
| PC | 113+31.54 | 3880.51 | 3,888.87 | 2030355.34 | 17108671.12 | 172.26 | 79.99 | 123.3858 | 140.85 |
| US Glide, DS Pool | 113+70.00 | 3879.79 | 3,888.88 | 2030358.68 | 17108633.18 | | | | |
| Pool Bottom | 114+05.00 | 3876.90 | 3,880.00 | 2030376.73 | 17108603.52 | | | | |
| US Pool, DS Run | 114+40.00 | 3879.90 | 3,880.54 | 2030405.65 | 17108584.30 | | | | |
| US Run, DS Riffle | 115+00.00 | 3881.21 | 3,880.51 | 2030464.25 | 17108584.73 | | | | |
| PT | 115+03.80 | 3881.22 | 3,880.33 | 2030467.74 | 17108586.23 | 158.39 | 297.75 | 30.478 | 156.53 |
| US Riffle, DS Glide | 116+29.00 | 3881.51 | 3,889.61 | 2030589.03 | 17108613.31 | | | | |
| PRC | 116+62.19 | 3881.04 | 3,889.59 | 2030622.17 | 17108611.78 | 171.88 | 83.00 | 118.6511 | 142.77 |
| US Glide, DS Pool | 116+99.00 | 3880.51 | 3,889.41 | 2030658.42 | 17108616.14 | | | | |
| Pool Bottom | 117+29.00 | 3877.49 | 3,889.51 | 2030684.28 | 17108631.02 | | | | |
| US Pool, DS Run | 117+59.00 | 3880.50 | 3,887.87 | 2030703.21 | 17108654.09 | | | | |
| US Run, DS Riffle | 118+19.00 | 3881.81 | 3,889.58 | 2030711.68 | 17108712.17 | | | | |
| PT | 118+34.07 | 3881.86 | 3,889.17 | 2030707.13 | 17108726.52 | 1.31 | | | |
| PC | 118+35.38 | 3881.86 | 3,889.15 | 2030706.62 | 17108727.73 | 41.22 | 64.30 | 36.7306 | 40.52 |
| PRC | 118+76.60 | 3881.98 | 3,890.25 | 2030703.49 | 17108768.12 | 44.09 | 64.30 | 39.2884 | 43.23 |
| US Riffle, DS Glide | 119+20.00 | 3882.11 | 3,890.79 | 2030699.47 | 17108810.51 | | | | |
| PT | 119+20.69 | 3882.10 | 3,890.79 | 2030699.18 | 17108811.14 | 28.08 | | | |




## CHANNEL LAYOUT CHART

"PC" = Point of Curvature

"PT" = Point of Tangency

"PCC" = Point of Compound Curvature

"PRC" = Point of Reverse Curvature

"L" = Curve Length

"Delta <" = Angle at Curve Center Point (PC to PT)

"R" = Curve Radius

"C" = Chord Length

"O" = Curve Center Point

Note:

All stationing is located along ℄ of channel.

The pool thalweg is offset from centerline of bankfull channel. Detail on Shee Sheet 11.

**BANK PROTECTION LEGEND**

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection
- Riffle Bank Protection

| | | Date |
|---|---|---|
| Designed | K Hoffman | 7/2015 |
| Drawn | B Krueger | 7/2015 |
| Checked | S Becker | 7/2015 |
| Approved | | |

# PLAN & PROFILE STA 112+80–119+40

## BIG SPRING CREEK RESTORATION PROJECT

MACHLER, ADAMS And MT FISH WILDLIFE & PARKS

FERGUS COUNTY MONTANA

United States Department of Agriculture

Natural Resources Conservation Service

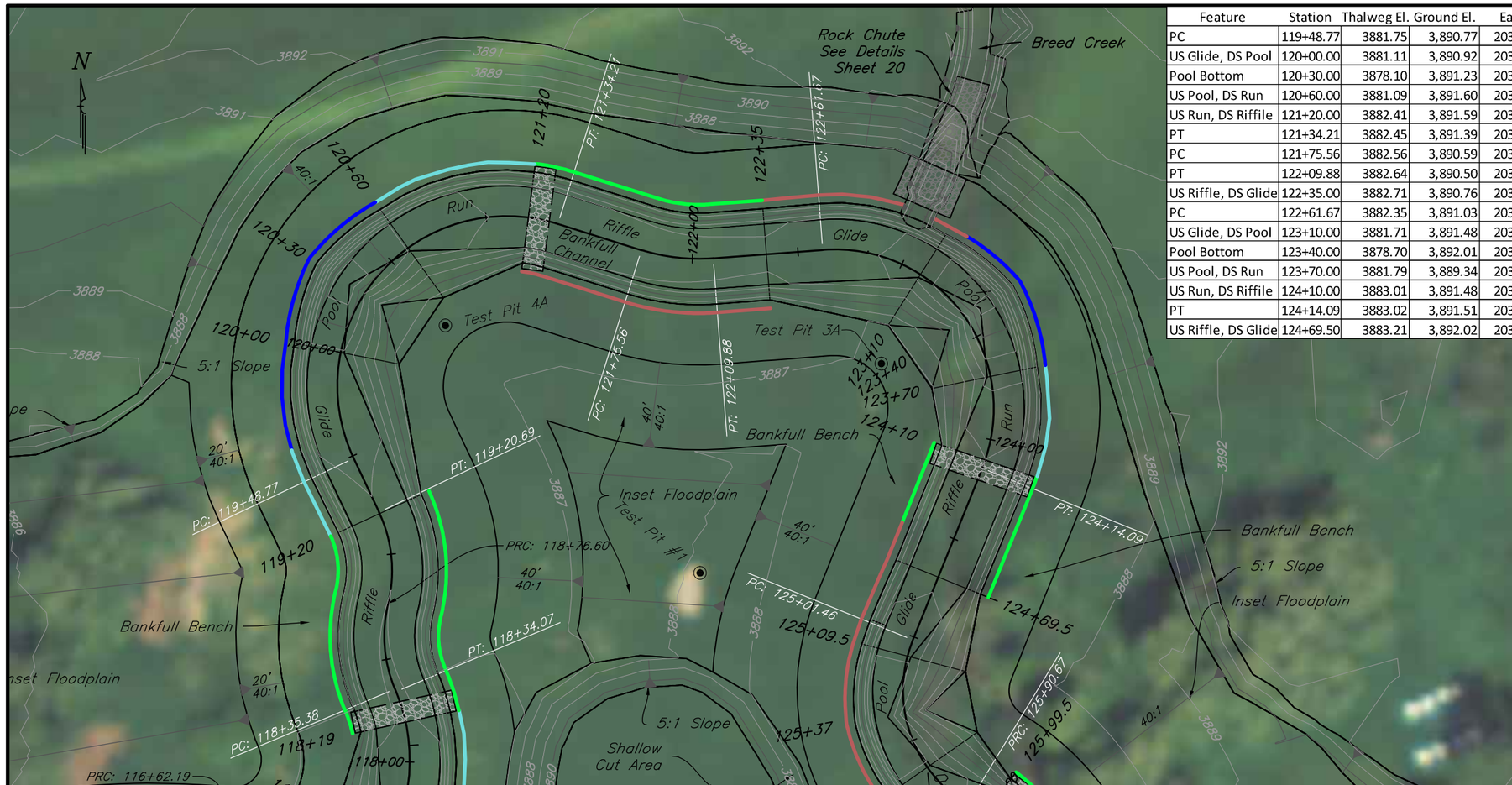
File No. BigSpPlanPro.dwg

Drawing No. 15–31

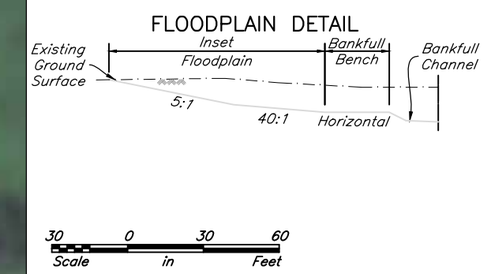
7/30/15 10:18 AM

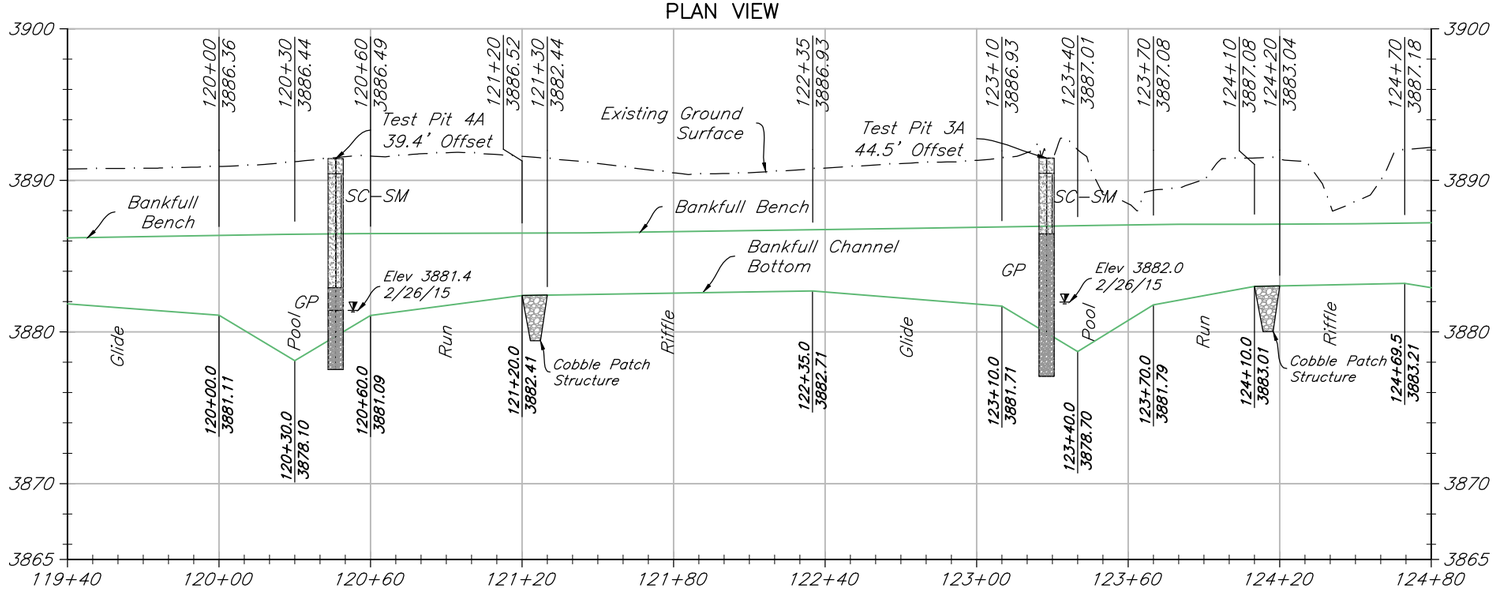
Sheet 7 of 21

| Feature | Station | Thalweg El. | Ground El. | Easting | Northing | L (ft) | R (ft) | Delta < | C (ft) |
|---|---|---|---|---|---|---|---|---|---|
| PC | 119+48.77 | 3881.75 | 3,890.77 | 2030687.15 | 17108836.51 | 185.44 | 80.00 | 132.8098 | 146.62 |
| US Glide, DS Pool | 120+00.00 | 3881.11 | 3,890.92 | 2030681.00 | 17108886.49 | | | | |
| Pool Bottom | 120+30.00 | 3878.10 | 3,891.23 | 2030692.21 | 17108914.13 | | | | |
| US Pool, DS Run | 120+60.00 | 3881.09 | 3,891.60 | 2030712.76 | 17108935.75 | | | | |
| US Run, DS Riffile | 121+20.00 | 3882.41 | 3,891.59 | 2030769.57 | 17108950.14 | | | | |
| PT | 121+34.21 | 3882.45 | 3,891.39 | 2030783.43 | 17108947.10 | 41.35 | | | |
| PC | 121+75.56 | 3882.56 | 3,890.59 | 2030822.87 | 17108934.70 | 34.32 | 90.00 | 21.8497 | 34.11 |
| PT | 122+09.88 | 3882.64 | 3,890.50 | 2030856.77 | 17108930.83 | 51.79 | | | |
| US Riffle, DS Glide | 122+35.00 | 3882.71 | 3,890.76 | 2030881.81 | 17108932.76 | | | | |
| PC | 122+61.67 | 3882.35 | 3,891.03 | 2030908.41 | 17108934.80 | 152.42 | 75.00 | 116.437 | 127.51 |
| US Glide, DS Pool | 123+10.00 | 3881.71 | 3,891.48 | 2030954.48 | 17108923.27 | | | | |
| Pool Bottom | 123+40.00 | 3878.70 | 3,892.01 | 2030975.93 | 17108902.58 | | | | |
| US Pool, DS Run | 123+70.00 | 3881.79 | 3,889.34 | 2030985.12 | 17108835.72 | | | | |
| US Run, DS Riffile | 124+10.00 | 3883.01 | 3,891.48 | 2030962.90 | 17108780.53 | | | | |
| PT | 124+14.09 | 3883.02 | 3,891.51 | 2030983.69 | 17108831.89 | 87.37 | | | |
| US Riffle, DS Glide | 124+69.50 | 3883.21 | 3,892.02 | 2030948.37 | 17108743.28 | | | | |




PLAN VIEW




NEW CHANNEL PROFILE

Note:
All stationing is located along ℄ of channel.

The pool thalweg is offset from centerline of bankfull channel. Detail on Shee Sheet 11.

CHANNEL LAYOUT CHART

"PC" = Point of Curvature
"PT" = Point of Tangency
"PCC" = Point of Compound Curvature
"PRC" = Point of Reverse Curvature
"L" = Curve Length
"Delta <" = Angle at Curve Center Point (PC to PT)
"R" = Curve Radius
"C" = Chord Length
"O" = Curve Center Point

BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection
- Riffle Bank Protection

| | | Date |
|---|---|---|
| Designed | K Hoffman | 7/2015 |
| Drawn | B Krueger | 7/2015 |
| Checked | S Becker | 7/2015 |
| Approved | | |

# PLAN & PROFILE
## BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS

FERGUS COUNTY MONTANA

STA. 119+40–124+80

United States Department of Agriculture
Natural Resources Conservation Service

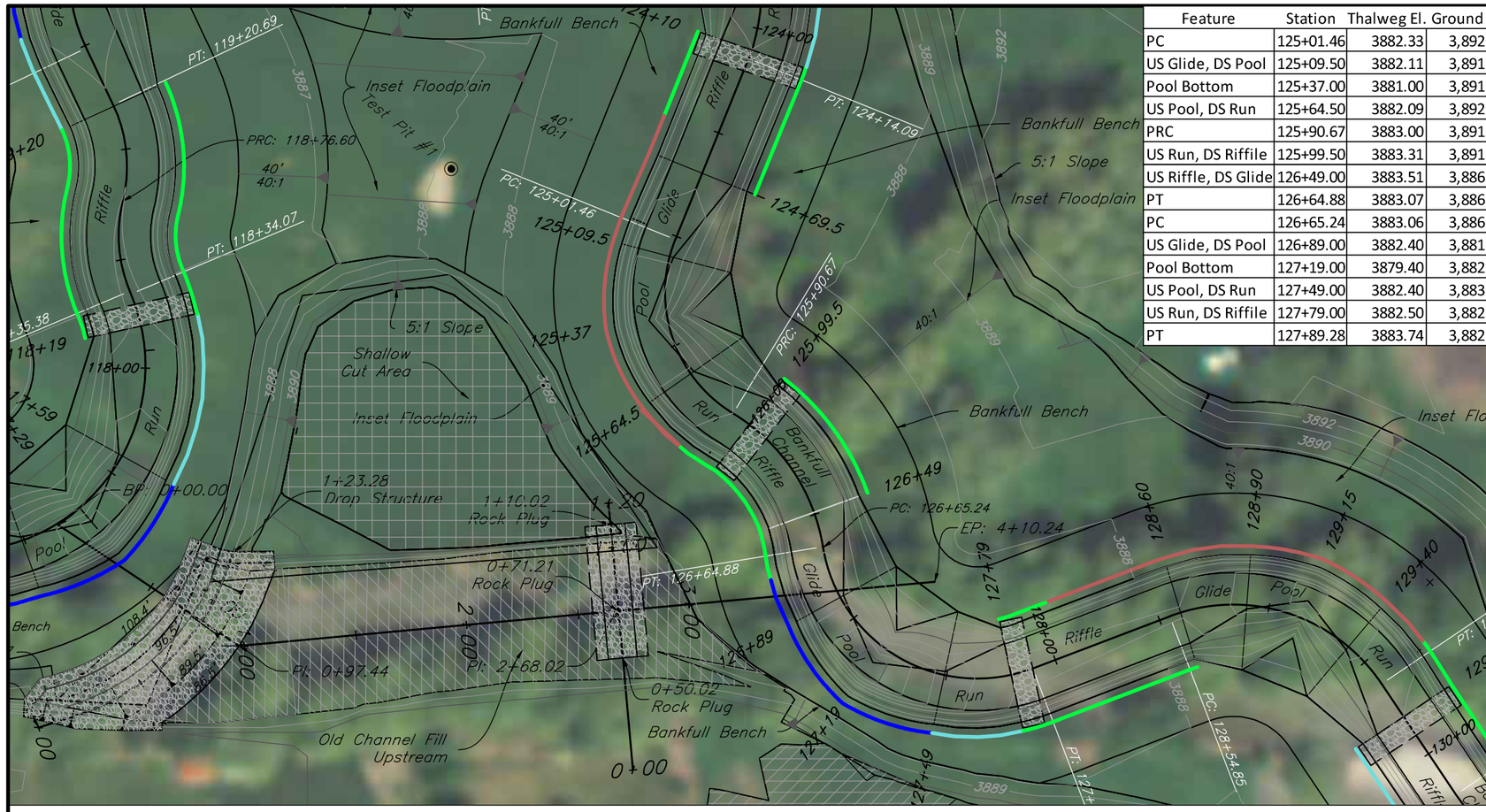
File No. BigSpPlanPro.dwg

Drawing No. 15–31

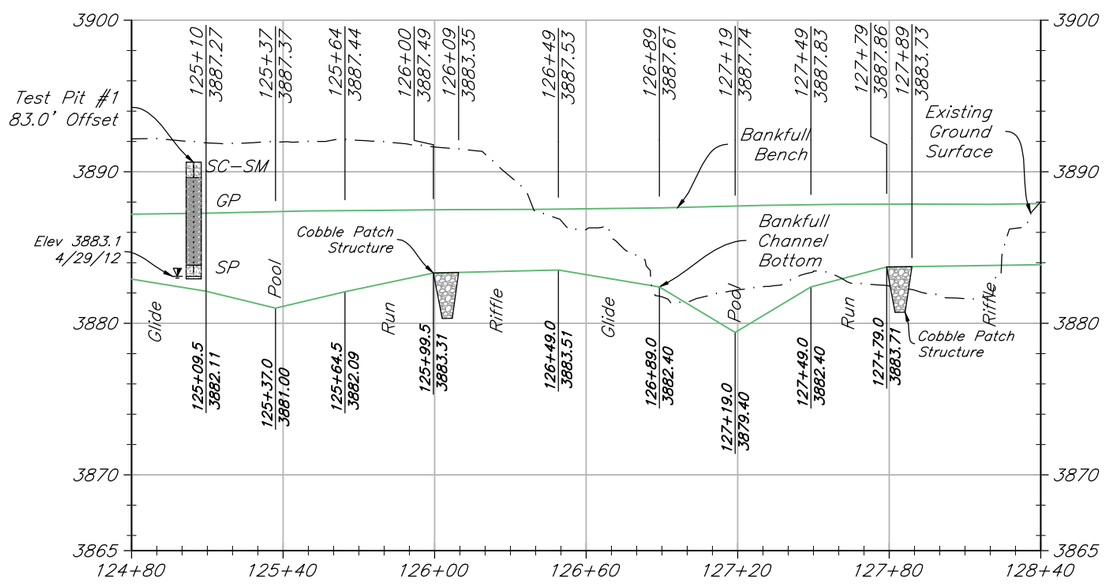
7/30/15 10:18 AM

Sheet 8 of 21

| Feature | Station | Thalweg El. | Ground El. | Easting | Northing | L (ft) | R (ft) | Delta < | C (ft) |
|---|---|---|---|---|---|---|---|---|---|
| PC | 125+01.46 | 3882.33 | 3,892.01 | 2030950.91 | 17108750.90 | 89.21 | 63.30 | 80.7427 | 82.01 |
| US Glide, DS Pool | 125+09.50 | 3882.11 | 3,891.91 | 2030947.27 | 17108716.01 | | | | |
| Pool Bottom | 125+37.00 | 3881.00 | 3,891.97 | 2030957.75 | 17108690.82 | | | | |
| US Pool, DS Run | 125+64.50 | 3882.09 | 3,892.11 | 2030984.00 | 17108668.09 | | | | |
| PRC | 125+90.67 | 3883.00 | 3,891.78 | 2030976.71 | 17108673.05 | 74.21 | 86.03 | 49.4243 | 71.93 |
| US Run, DS Riffle | 125+99.50 | 3883.31 | 3,891.62 | 2031012.94 | 17108628.77 | | | | |
| US Riffle, DS Glide | 126+49.00 | 3883.51 | 3,886.90 | 2031024.69 | 17108590.71 | | | | |
| PT | 126+64.88 | 3883.07 | 3,886.31 | 2031016.93 | 17108613.42 | 0.35 | | | |
| PC | 126+65.24 | 3883.06 | 3,886.31 | 2031016.99 | 17108613.07 | 124.04 | 70.00 | 101.5296 | 108.44 |
| US Glide, DS Pool | 126+89.00 | 3882.40 | 3,881.79 | 2031044.23 | 17108568.24 | | | | |
| Pool Bottom | 127+19.00 | 3879.40 | 3,882.18 | 2031071.33 | 17108555.93 | | | | |
| US Pool, DS Run | 127+49.00 | 3882.40 | 3,883.36 | 2031101.10 | 17108555.99 | | | | |
| US Run, DS Riffle | 127+79.00 | 3882.50 | 3,882.50 | 2031177.10 | 17108583.90 | | | | |
| PT | 127+89.28 | 3883.74 | 3,882.23 | 2031110.94 | 17108558.93 | 65.58 | | | |




PLAN VIEW

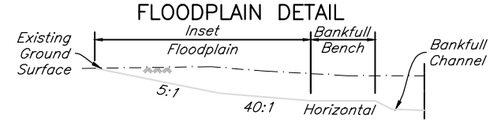



NEW CHANNEL PROFILE

Note:
All stationing is located along ℄ of channel.

The pool thalweg is offset from centerline of bankfull channel. Detail on Shee Sheet 11.

FLOODPLAIN DETAIL




CHANNEL LAYOUT CHART

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"PT" = Point of Tangency
"PCC" = Point of Compound Curvature
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"L" = Curve Length
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"R" = Curve Radius
"C" = Chord Length
"O" = Curve Center Point

BANK PROTECTION LEGEND

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection
- Riffle Bank Protection

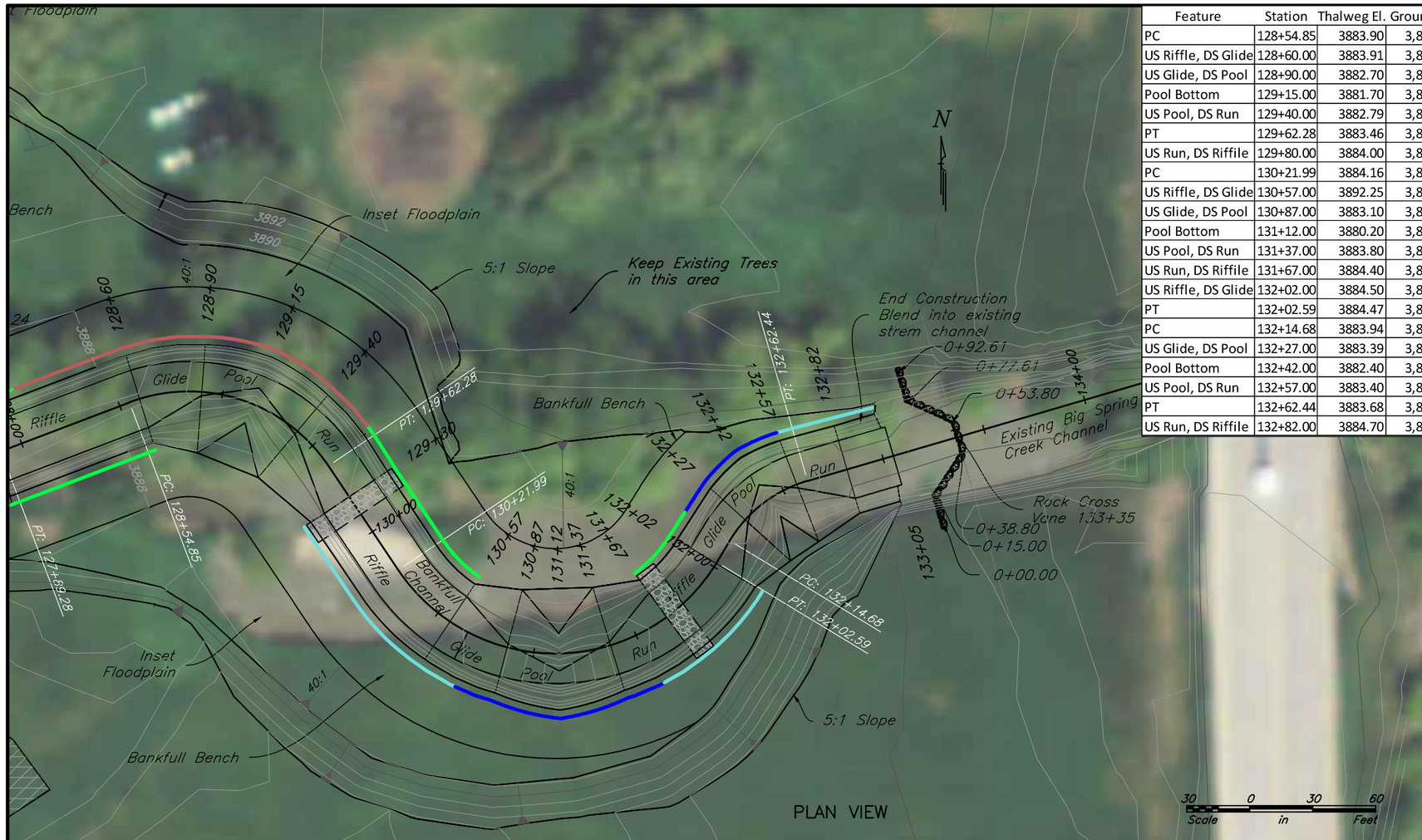
Scale 30 0 30 60 in Feet

Designed K Hoffman 7/2015
Drawn B Krueger 7/2015
Checked S Becker 7/2015
Approved

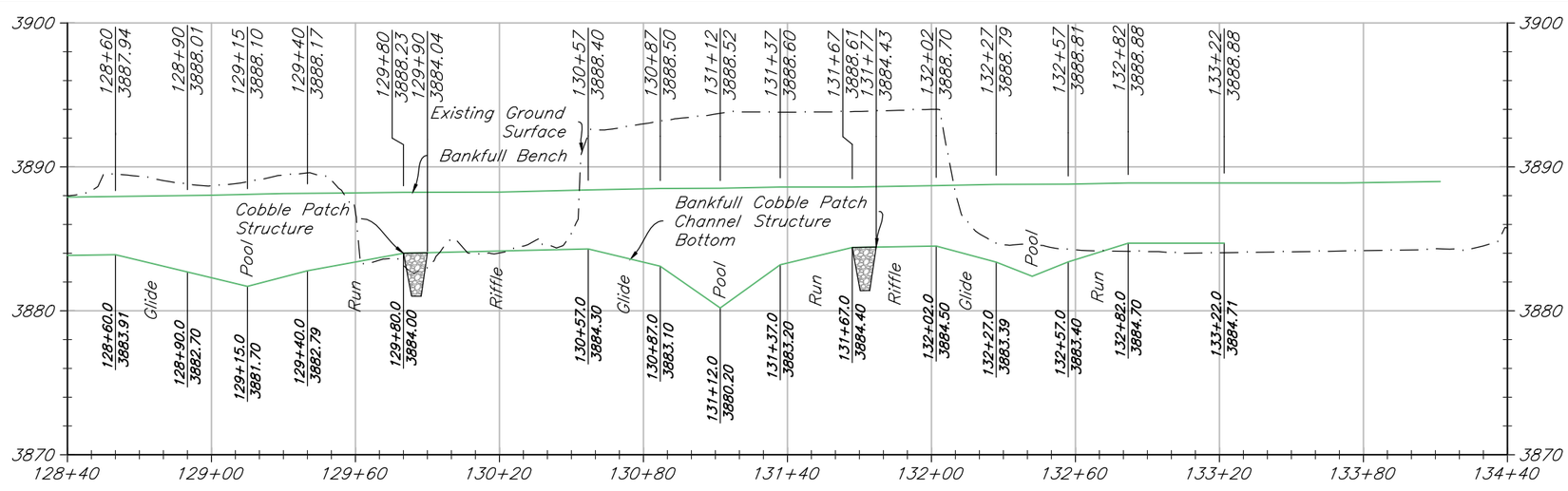
# PLAN & PROFILE STA. 124+80–128+40
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

USDA United States Department of Agriculture
Natural Resources Conservation Service

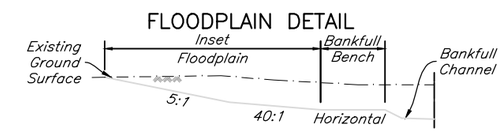
File No. BigSpPlanPro.dwg
Drawing No. 15–31
7/30/15 10:18 AM
Sheet 9 of 21




| Feature | Station | Thalweg El. | Ground El. | Easting | Northing | L (ft) | R (ft) | Delta < | C (ft) |
|---|---|---|---|---|---|---|---|---|---|
| PC | 128+54.85 | 3883.90 | 3,889.44 | 2031172.24 | 17108582.23 | 107.43 | 80.00 | 76.9388 | 99.54 |
| US Riffle, DS Glide | 128+60.00 | 3883.91 | 3,889.50 | 2031206.74 | 17108587.22 | | | | |
| US Glide, DS Pool | 128+90.00 | 3882.70 | 3,888.80 | 2031230.97 | 17108581.49 | | | | |
| Pool Bottom | 129+15.00 | 3881.70 | 3,888.96 | 2031252.27 | 17108568.58 | | | | |
| US Pool, DS Run | 129+40.00 | 3882.79 | 3,889.58 | 2031276.96 | 17108537.33 | | | | |
| PT | 129+62.28 | 3883.46 | 3,883.23 | 2031267.08 | 17108552.04 | 59.71 | | | |
| US Run, DS Riffle | 129+80.00 | 3884.00 | 3,893.17 | 2031324.97 | 17108477.88 | | | | |
| PC | 130+21.99 | 3884.16 | 3,884.09 | 2031300.36 | 17108502.47 | 180.61 | 90.00 | 114.9778 | 151.79 |
| US Riffle, DS Glide | 130+57.00 | 3892.25 | 3,892.45 | 2031352.19 | 17108465.60 | | | | |
| US Glide, DS Pool | 130+87.00 | 3883.10 | 3,893.17 | 2031376.94 | 17108462.65 | | | | |
| Pool Bottom | 131+12.00 | 3880.20 | 3,893.73 | 2031401.54 | 17108466.61 | | | | |
| US Pool, DS Run | 131+37.00 | 3883.80 | 3,893.80 | 2031428.23 | 17108480.00 | | | | |
| US Run, DS Riffle | 131+67.00 | 3884.40 | 3,893.84 | 2031451.80 | 17108505.58 | | | | |
| US Riffle, DS Glide | 132+02.00 | 3884.50 | 3,894.00 | 2031465.70 | 17108526.30 | | | | |
| PT | 132+02.59 | 3884.47 | 3,894.00 | 2031452.11 | 17108506.08 | 12.09 | | | |
| PC | 132+14.68 | 3883.94 | 3,886.24 | 2031458.36 | 17108516.43 | 47.76 | 64.30 | 42.5576 | 46.67 |
| US Glide, DS Pool | 132+27.00 | 3883.39 | 3,884.68 | 2031476.97 | 17108536.16 | | | | |
| Pool Bottom | 132+42.00 | 3882.40 | 3,884.64 | 2031490.20 | 17108543.14 | | | | |
| US Pool, DS Run | 132+57.00 | 3883.40 | 3,884.27 | 2031514.13 | 17108550.38 | | | | |
| PT | 132+62.44 | 3883.68 | 3,884.21 | 2031495.35 | 17108544.89 | 205.07 | | | |
| US Run, DS Riffle | 132+82.00 | 3884.70 | 3,884.14 | 2031533.32 | 17108555.99 | | | | |




NEW CHANNEL PROFILE




Note:
All stationing is located along ℄ of channel.

The pool thalweg is offset from centerline of bankfull channel. Detail on Shee Sheet 11.

## CHANNEL LAYOUT CHART

"PC" = Point of Curvature
"PT" = Point of Tangency
"PCC" = Point of Compound Curvature
"PRC" = Point of Reverse Curvature
"L" = Curve Length
"Delta <" = Angle at Curve Center Point (PC to PT)
"R" = Curve Radius
"C" = Chord Length
"O" = Curve Center Point

**BANK PROTECTION LEGEND**

- Type I Bank Protection
- Type II Bank Protection
- Type III Bank Protection
- Type IV Bank Protection
- Riffle Bank Protection

| | | Date |
|---|---|---|
| Designed | K Hoffman | 7/2015 |
| Drawn | B Krueger | 7/2015 |
| Checked | S Becker | 7/2015 |
| Approved | | |

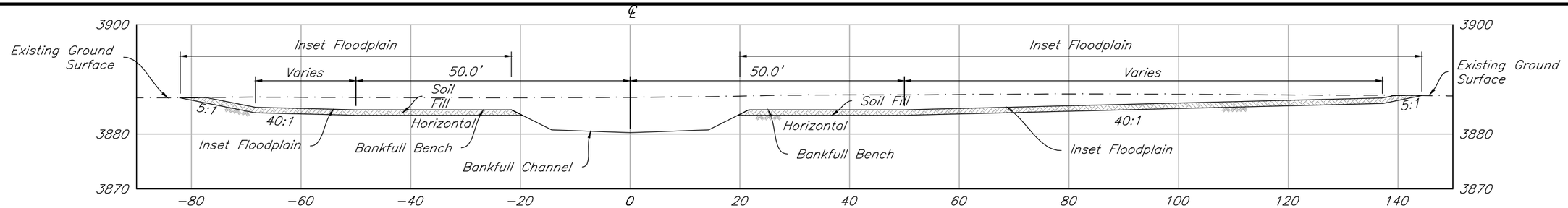
# PLAN & PROFILE STA. 128+40–135+00
## BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

United States Department of Agriculture
Natural Resources Conservation Service

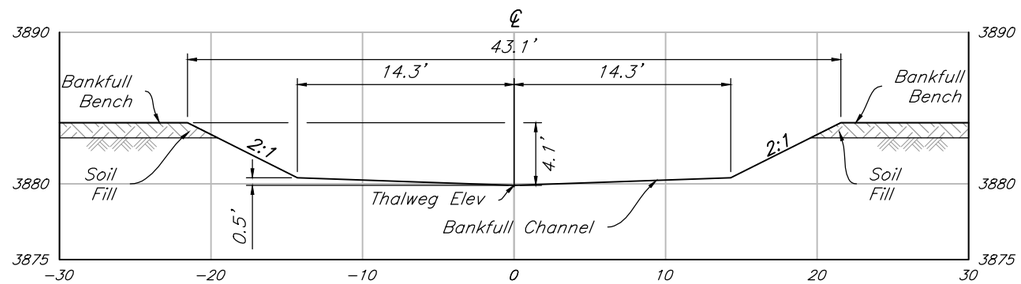
File No. BigSpPlanPro.dwg

Drawing No. 15–31

7/30/15 10:18 AM
Sheet 10 of 21




TYPICAL FLOODPLAIN SECTION

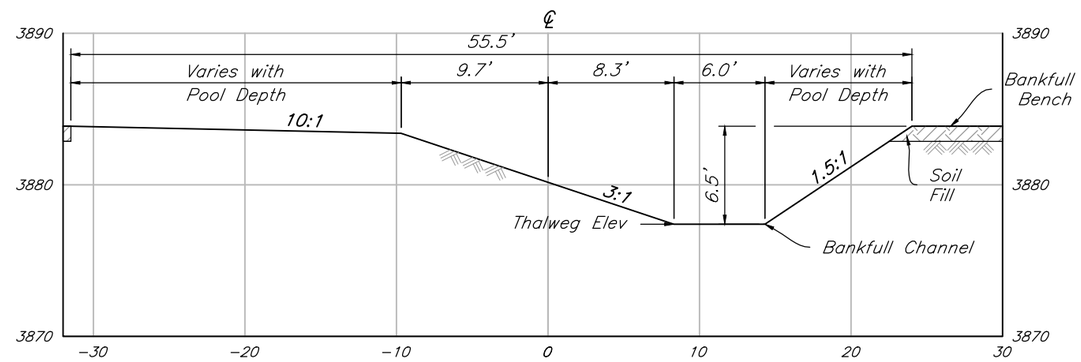



TYPICAL RIFFLE SECTION

Note:

Bankfull Bench and Inset Floodplain shall be over-excavated by 1 foot. Replace over-excavation with 1 foot of Soil Fill.

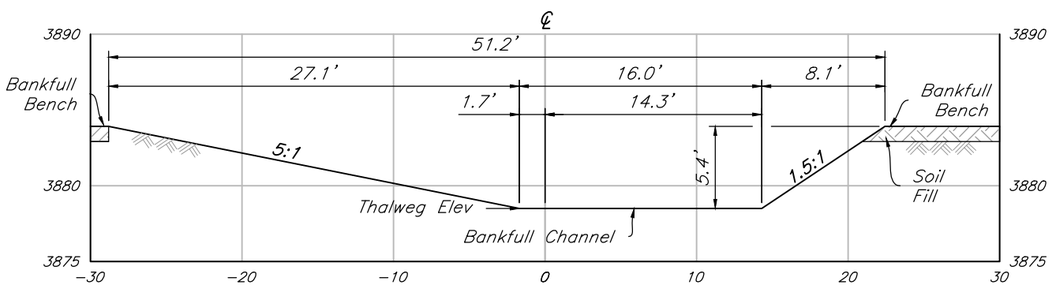
Centerline of thalweg is offset from centerline of bankfull channel on all but riffle sections.



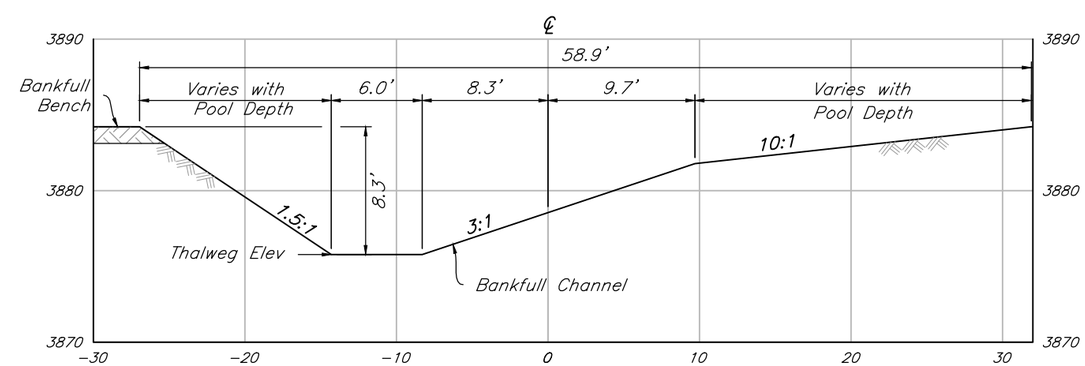

TYPICAL POOL SECTION

Note:

Pool depths vary from 6.3' – 8.3'.



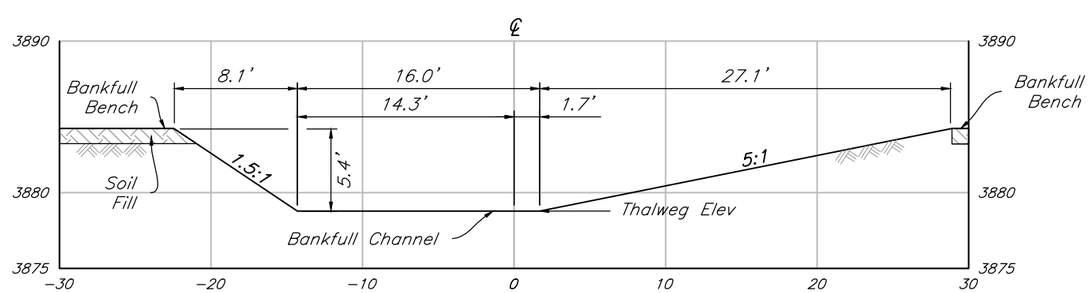

TYPICAL RUN / GLIDE SECTION




TYPICAL POOL SECTION

Note:

Pool depths vary from 6.3' – 8.3'.




TYPICAL RUN / GLIDE SECTION

| | | Date |
|---|---|---|
| Designed | K Hoffman | 7/2015 |
| Drawn | B Krueger | 7/2015 |
| Checked | S Becker | 7/2015 |
| Approved | | |

TYPICAL CHANNEL XSECTIONS
BIG SPRING CREEK RESTORATION PROJECT
MACHLER, ADAMS And MT FISH WILDLIFE & PARKS
FERGUS COUNTY MONTANA

United States Department of Agriculture
Natural Resources Conservation Service

File No. BigSpPlanPro.dwg

Drawing No. 15-31

7/30/15 10:18 AM
Sheet 11 of 21