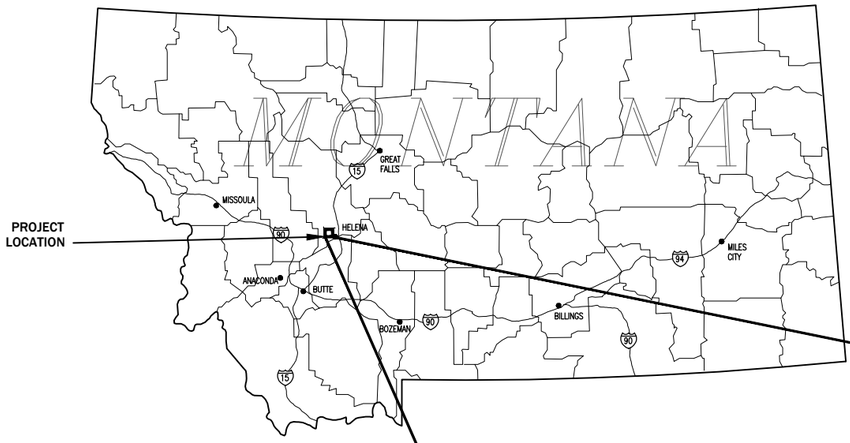


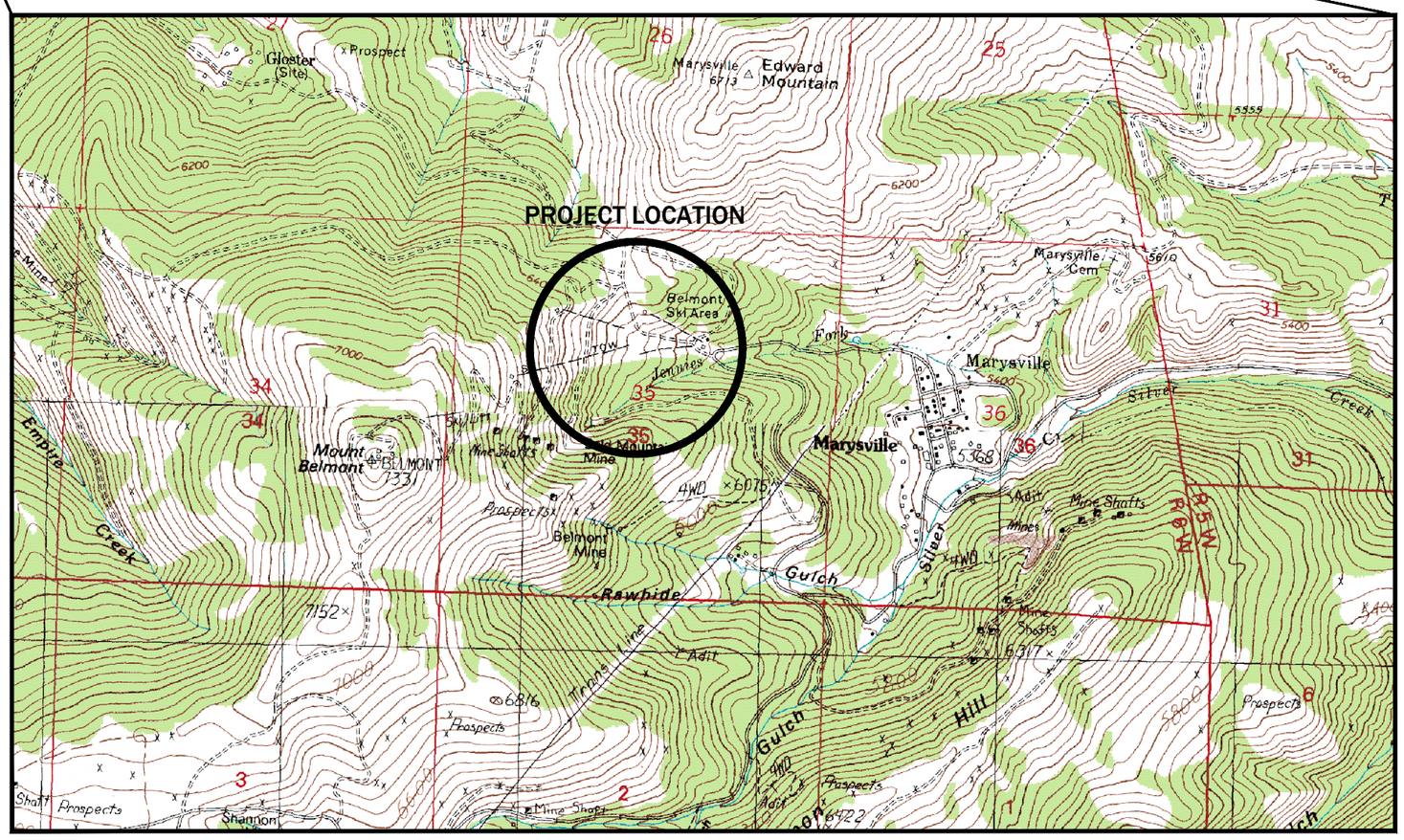
AS-BUILT

GREAT DIVIDE SAND TAILINGS RECLAMATION PROJECT
LEWIS AND CLARK COUNTY, MONTANA

DEQ CONTRACT NO. 410017
MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE LANDS BUREAU

RECOVERY.GOV

PREPARED BY
PIONEER TECHNICAL SERVICES, INC.
APRIL 05, 2013



SITE VICINITY MAP

SOURCE: USGS 7.5 MINUTE QUADRANGLE

SHEET
GD-1

LEGEND

EXISTING - PLAN VIEW

- INDEX CONTOURS
- INTERMEDIATE CONTOURS
- CULVERT
- FENCE
- EXISTING ROAD
- STREAM CHANNEL/SURFACE WATER
- TEL — TEL — TELEPHONE LINE
- PWR — PWR — ELECTRICAL LINE
- WTR — WTR — WATER LINE
- COM — COM — COMMUNITCATION LINE
- SKI — SKI — SKI LIFT
- LIGHT POLE
- SNOW-PRODUCTION HYDRANT
- SNOW-PRODUCTION POWER PANEL
- STRUCTURE
- COLLAPSED ADIT

PROPOSED - PLAN VIEW

- INDEX CONTOURS
- INTERMEDIATE CONTOURS
- 2400 — 100 FT. STATIONING
- 2% — GRADE OR SURFACE SLOPE (PERCENT)
- TEL — TEL — TELEPHONE LINE
- PWR — PWR — ELECTRICAL LINE
- WTR — WTR — WATER LINE
- COM — COM — COMMUNITCATION LINE
- CENTERLINE
- ℄ CENTERLINE
- SLOPE DESIGNATION (ARROWS POINT DOWN SLOPE)
- 3 / 1 — SLOPE DESIGNATION

- TAILINGS
- SELECT BACKFILL/ BEDDING MATERIAL
- STRUCTURAL FILL/ CRUSHED TOP SURFACING
- TYPE I OR TYPE II RIPRAP AS NOTED.
- COVER SOIL
- GENERAL FILL
- EROSION CONTROL MAT

DETAIL INDICATOR

1 / 7

DETAIL NUMBER

SHEET NUMBER ON WHICH DETAIL APPEARS

ON PLAN

DETAIL 1 / 7

DETAIL NUMBER

SHEET NUMBER ON WHICH DETAIL APPEARS.

AT DETAIL

SECTION INDICATOR

A / 1

SECTION DESIGNATION

SHEET NUMBER ON WHICH SECTION APPEARS

ON PLAN

SECTION A–A / 7

SECTION DESIGNATION

SHEET NUMBER ON WHICH SECTION APPEARS.

AT SECTION DETAIL

PROFILE ELEVATIONS

6062.3

6061.00

1+00

EXISTING GROUND ELEVATION (AS SPECIFIED ON PROFILE)

FINISHED GROUND ELEVATION (AS SPECIFIED ON PROFILE)

SHEET INDEX

AS-BUILT

GD-1	COVER SHEET - SITE VICINITY MAP
GD-2	SHEET INDEX AND LEGEND
GD-3	GREAT DIVIDE - PROJECT OVERVIEW
GD-4	HAUL ROAD IMPROVEMENT PLAN VIEW 1
GD-5	HAUL ROAD IMPROVEMENT PLAN VIEW 2
GD-6	HAUL ROAD IMPROVEMENT PLAN VIEW 3
GD-7	HAUL ROAD IMPROVEMENT PLAN VIEW4
GD-8	TAILINGS EXCAVATION SITE OVERVIEW
GD-9	TAILINGS EXCAVATION, PLAN AND PROFILE
GD-10	TAILINGS EXCAVATION, CROSS-SECTIONS 2+50 TO 7+00
GD-11	TAILINGS EXCAVATION, CROSS-SECTIONS 7+50 TO 11+50
GD-12	PARKING LOTS EXCAVATION PLAN AND DETAIL
GD-13	UPPER ROAD AND RUNOFF DITCH RECONSTRUCTION, PLAN AND PROFILE
GD-14	LOWER ROAD AND RUNOFF DITCH RECONSTRUCTION, PLAN AND PROFILE
GD-15	MIDDLE DITCH CONSTRUCTION, PLAN AND PROFILE
GD-16	COVER SOIL INSTALLATION PLAN
GD-17	SNOW PRODUCTION WATER LINE, PLAN AND PROFILE
GD-18	ELECTRICAL DEMO SITE PLAN
GD-19	ELECTRICAL SITE PLAN
GD-D1	TOWER 5 EXCAVATION AND BACKFILL SECTIONS
GD-D2	TOWER 6 EXCAVATION AND BACKFILL SECTIONS
GD-D3	UPPER AND LOWER ROAD RECONSTRUCTION, TYPICAL CROSS-SECTIONS
GD-D4	UPPER ROAD SWALE DETAIL AND CROSS SECTIONS
GD-D5	RUNOFF CONTROL DITCH DETAILS
GD-D6	CULVERT AND DRAINAGE DETAILS
GD-D7	CATTLE GUARD DETAILS
GD-D8	ENERGY DISSIPATOR DETAILS
GD-D9	EROSION CONTROL MAT DETAILS
GD-D10	GENERAL BMP CONSTRUCTION DETAILS
GD-D11	UTILTIY TRENCH AND WATER LINE DETAILS
GD-D12	ELECTRICAL DETAILS
MCF-1	GREAT DIVIDE MINE COLLAPSE FEATURE LOCATIONS
MCF-2	GREAT DIVIDE MINE COLLAPSE FEATURE LOCATIONS

NOTE:
SEE BALD BUTTE DRAWING SET FOR TAILINGS PLACEMENT PLAN AND REPOSITORY.

REVISION:

DATE:	BY:	DESC:
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DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

PROJECTION: -
ZONE: -
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

SHEET INDEX AND LEGEND

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-2

REVISION:		
DATE:	BY:	DESC:

DRAWN BY:	CA/CR
DESIGNED BY:	JJM
CHECKED BY:	MCB
APPROVED BY:	TR
PROJECT NO:	10162
DATE:	04-05-2013

DISPLAYED AS:	
COORD SYS/ZONE:	MSP
DATUM:	NAD83
UNITS:	FEET
SOURCE:	NAIP AERIAL

N

SCALE IN FEET

0 500 1000

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

GREAT DIVIDE
PROJECT OVERVIEW

PIONEER
TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-3

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: NAIP AERIAL

N

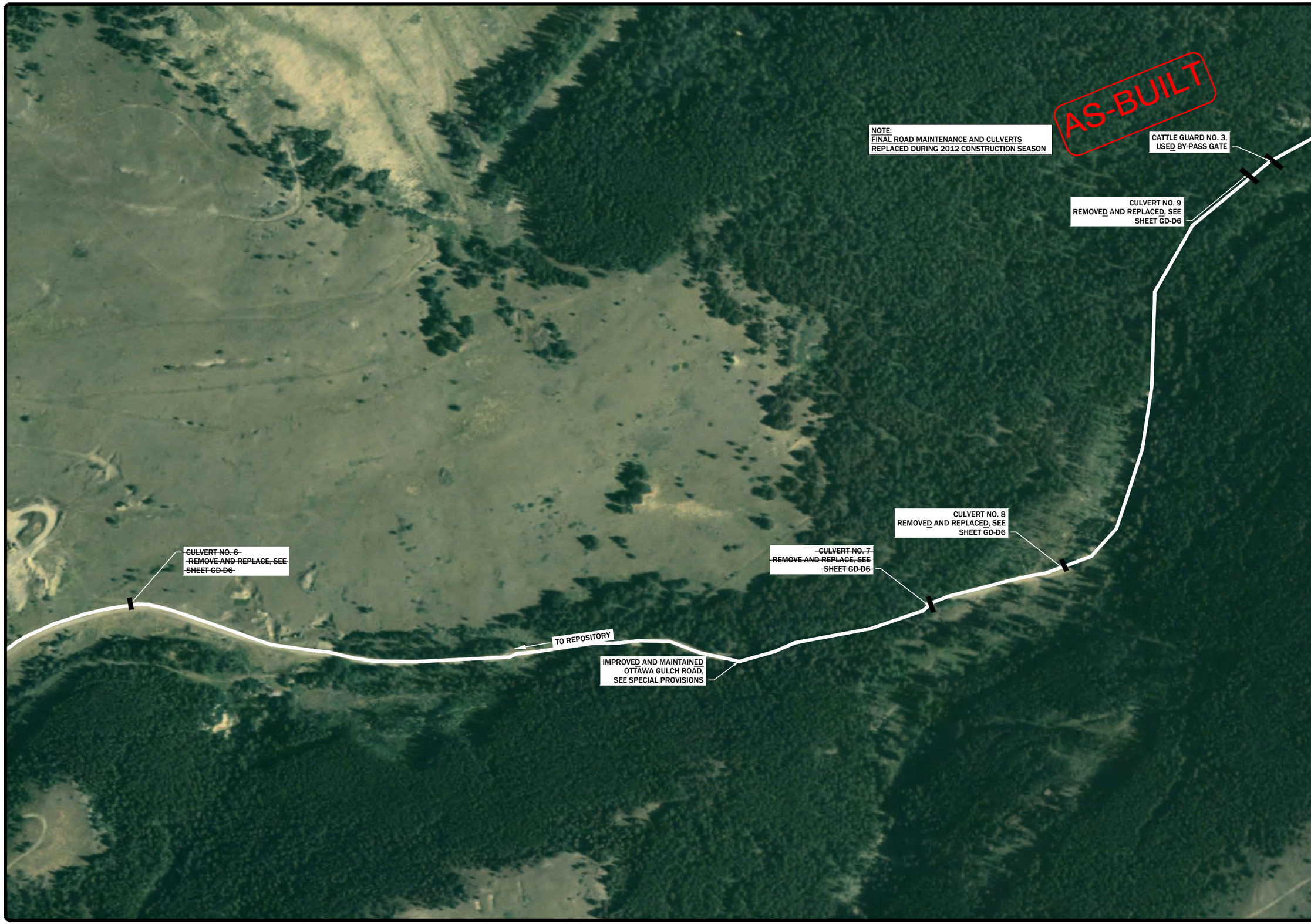
SCALE IN FEET
0 150 300

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

HAUL ROAD
IMPROVEMENT
PLAN VIEW 1

PIONEER
TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-4



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DATUM: NAD83
UNITS: FEET
SOURCE: NAIP AERIAL

N

SCALE IN FEET
0 150 300

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

HAUL ROAD IMPROVEMENT PLAN VIEW 2

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-5

REVISION:

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DESIGNED BY: JJM
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PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: NAIP AERIAL

N

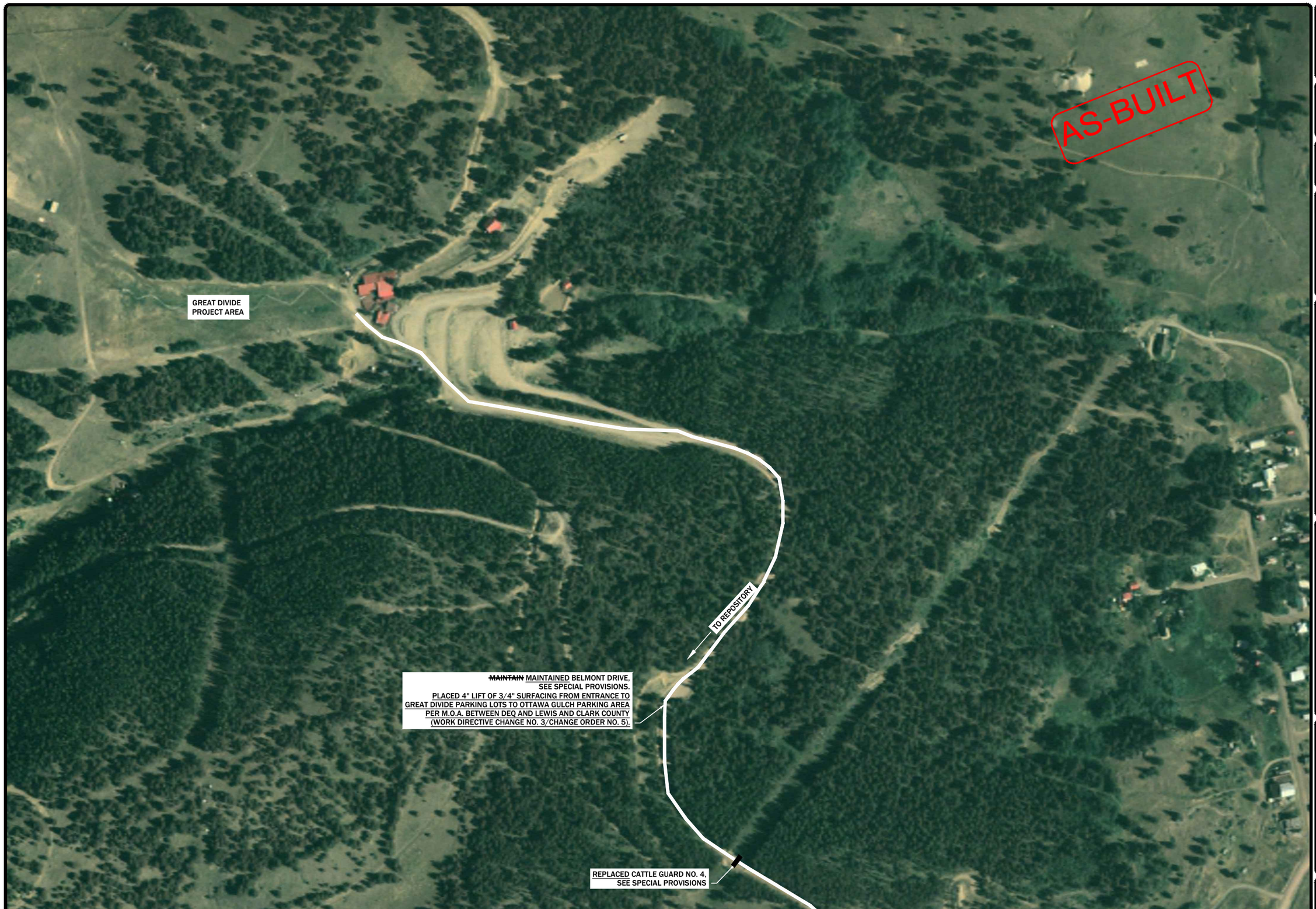
SCALE IN FEET
0 150 300

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

HAUL ROAD
IMPROVEMENTS
PLAN VIEW 3

PIONEER
TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-6



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UNITS: FEET
SOURCE: NAIP AERIAL

N

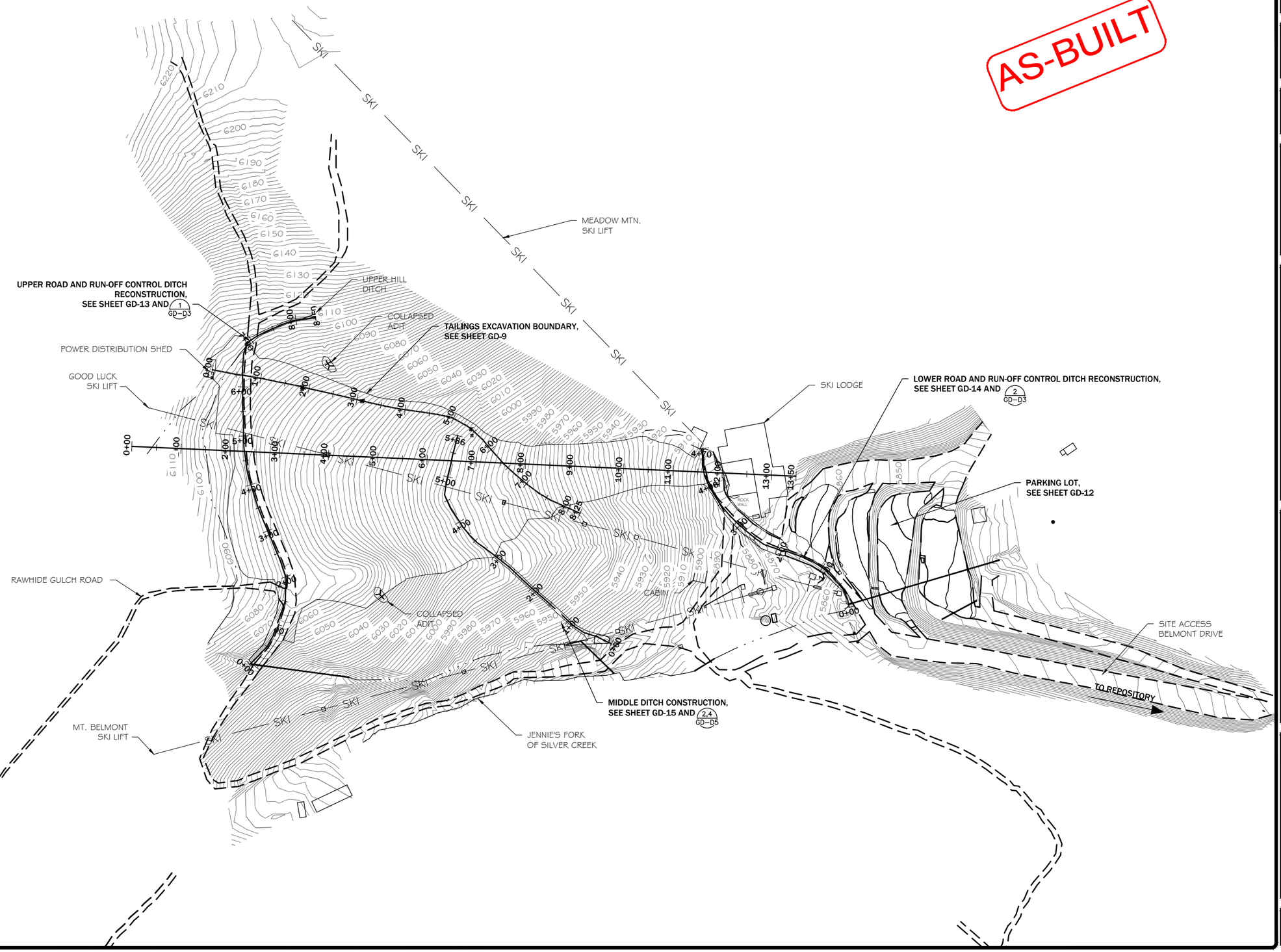
SCALE IN FEET
0 150 300

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

HAUL ROAD
IMPROVEMENT
PLAN VIEW 4

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-7



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SOURCE: PIONEER

SCALE IN FEET
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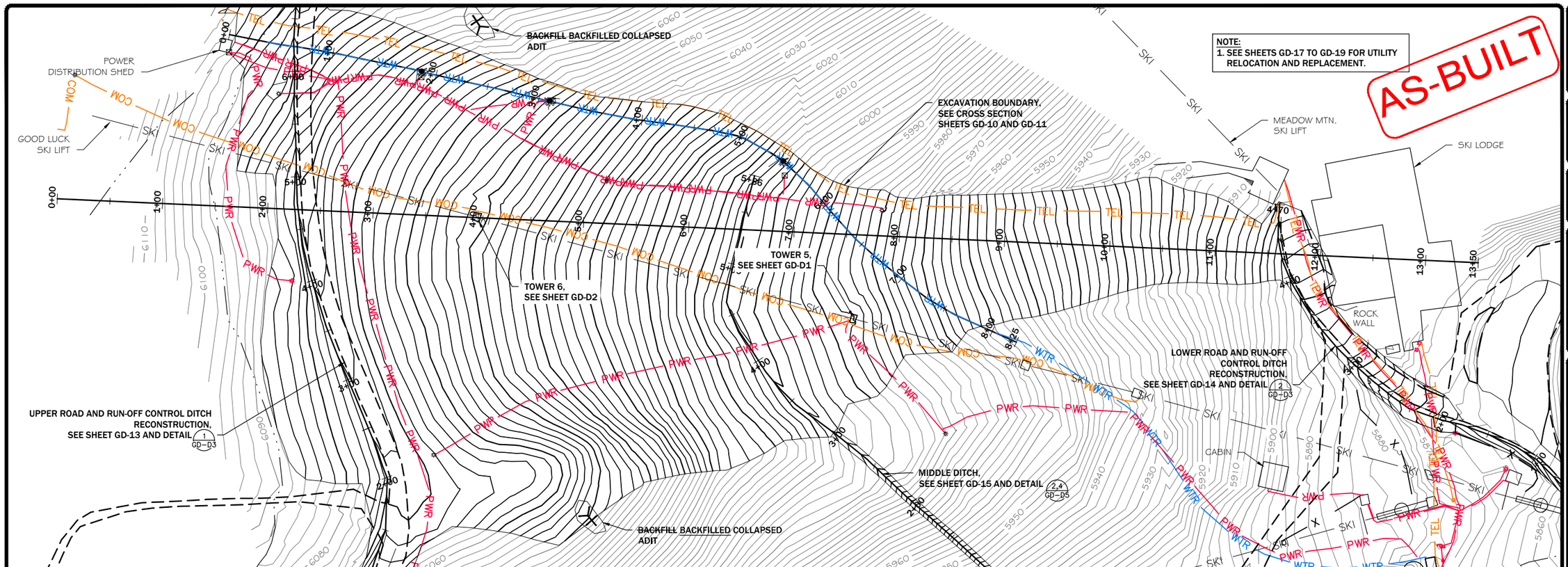
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

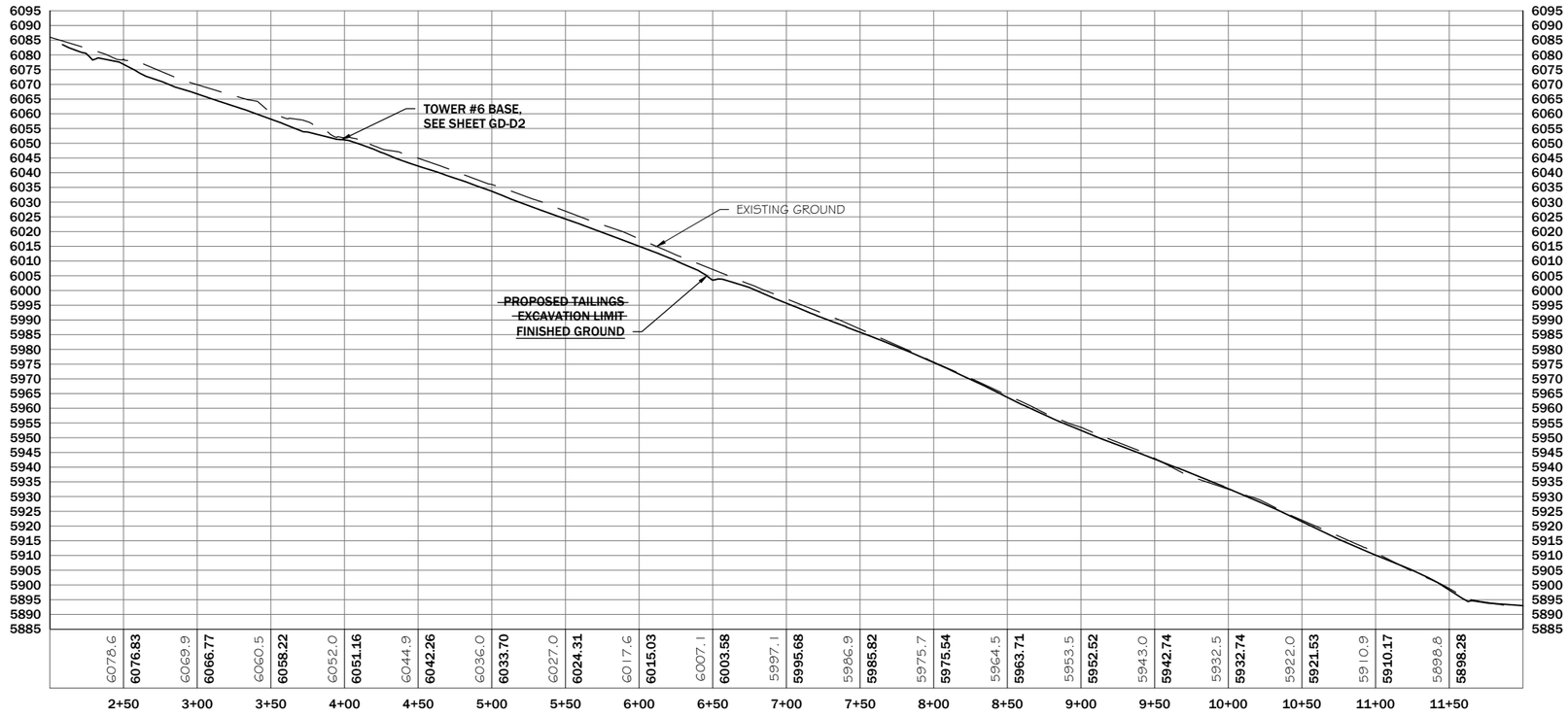
TAILINGS EXCAVATION
SITE OVERVIEW

PIONEER
TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-8

4/2/2013 4:35:24 PM \\192.168.253.15\PROJECT$\HELENADATA\DEQ\BALD BUTTE - GREAT DIVIDE\CONSTRUCTION\DRAWINGS\AS-BUILT\SHEET SET - GREAT DIVIDE\GD-F-CO-PLN-001-11.DWG





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DATUM:	NAD83
UNITS:	FEET
SOURCE:	PIONEER

N

SCALE IN FEET
0 50 100

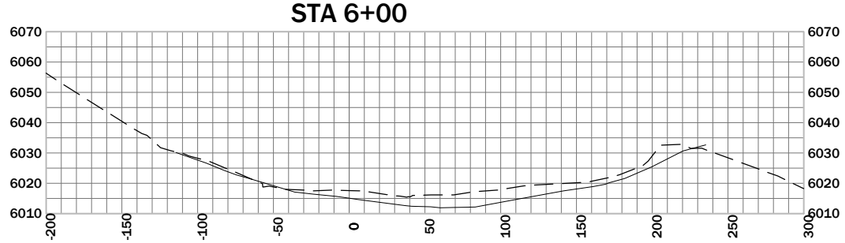
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

TAILINGS EXCAVATION
PLAN AND PROFILE

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-9

STA 6+00



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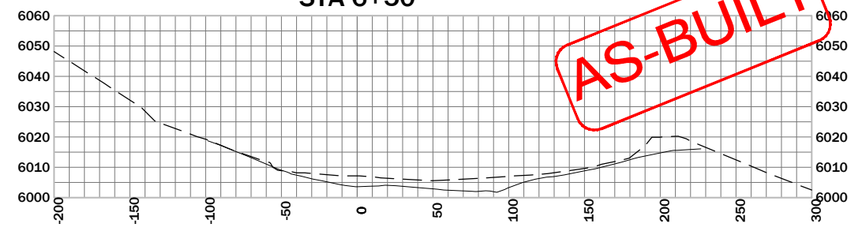

AS-BUILT

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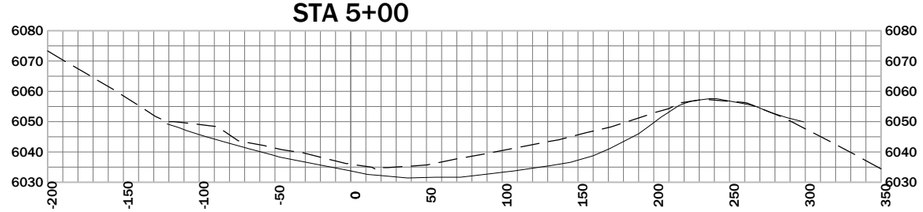

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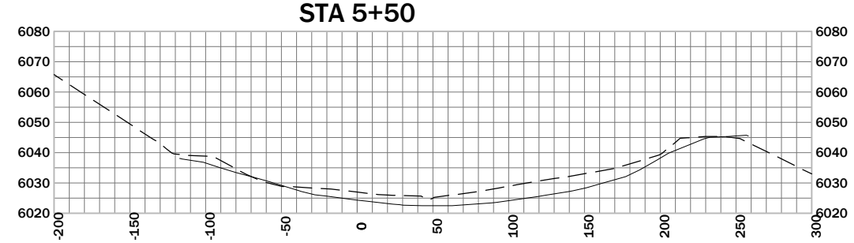

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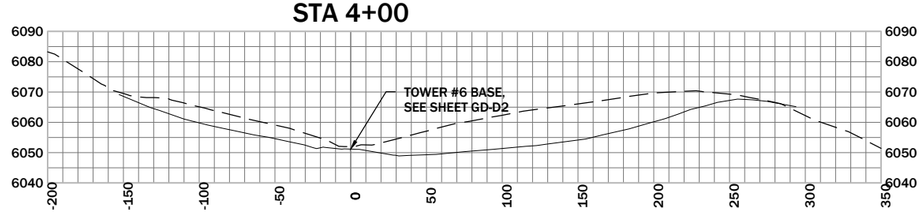

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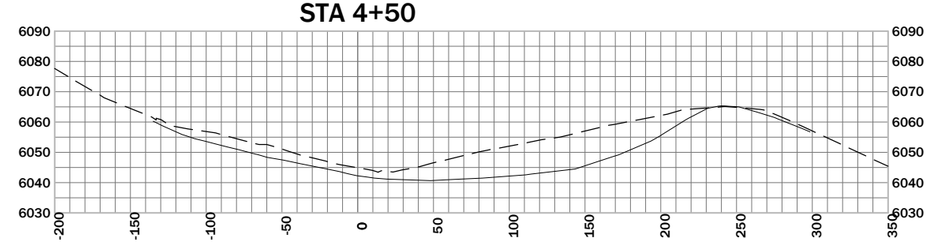

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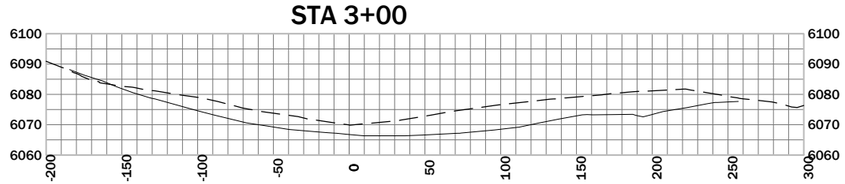

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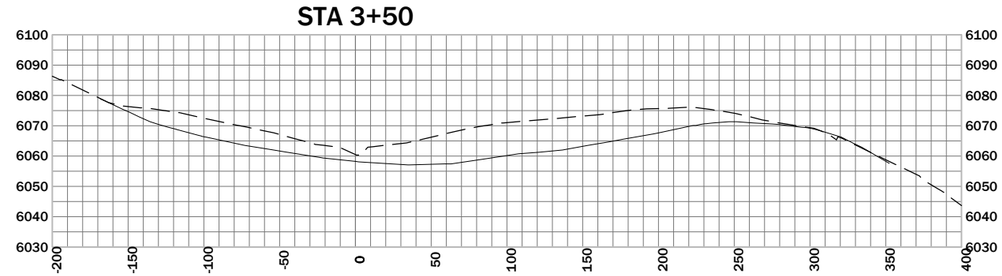

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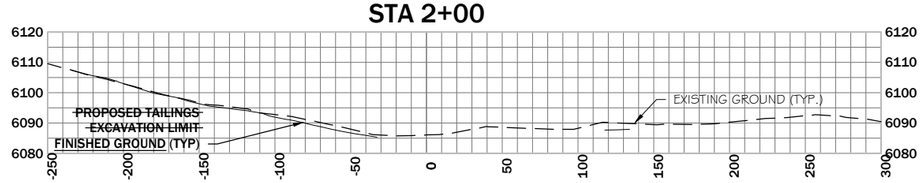

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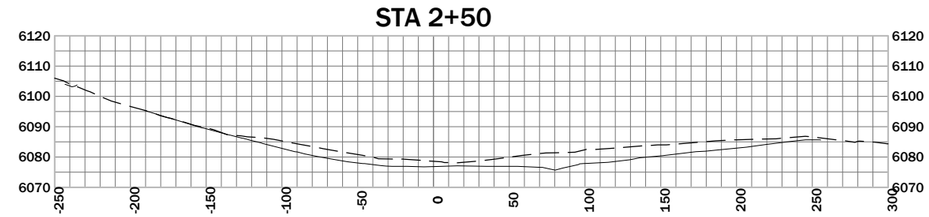

REVISION:

DATE:	BY:	DESC:

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DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

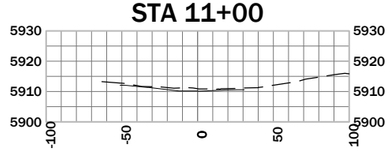
TAILINGS EXCAVATION
CROSS SECTIONS
2+50 TO 7+00

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-10

AS-BUILT

STA 11+00



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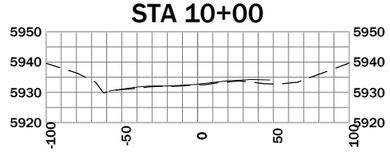

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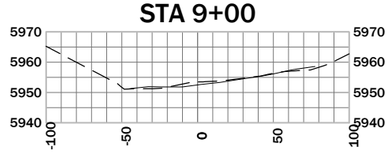

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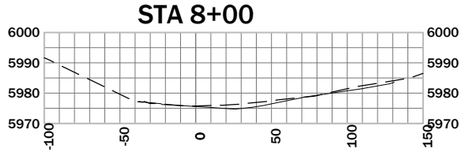

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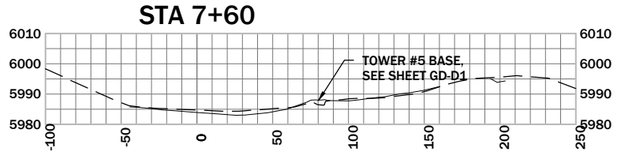

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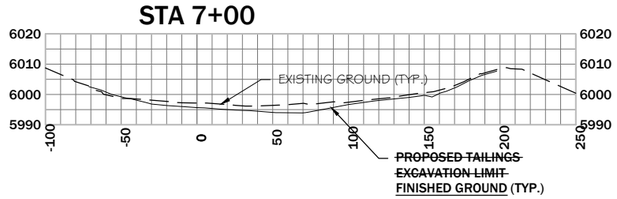

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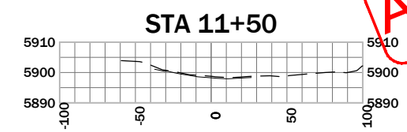

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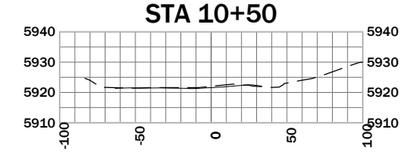

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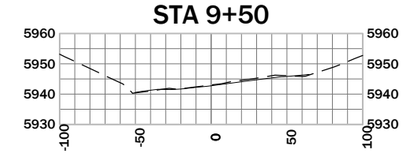

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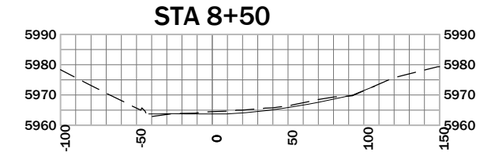

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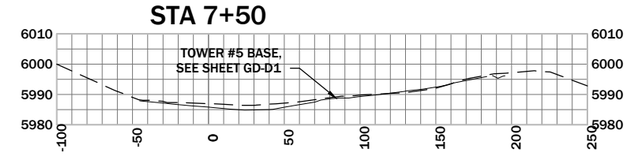

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DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

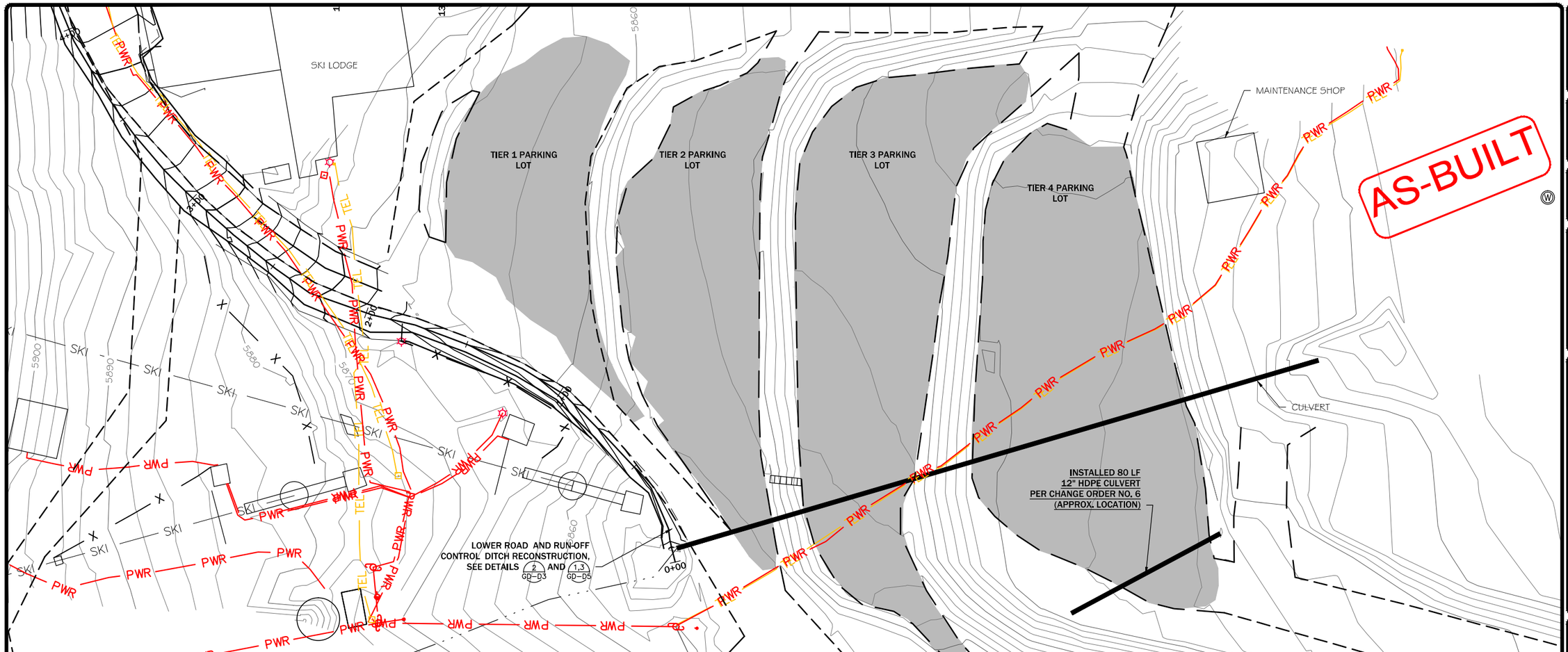
SCALE IN FEET
0 50 100

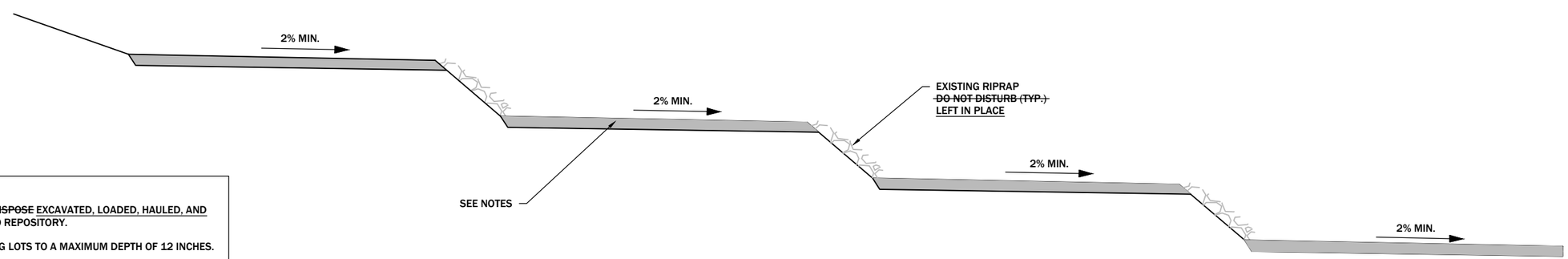
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

TAILINGS EXCAVATION
CROSS SECTIONS
7+50 TO 11+50

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-11





NOTES:

1. ~~EXCAVATE, LOAD, HAUL, AND DISPOSE~~ EXCAVATED, LOADED, HAULED, AND DISPOSED TAILINGS MATERIAL TO REPOSITORY.

2. ~~EXCAVATE~~ EXCAVATED PARKING LOTS TO A MAXIMUM DEPTH OF 12 INCHES.

3. ~~GRADE, SLOPE, AND COMPACT~~ GRADED, SLOPED, AND COMPACTED SUBGRADE TO A MINIMUM 2% SLOPE.

4. ~~BACKFILL~~ BACKFILLED 6" MINIMUM CRUSHED TOP SURFACING MATERIAL OVER ENTIRE EXCAVATED AREA. ~~GRADE AND SMOOTH~~ GRADED AND SMOOTHED TO MATCH EXISTING TOPOGRAPHY.

5. ~~COMPACT~~ COMPACTED SUBGRADE AND CRUSHED TOP SURFACING MATERIAL TO ATTAIN 95% OF STANDARD PROCTOR (AASHTO T-99) MAXIMUM DRY DENSITY AT ±4% OPTIMUM MOISTURE CONTENT.

PARKING LOT EXCAVATION DETAIL

N.T.S.

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

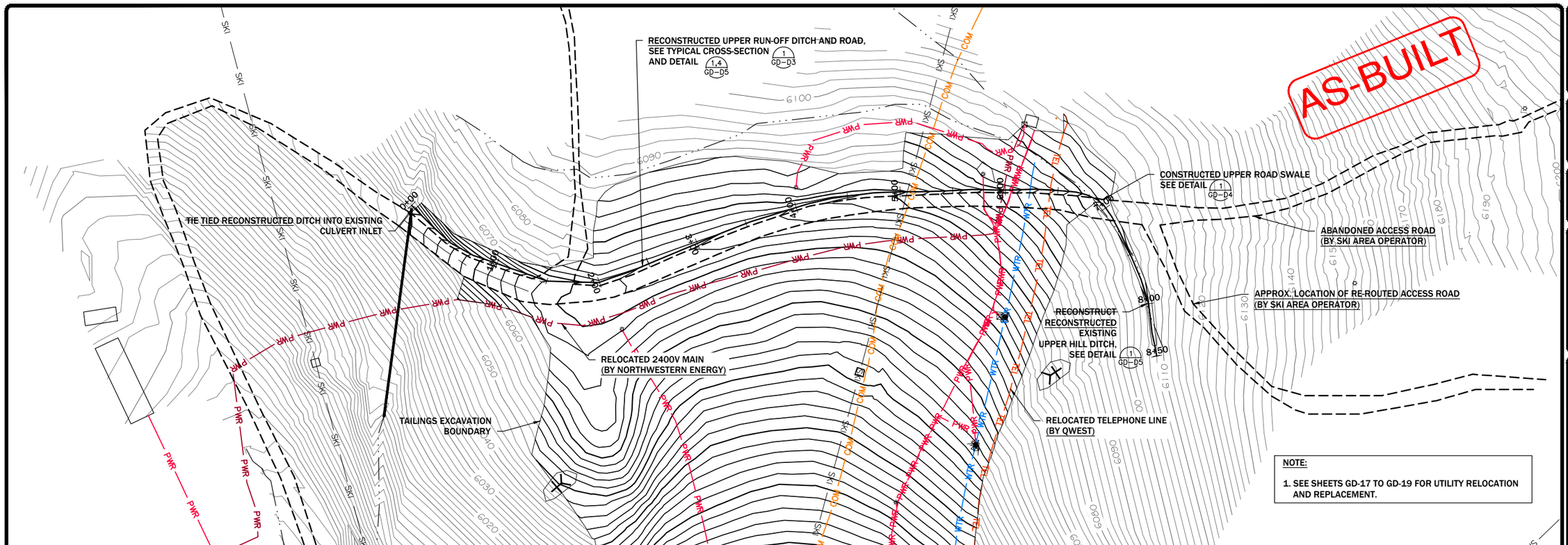
SCALE IN FEET
0 25 50

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

PARKING LOTS
EXCAVATION PLAN
AND DETAIL

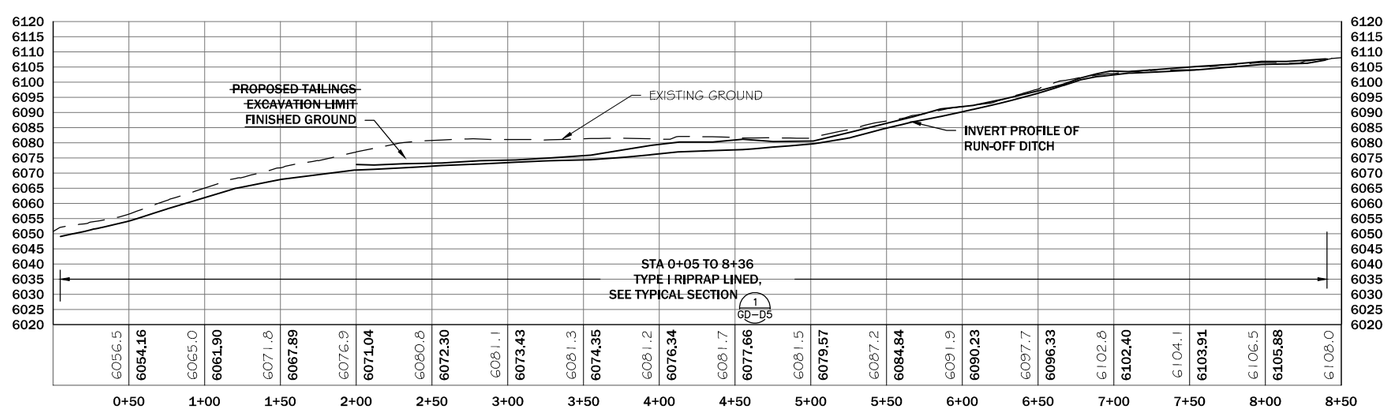
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-12



NOTE:

1. SEE SHEETS GD-17 TO GD-19 FOR UTILITY RELOCATION AND REPLACEMENT.



REVISION:		
DATE:	BY:	DESC:

DRAWN BY:	CA/CR
DESIGNED BY:	JJM
CHECKED BY:	MCB
APPROVED BY:	TR
PROJECT NO:	10162
DATE:	04-05-2013

DISPLAYED AS:	
COORD SYS/ZONE:	MSP
DATUM:	NAD83
UNITS:	FEET
SOURCE:	PIONEER

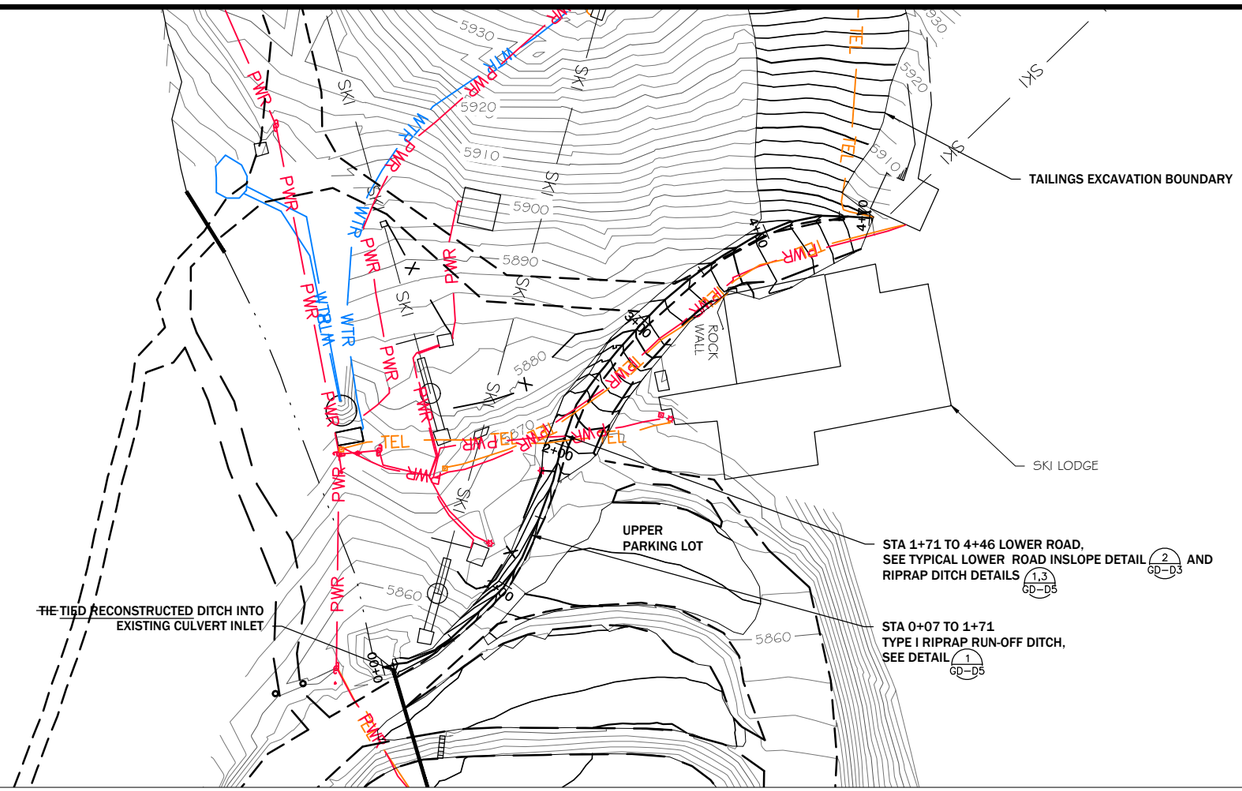
SCALE IN FEET
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

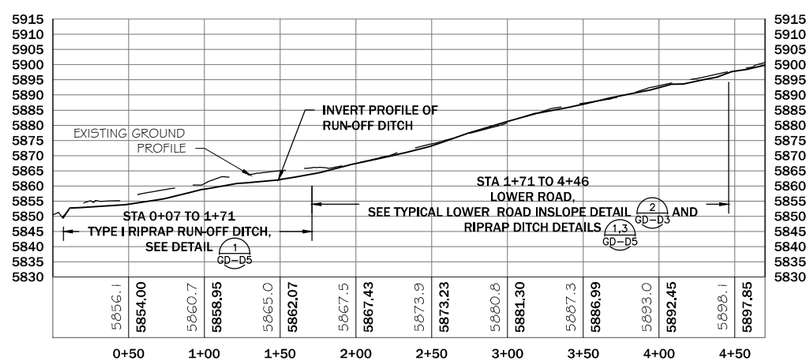
UPPER ROAD
AND RUN-OFF DITCH
RECONSTRUCTION
PLAN AND PROFILE

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-13



AS-BUILT



REVISION:		
DATE:	BY:	DESC:

DRAWN BY:	CA/CR
DESIGNED BY:	JJM
CHECKED BY:	MCB
APPROVED BY:	TR
PROJECT NO:	10162
DATE:	04-05-2013

DISPLAYED AS:	
COORD SYS/ZONE:	MSP
DATUM:	NAD83
UNITS:	FEET
SOURCE:	PIONEER

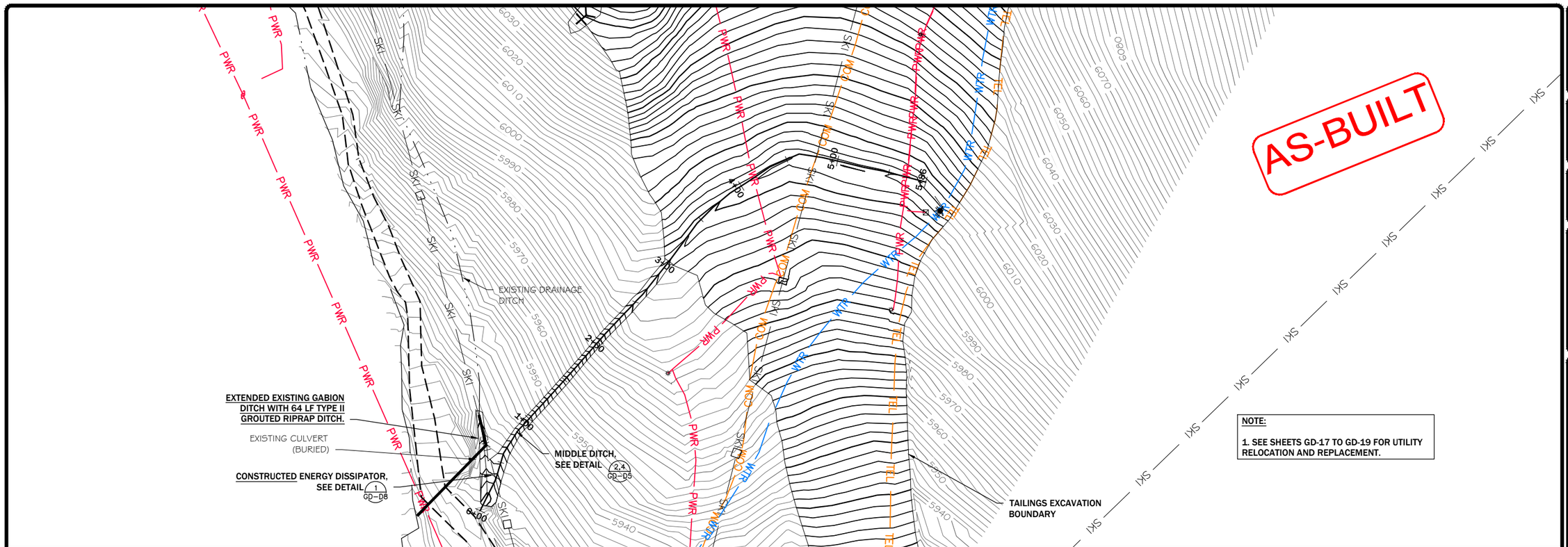
SCALE IN FEET
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

LOWER ROAD
AND RUN-OFF DITCH
RECONSTRUCTION
PLAN AND PROFILE

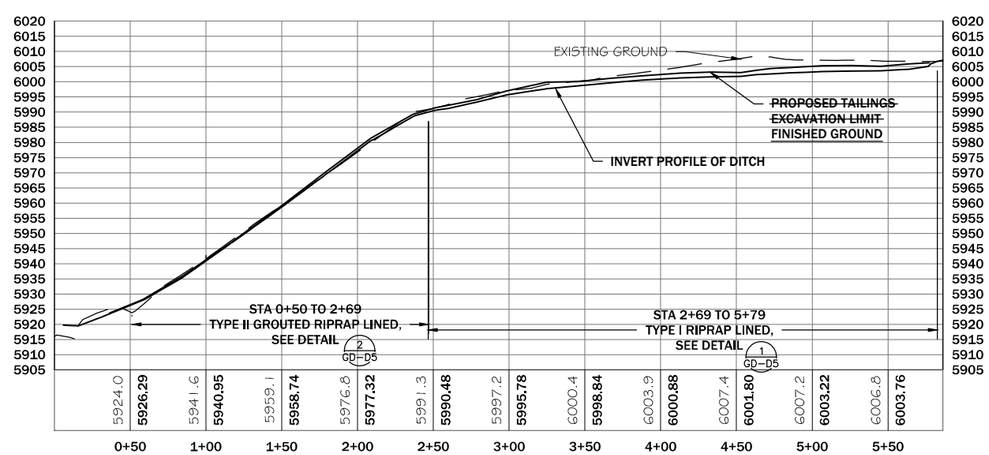
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-14



NOTE:

1. SEE SHEETS GD-17 TO GD-19 FOR UTILITY RELOCATION AND REPLACEMENT.



REVISION:

DATE:	BY:	DESC:

DRAWN BY:	CA/CR
DESIGNED BY:	JJM
CHECKED BY:	MCB
APPROVED BY:	TR
PROJECT NO:	10162
DATE:	04-05-2013

DISPLAYED AS:

COORD SYS/ZONE:	MSP
DATUM:	NAD83
UNITS:	FEET
SOURCE:	PIONEER

SCALE IN FEET

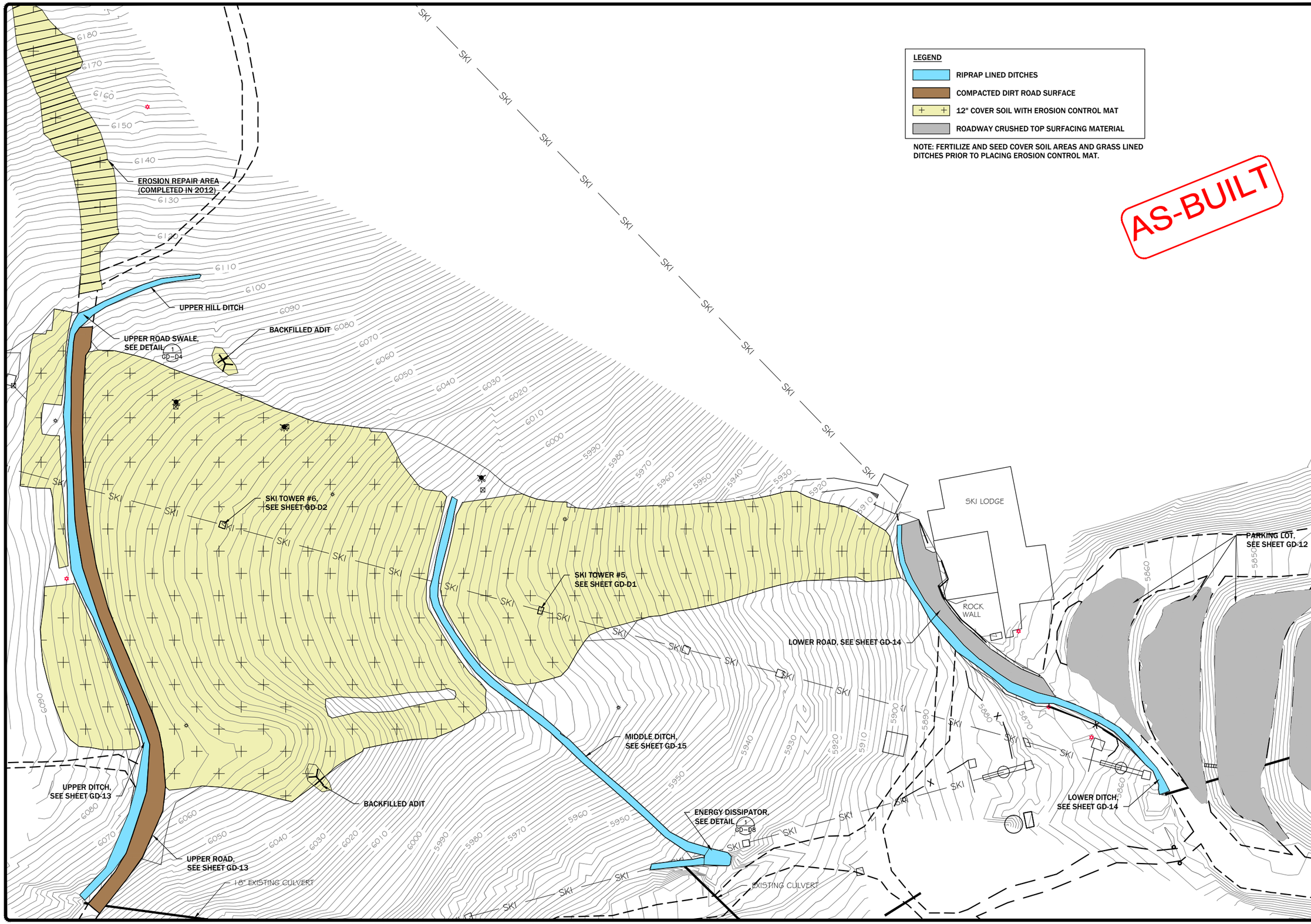
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

MIDDLE DITCH
CONSTRUCTION
PLAN AND PROFILE

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-15



LEGEND

- RIPRAP LINED DITCHES
- COMPACTED DIRT ROAD SURFACE
- 12" COVER SOIL WITH EROSION CONTROL MAT
- ROADWAY CRUSHED TOP SURFACING MATERIAL

NOTE: FERTILIZE AND SEED COVER SOIL AREAS AND GRASS LINED DITCHES PRIOR TO PLACING EROSION CONTROL MAT.

AS-BUILT

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

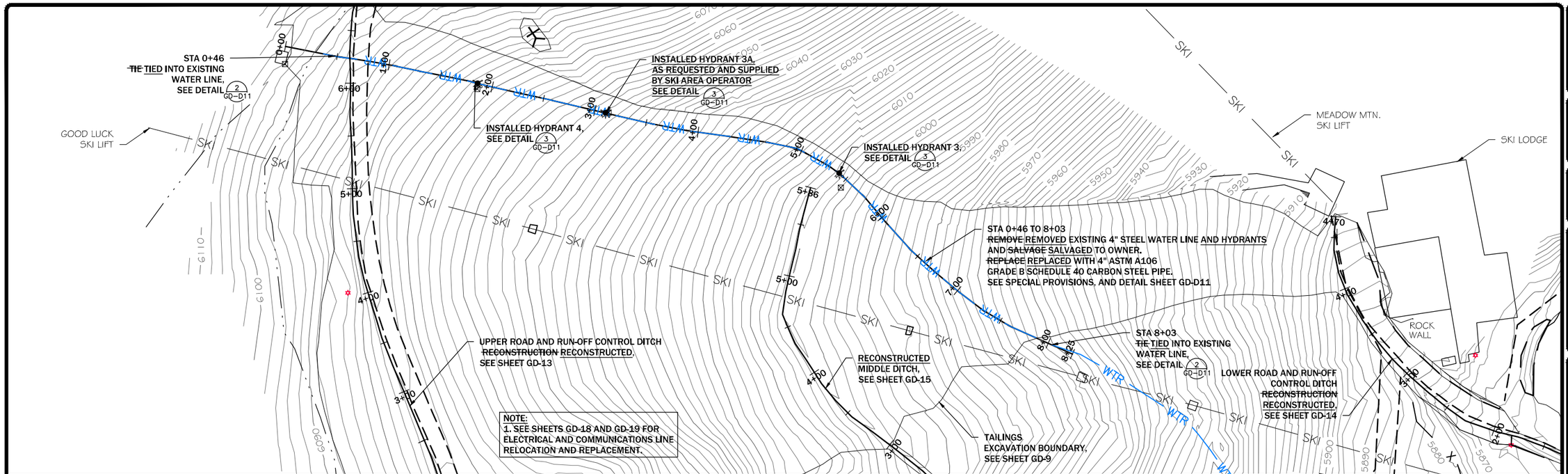
SCALE IN FEET
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

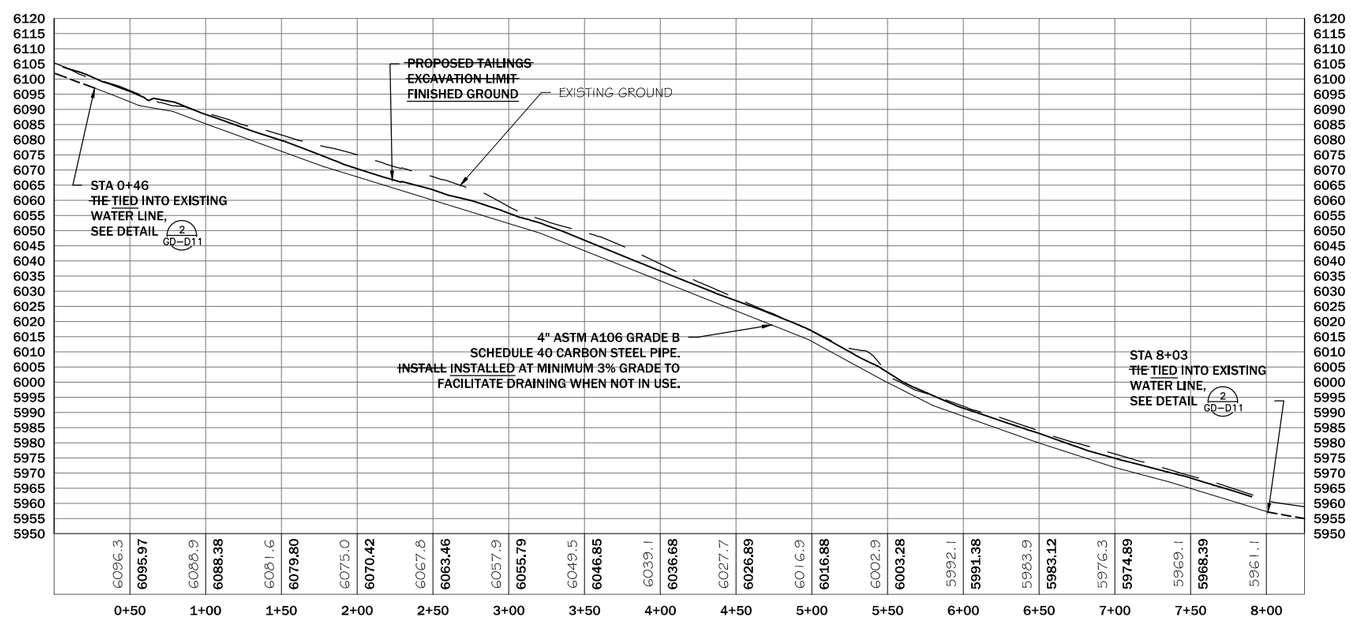
COVER SOIL INSTALLATION PLAN

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET GD-16



AS-BUILT



REVISION:

DATE:	BY:	DESC:

DRAWN BY:	CA/CR
DESIGNED BY:	JJM
CHECKED BY:	MCB
APPROVED BY:	TR
PROJECT NO:	10162
DATE:	04-05-2013

DISPLAYED AS:

COORD SYS/ZONE:	MSP
DATUM:	NAD83
UNITS:	FEET
SOURCE:	PIONEER

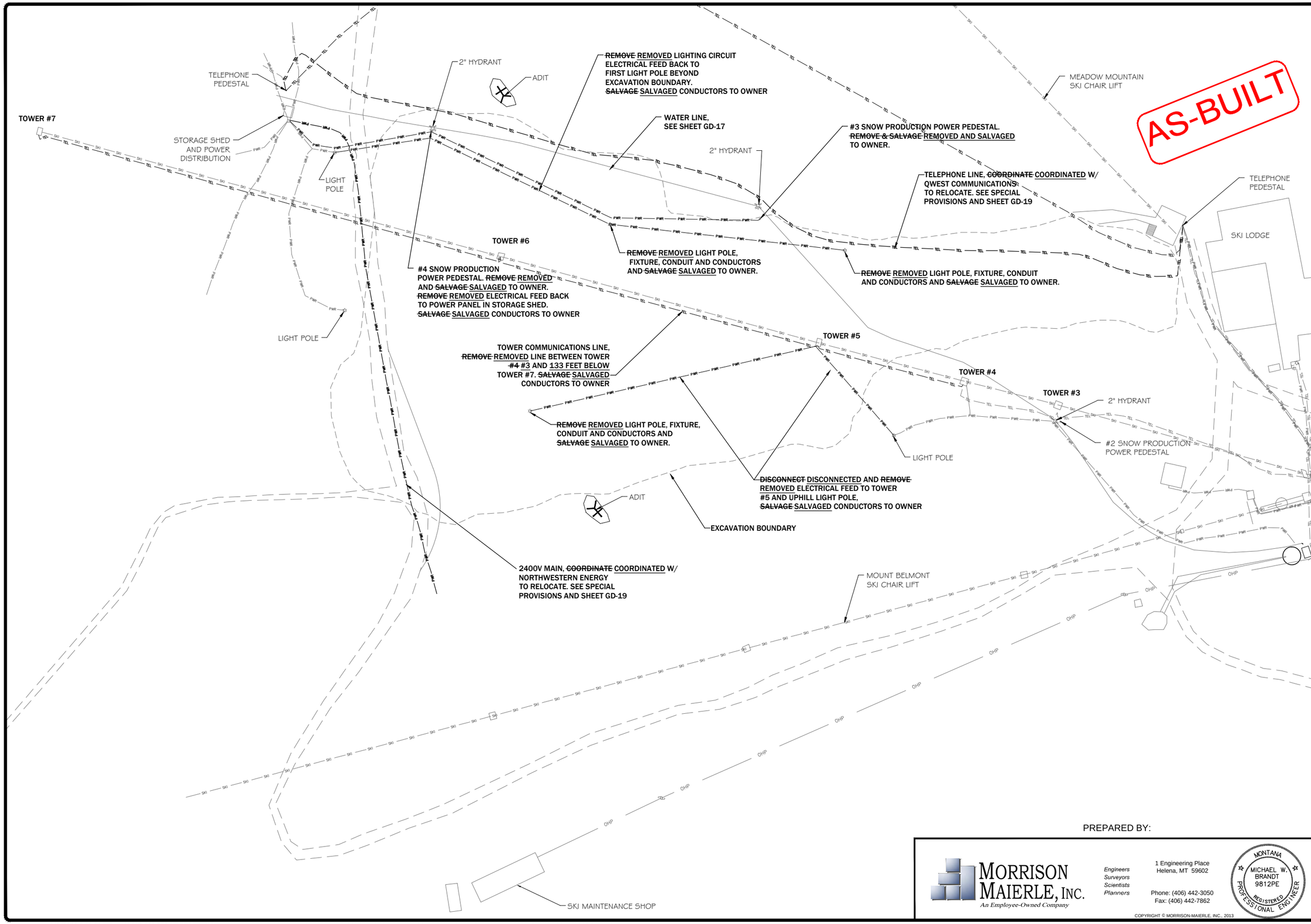
SCALE IN FEET
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

SNOW PRODUCTION
WATER LINE
PLAN AND PROFILE

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-17



REVISION:		
DATE:	BY:	DESC:

DRAWN BY:	CA/CR
DESIGNED BY:	JJM
CHECKED BY:	MCB
APPROVED BY:	TR
PROJECT NO:	10162
DATE:	04-05-2013

DISPLAYED AS:	
COORD SYS/ZONE:	MSP
DATUM:	NAD83
UNITS:	FEET
SOURCE:	PIONEER

SCALE IN FEET
0 50 100

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

ELECTRIACL DEMO
SITE PLAN

PREPARED BY:

MORRISON MAIERLE, INC.
An Employee-Owned Company
Engineers
Surveyors
Scientists
Planners
1 Engineering Place
Helena, MT 59602
Phone: (406) 442-3050
Fax: (406) 442-7862

MONTANA
MICHAEL W. BRANDT
9812PE
REGISTERED PROFESSIONAL ENGINEER

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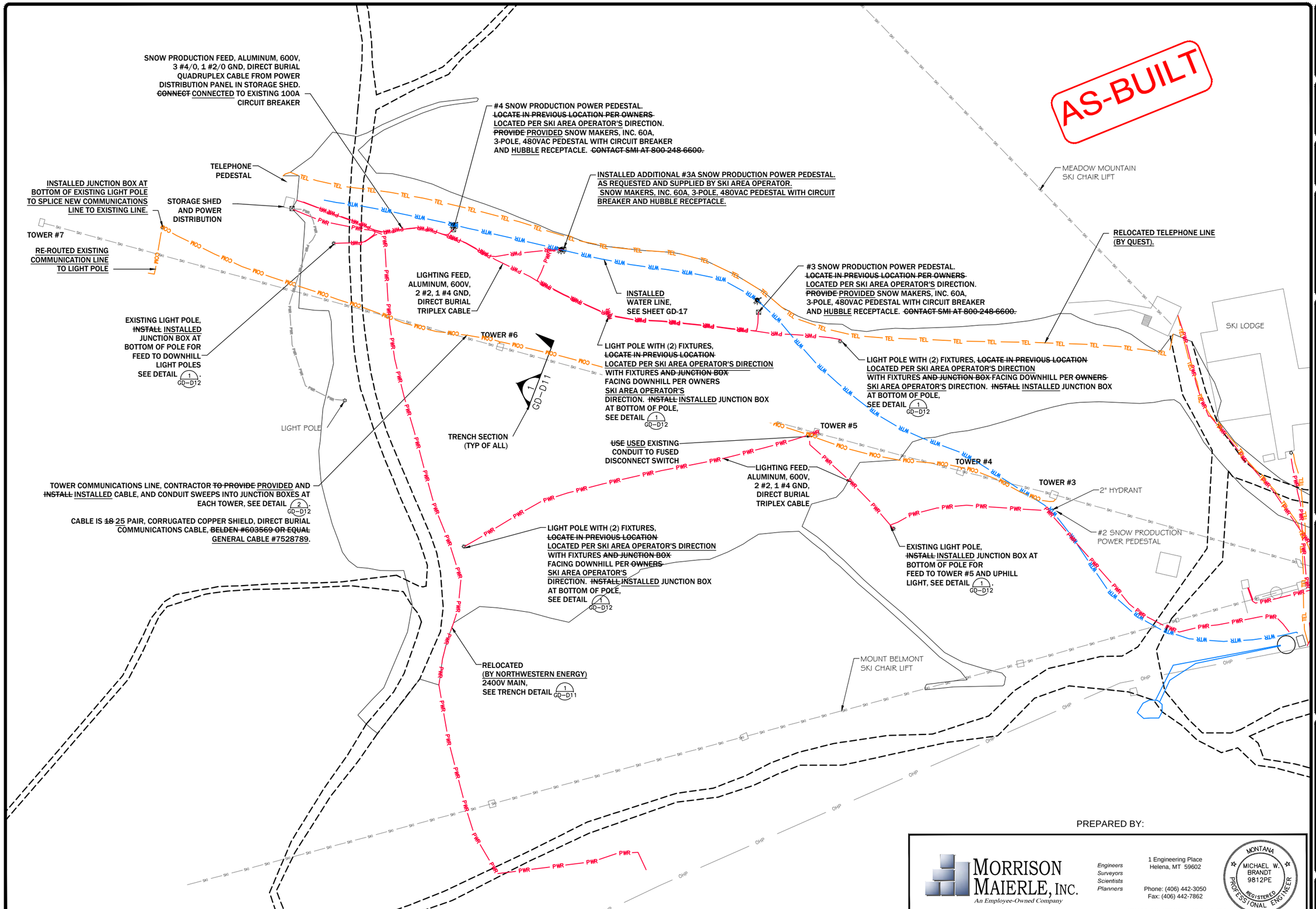
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-18



PREPARED BY:

MORRISON MAIERLE, INC.
An Employee-Owned Company

Engineers
Surveyors
Scientists
Planners

1 Engineering Place
Helena, MT 59602

Phone: (406) 442-3050
Fax: (406) 442-7862

MONTANA
MICHAEL W. BRANDT
9812PE
REGISTERED PROFESSIONAL ENGINEER

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REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 50 100

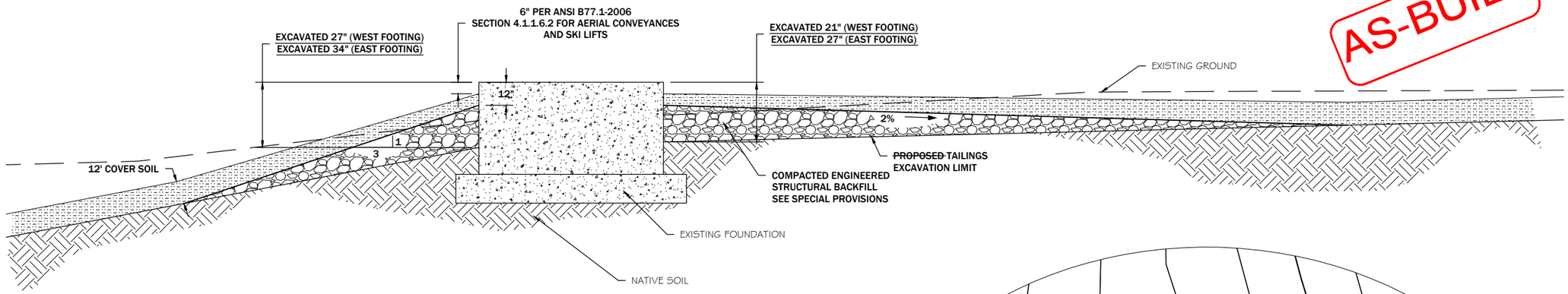
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

ELECTRICAL SITE PLAN

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

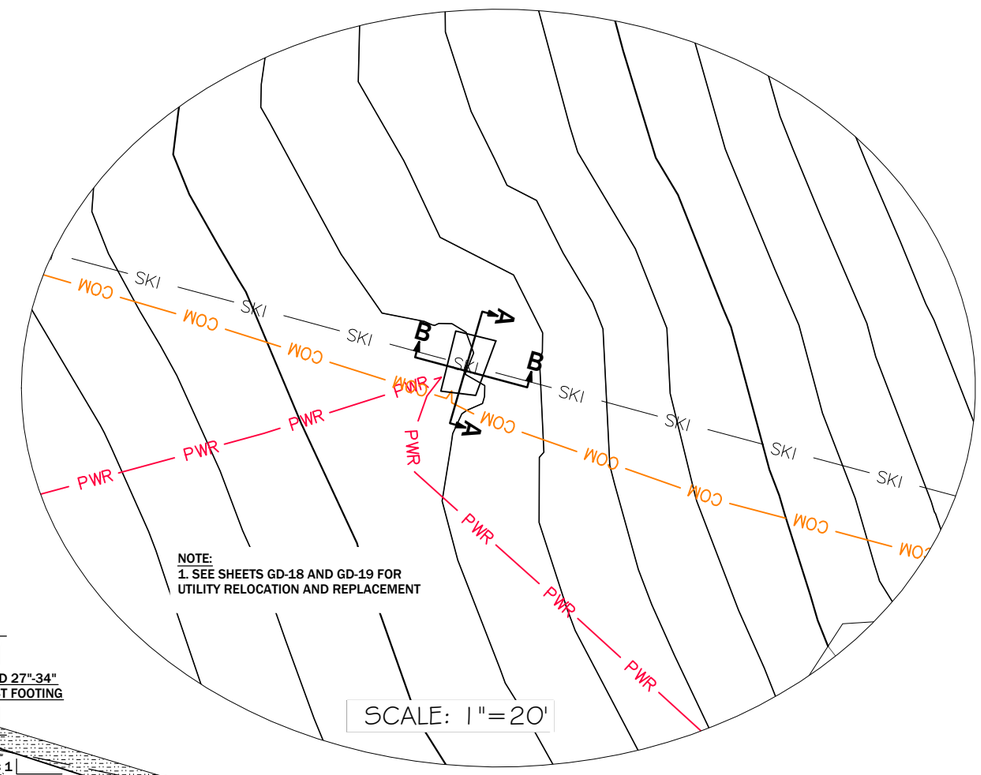
SHEET
GD-19

4/2/2013 4:41:57 PM \\192.168.253.15\PROJECT$\HELENADATA\DEQ\BALD BUTTE - GREAT DIVIDE\CONSTRUCTION\DRAWINGS\AS-BUILT\SHEET SET - GREAT DIVIDE\GDMM-F-CO-PLN-001-11.DWG

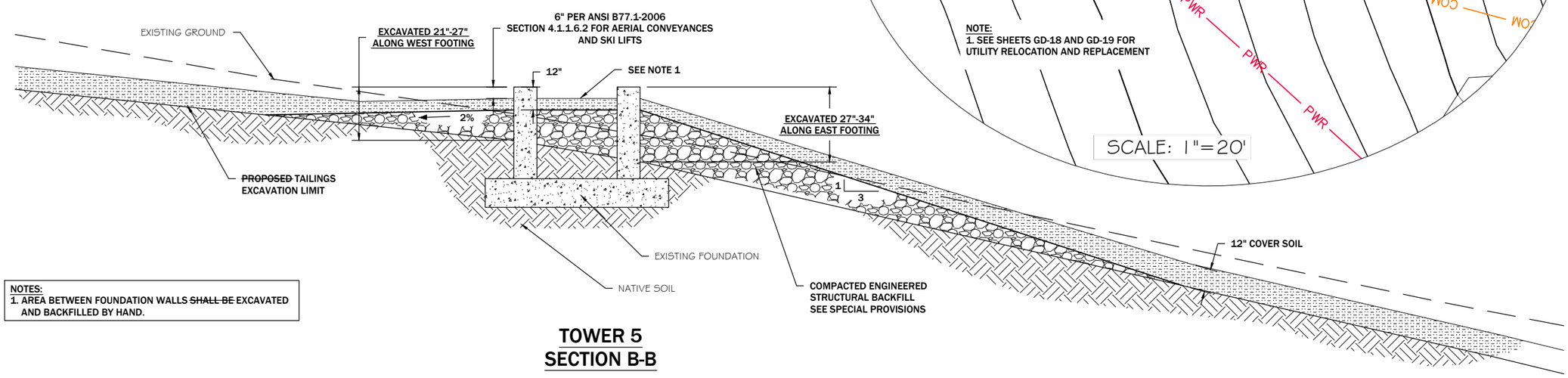


AS-BUILT

TOWER 5
SECTION A-A



NOTE:
1. SEE SHEETS GD-18 AND GD-19 FOR UTILITY RELOCATION AND REPLACEMENT



NOTES:
1. AREA BETWEEN FOUNDATION WALLS ~~SHALL BE~~ EXCAVATED AND BACKFILLED BY HAND.

TOWER 5
SECTION B-B

REVISION:		
DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

N

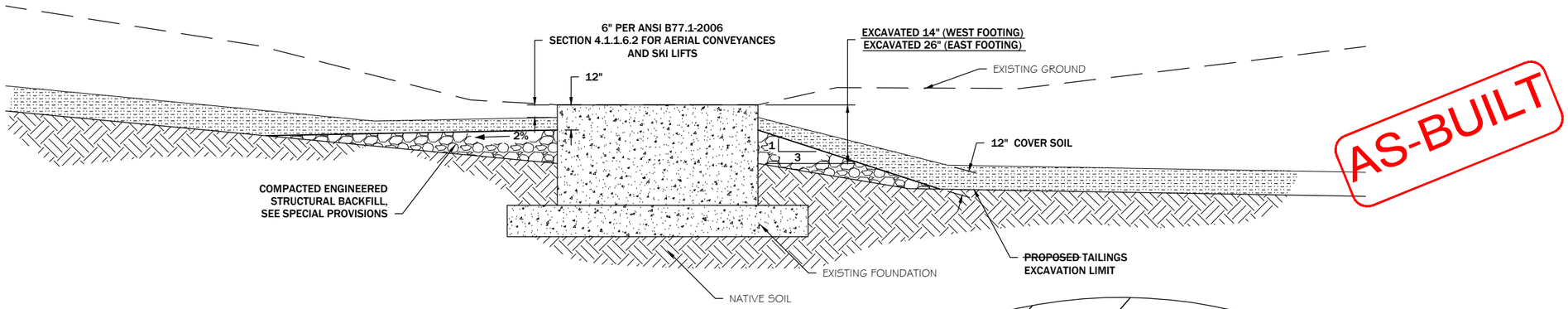
SCALE IN FEET
0 N.T.S N.T.S

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

TOWER 5
EXCAVATION AND
BACKFILL SECTIONS

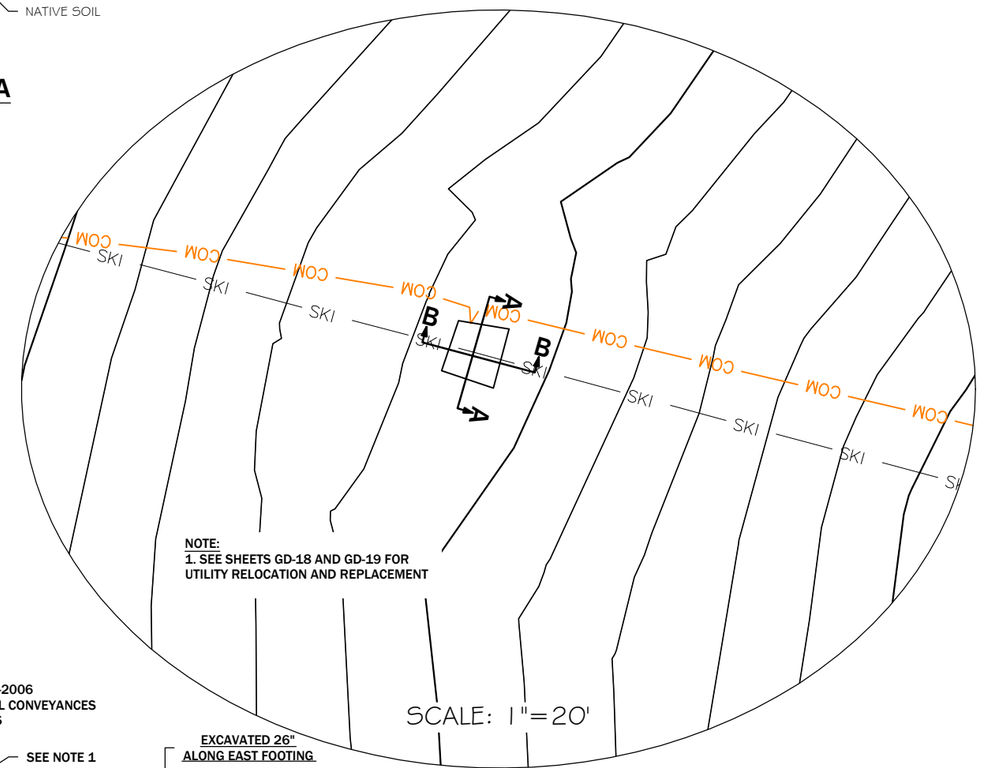
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D1

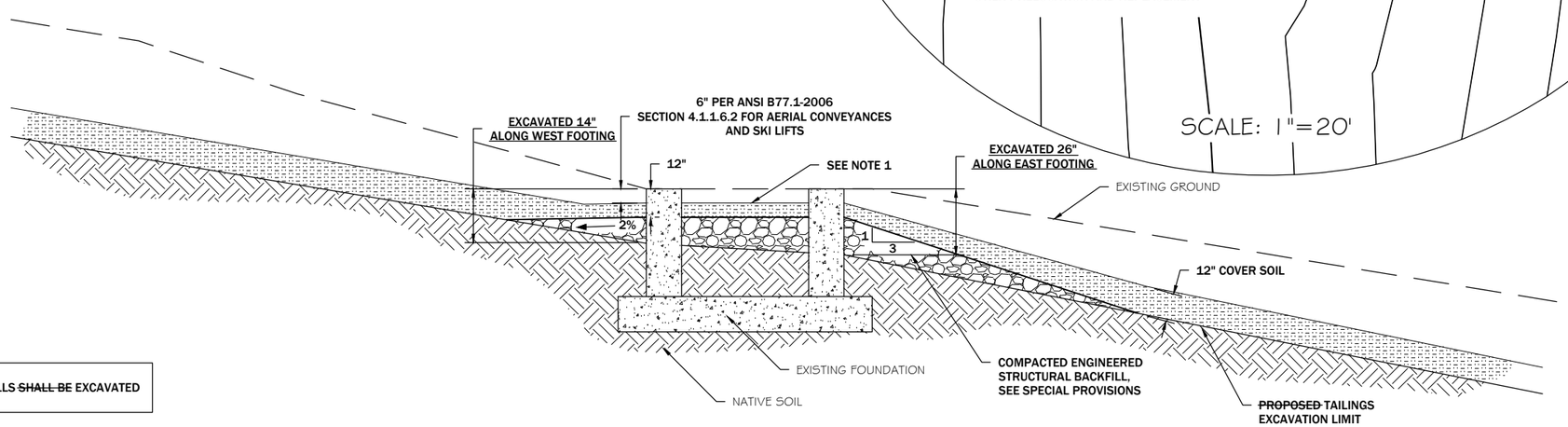


AS-BUILT

TOWER 6
SECTION A-A



NOTE:
1. SEE SHEETS GD-18 AND GD-19 FOR UTILITY RELOCATION AND REPLACEMENT



NOTES:
1. AREA BETWEEN FOUNDATION WALLS ~~SHALL BE~~ EXCAVATED AND BACKFILLED BY HAND.

TOWER 6
SECTION B-B

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

N

SCALE IN FEET
0 N.T.S N.T.S.

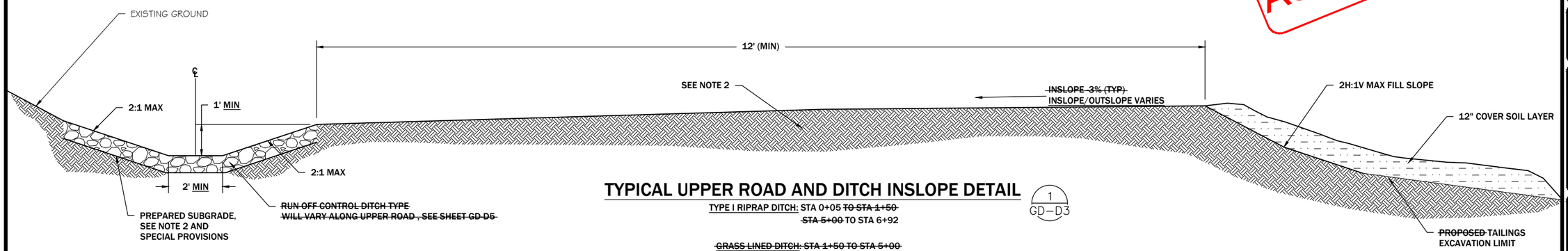
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

TOWER 6
EXCAVATION AND
BACKFILL SECTIONS

PIONEER
TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D2

AS-BUILT



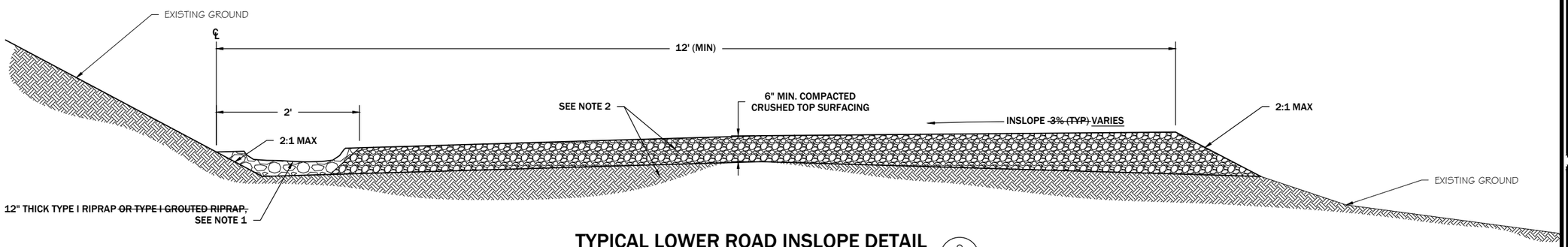
TYPICAL UPPER ROAD AND DITCH INSLOPE DETAIL

1
GD–D3

TYPE I RIPRAP DITCH: STA 0+05 ~~TO STA 1+50~~
~~STA 5+00~~ TO STA 6+92

~~GRASS LINED DITCH: STA 1+50 TO STA 5+00~~

N.T.S.



TYPICAL LOWER ROAD INSLOPE DETAIL

2
GD–D3

TYPE I RIPRAP LINED DITCH : STA 1+71 ~~TO 2+10~~
~~STA 3+00~~ TO STA 4+46

~~TYPE I GROUTED RIPRAP LINED DITCH: STA 2+10 TO STA 3+00~~

N.T.S.

NOTES:
1. CONTRACTOR ~~SHALL SHAPE AND SMOOTH~~ SHAPED AND SMOOTHED RIPRAP AS DIRECTED BY ENGINEER ALONG LOWER ROAD FROM STA 1+71 TO 4+46.

2. ~~COMPACT~~ COMPACTED EXISTING SUBGRADE AND SURFACE AGGREGATE TO 95% OF STANDARD PROCTOR (AASHTO T-99) MAXIMUM DRY DENSITY OF ±4% MOISTURE.

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

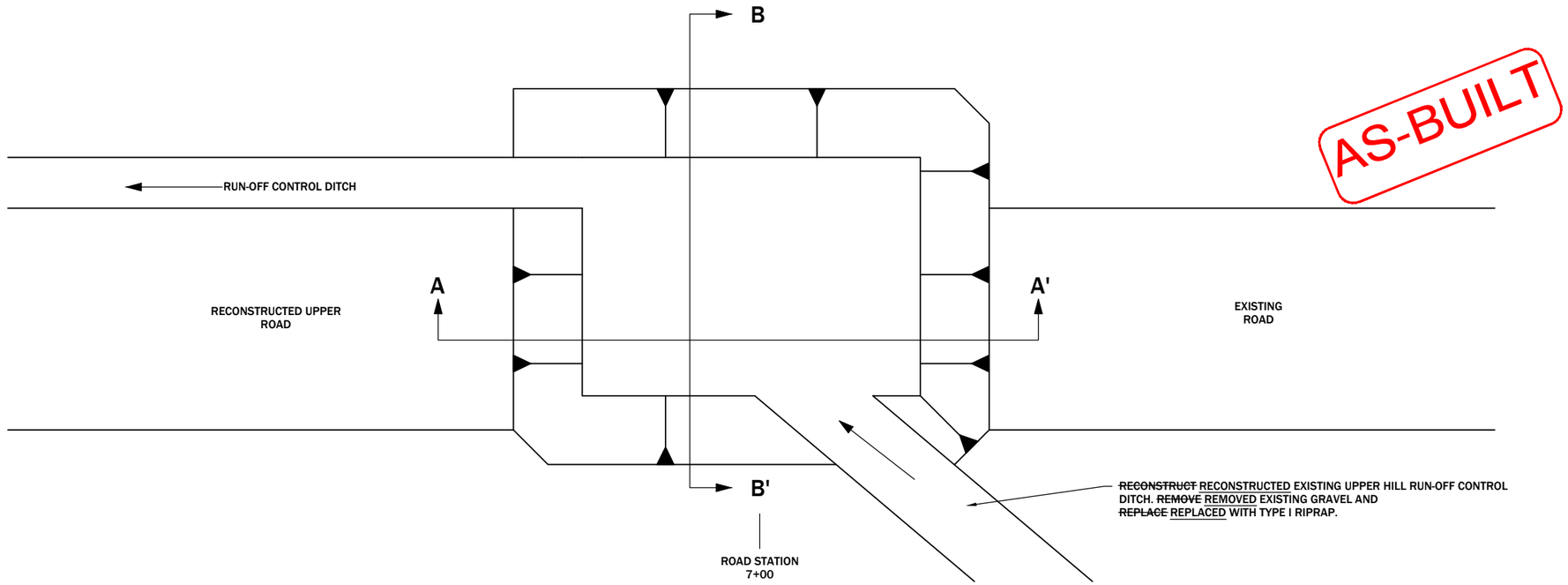
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

UPPER AND LOWER ROAD TYPICAL CROSS SECTIONS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D3

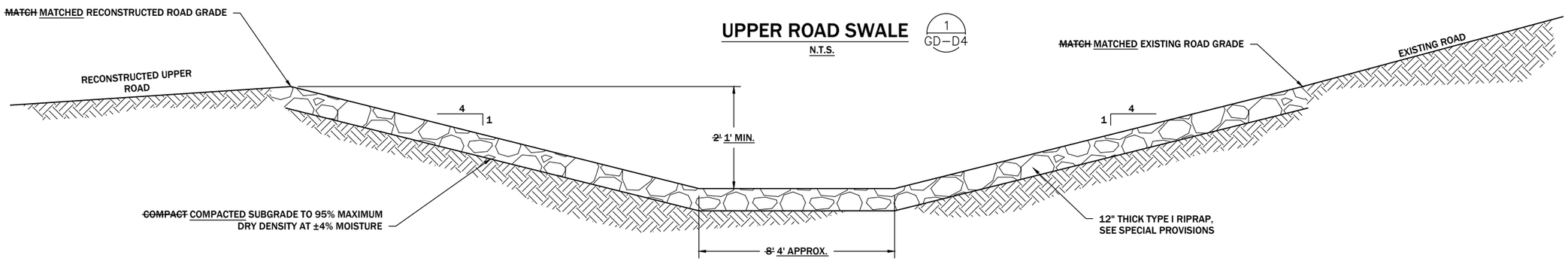


AS-BUILT

UPPER ROAD SWALE

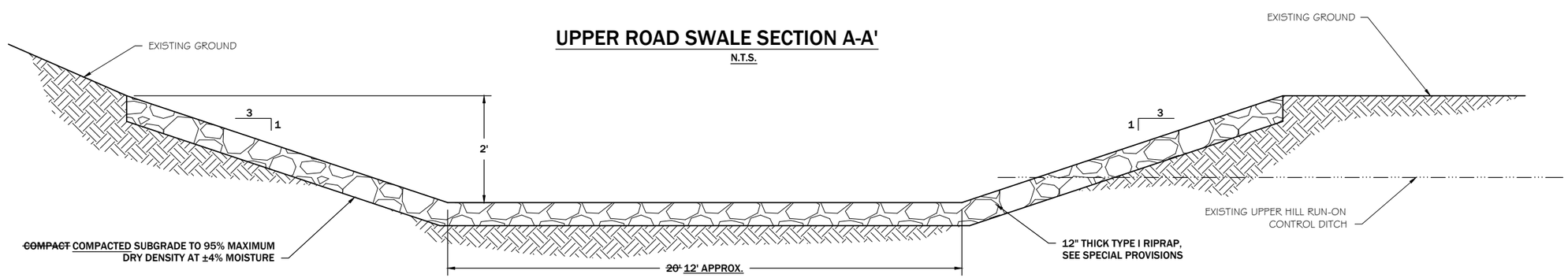
N.T.S.

1 GD-D4



UPPER ROAD SWALE SECTION A-A'

N.T.S.



UPPER ROAD SWALE SECTION B-B'

N.T.S.

REVISION:		
DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

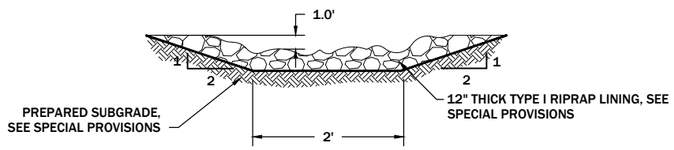
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

UPPER ROAD SWALE DETAIL AND CROSS SECTIONS

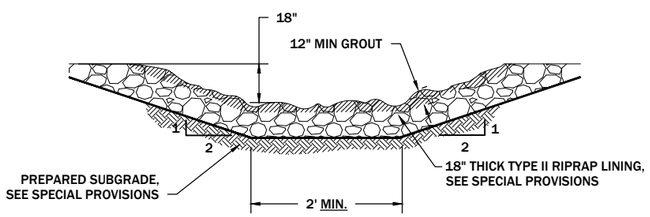
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET GD-D4



TYPE I RIPRAP DITCH DETAIL (1 / GD-D5)

UPPER ROAD: STA 0+05 ~~TO 1+50~~
~~STA 5+00~~ TO 6+92
UPPER HILL DITCH: STA 6+92 TO 8+36
MIDDLE DITCH: STA 2+69 TO 5+79
LOWER DITCH: STA 0+07 TO 1+71
LOWER ROAD: STA 1+71 ~~TO 2+10~~
~~STA 3+00~~ TO 4+46
N.T.S.

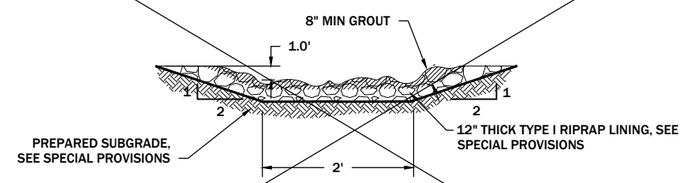


MIDDLE DITCH TYPE II GROUTED RIPRAP DETAIL (2 / GD-D5)

STA 0+50 TO 2+69
N.T.S.

AS-BUILT

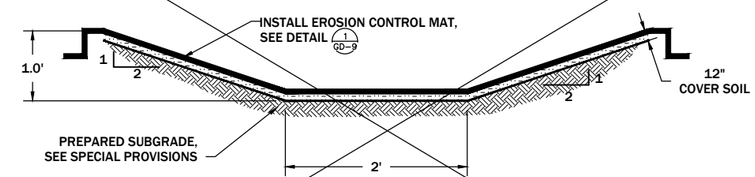
DITCH TYPE NOT USED



TYPE I GROUTED RIPRAP DITCH DETAIL (3 / GD-D5)

LOWER ROAD: STA 2+10 TO 3+00
N.T.S.

DITCH TYPE NOT USED



GRASS LINED DITCH DETAIL (4 / GD-D5)

UPPER ROAD: STA 1+50 TO STA 5+00
MIDDLE DITCH: STA 2+35 TO 5+20
N.T.S.

REVISION:		
DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 N.T.S. N.T.S.

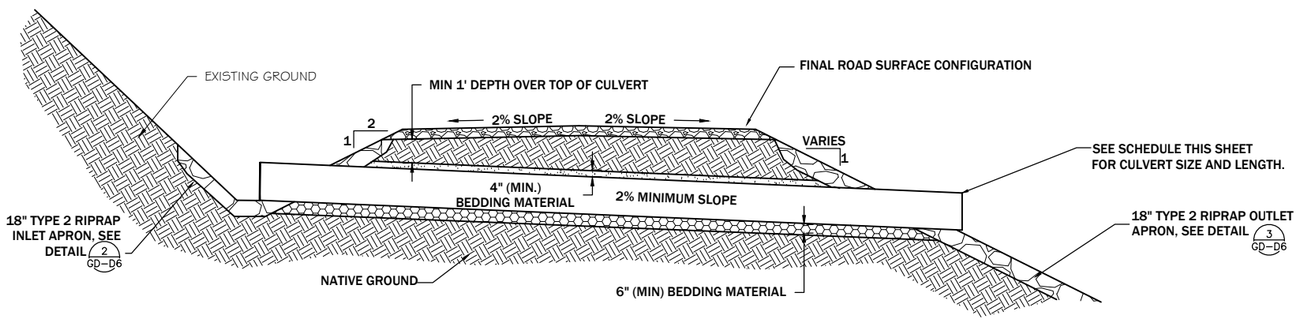
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

RUN-OFF CONTROL
DITCH DETAILS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D5

NOTE:
1. USED CULVERT TYPES AS DESIGNATED IN CULVERT SCHEDULE.
2. INSTALLED CULVERT PER MANUFACTURER'S RECOMMENDATIONS.

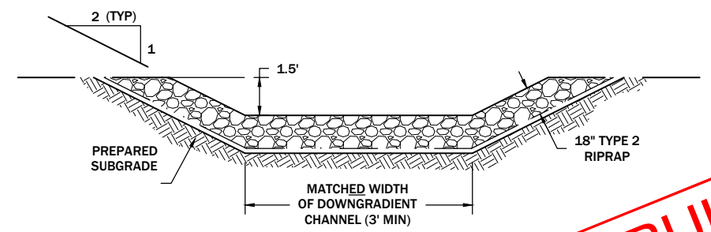


TYPICAL CULVERT INSTALLATION DETAIL (1 GD-D6)

N.T.S.

Culvert Schedule			
Culvert No.	Type	Size (in.)	Length* (ft.)
1	RCP ARCH	13x22	~~40~~ 48
~~2~~	~~RCP ARCH~~	~~13x22~~	~~40~~
~~3~~	~~RCP ARCH~~	~~13x22~~	~~48~~
4	RCP ARCH	18x28	~~40~~ 48
5	RCP ARCH	13x22	~~40~~ 48
~~6~~	~~RCP ARCH~~	~~13x22~~	~~32~~
~~7~~	~~RCP ARCH~~	~~13x22~~	~~40~~
8	RCP ARCH	13x22	~~32~~ 40
9	RCP ARCH	13x22	~~32~~ 40
		Total Length* =	~~344~~ 224

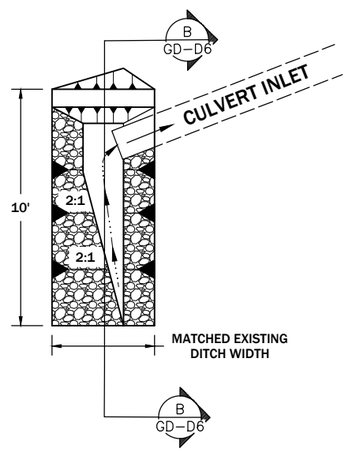
* LENGTHS OF CULVERTS ~~ARE~~ ESTIMATED BASED ON EXISTING CONDITIONS AND ~~MAY VARY~~ VARIED ACCORDINGLY TO THE FINAL WIDTH AND SLOPE OF FINISHED ROAD. CONTRACTOR ~~SHALL~~ FIELD ~~VERIFY~~ VERIFIED LENGTHS PRIOR TO INSTALLATION



SECTION (A–A GD-D6)

N.T.S.

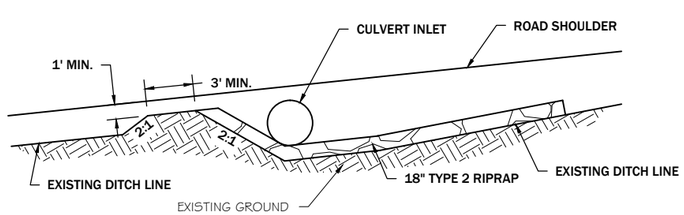
AS-BUILT



CULVERT INSTALLATIONS COMPLETED DURING 2012 CONSTRUCTION SEASON

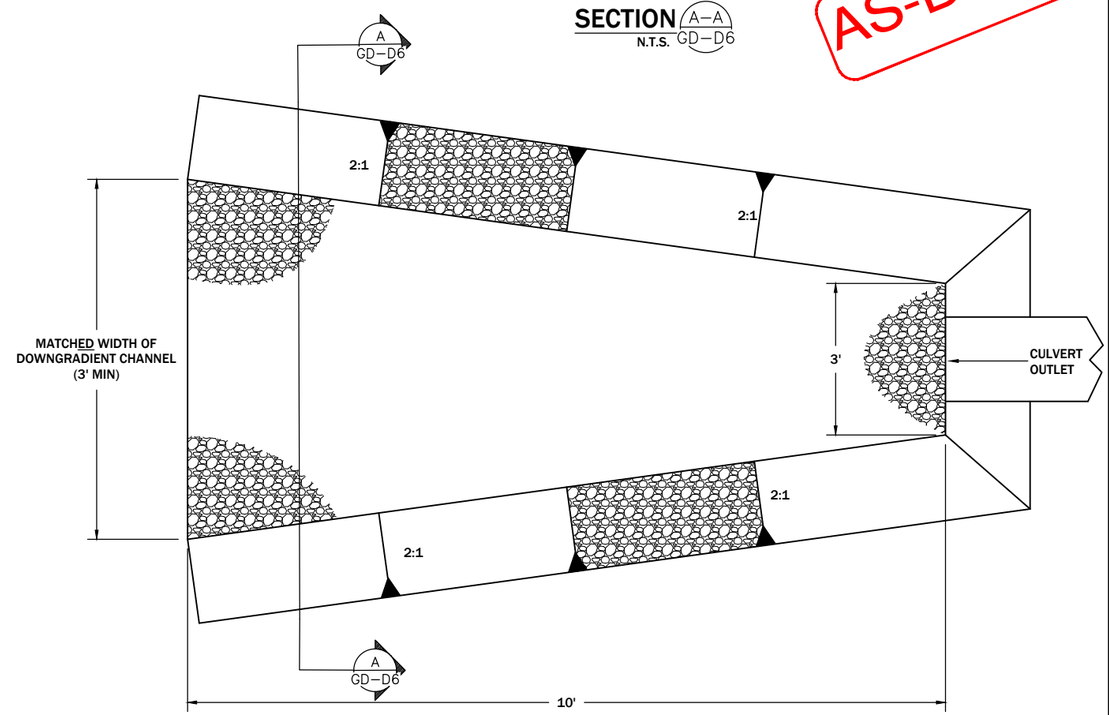
INLET APRON DETAIL PLAN VIEW (2 GD-D6)

N.T.S.



INLET APRON DITCH PROFILE B-B

N.T.S.



RIPRAP APRON FOR OUTLET WORKS DETAIL (3 GD-D6)

N.T.S.

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

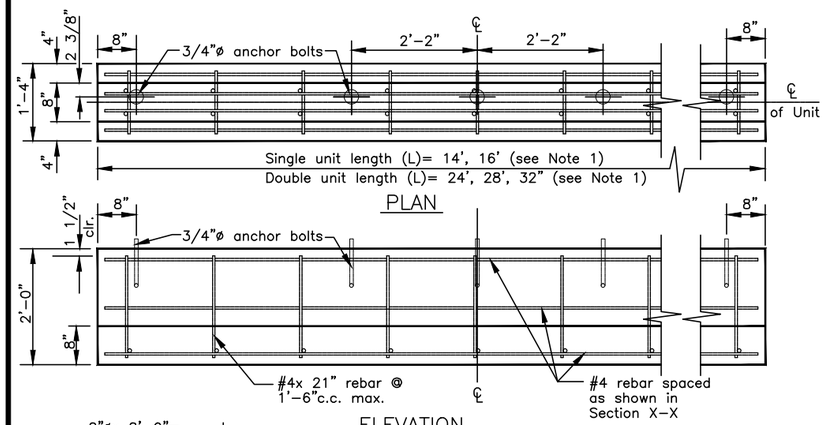
SCALE IN FEET
0 N.T.S. N.T.S.

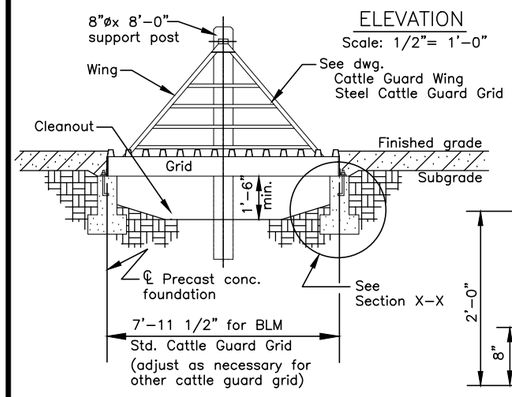
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

CULVERT AND DRAINAGE DETAILS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

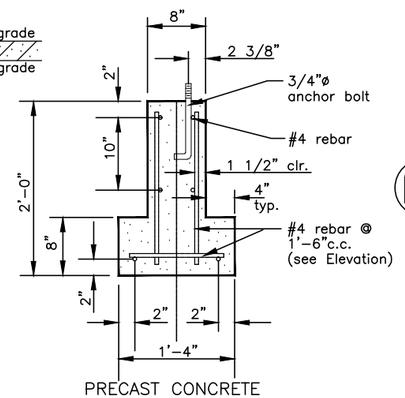
SHEET GD-D6





SECTION @ ROAD ℄

(with grid & wings in place)
scale: 1/4"= 1'-0"



PRECAST CONCRETE CATTLE GUARD FOUNDATION

SECTION X-X

Scale: 3/4"= 1'-0"

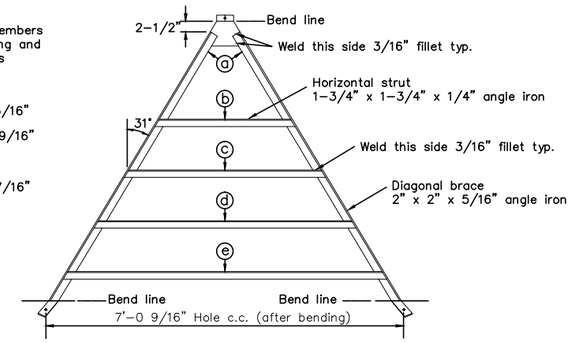
NOTES:
1. See Bid Schedule for Length (L).
2. Standard bolt & washer shall be furnished with each foundation unit, including angle brackets. Weld or bolt angle brackets to cattleguard header plate.
3. On earth-surfaced roads, set top of cattleguard 8" above subgrade, unless plans or stakes indicate another elevation. Taper fill back from cattleguard approx. 50' in both directions.
4. #4 reinforcing bars may be spliced with 24" lap unless prohibited.

ESTIMATED QUANTITIES FOR FOUNDATION					
DESCRIPTION	QUANTITIES				
Unit Lengths	14'	16'	24'	28'	32'
Concrete	1.85cy	2.2cy	3.2cy	3.7cy	4.3cy
#4 reinforcing bar	256LF	287LF	437LF	505LF	580LF

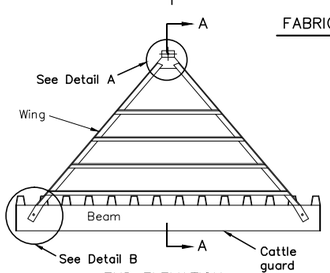
CATTLE GUARD FOUNDATION

Length of members before bending and mitering ends

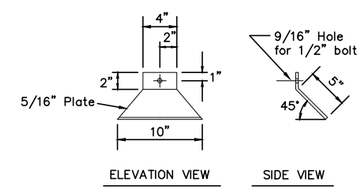
ⓐ 6' 7"
ⓑ 2' 9-3/16"
ⓒ 3' 11-9/16"
ⓓ 5' 2"
ⓔ 6' 4-7/16"



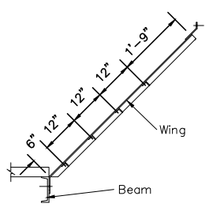
FABRICATION DETAIL



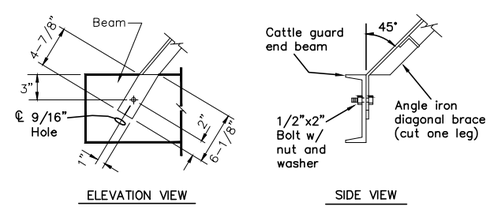
END ELEVATION



DETAIL A



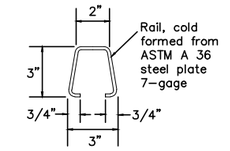
SECTION A-A



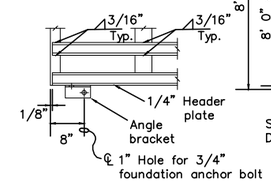
DETAIL B

NOTE: Furnish two 1/2" dia. x 2" bolts with standard nuts, washers and lockwashers with each wing.

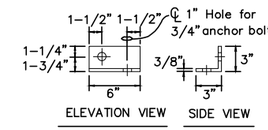
CATTLE GUARD WING



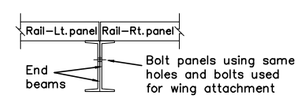
RAIL DETAIL



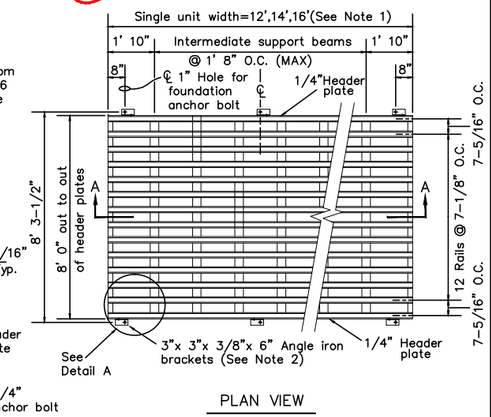
DETAIL A



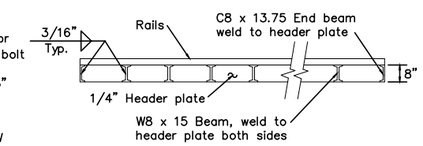
ANGLE BRACKET DETAIL



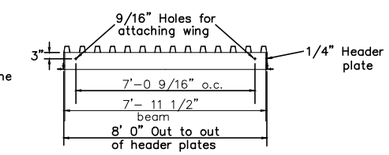
MULTIPLE INSTALLATION



PLAN VIEW



SECTION A-A



END ELEVATION

NOTES:
1. See Bid Schedule for width.
2. Furnish loose, six angle brackets and six 3/4" dia. x 2" anchor bolts with standard nuts, washers and lock washers, with each grid.
3. Steel for components shall be ASTM A 36 unless indicated otherwise on drawing.
4. Design loading of grid shall conform to AASHTO H-20.

WELDING SYMBOL LEGEND

Weld both sides

Weld this side

STEEL CATTLE GUARD GRID

SOURCE: BUREAU OF LAND MANAGEMENT STANDARD DRAWING

AS-BUILT

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

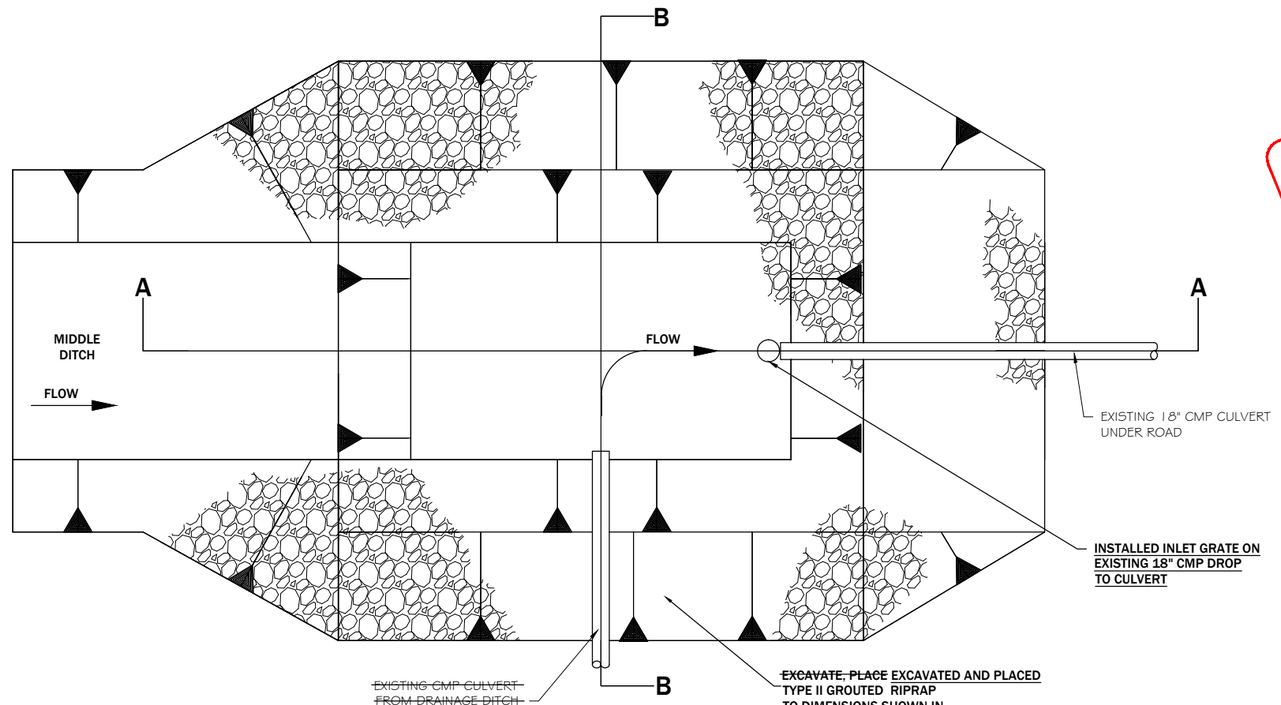
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

CATTLE GUARD DETAILS

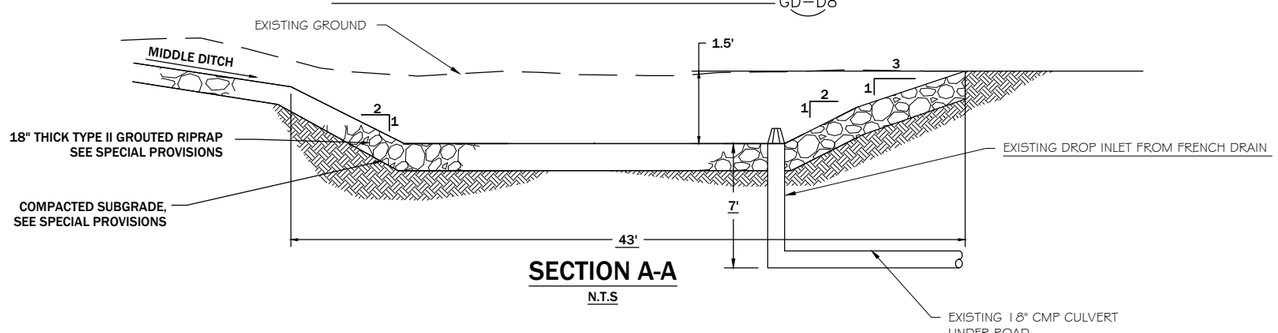
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET GD-D7



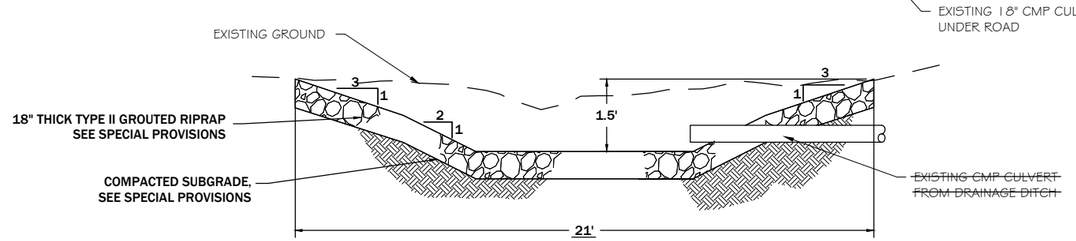
PLAN VIEW

RIPRAP ENERGY DISSIPATOR DETAIL (1 / GD-D8)



SECTION A-A

N.T.S



SECTION B-B

N.T.S

AS-BUILT

REVISION:		
DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

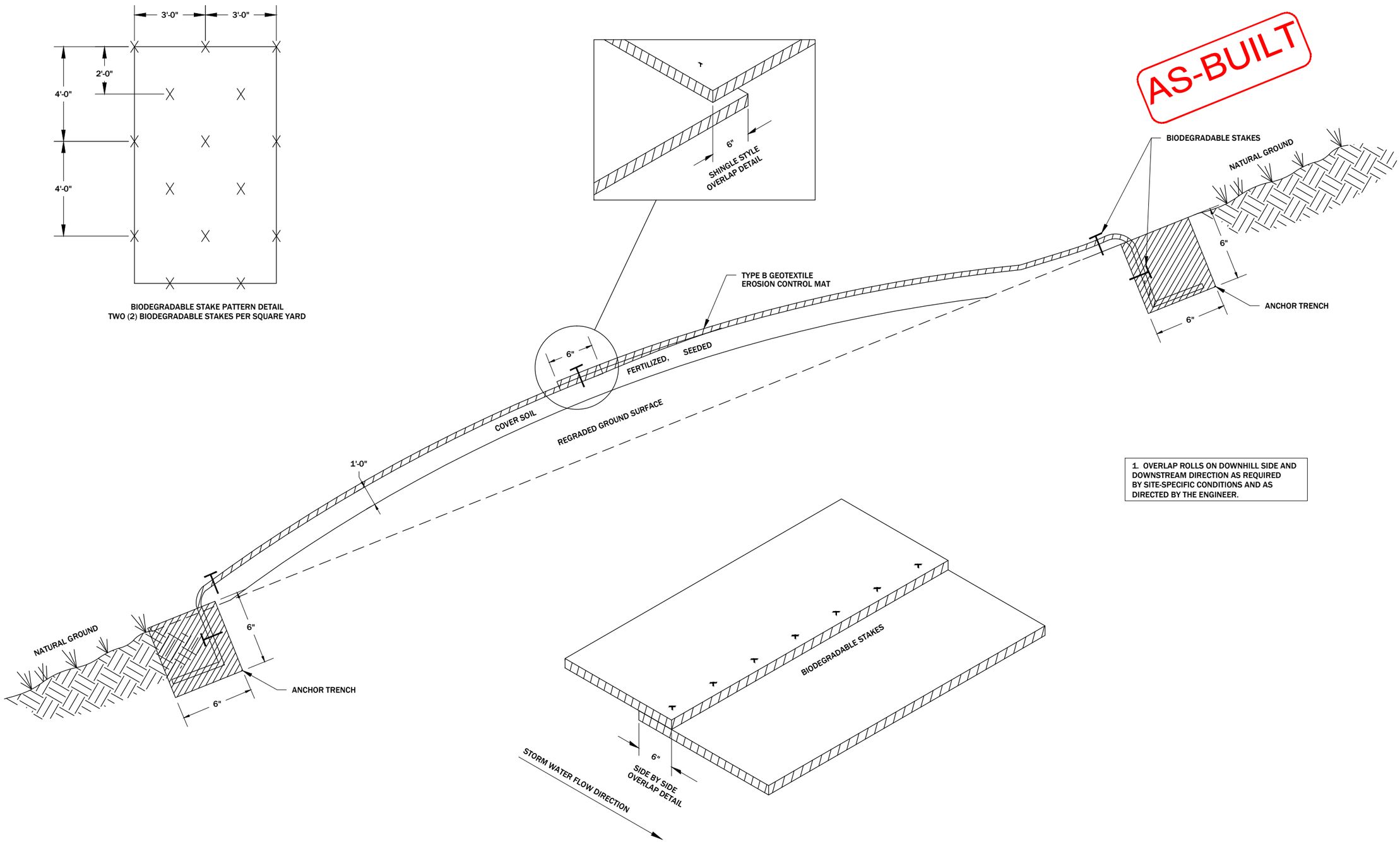
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

ENERGY DISSIPATOR DETAILS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET GD-D8



1. OVERLAP ROLLS ON DOWNHILL SIDE AND DOWNSTREAM DIRECTION AS REQUIRED BY SITE-SPECIFIC CONDITIONS AND AS DIRECTED BY THE ENGINEER.

TYPE B GEOTEXTILE - EROSION CONTROL MAT INSTALLATION DETAIL

N.T.S.

1
GD-D9

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

SCALE IN FEET
0 N.T.S. N.T.S.

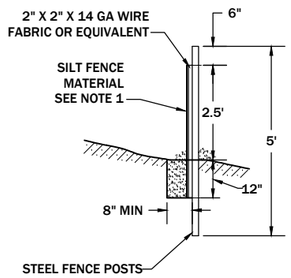
BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

EROSION CONTROL
MAT DETAILS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D9

AS-BUILT

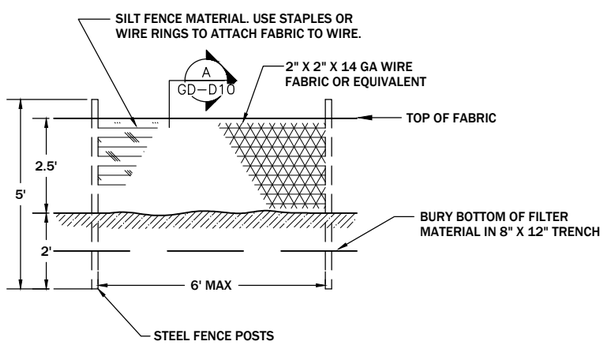


NOTE:
1. FOR SILT FENCE USE NORTH AMERICAN GREEN C-125 MATERIAL (OR EQUIVALENT).
2. FOR STRAW WATTLE USE AMERICAN EXCELSIOR PREMIUM (OR EQUIVALENT).

SILT FENCE SECTION

(CROSS SECTION)

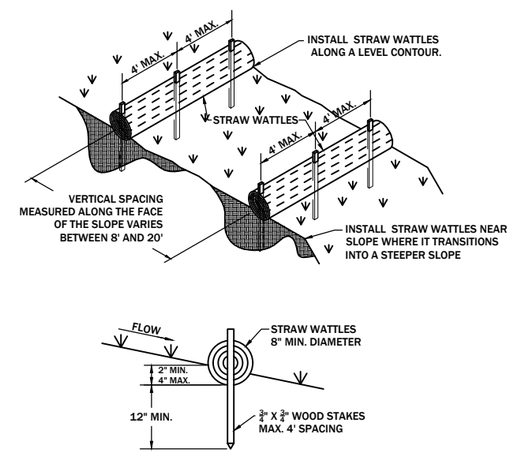
A GD-D10



SILT FENCE DETAIL

(FRONT CROSS SECTION)

1 GD-D10



STRAW WATTLES (FIBER ROLLS) DETAILS

N.T.S. 2 GD-D10

REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

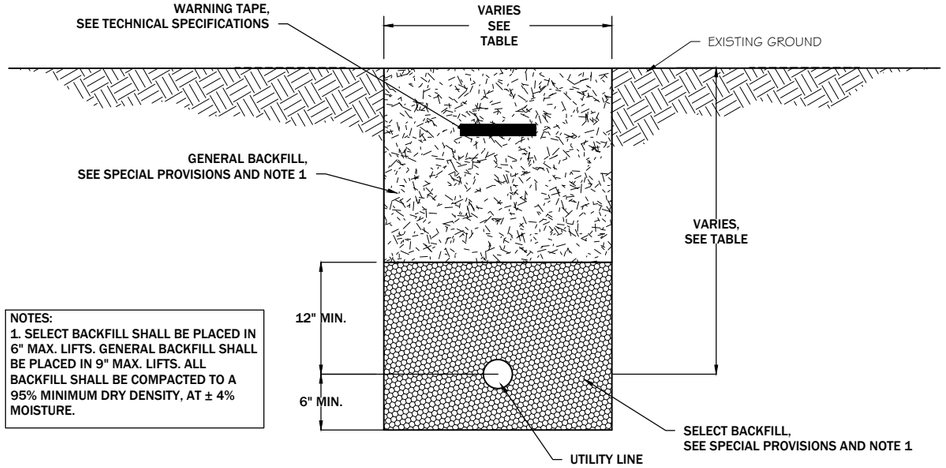
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

GENERAL BMP CONSTRUCTION DETAILS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET GD-D10

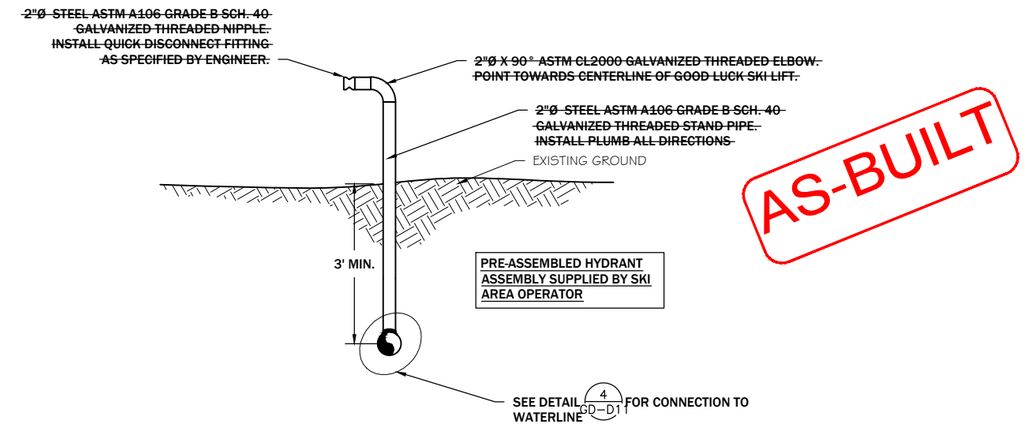


NOTES:
1. SELECT BACKFILL SHALL BE PLACED IN 6" MAX. LIFTS. GENERAL BACKFILL SHALL BE PLACED IN 9" MAX. LIFTS. ALL BACKFILL SHALL BE COMPACTED TO A 95% MINIMUM DRY DENSITY, AT ± 4% MOISTURE.

UTILITY LINE TRENCH DETAIL (1 / GD-D11)

N.T.S.

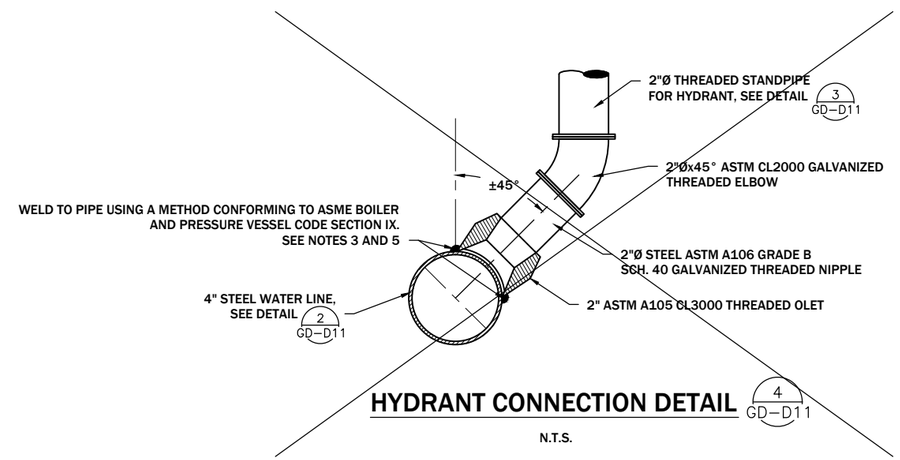
UTILITY	TRENCH WIDTH	LINE DEPTH
QWEST TELEPHONE LINE	4" MIN.	30" MIN.
NORTHWESTERN POWER LINE	30" MIN.	36" MIN./40" MAX
WATER LINE	30" MIN	36" MIN
LIGHTING FEED SNOW MAKING FEED TOWER COMMUNICATIONS	4" MIN	24" MIN



AS-BUILT

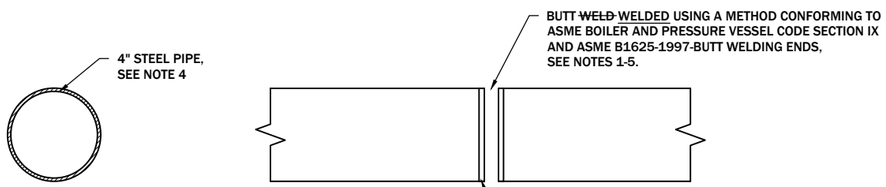
HYDRANT INSTALLATION DETAIL (3 / GD-D11)

N.T.S.



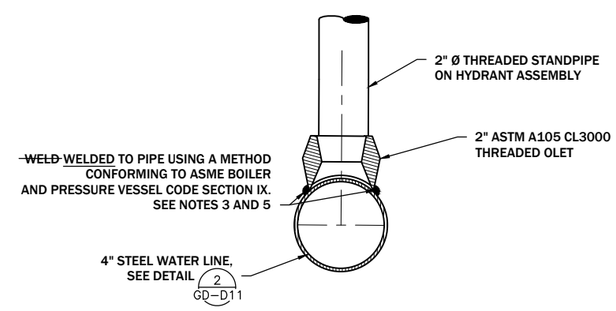
HYDRANT CONNECTION DETAIL (4 / GD-D11)

N.T.S.



NOTES:
1. NEW PIPE ~~SHALL BE~~ CONNECTED TO EXISTING PIPE AT LOWER AND UPPER END OF INSTALLED RUN.
2. SPECIFIED PIPE GRADES ~~SHALL BE~~ MAINTAINED TO ELIMINATE LOW SPOTS IN THE INSTALLED PIPE RUN.
3. WELDING ~~SHALL BE~~ COMPLETED BY A WELDER CERTIFIED FOR 1G, 2G, 5G, AND 6G POSITIONS.
4. ~~ACCEPTABLE PIPE SHALL BE~~ 4-INCH STEEL ASTM A106 GRADE B SCHEDULE 40 PIPE ~~MUST BE~~ APPROVED BY ENGINEER. PIPE ~~MUST HAVE~~ INSTALLED WITH A BITUMINOUS ASPHALT COATING MEETING ANSI-A21.4
5. ~~WRAP~~ WRAPPED ALL JOINTS WITH APPROVED BITUMINOUS PIPE WRAP IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.

WELDED PIPE CONNECTION DETAIL (2 / GD-D11)



REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

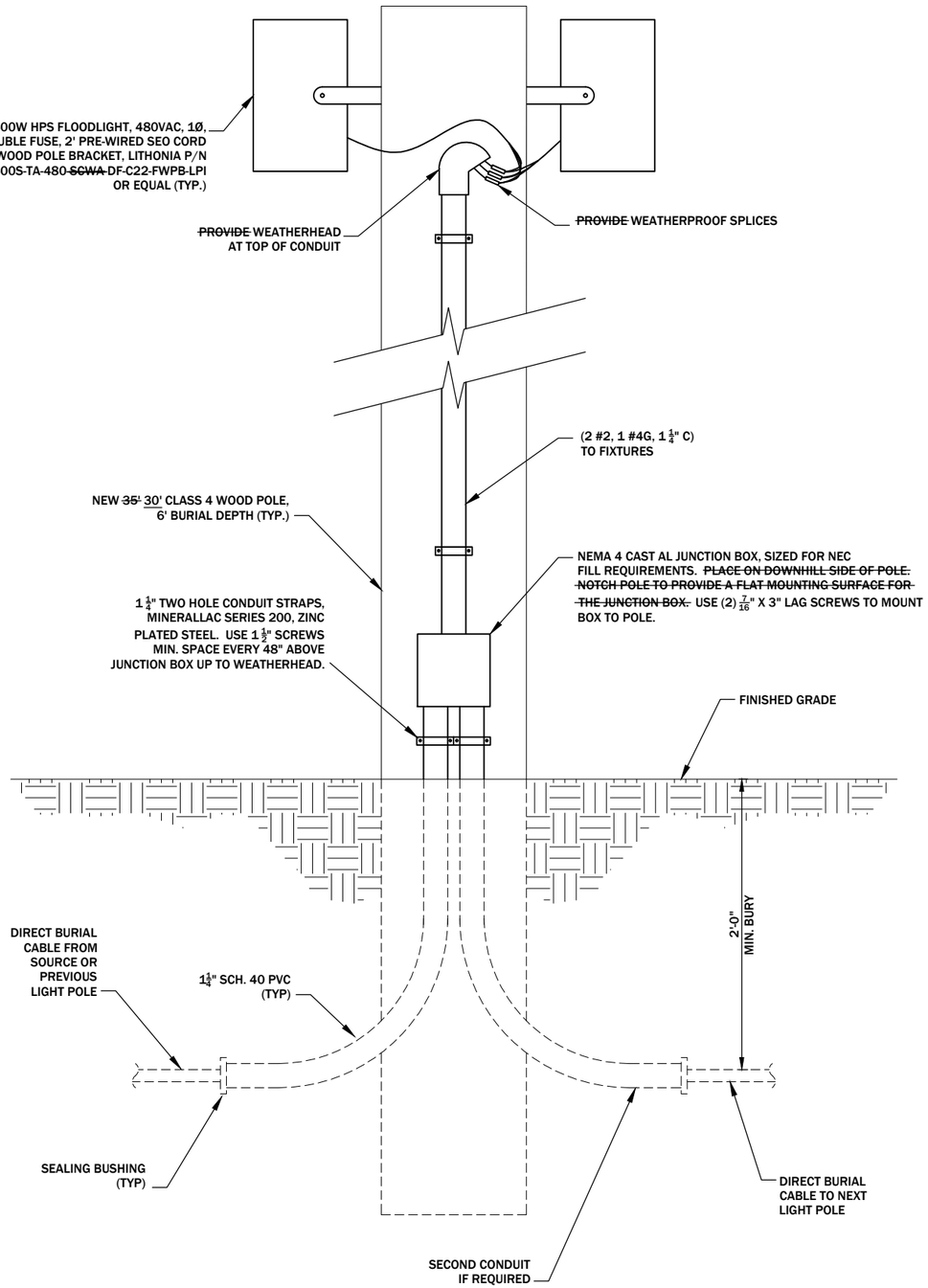
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

UTILITY TRIENCH AND WATERLINE DETAILS

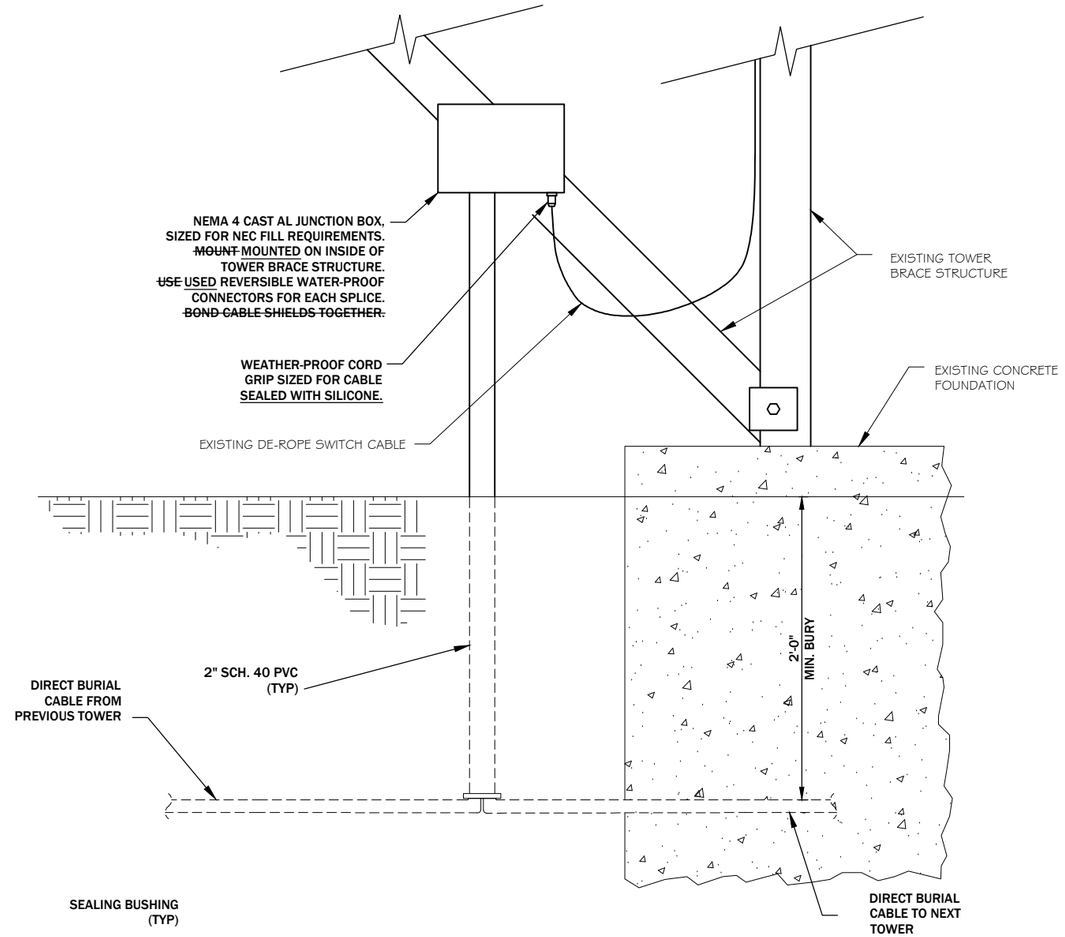
PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D11



LIGHT POLE JUNCTION BOX DETAIL 1 GD-D12

SCALE: N.T.S.



TOWER COMMUNICATION LINE JUNCTION BOX DETAIL 2 GD-D12

SCALE: N.T.S.

AS-BUILT

PREPARED BY:

MORRISON MAIERLE, INC.
An Employee-Owned Company
Engineers
Surveyors
Scientists
Planners
1 Engineering Place
Helena, MT 59602
Phone: (406) 442-3050
Fax: (406) 442-7862
MONTANA MICHAEL W. BRANDT 9812PE REGISTERED PROFESSIONAL ENGINEER

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REVISION:

DATE:	BY:	DESC:

DRAWN BY: CA/CR
DESIGNED BY: JJM
CHECKED BY: MCB
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: PIONEER

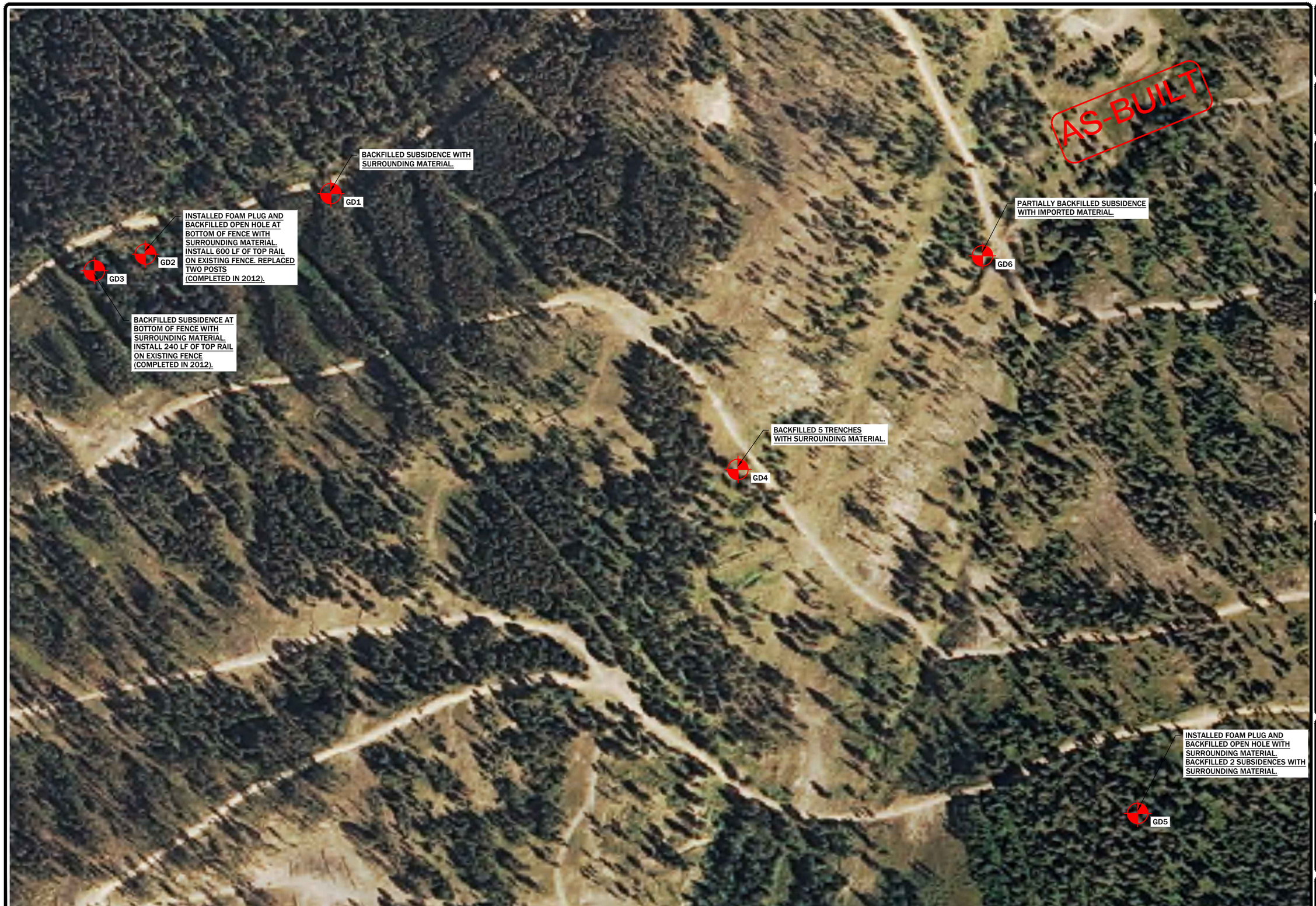
SCALE IN FEET
0 N.T.S. N.T.S.

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

ELECTRICAL DETAILS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
GD-D12



REVISION:

DATE:	BY:	DESC:

DRAWN BY: CR
DESIGNED BY: DEQ
CHECKED BY: JJM
APPROVED BY: TR
PROJECT NO: 10162
DATE: 04-05-2013

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD83
UNITS: FEET
SOURCE: NAIP 2011

N

SCALE IN FEET
0 100 200

BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

GREAT DIVIDE
MINE COLLASPE
FEATURE LOCATIONS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
MCF-1

REVISION:

DATE:	BY:	DESC:

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CHECKED BY: JJM
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SCALE IN FEET
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BLM/DEQ-AMLB
GREAT DIVIDE SAND TAILINGS
RECLAMATION PROJECT

GREAT DIVIDE MINE COLLAPSE FEATURE LOCATIONS

PIONEER TECHNICAL SERVICES, INC.
201 E. BROADWAY, SUITE C
HELENA, MT 59601
(406) 457-8252

SHEET
MCF-2