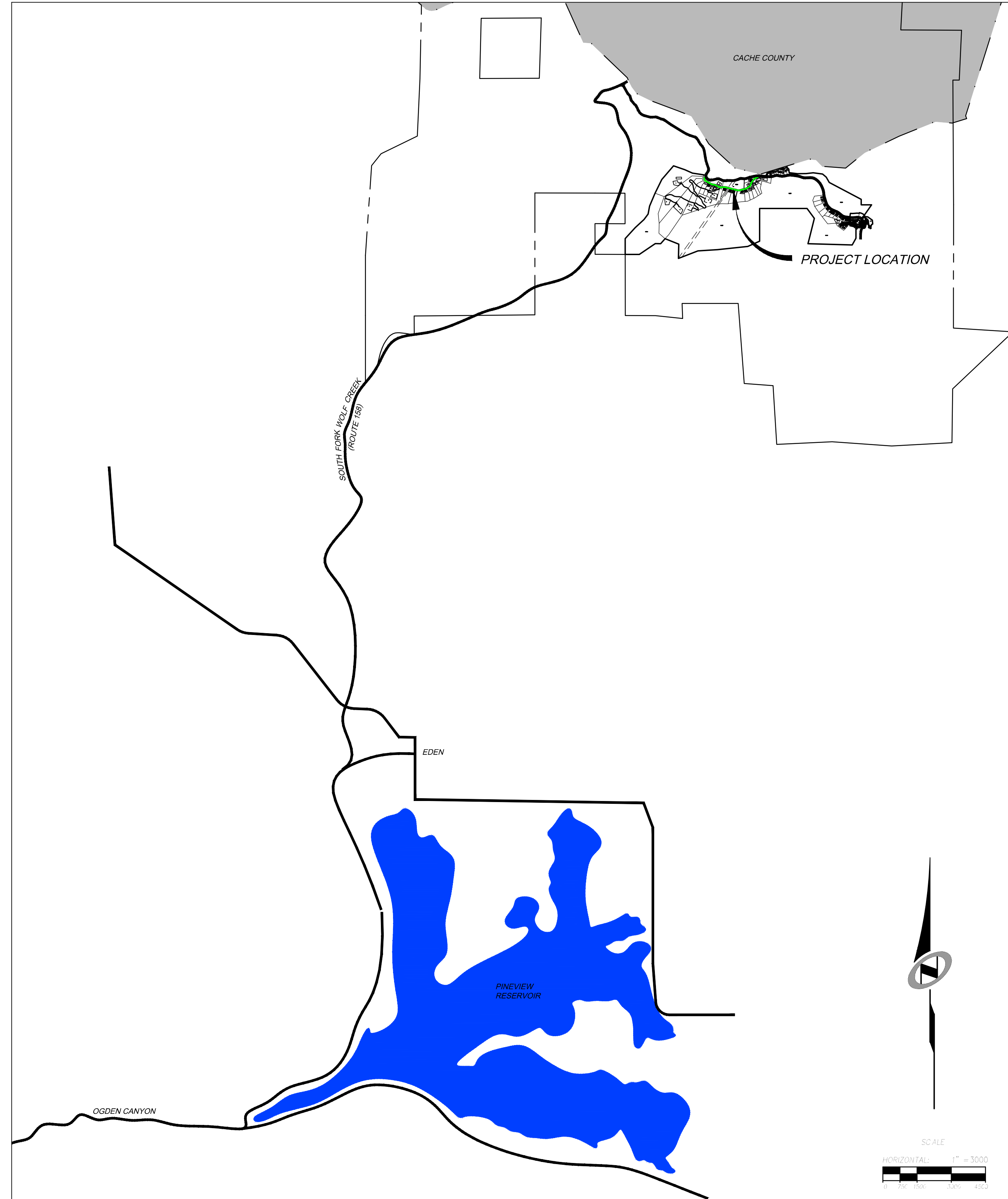


SUMMIT AT POWDER MOUNTAIN PHASE 1A - HORIZON RUN ROADWAY AND UTILITY CONSTRUCTION DRAWINGS

**Located in Sec 01 T7N R1E
Weber County, Utah**



SHEET INDEX:

| SHEET NUMBER | SHEET DESCRIPTION |
|--------------|---|
| 1.00 | CIVIL TITLE SHEET |
| 1.01 | GENERAL NOTES, LEGEND, AND KEYNOTES |
| 1.02 | SHEET KEYMAP |
| 1.03 | OVERALL UTILITY |
| 1.04 | OVERALL GRADING |
| 1.05 | TYPICAL ROADWAY SECTION |
| 2.00 | PLAN & PROFILE - HORIZON RUN |
| 2.01 | PLAN & PROFILE - HORIZON RUN |
| 2.02 | PLAN & PROFILE - HORIZON RUN |
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| 3.01 | EARTHWORK & SECTIONS - HORIZON RUN |
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| 4.00 | EROSION CONTROL PLAN - HORIZON RUN |
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| 5.00 | STORM DRAIN DETAILS |
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| 5.20 | ELECTRICAL DETAILS |
| 5.30 | MISCELLANEOUS DETAILS |
| E1 | ELECTRICAL NOTES AND DETAILS |
| E2 | ELECTRICAL SITE PLAN AND SEWAGE LIFT STATION NUMBER 2 |
| E3 | LIFT STATION NUMBER 2 POWER ONE-LINE DIAGRAM |
| GE-1 | ELECTRICAL DETAILS |
| GE-2 | ELECTRICAL DETAILS |

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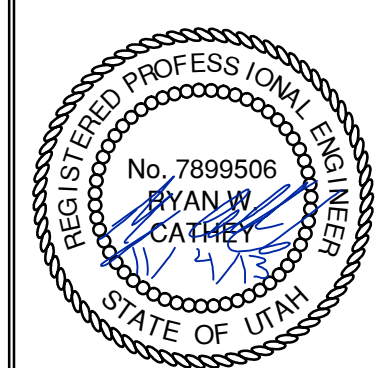
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XREFS:

| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|----------------------------------|
| 1 | RWC | 8/27/2013 | ADDENDUM 1 |
| 2 | RWC | 9/24/2013 | UTILITY, GRADING, AND ROCKET REV |

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**PHASE 1A CONSTRUCTION
CIVIL TITLE SHEET**

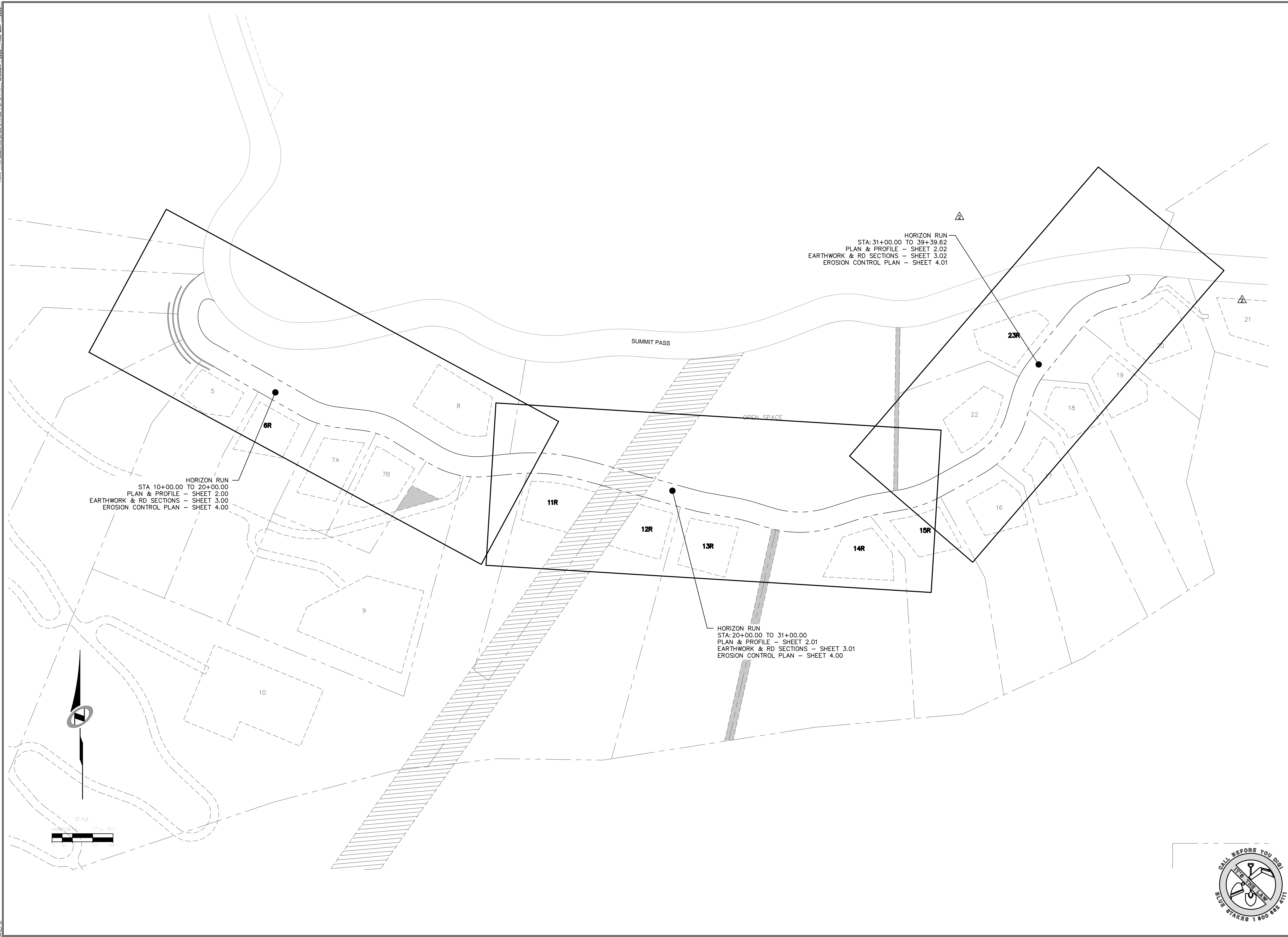
NV5
BEYOND ENGINEERING
627 SOUTH STATE STREET, SUITE 200
MURRAY, UT 84107
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| |
|--|
| SHEET NUMBER 1.00 |
| SCALE VERTICAL: 1" = 8' HORIZONTAL: 1" = 3000' |
| JOB NUMBER SLB079306 |



DATE SUBMITTED: 11/4/2013
PREPARED FOR: SUMMIT, LLC



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|-----|-----|-----------|---|
| 1 | RWC | 8/27/2013 | ADDITIONAL UTILITY, GRADING, AND SOCKET REV |
| 2 | RWC | 9/24/2013 | |

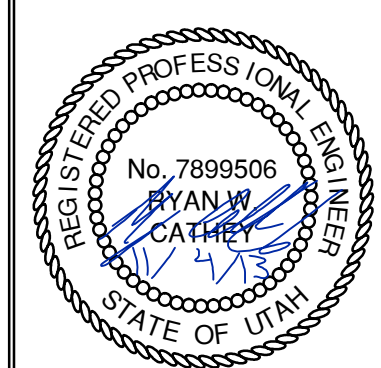
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DATE SUBMITTED: 11/4/2013

PHASE 1A CONSTRUCTION SHEET KEYMAP

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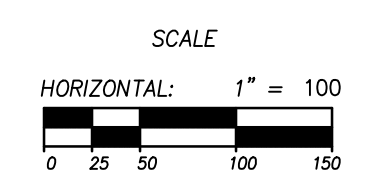
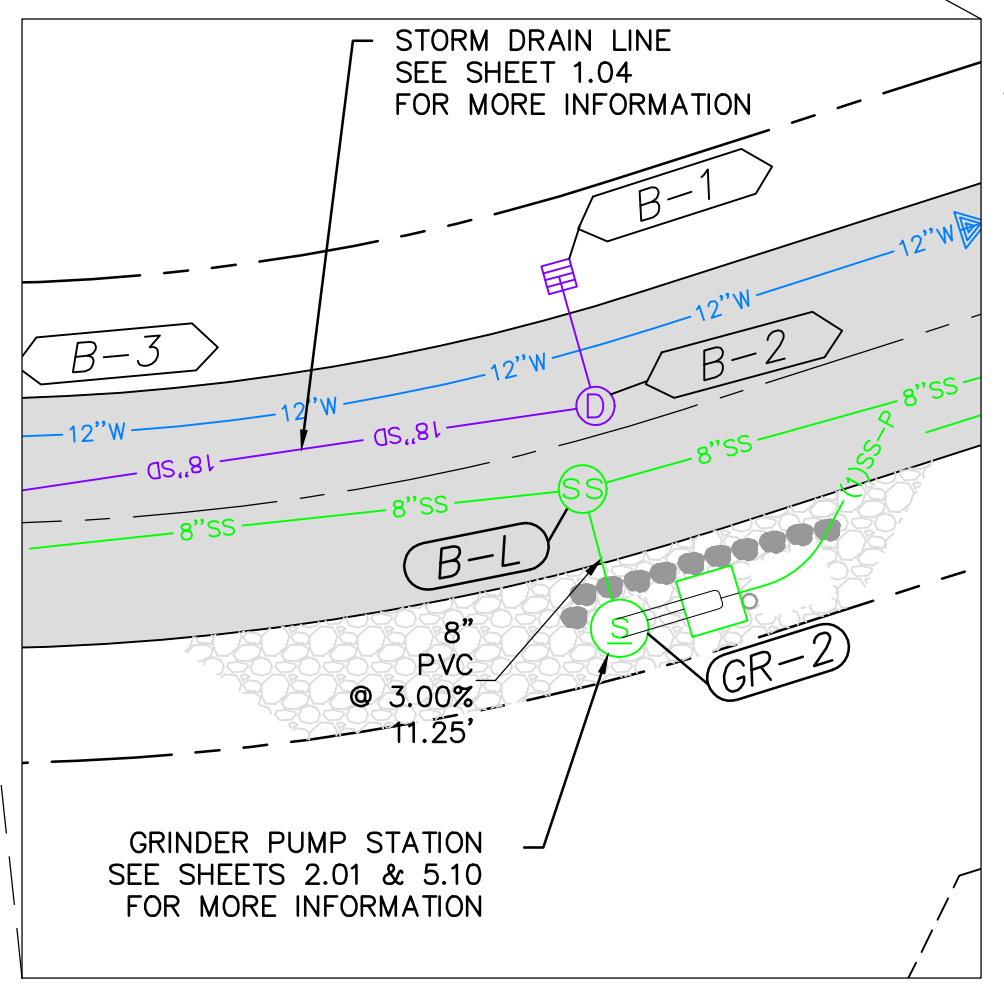
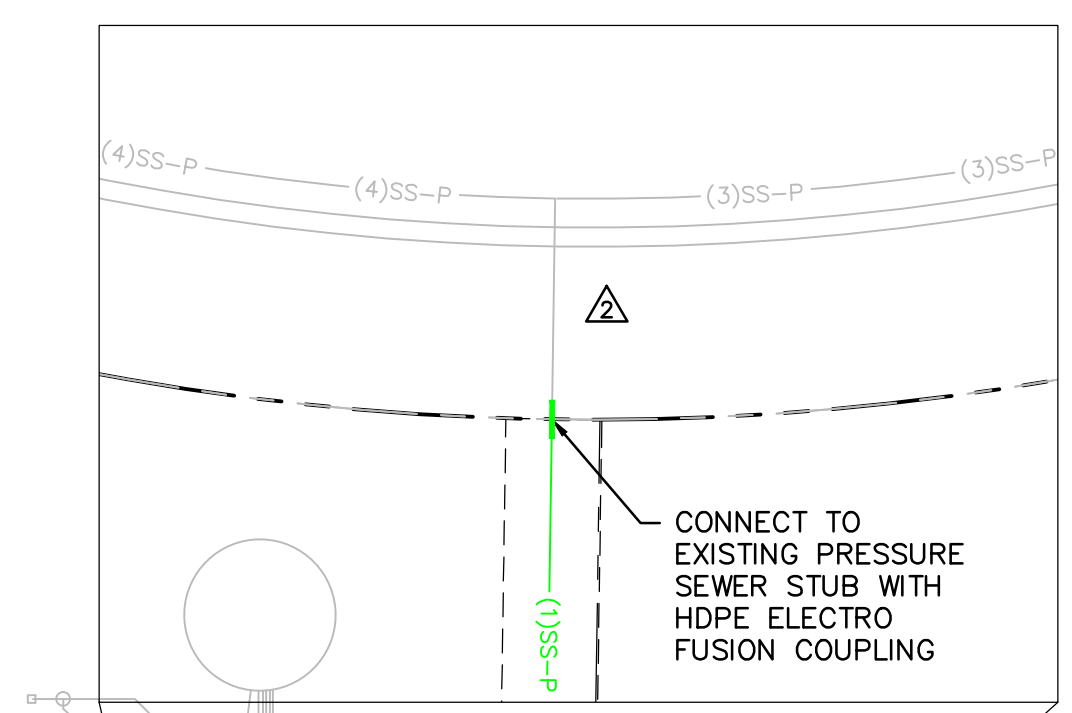
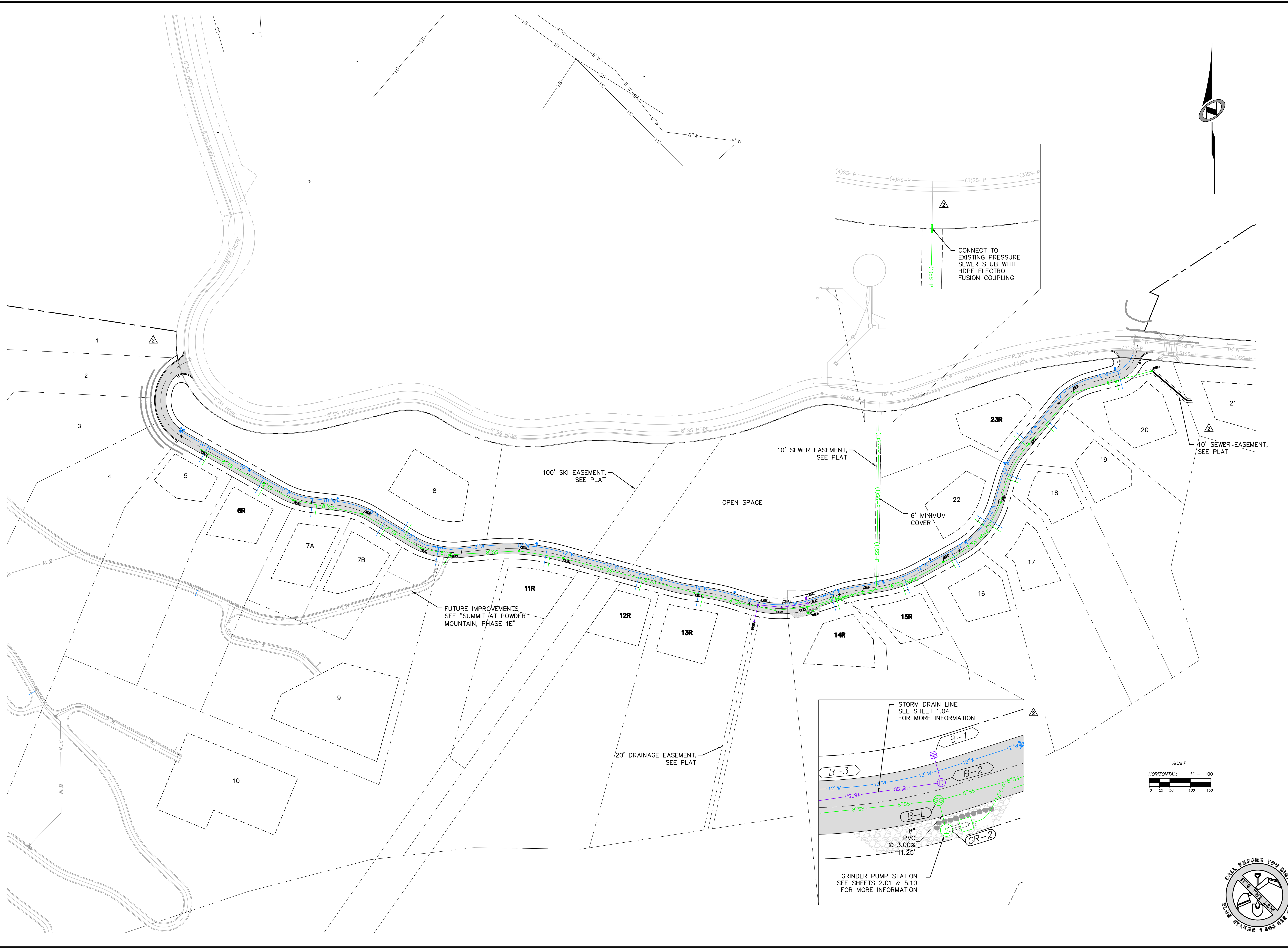


SHEET NUMBER
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 HORIZONTAL: 1" = NA

JOB NUMBER
SLB079306

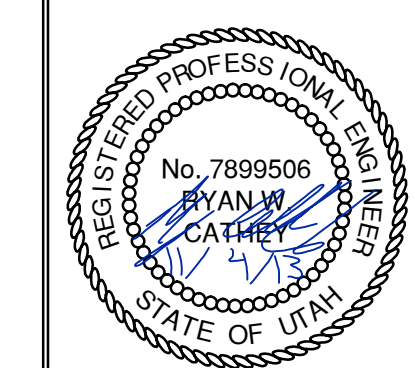




| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|--|
| 1 | RWC | 8/27/2013 | ADDITIONAL UTILITY, GRADING, AND SOCKET REV. |
| 2 | RWC | 9/24/2013 | |

PHASE 1A CONSTRUCTION OVERALL UTILITY PLAN

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 5217 SOUTH STATE STREET, SUITE 200
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SHEET NUMBER
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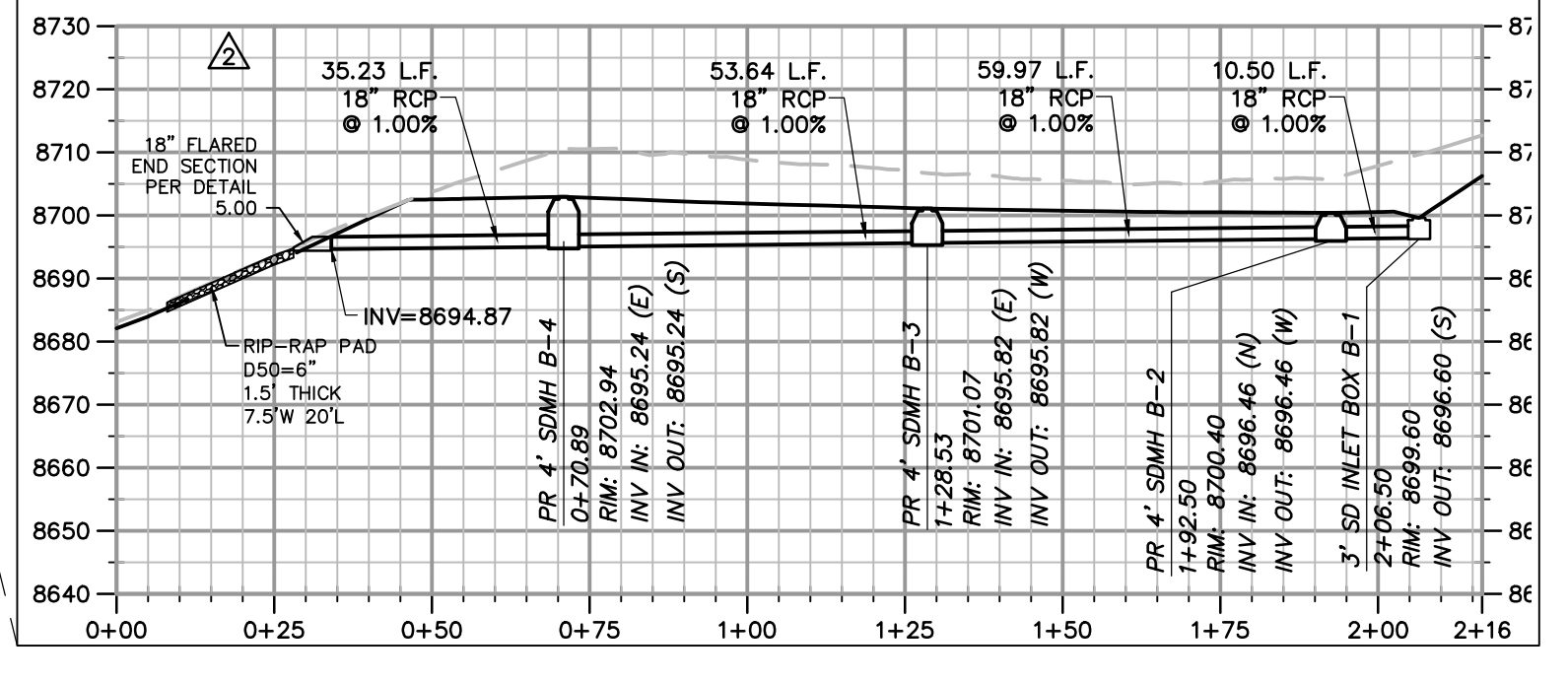
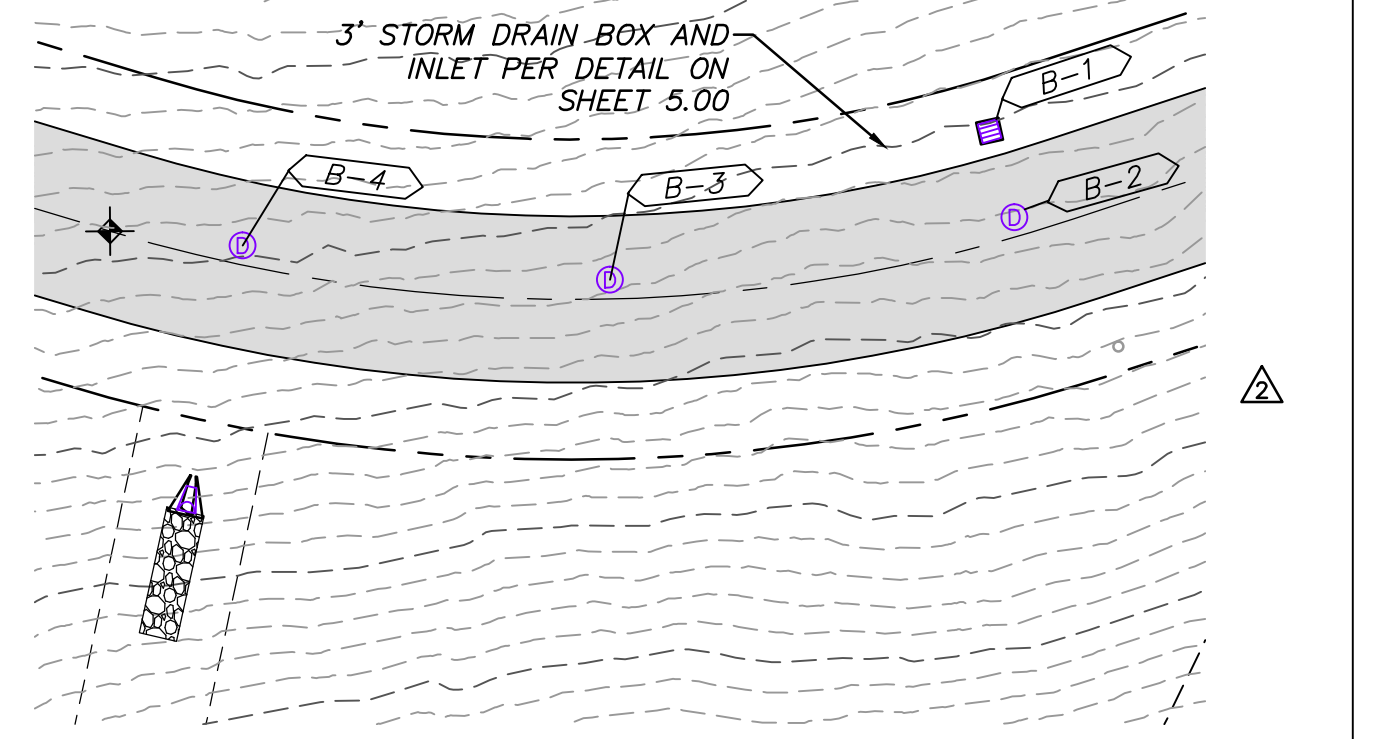
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JOB NUMBER
SLB079306

DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

CAUTION
 The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. Any such changes or uses must be approved by the preparer of these plans.

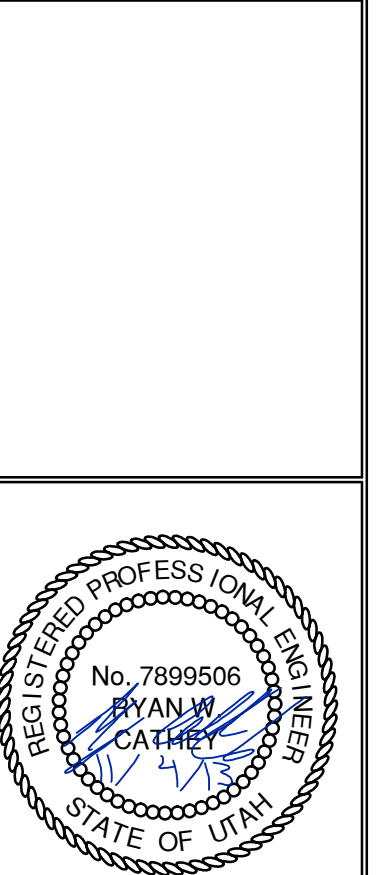


| NO. | BY | DATE | REVISIONS |
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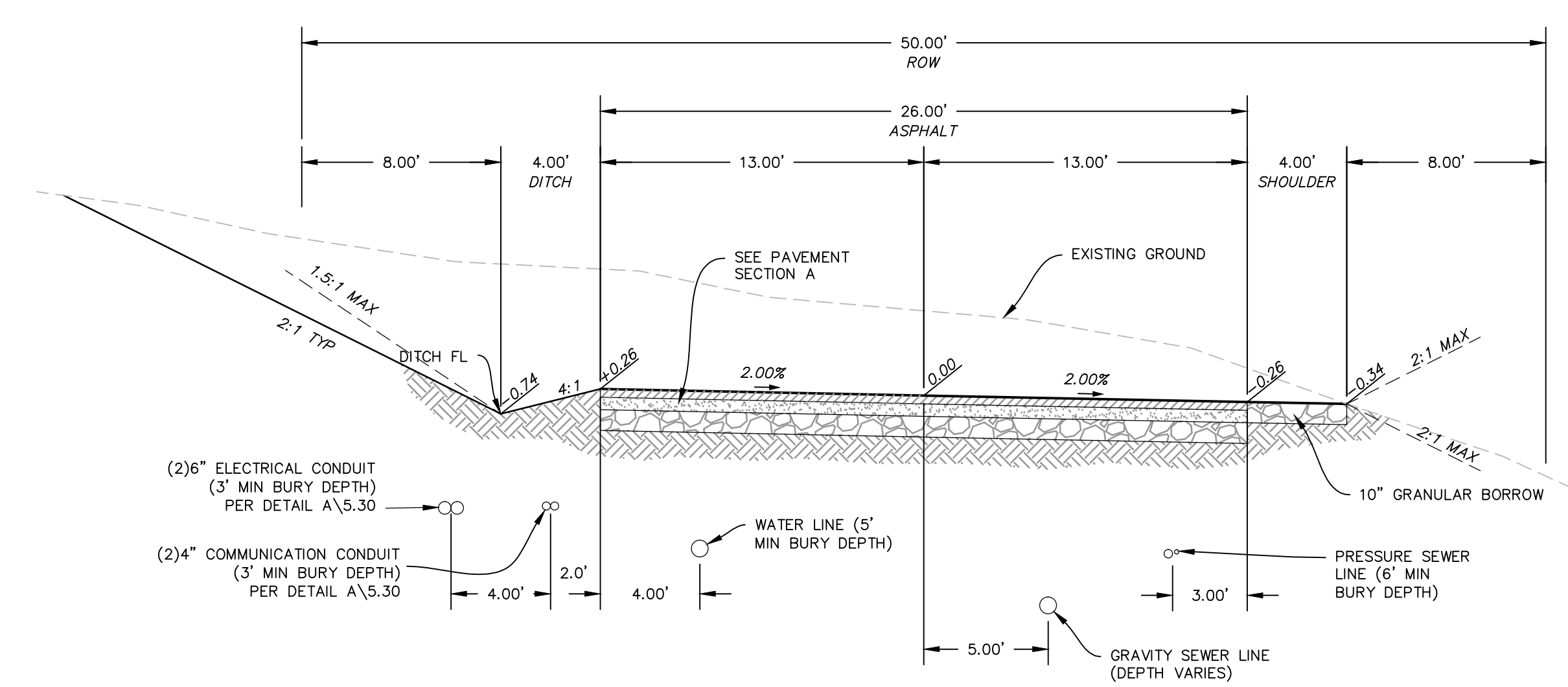
CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans for purposes not intended by the engineer. Any such changes and uses must be approved by the preparer of these plans.

PHASE 1A CONSTRUCTION
 HORIZON RUN
 OVERALL GRADING AND DRAINAGE PLAN
 PREPARED FOR: SUMMIT, LLC
 DATE SUBMITTED: 11/4/2013

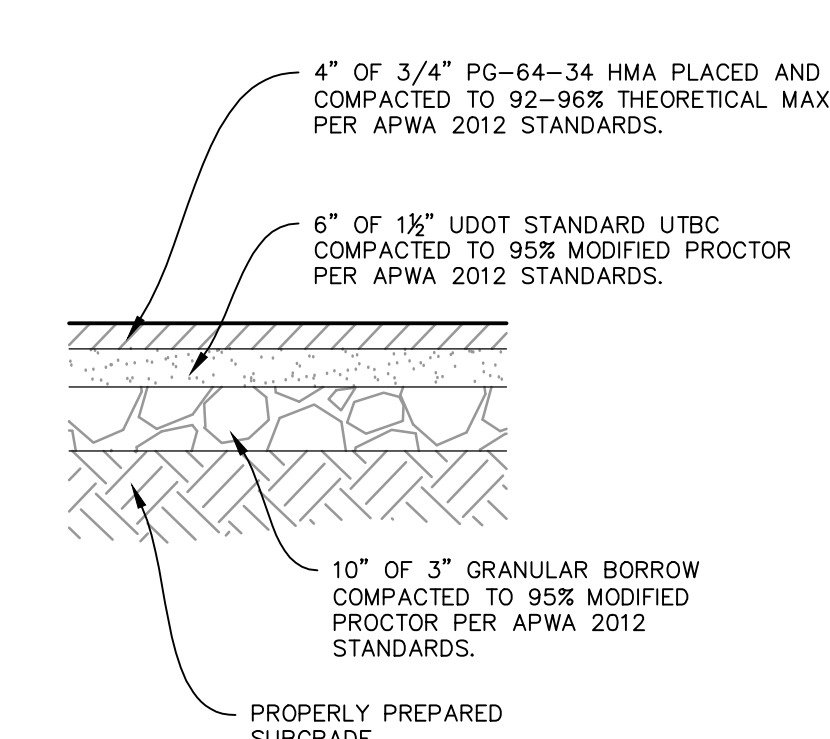
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SHEET NUMBER
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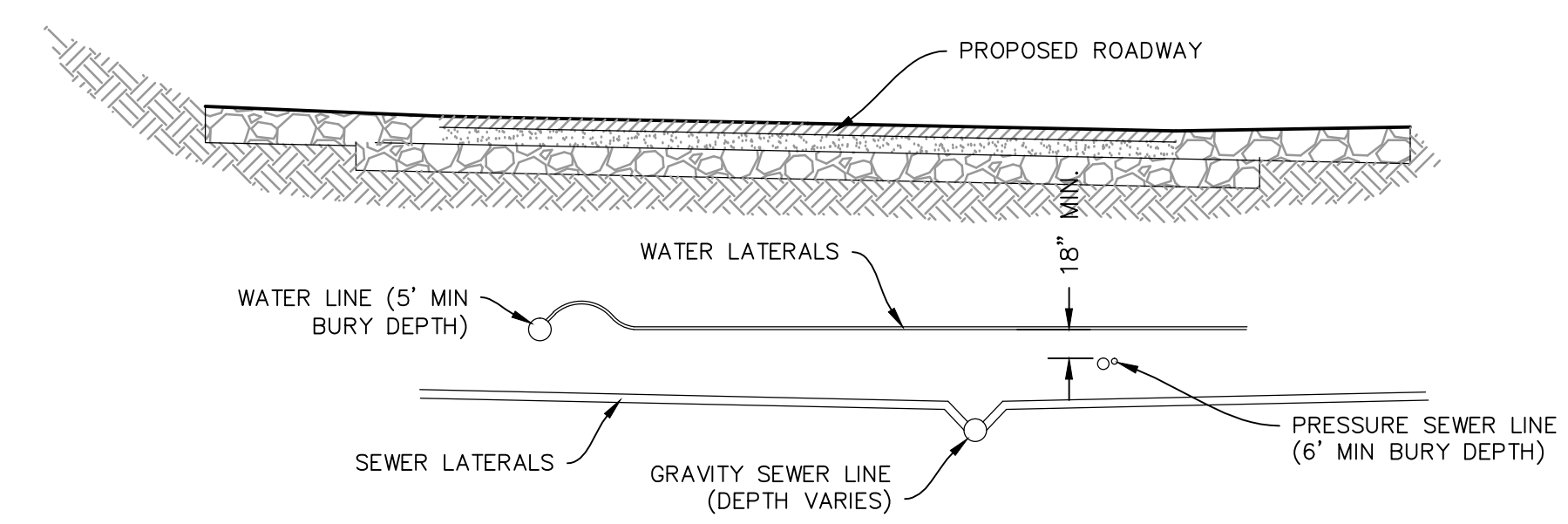


TYPICAL ROADWAY SECTION A-A
 (50' RIGHT OF WAY SECTION)
 STA: 10+00.00 TO 18+14.86



PAVEMENT SECTION A

FOR CUT AND FILL SLOPES GREATER THAN 2:1 REFER TO GEOTECHNICAL REPORT AND SUPPLEMENTAL LETTERS FOR SPECIAL STABILIZATION REQUIREMENTS



WATER AND SEWER SEPARATION DETAIL

| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|----------------------------------|
| 1 | RWC | 8/27/2013 | ADDENDUM 1 |
| 2 | RWC | 9/24/2013 | UTILITY, GRADING, AND ROCKET REV |

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CAUTION

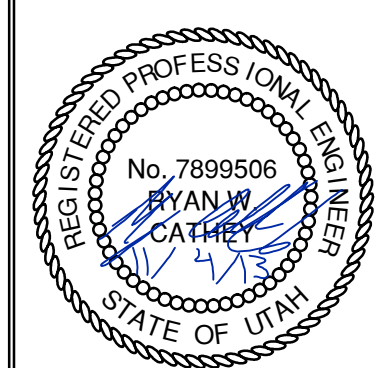
PHASE 1A CONSTRUCTION

ROADWAY TYPICAL SECTIONS

DATE SUBMITTED: 11/4/2013

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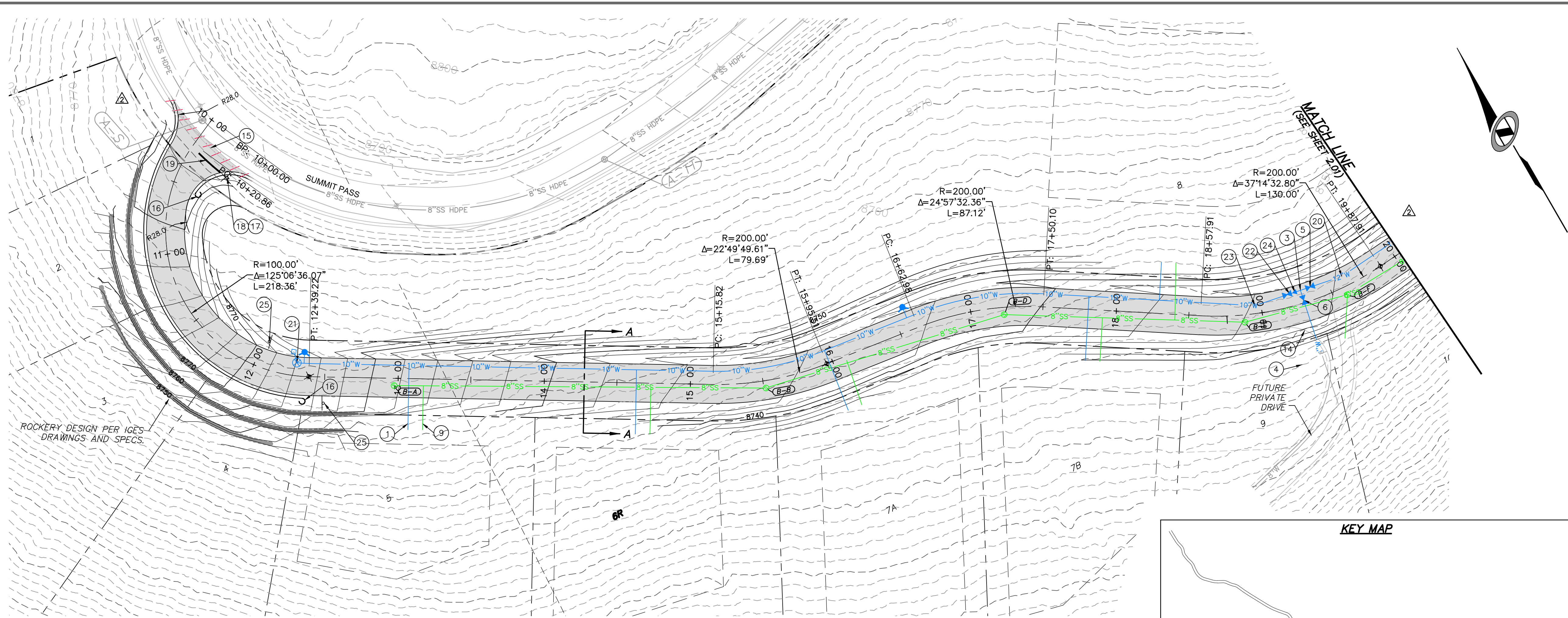
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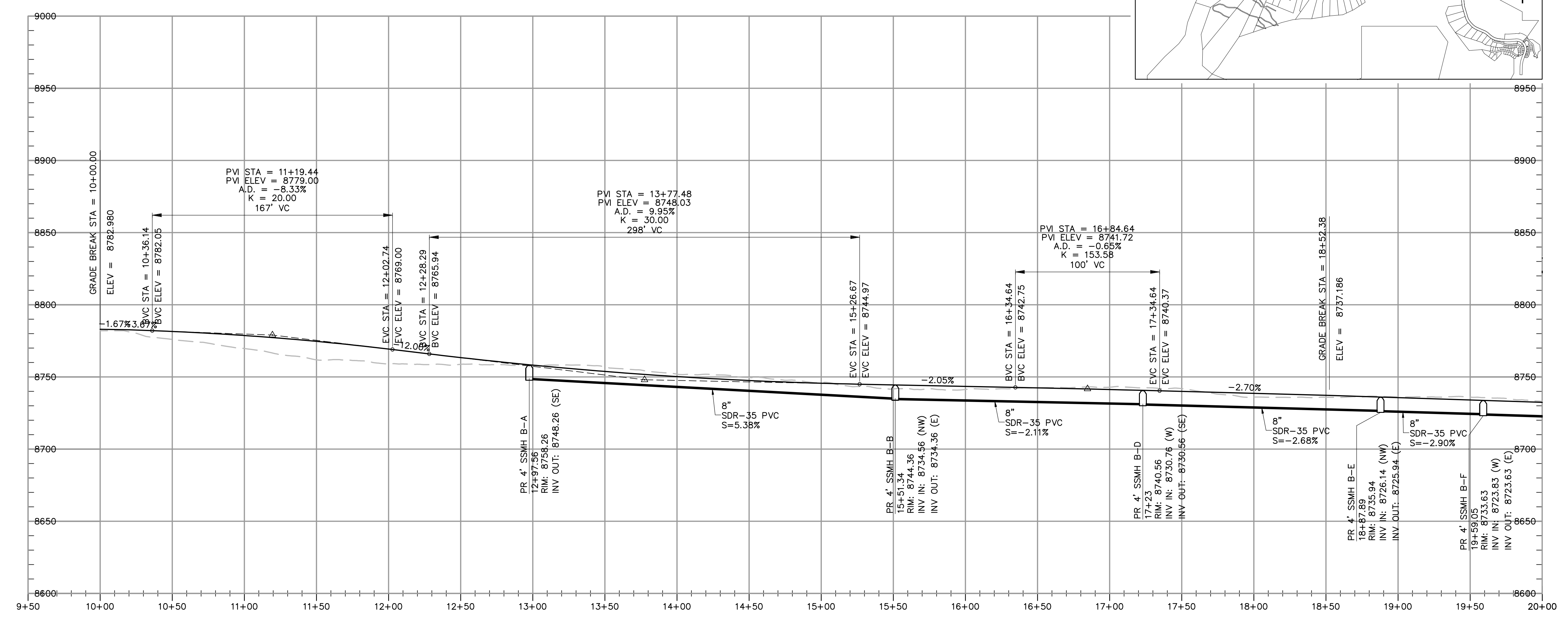
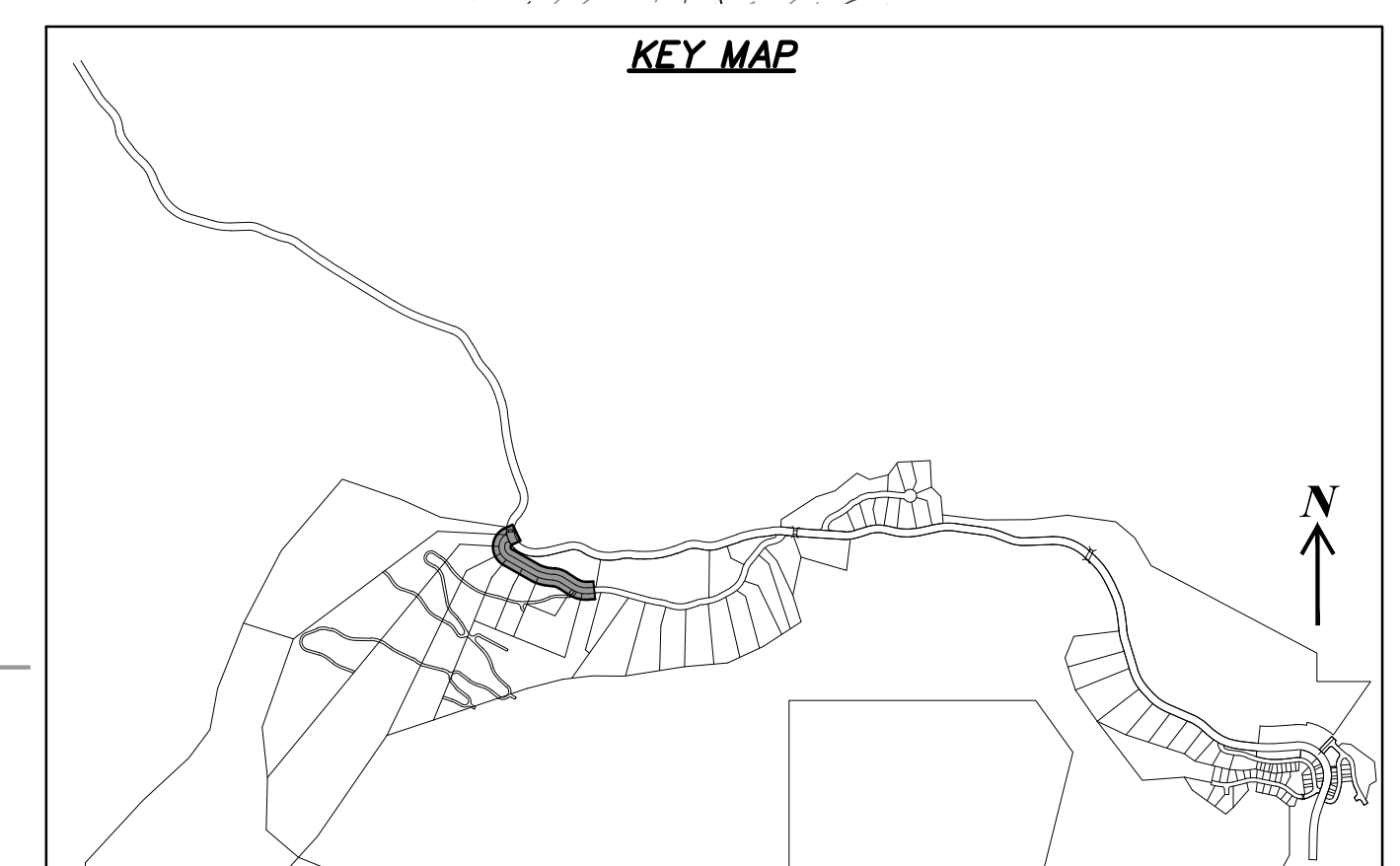
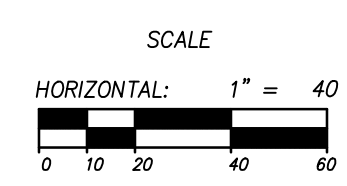
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HORIZON RUN
 STA: 10+00.00 TO 20+00.00



| NO. | BY | DATE | REVISIONS |
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| 2 | PMC | 8/27/2013 | UTILITY, GRADING, AND ROCKERY REV |

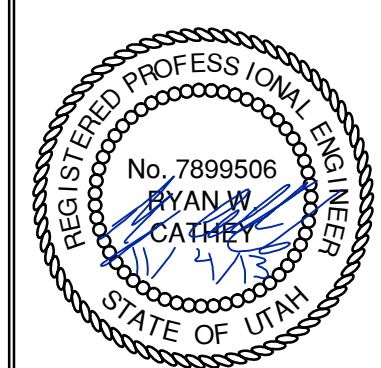
The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. The engineer's liability is limited to the design and construction of these plans.

PHASE 1A CONSTRUCTION
PLAN AND PROFILE
HORIZON RUN

DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

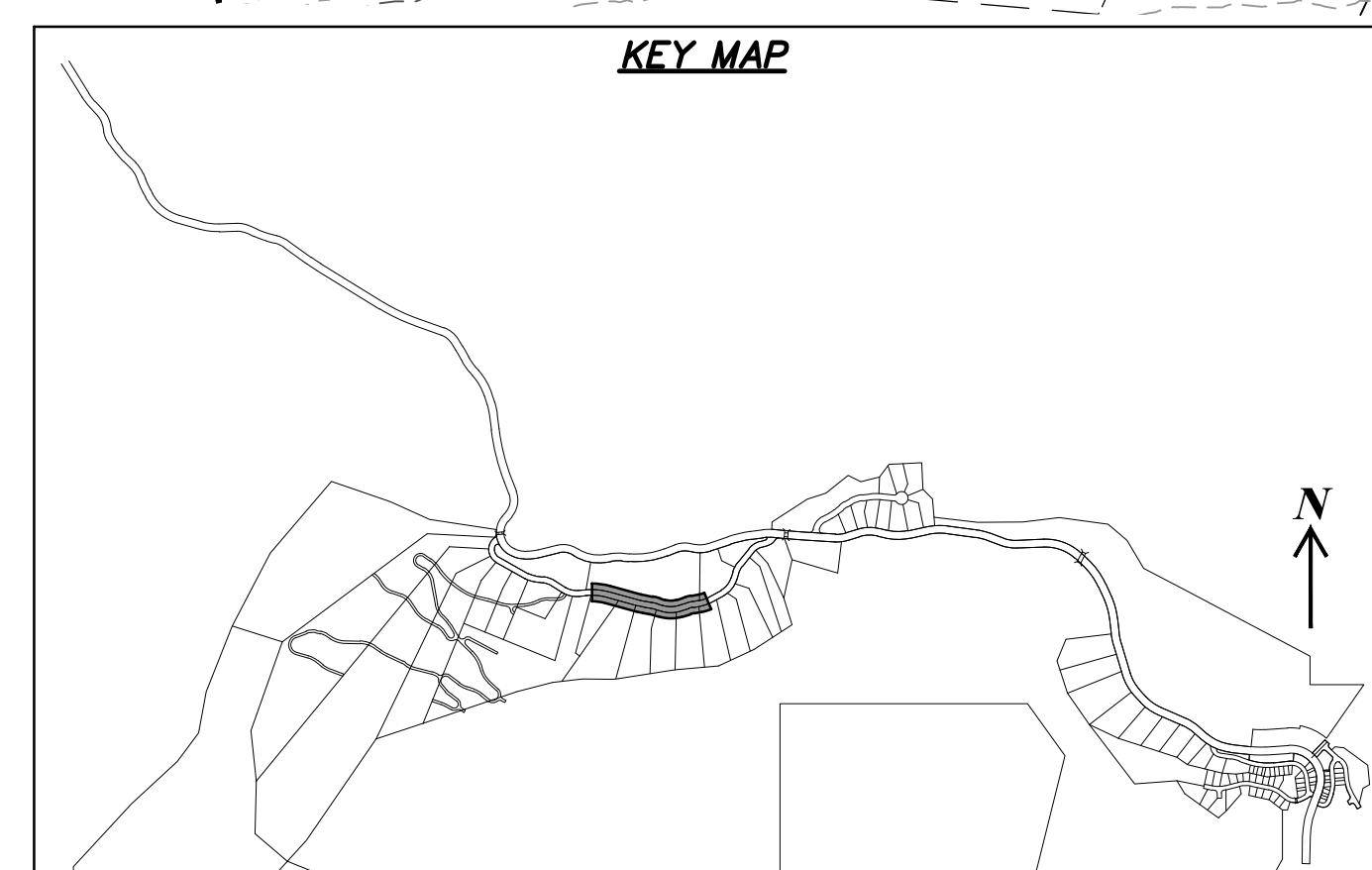
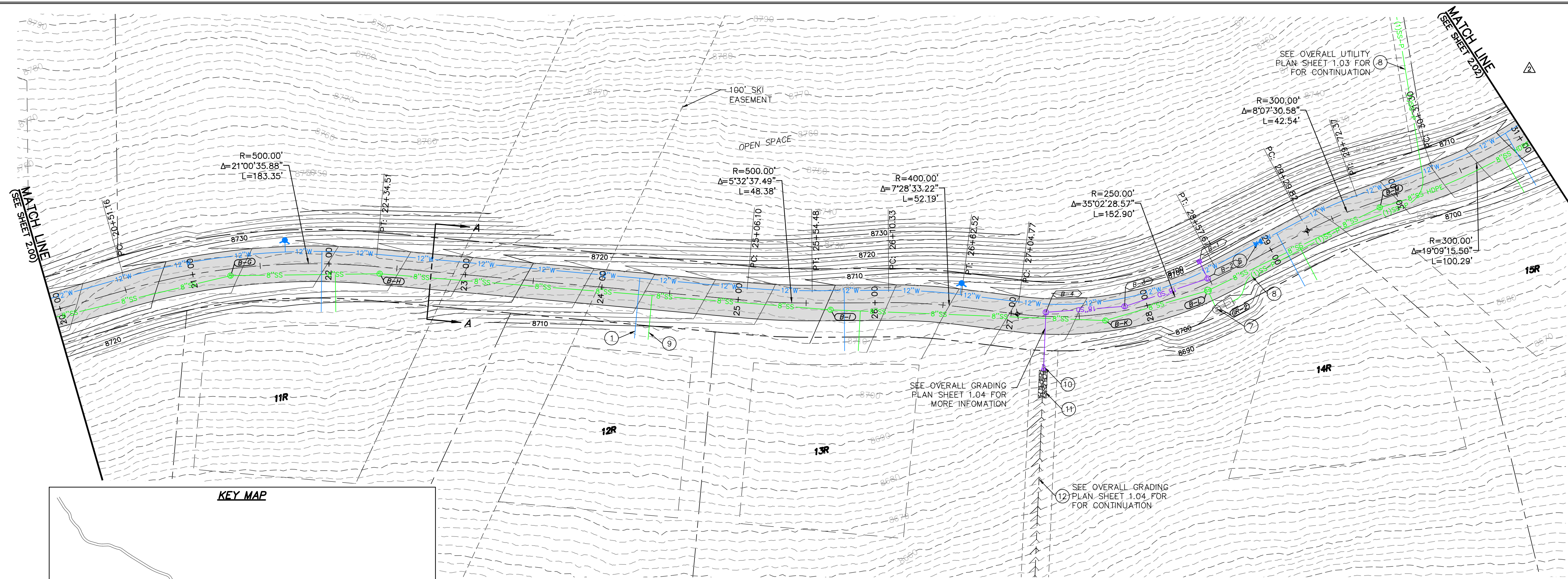
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 MURRAY, UT 84107
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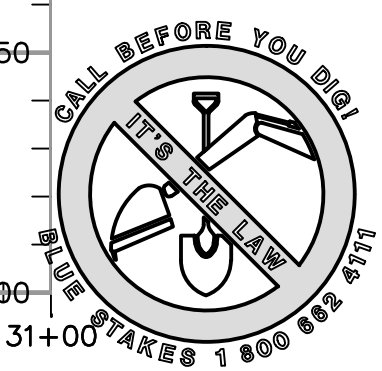
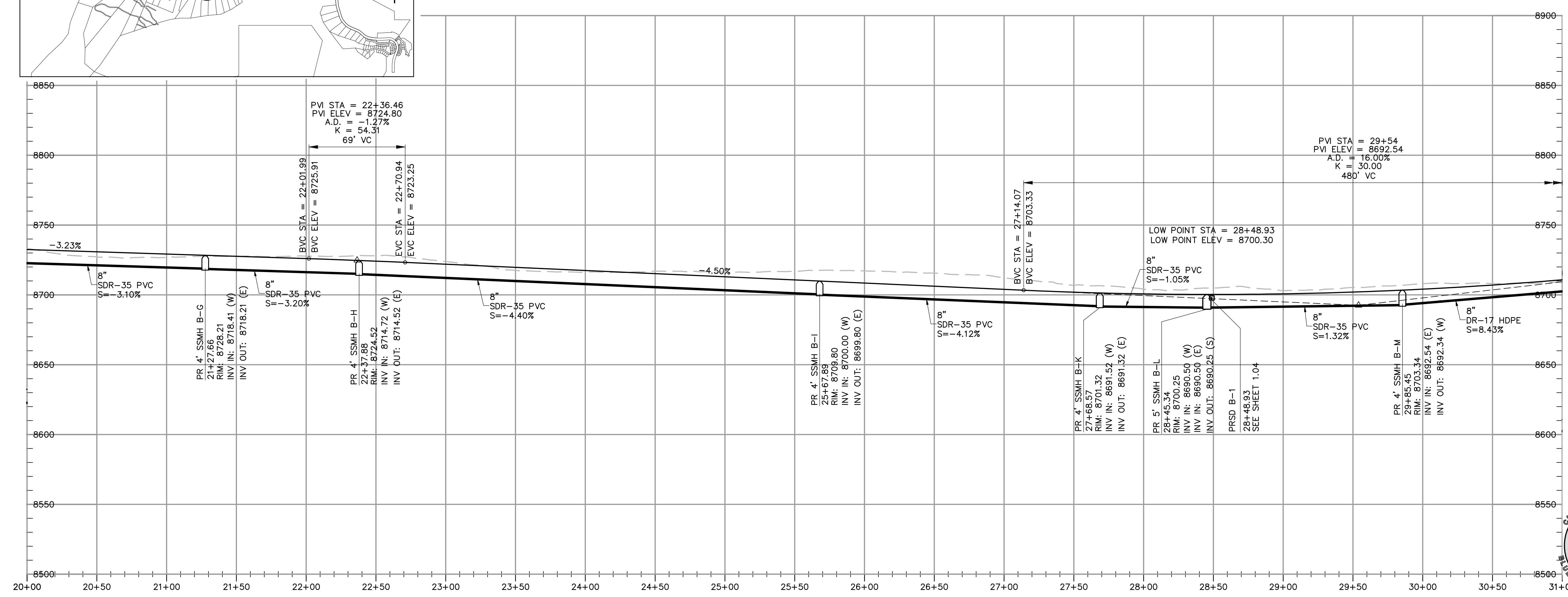
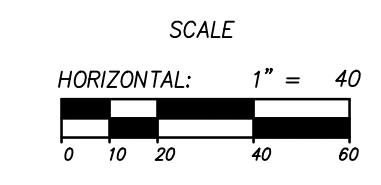
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JOB NUMBER
SLB079306



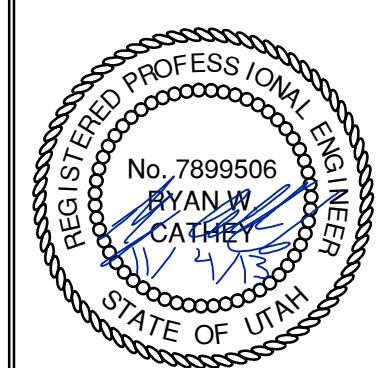
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 STA: 20+00.00 TO 31+00.00



| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|------------------------------------|
| 1 | PMC | 8/27/2013 | ADDendum 1 |
| 2 | PMC | 8/27/2013 | UTILITY, GRADING, AND ROCKETRY REV |

PREPARED FOR: SUMMIT, LLC
 DATE SUBMITTED: 11/4/2013

PHASE 1A CONSTRUCTION PLAN AND PROFILE HORIZON RUN



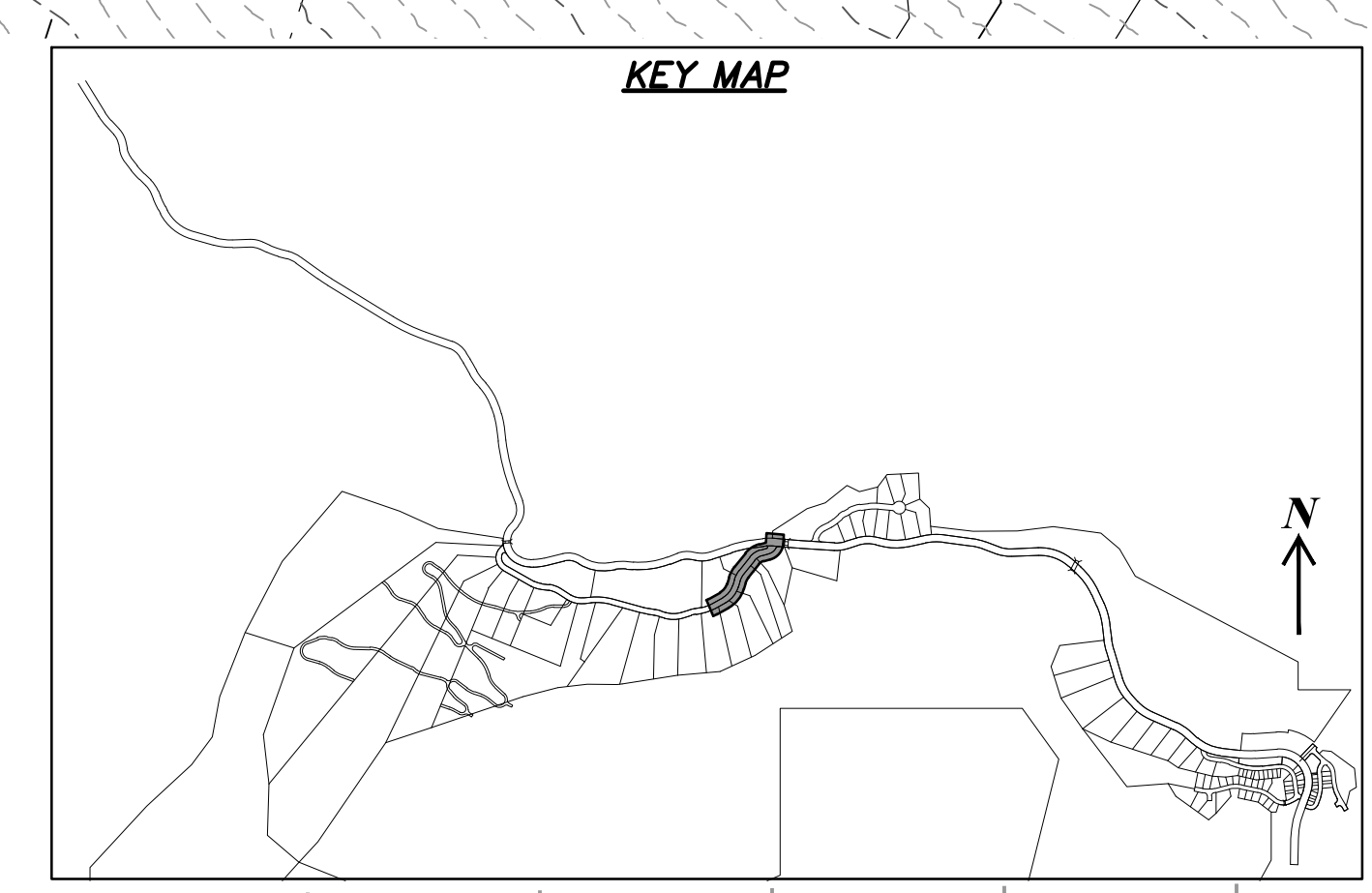
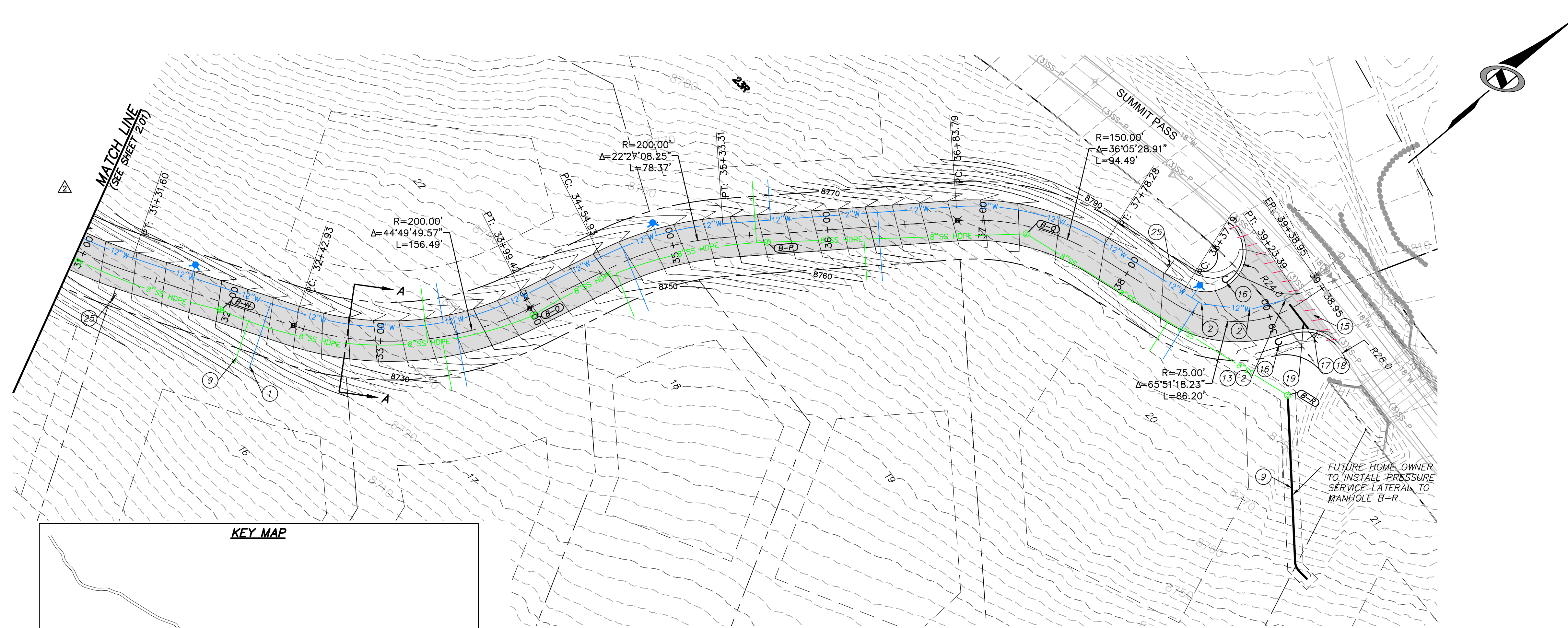
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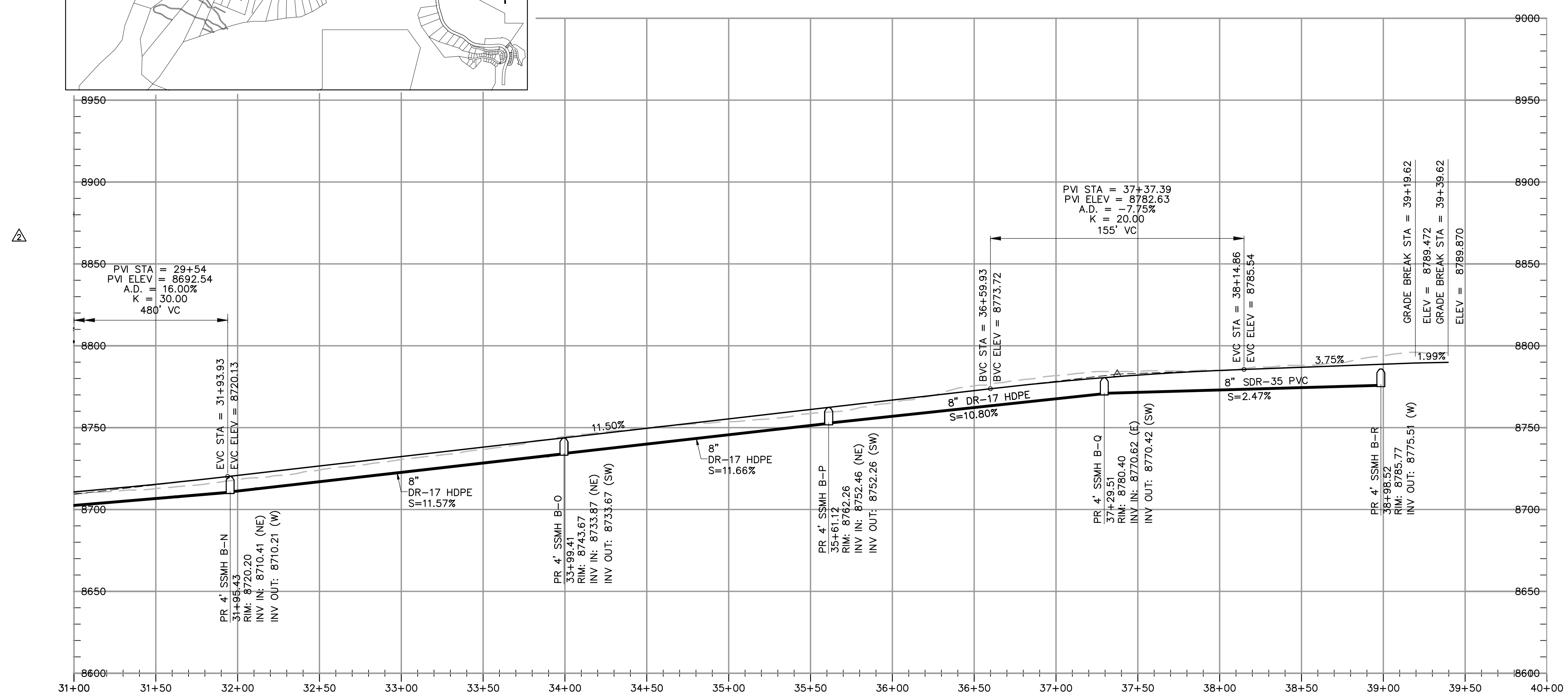
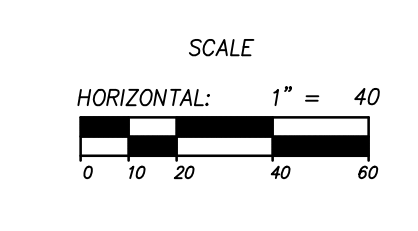
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CAUTION
 The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans, and must be approved by the preparer of these plans.

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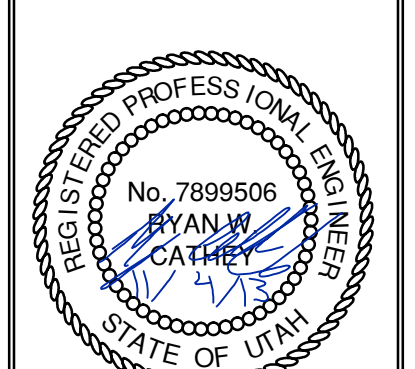
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 STA: 31+00.00 TO 39+39.62



| NO. | BY | DATE | REVISIONS |
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| 2 | RMC | 8/27/2013 | UTILITY, GRADING, AND ROCKERY REV |

PHASE 1A CONSTRUCTION
PLAN AND PROFILE
HORIZON RUN

NV5
 BEYOND ENGINEERING
 6217 SOUTH STATE STREET, SUITE 200
 801743.0000 TEL. 801743.0000 FAX
 MURRAY, UT 84107
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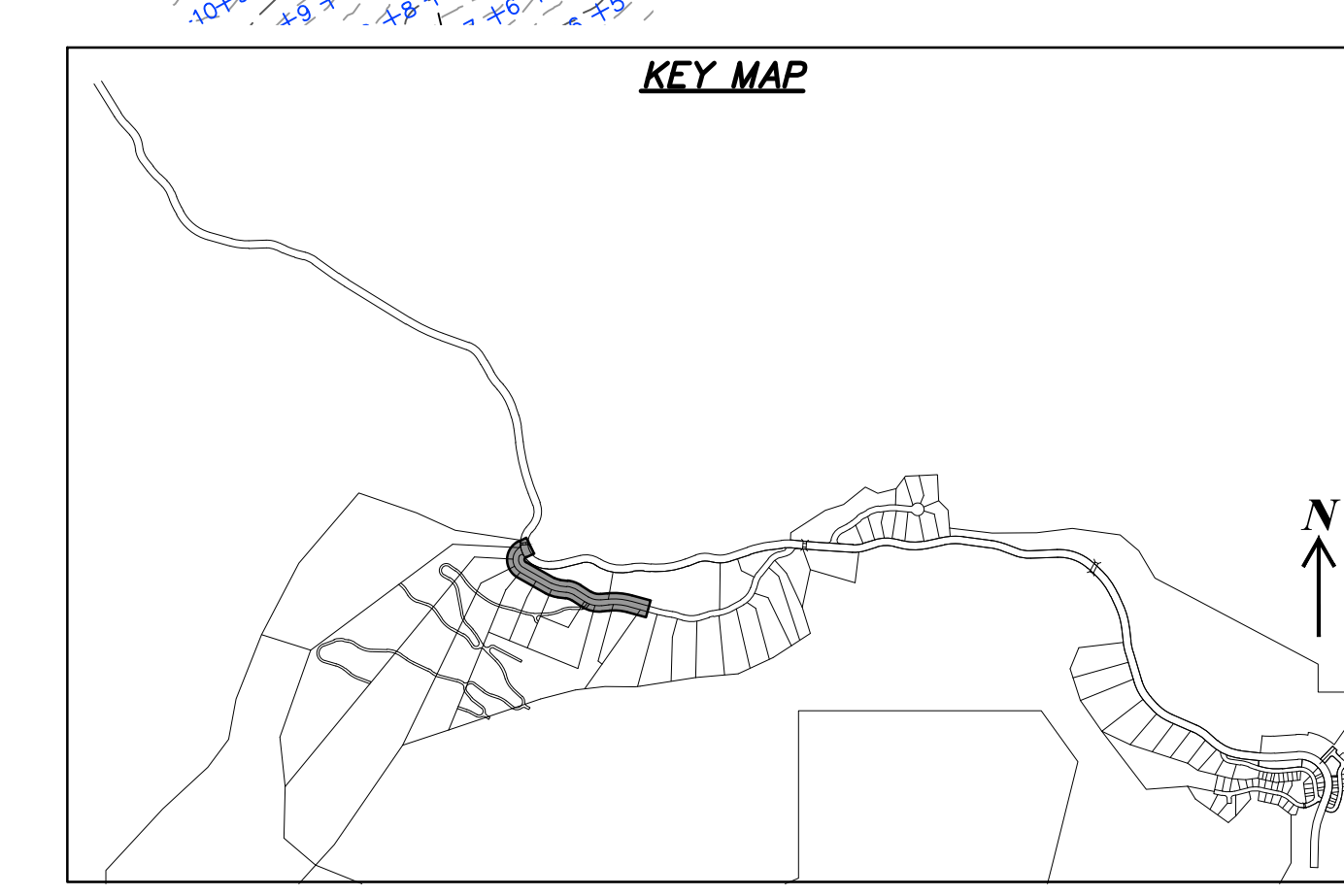
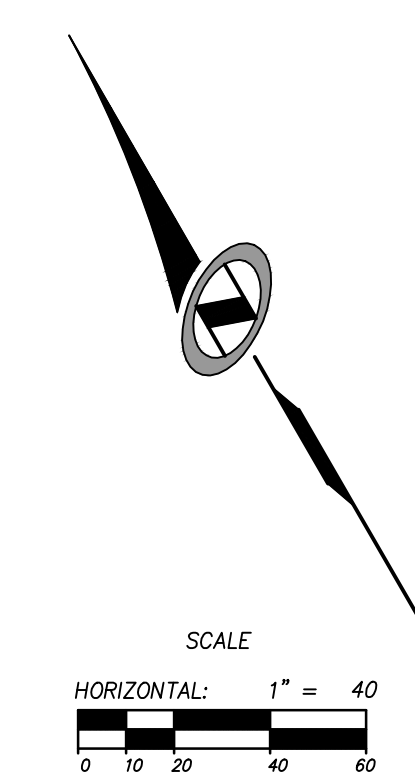
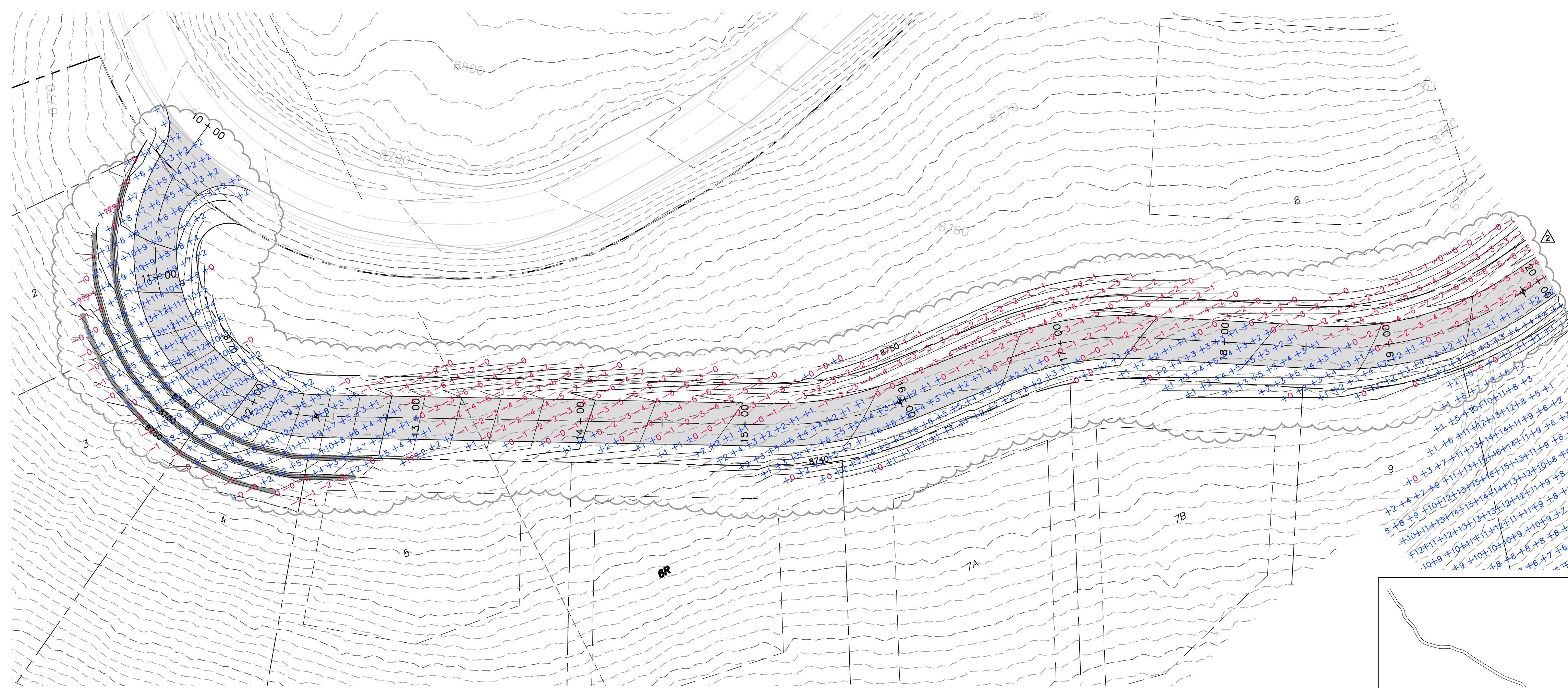


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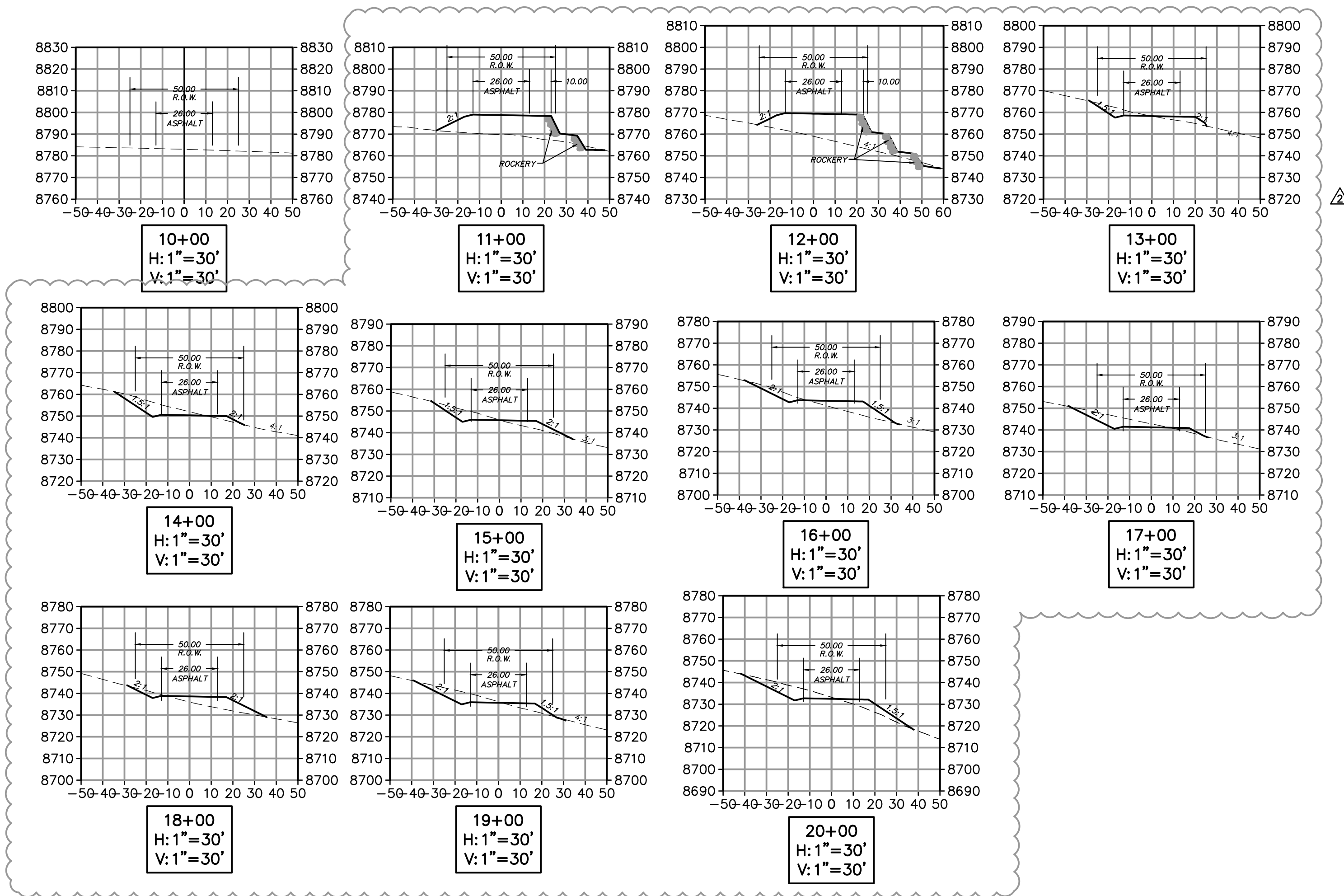
DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

CAUTION
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HORIZON RUN
 STA: 10+00.00 TO 20+00.00



| NO. | BY | DATE | REVISIONS |
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| 2 | RMC | 9/24/2013 | UTILITY, GRADING, AND ROCKERY REV. |

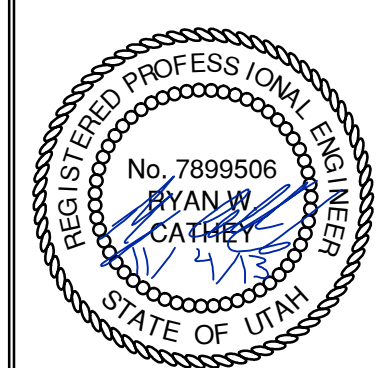
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PHASE 1A CONSTRUCTION
EARTHWORK AND SECTIONS
HORIZON RUN

PREPARED FOR: SUMMIT, LLC

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 527 SOUTH STATE STREET, SUITE 200
 801743.000 TEL. 801743.000 FAX
 MURRAY, UT 84107
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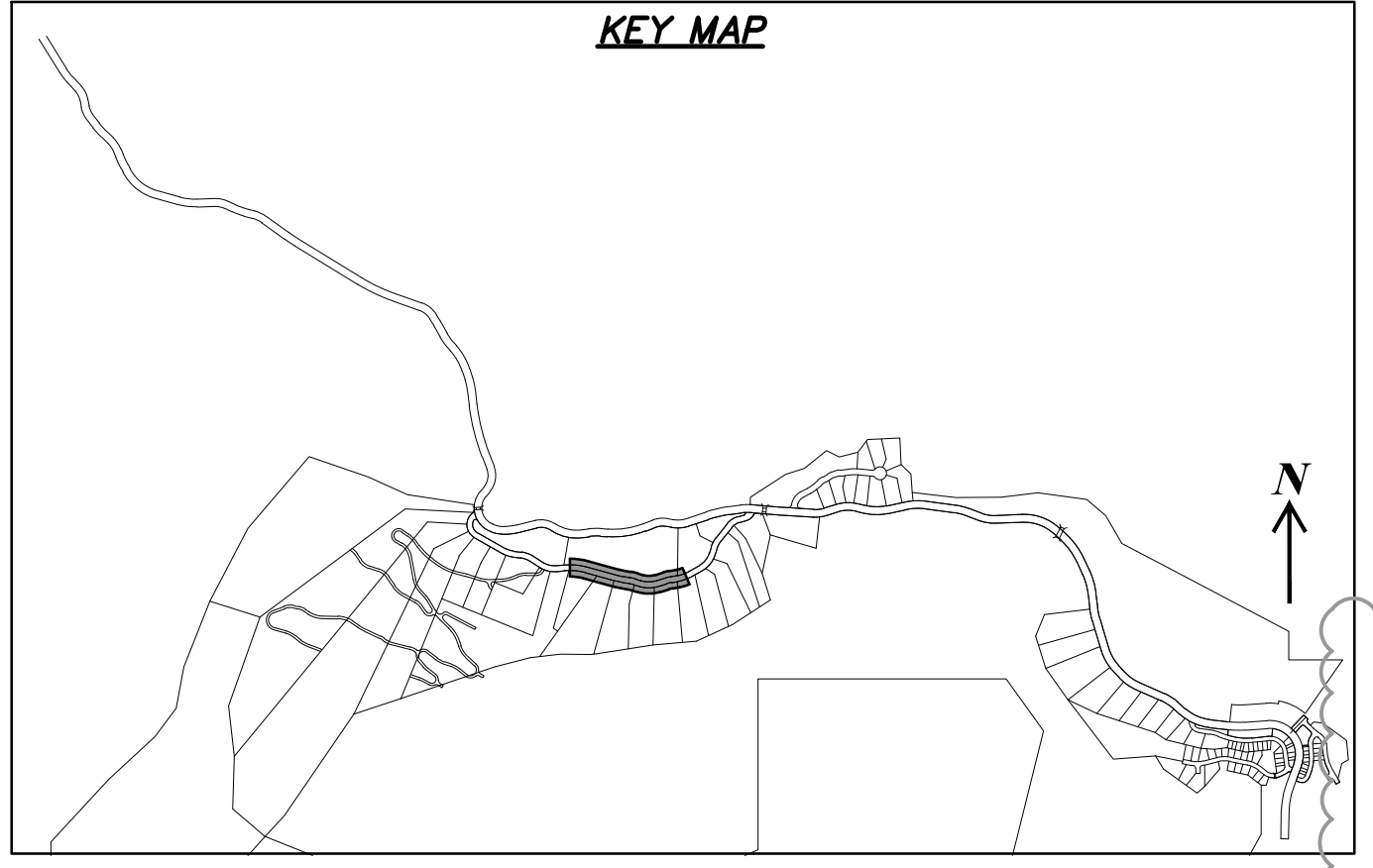
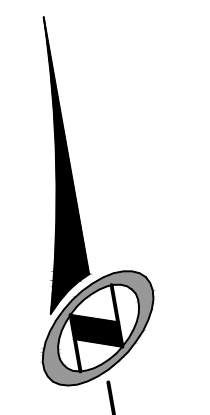
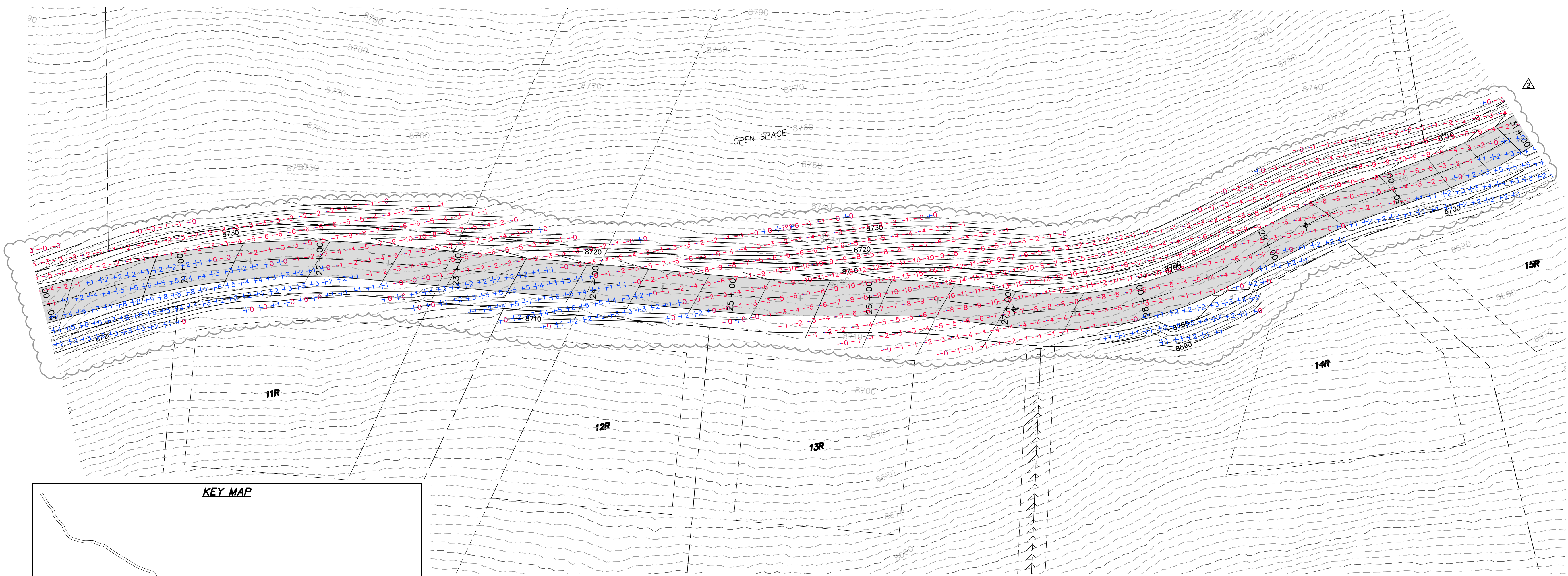


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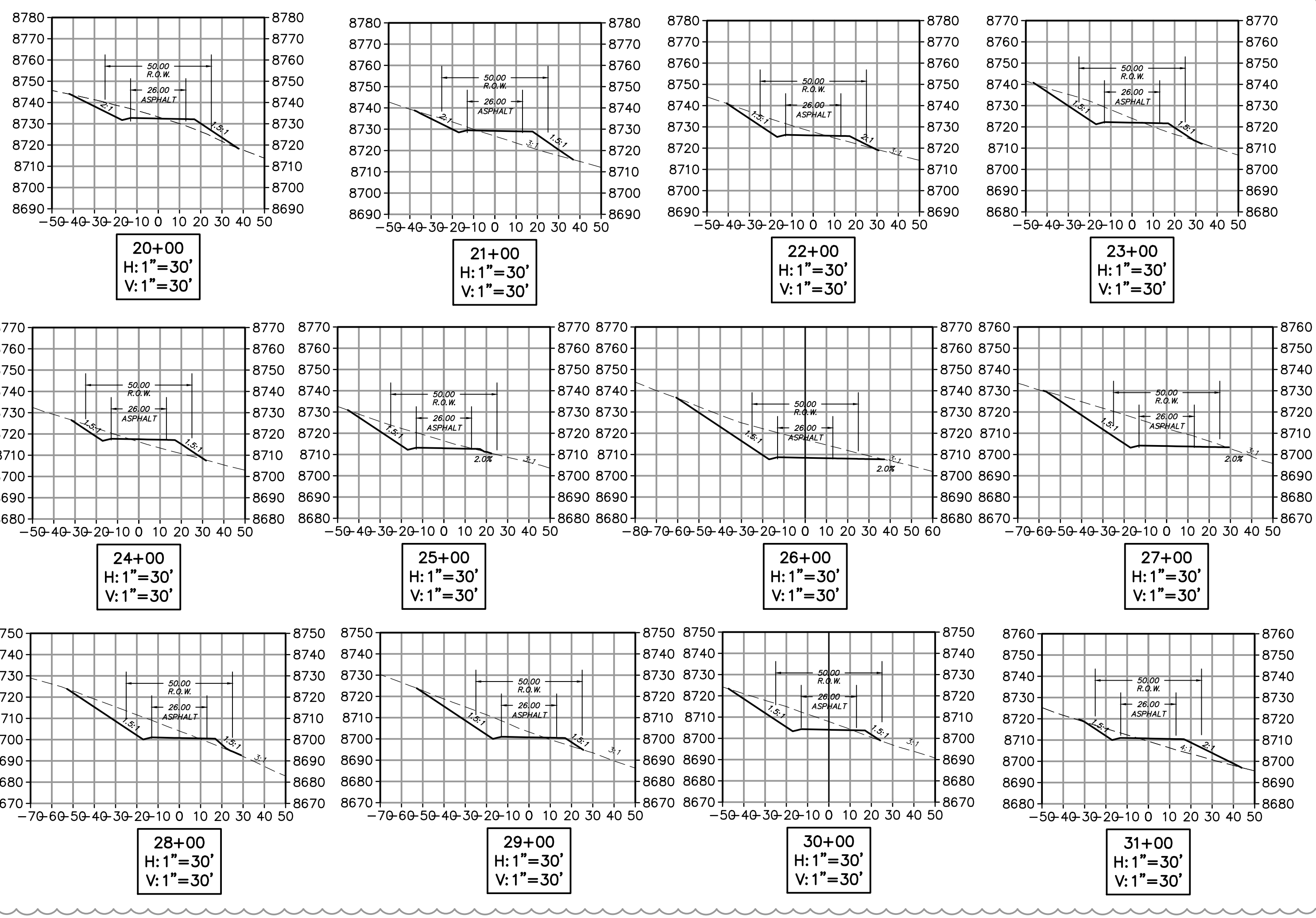
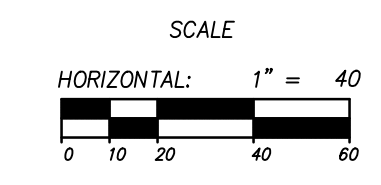
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 HORIZONTAL: 1" = 40'

JOB NUMBER
SLB079306





HORIZON RUN
 STA: 20+00.00 TO 31+00.00



| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|----------------------------------|
| 1 | RMC | 8/27/2013 | UTILITY, GRADING, AND ROCKET REV |
| 2 | RMC | 8/27/2013 | |

PHASE 1A CONSTRUCTION
 EARTHWORK AND SECTIONS
 HORIZON RUN

DATE SUBMITTED: 11/4/2013
 PREPARED FOR: SUMMIT, LLC

5217 SOUTH STATE STREET, SUITE 200
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 MURRAY, UT 84107
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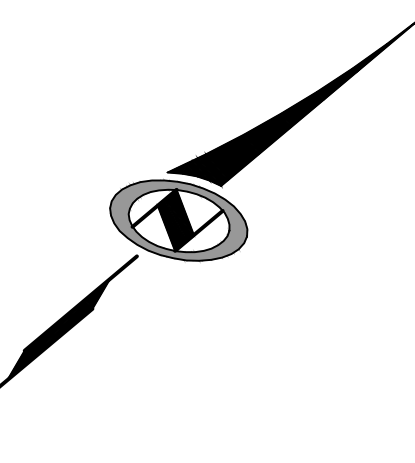
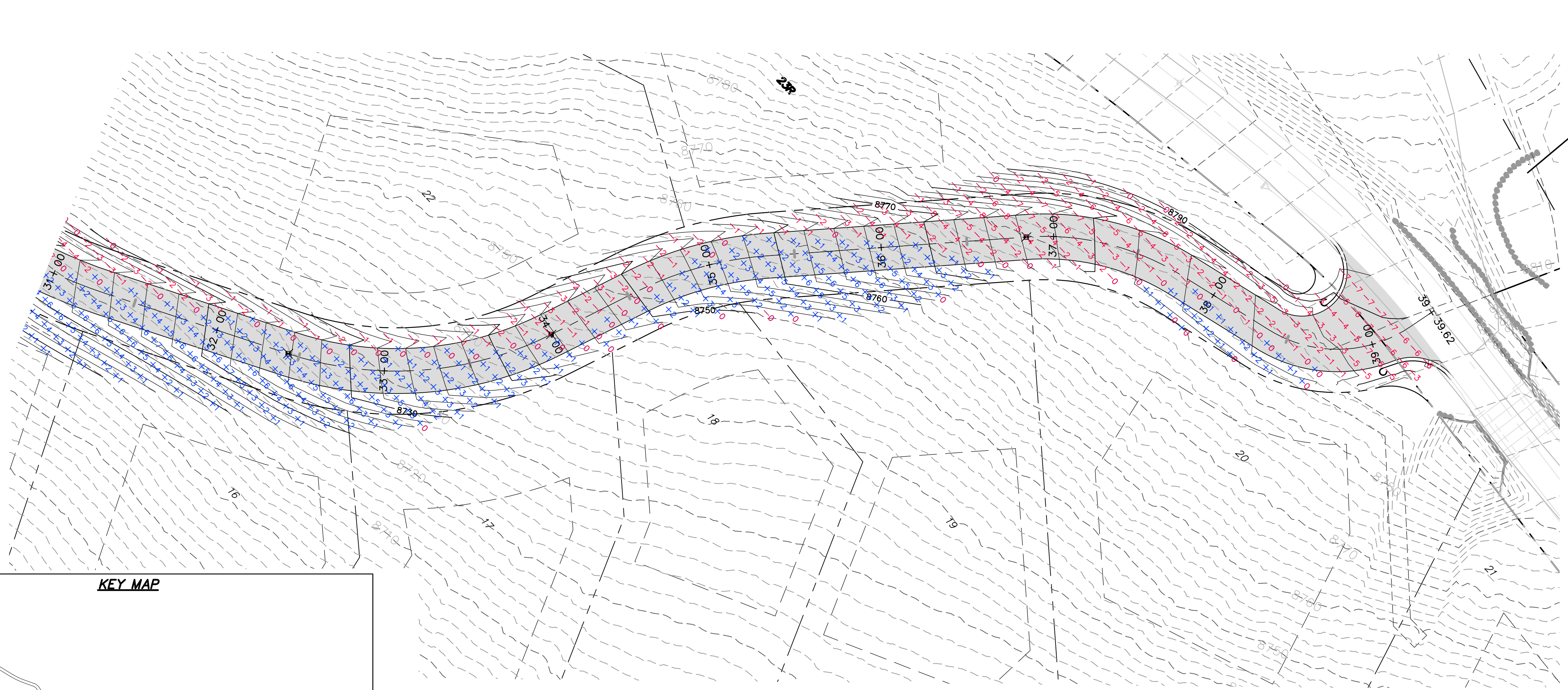
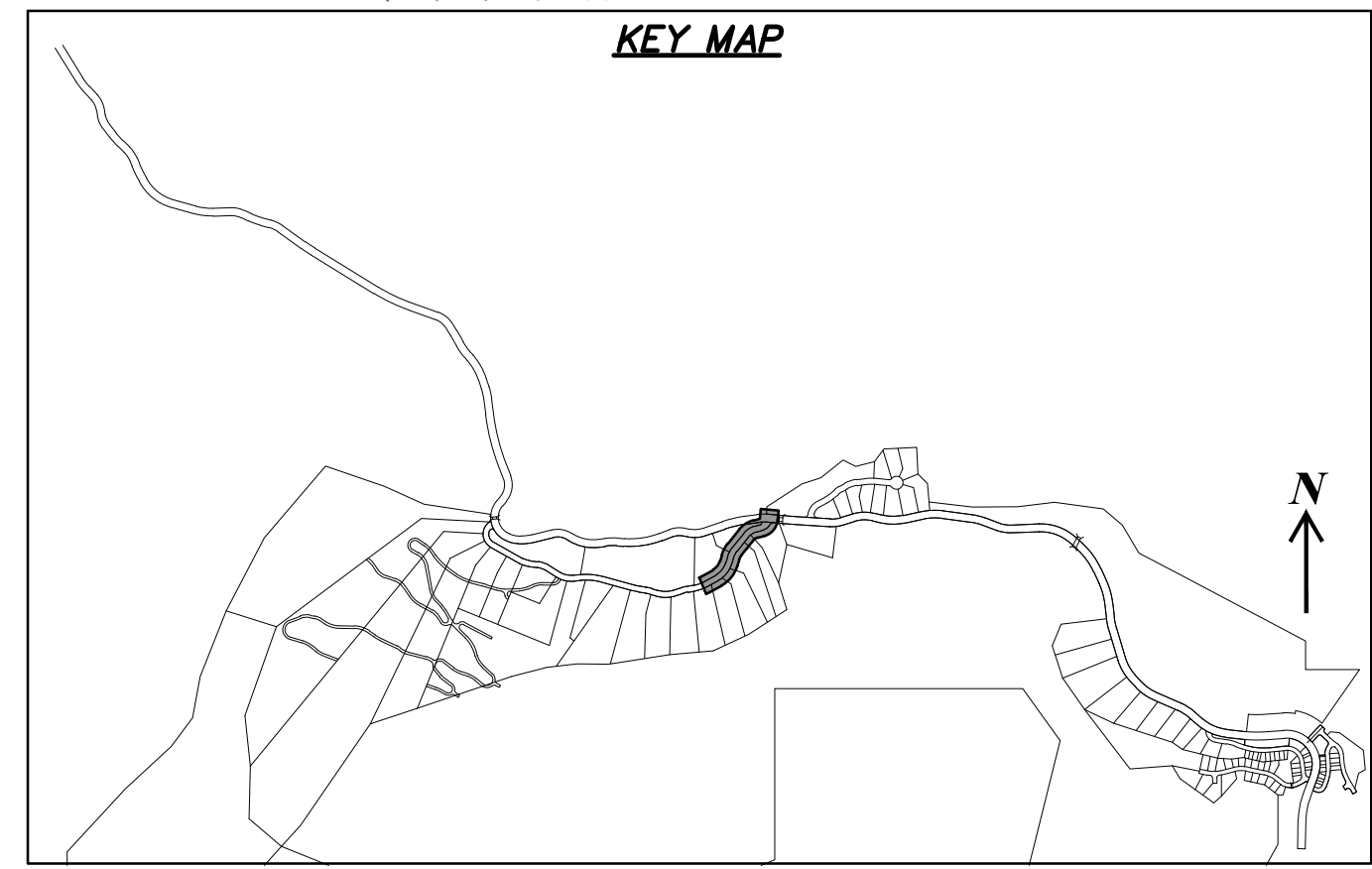
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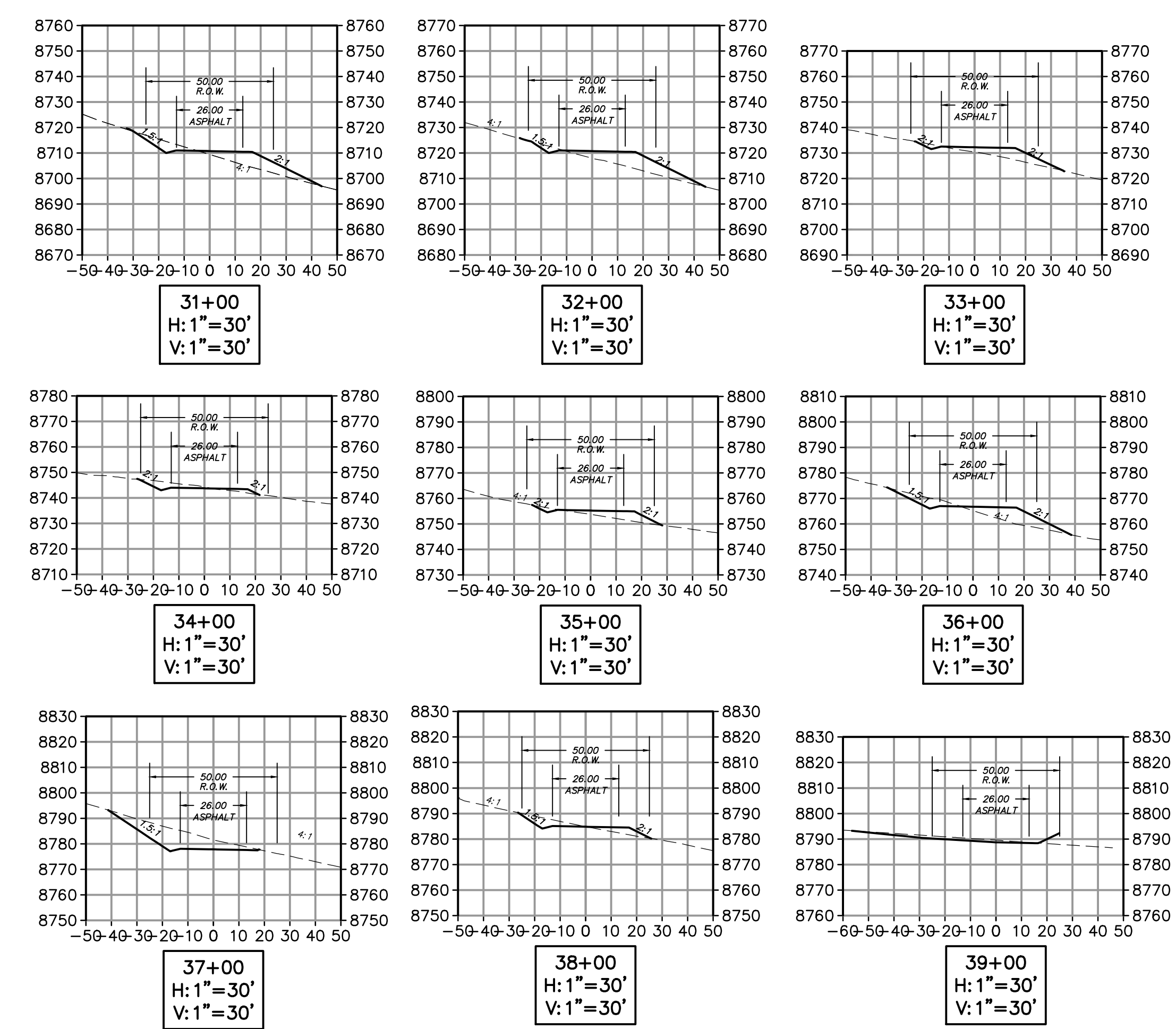
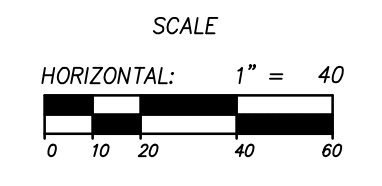
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HORIZON RUN
 STA: 31+00.00 TO 39+39.62



| NO. | BY | DATE | REVISIONS |
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| 2 | RWC | 8/27/2013 | UTILITY, GRADING, AND ROCKET REV |

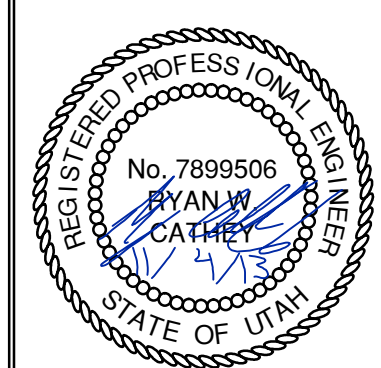
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PREPARED FOR: SUMMIT, LLC

PHASE 1A CONSTRUCTION
EARTHWORK AND SECTIONS
HORIZON RUN

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SHEET NUMBER
3.02

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 VERTICAL: 1" = 40'
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JOB NUMBER
SLB079306

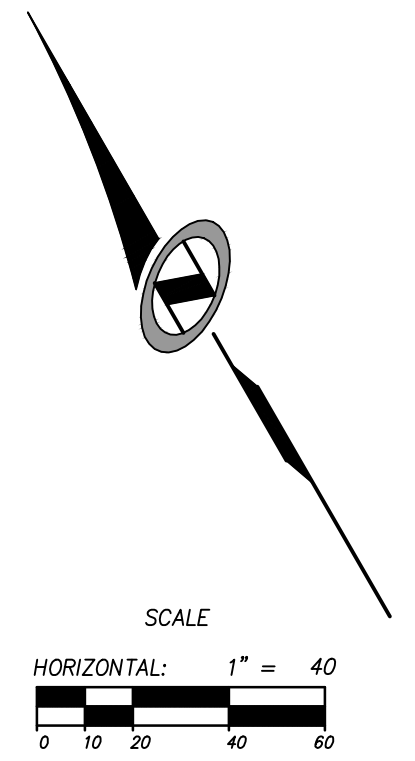


PREFACE
 XREFS:

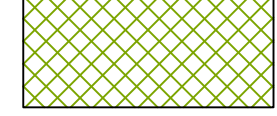
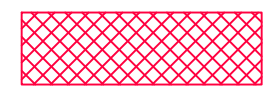
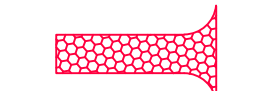





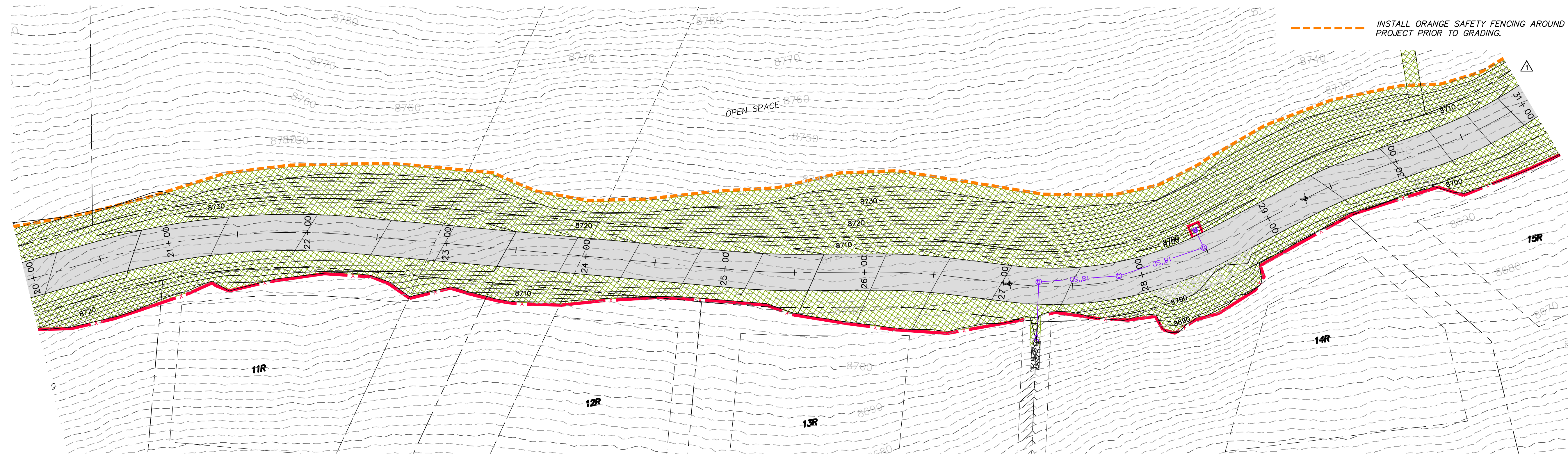
HORIZON RUN

STA: 10+00.00 TO 20+00.00



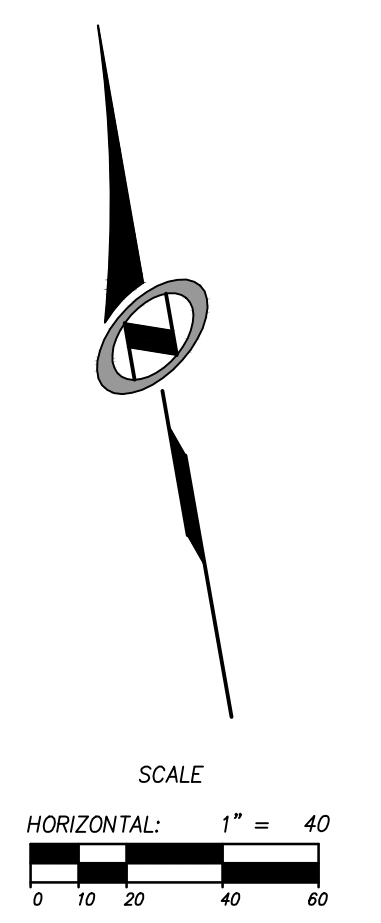
LEGEND

-  HATCHING INDICATES AREAS TO RECEIVE 4" TOPSOIL AND TO BE SEED FOR NATURAL REVEGETATION. AREAS RECEIVING SEEDING FOR NATURAL REVEGETATION MUST BE COVERED WITH AN EROSION CONTROL BLANKET AFTER THE FINAL GRADING AND SEEDING ARE FINISHED. INSTALL NORTH AMERICAN GREEN SC-150 BLANKET OR APPROVED EQUAL. FOLLOW MANUFACTURER'S SPECIFICATIONS. INSTALL NORTH AMERICAN GREEN P300 EROSION CONTROL BLANKET ON ALL SLOPES GREATER THAN 1.5:1.
-  INSTALL 15' X 50' VEHICLE WASH DOWN AREA WITH 1"-2.5" COARSE AGGREGATE PLACED A MINIMUM 8" THICK. SUPPLY WATER FOR VEHICLE WASH DOWN.
-  STABILIZED CONSTRUCTION ENTRANCE FOR SITE INGRESS/EGRESS. IF ALTERNATE ACCESS POINTS ARE APPROVED BY OWNER, ADDITIONAL STABILIZED CONSTRUCTION ENTRANCES WILL BE REQUIRED.
-  INSTALL INLET PROTECTION IN FORM OF CONCRETE BLOCKS / FILTER CLOTH / GRAVEL OR SILT SACK AT EXISTING AND PROPOSED CATCH BASINS AS SHOWN ON PLAN.
-  INSTALL SILT FENCE ALONG DOWN GRADIENT LIMITS OF DISTURBANCE AS SHOWN ON PLAN.
-  INSTALL ORANGE SAFETY FENCING AROUND OUTER LIMITS OF PROJECT PRIOR TO GRADING.



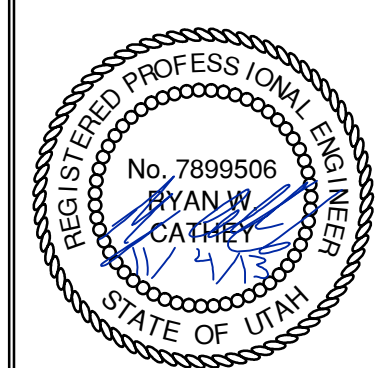
HORIZON RUN

STA: 20+00.00 TO 31+00.00



| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|---------------------------------|
| 1 | RWC | 8/27/2013 | ADDendum 1 |
| 2 | RWC | 9/24/2013 | UTILITY, GRADING, AND SOBBY REV |

**PHASE 1A CONSTRUCTION
 EROSION CONTROL PLAN
 HORIZON RUN**



SHEET NUMBER
4.00

SCALE
 VERTICAL: 1" = 40'
 HORIZONTAL: 1" = 40'

JOB NUMBER
SLB079306

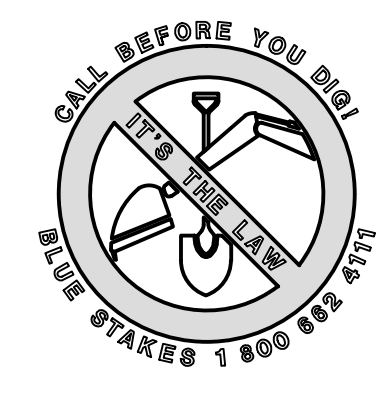
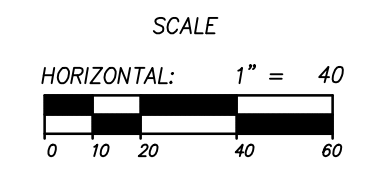
DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

CAUTION
 The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. Any such changes or uses must be approved by the preparer of these plans.



HORIZON RUN
 STA: 31+00.00 TO 39+39.62



| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|----------------------------------|
| 1 | RWC | 8/27/2013 | ADD/NOV 1 |
| 2 | RWC | 8/27/2013 | UTILITY, GRADING, AND ROCKET REV |

The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. Any such changes or uses must be approved by the preparer of these plans.

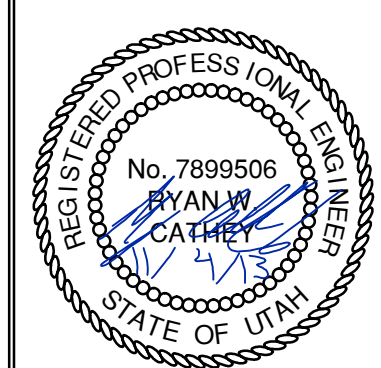
CAUTION

PHASE 1A CONSTRUCTION
EROSION CONTROL PLAN
HORIZON RUN

DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

NV5
 BEYOND ENGINEERING
 627 SOUTH STATE STREET, SUITE 200
 801743.000 TEL 801743.000 FAX
 MURRAY, UT 84107
 WWW.NV5.COM



SHEET NUMBER
4.01

SCALE
 VERTICAL: 1" = 40'
 HORIZONTAL: 1" = 40'

JOB NUMBER
SLB079306

3' X 3' LID
WT. 990 #

3' X 3' RISER

3' X 3' BASE

| HEIGHT | WEIGHTS | |
|--------|---------|---------|
| | BASE | RISER |
| 6" | | 550 # |
| 1' | | 1,099 # |
| 2' | | 2,198 # |
| 3' | 3,171 # | 3,297 # |
| 4' | 4,796 # | 4,207 # |
| 5' | 5,896 # | 5,259 # |
| 6' | 6,994 # | 7,894 # |

NOTES:
 1. Vault design complies with ASTM C-857 and C-858 with less than 2" of earth cover and an AASHTO HS-20 loading.
 2. Lifting insert type and location may change without notice.

Oldcastle Precast
 801 West 12th Street, Ogden, Utah 84404
 Phone: 801-399-1171 Fax: 801-392-7849

3' x 3' Basin
 FILE NAME: 210DC3X3CB000
 ISSUE DATE: 1/08
 www.oldcastleprecast.com

3' x 3' Catch Basin Bases, Risers and lid
 Copyright © 2008

3'x3' CATCH BASIN LID ELEVATION VIEW

3'x3' CATCH BASIN LID PLAN VIEW 31" OPENING

3'x3' CATCH BASIN LID PLAN VIEW 2'x3' OPENING CENTER/OFFSET

3'x3' CATCH BASIN RISER ELEVATION VIEW

3'x3' CATCH BASIN BASE ELEVATION VIEW

3'x3' CATCH BASIN BASE / RISER PLAN VIEW

JOINT DETAIL

| KNOCKOUT | |
|-------------|------|
| BASE HEIGHT | DIA. |
| 3' | 30" |
| 4' | 36" |
| 5' | 36" |
| 6' | 36" |

KNOCKOUTS ARE 4" DEEP

Oldcastle Precast
 801 West 12th Street, Ogden, Utah 84404
 Phone: 801-399-1171 Fax: 801-392-7849

3' x 3' Basin
 FILE NAME: 210DC3X3CB000
 ISSUE DATE: 1/08
 www.oldcastleprecast.com

3' x 3' Catch Basin Bases, risers and lid
 Copyright © 2008

PLAN VIEW

SECTION A-A

END VIEW

| Diag. | Slope X : Y | A B C E F G | | | | | |
|-------|----------------|-------------|-----|-----|-----|-----|--------|
| | | 4" | 24" | 48" | 72" | 24" | 2" |
| 12" | 2.4 : 1 | 4" | 24" | 48" | 72" | 24" | 2" |
| 15" | 2.4 : 1 | 6" | 27" | 46" | 73" | 30" | 2 1/4" |
| 18" | 2.3 : 1 | 9" | 27" | 46" | 73" | 36" | 2 3/4" |
| 24" | 2.5 : 1 | 9" | 30" | 43" | 70" | 48" | 3" |
| 30" | 2.5 : 1 | 12" | 54" | 19" | 73" | 60" | 3 1/2" |
| 36" | 2.5 : 1 | 15" | 63" | 34" | 97" | 72" | 4" |
| 42" | 2.5 : 1 | 21" | 63" | 35" | 98" | 78" | 4 1/2" |
| 48" | 2.5 : 1 | 24" | 72" | 26" | 98" | 84" | 5" |

Oldcastle Precast
 801 West 12th Street, Ogden, Utah 84404
 Phone: 801-399-1171 Fax: 801-392-7849

Flared End
 FILE NAME: 210DPERNDFLARE
 ISSUE DATE: 5/2008
 www.oldcastleprecast.com

Flared End Section for Round Pipe
 Copyright © 2008

I-3742 Drop Inlet

BICYCLE SAFETY LUGS

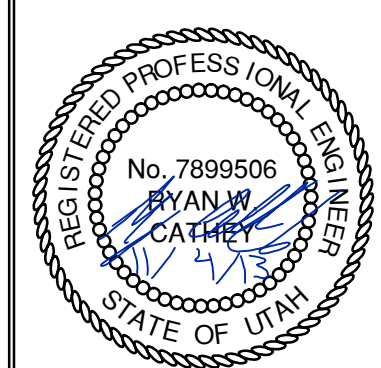
CAST IRON to conform to ASTM A-48, CLASS 35B H-20 Wheel Loading

I-3742
 Est. weight 582 lbs.

D&L SUPPLY
 D&L Foundry
 P.O. Box 1919
 Moses Lake, WA 98837
 Phone: (509) 765-7952
 Fax: (509) 765-8124

Designation: I-3742 Date of Drawing: JUL 1994 Prepared by: D&L Supply Scale: 1" = 17 1/2" Sheet Number: 1 Total Sheets: 1

PHASE 1A CONSTRUCTION STORM DRAIN DETAILS

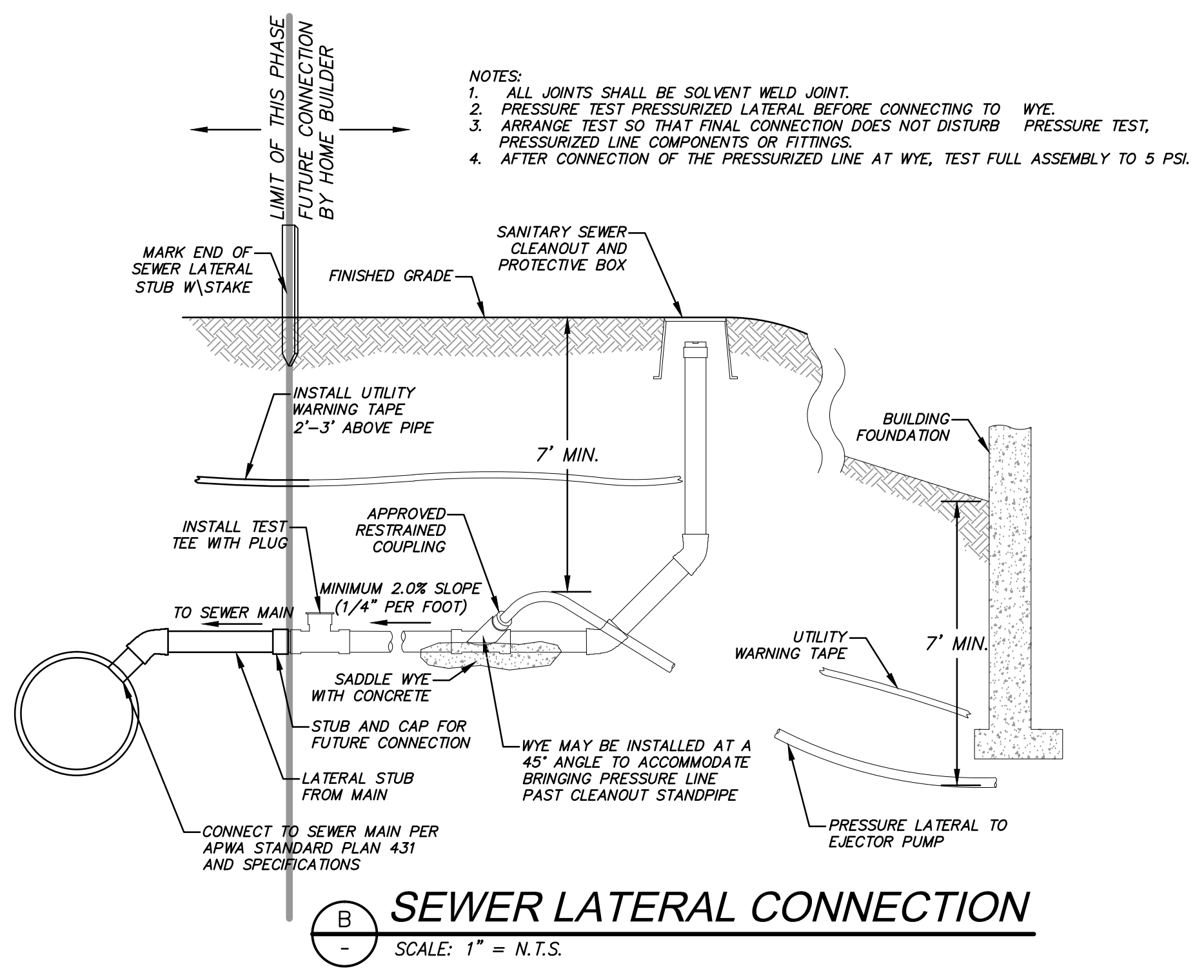
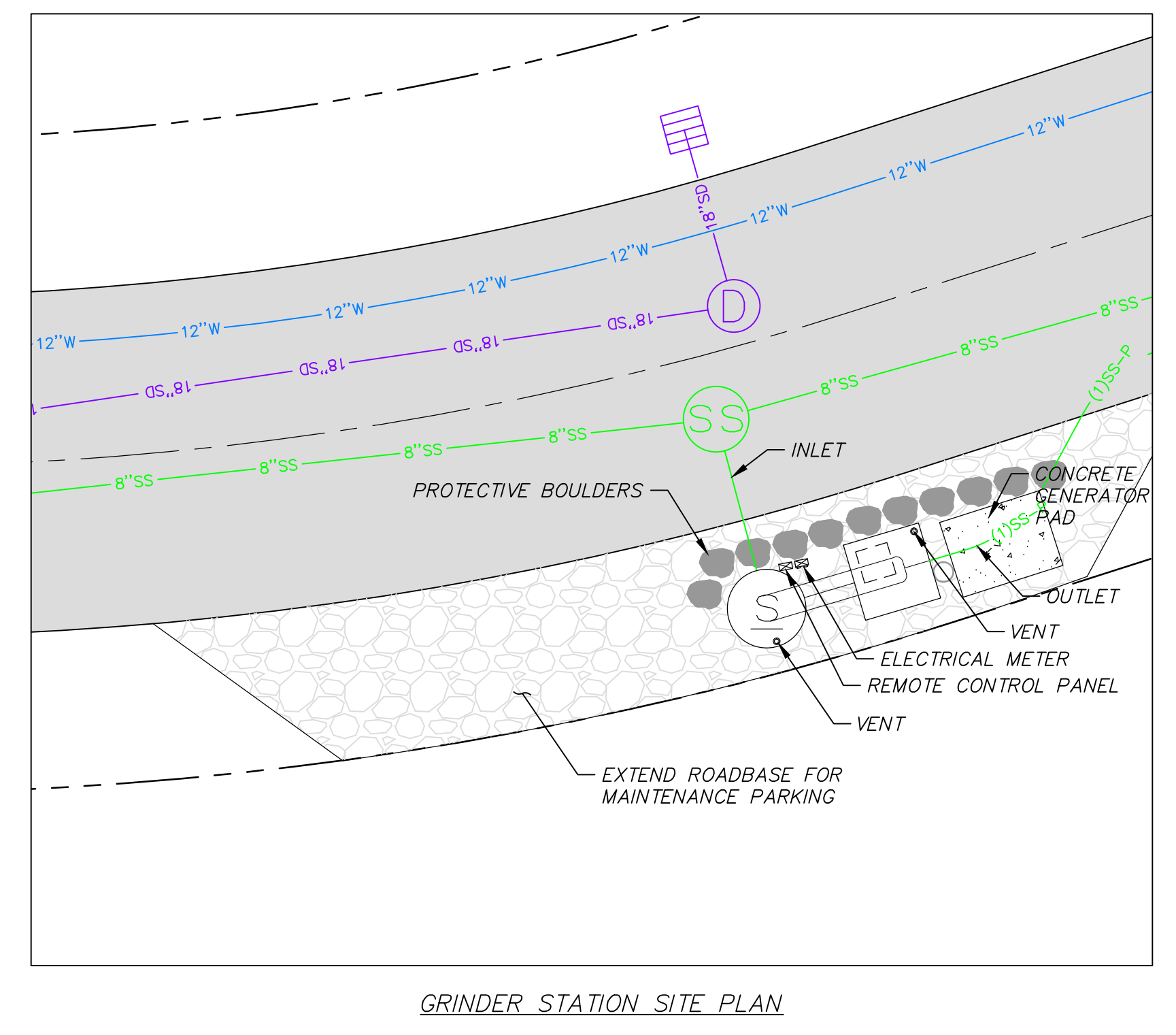
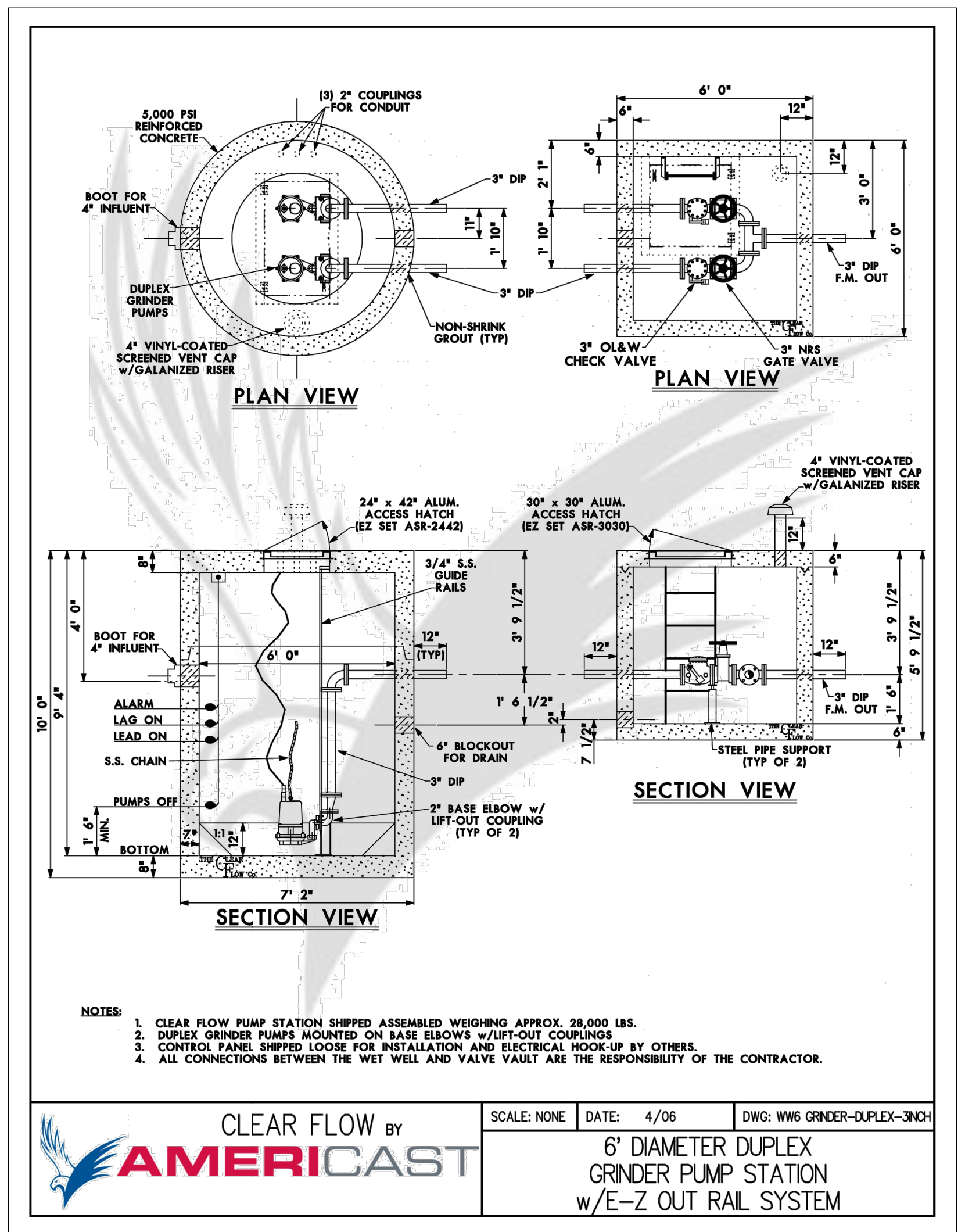


| | |
|--------------|--|
| SHEET NUMBER | 5.00 |
| SCALE | VERTICAL: 1" = N/A HORIZONTAL: 1" = N/A |
| JOB NUMBER | SLB079306 |

DATE SUBMITTED: 11/4/2013
 PREPARED FOR: SUMMIT, LLC

REVISIONS:
 NO. BY DATE
 1 RMC 8/27/2013
 2 RMC 9/25/2013

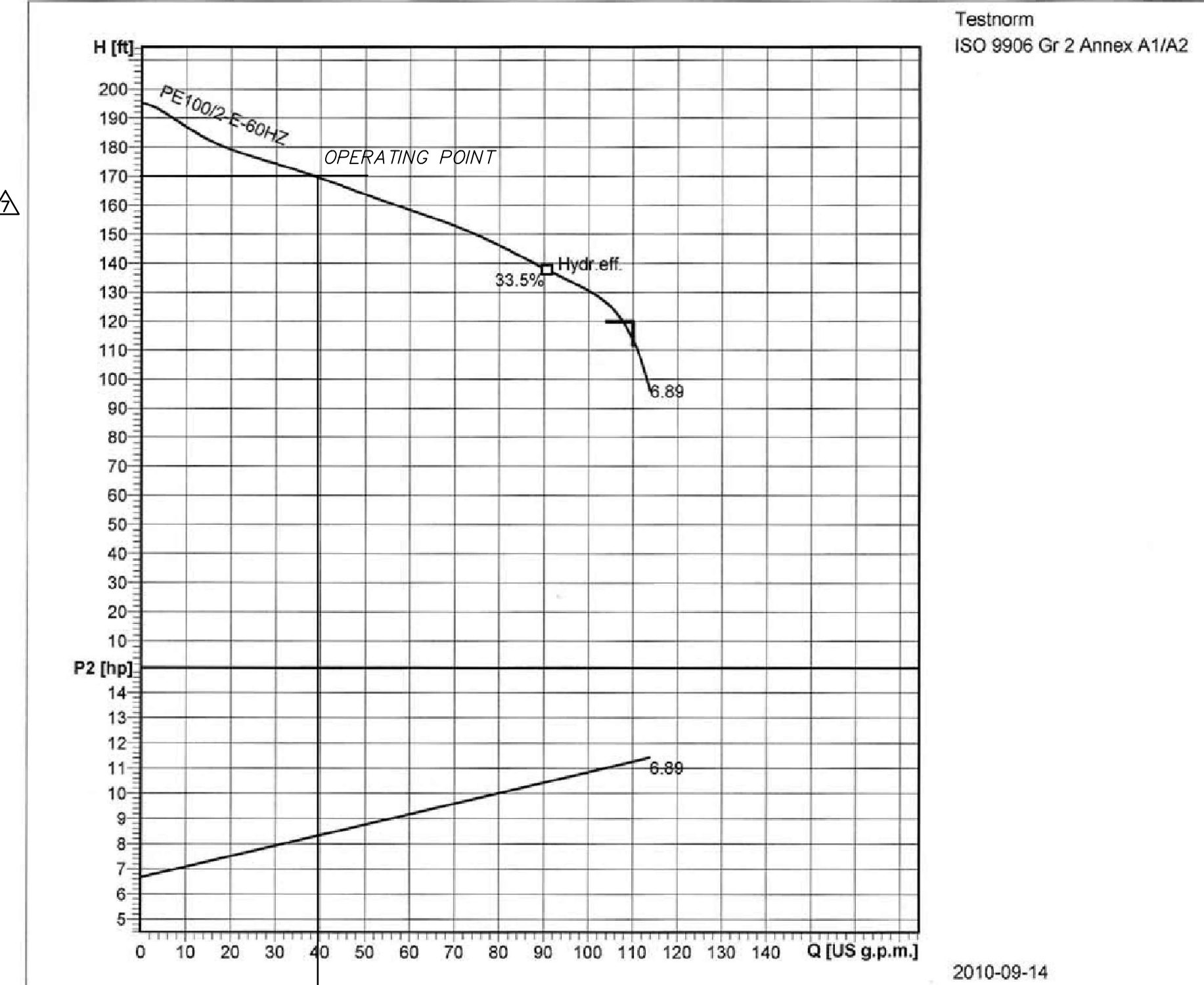
CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. Any such changes and uses must be approved by the preparer of these plans.



| PUMP NAME | INVERT IN | INVERT IN SIZE | SUMP ELEV | BASIN DIA. | PUMP HEAD | PUMP HP | DISCHARGE DIA | DISCHARGE VELOCITY | MIN STORAGE VOLUME (gal) | STATION DETAIL | PUMP | PEAK FLOW (GPM) | AUTO DIALER | MAIN POWER TRANSFER SWITCH | POWER |
|-----------|-----------|----------------|-----------|------------|-----------|---------|---------------|--------------------|--------------------------|--------------------------|------------------------|-----------------|-------------|----------------------------|------------------|
| GR-2 | 8689.80 | 8" | 8682.71 | 72" | 170 | 3 | 3" | 2.16 | 1500 | AMERICAST 6' DIA. DUPLEX | ABS PUMP MODEL M100/2D | 38 | CELLULAR | MANUAL | 1 PHASE/240 VOLT |

SEWER GRINDER PUMP DETAILS
 SCALE: 1" = N.T.S.

| Grinder Station Calculations | |
|------------------------------------|---|
| GR-2 | |
| Head Difference | 8683.71-8848.06=164.35 ft. |
| Pipe Length | 750 ft. |
| Friction Loss | 6.28 ft. |
| Flow Calc. | (23 units)(3.2 People/household)(100 gallons/day/capita) = 5.11 g/m average |
| Peaking Factor (Ten States Method) | $Q_{peak}/Q_{ave} = 18+VP/4+VP=4.5$ $Q_{peak} = 23.0$ g/m |
| Pump Curve | See Pump Curve = 40 g/m |



PHASE 1A CONSTRUCTION
 SEWER DETAILS

DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

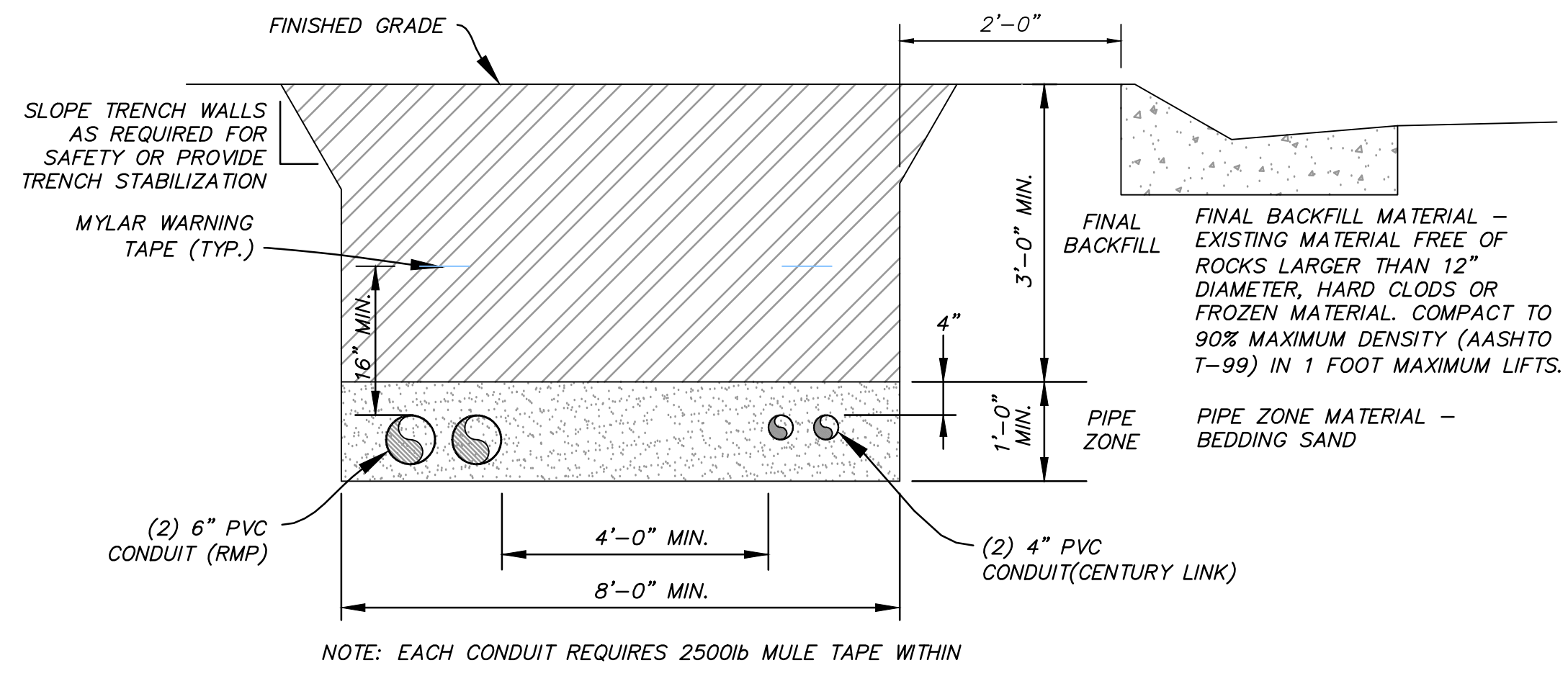
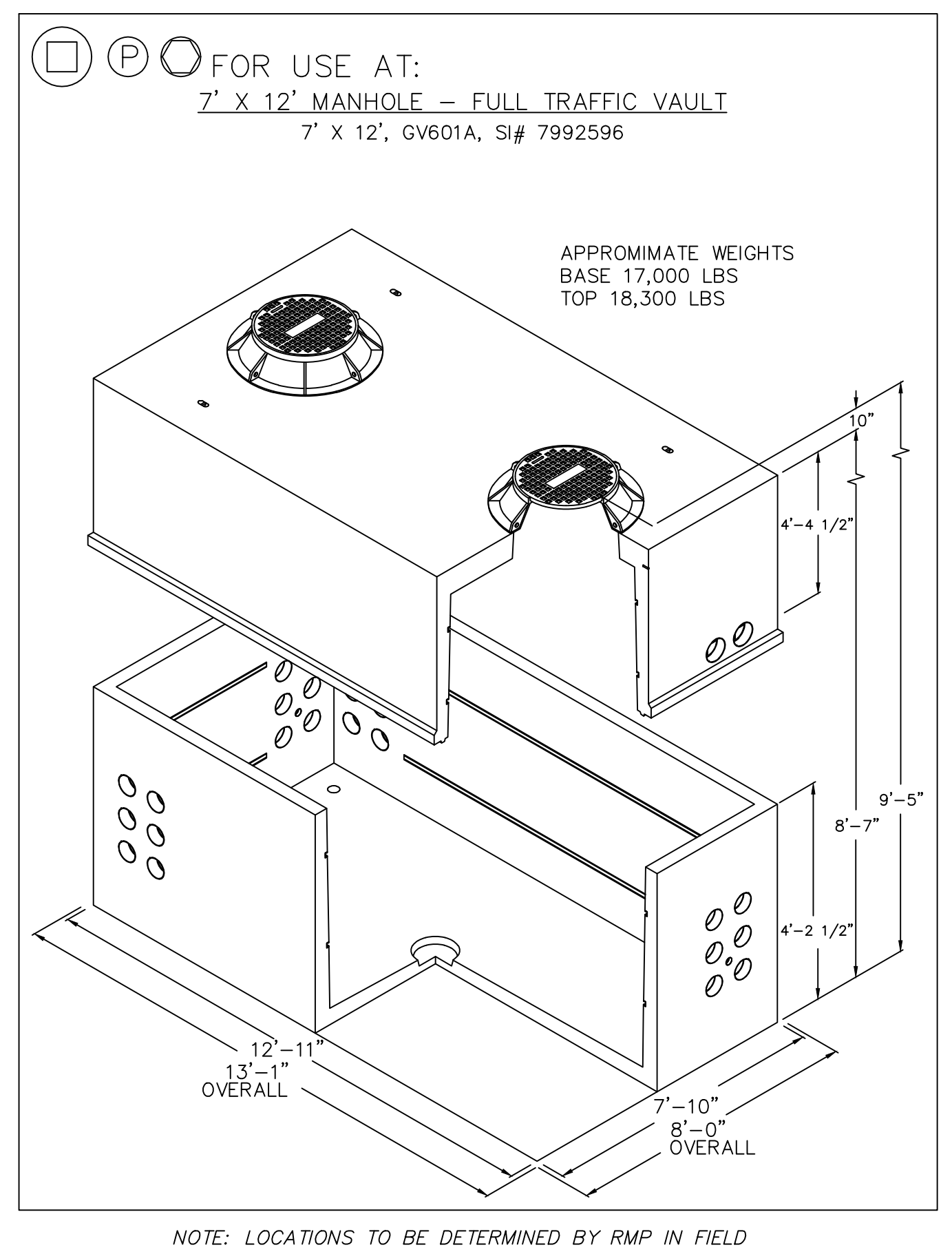
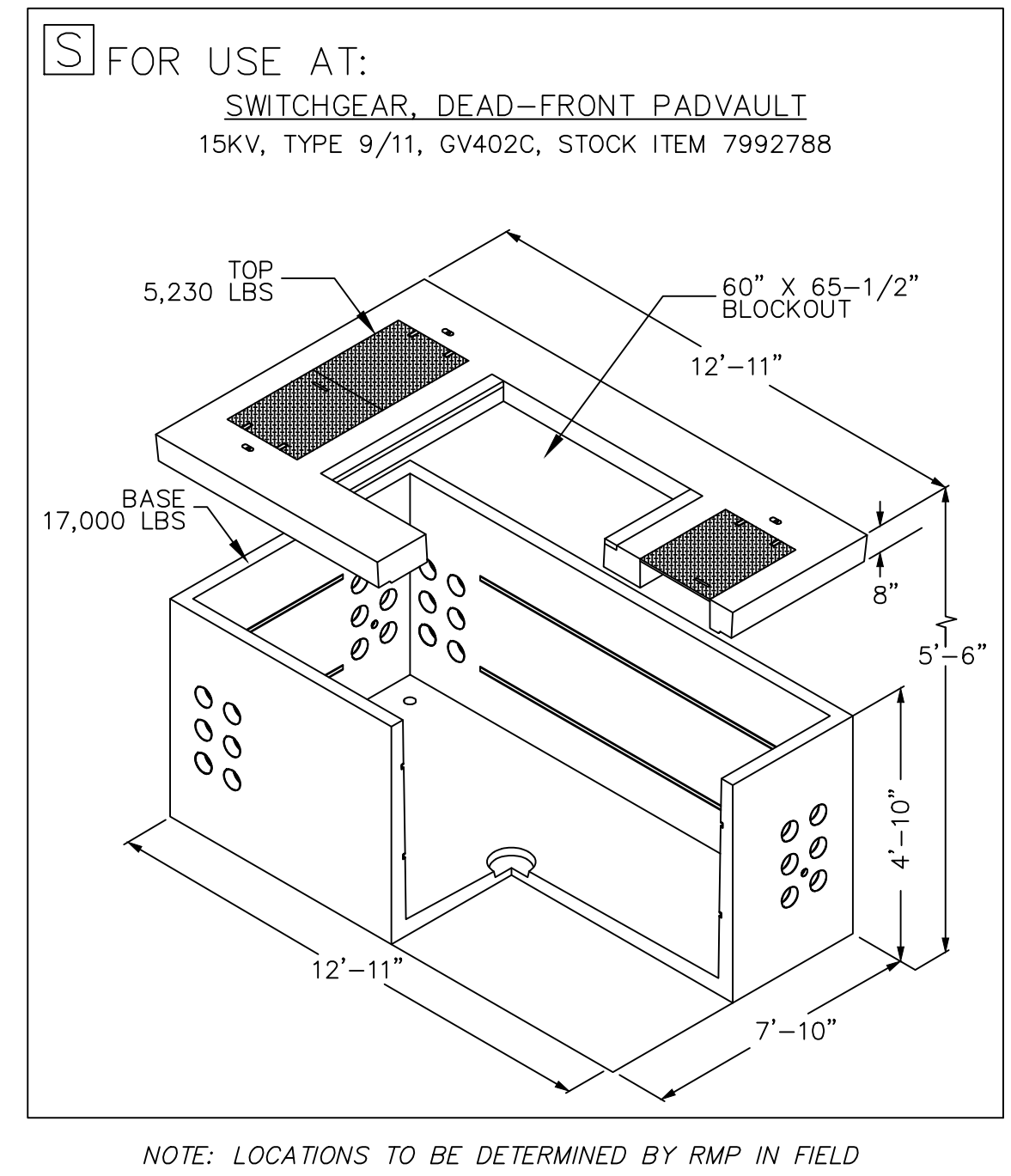
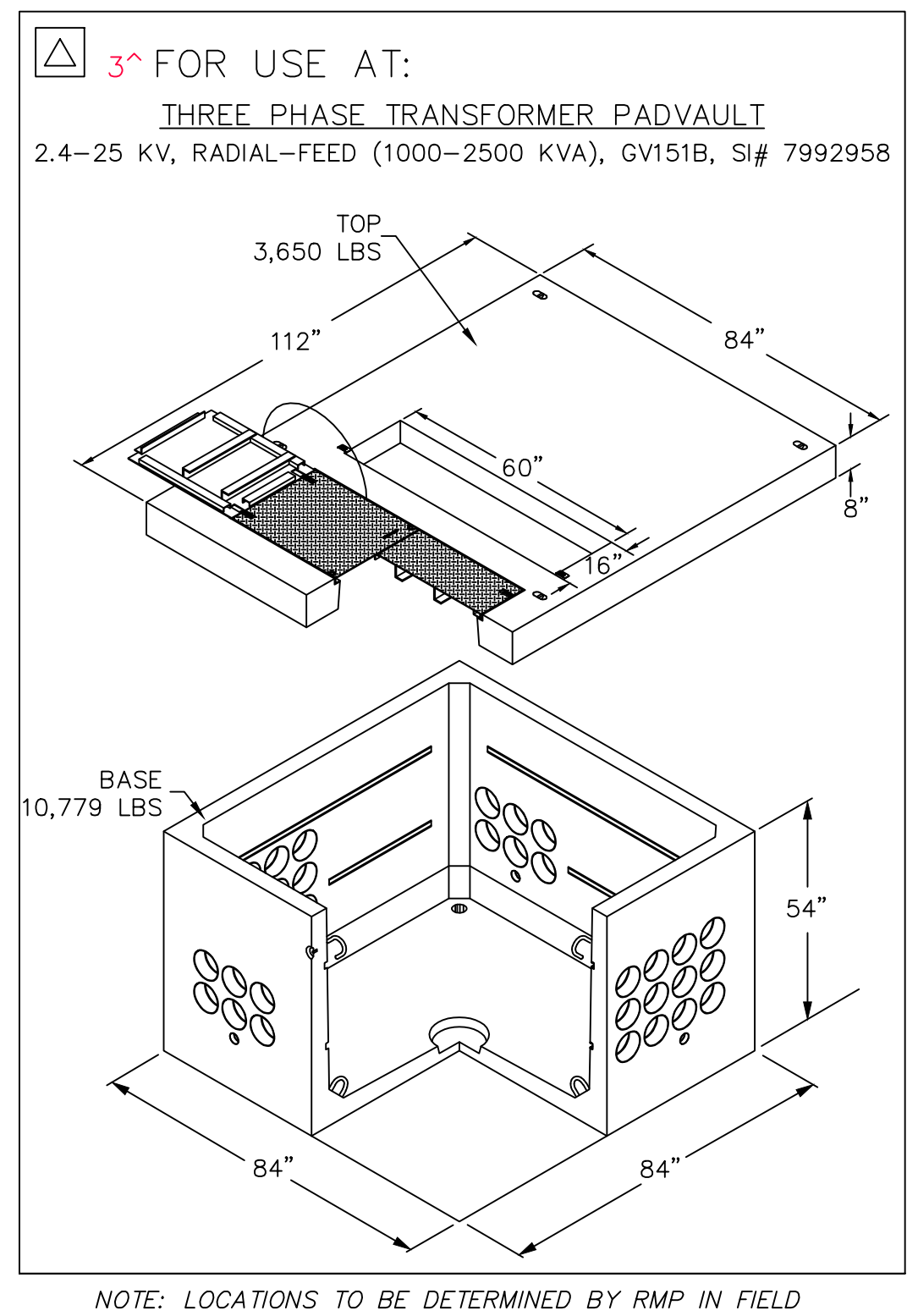
NV5
 BEYOND ENGINEERING
 5217 SOUTH STATE STREET, SUITE 200
 MURRAY, UT 84107
 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER
 No. 7899506
 RYAN W. CATHEY
 STATE OF UTAH

SHEET NUMBER
5.10

SCALE
 VERTICAL: 1" = N/A
 HORIZONTAL: 1" = N/A

JOB NUMBER
SLB079306



POWER CONDUIT TRENCH
 NTS

| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|----------------------------------|
| 1 | RMC | 8/27/2013 | ADD ITEM 1 |
| 2 | RMC | 9/24/2013 | UTILITY, GRADING, AND SOCKET REV |

PHASE 1A CONSTRUCTION
ELECTRICAL DETAILS

PREPARED FOR: SUMMIT, LLC

DATE SUBMITTED: 11/4/2013

NV5
 BEYOND ENGINEERING

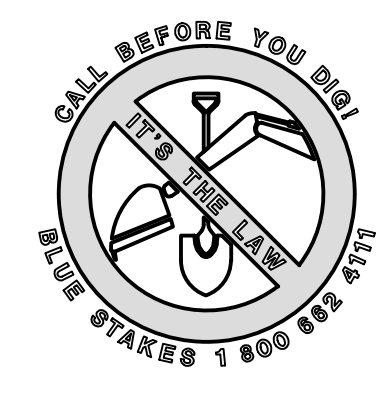
5217 SOUTH STATE STREET, SUITE 200
 8017431900 TEL. 8017431900 FAX
 MURRAY, UT 84107
 WWW.NV5.COM

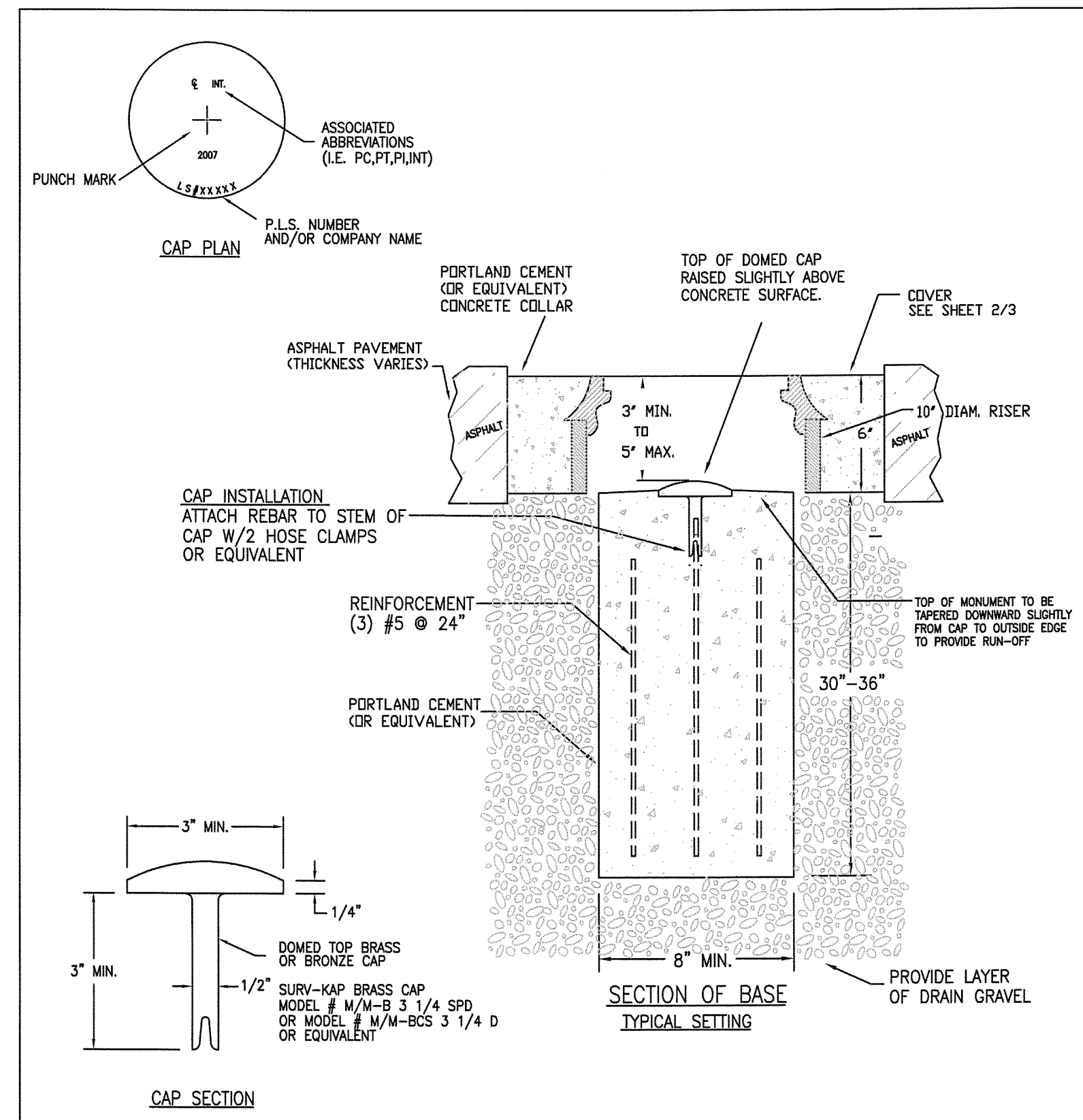
REGISTERED PROFESSIONAL ENGINEER
 No. 7899506
 RYAN W. CATHEY
 STATE OF UTAH

SHEET NUMBER
5.20

SCALE
 VERTICAL: 1" = N/A
 HORIZONTAL: 1" = N/A

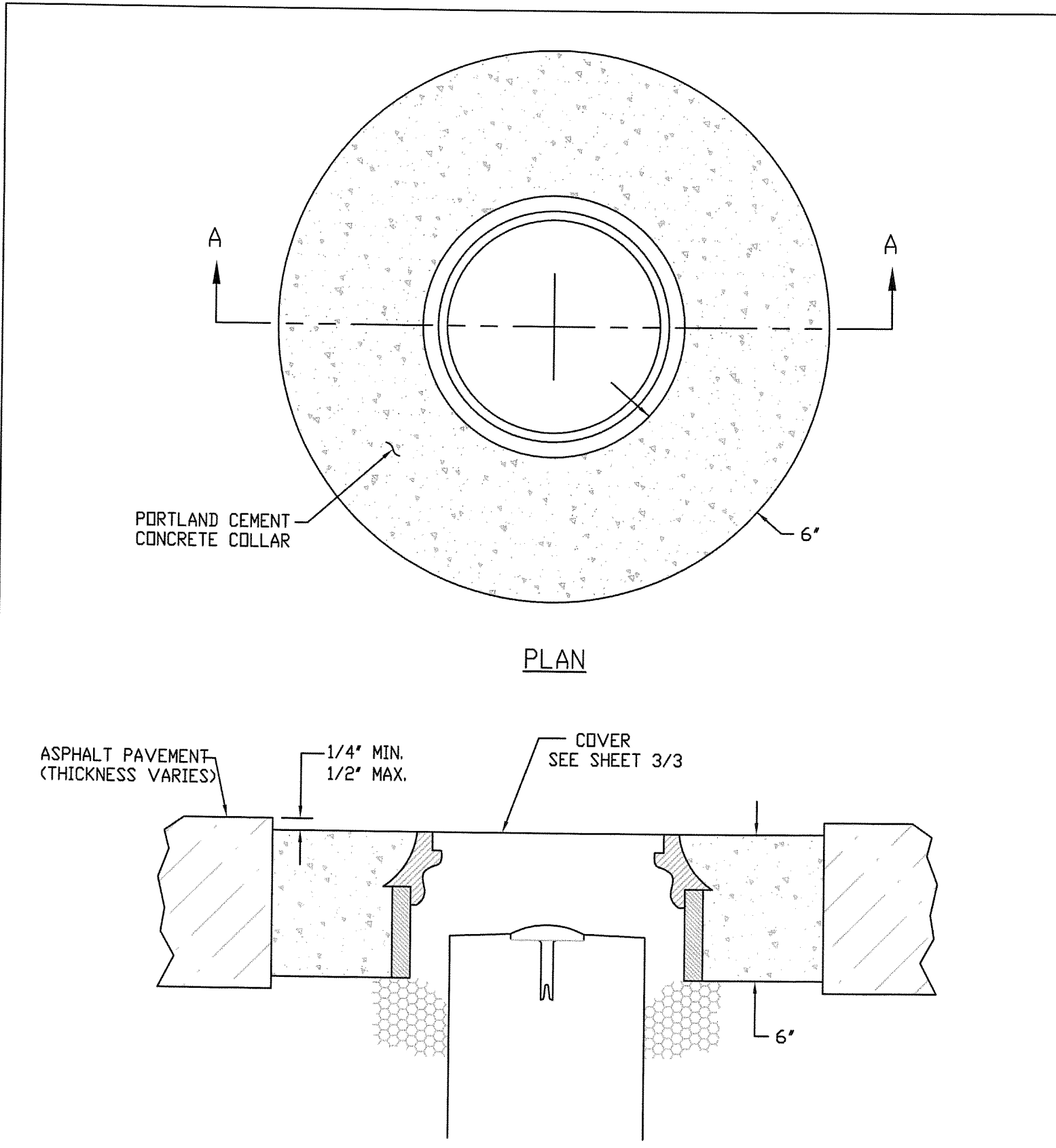
JOB NUMBER
SLB079306



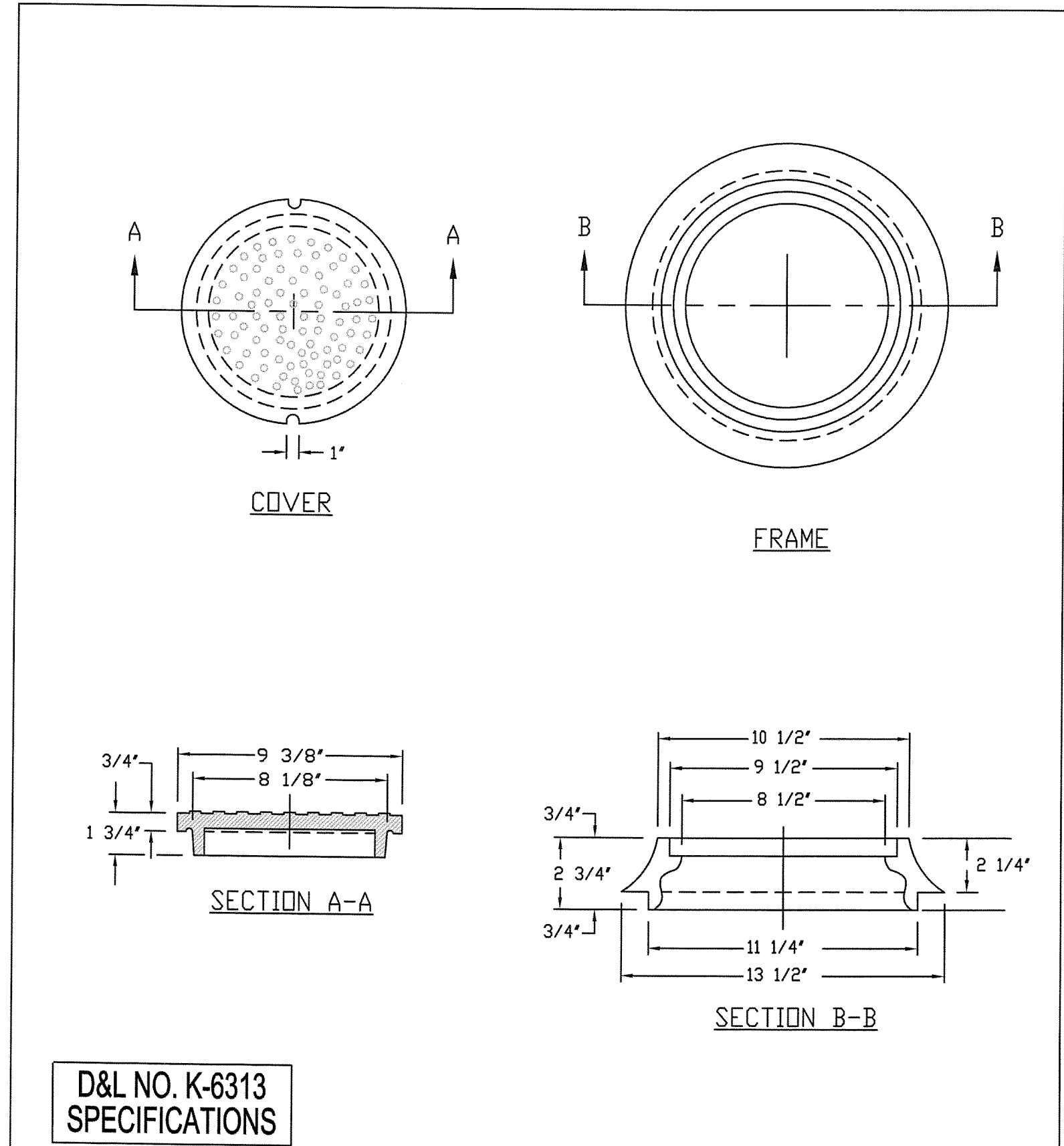


CAP CAN BE PURCHASED FROM SURVEYOR'S OFFICE

| | | |
|-------------------------------|-------------------------------|----------------------|
| WEBER COUNTY SURVEY OFFICE | RING & LID SURVEY MONUMENT | STANDARD PLANS |
| | | Monument Standard |
| 3/28/10 | 399-8020 | SHEET 1 OF 3 |



| | | |
|-------------------------------|--------------------------------------|----------------------------|
| WEBER COUNTY SURVEY OFFICE | Cover Collar For Survey Monuments | STANDARD PLANS |
| | | Monument Specifications |
| 3/28/10 | 399-8020 | SHEET 2 OF 3 |



| | | |
|-------------------------------|-------------------------------|----------------------------|
| WEBER COUNTY SURVEY OFFICE | RING & LID SURVEY MONUMENT | STANDARD PLANS |
| | | Monument Specifications |
| 3/28/10 | 399-8020 | SHEET 3 OF 3 |

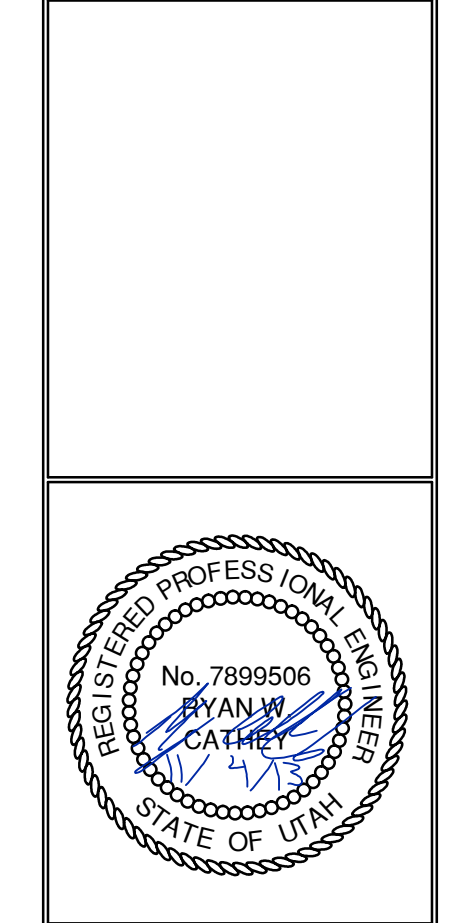
| NO. | BY | DATE | REVISIONS |
|-----|-----|-----------|------------------------------------|
| 1 | RWC | 8/27/2013 | ADDITION 1 |
| 2 | RWC | 8/27/2013 | UTILITY, GRADING, AND SOCIETY REV. |

PHASE 1A CONSTRUCTION
MISCELLANEOUS DETAILS

DATE SUBMITTED: 11/4/2013

PREPARED FOR: SUMMIT, LLC

NV5
 BEYOND ENGINEERING
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 801743.000 TEL. 801743.000 FAX
 MURRAY, UT 84107
 WWW.NV5.COM



| | |
|--------------|--|
| SHEET NUMBER | 5.30 |
| SCALE | VERTICAL: 1" = N/A HORIZONTAL: 1" = N/A |
| JOB NUMBER | SLB079306 |



ELECTRICAL SYMBOLS LEGEND

| | | | |
|--|---|--|---|
| | SELECTOR SWITCH 2 POSITION | | THERMAL OVERLOAD RELAY |
| | NORMALLY OPEN TIME DELAY CLOSING AFTER COIL ENERGIZED | | DETAIL DESIGNATION |
| | NORMALLY CLOSED TIME DELAY OPENING AFTER COIL ENERGIZED | | DETAIL CALL OUT |
| | INDICATOR LIGHT | | SHEET REFERENCE |
| | REMOTE DEVICE CONNECTION | | GROUND ROD |
| | CLOSED RELAY CONTACT | | GROUND ROD IN GROUND WELL |
| | OPEN RELAY CONTACT | | GROUND RISER FROM THE GROUND PLATE (REBAR) |
| | TERMINAL TO EXTERNAL REMOTE DEVICE | | BOLTED AND WELDED GROUND CONNECTIONS, RESPECTIVELY |
| | WIRE TERMINAL OR CONNECTION POINT | | GROUND CABLE: • EMBEDDED IN CONCRETE • BURIED IN EARTH • EXPOSED |
| | SINGLE PHASE MOTOR | | CONDUIT EXPOSED |
| | MOTOR OVERLOAD RELAY | | CONDUIT RUN UNDERGROUND OR IN CONCRETE |
| | LIMIT SWITCH | | BARE COPPER WIRE IN SLAB OR UNDERGROUND GRID, SIZE AS NOTED |
| | CONTROL RELAY | | TRANSFORMER W/ DELTA-Y AND GROUND |
| | TRANSFORMER | | UTILITY METER |
| | SELECTOR SWITCH 3 POSITION MAINTAINED CONTACT | | UTILITY CT |
| | LEVEL SWITCH CLOSING ON FALLING LEVEL | | MOTOR, HORSEPOWER AS NOTED |
| | LEVEL SWITCH CLOSING ON RISING LEVEL | | CIRCUIT BREAKER |
| | CONTROL SWITCH PUSHBUTTON, MOMENTARY CONTACT | | ELECTRICAL PANEL |
| | GROUND CONNECTION | | FUSE |
| | FRACTIONAL HP MOTOR | | MOTOR STARTER NEMA SIZE AS NOTED |
| | CONTROL STATION | | DISCONNECT SWITCH SIZE AS NOTED |
| | JUNCTION BOX | | GFCI DUPLEX RECEPTACLE |
| | DUPLEX RECEPTACLE | | INCANDESCENT FIXTURE |
| | LIGHT FIXTURE TYPE AS INDICATED | | POLE MOUNTED HID FIXTURE |
| | FUSED DISCONNECT | | ELECTRICAL CONNECTION |
| | SINGLE LIGHT SWITCH | | |
| | DISCONNECT UNFUSED SIZE NOTED | | |
| | CONTACTOR/STARTER (NO. OF POLES SHOWN) | | |
| | CIRCUIT BREAKER (NO. OF POLES SHOWN) | | |
| | SOLENOID | | |
| | FLOW SWITCH CLOSING ON LOW FLOW | | |
| | PRESSURE SWITCH CLOSING ON RISING PRESSURE | | |

EQUIPMENT GROUNDING CONDUCTORS

| FUSE OR CB SIZE | CB SIZE (COPPER) |
|-----------------|------------------|
| 15 | 14 |
| 20 | 12 |
| 30 | 10 |
| 40 | 10 |
| 60 | 10 |
| 100 | 8 |
| 200 | 6 |
| 300 | 4 |
| 400 | 3 |
| 500 | 2 |
| 600 | 1 |
| 800 | 1/0 |
| 1000 | 2/0 |
| 1200 | 3/0 |
| 1600 | 4/0 |
| 2000 | 250 |
| 2500 | 350 |

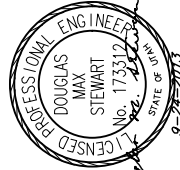
GROUNDING ELECTRODE CONDUCTOR SERVICE ENTRANCE OR SEPARATELY DERIVED SYSTEM

| COPPER CONDUCTOR | WIRE SIZE |
|---------------------------|-----------|
| #2 OR SMALLER | #8 |
| 1 OR 1/0 | #6 |
| 2/0 OR 3/0 | #4 |
| >3/0 THRU 350 KCMIL | #2 |
| >350 KCMIL THRU 600 KCMIL | 1/0 |

GENERAL NOTES:

1. VERIFY ALL EQUIPMENT DIMENSIONS AND LOCATIONS BEFORE BEGINNING ROUGH-IN. CONSULT ALL APPLICABLE CONTRACT DRAWINGS AND SHOP DRAWINGS TO ENSURE NEC CODE CLEARANCE REQUIRED AROUND ALL ELECTRICAL EQUIPMENT.
2. CONTRACTOR SHALL VERIFY ALL ELECTRICAL LOADS (VOLTAGE, PHASE, CONNECTION REQUIREMENTS, ETC.) OF EQUIPMENT FURNISHED BEFORE BEGINNING ROUGH-IN.
3. SEE APPLICABLE SHOP DRAWINGS FOR ROUGH-IN LOCATION OF ALL EQUIPMENT, WIRING DEVICES, ETC.
4. THE ELECTRICAL CONTRACTOR SHALL NOTIFY AND COOPERATE WITH THE MECHANICAL CONTRACTOR SUCH THAT NO PIPING, OR EQUIPMENT FOREIGN TO THE OPERATION OF THE ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE INSTALLED IN, ENTER OR PASS THROUGH ELECTRICAL ROOMS OR SPACES; OR ABOVE OR BELOW ELECTRICAL EQUIPMENT IN THE OTHER AREAS.
5. ALL PENETRATIONS OF FLOORS, WALLS AND CEILINGS SHALL BE SEALED WITH APPROVED MATERIAL.
6. FOR PACKAGE EQUIPMENT PROVIDED ON THE PROJECT, SOME CONDUITS AND WIRES ARE SHOWN ON THE DRAWINGS, BUT IT IS EXPECTED THAT SOME ADDITIONAL CONDUITS AND WIRES MAY BE REQUIRED BY EQUIPMENT MANUFACTURERS TO COMPLETE INSTALLATION. IT IS INCUMBENT UPON THE GENERAL CONTRACTOR TO COORDINATE THIS REQUIREMENT WITH HIS SUBCONTRACTORS TO MAKE SURE THAT EQUIPMENT SUPPLIER PROVIDED ALL NECESSARY ELECTRICAL INFORMATION TO ELECTRICAL SUBCONTRACTOR FOR INCLUSION WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.
7. IF OTHER THAN FIRST NAMED EQUIPMENT IS USED, IT SHALL BE CAREFULLY CHECKED FOR ELECTRICAL REQUIREMENTS AND CONTROL REQUIREMENTS OF ALTERNATE EQUIPMENT. SHOULD CHANGES OR ADDITIONS OCCUR IN ELECTRICAL WORK, OR THE WORK OF OTHER CONTRACTORS BE REVISED BY THE ALTERNATE EQUIPMENT, THE COST OF ALL CHANGES SHALL BE BORNE BY THE CONTRACTOR.
8. IT IS THE ELECTRICAL SUBCONTRACTOR'S RESPONSIBILITY TO DELIVER THE COMPLETE SET OF PLANS IN ORDER TO INSURE THAT ALL ITEMS RELATED TO ELECTRICAL POWER AND CONTROL SYSTEMS ARE COMPLETELY ACCOUNTED FOR.
9. ALL EQUIPMENT DIMENSIONS SHOWN ON PLANS AND ELEVATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL USE THE SHOP DRAWINGS FOR PROPER LAYOUT, FOUNDATION AND PAD, ETC. FOR FINAL INSTALLATION WITHOUT ANY ADDITIONAL COST TO THE OWNER.
10. THE DRAWINGS DIAGRAMMATICALLY INDICATE THE DESIRED LOCATION AND ARRANGEMENT OF OUTLETS, CONDUIT RUNS, EQUIPMENT AND OTHERS ITEMS. DETERMINE EXACT LOCATIONS IN THE FIELD BASED ON PHYSICAL SIZE AND ARRANGEMENT OF EQUIPMENT, FINISHED ELEVATIONS, AND OTHERS OBSTRUCTIONS. LOCATIONS SHOWN ON THE DRAWINGS, HOWEVER, SHALL BE ADHERED TO AS CLOSELY AS POSSIBLE.

Bowen Collins & Associates, Inc. CONSULTING ENGINEERS



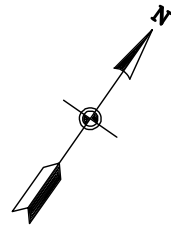
| NO. | DATE | REV. BY | DESCRIPTION |
|-----|------|---------|-------------|
| | | | |
| | | | |
| | | | |
| | | | |

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

DESIGN D. STEWART
DRAWN D. LAMPH
CHECKED D. STEWART
APPROVED J. BECKMAN

ELECTRICAL
SUMMIT AT POWDER MOUNTAIN
POWDER MOUNTAIN, UT
PHASE 1A
REVIEW
DATE: September 2013
PROJECT NUMBER 334-13-01

DRAWING NO. E-1
SHEET 1 OF 5

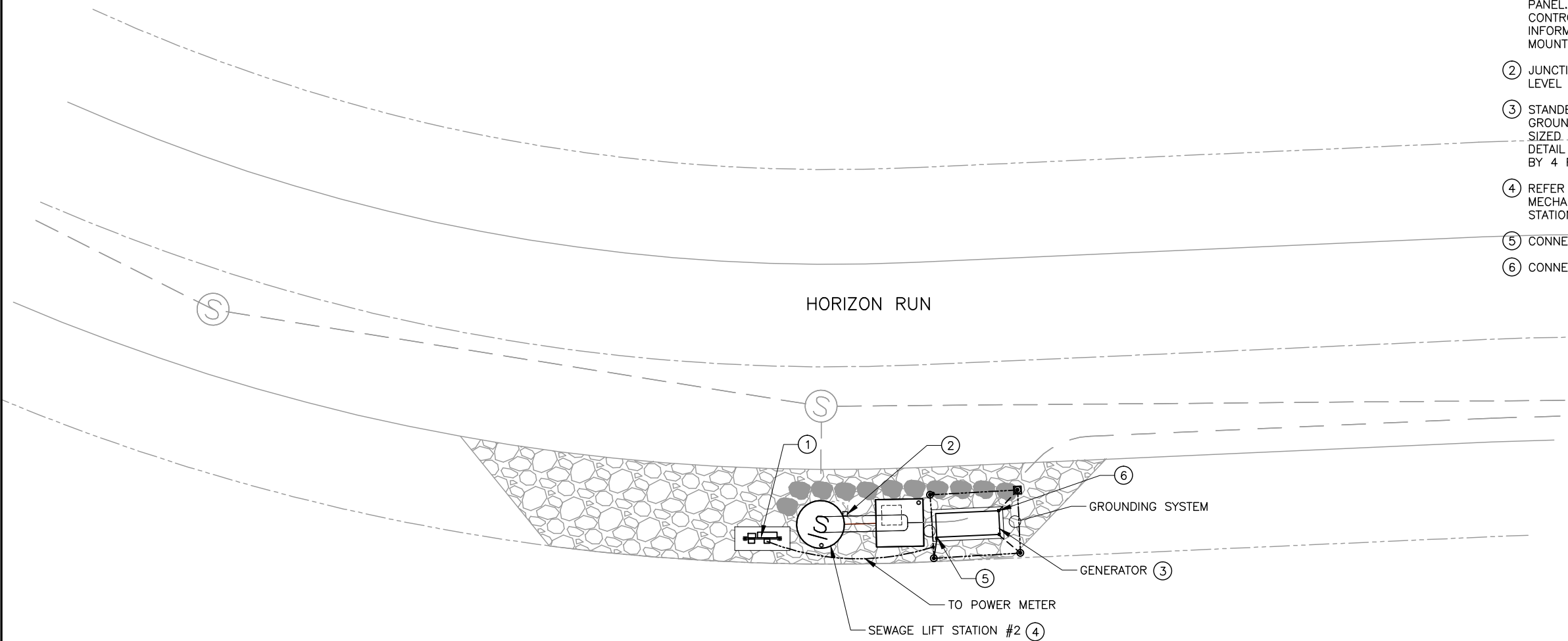


GENERAL NOTES:

1. THE GROUNDING SYSTEM SHALL HAVE A GROUND RING OF 2/0 AWG BARE COPPER BURIED NOT LESS THAN 30" BELOW THE EARTH'S SURFACE. CONNECT REBAR TO THE GROUND RING VIA 2/0 AWG BARE COPPER GROUND CABLE (GROUND RISERS). EQUIPMENT AND MISCELLANEOUS METALWORK SHALL BE CONNECTED TO THE GROUND RING WITH 2/0 AWG BARE COPPER GROUND CABLE. 2/0 AWG CONDUCTOR FROM GROUND RING SHALL CONNECT TO GENERATOR, METER BASE, AND AUTOMATIC TRANSFER SWITCH. THE GROUND RING SHALL BE A MINIMUM OF 2 FEET FROM GENERATOR FOUNDATION WHERE POSSIBLE. REFER TO DETAILS E-5001, E-5002, E-5003.
2. DRAWING SHOWS TYPICAL LOCATIONS OF GROUNDING SYSTEM COMPONENTS.
3. DRAWING SHOWS APPROXIMATE LOCATIONS AND MINIMUM NUMBER OF RISERS AND GROUNDING CONNECTIONS TO BE INSTALLED.
4. REFER TO POWER ONE-LINE DIAGRAM FOR GENERATOR SIZE AND CONDUIT AND CONDUCTOR SIZES.
5. REFER TO POWER ONE-LINE DIAGRAM FOR PUMP SIZES AND QUANTITY. FOR CONDUIT AND CONDUCTOR SIZES REFER TO POWER ONE-LINE DIAGRAM AND CONTROL BLOCK DIAGRAM.

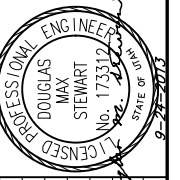
KEY NOTES:

- ① SEWAGE LIFT STATION CONTROL PANEL, AUTOMATIC TRANSFER SWITCH, POWER METER, AND POWER PANEL. REFER TO POWER ONE-LINE DIAGRAM AND CONTROL BLOCK DIAGRAM FOR SIZES AND MORE INFORMATION. REFER TO DETAIL E-5073 FOR MOUNTING INFORMATION.
- ② JUNCTION BOX TO CONNECT PUMP CABLES AND LEVEL SWITCHES REFER TO DETAIL E-5201
- ③ STANDBY GENERATOR WITH CONCRETE PAD AND GROUND SYSTEM. THE GENERATOR PAD SHALL BE SIZED BY CONTRACTOR FOR GENERATOR REFER TO DETAIL E-5081, APPROXIMATE SIZE IS 9 FEET LONG BY 4 FEET WIDE.
- ④ REFER TO CIVIL DRAWINGS FOR LOCATION AND MECHANICAL DRAWINGS FOR SECTION VIEW OF LIFT STATION.
- ⑤ CONNECT TO REBAR.
- ⑥ CONNECT TO GENERATOR.



ELECTRICAL SITE PLAN SEWAGE LIFT STATION #2
SCALE: 1/8" = 1'-0"

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS



| NO. | DATE | REV. BY | DESCRIPTION |
|-----|------|---------|-------------|
| | | | |
| | | | |

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

SUMMIT AT POWDER MOUNTAIN
PHASE 1A
POWDER MOUNTAIN, UT
REVIEW
CHECKED D. STEWART
APPROVED J. BECKMAN

DESIGN
DESIGN D. STEWART
DRAWN D. LAMPH

ELECTRICAL
ELECTRICAL SITE PLAN SEWAGE LIFT STATION NUMBER 2
PROJECT NUMBER 334-13-01
DATE: September 2013

DRAWING NO.
E-2
SHEET 2 OF 5

THE ORIGINAL DRAWING WAS STAMPED BY DOUGLAS MAX STEWART REGISTERED P.E. UTAH 173312

| NO. | DATE | REV. BY | DESCRIPTION |
|-----|---------|---------|----------------|
| 1 | 10/2013 | PMS | ADDENDUM NO. 1 |

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

SUMMIT AT POWDER MOUNTAIN
PHASE 1A
POWDER MOUNTAIN, UT

REVIEW
CHECKED D. STEWART
APPROVED D. STEWART

DESIGN
DESIGN T. BIRD
DRAWN D. LAMPH

SEWER LIFT STATION #2
POWER
ONE-LINE DIAGRAM

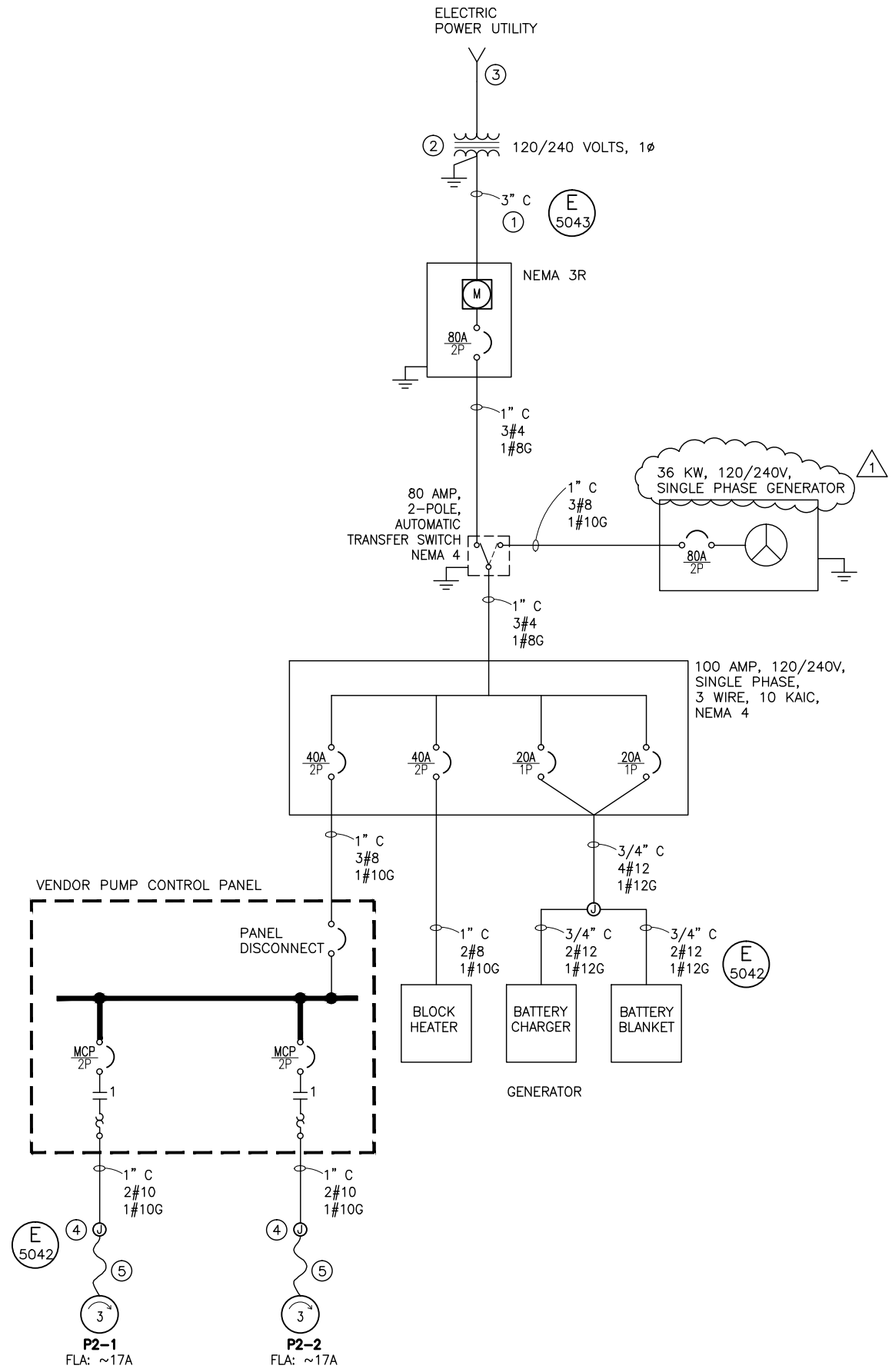
DATE: September 2013
PROJECT NUMBER 334-13-01
DRAWING NO. E-3
SHEET 3 OF 5

GENERAL NOTES:

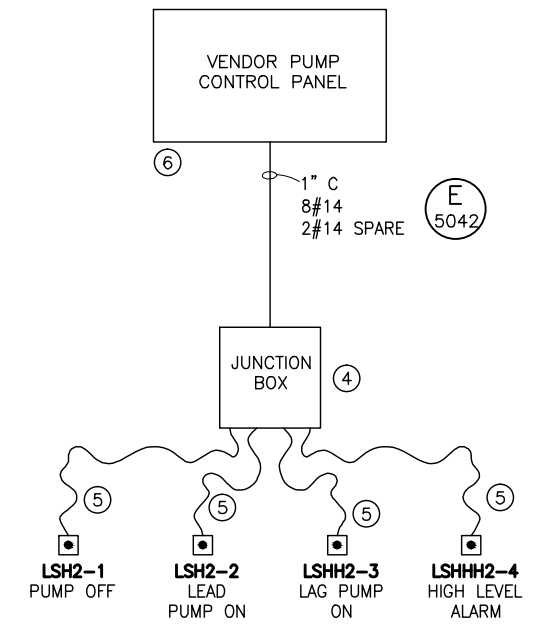
- REFER TO SITE PLAN FOR EQUIPMENT LOCATION.

KEY NOTES:

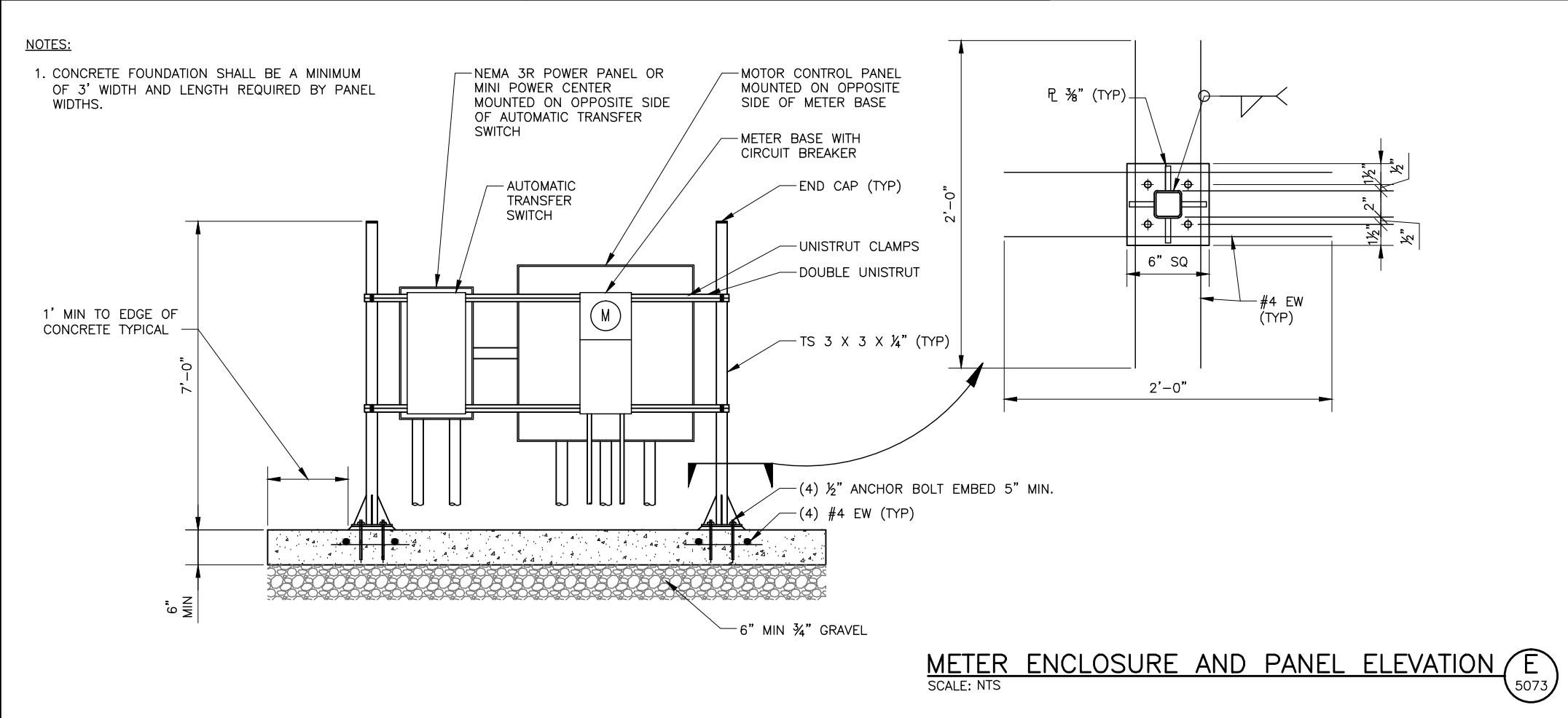
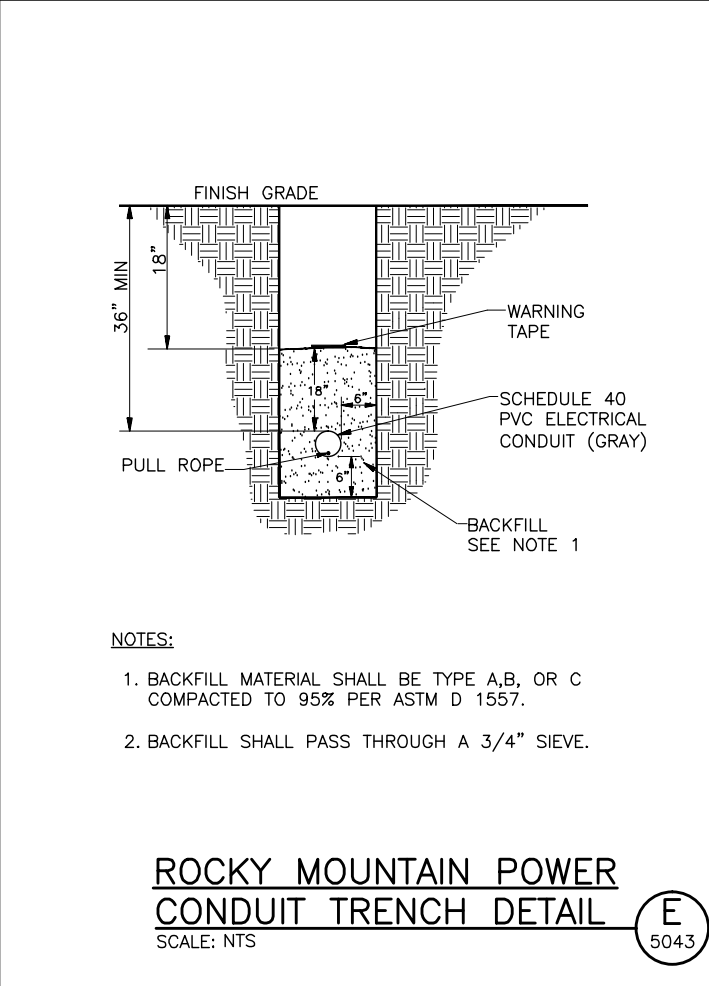
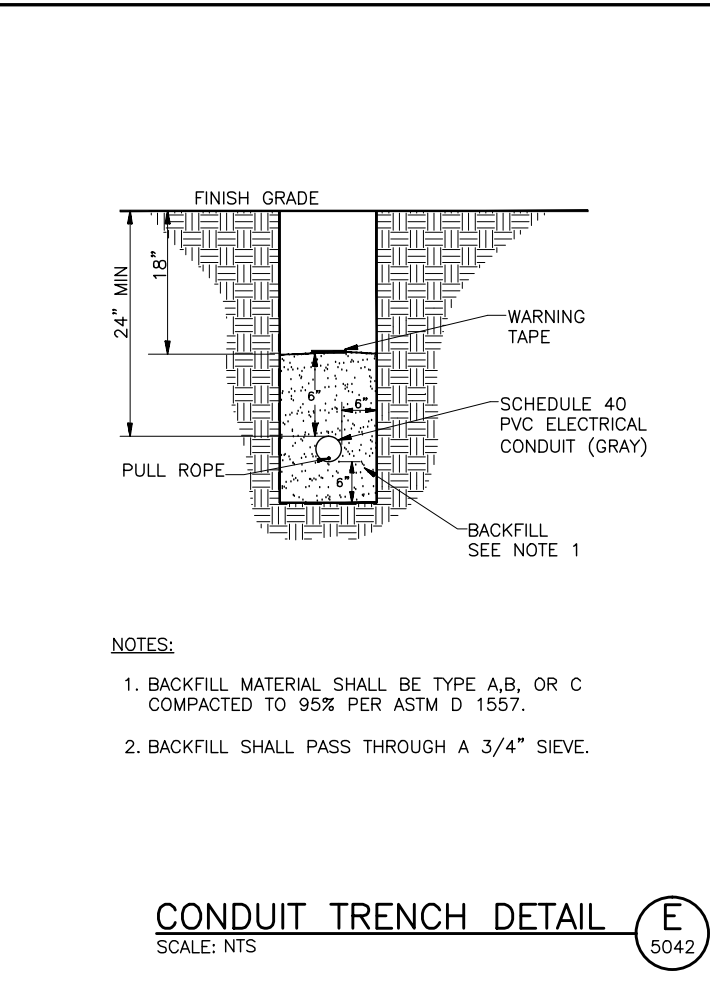
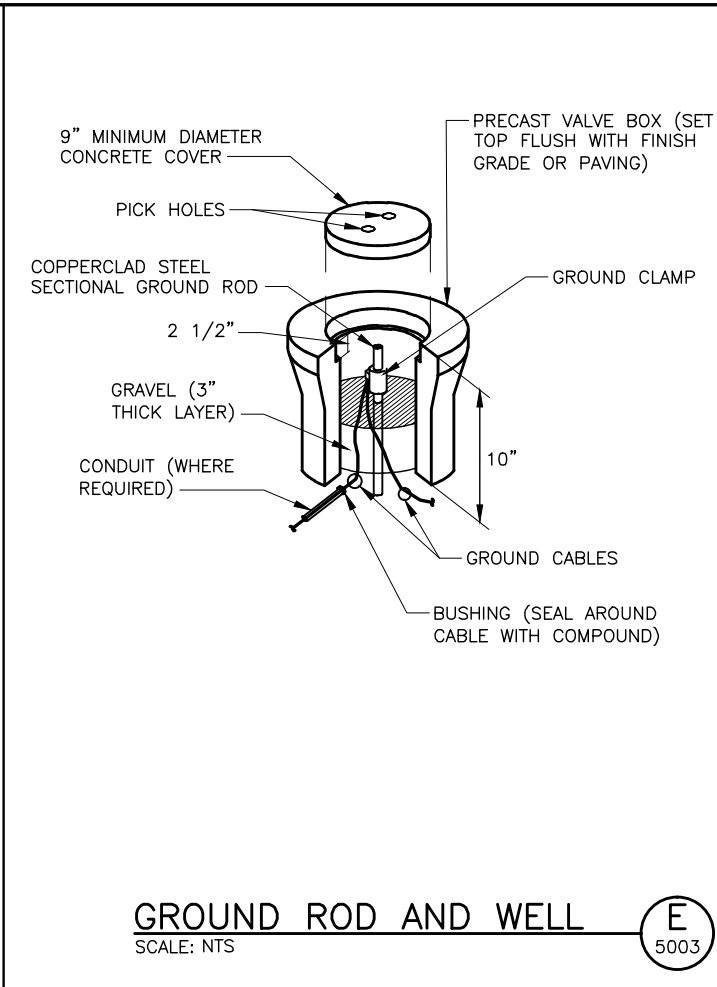
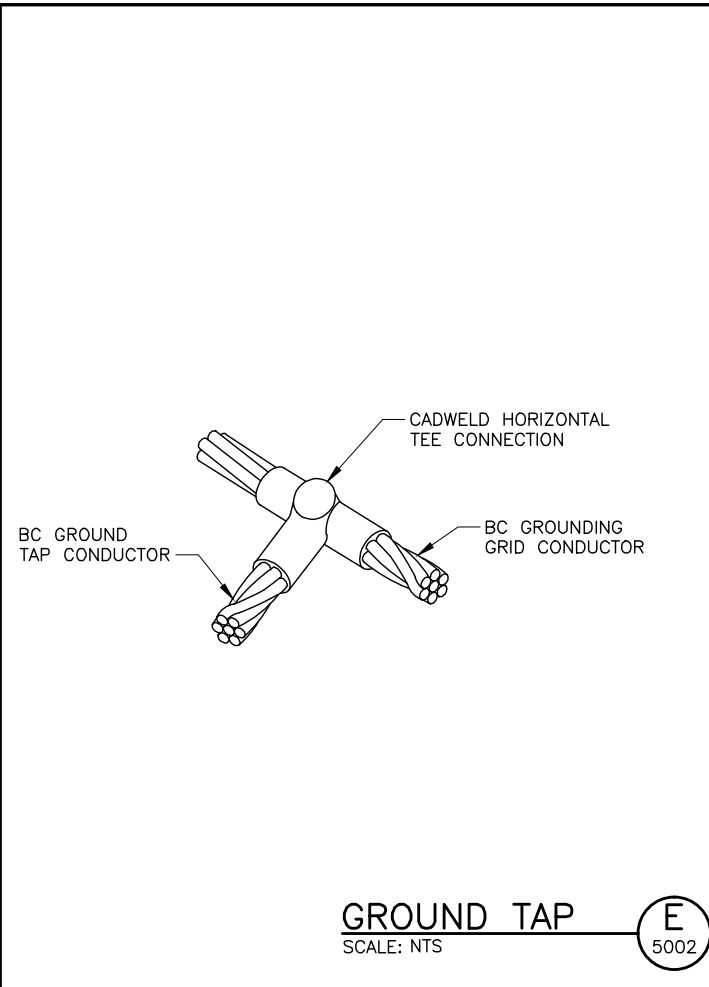
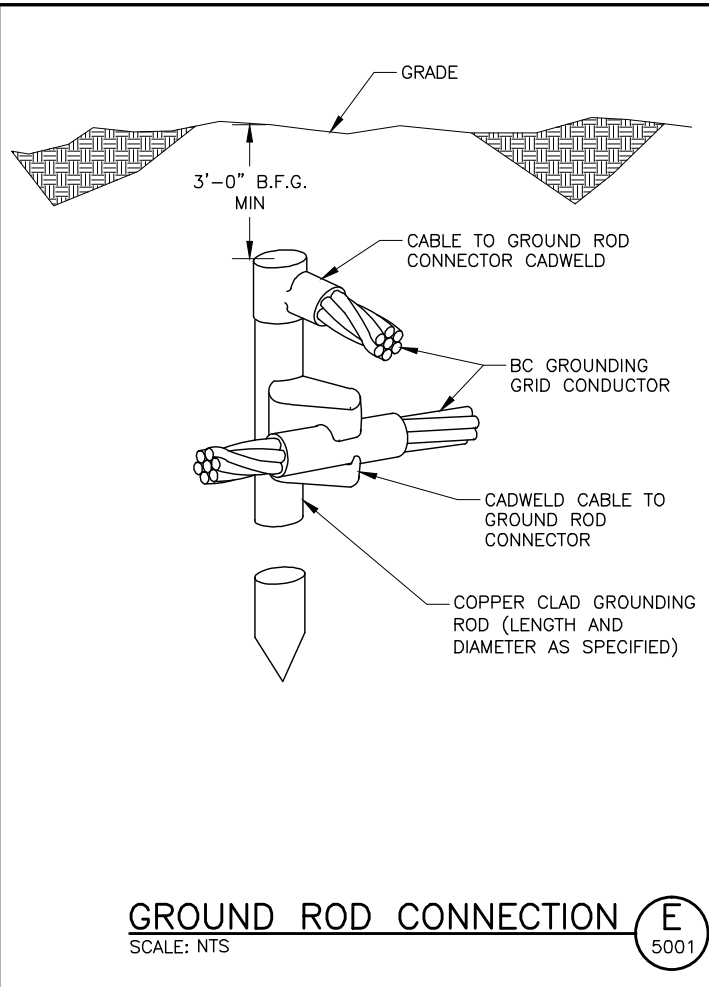
- CONTRACTOR SHALL PROVIDE AND INSTALL CONDUIT IN ACCORDANCE WITH ROCKY MOUNTAIN POWER REQUIREMENTS. CONDUCTORS SHALL BE INSTALLED BY ROCKY MOUNTAIN POWER.
- PROVIDED AND INSTALLED BY ROCKY MOUNTAIN POWER.
- PROVIDED AND INSTALLED BY DEVELOPER.
- HAZARDOUS LOCATION JUNCTION BOX AND CONDUIT SEAL REFER TO DETAIL E-5201.
- MANUFACTURER'S CABLE.
- PROVIDE AND INSTALL AN INTRINSICALLY SAFE BARRIER FOR EACH LEVEL SWITCH. THE LEVEL SWITCHES SHALL BE MADE FOR LOW ENERGY CIRCUITS TO BE USED IN A HAZARDOUS LOCATION, ANCHOR SCIENTIFIC TYPE GSI - GOLD OR EQUAL.



POWER ONE-LINE DIAGRAM #2



CONTROL BLOCK DIAGRAM #2



Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

| NO. | DATE | REV. BY | DESCRIPTION | REVISIONS |
|-----|------|---------|-------------|-----------|
| | | | | |

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING

PHASE 1A

| | | | | | |
|--------|------------|---------|------------|----------------|------------|
| DESIGN | D. STEWART | DRAWN | D. LAMPH | APPROVED | J. BECKMAN |
| REVIEW | D. STEWART | CHECKED | D. STEWART | PROJECT NUMBER | 334-13-01 |

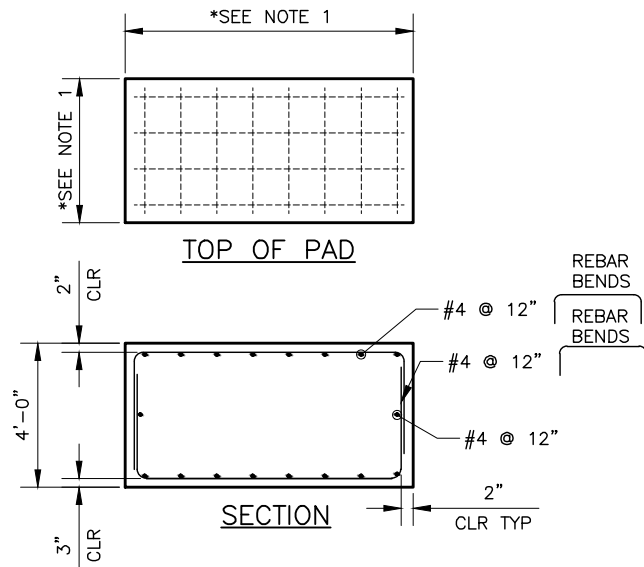
ELECTRICAL

ELECTRICAL DETAILS - 1

DATE: September 2013

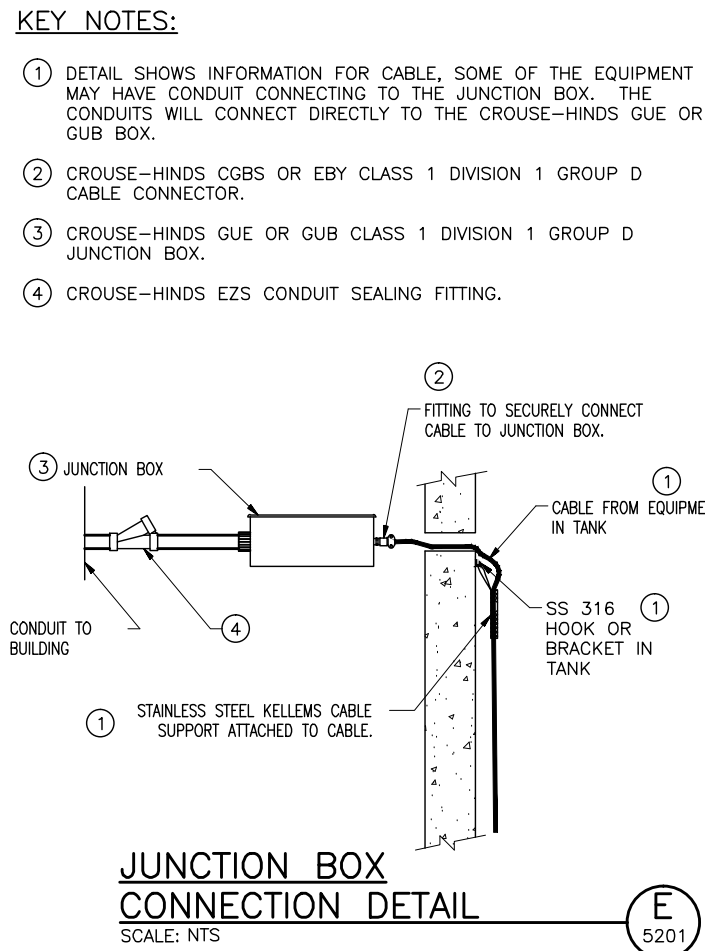
DRAWING NO. **GE-1**

SHEET **4** OF **5**

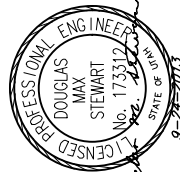


NOTES:
 1. THE LENGTH AND WIDTH OF THE GENERATOR PAD WILL BE SIZED AS NEEDED TO ACCOMMODATE THE GENERATOR WITH AN ADDITIONAL EIGHT INCHES OF SPACE ON ALL SIDES. ANCHOR GENERATOR TO CONCRETE PAD WITH FOUR 5/8" EPOXY ANCHORS, MINIMUM 4" EMBEDDED INTO CONCRETE.

CONCRETE GENERATOR PAD (E) 5081
 SCALE: NTS



Bowen Collins & Associates, Inc.
 CONSULTING ENGINEERS



| NO. | DATE | REV. BY | DESCRIPTION |
|-----|------|---------|-------------|
| | | | |
| | | | |
| | | | |
| | | | |

VERIFY SCALE
 BAR IS ONE INCH ON ORIGINAL DRAWING

SUMMIT AT POWDER MOUNTAIN
PHASE 1A
 POWDER MOUNTAIN, UT

DESIGN: D. STEWART
 DRAWN: D. LAMPH

REVIEW: D. STEWART
 CHECKED: D. STEWART
 APPROVED: J. BECKMAN

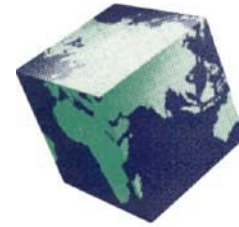
ELECTRICAL

ELECTRICAL DETAILS - 2

DATE: September 2013
 PROJECT NUMBER: 334-13-01

DRAWING NO.
GE-2

SHEET 5 OF 5



IGES®

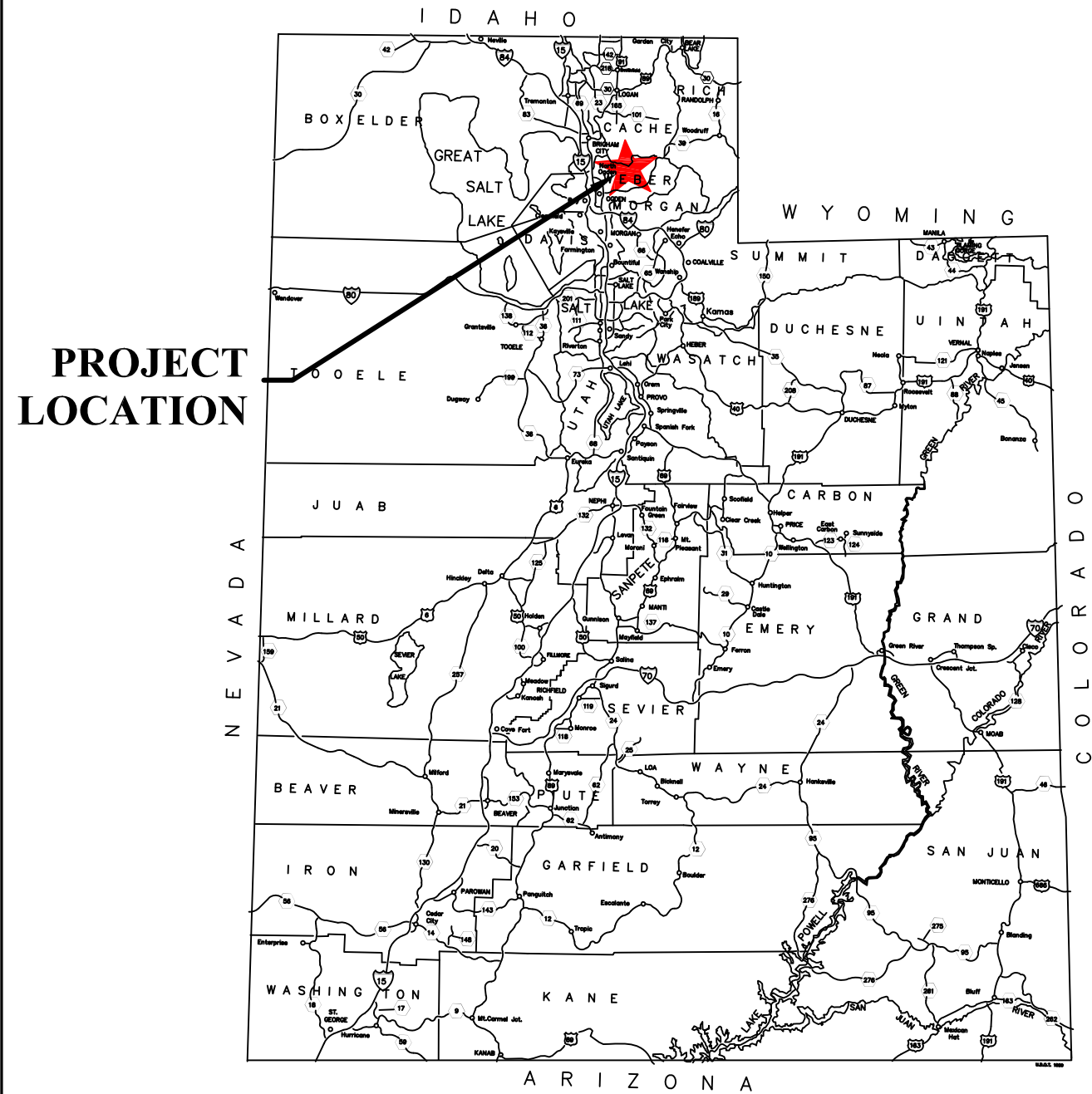
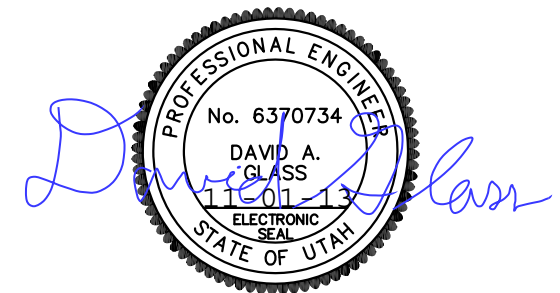
DESIGN PACKAGE ROCKERY DESIGN - HORIZON RUN POWDER MOUNTAIN RESORT WEBER COUNTY, UTAH

TABLE OF CONTENTS

1. SHOP DRAWINGS
 - SHEET 1.1 - COVER SHEET
 - SHEET 1.2 - PLAN VIEW
 - SHEET 1.3 - DESIGN CRITERIA
 - SHEET 1.4a - SECTION VIEW
 - SHEET 1.4b - SECTION VIEW
 - SHEET 1.5 - ARC ROCKERY CONSTRUCTION DETAILS
2. DESIGN CALCULATION PACKAGE
 - 2.1 - FHWA ROCKERY DESIGN CALCULATIONS
 - 2.2 - SLIDE CALCULATION OUTPUT

PREPARED BY:
JUSTIN W. WHITMER, P.E.I.

REVIEWED BY:
DAVID A. GLASS, P.E.



PROJECT LOCATION

PROJECT LOCATION MAP

| MARK | REVISIONS | DATE | BY | CHK |
|------|-----------|------|----|-----|
| | | | | |

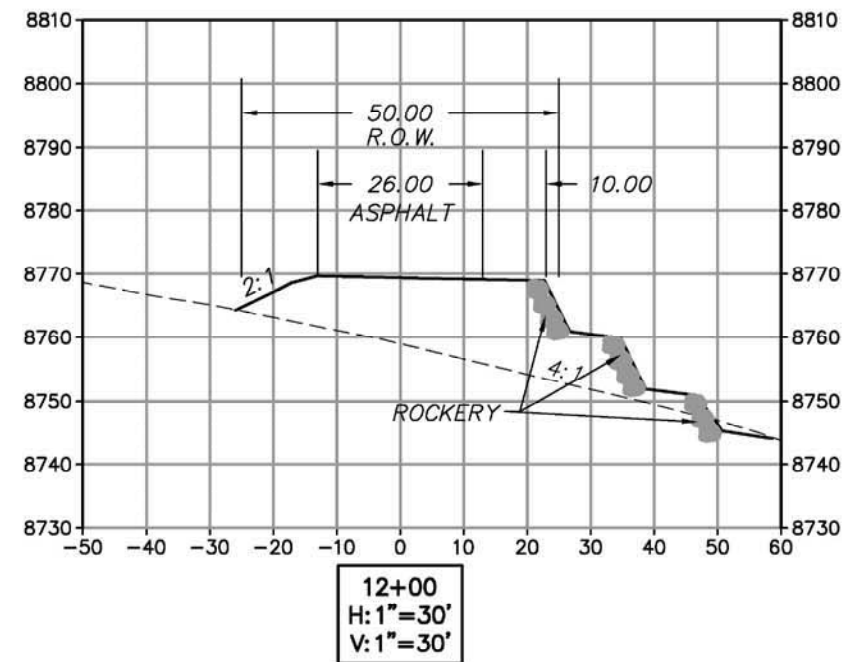
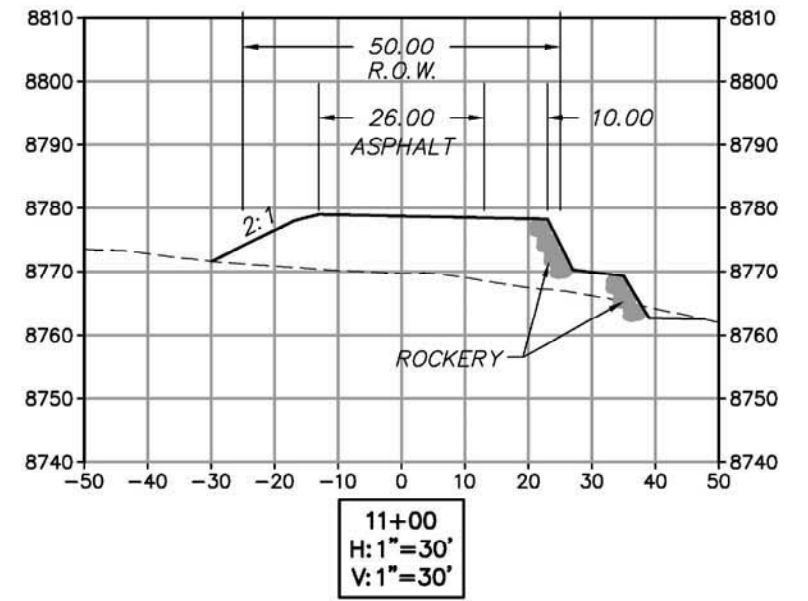
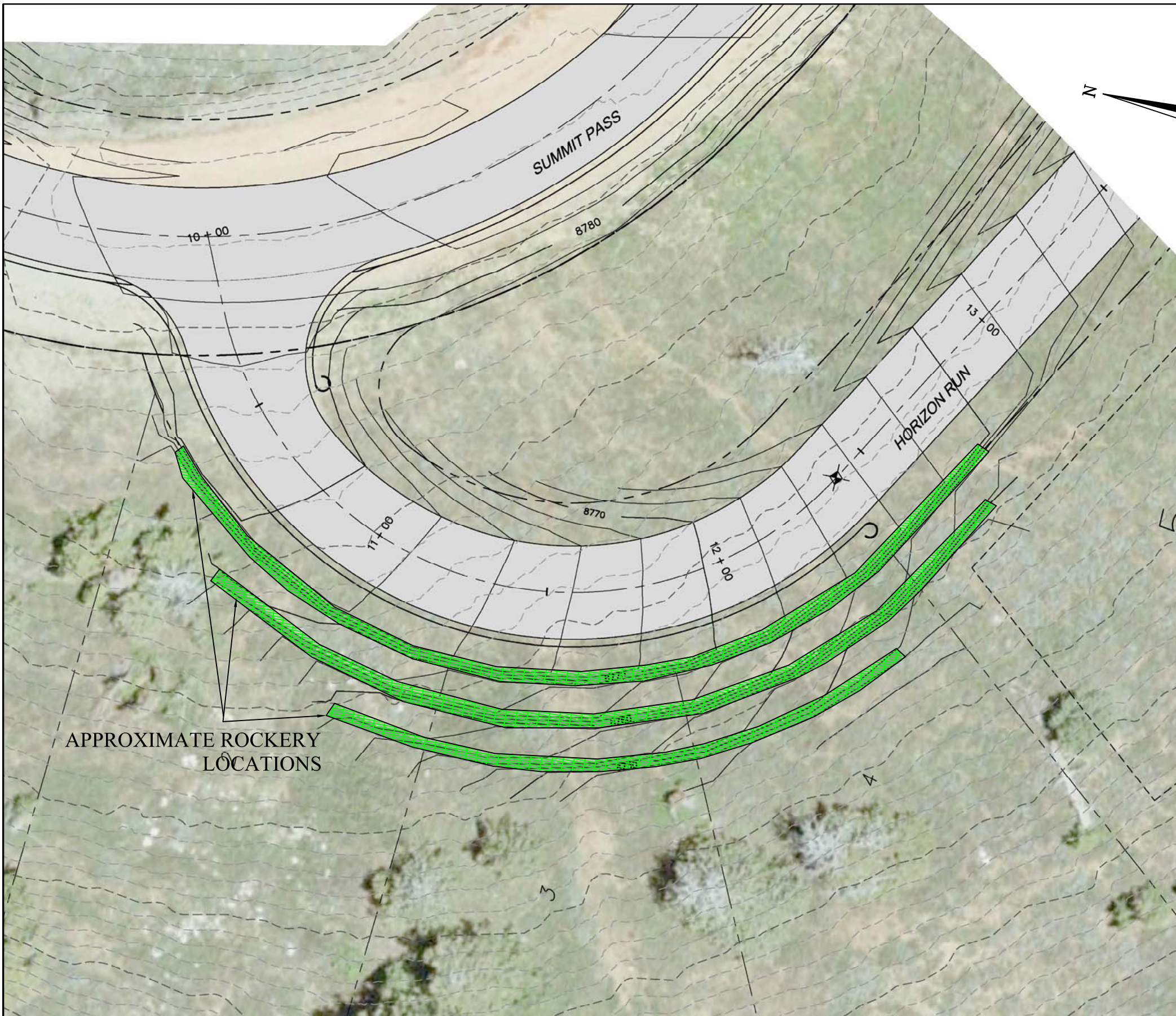


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DRAPER, UTAH 84020
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ROCKERY DESIGN - HORIZON RUN
POWDER MOUNTAIN RESORT
WEBER COUNTY, UTAH
COVER SHEET

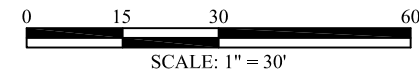
| | |
|-------------------------------|---------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: KAH OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | NTS |
| IGES PROJECT NO. 01855-001 | SHEET NO. 1.1 |
| | REV. N/A |

PLOT DATE: OCT 30, 2013



BASE MAP: UNDATED SITE PLAN PROVIDED BY NV5

POWDER MOUNTAIN HORIZON RUN SITE LAYOUT



PLOT DATE: OCT 30, 2013

| MARK | REVISIONS | DATE | BY | CHK |
|------|-----------|------|----|-----|
| | | | | |
| | | | | |



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ROCKERY DESIGN - HORIZON RUN
POWDER MOUNTAIN RESORT
WEBER COUNTY, UTAH
PLAN VIEW

| | |
|-------------------------------|---------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | 1"=30' |
| IGES PROJECT NO. 01855-001 | SHEET NO. 1.2 |
| | REV. N/A |

| ROCKERY STABILITY ANALYSES | |
|----------------------------|--|
| ANALYSIS | DESIGN REFERENCES/SOFTWARE |
| EXTERNAL STABILITY | FHWA 2006 CFL/TD-06-006 DESIGN METHODOLOGY |
| INTERNAL STABILITY | FHWA 2006 CFL/TD-06-006 DESIGN METHODOLOGY |
| GLOBAL STABILITY | SLIDE: ROCSCIENCE INC., 1998-2010, VERSION 5.044, BUILD DATE FEBRUARY 2, 2010. |

| SOIL CONDITIONS | | | |
|----------------------------|----------------|----------|-------------|
| SOIL AREA | FRICTION ANGLE | COHESION | UNIT WEIGHT |
| NATIVE CLAYEY GRAVEL SOILS | 36° | 100 PSF* | 125 PCF |
| ENGINEERED FILL | 34° | 50 PSF* | 125 PCF |

* COHESION USED ONLY IN GLOBAL STABILITY ANALYSIS

| ROCKERY GEOMETRY AND LOADING CONDITIONS | | | | |
|---|-------------|---------------------|----------------------|-------------------|
| TIER | LENGTH (FT) | MAXIMUM HEIGHT (FT) | BACKSLOPE CONDITIONS | SURCHARGE LOADING |
| UPPER | ~225 | 8 | FLAT | 250 PSF (TRAFFIC) |
| MIDDLE | ~185 | 8 | 8:1 | 150 PSF (SNOW) |
| LOWER | ~140 | 6 | 8:1 | 150 PSF (SNOW) |

| 2012 IBC HORIZONTAL GROUND ACCELERATION | | |
|---|-------|---------------------|
| SITE CLASS | PGA | SEISMIC COEFFICIENT |
| C: VERY DENSE SOIL | 0.35g | 0.15g |

SOURCES:

1. INTERNATIONAL CODE COUNCIL, 2012, INTERNATIONAL BUILDING CODE.

REFERENCE: IGES, INC., 2013, ROCKERY CONSTRUCTION GUIDELINES, POWDER MOUNTAIN RESORT, WEBER COUNTY, UTAH, PROJECT NO. 01628-005, DATED MAY 8, 2013

PLOT DATE: OCT 30, 2013

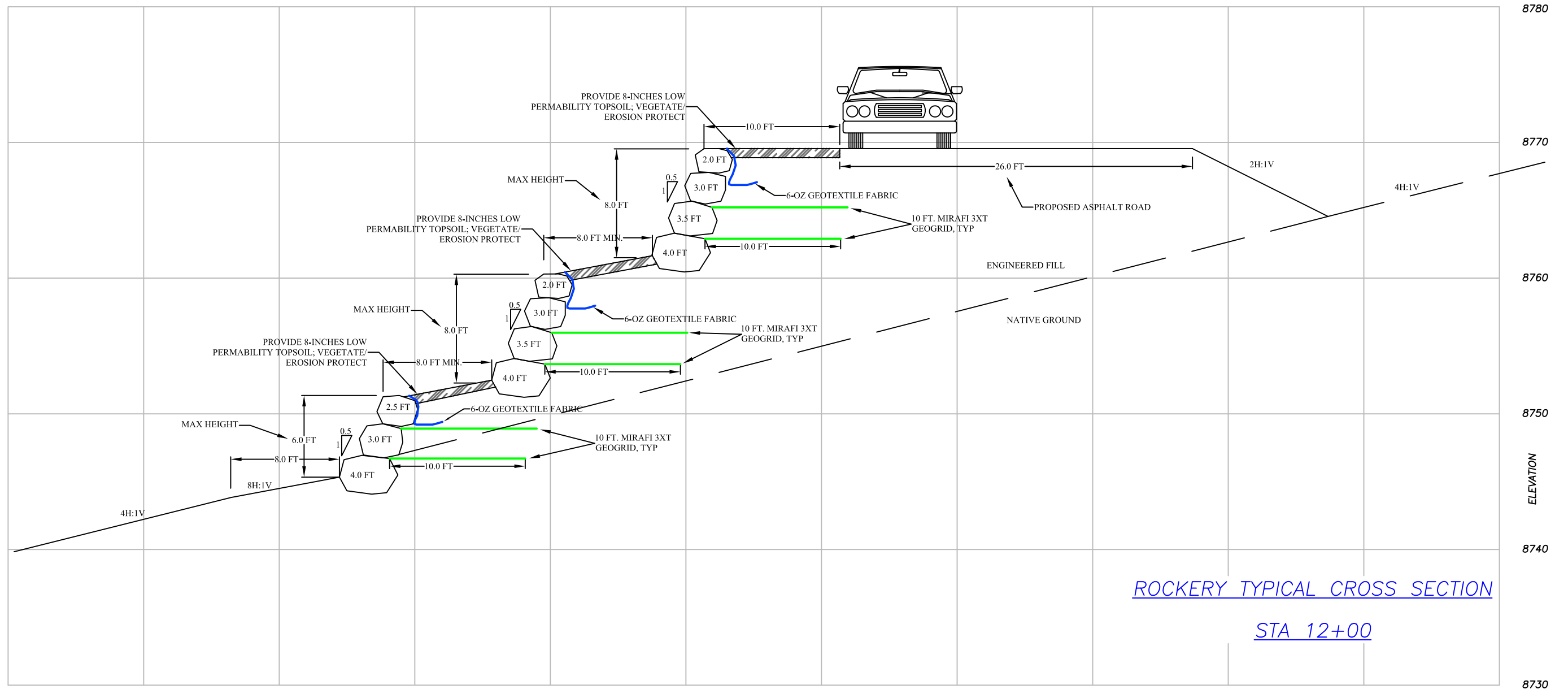
| MARK | REVISIONS | DATE | BY | CHK |
|------|-----------|------|----|-----|
| | | | | |



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ROCKERY DESIGN - HORIZON RUN
 POWDER MOUNTAIN RESORT
 WEBER COUNTY, UTAH
 DESIGN CRITERIA

| | |
|-------------------------------|---------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | NA |
| IGES PROJECT NO. 01855-001 | SHEET NO. 1.3 |
| | REV. N/A |



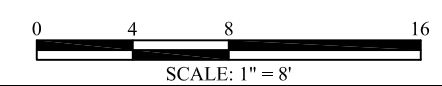
ROCKERY TYPICAL CROSS SECTION
STA 12+00

SECTION BASED ON UNDATED CROSS-SECTION DRAWN BY NV-5

EXPOSED ROCKERY HEIGHT - ASSUMES 1-FOOT MINIMUM EMBEDMENT DEPTH FOR ALL ROCKERY SECTIONS AND TIERS

CONSTRUCTION CRITERIA

1. MAINTAIN MINIMUM OF 10 FEET FROM FACE OF TOP BOULDER TO ASPHALT PAVEMENT
2. MAXIMUM BATTER OF 0.5H:1V
3. BOULDER SIZES SHOWN IS MINIMUM DIMENSION INTO THE SLOPE



PLOT DATE: OCT 30, 2013

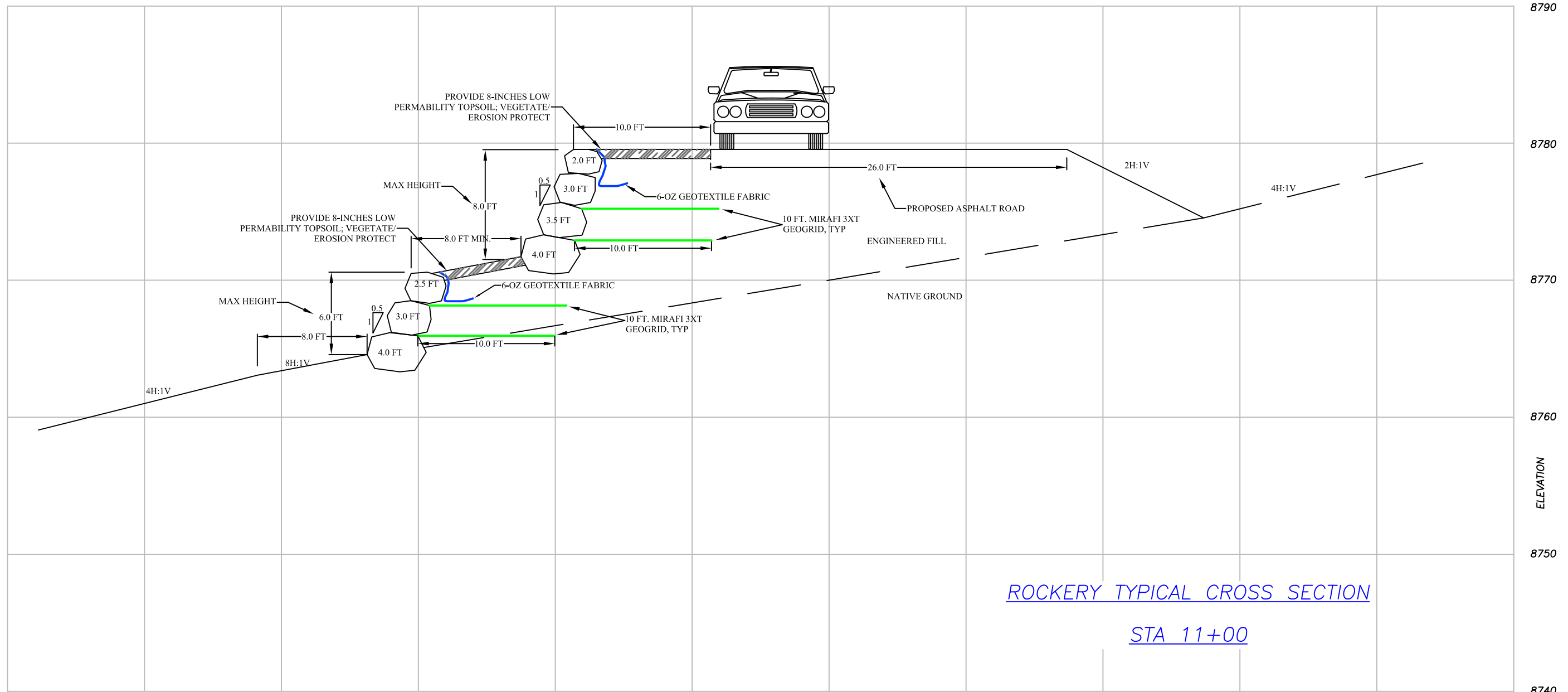
| MARK | REVISIONS | DATE | BY | CHK |
|------|-----------|------|----|-----|
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ROCKERY DESIGN - HORIZON RUN
POWDER MOUNTAIN RESORT
WEBER COUNTY, UTAH
SECTION VIEW

| | |
|-------------------------------|----------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | 1"=8' |
| IGES PROJECT NO. 01855-001 | SHEET NO. 1.4a |
| | REV. N/A |



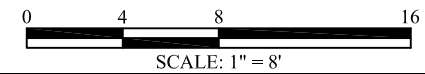
ROCKERY TYPICAL CROSS SECTION
STA 11+00

SECTION BASED ON UNDATED CROSS-SECTION DRAWN BY NV-5

* EXPOSED ROCKERY HEIGHT - ASSUMES 1-FOOT MINIMUM EMBEDMENT DEPTH FOR ALL ROCKERY SECTIONS AND TIERS

CONSTRUCTION CRITERIA

1. MAINTAIN MINIMUM OF 10 FEET FROM FACE OF TOP BOULDER TO ASPHALT PAVEMENT
2. MAXIMUM BATTER OF 0.5H:1V
3. BOULDER SIZES SHOWN IS MINIMUM DIMENSION INTO THE SLOPE



PLOT DATE: OCT 30, 2013

| MARK | REVISIONS | DATE | BY | CHK |
|------|-----------|------|----|-----|
| | | | | |
| | | | | |
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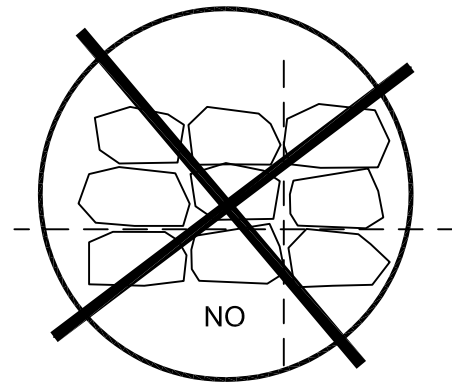
ROCKERY DESIGN - HORIZON RUN
POWDER MOUNTAIN RESORT
WEBER COUNTY, UTAH
SECTION VIEW

| | |
|-------------------------------|----------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | 1"=8' |
| IGES PROJECT NO. 01855-001 | SHEET NO. 1.4b |
| | REV. N/A |

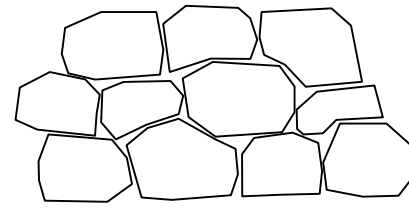
Rock Stacking Construction Guidelines:

Rocks should be stacked in general accordance with the Associated Rockery Contractors (ARC) Rockery Construction Guidelines, summarized as follows:

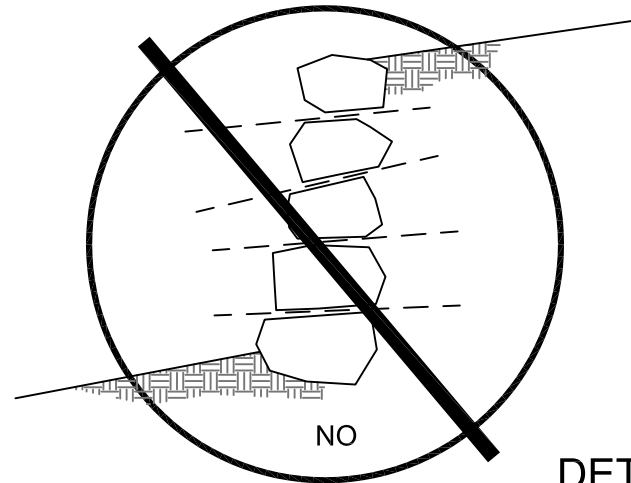
- Rocks should be placed so that there are no continuous joint planes in either the vertical or lateral direction (see detail A)
- Wherever possible, each rock should bear on at least two rocks below it.
- The upper plane of each rock between courses (the top surface of rock), should slope back towards the slope face and away from the face of the rock wall (see detail B)



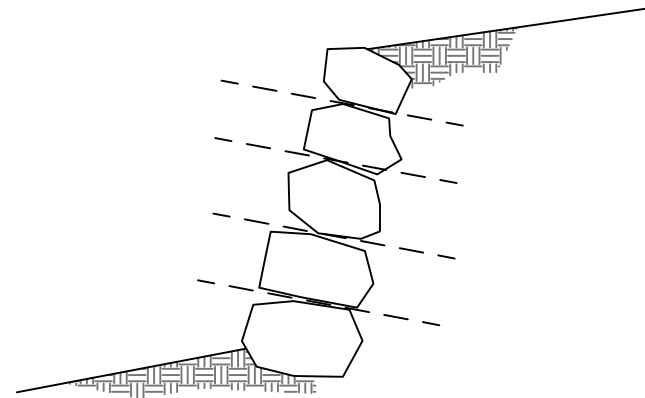
DETAIL A



YES



DETAIL B



YES

1. INTRODUCTION

- 1.1. DESIGN AND CONSTRUCTION INFORMATION IS BASED ON INFORMATION OBTAINED FROM SITE TOPOGRAPHY, SOIL DESCRIPTIONS, SITE OBSERVATIONS, SITE GEOMETRY, PROJECT PLANS, AND THE ENGINEERING ANALYSIS PERFORMED AS PART OF THE SCOPE OF WORK FOR THIS PROJECT BY IGES, INC.
- 1.2. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO ROCKERY CONSTRUCTION.
- 1.3. THE DESIGN INCLUDES MEASURES TO REDUCE THE POTENTIAL FOR SATURATION OF THE SLOPES ABOVE THE ROCKERIES.
 - 1.3.1. VEGETATION OR EROSION CONTROL MEASURES SHALL BE ESTABLISHED ABOVE AND BELOW THE ROCKERIES IMMEDIATELY FOLLOWING CONSTRUCTION.
- 1.4. CONDITIONS SUCH AS LEAKY OR BROKEN IRRIGATION LINES AND/OR RUNOFF FROM PRECIPITATION CAN LEAD TO UNDERMINING OR SATURATION OF THE SOIL BEHIND THE ROCKERY, WHICH CAN LEAD TO SLOPE MOVEMENT.
 - 1.4.1. THE OWNER SHALL BE AWARE OF THE RISKS IF THESE OR OTHER CONDITIONS OCCUR THAT COULD SATURATE OR ERODE THE SOIL BEHIND THE ROCKERIES.

2. MATERIALS

- 2.1. RETAINED SOILS ARE TO CONSIST OF NATIVE CUT SOILS OR GRANULAR IMPORT APPROVED BY IGES, INC. IF NATIVE FILL IS USED, THE FILL SHOULD CONSIST OF 4-INCH MINUS GRANULAR SOILS COMPACTED TO A MINIMUM OF 90 PERCENT ASTM D-1557 FOR LANDSCAPE AREAS AND 95 PERCENT UNDERNEATH OR IMMEDIATELY ADJACENT TO STRUCTURES. ANY BACKFILL MATERIAL THAT IS IMPORTED SHOULD BE APPROVED BY IGES INC. PRIOR TO IMPORTING.
- 2.2. ROCKERY BOULDERS TO BE USED AS FACING SHALL BE DURABLE ANGULAR PARTICLES WITH A MINIMUM NOMINAL DIAMETER OF 1½ -FEET. ROCK SIZES SHALL BE IN ACCORDANCE WITH DESIGN DRAWINGS.

3. ROCKERY INSTALLATION

- 3.1. ROCKS SHOULD BE STACKED IN GENERAL ACCORDANCE WITH THE ASSOCIATED ROCKERY CONTRACTORS (ARC) ROCKERY CONSTRUCTION GUIDELINES (SEE ADJACENT DETAILS).
- 3.2. ROCK FACING SHOULD BE STACKED AT A MAXIMUM STEEPNESS OF ½ HORIZONTAL TO 1 VERTICAL.
- 3.3. BOTTOM ROW OF ROCKS SHOULD BE BURIED (KEYED IN) A MINIMUM DEPTH OF 1 FOOT.

4. CONSTRUCTION OBSERVATION

- 4.1. TO FULFILL ANY APPLICABLE CITY, COUNTY AND/OR STATE AGENCY REQUIREMENTS, AND TO PROTECT THE CONTRACTOR AND DESIGN ENGINEER, IGES MUST PERFORM PERIODIC CONSTRUCTION OBSERVATIONS.
 - 4.1.1. INSPECTIONS SHALL PROCEED AS FOLLOWS:
 - 4.1.1.1. OBSERVE THE ROCKERY BASE EXCAVATION TO ASSESS THE SUITABILITY OF THE FOUNDATION SOILS.
 - 4.1.1.2. INSPECT THE FIRST COURSE OF ROCKS FOR SIZE AND EMBEDMENT INSTALLATION.
 - 4.1.1.3. INSPECT THE SECOND OR THIRD COURSE OF ROCKS FOR SIZE, POSITION AND PLACEMENT.
 - 4.1.1.4. INSPECT THE FINISHED ROCKERIES FOR CONFORMANCE TO DESIGN REQUIREMENTS SUCH AS MAXIMUM HEIGHTS, BATTER, FRONT AND BACK SLOPE GEOMETRIES, ROCK SIZING, POSITIONING AND PLACEMENT.

PLOT DATE: OCT 30, 2013

| MARK | REVISIONS | DATE | BY | CHK |
|------|-----------|------|----|-----|
| | | | | |



IGES®

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ROCKERY DESIGN - HORIZON RUN
 POWDER MOUNTAIN RESORT
 WEBER COUNTY, UTAH
ARC DETAILS AND SPECIFICATIONS

| | |
|-------------------------------|-------------------------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | N/A |
| IGES PROJECT NO. 01855-001 | SHEET NO. 1.5 REV. N/A |

ROCKERY EXTERNAL AND INTERNAL STABILITY CALCULATIONS FROM FHWA 2006 CFL/TD-06-006

| <i>MINIMUM ALLOWABLE FACTORS OF SAFETY</i> | | |
|--|--------------------------------|---------------------------------|
| <i>FAILURE MECHANISM</i> | <i>UNDER STATIC CONDITIONS</i> | <i>UNDER SEISMIC CONDITIONS</i> |
| <i>EXTERNAL SLIDING</i> | <i>1.5</i> | <i>1.13</i> |
| <i>EXTERNAL OVERTURNING</i> | <i>1.5</i> | <i>1.13</i> |
| <i>BEARING CAPACITY</i> | <i>2.0</i> | <i>1.50</i> |
| <i>INDIVIDUAL ROCK OVERTURNING</i> | <i>1.5</i> | <i>1.13</i> |



ROCKERY DESIGN
POWDER MOUNTAIN RESORT
WEBER COUNTY, UTAH

| | |
|-------------------------------|---------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | N/A |
| IGES PROJECT NO. 01855-001 | SHEET NO. 2.1 |
| | REV. N/A |

Interactive Rockery Minimum Rock Size Stability Calculations

Project: Powder Mountain Resort
Rockery Analysis and Design
Location: Weber County, UT
IGES, Inc. Project No:
Engineer: JWW
Date: October 28, 2013

| | Minimum Factors of Safety: | | Allowable | | Actual | |
|-----------------------|----------------------------|---------|-----------|---------|--------|---------|
| | Static | Seismic | Static | Seismic | Static | Seismic |
| Overturning: | 1.5 | 1.1 | 2.16 | 1.46 | | |
| Sliding: | 1.5 | 1.1 | 1.78 | 1.30 | | |
| Bearing Capacity: | 2.0 | 1.5 | 2.56 | 1.83 | | |
| Internal Sliding: | 1.5 | 1.1 | 1.87 | 1.34 | | |
| Internal Overturning: | 1.5 | 1.1 | 2.76 | 1.86 | | |

Rockery Section Description: 8-ft Rockery Section **Top Tier**

1. Enter Geometric Parameters:

| | | |
|--|---|---|
| Backslope (for flat backslope V=0): 10 H. : 1 V. $\beta = 5.71$ degrees surcharge, $q_B = 250$ psf | Toeslope (for flat toeslope V=0): 4 H. : 0 V. $\beta_T = 0.00$ degrees surcharge, $q_T = 0$ psf | Rockery Batter (for vertical stacking H = 0): 1 H. : 2 V. $\Psi_{front} = -26.57$ degrees Number of Rocks (8 max): 4 Appr. Rockery Length, L = 80 ft |
|--|---|---|

2. Enter Soil, Foundation, Rock and Seismic Properties

Will geotextile fabric be used along the back soil? YES NO

| | | | |
|--|---|---|--|
| Retained Soil Properties: $\gamma_{retained} = 125$ pcf $\phi_{retained} = 30$ degrees $C_{retained} = 0$ psf $\delta_{retained} = 30.00$ degrees $K_a = 0.195$ $K_{ah} = 0.190$ | Foundation Properties: $\gamma_{foundation} = 125$ pcf $\phi_{foundation} = 30.0$ degrees $C_{foundation} = 0$ psf $I_{foundation} = 0.6$ Depth to Groundwater, z = 50.0 ft | Foundation Soil Type: Sand Silt or Clay Gravel Bedrock Structural Fill | Rock Properties: $\gamma_{Rock\ Boulder} = 150$ pcf $\phi_{Boulder\ Interface} = 0.55$ degrees Rockery Embedment, D = 1.0 ft Rock Stacking Red. Factor* = 0.70 *Height to Width Ratio |
|--|---|---|--|

| | | |
|--|----------------------|--|
| Seismic Properties: 2 % Exceedance Prob. 50 years Exposure Time 2475 -yr Recurrence Interval | 2 PE 50 PGA: 0.150 g | $k_v = 0.000$ g $k_h = 0.075$ g $\theta = 4.29$ degrees $K_{AE} = 0.247$ $F_{AE} = 1,348.0$ lb/ft $\Delta F_{AE} = 282.5$ lb/ft |
|--|----------------------|--|

3. Enter Rock Diameters in Table Below

Actual Back of Rock Batter, $\psi = 17.2$ degrees from vertical (CW)

4. Calculate Hinge Height do not use

Avg. rock diameter: 3.1 ft Hinge Ht., $H_h = 10.1$ ft

5. Calculate the Factor of Safety against Overturning (Min. FS = 1.5)

Wall Weight, $W_1 = 4,208$ lb/ft

Acting At: x = 2.48 y = 4.16

Resisting Moment, $M_{res} = 11,623.0$ lb $M_{res-E} = 11,981.0$ lb-dyn

Driving Moment, $M_{drv} = 5,369.9$ lb $M_{drv-E} = 8,226.8$ lb-dyn

$FS_{ovt} = M_{res}/M_{drv} = 2.16$ static 1.46 seismic

6. Calculate the Factor of Safety against Base Sliding (Min. FS = 1.5)

Resisting Force, $P_{res} = 2,665.6$ lb/ft $P_{res-E} = 2,703.0$ lb/ft-dyn

Driving Force, $P_{ah1} = 1,495.0$ lb/ft $P_{ah1-E} = 2,086.1$ lb/ft-dyn

$FS_{slid} = P_{res}/P_{ah1} = 1.78$ static 1.30 seismic

7. Calculate the Factor of Safety for Bearing Capacity (Min. FS = 2.0)

Eccentricity, e = 0.593 ft OK $e_E = 1.17$ ft

Bearing Stress, $\sigma_{vb} = 2,098$ psf $\sigma_{vb-E} = 2,936$ psf-dyn

Max. Allow., $q_{ULT} = 5,368$ psf $q_{ULT-E} = 5,368$ psf-dyn

$FS_{bearing} = q_{ULT}/\sigma_{vb} = 2.56$ static 1.83 seismic

8. Calculate the Factors of Safety for Internal Bulldging (Min. FS = 1.5)

Values tabulated below

Approximate Maximum Exposed Rockery Height: **8.4** ft

| Row, i | Min. Rock Dia. (ft) | $H_{1,i}$ (ft) | Accm. Weigh t (lb/ft) | F_{AEi} (lb/ft) | ΔF_{AEi} (lb/ft) | P_{ahi} | | P_{resi} | | F.S. Internal Sliding | | M_{drv} | | M_{res} | | F.S. Internal Overturning | |
|--------|---------------------|----------------|-----------------------|-------------------|--------------------------|-----------|---------|------------|---------|-----------------------|-----------|-----------|---------|-----------|-------------|---------------------------|----------|
| | | | | | | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic |
| | | | | | | (lb/ft) | (lb/ft) | (lb/ft) | (lb/ft) | 1.5 Min. | 1.13 Min. | lb | lb | lb | lb | 1.5 Min. | 1.1 Min. |
| 1 | 4.0 | 9.4 | 4,208 | 1,348 | 282 | 1,495 | 2,086 | 2,666 | 2,703 | See Base Sliding | 5,370 | 8,227 | 11,623 | 11,981 | See Ext. OT | | |
| 2 | 3.5 | 6.6 | 2,702 | 662 | 139 | 829 | 1,167 | 1,550 | 1,568 | 1.87 | 1.34 | 2,159 | 3,294 | 5,968 | 6,113 | 2.76 | 1.86 |
| 3 | 3.0 | 4.1 | 1,538 | 259 | 54 | 400 | 568 | 870 | 878 | 2.18 | 1.55 | 683 | 1,034 | 2,666 | 2,711 | 3.90 | 2.62 |
| 4 | 2.0 | 2.0 | 600 | 62 | 13 | 145 | 203 | 336 | 338 | 2.32 | 1.67 | 129 | 189 | 713 | 720 | 5.52 | 3.80 |

Calculations Based on *Rockery Design and Construction Guidelines*, FHWA Publication No. FHWA-CFL/TD-06-006



Interactive Rockery Minimum Rock Size Stability Calculations

Project: Powder Mountain Resort
 Rockery Analysis and Design
 Location: Weber County, UT
 IGES, Inc. Project No:
 Engineer: JWW
 Date: October 28, 2013

| | Minimum Factors of Safety: | | Allowable | | Actual | |
|-----------------------|----------------------------|---------|-----------|---------|--------|---------|
| | Static | Seismic | Static | Seismic | Static | Seismic |
| Overturning: | 1.5 | 1.1 | 2.53 | 1.60 | 2.53 | 1.60 |
| Sliding: | 1.5 | 1.1 | 2.00 | 1.40 | 2.00 | 1.40 |
| Bearing Capacity: | 2.0 | 1.5 | 3.16 | 2.13 | 3.16 | 2.13 |
| Internal Sliding: | 1.5 | 1.1 | 2.17 | 1.49 | 2.17 | 1.49 |
| Internal Overturning: | 1.5 | 1.1 | 3.37 | 2.09 | 3.37 | 2.09 |

Rockery Section Description: 8-ft Rockery Section Middle Tier

1. Enter Geometric Parameters:

| | | |
|---|---|---|
| Backslope (for flat backslope V=0): 8 H. : 1 V. $\beta = 7.13$ degrees surcharge, $q_B = 150$ psf | Toeslope (for flat toeslope V=0): 4 H. : 0 V. $\beta_T = 0.00$ degrees surcharge, $q_T = 0$ psf | Rockery Batter (for vertical stacking H = 0): 1 H. : 2 V. $\Psi_{front} = -26.57$ degrees Number of Rocks (8 max): 4 Appr. Rockery Length, L = 80 ft |
|---|---|---|

2. Enter Soil, Foundation, Rock and Seismic Properties

Will geotextile fabric be used along the back soil? YES NO

| | | |
|--|---|--|
| Retained Soil Properties: $\gamma_{retained} = 125$ pcf $\phi_{retained} = 30$ degrees $C_{retained} = 0$ psf $\delta_{retained} = 30.00$ degrees $K_a = 0.198$ $K_{ah} = 0.194$ | Foundation Properties: $\gamma_{foundation} = 125$ pcf $\phi_{foundation} = 30.0$ degrees $C_{foundation} = 0$ psf $I_{foundation} = 0.6$ Depth to Groundwater, z = 50.0 ft | Rock Properties: $\gamma_{Rock\ Boulder} = 150$ pcf $\phi_{Boulder\ Interface} = 0.55$ degrees Rockery Embedment, D = 1.0 ft Rock Stacking Red. Factor* = 0.70 *Height to Width Ratio |
|--|---|--|

| | | |
|--|---|---|
| Seismic Properties: 2 % Exceedance Prob. 50 years Exposure Time 2475 -yr Recurrence Interval | 2 PE 50 PGA: 0.150 g $k_v = 0.000$ g $k_h = 0.075$ g $\theta = 4.29$ degrees | $K_{AE} = 0.252$ $F_{AE} = 1,377.6$ lb/ft $\Delta F_{AE} = 293.2$ lb/ft |
|--|---|---|

3. Enter Rock Diameters in Table Below

Actual Back of Rock Batter, $\psi = 17.2$ degrees from vertical (CW)

4. Calculate Hinge Height do not use

Avg. rock diameter: 3.1 ft Hinge Ht., $H_h = 10.1$ ft

5. Calculate the Factor of Safety against Overturning (Min. FS = 1.5)

Wall Weight, $W_1 = 4,208$ lb/ft
 Acting At: x = 2.48 y = 4.16

| | |
|--|-------------------------------|
| Resisting Moment, $M_{res} = 11,643.7$ lb | $M_{res-E} = 12,015.3$ lb-dyn |
| Driving Moment, $M_{drv} = 4,597.5$ lb | $M_{drv-E} = 7,513.1$ lb-dyn |
| $FS_{ovt} = M_{res}/M_{drv} = 2.53$ static | 1.60 seismic |

6. Calculate the Factor of Safety against Base Sliding (Min. FS = 1.5)

| | |
|---|---------------------------------|
| Resisting Force, $P_{res} = 2,668.1$ lb/ft | $P_{res-E} = 2,706.9$ lb/ft-dyn |
| Driving Force, $P_{ah1} = 1,336.0$ lb/ft | $P_{ah1-E} = 1,937.5$ lb/ft-dyn |
| $FS_{slid} = P_{res}/P_{ah1} = 2.00$ static | 1.40 seismic |

7. Calculate the Factor of Safety for Bearing Capacity (Min. FS = 2.0)

| | | |
|--|---------------------------------|-----------------|
| Eccentricity, e = 0.415 ft | OK | $e_E = 1.00$ ft |
| Bearing Stress, $\sigma_{vb} = 1,805$ psf | $\sigma_{vb-E} = 2,673$ psf-dyn | |
| Max. Allow., $q_{ULT} = 5,699$ psf | $q_{ULT-E} = 5,699$ psf-dyn | |
| $FS_{bearing} = q_{ULT}/\sigma_{vb} = 3.16$ static | 2.13 seismic | |

8. Calculate the Factors of Safety for Internal Bulldging (Min. FS = 1.5)

Values tabulated below

Approximate Maximum Exposed Rockery Height: **8.4** ft

| Row, i | Min. Rock Dia. (ft) | $H_{1,i}$ (ft) | Accm. Weigh t (lb/ft) | F_{AEi} (lb/ft) | ΔF_{AEi} (lb/ft) | P_{ahi} | | P_{resi} | | F.S. Internal Sliding | | M_{drv} | | M_{res} | | F.S. Internal Overturning | |
|--------|---------------------|----------------|-----------------------|-------------------|--------------------------|-----------|---------|------------|---------|-----------------------|-----------|-----------|---------|-----------|-------------|---------------------------|----------|
| | | | | | | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic |
| | | | | | | (lb/ft) | (lb/ft) | (lb/ft) | (lb/ft) | 1.5 Min. | 1.13 Min. | Lb | Lb | Lb | Lb | 1.5 Min. | 1.1 Min. |
| 1 | 4.0 | 9.4 | 4,208 | 1,378 | 293 | 1,336 | 1,937 | 2,668 | 2,707 | See Base Sliding | 4,598 | 7,513 | 11,644 | 12,015 | See Ext. OT | | |
| 2 | 3.5 | 6.6 | 2,702 | 676 | 144 | 714 | 1,057 | 1,551 | 1,570 | 2.17 | 1.49 | 1,772 | 2,927 | 5,977 | 6,127 | 3.37 | 2.09 |
| 3 | 3.0 | 4.1 | 1,538 | 265 | 56 | 325 | 496 | 871 | 878 | 2.68 | 1.77 | 528 | 884 | 2,669 | 2,716 | 5.05 | 3.07 |
| 4 | 2.0 | 2.0 | 600 | 63 | 13 | 108 | 166 | 336 | 338 | 3.11 | 2.03 | 92 | 153 | 714 | 721 | 7.77 | 4.73 |

Calculations Based on *Rockery Design and Construction Guidelines*, FHWA Publication No. FHWA-CFL/TD-06-006

Interactive Rockery Minimum Rock Size Stability Calculations

Project: Powder Mountain Resort
Rockery Analysis and Design
Location: Weber County, UT
IGES, Inc. Project No:
Engineer: JWW
Date: October 28, 2013

| | Minimum Factors of Safety: | | Allowable | | Actual | |
|-----------------------|----------------------------|---------|-----------|---------|--------|---------|
| | Static | Seismic | Static | Seismic | Static | Seismic |
| Overturning: | 1.5 | 1.1 | 3.71 | 2.24 | | |
| Sliding: | 1.5 | 1.1 | 2.54 | 1.70 | | |
| Bearing Capacity: | 2.0 | 1.5 | 4.83 | 3.40 | | |
| Internal Sliding: | 1.5 | 1.1 | 2.72 | 1.79 | | |
| Internal Overturning: | 1.5 | 1.1 | 4.96 | 2.94 | | |

Rockery Section Description: 6-ft Rockery Section Lower Tier

1. Enter Geometric Parameters:

| | | |
|---|---|---|
| Backslope (for flat backslope V=0): 8 H. : 1 V. $\beta = 7.13$ degrees surcharge, $q_B = 150$ psf | Toeslope (for flat toeslope V=0): 4 H. : 0 V. $\beta_T = 0.00$ degrees surcharge, $q_T = 0$ psf | Rockery Batter (for vertical stacking H = 0): 1 H. : 2 V. $\psi_{front} = -26.57$ degrees Number of Rocks (8 max): 3 Appr. Rockery Length, L = 80 ft |
|---|---|---|

2. Enter Soil, Foundation, Rock and Seismic Properties

Will geotextile fabric be used along the back soil? YES NO

| | | |
|--|---|--|
| Retained Soil Properties: $\gamma_{retained} = 125$ pcf $\phi_{retained} = 30$ degrees $C_{retained} = 0$ psf $\delta_{retained} = 30.00$ degrees $K_a = 0.200$ $K_{ah} = 0.195$ | Foundation Properties: $\gamma_{foundation} = 125$ pcf $\phi_{foundation} = 30.0$ degrees $C_{foundation} = 0$ psf $I_{foundation} = 0.6$ Depth to Groundwater, z = 50.0 ft | Rock Properties: $\gamma_{Rock\ Boulder} = 150$ pcf $\phi_{Boulder\ Interface} = 0.55$ degrees Rockery Embedment, D = 1.0 ft Rock Stacking Red. Factor* = 0.70 *Height to Width Ratio |
|--|---|--|

| | | |
|--|---|---|
| Seismic Properties: 2 % Exceedance Prob. 50 years Exposure Time 2475 -yr Recurrence Interval | 2 PE 50 PGA: 0.150 g $k_v = 0.000$ g $k_h = 0.075$ g $\theta = 4.29$ degrees | $K_{AE} = 0.254$ $F_{AE} = 868.2$ lb/ft $\Delta F_{AE} = 184.1$ lb/ft |
|--|---|---|

3. Enter Rock Diameters in Table Below

Actual Back of Rock Batter, $\psi = 17.0$ degrees from vertical (CW)

4. Calculate Hinge Height do not use

Avg. rock diameter: 3.2 ft Hinge Ht., $H_h = 10.3$ ft

5. Calculate the Factor of Safety against Overturning (Min. FS = 1.5)

Wall Weight, $W_1 = 3,608$ lb/ft
 Acting At: x = 2.33 y = 3.42

| | |
|--|------------------------------|
| Resisting Moment, $M_{res} = 9,145.6$ lb | $M_{res-E} = 9,367.1$ lb-dyn |
| Driving Moment, $M_{drv} = 2,465.4$ lb | $M_{drv-E} = 4,186.1$ lb-dyn |
| $FS_{ovt} = M_{res}/M_{drv} = 3.71$ static | 2.24 seismic |

6. Calculate the Factor of Safety against Base Sliding (Min. FS = 1.5)

| | |
|---|---------------------------------|
| Resisting Force, $P_{res} = 2,256.7$ lb/ft | $P_{res-E} = 2,281.5$ lb/ft-dyn |
| Driving Force, $P_{ah1} = 888.5$ lb/ft | $P_{ah1-E} = 1,338.5$ lb/ft-dyn |
| $FS_{slid} = P_{res}/P_{ah1} = 2.54$ static | 1.70 seismic |

7. Calculate the Factor of Safety for Bearing Capacity (Min. FS = 2.0)

| | |
|--|---------------------------------|
| Eccentricity, e = 0.224 ft OK | $e_E = 0.64$ ft OK |
| Bearing Stress, $\sigma_{vb} = 1,256$ psf | $\sigma_{vb-E} = 1,784$ psf-dyn |
| Max. Allow., $q_{ULT} = 6,060$ psf | $q_{ULT-E} = 6,060$ psf-dyn |
| $FS_{bearing} = q_{ULT}/\sigma_{vb} = 4.83$ static | 3.40 seismic |

8. Calculate the Factors of Safety for Internal Bulding (Min. FS = 1.5)

Values tabulated below

Approximate Maximum Exposed Rockery Height: 6.4 ft

| Row, i | Min. Rock Dia. (ft) | $H_{1,i}$ (ft) | Accm. Weigh t (lb/ft) | F_{AEi} (lb/ft) | ΔF_{AEi} (lb/ft) | P_{ahi} | | P_{resi} | | F.S. Internal Sliding | | M_{drv} | | M_{res} | | F.S. Internal Overturning | |
|--------|---------------------|----------------|-----------------------|-------------------|--------------------------|-----------|---------|------------|---------|-----------------------|-----------|-----------|---------|-----------|-------------|---------------------------|----------|
| | | | | | | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic | Static | Seismic |
| | | | | | | (lb/ft) | (lb/ft) | (lb/ft) | (lb/ft) | 1.5 Min. | 1.13 Min. | Lb | Lb | Lb | Lb | 1.5 Min. | 1.1 Min. |
| 1 | 4.0 | 7.4 | 3,608 | 868 | 184 | 889 | 1,339 | 2,257 | 2,281 | See Base Sliding | 2,465 | 4,186 | 9,146 | 9,367 | See Ext. OT | | |
| 2 | 3.0 | 4.6 | 1,898 | 336 | 71 | 396 | 607 | 1,076 | 1,086 | 2.72 | 1.79 | 712 | 1,221 | 3,532 | 3,593 | 4.96 | 2.94 |
| 3 | 2.5 | 2.5 | 938 | 99 | 21 | 151 | 242 | 525 | 528 | 3.48 | 2.18 | 157 | 276 | 1,395 | 1,409 | 8.88 | 5.11 |

Calculations Based on Rockery Design and Construction Guidelines, FHWA Publication No. FHWA-CFL/TD-06-006

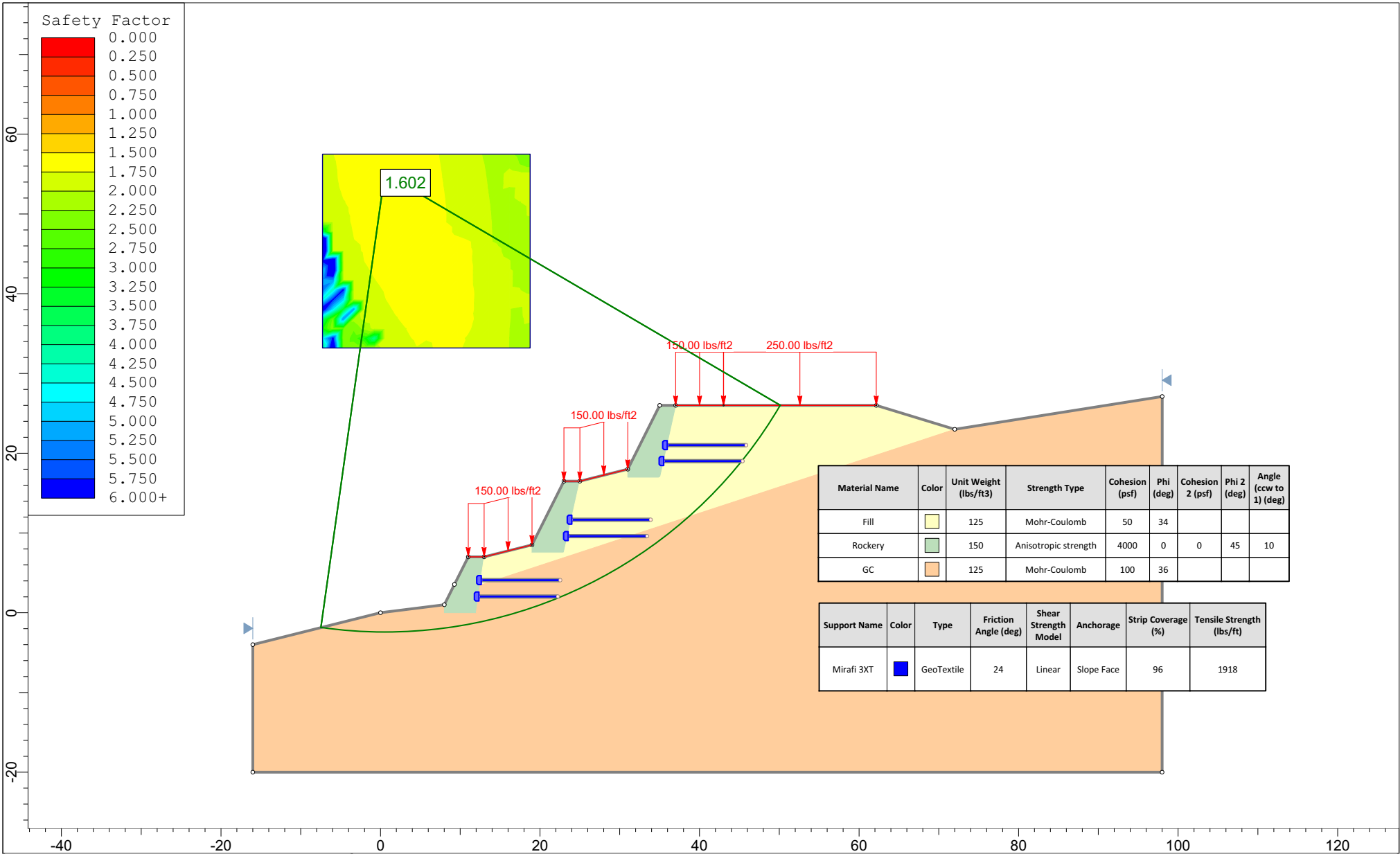
ROCKERY RETAINING WALL GLOBAL STABILITY CALCULATIONS FROM SLIDE

| <i>MINIMUM ALLOWABLE FACTORS OF SAFETY</i> | |
|--|-------------------------------------|
| <i>UNDER STATIC CONDITIONS</i> | <i>UNDER SEISMIC CONDITIONS</i> |
| 1.5 | 1.1 |




ROCKERY DESIGN
POWDER MOUNTAIN RESORT
WEBER COUNTY, UTAH

| | |
|-------------------------------|---------------|
| DESIGNED BY: JWW OCT 30, 2013 | PLOT SCALE |
| DRAWN BY: JWW OCT 30, 2013 | 1=1 |
| CHECKED BY: DAG OCT 30, 2013 | DWG SCALE |
| APPROVED BY: DAG OCT 30, 2013 | N/A |
| IGES PROJECT NO. 01855-001 | SHEET NO. 2.2 |
| | REV. N/A |



| Material Name | Color | Unit Weight (lbs/ft ³) | Strength Type | Cohesion (psf) | Phi (deg) | Cohesion 2 (psf) | Phi 2 (deg) | Angle (ccw to 1) (deg) |
|---------------|-------|------------------------------------|----------------------|----------------|-----------|------------------|-------------|------------------------|
| Fill | | 125 | Mohr-Coulomb | 50 | 34 | | | |
| Rockery | | 150 | Anisotropic strength | 4000 | 0 | 0 | 45 | 10 |
| GC | | 125 | Mohr-Coulomb | 100 | 36 | | | |

| Support Name | Color | Type | Friction Angle (deg) | Shear Strength Model | Anchorage | Strip Coverage (%) | Tensile Strength (lbs/ft) |
|--------------|-------|------------|----------------------|----------------------|------------|--------------------|---------------------------|
| Mirafi 3XT | | GeoTextile | 24 | Linear | Slope Face | 96 | 1918 |



Project

Powder Mountain - Max Section - Static

Analysis Description

Spencer's

| | | | | | |
|-----------------|----------|------------------|-----------------|----------------|-----------|
| <i>Drawn By</i> | Justin W | <i>Scale</i> | 1:200 | <i>Company</i> | IGES, Inc |
| <i>Date</i> | 10/28/13 | <i>File Name</i> | 25H Static.slim | | |

Slide Analysis Information
Powder Mountain - Max Section - Static

Project Summary

- File Name: 25H Static
- Slide Modeler Version: 6.025
- Project Title: Powder Mountain - Max Section - Static
- Analysis: Spencer's
- Author: Justin W
- Company: IGES, Inc
- Date Created: 10/28/13

General Settings

- Units of Measurement: Imperial Units
- Time Units: seconds
- Permeability Units: feet/second
- Failure Direction: Right to Left
- Data Output: Standard
- Maximum Material Properties: 20
- Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

- Number of slices: 25
- Tolerance: 0.005
- Maximum number of iterations: 50
- Initial trial value of FS: 1
- Steffensen Iteration: Yes

Groundwater Analysis

- Groundwater Method: Water Surfaces
- Pore Fluid Unit Weight: 62.4 lbs/ft3
- Advanced Groundwater Method: None

Random Numbers

- Pseudo-random Seed: 10116
- Random Number Generation Method: Park and Miller v.3

Surface Options

- Surface Type: Circular
- Search Method: Grid Search
- Radius Increment: 10
- Composite Surfaces: Disabled
- Reverse Curvature: Create Tension Crack
- Minimum Elevation: Not Defined
- Minimum Depth: Not Defined

Loading

- 4 Distributed Loads present




Distributed Load 1
Distribution: Constant
Magnitude [psf]: 250
Orientation: Normal to boundary

Distributed Load 2
Distribution: Constant
Magnitude [psf]: 150
Orientation: Normal to boundary

Distributed Load 3
Distribution: Constant
Magnitude [psf]: 150
Orientation: Vertical

Distributed Load 4
Distribution: Constant
Magnitude [psf]: 150
Orientation: Vertical

Material Properties

| Property | Fill | Rockery | GC |
|------------------------|---|---|---|
| Color |  |  |  |
| Strength Type | Mohr-Coulomb | Anisotropic strength | Mohr-Coulomb |
| Unit Weight [lbs/ft3] | 125 | 150 | 125 |
| Cohesion [psf] | 50 | | 100 |
| Friction Angle [deg] | 34 | | 36 |
| Cohesion 1 [psf] | | 4000 | |
| Cohesion 2 [psf] | | 0 | |
| Friction Angle 1 [deg] | | 0 | |
| Friction Angle 2 [deg] | | 45 | |
| Angle from 1 [deg] | | 10 | |
| Water Surface | None | None | None |
| Ru Value | 0 | 0 | 0 |

Support Properties

Mirafi 3XT
Support Type: GeoTextile
Force Application: Passive
Force Orientation: Bisector of Parallel and Tangent
Anchorage: Slope Face
Shear Strength Model: Linear
Strip Coverage: 96 percent

Tensile Strength: 1918 lb/ft
 Pullout Strength Adhesion: 0 psf
 Pullout Strength Friction Angle: 24 degrees

Global Minimums

Method: spencer
 FS: 1.601890
 Center: 0.539, 55.069
 Radius: 57.498
 Left Slip Surface Endpoint: -7.472, -1.868
 Right Slip Surface Endpoint: 50.148, 26.000
 Resisting Moment=2.8359e+006 lb-ft
 Driving Moment=1.77035e+006 lb-ft
 Resisting Horizontal Force=42723.4 lb
 Driving Horizontal Force=26670.6 lb
 Total Slice Area=464.539 ft2

Valid / Invalid Surfaces

Method: spencer
 Number of Valid Surfaces: 3889
 Number of Invalid Surfaces: 962

Error Codes:

Error Code -106 reported for 11 surfaces
 Error Code -108 reported for 298 surfaces
 Error Code -111 reported for 653 surfaces

Error Codes

The following errors were encountered during the computation:
 -106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
 -108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
 -111 = safety factor equation did not converge

Slice Data

• Global Minimum Query (spencer) - Safety Factor: 1.60189

| Slice Number | Width [ft] | Weight [lbs] | Base Material | Base Cohesion [psf] | Base Friction Angle [degrees] | Shear Stress [psf] | Shear Strength [psf] | Base Normal Stress [psf] | Pore Pressure [psf] | Effective Normal Stress [psf] |
|--------------|------------|--------------|---------------|---------------------|-------------------------------|--------------------|----------------------|--------------------------|---------------------|-------------------------------|
| 1 | 2.3088 | 123.317 | GC | 100 | 36 | 123.03 | 197.081 | 133.621 | 0 | 133.621 |
| 2 | 2.3088 | 356.367 | GC | 100 | 36 | 182.947 | 293.061 | 265.725 | 0 | 265.725 |
| 3 | 2.3088 | 562.38 | GC | 100 | 36 | 230.058 | 368.528 | 369.598 | 0 | 369.598 |
| 4 | 2.3088 | 717.262 | GC | 100 | 36 | 259.973 | 416.448 | 435.555 | 0 | 435.555 |
| 5 | 2.3088 | 788.684 | GC | 100 | 36 | 267.103 | 427.869 | 451.272 | 0 | 451.272 |
| 6 | 2.3088 | 830.927 | GC | 100 | 36 | 266.759 | 427.319 | 450.518 | 0 | 450.518 |
| 7 | 2.3088 | 930.955 | GC | 100 | 36 | 278.967 | 446.874 | 477.432 | 0 | 477.432 |
| 8 | 2.3088 | 2102.29 | GC | 100 | 36 | 515.966 | 826.521 | 999.97 | 0 | 999.97 |

| | | | | | | | | | | |
|----|---------|---------|------|-----|----|---------|---------|---------|---|---------|
| 9 | 2.3088 | 2639.9 | GC | 100 | 36 | 675.46 | 1082.01 | 1351.62 | 0 | 1351.62 |
| 10 | 2.3088 | 2329.2 | GC | 100 | 36 | 591.046 | 946.791 | 1165.51 | 0 | 1165.51 |
| 11 | 2.3088 | 2314.56 | GC | 100 | 36 | 565.903 | 906.515 | 1110.07 | 0 | 1110.07 |
| 12 | 2.3088 | 2504.86 | GC | 100 | 36 | 544.406 | 872.078 | 1062.67 | 0 | 1062.67 |
| 13 | 2.3088 | 3732.37 | GC | 100 | 36 | 705.935 | 1130.83 | 1418.81 | 0 | 1418.81 |
| 14 | 2.3088 | 4348.5 | GC | 100 | 36 | 825.594 | 1322.51 | 1682.64 | 0 | 1682.64 |
| 15 | 2.3088 | 3816.06 | GC | 100 | 36 | 720.998 | 1154.96 | 1452.03 | 0 | 1452.03 |
| 16 | 2.3088 | 3632.54 | GC | 100 | 36 | 664.072 | 1063.77 | 1326.52 | 0 | 1326.52 |
| 17 | 2.3088 | 3511.3 | GC | 100 | 36 | 601.489 | 963.52 | 1188.53 | 0 | 1188.53 |
| 18 | 2.3088 | 4401.77 | GC | 100 | 36 | 665.751 | 1066.46 | 1330.22 | 0 | 1330.22 |
| 19 | 2.3088 | 5119.93 | GC | 100 | 36 | 729.913 | 1169.24 | 1471.69 | 0 | 1471.69 |
| 20 | 2.3088 | 4323.05 | GC | 100 | 36 | 627.237 | 1004.77 | 1245.3 | 0 | 1245.3 |
| 21 | 2.28877 | 3680.27 | Fill | 50 | 34 | 476.91 | 763.957 | 1058.49 | 0 | 1058.49 |
| 22 | 2.28877 | 3029.94 | Fill | 50 | 34 | 385.942 | 618.236 | 842.446 | 0 | 842.446 |
| 23 | 2.28877 | 2299.3 | Fill | 50 | 34 | 310.38 | 497.194 | 662.992 | 0 | 662.992 |
| 24 | 2.28877 | 1470.11 | Fill | 50 | 34 | 213.52 | 342.036 | 432.962 | 0 | 432.962 |
| 25 | 2.28877 | 514.079 | Fill | 50 | 34 | 114.386 | 183.234 | 197.528 | 0 | 197.528 |

Interslice Data

• Global Minimum Query (spencer) - Safety Factor: 1.60189

| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|--------------|-------------------|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 1 | -7.47209 | -1.86802 | 0 | 0 | 0 |
| 2 | -5.16329 | -2.14541 | 320.583 | 159.375 | 26.4339 |
| 3 | -2.85449 | -2.32866 | 790.87 | 393.174 | 26.4339 |
| 4 | -0.545689 | -2.41868 | 1354.3 | 673.279 | 26.4339 |
| 5 | 1.76311 | -2.4159 | 1952.18 | 970.512 | 26.4339 |
| 6 | 4.07191 | -2.32031 | 2524.57 | 1255.07 | 26.4339 |
| 7 | 6.38071 | -2.13144 | 3054.22 | 1518.38 | 26.4339 |
| 8 | 8.68952 | -1.84837 | 3561.94 | 1770.79 | 26.4339 |
| 9 | 10.9983 | -1.46969 | 4372.29 | 2173.65 | 26.4339 |
| 10 | 13.3071 | -0.993442 | 5285.15 | 2627.47 | 26.4339 |
| 11 | 15.6159 | -0.41713 | 5975.49 | 2970.67 | 26.4339 |
| 12 | 17.9247 | 0.262407 | 6525.26 | 3243.98 | 26.4339 |
| 13 | 20.2335 | 1.04906 | 6943.86 | 3452.08 | 26.4339 |
| 14 | 22.5423 | 1.9476 | 7295.79 | 3627.04 | 26.4339 |
| 15 | 24.8511 | 2.96381 | 7488.43 | 3722.81 | 26.4339 |
| 16 | 27.1599 | 4.10471 | 7493.31 | 3725.24 | 26.4339 |
| 17 | 29.4687 | 5.37892 | 7333.38 | 3645.73 | 26.4339 |
| 18 | 31.7775 | 6.79697 | 7034.09 | 3496.94 | 26.4339 |
| 19 | 34.0863 | 8.37197 | 6473.18 | 3218.09 | 26.4339 |
| 20 | 36.3951 | 10.1204 | 5582.06 | 2775.08 | 26.4339 |
| 21 | 38.7039 | 12.0635 | 4607.82 | 2290.74 | 26.4339 |

| | | | | | |
|----|---------|---------|---------|---------|---------|
| 22 | 40.9927 | 14.209 | 3426.25 | 1703.33 | 26.4339 |
| 23 | 43.2815 | 16.6097 | 2285.52 | 1136.23 | 26.4339 |
| 24 | 45.5702 | 19.3167 | 1277.45 | 635.074 | 26.4339 |
| 25 | 47.859 | 22.4063 | 427.58 | 212.568 | 26.4339 |
| 26 | 50.1478 | 26 | 0 | 0 | 0 |

List Of Coordinates

Line Load

| X | Y |
|--------|----|
| 62.156 | 26 |
| 43 | 26 |

Line Load

| X | Y |
|---------|----|
| 43.0223 | 26 |
| 37 | 26 |

Line Load

| X | Y |
|----|------|
| 31 | 18 |
| 25 | 16.5 |
| 23 | 16.5 |

Line Load

| X | Y |
|----|-----|
| 19 | 8.5 |
| 13 | 7 |
| 11 | 7 |

External Boundary

| X | Y |
|--------|--------|
| -16 | -20 |
| 98 | -20 |
| 98.005 | 27.116 |
| 72 | 23 |
| 62.156 | 26 |
| 37 | 26 |
| 35 | 26 |
| 31 | 18 |
| 25 | 16.5 |
| 23 | 16.5 |

| | |
|---------|---------|
| 19 | 8.5 |
| 13 | 7 |
| 11 | 7 |
| 9.27164 | 3.54328 |
| 8 | 1 |
| 0 | 0 |
| -16 | -4 |

Material Boundary

| X | Y |
|---------|---------|
| 8 | 1 |
| 8 | 0 |
| 12 | 0 |
| 12.4935 | 3.45431 |
| 13 | 7 |

Material Boundary

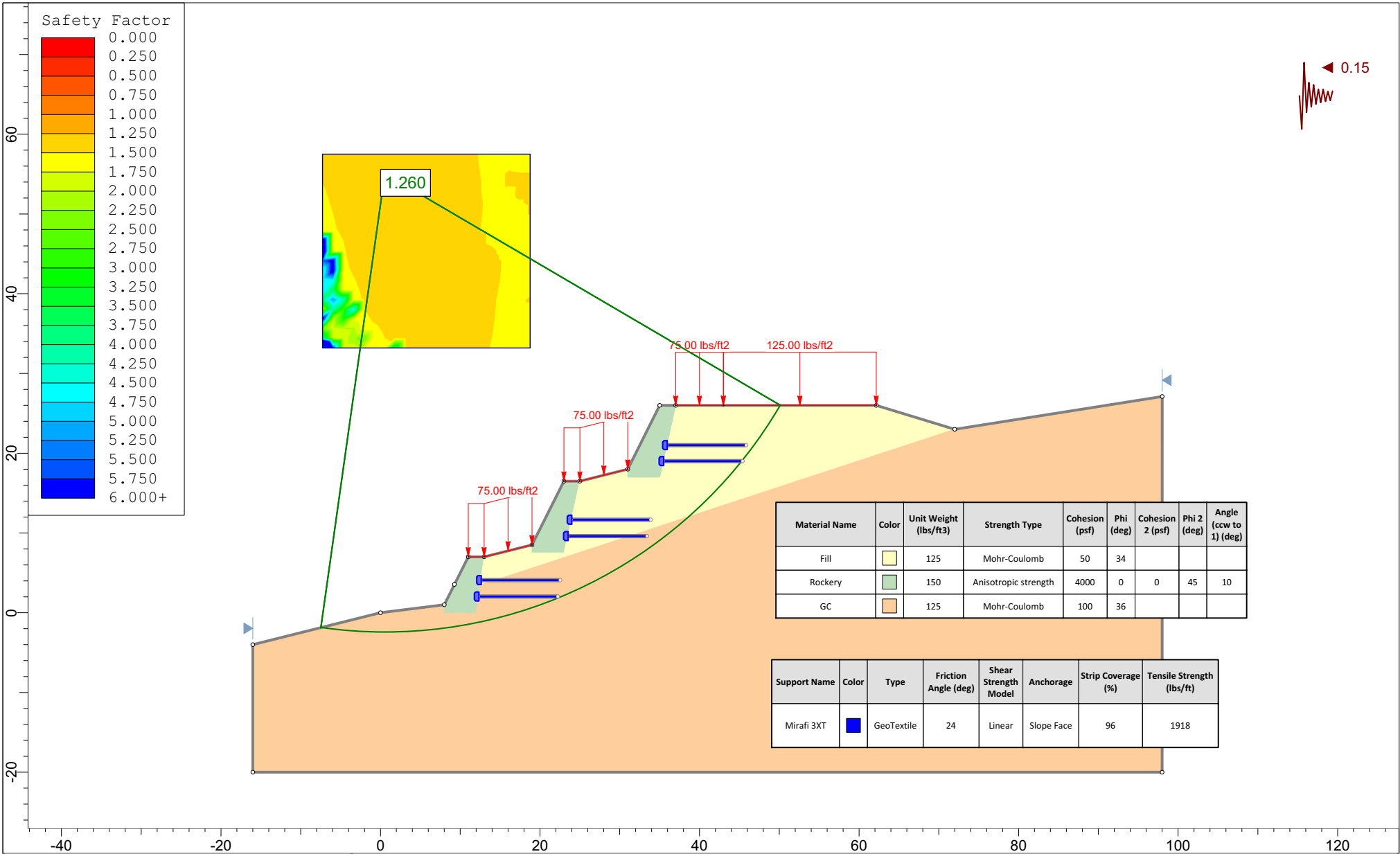
| X | Y |
|----|------|
| 19 | 8.5 |
| 19 | 7.5 |
| 23 | 7.5 |
| 25 | 16.5 |

Material Boundary

| X | Y |
|----|----|
| 31 | 18 |
| 31 | 17 |
| 35 | 17 |
| 37 | 26 |

Material Boundary

| X | Y |
|---------|---------|
| 12.4935 | 3.45431 |
| 72 | 23 |



| | | | |
|--|---|---------------------------------------|-----------------------------|
| | Project Powder Mountain - Max Section - Pseudo Static | | |
| | Analysis Description Spencer's | | |
| | Drawn By Justin W | Scale 1:200 | Company IGES, Inc |
| | Date 10/28/13 | File Name 25H P-Static.slim | |

Slide Analysis Information
Powder Mountain - Max Section - Pseudo Static

Project Summary

- File Name: 25H P-Static
- Slide Modeler Version: 6.025
- Project Title: Powder Mountain - Max Section - Pseudo Static
- Analysis: Spencer's
- Author: Justin W
- Company: IGES, Inc
- Date Created: 10/28/13

General Settings

- Units of Measurement: Imperial Units
- Time Units: seconds
- Permeability Units: feet/second
- Failure Direction: Right to Left
- Data Output: Standard
- Maximum Material Properties: 20
- Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

- Number of slices: 25
- Tolerance: 0.005
- Maximum number of iterations: 50
- Check $m\alpha < 0.2$: Yes
- Initial trial value of FS: 1
- Steffensen Iteration: Yes

Groundwater Analysis

- Groundwater Method: Water Surfaces
- Pore Fluid Unit Weight: 62.4 lbs/ft³
- Advanced Groundwater Method: None

Random Numbers

- Pseudo-random Seed: 10116
- Random Number Generation Method: Park and Miller v.3

Surface Options

- Surface Type: Circular
- Search Method: Grid Search
- Radius Increment: 10
- Composite Surfaces: Disabled
- Reverse Curvature: Create Tension Crack
- Minimum Elevation: Not Defined

- Minimum Depth: Not Defined

Loading

- Seismic Load Coefficient (Horizontal): 0.15
- 4 Distributed Loads present

Distributed Load 1

Distribution: Constant
Magnitude [psf]: 125
Orientation: Normal to boundary

Distributed Load 2

Distribution: Constant
Magnitude [psf]: 75
Orientation: Normal to boundary




Distributed Load 3

Distribution: Constant
Magnitude [psf]: 75
Orientation: Vertical

Distributed Load 4

Distribution: Constant
Magnitude [psf]: 75
Orientation: Vertical

Material Properties

| Property | Fill | Rockery | GC |
|------------------------------------|---|---|---|
| Color |  |  |  |
| Strength Type | Mohr-Coulomb | Anisotropic strength | Mohr-Coulomb |
| Unit Weight [lbs/ft ³] | 125 | 150 | 125 |
| Cohesion [psf] | 50 | | 100 |
| Friction Angle [deg] | 34 | | 36 |
| Cohesion 1 [psf] | | 4000 | |
| Cohesion 2 [psf] | | 0 | |
| Friction Angle 1 [deg] | | 0 | |
| Friction Angle 2 [deg] | | 45 | |
| Angle from 1 [deg] | | 10 | |
| Water Surface | None | None | None |
| Ru Value | 0 | 0 | 0 |

Support Properties

Mirafi 3XT

Support Type: GeoTextile
Force Application: Passive
Force Orientation: Bisector of Parallel and Tangent
Anchorage: Slope Face

Shear Strength Model: Linear
 Strip Coverage: 96 percent
 Tensile Strength: 1918 lb/ft
 Pullout Strength Adhesion: 0 psf
 Pullout Strength Friction Angle: 24 degrees

Global Minimums

Method: spencer
 FS: 1.259510
 Center: 0.539, 55.069
 Radius: 57.498
 Left Slip Surface Endpoint: -7.472, -1.868
 Right Slip Surface Endpoint: 50.148, 26.000
 Resisting Moment=2.61663e+006 lb-ft
 Driving Moment=2.0775e+006 lb-ft
 Resisting Horizontal Force=39926.5 lb
 Driving Horizontal Force=31700 lb
 Total Slice Area=464.539 ft2

Valid / Invalid Surfaces

Method: spencer
 Number of Valid Surfaces: 3585
 Number of Invalid Surfaces: 1266

Error Codes:

Error Code -106 reported for 11 surfaces
 Error Code -108 reported for 383 surfaces
 Error Code -111 reported for 872 surfaces

Error Codes

The following errors were encountered during the computation:
 -106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
 -108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
 -111 = safety factor equation did not converge

Slice Data

• Global Minimum Query (spencer) - Safety Factor: 1.25951

| Slice Number | Width [ft] | Weight [lbs] | Base Material | Base Cohesion [psf] | Base Friction Angle [degrees] | Shear Stress [psf] | Shear Strength [psf] | Base Normal Stress [psf] | Pore Pressure [psf] | Effective Normal Stress [psf] |
|--------------|------------|--------------|---------------|---------------------|-------------------------------|--------------------|----------------------|--------------------------|---------------------|-------------------------------|
| 1 | 2.3088 | 123.317 | GC | 100 | 36 | 205.17 | 258.414 | 218.038 | 0 | 218.038 |
| 2 | 2.3088 | 356.367 | GC | 100 | 36 | 288.819 | 363.771 | 363.049 | 0 | 363.049 |
| 3 | 2.3088 | 562.38 | GC | 100 | 36 | 348.511 | 438.953 | 466.529 | 0 | 466.529 |
| 4 | 2.3088 | 717.262 | GC | 100 | 36 | 380.856 | 479.692 | 522.6 | 0 | 522.6 |
| 5 | 2.3088 | 788.684 | GC | 100 | 36 | 380.752 | 479.561 | 522.421 | 0 | 522.421 |
| 6 | 2.3088 | 830.927 | GC | 100 | 36 | 371.338 | 467.704 | 506.101 | 0 | 506.101 |
| 7 | 2.3088 | 930.955 | GC | 100 | 36 | 379.517 | 478.005 | 520.281 | 0 | 520.281 |

| | | | | | | | | | | |
|----|---------|---------|------|-----|----|---------|---------|---------|---|---------|
| 8 | 2.3088 | 2102.29 | GC | 100 | 36 | 677.934 | 853.865 | 1037.61 | 0 | 1037.61 |
| 9 | 2.3088 | 2639.9 | GC | 100 | 36 | 827.916 | 1042.77 | 1297.61 | 0 | 1297.61 |
| 10 | 2.3088 | 2329.2 | GC | 100 | 36 | 709.62 | 893.774 | 1092.54 | 0 | 1092.54 |
| 11 | 2.3088 | 2314.56 | GC | 100 | 36 | 669.456 | 843.187 | 1022.91 | 0 | 1022.91 |
| 12 | 2.3088 | 2504.86 | GC | 100 | 36 | 653.804 | 823.473 | 995.774 | 0 | 995.774 |
| 13 | 2.3088 | 3732.37 | GC | 100 | 36 | 853.33 | 1074.78 | 1341.67 | 0 | 1341.67 |
| 14 | 2.3088 | 4348.5 | GC | 100 | 36 | 959.143 | 1208.05 | 1525.1 | 0 | 1525.1 |
| 15 | 2.3088 | 3816.06 | GC | 100 | 36 | 820.483 | 1033.41 | 1284.72 | 0 | 1284.72 |
| 16 | 2.3088 | 3632.54 | GC | 100 | 36 | 746.648 | 940.411 | 1156.73 | 0 | 1156.73 |
| 17 | 2.3088 | 3511.3 | GC | 100 | 36 | 677.05 | 852.751 | 1036.07 | 0 | 1036.07 |
| 18 | 2.3088 | 4401.77 | GC | 100 | 36 | 758.411 | 955.226 | 1177.12 | 0 | 1177.12 |
| 19 | 2.3088 | 5119.93 | GC | 100 | 36 | 820.595 | 1033.55 | 1284.92 | 0 | 1284.92 |
| 20 | 2.3088 | 4323.05 | GC | 100 | 36 | 682.838 | 860.041 | 1046.11 | 0 | 1046.11 |
| 21 | 2.28877 | 3680.27 | Fill | 50 | 34 | 501.185 | 631.247 | 861.734 | 0 | 861.734 |
| 22 | 2.28877 | 3029.94 | Fill | 50 | 34 | 396.818 | 499.796 | 666.849 | 0 | 666.849 |
| 23 | 2.28877 | 2299.3 | Fill | 50 | 34 | 305.62 | 384.931 | 496.557 | 0 | 496.557 |
| 24 | 2.28877 | 1470.11 | Fill | 50 | 34 | 201.495 | 253.785 | 302.125 | 0 | 302.125 |
| 25 | 2.28877 | 514.079 | Fill | 50 | 34 | 102.123 | 128.625 | 116.567 | 0 | 116.567 |

Interslice Data

• Global Minimum Query (spencer) - Safety Factor: 1.25951

| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|--------------|-------------------|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 1 | -7.47209 | -1.86802 | 0 | 0 | 0 |
| 2 | -5.16329 | -2.14541 | 515.949 | 330.547 | 32.646 |
| 3 | -2.85449 | -2.32866 | 1196.23 | 766.373 | 32.6459 |
| 4 | -0.545689 | -2.41868 | 1958.96 | 1255.03 | 32.6461 |
| 5 | 1.76311 | -2.4159 | 2729.74 | 1748.83 | 32.646 |
| 6 | 4.07191 | -2.32031 | 3441.08 | 2204.56 | 32.646 |
| 7 | 6.38071 | -2.13144 | 4078.69 | 2613.05 | 32.646 |
| 8 | 8.68952 | -1.84837 | 4668.49 | 2990.91 | 32.646 |
| 9 | 10.9983 | -1.46969 | 5526.32 | 3540.49 | 32.646 |
| 10 | 13.3071 | -0.993442 | 6424.94 | 4116.19 | 32.646 |
| 11 | 15.6159 | -0.41713 | 7085.22 | 4539.2 | 32.646 |
| 12 | 17.9247 | 0.262407 | 7589.44 | 4862.24 | 32.646 |
| 13 | 20.2335 | 1.04906 | 7940.74 | 5087.3 | 32.646 |
| 14 | 22.5423 | 1.9476 | 8146.63 | 5219.21 | 32.646 |
| 15 | 24.8511 | 2.96381 | 8160.27 | 5227.95 | 32.646 |
| 16 | 27.1599 | 4.10471 | 8017.52 | 5136.49 | 32.646 |
| 17 | 29.4687 | 5.37892 | 7723.57 | 4948.17 | 32.646 |
| 18 | 31.7775 | 6.79697 | 7291.73 | 4671.51 | 32.646 |
| 19 | 34.0863 | 8.37197 | 6529.51 | 4183.19 | 32.646 |
| 20 | 36.3951 | 10.1204 | 5410.57 | 3466.33 | 32.646 |

| | | | | | |
|----|---------|---------|---------|---------|---------|
| 21 | 38.7039 | 12.0635 | 4306.9 | 2759.25 | 32.646 |
| 22 | 40.9927 | 14.209 | 3053.7 | 1956.38 | 32.646 |
| 23 | 43.2815 | 16.6097 | 1907.08 | 1221.79 | 32.6461 |
| 24 | 45.5702 | 19.3167 | 986.881 | 632.253 | 32.646 |
| 25 | 47.859 | 22.4063 | 294.377 | 188.595 | 32.646 |
| 26 | 50.1478 | 26 | 0 | 0 | 0 |

List Of Coordinates

Line Load

| X | Y |
|--------|----|
| 62.156 | 26 |
| 43 | 26 |

Line Load

| X | Y |
|---------|----|
| 42.9819 | 26 |
| 37 | 26 |

Line Load

| X | Y |
|----|------|
| 31 | 18 |
| 25 | 16.5 |
| 23 | 16.5 |

Line Load

| X | Y |
|----|-----|
| 19 | 8.5 |
| 13 | 7 |
| 11 | 7 |

External Boundary

| X | Y |
|--------|--------|
| -16 | -20 |
| 98 | -20 |
| 98.005 | 27.116 |
| 72 | 23 |
| 62.156 | 26 |
| 37 | 26 |
| 35 | 26 |
| 31 | 18 |
| 25 | 16.5 |

| | |
|---------|---------|
| 23 | 16.5 |
| 19 | 8.5 |
| 13 | 7 |
| 11 | 7 |
| 9.27164 | 3.54328 |
| 8 | 1 |
| 0 | 0 |
| -16 | -4 |

Material Boundary

| X | Y |
|---------|---------|
| 8 | 1 |
| 8 | 0 |
| 12 | 0 |
| 12.4935 | 3.45431 |
| 13 | 7 |

Material Boundary

| X | Y |
|----|------|
| 19 | 8.5 |
| 19 | 7.5 |
| 23 | 7.5 |
| 25 | 16.5 |

Material Boundary

| X | Y |
|----|----|
| 31 | 18 |
| 31 | 17 |
| 35 | 17 |
| 37 | 26 |

Material Boundary

| X | Y |
|---------|---------|
| 12.4935 | 3.45431 |
| 72 | 23 |