Appendix G

Site Grading Plans for Well Pads

ESTIMATED EARTHWORK QUANTITIES

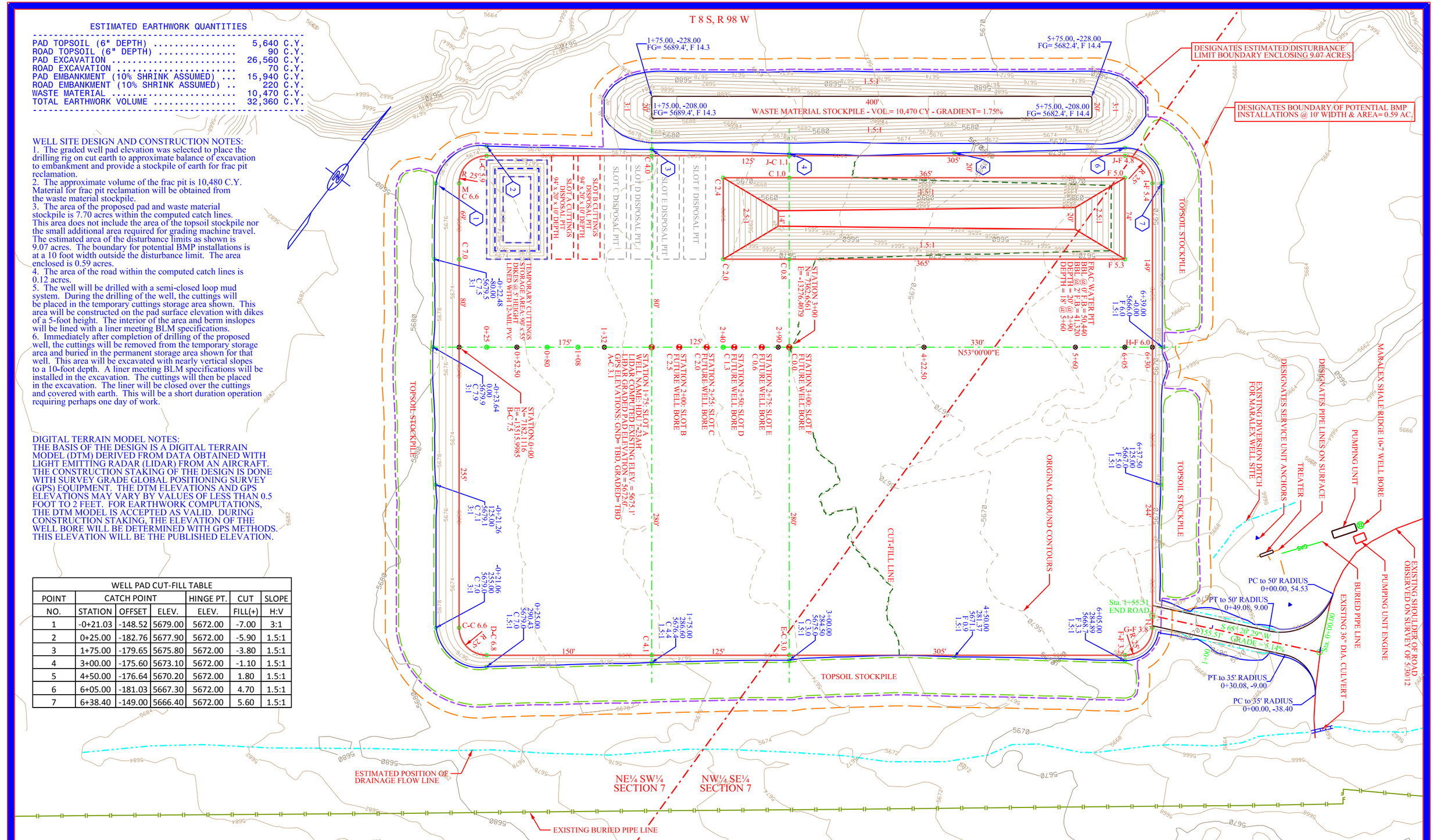
PAD TOPSOIL (6" DEPTH)	5,640 C.Y.
ROAD TOPSOIL (6" DEPTH)	90 C.Y.
PAD EXCAVATION	26,560 C.Y.
ROAD EXCAVATION	70 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	15,940 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	220 C.Y.
WASTE MATERIAL	10,470 C.Y.
TOTAL EARTHWORK VOLUME	32,360 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to place the drilling rig on cut earth to approximate balance of excavation to embankment and provide a stockpile of earth for frac pit reclamation.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile.
3. The area of the proposed pad and waste material stockpile is 7.70 acres within the computed catch lines. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.07 acres. The boundary for potential BMP installations is at a 10 foot width outside the disturbance limit. The area enclosed is 0.59 acres.
4. The area of the road within the computed catch lines is 0.12 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

DIGITAL TERRAIN MODEL NOTES:
THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS MAY VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. FOR EARTHWORK COMPUTATIONS, THE DTM MODEL IS ACCEPTED AS VALID. DURING CONSTRUCTION STAKING, THE ELEVATION OF THE WELL BORE WILL BE DETERMINED WITH GPS METHODS. THIS ELEVATION WILL BE THE PUBLISHED ELEVATION.

WELL PAD CUT-FILL TABLE

POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+21.03	-148.52	5679.00	5672.00	-7.00	3:1
2	0+25.00	-182.76	5677.90	5672.00	-5.90	1.5:1
3	1+75.00	-179.65	5675.80	5672.00	-3.80	1.5:1
4	3+00.00	-175.60	5673.10	5672.00	-1.10	1.5:1
5	4+50.00	-176.64	5670.20	5672.00	1.80	1.5:1
6	6+05.00	-181.03	5667.30	5672.00	4.70	1.5:1
7	6+38.40	-149.00	5666.40	5672.00	5.60	1.5:1



PREPARED BY: P.E. GROSCH CONSTRUCTION, INC. SURVEYORS - ENGINEERS - CONSTRUCTORS P. O. BOX 36 WORLAND, WY 82401 (307)347-3332	SUR:	AMG	5/30/12	PRJ. #:	23a12
	DES:	SAG	9/08/12	REC:	lidar / 86-126
	DWN:	SAG	9/10/12	FILE:	T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa
	REV:			DWG:	23A12 HDU 7-33/Dgn/7-23R_ex6-site

SCALE: 1" = 80' (0, 80, 160, 240)
CONTOUR INTERVAL: TWO FEET

OWNER: BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC DENVER, COLORADO

PROJECT: HOMER DEEP UNIT 7-23AH NE¼ SW¼, SECTION 7, T. 8 S., R. 98 W. GARFIELD COUNTY, COLORADO

DRAWING TITLE: EXHIBIT VI
DRAWING DESCRIPTION: WELL SITE GRADING PLAN

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	5,630 C.Y.
ROAD TOPSOIL (3" DEPTH)	220 C.Y.
PAD EXCAVATION	30,980 C.Y.
ROAD EXCAVATION	280 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	20,050 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	670 C.Y.
WASTE MATERIAL	10,540 C.Y.
TOTAL EARTHWORK VOLUME	37,110 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to place the drilling rig on cut earth and to approximate the balance of excavation to embankment.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile.
3. The area of the proposed pad and waste material stockpile is 7.61 acres within the computed catch lines. The area of the road within the computed catch lines is 0.55 acres. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.07 acres.
4. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

WELL PAD CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+16.07	-149.00	5531.90	5521.20	-10.70	1.5:1
2	0+25.00	-191.71	5533.00	5521.20	-11.80	1.5:1
3	1+75.00	-187.91	5530.50	5521.20	-9.30	1.5:1
4	3+00.00	-186.16	5529.30	5521.20	-8.10	1.5:1
5	4+50.00	-182.36	5526.80	5521.20	-5.60	1.5:1
6	6+05.00	-177.14	5523.30	5521.20	-2.10	1.5:1
7	6+31.12	-149.00	5521.90	5521.20	-0.70	1.5:1

DIGITAL TERRAIN MODEL NOTES:
THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. THE DTM MODEL IS ACCEPTED AS VALID, THEREFORE THE CUT AT THE WELL BORE IS PLANNED TO BE 3.7 FEET. THE GPS ELEVATION AT THE WELL BORE WAS OBSERVED TO BE 5526.5 FEET. THEREFORE THE GRADED PAD ELEVATION DETERMINED BY GPS METHODS IS 5522.8 FEET.

NOTE:
A LOCATE OF BUIRED UTILITIES IS NECESSARY BEFORE EXCAVATION OPERATIONS ARE BEGUN.

PREPARED BY:
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SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

SUR:			PRJ. #:	24a12	
DES:	SAG	4/18/12	REC:	lidar	
DWN:	SAG	4/18/12	FILE:	T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa	
REV:			DWG:	24A12 HDU 9-11/Dgn/9-11_ex6A-site	

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HOMER DEEP UNIT 9-11AH
NW¼ NW¼, SECTION 9, T. 8 S., R. 98 W.
GARFIELD COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN

DIGITAL TERRAIN MODEL NOTES:
THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS MAY VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. FOR EARTHWORK COMPUTATIONS, THE DTM MODEL IS ACCEPTED AS VALID. DURING CONSTRUCTION STAKING, THE ELEVATION OF THE WELL BORE WILL BE DETERMINED WITH GPS METHODS. THIS ELEVATION WILL BE THE PUBLISHED ELEVATION.

WELL PAD CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+28.80	-149.00	5495.70	5476.50	-19.20	1.5:1
2	0+25.00	-199.48	5493.50	5476.50	-17.00	1.5:1
3	1+75.00	-198.49	5492.80	5476.50	-16.30	1.5:1
4	3+00.00	-192.33	5488.70	5476.50	-12.20	1.5:1
5	4+50.00	-182.29	5482.00	5476.50	-5.50	1.5:1
6	6+05.00	-178.64	5473.40	5476.50	3.10	1.5:1
7	6+37.49	-149.00	5471.50	5476.50	5.00	1.5:1

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to approximate balance of excavation to embankment and to provide a stockpile of earth for the eventual frac pit reclamation.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile.
3. The area of the proposed pad and waste material stockpile is 8.06 acres within the computed catch lines. The area of the channel change within the computed catch lines is 0.15 acres. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits of the pad as shown is 9.53 acres. The estimated area of the disturbance limits of the channel change is 0.31 acres. The area enclosed on the perimeter of the pad and channel change at a 10 foot width for potential BMP installations is 0.53 and 0.15 acres, respectively.
4. A permanent water diversion channel is planned at the north west side of the pad. See Exhibit VI-B for the channel profile.
5. Approximately 1,310 feet of existing fence is to be removed and 1,802 of new fence and an 8' x 18' cattle guard is to be installed.
6. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
7. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

DIVERSION CHANNEL NOTES:
1. The existing channel to be diverted and the existing channel to the west to receive the diversion are each approximately 8 feet in width.
2. The proposed channel is planned with an 8 foot flat bottom width with 1.5:1 side slopes.
3. The estimated drainage area is 4.4 acres. The slope of the basin is 0.16. Using the Rational Method the flows for a 10-year and 25-year event are 1.1 CFS and 2.1 CFS, respectively. The normal depth of flow in the channel for a 25-year event is less than 0.2 foot.
4. The profile of the proposed channel is shown on Exhibit VI-B.

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	5,910 C.Y.
CHANNEL TOPSOIL (3" DEPTH)	60 C.Y.
ROAD TOPSOIL (6" DEPTH)	90 C.Y.
PAD EXCAVATION	51,520 C.Y.
CHANNEL EXCAVATION	1,000 C.Y.
CHANNEL SUB-EXCAVATION	40 C.Y.
ROAD EXCAVATION	0 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	40,730 C.Y.
CHANNEL EMBANKMENT (10% SHRINK ASSUMED)	10 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	650 C.Y.
WASTE MATERIAL	11,170 C.Y.
TOTAL EARTHWORK VOLUME	58,620 C.Y.

PREPARED BY:
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SUR:			PRJ. #:	25a12	
DES:	SAG	8/27/12	REC:	lidar	
DWN:	SAG	8/12/12	FILE:	T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa	
REV:			DWG:	25A12 HDU 9-41/Dgn/9-41R_ex6A-site	

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HOMER DEEP UNIT 9-41AH
NE¼ NE¼, SECTION 9, T. 8 S., R. 98 W.
GARFIELD COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN - REVISED

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	6,530 C.Y.
ROAD TOPSOIL (3" DEPTH)	160 C.Y.
PAD EXCAVATION	63,080 C.Y.
ROAD EXCAVATION	70 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	44,770 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	2,950 C.Y.
WASTE MATERIAL	15,430 C.Y.
TOTAL EARTHWORK VOLUME	69,840 C.Y.

DIGITAL TERRAIN MODEL NOTES:
THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS MAY VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. FOR EARTHWORK COMPUTATIONS, THE DTM MODEL IS ACCEPTED AS VALID. DURING CONSTRUCTION STAKING, THE ELEVATION OF THE WELL BORE WAS DETERMINED WITH GPS METHODS. THIS ELEVATION IS AS SHOWN.

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to place the drilling rig on cut earth at the maximum elevation possilbe.
2. The approximate volume of the frac pit is 10,480 C.Y. The area selected for storage of waste material is shown as a pad extension of 41 feet. Material for frac pit reclamation will be obtained from this area.
3. The area of the proposed pad and waste material pad extension area is 8.09 acres within the computed catch lines. This area does not include the area of the topsoil stockpiles nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.36 acres. The boundary for potential BMP installations is at a 10 foot width outside the disturbance limit. The area enclosed is 0.63 acres.
4. The area of the road within the computed catch lines is 0.39 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

WELL PAD CUT-FILL TABLE

POINT NO.	CATCH POINT STATION	CATCH POINT OFFSET	CATCH POINT ELEV.	HINGE PT. ELEV.	CUT	SLOPE FILL(+)	SLOPE H:V
1	-0+04.71	-149.00	6447.70	6443.00	-4.70		1:1
2	0+25.00	-184.41	6453.40	6443.00	-10.40		1:1
3	1+75.00	-191.09	6460.10	6443.00	-17.10		1:1
4	3+00.00	-208.03	6477.00	6443.00	-34.00		1:1
5	4+80.00	-229.43	6498.40	6443.00	-55.40		1:1
6	6+05.00	-207.21	6476.20	6443.00	-33.20		1:1
7	6+36.36	-149.00	6449.40	6443.00	-6.40		1:1
8	6+32.08	-119.00	6441.60	6443.00		1.40	1.5:1

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

SUR:			PRJ. #:	77E12	
DES:	SAG	5/29/12	REC:	lidar	
DWN:	SAG	5/29/12	FILE:	T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa	
REV:	SAG	8/28/12	DWG:	77e12 HDU 17-43AH/Dgn/17-43R_ex6A-site	

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HOMER DEEP UNIT 17-43AH
NE¼ SE¼, SECTION 17, T. 8 S., R. 98 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN - REVISED

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	6,230 C.Y.
LEASE ROAD TOPSOIL (3" DEPTH)	170 C.Y.
APPROACH ROAD TOPSOIL (6" DEPTH)	140 C.Y.
PAD EXCAVATION	83,420 C.Y.
LEASE ROAD EXCAVATION	180 C.Y.
APPROACH ROAD EXCAVATION	130 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	83,270 C.Y.
LEASE ROAD EMBANKMENT (10% SHRINK)	180 C.Y.
APPROACH ROAD EMBANKMENT (10% SHRINK)	280 C.Y.
WASTE MATERIAL	0 C.Y.
TOTAL EARTHWORK VOLUME	90,270 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to place the drilling rig on cut earth and to approximate the balance of excavation to embankment.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from excess excavation made during interim reclamation of the site.
3. The area of the proposed pad is 7.73 acres within the computed catch lines. This area does not include the area of the topsoil stockpiles nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.05 acres. The boundary for potential BMP installations is at a 10 foot width outside the disturbance limit. The area enclosed is 0.60 acres.
4. The lease road alignment is altered to avoid the site. The area of the lease road within the computed catch lines is 0.43 acres. The area of the approach road is 0.19 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

DIGITAL TERRAIN MODEL NOTES:
THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS MAY VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. FOR EARTHWORK COMPUTATIONS, THE DTM MODEL IS ACCEPTED AS VALID. DURING CONSTRUCTION STAKING, THE ELEVATION OF THE WELL BORE WILL BE DETERMINED WITH GPS METHODS. THIS ELEVATION WILL BE THE PUBLISHED ELEVATION.

WELL PAD CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+26.52	-149.00	5826.00	5843.70	17.70	1.5:1
2	0+25.00	-198.54	5827.30	5843.70	16.40	1.5:1
3	1+75.00	-176.70	5841.30	5843.70	2.40	1.5:1
4	3+00.00	-176.89	5841.80	5843.70	1.90	1.5:1
5	4+50.00	-178.65	5840.60	5843.70	3.10	1.5:1
6	6+05.00	-190.52	5832.70	5843.70	11.00	1.5:1
7	6+43.05	-149.00	5835.00	5843.70	8.70	1.5:1

DESIGNATES BOUNDARY OF POTENTIAL BMP INSTALLATIONS @ 10' WIDTH & AREA= 0.60 AC.

DESIGNATES ESTIMATED DISTURBANCE LIMIT BOUNDARY ENCLOSING 9.05 ACRES

NW¼ NE¼ SECTION 24

NE¼ NE¼ SECTION 24

EXISTING ROAD TO BE RE-ALIGNED

FILL SLOPE CATCH LINE

SURFACED SHOULDERS @ 7' Lt. & 7' Rt.

DITCH FLOW LINE

CUT SLOPE CATCH LINE

CURVE 3
DI= 20° 13' 24" (RT)
D= 19° 05' 55"
R= 300.00'
L= 105.89'
T= 53.50'

PC Sta. 4+48.14

PT Sta. 4+01.62

CURVE 2
DI= 61° 07' 15" (LT)
D= 28° 38' 52"
R= 200.00'
L= 213.35'
T= 118.09'

PC Sta. 1+88.27

PT Sta. 1+29.91

CURVE 1
DI= 19° 46' 30" (RT)
D= 19° 05' 55"
R= 300.00'
L= 103.54'
T= 52.29'

PC Sta. 0+26.36

POT Sta. 0+00.00

TOPSOIL STOCKPILE

SLOT A CUTTINGS DISPOSAL PIT 90' x 20' x 10' DEPTH

SLOT B CUTTINGS DISPOSAL PIT 90' x 20' x 10' DEPTH

TEMPORARY CUTTINGS STORAGE AREA 90' x 55' DIKES @ 5' HEIGHT LINED WITH 12-MIL PVC

SLOT C DISPOSAL PIT

SLOT D DISPOSAL PIT

SLOT E DISPOSAL PIT

SLOT F DISPOSAL PIT

STATION 1+75: SLOT A
WELL NAME: HDU 24-11(AH)
LIDAR GRADED PAD ELEV = 5859.4'
GPS ELEVATIONS: GND = TBD, GRADED = TBD
A-C 15.7

STATION 2+00: SLOT B
FUTURE WELL BORE
C 18.2

STATION 2+25: SLOT C
FUTURE WELL BORE
C 20.8

STATION 2+50: SLOT D
FUTURE WELL BORE
C 23.6

STATION 2+75: SLOT E
FUTURE WELL BORE
C 25.7

STATION 3+00: SLOT F
FUTURE WELL BORE
C 26.8

STATION 0+00
N= 295,459.0
E= 1066,572.7
B-E 3.1

STATION 3+400
N= 480,157.5
E= 1044,932.5

FRAC WATER PIT
BBL @ 0' F.B.= 50,440
BBL @ 2' F.B.= 41,320
DEPTH = 20' @ 2:60
DEPTH = 18' @ 5:60

CUT-FILL LINE

EXISTING GROUND CONTOURS

Sta. 1+56.90
END ROAD C
F 5.4

EXISTING ROAD POSITION AS DETERMINED FROM SATELITE IMAGERY

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

SUR:			
DES:	SAG	8/28/12	
DWN:	SAG	8/29/12	
REV:			

PRJ. #: 22a12
REC: lidar / 86-127
FILE: T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa
DWG: 22A12 HDU 24-11/Dgn/24-11R_ex6A-site

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HOMER DEEP UNIT 24-11H
NE¼ NE¼, SECTION 24, T. 8 S., R. 98 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN

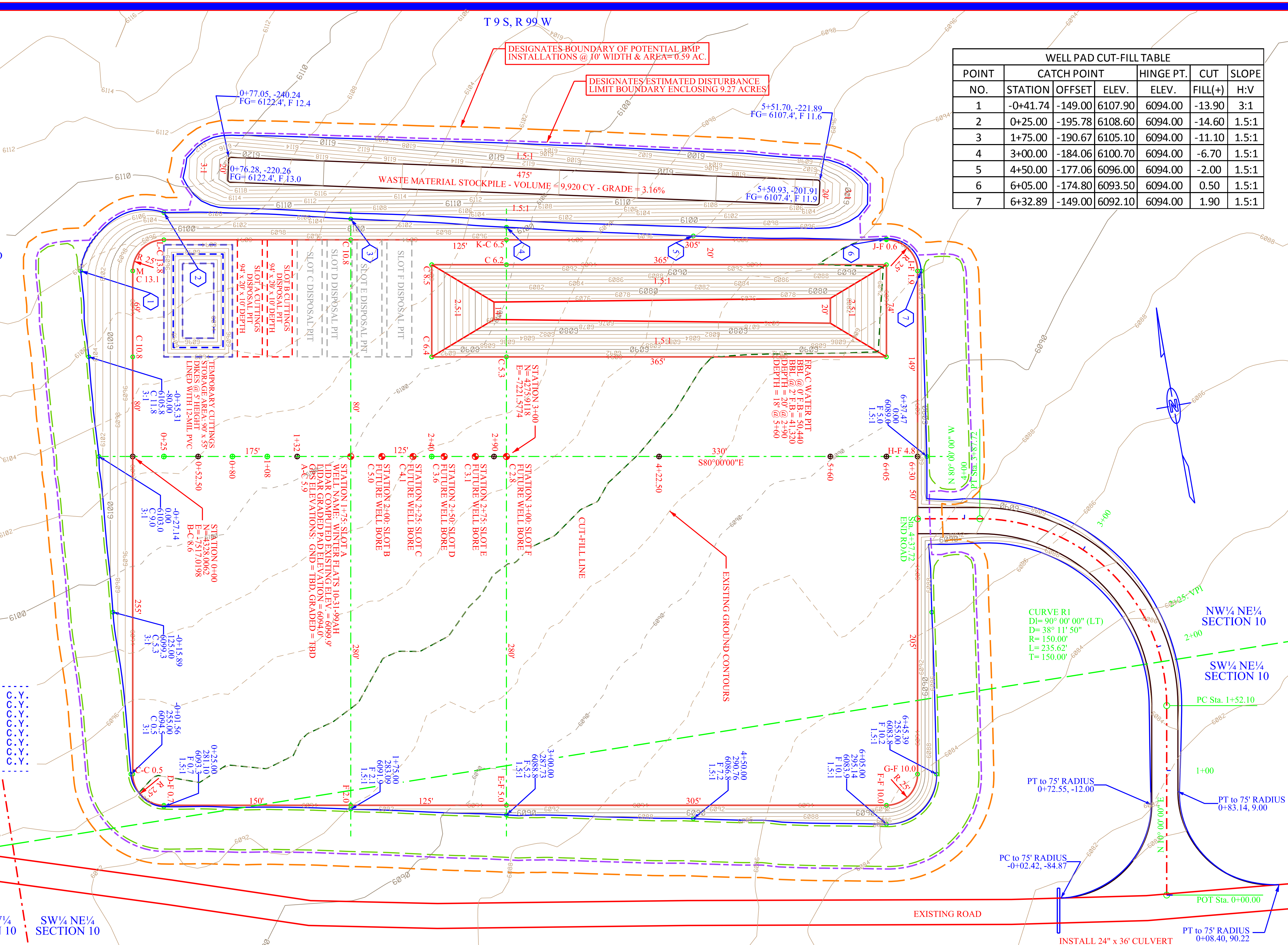
NE¼ NW¼
SECTION 10

NW¼ NE¼
SECTION 10

T 9 S, R 99 W

DIGITAL TERRAIN MODEL NOTES:
THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS MAY VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. FOR EARTHWORK COMPUTATIONS, THE DTM MODEL IS ACCEPTED AS VALID. DURING CONSTRUCTION STAKING, THE ELEVATION OF THE WELL BORE WILL BE DETERMINED WITH GPS METHODS. THIS ELEVATION WILL BE THE PUBLISHED ELEVATION.O

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to approximate balance of excavation to embankment and to provide a stockpile of earth for the eventual frac pit reclamation.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile.
3. The area of the proposed pad and waste material pad extension area is 7.88 acres within the computed catch lines. This area does not include the area of the topsoil stockpiles nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.27 acres. The boundary for potential BMP installations is at a 10 foot width outside the disturbance limit. The area enclosed is 0.59 acres.
4. The area of the road within the computed catch lines is 0.34 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.



WELL PAD CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+41.74	-149.00	6107.90	6094.00	-13.90	3:1
2	0+25.00	-195.78	6108.60	6094.00	-14.60	1.5:1
3	1+75.00	-190.67	6105.10	6094.00	-11.10	1.5:1
4	3+00.00	-184.06	6100.70	6094.00	-6.70	1.5:1
5	4+50.00	-177.06	6096.00	6094.00	-2.00	1.5:1
6	6+05.00	-174.80	6093.50	6094.00	0.50	1.5:1
7	6+32.89	-149.00	6092.10	6094.00	1.90	1.5:1

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	5,770 C.Y.
ROAD TOPSOIL (3" DPTH)	140 C.Y.
PAD EXCAVATION	36,550 C.Y.
ROAD EXCAVATION	0 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	25,360 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	1,270 C.Y.
WASTE MATERIAL	9,920 C.Y.
TOTAL EARTHWORK VOLUME	42,460 C.Y.

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

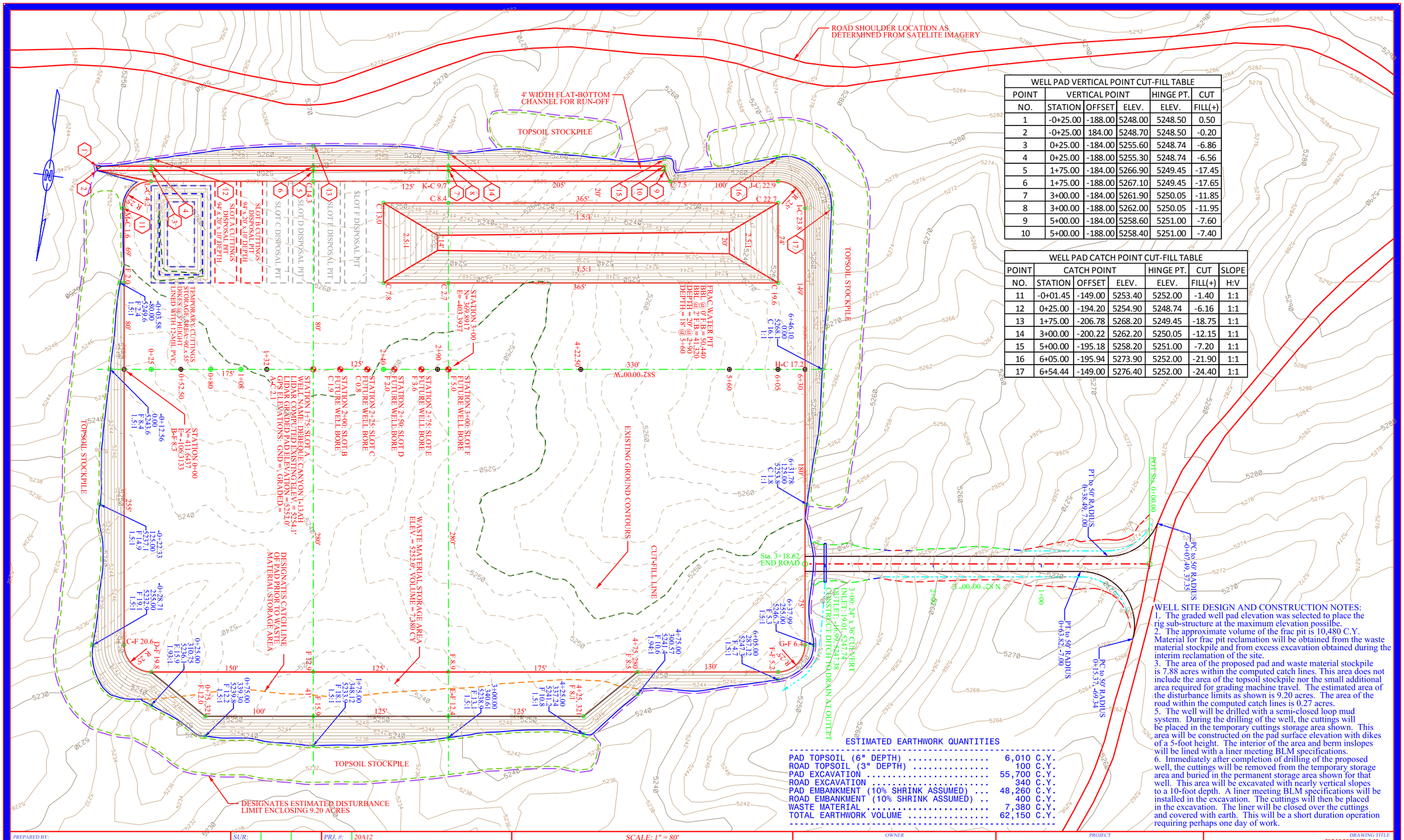
SUR:			PRJ. #:	31a12
DES:	SAG	8/30/12	REC:	lidar
DWN:	SAG	8/30/12	FILE:	T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa
REV:			DWG:	31A12 WF 10-31/Dgn/10-31R_ex6A-site

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
WINTER FLATS 10-31-99AH
NW¼ NE¼, SECTION 10, T. 9 S., R. 99 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN



WELL PAD VERTICAL POINT CUT-FILL TABLE					
POINT	VERTICAL POINT			HINGE PT.	CUT
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)
1	-0+25.00	-188.00	5248.00	5248.50	0.50
2	-0+25.00	184.00	5248.70	5248.50	-0.20
3	0+25.00	-184.00	5255.60	5248.74	-6.86
4	0+25.00	-188.00	5255.30	5248.74	-6.56
5	1+75.00	-184.00	5266.90	5249.45	-17.45
6	1+75.00	-188.00	5267.10	5249.45	-17.65
7	3+00.00	-184.00	5261.90	5250.05	-11.85
8	3+00.00	-188.00	5262.00	5250.05	-11.95
9	5+00.00	-184.00	5258.60	5251.00	-7.60
10	5+00.00	-188.00	5258.40	5251.00	-7.40

WELL PAD CATCH POINT CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
11	-0+01.45	-149.00	5253.40	5252.00	-1.40	1:1
12	0+25.00	-194.20	5254.90	5248.74	-6.16	1:1
13	1+75.00	-206.78	5268.20	5249.45	-18.75	1:1
14	3+00.00	-200.22	5262.20	5250.05	-12.15	1:1
15	5+00.00	-195.18	5258.20	5251.00	-7.20	1:1
16	6+05.00	-195.96	5273.90	5252.00	-21.90	1:1
17	6+54.44	-149.00	5276.40	5252.00	-24.40	1:1

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	6,010 C.Y.
ROAD TOPSOIL (3" DEPTH)	100 C.Y.
PAD EXCAVATION	55,700 C.Y.
ROAD EXCAVATION	340 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	48,260 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	400 C.Y.
WASTE MATERIAL	7,380 C.Y.
TOTAL EARTHWORK VOLUME	62,150 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to place the rig sub-structure at the maximum elevation possible.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile and from excess excavation obtained during the interim reclamation of the site.
3. The area of the proposed pad and waste material stockpile is 7.88 acres within the computed catch lines. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.20 acres. The area of the road within the computed catch lines is 0.27 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

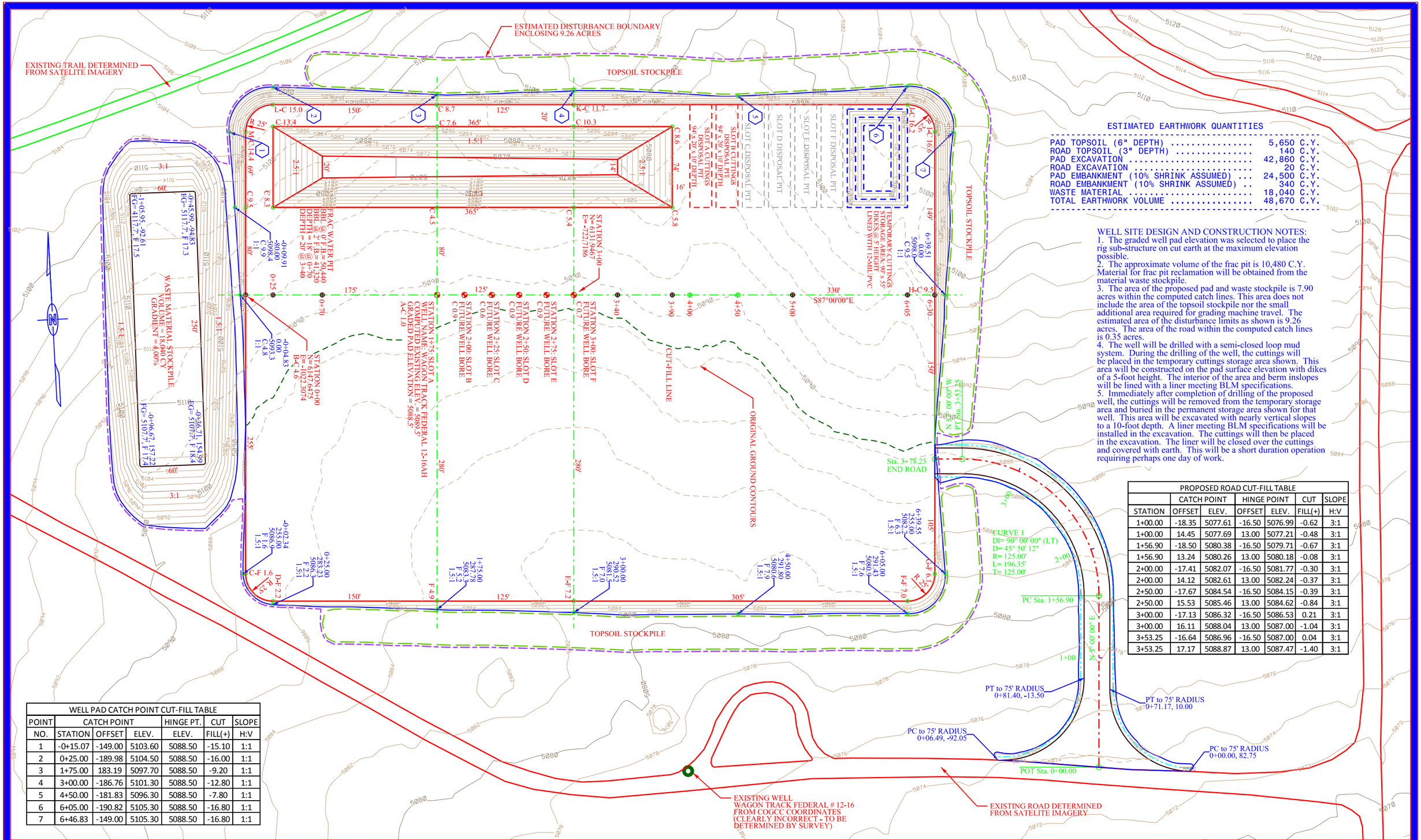
SUR:			PRJ. #:	20A12	
DES:	SAG	6/07/12	REC:	lidar	
DWN:	SAG	6/08/12	FILE:	T7400/GpkData-v8/Client/Black Hills E&P/Colo/Mesa	
REV:			DWG:	20a12 DC 1-13/Dgn/20a_ex6A-site	

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
DEBEQUE CANYON 1-13AH
SE¼ SE¼, SECTION 13, T. 9 S., R. 98 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN



ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	5,650 C.Y.
ROAD TOPSOIL (3" DEPTH)	140 C.Y.
PAD EXCAVATION	42,860 C.Y.
ROAD EXCAVATION	20 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	24,500 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	340 C.Y.
WASTE MATERIAL	18,040 C.Y.
TOTAL EARTHWORK VOLUME	48,670 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:

1. The graded well pad elevation was selected to place the rig sub-structure on cut earth at the maximum elevation possible.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the material waste stockpile.
3. The area of the proposed pad and waste stockpile is 7.90 acres within the computed catch lines. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.26 acres. The area of the road within the computed catch lines is 0.35 acres.
4. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
5. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

PROPOSED ROAD CUT-FILL TABLE

	CATCH POINT		HINGE POINT		CUT	SLOPE
STATION	OFFSET	ELEV.	OFFSET	ELEV.	FILL(+)	H:V
1+00.00	-18.35	5077.61	-16.50	5076.99	-0.62	3:1
1+00.00	14.45	5077.69	13.00	5077.21	-0.48	3:1
1+56.90	-18.50	5080.38	-16.50	5079.71	-0.67	3:1
1+56.90	13.24	5080.26	13.00	5080.18	-0.08	3:1
2+00.00	-17.41	5082.07	-16.50	5081.77	-0.30	3:1
2+00.00	14.12	5082.61	13.00	5082.24	-0.37	3:1
2+50.00	-17.67	5084.54	-16.50	5084.15	-0.39	3:1
2+50.00	15.53	5085.46	13.00	5084.62	-0.84	3:1
3+00.00	-17.13	5086.32	-16.50	5086.53	0.21	3:1
3+00.00	16.11	5088.04	13.00	5087.00	-1.04	3:1
3+53.25	-16.64	5086.96	-16.50	5087.00	0.04	3:1
3+53.25	17.17	5088.87	13.00	5087.47	-1.40	3:1

WELL PAD CATCH POINT CUT-FILL TABLE

POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+15.07	-149.00	5103.60	5088.50	-15.10	1:1
2	0+25.00	-189.98	5104.50	5088.50	-16.00	1:1
3	1+75.00	183.19	5097.70	5088.50	-9.20	1:1
4	3+00.00	-186.76	5101.30	5088.50	-12.80	1:1
5	4+50.00	-181.83	5096.30	5088.50	-7.80	1:1
6	6+05.00	-190.82	5105.30	5088.50	-16.80	1:1
7	6+46.83	-149.00	5105.30	5088.50	-16.80	1:1

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

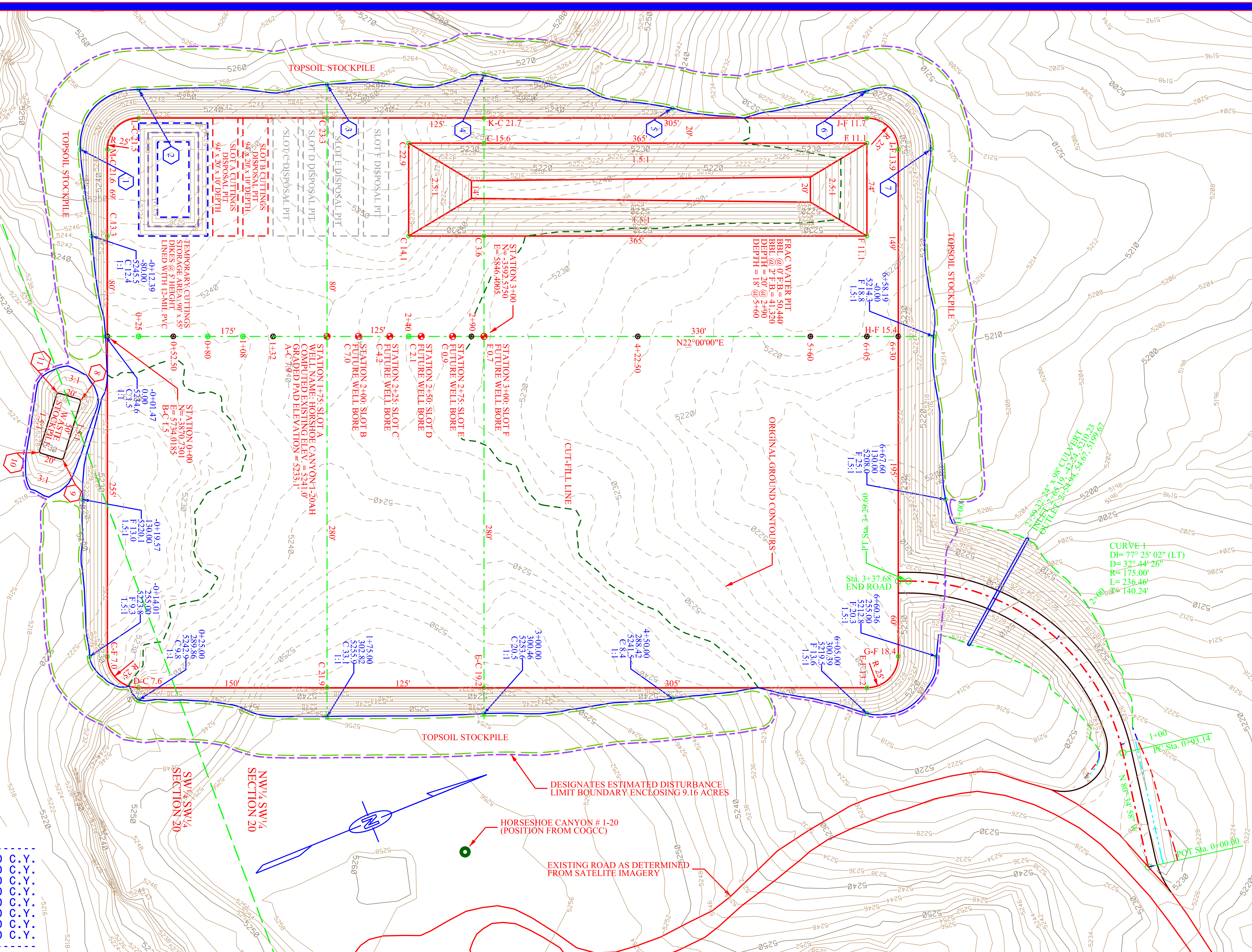
SUR:			PRJ. #:	30A12
DES:	SAG	7/04/12	REC:	lidar
DWN:	SAG	7/05/12	FILE:	/GpkData-v8/Client/Black Hills E&P/Colo/Mesa
REV:			DWG:	30A12 WTF 12-16/Dgn/12-16_ex6A-site

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
WAGON TRACK FEDERAL 12-16AH
SE¼ SE¼, SECTION 12, T. 9 S., R. 98 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN



WELL PAD CATCH POINT CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+21.50	-149.00	5254.60	5233.10	-21.50	1:1
2	0+25.00	-196.81	5255.90	5233.10	-22.80	1:1
3	1+75.00	-200.78	5259.90	5233.10	-26.80	1:1
4	3+00.00	-208.10	5267.20	5233.10	-34.10	1:1
5	4+50.00	-181.78	5240.90	5233.10	-7.80	1:1
6	6+05.00	-195.60	5218.80	5233.10	14.30	1.5:1
7	6+55.82	-149.00	5215.90	5233.10	17.20	1.5:1
8	-0+20.81	50.63	5229.30	5238.60	9.30	-
9	-0+35.43	98.44	5221.20	5228.60	7.40	-
10	-0+54.55	92.60	5221.80	5228.60	6.80	-
11	-0+39.94	44.78	5228.40	5238.60	10.20	-

WELL SITE DESIGN AND CONSTRUCTION NOTES:

1. The graded well pad elevation was selected to place the rig sub-structure on cut earth and to approximate balance of excavation to embankment.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile and from excess excavation obtained during the interim reclamation of the site.
3. The area of the proposed pad and waste material stockpile is 7.64 acres within the computed catch lines. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.16 acres. The area of the road within the computed catch lines is 0.42 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	6,080 C.Y.
ROAD TOPSOIL (3" DEPTH)	190 C.Y.
PAD EXCAVATION	63,980 C.Y.
ROAD EXCAVATION	160 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	57,050 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	6,370 C.Y.
WASTE MATERIAL	720 C.Y.
TOTAL EARTHWORK VOLUME	70,410 C.Y.

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

SUR:			PRJ. #:	26A12
DES:	SAG	6/29/12	REC:	lidar
DWN:	SAG	6/29/12	FILE:	/GpkData-v8/Client/Black Hills E&P/Colo/Mesa
REV:			DWG:	26A12 HSC 1-20AH/Dgn/26a12_ex6A-site

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HORSESHOE CANYON 1-20AH
NW¼ SW¼, SECTION 20, T. 9 S., R. 97 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN

ESTIMATED EARTHWORK QUANTITIES

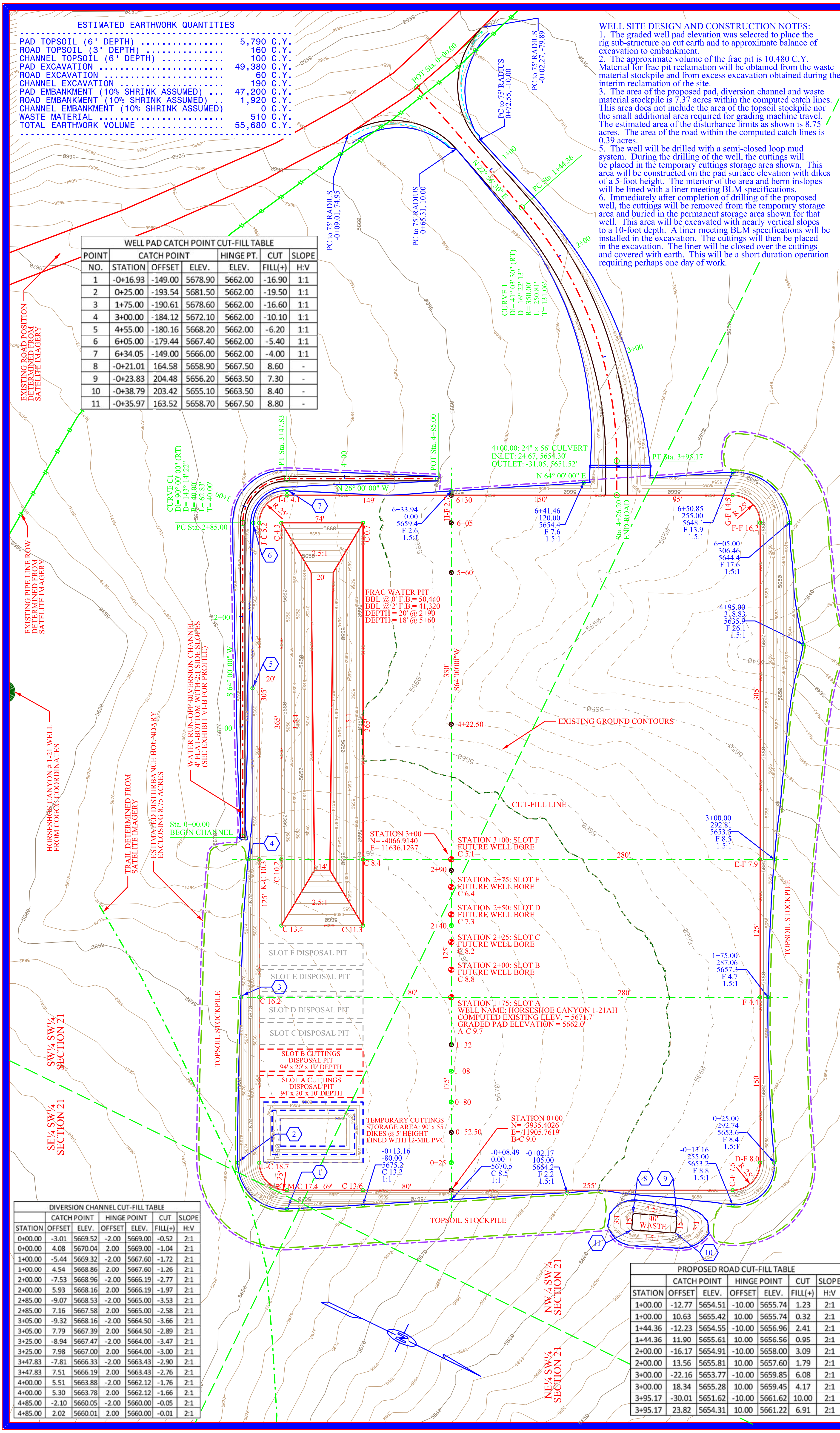
PAD TOPSOIL (6" DEPTH)	5,790 C.Y.
ROAD TOPSOIL (3" DEPTH)	160 C.Y.
CHANNEL TOPSOIL (6" DEPTH)	100 C.Y.
PAD EXCAVATION	49,380 C.Y.
ROAD EXCAVATION	60 C.Y.
CHANNEL EXCAVATION	190 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED) ...	47,200 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED) ..	1,920 C.Y.
CHANNEL EMBANKMENT (10% SHRINK ASSUMED)	0 C.Y.
WASTE MATERIAL	510 C.Y.
TOTAL EARTHWORK VOLUME	55,680 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:

1. The graded well pad elevation was selected to place the rig sub-structure on cut earth and to approximate balance of excavation to embankment.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile and from excess excavation obtained during the interim reclamation of the site.
3. The area of the proposed pad, diversion channel and waste material stockpile is 7.37 acres within the computed catch lines. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 8.75 acres. The area of the road within the computed catch lines is 0.39 acres.
5. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
6. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

WELL PAD CATCH POINT CUT-FILL TABLE

POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+16.93	-149.00	5678.90	5662.00	-16.90	1:1
2	0+25.00	-193.54	5681.50	5662.00	-19.50	1:1
3	1+75.00	-190.61	5678.60	5662.00	-16.60	1:1
4	3+00.00	-184.12	5672.10	5662.00	-10.10	1:1
5	4+55.00	-180.16	5668.20	5662.00	-6.20	1:1
6	6+05.00	-179.44	5667.40	5662.00	-5.40	1:1
7	6+34.05	-149.00	5666.00	5662.00	-4.00	1:1
8	-0+21.01	164.58	5658.90	5667.50	8.60	-
9	-0+23.83	204.48	5656.20	5663.50	7.30	-
10	-0+38.79	203.42	5655.10	5663.50	8.40	-
11	-0+35.97	163.52	5658.70	5667.50	8.80	-



DIVERSION CHANNEL CUT-FILL TABLE

	CATCH POINT		HINGE POINT		CUT	SLOPE
STATION	OFFSET	ELEV.	OFFSET	ELEV.	FILL(+)	H:V
0+00.00	-3.01	5669.52	-2.00	5669.00	-0.52	2:1
0+00.00	4.08	5670.04	2.00	5669.00	-1.04	2:1
1+00.00	-5.44	5669.32	-2.00	5667.60	-1.72	2:1
1+00.00	4.54	5668.86	2.00	5667.60	-1.26	2:1
2+00.00	-7.53	5668.96	-2.00	5666.19	-2.77	2:1
2+00.00	5.93	5668.16	2.00	5666.19	-1.97	2:1
2+85.00	-9.07	5668.53	-2.00	5665.00	-3.53	2:1
2+85.00	7.16	5667.58	2.00	5665.00	-2.58	2:1
3+05.00	-9.32	5668.16	-2.00	5664.50	-3.66	2:1
3+05.00	7.79	5667.39	2.00	5664.50	-2.89	2:1
3+25.00	-8.94	5667.47	-2.00	5664.00	-3.47	2:1
3+25.00	7.98	5667.00	2.00	5664.00	-3.00	2:1
3+47.83	-7.81	5666.33	-2.00	5663.43	-2.90	2:1
3+47.83	7.51	5666.19	2.00	5663.43	-2.76	2:1
4+00.00	5.51	5663.88	-2.00	5662.12	-1.76	2:1
4+00.00	5.30	5663.78	2.00	5662.12	-1.66	2:1
4+85.00	-2.10	5660.05	-2.00	5660.00	-0.05	2:1
4+85.00	2.02	5660.01	2.00	5660.00	-0.01	2:1

PROPOSED ROAD CUT-FILL TABLE

	CATCH POINT		HINGE POINT		CUT	SLOPE
STATION	OFFSET	ELEV.	OFFSET	ELEV.	FILL(+)	H:V
1+00.00	-12.77	5654.51	-10.00	5655.74	1.23	2:1
1+00.00	10.63	5655.42	10.00	5655.74	0.32	2:1
1+44.36	-12.23	5654.55	-10.00	5656.96	2.41	2:1
1+44.36	11.90	5655.61	10.00	5656.56	0.95	2:1
2+00.00	-16.17	5654.91	-10.00	5658.00	3.09	2:1
2+00.00	13.56	5655.81	10.00	5657.60	1.79	2:1
3+00.00	-22.16	5653.77	-10.00	5659.85	6.08	2:1
3+00.00	18.34	5655.28	10.00	5659.45	4.17	2:1
3+95.17	-30.01	5651.62	-10.00	5661.62	10.00	2:1
3+95.17	23.82	5654.31	10.00	5661.22	6.91	2:1

PREPARED BY:
P.E. GROSCH CONSTRUCTION, INC.
SURVEYORS - ENGINEERS - CONSTRUCTORS
P. O. BOX 36 WORLAND, WY 82401 (307)347-3332

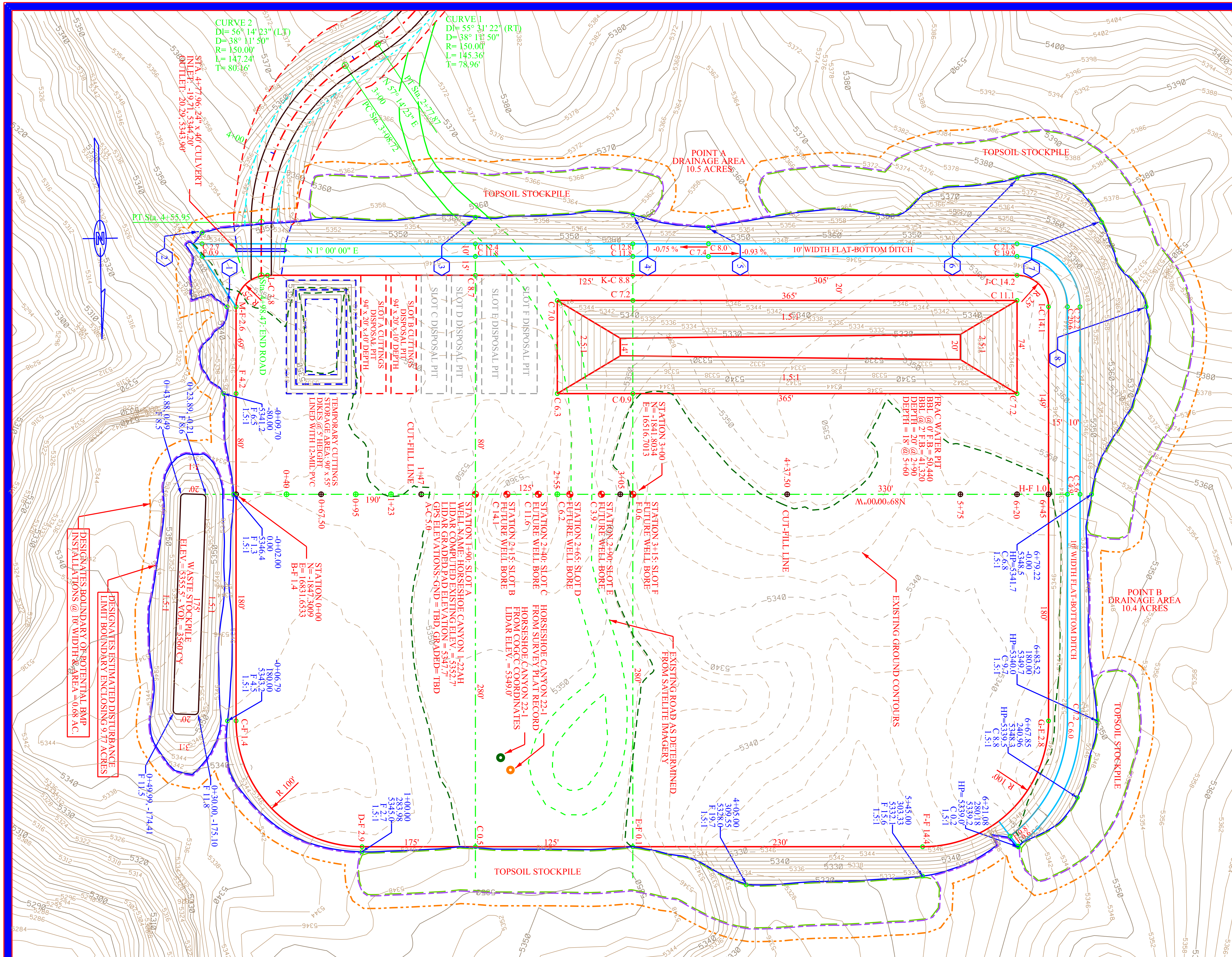
SUR:			PRJ. #:	27A12
DES:	SAG	7/01/12	REC:	lidar
DWN:	SAG	7/02/12	FILE:	/GpkData-v8/Client/Black Hills E&P/Colo/Mesa
REV:			DWG:	27A12 HSC 1-21AH/Dgn/1-21_ex6A-site

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HORSESHOE CANYON 1-21AH
NW¼ SW¼, SECTION 21, T. 9 S., R. 97 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN



WELL PAD CATCH POINT CUT-FILL TABLE						
POINT	CATCH POINT			HINGE PT.	CUT	SLOPE
NO.	STATION	OFFSET	ELEV.	ELEV.	FILL(+)	H:V
1	-0+07.34	-149.00	5343.30	5347.70	4.40	1.5:1
2	-0+27.00	-207.72	5349.50	5343.00	-6.50	1.5:1
3	1+90.00	-220.13	5359.40	5344.62	-14.78	1.5:1
4	3+15.00	-222.14	5361.70	5345.55	-16.15	1.5:1
5	3+75.00	-212.15	5355.50	5346.00	-9.50	1.5:1
6	6+20.00	-251.18	5379.20	5343.73	-35.47	1.5:1
7	6+87.13	-216.13	5374.10	5343.40	-30.70	1.5:1
8	7+22.49	-149.00	5378.70	5343.07	-35.63	1.5:1

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	5,990 C.Y.
ROAD TOPSOIL (3" DEPTH)	160 C.Y.
PAD EXCAVATION	43,970 C.Y.
ROAD EXCAVATION	2,350 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	42,550 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	210 C.Y.
WASTE MATERIAL	3,560 C.Y.
TOTAL EARTHWORK VOLUME	52,470 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:

1. The graded well pad elevation was selected to place the rig sub-structure on cut earth and to provide a portion of the material in stockpile to reclaim the frac pit.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from the waste material stockpile and from excess excavation obtained during the interim reclamation of the site.
3. The existing Horseshoe Canyon 1-22 well bore lies on the site as shown. The approximate cut at the well bore is 1.3 feet. During interim reclamation, a pad at the existing well bore will be constructed for access to the well for a well service unit.
4. The proposed site lies in a basin. The 10 foot width flat-bottom diversion channel shown is provided to divert run-off around the site. The drainage area contributing to Point A is 10.5 acres and the area contributing to Point B is 10.4 acres. By the rational method, the estimated flows at each end of the channel is 2.3 cfs and 4.2 cfs for a 10-year and 25-year event, respectively. The flow capacity of a 24" diameter culvert at a head water depth to diameter ratio of 1.0 and 1.5 is 10.2 and 18.6 cfs, respectively.
5. The area of the proposed pad and waste material stockpile area is 8.49 acres within the computed catch lines. This area does not include the area of the topsoil stockpiles nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 9.77 acres. The boundary for potential BMP installations is at a 10 foot width outside the disturbance limit. The area enclosed is 0.68 acres.
6. The area of the road within the computed catch lines is 0.46 acres.
7. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
8. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

DIGITAL TERRAIN MODEL NOTES:

THE BASIS OF THE DESIGN IS A DIGITAL TERRAIN MODEL (DTM) DERIVED FROM DATA OBTAINED WITH LIGHT EMITTING RADAR (LIDAR) FROM AN AIRCRAFT. THE CONSTRUCTION STAKING OF THE DESIGN IS DONE WITH SURVEY GRADE GLOBAL POSITIONING SURVEY (GPS) EQUIPMENT. THE DTM ELEVATIONS AND GPS ELEVATIONS MAY VARY BY VALUES OF LESS THAN 0.5 FOOT TO 2 FEET. FOR EARTHWORK COMPUTATIONS, THE DTM MODEL IS ACCEPTED AS VALID. DURING CONSTRUCTION STAKING, THE ELEVATION OF THE WELL BORE WILL BE DETERMINED WITH GPS METHODS. THIS ELEVATION WILL BE THE PUBLISHED ELEVATION.

PREPARED BY:
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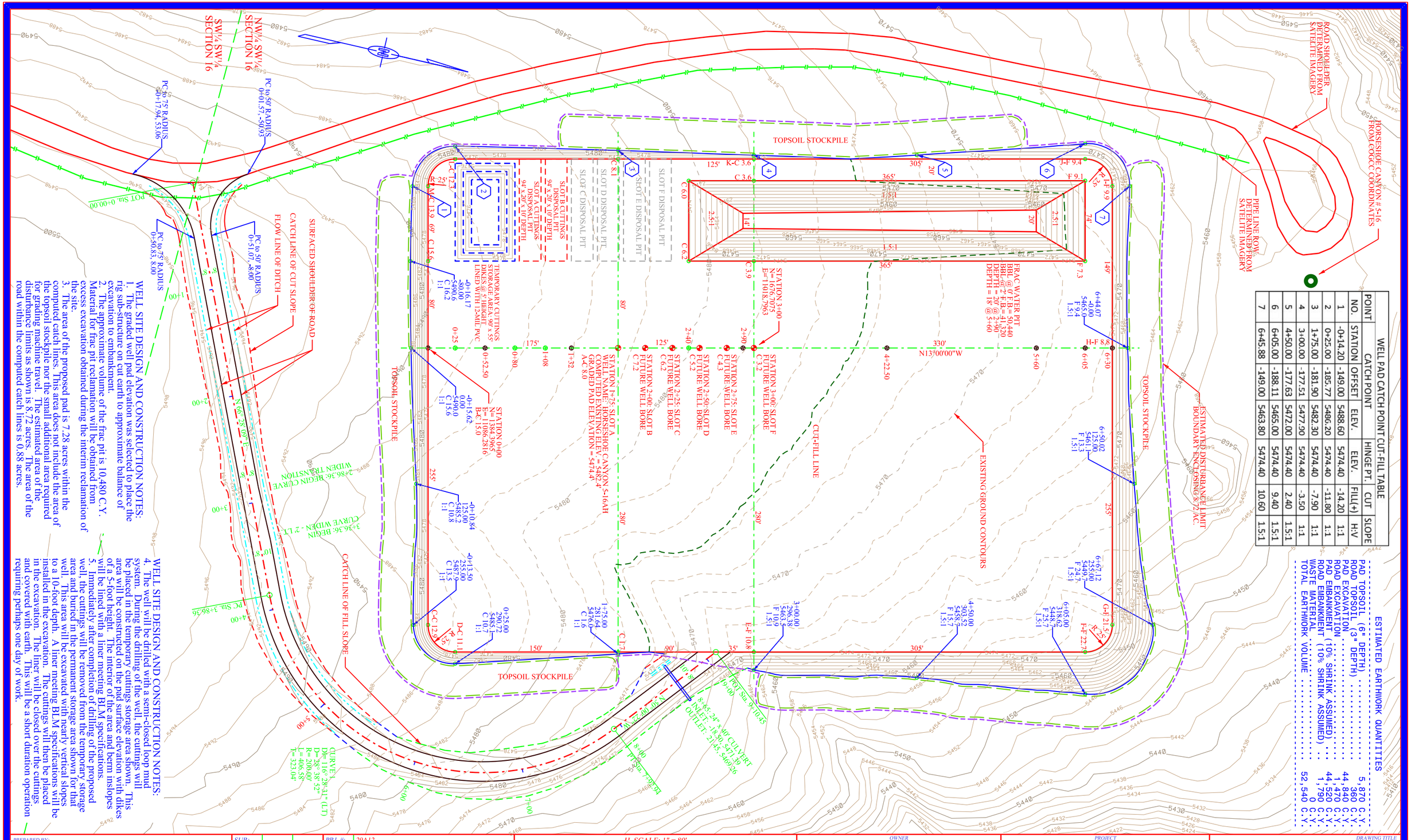
SUR:			PRJ. #:	28A12
DES:	SAG	10/06/12	REC:	lidar
DWN:	SAG	10/07/12	FILE:	GpkData-v8/Client/Black Hills E&P/Colo/Mesa
REV:			DWG:	28A12 HSC 1-22/Dgn/1-22R_ex6A-site

SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HORSESHOE CANYON 1-22AH
SW¼ NW¼, SECTION 22, T. 9 S., R. 97 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN



POINT NO.	CATCH POINT STATION	OFFSET	ELEV.	HINGE PT. ELEV.	CUT FILL(+)	SLOPE H:V
1	-0+14.20	-149.00	5488.60	5474.40	-14.20	1:1
2	0+25.00	-185.77	5486.20	5474.40	-11.80	1:1
3	1+75.00	-181.90	5482.30	5474.40	-7.90	1:1
4	3+00.00	-177.51	5477.90	5474.40	-3.50	1:1
5	4+50.00	-177.63	5472.00	5474.40	2.40	1.5:1
6	6+05.00	-188.11	5465.00	5474.40	9.40	1.5:1
7	6+45.88	-149.00	5463.80	5474.40	10.60	1.5:1

WELL PAD CATCH POINT CUT-FILL TABLE

ESTIMATED EARTHWORK QUANTITIES

PAD TOPSOIL (6" DEPTH)	5,870 C.Y.
ROAD TOPSOIL (3" DEPTH)	360 C.Y.
PAD EXCAVATION	44,840 C.Y.
ROAD EXCAVATION	1,470 C.Y.
PAD EMBANKMENT (10% SHRINK ASSUMED)	44,520 C.Y.
ROAD EMBANKMENT (10% SHRINK ASSUMED)	1,790 C.Y.
WASTE MATERIAL	0 C.Y.
TOTAL EARTHWORK VOLUME	52,540 C.Y.

WELL SITE DESIGN AND CONSTRUCTION NOTES:
1. The graded well pad elevation was selected to place the rig sub-structure on cut earth to approximate balance of excavation to embankment.
2. The approximate volume of the frac pit is 10,480 C.Y. Material for frac pit reclamation will be obtained from excess excavation obtained during the interim reclamation of the site.
3. The area of the proposed pad is 7.28 acres within the computed catch lines. This area does not include the area of the topsoil stockpile nor the small additional area required for grading machine travel. The estimated area of the disturbance limits as shown is 8.72 acres. The area of the road within the computed catch lines is 0.88 acres.
4. The well will be drilled with a semi-closed loop mud system. During the drilling of the well, the cuttings will be placed in the temporary cuttings storage area shown. This area will be constructed on the pad surface elevation with dikes of a 5-foot height. The interior of the area and berm inslopes will be lined with a liner meeting BLM specifications.
5. Immediately after completion of drilling of the proposed well, the cuttings will be removed from the temporary storage area and buried in the permanent storage area shown for that well. This area will be excavated with nearly vertical slopes to a 10-foot depth. A liner meeting BLM specifications will be installed in the excavation. The cuttings will then be placed in the excavation. The liner will be closed over the cuttings and covered with earth. This will be a short duration operation requiring perhaps one day of work.

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SUR:			PRJ. #:	29A12	
DES:	SAG	7/03/12	REC:	lidar	
DWN:	SAG	7/03/12	FILE:	/GpkData-v8/Client/Black Hills E&P/Colo/Mesa	
REV:			DWG:	29a12 HSC 5-16/Dgn/5-16_ex6A-site	

H. SCALE: 1" = 80'
0 80 160 240
CONTOUR INTERVAL: TWO FEET

OWNER
BLACK HILLS PLATEAU PRODUCTION COMPANY, LLC
DENVER, COLORADO

PROJECT
HORSESHOE CANYON 5-16AH
NW¼ SW¼, SECTION 16, T. 9 S., R. 97 W.
MESA COUNTY, COLORADO

DRAWING TITLE
EXHIBIT VI-A
DRAWING DESCRIPTION
WELL SITE GRADING PLAN