Summary for Subcatchment B3:

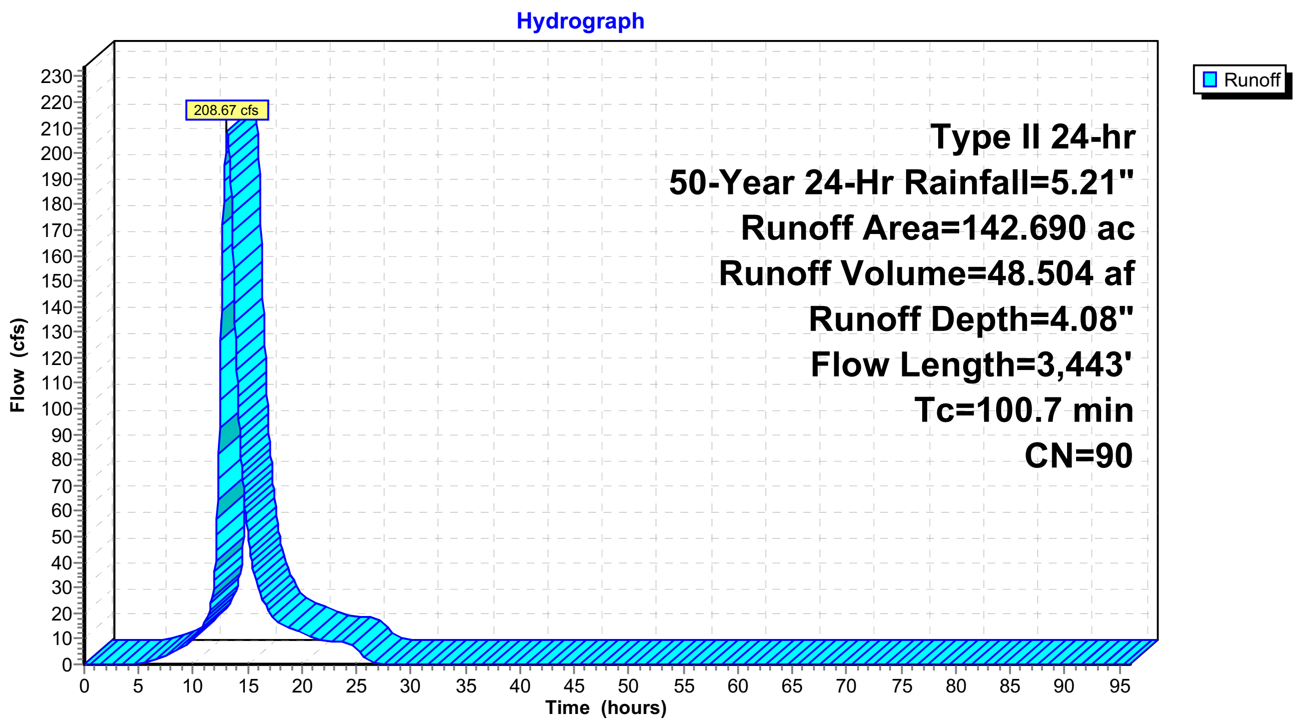
Runoff = 208.67 cfs @ 13.11 hrs, Volume= 48.504 af, Depth= 4.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year 24-Hr Rainfall=5.21"

	Area (ac)	CN	Description
*	142.690	90	
	142.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
86.7	3,343	0.0051	0.64		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
14.0	100	0.0119	0.12		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
100.7	3,443	Total			

Subcatchment B3:



Summary for Subcatchment B4:

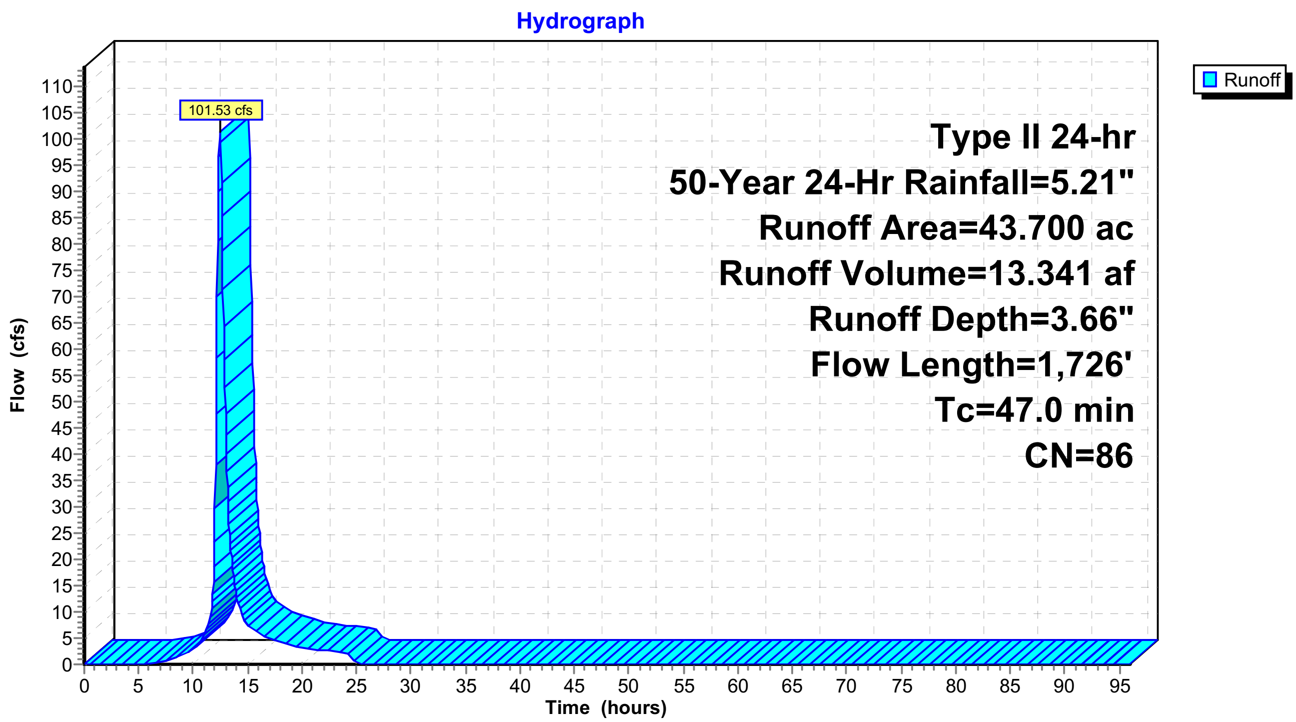
Runoff = 101.53 cfs @ 12.45 hrs, Volume= 13.341 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year 24-Hr Rainfall=5.21"

	Area (ac)	CN	Description
*	43.700	86	
	43.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	1,626	0.0097	0.89		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
16.4	100	0.0080	0.10		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
47.0	1,726	Total			

Subcatchment B4:



Summary for Subcatchment B5:

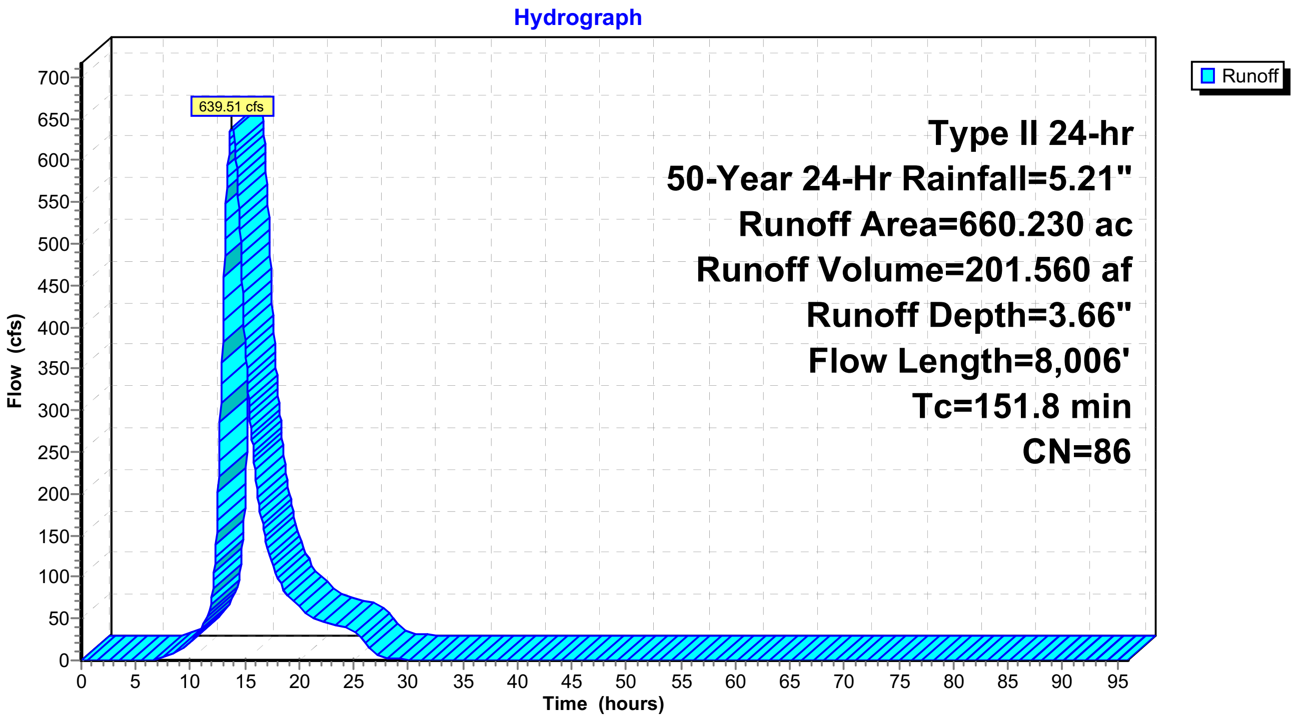
Runoff = 639.51 cfs @ 13.82 hrs, Volume= 201.560 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year 24-Hr Rainfall=5.21"

	Area (ac)	CN	Description
*	660.230	86	
	660.230		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	1,926	0.0007	2.40	60.04	**Parabolic Channel, Woody Wetlands** W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
18.4	100	0.0060	0.09		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
104.6	3,995	0.0050	0.64		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
0.6	335	0.0099	9.03	225.80	**Parabolic Channel, Woody Wetlands** W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
0.2	42	0.0054	3.94	3.09	**Pipe Channel, Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	31	0.0339	9.87	7.75	**Pipe Channel, Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
14.5	1,577	0.0001	1.82	45.39	**Parabolic Channel, Woody Wetlands** W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.011 Concrete pipe, straight & clean
151.8	8,006	Total			

Subcatchment B5:



Summary for Subcatchment B6:

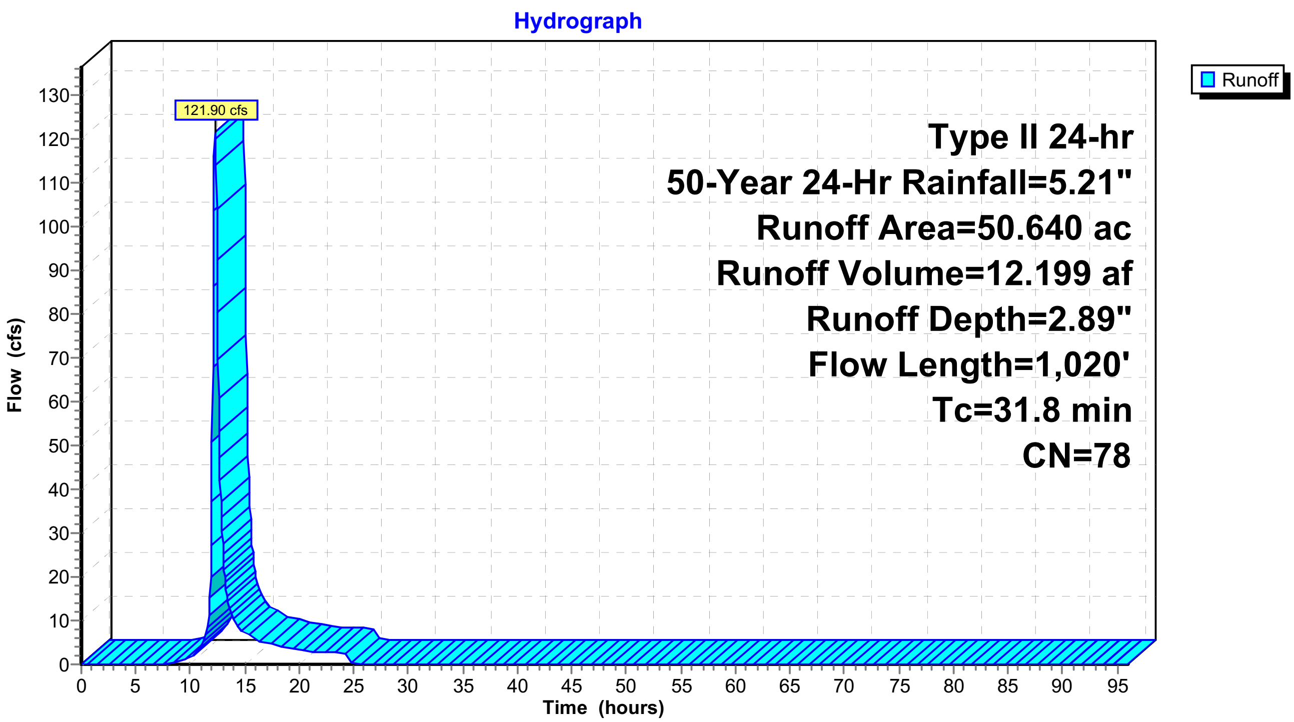
Runoff = 121.90 cfs @ 12.27 hrs, Volume= 12.199 af, Depth= 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year 24-Hr Rainfall=5.21"

	Area (ac)	CN	Description
*	50.640	78	
	50.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	920	0.0103	0.91		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
15.0	100	0.0100	0.11		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
31.8	1,020	Total			

Subcatchment B6:



Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentB1: Runoff Area=159.860 ac 0.00% Impervious Runoff Depth=4.66"
Flow Length=1,860' Tc=63.7 min CN=88 Runoff=376.15 cfs 62.138 af

SubcatchmentB2: Runoff Area=317.610 ac 0.00% Impervious Runoff Depth=4.77"
Flow Length=5,853' Tc=188.4 min CN=89 Runoff=337.04 cfs 126.361 af

SubcatchmentB3: Runoff Area=142.690 ac 0.00% Impervious Runoff Depth=4.88"
Flow Length=3,443' Tc=100.7 min CN=90 Runoff=248.44 cfs 58.085 af

SubcatchmentB4: Runoff Area=43.700 ac 0.00% Impervious Runoff Depth=4.45"
Flow Length=1,726' Tc=47.0 min CN=86 Runoff=122.68 cfs 16.196 af

SubcatchmentB5: Runoff Area=660.230 ac 0.00% Impervious Runoff Depth=4.45"
Flow Length=8,006' Tc=151.8 min CN=86 Runoff=774.29 cfs 244.695 af

SubcatchmentB6: Runoff Area=50.640 ac 0.00% Impervious Runoff Depth=3.61"
Flow Length=1,020' Tc=31.8 min CN=78 Runoff=152.63 cfs 15.252 af

Total Runoff Area = 1,374.730 ac Runoff Volume = 522.726 af Average Runoff Depth = 4.56"
100.00% Pervious = 1,374.730 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment B1:

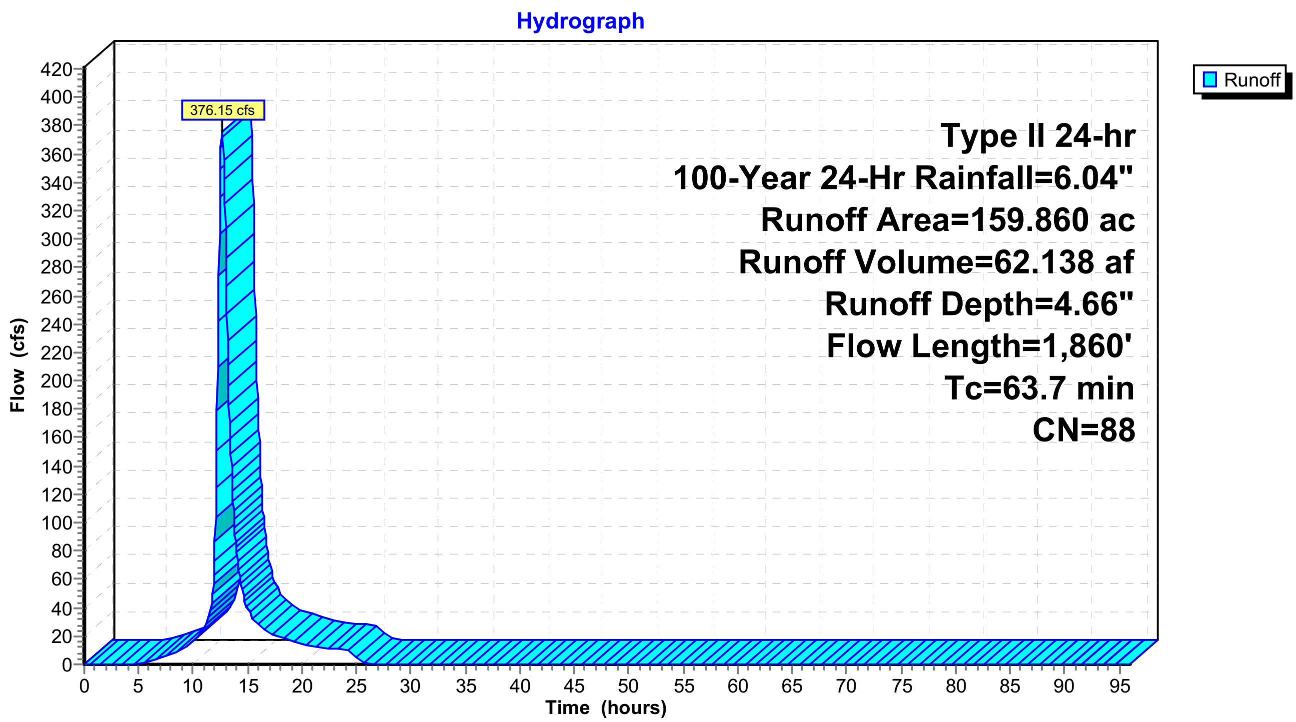
Runoff = 376.15 cfs @ 12.65 hrs, Volume= 62.138 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	159.860	88	
	159.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.6	1,760	0.0049	0.63		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
17.1	100	0.0072	0.10		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
63.7	1,860	Total			

Subcatchment B1:



Summary for Subcatchment B2:

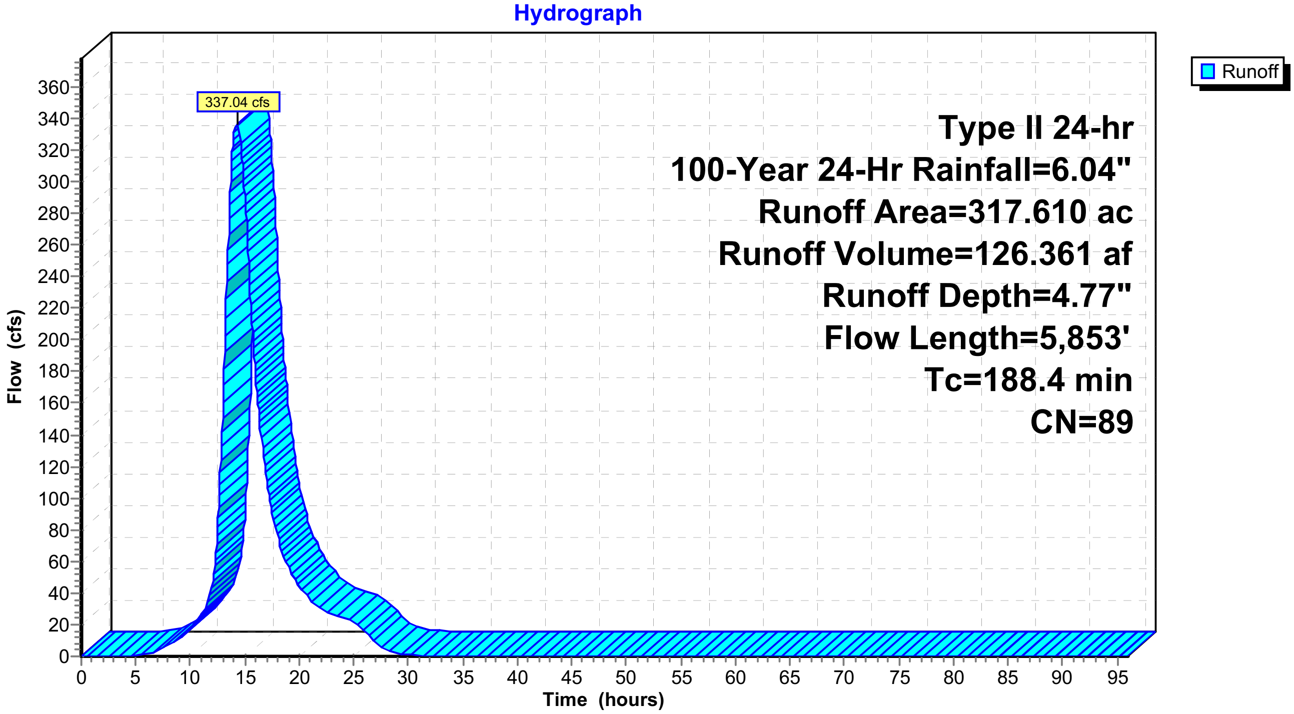
Runoff = 337.04 cfs @ 14.26 hrs, Volume= 126.361 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	317.610	89	
	317.610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
77.2	2,245	0.0029	0.48		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
15.0	100	0.0100	0.11		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
34.9	1,434	0.0058	0.69		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
0.1	41	0.0370	10.31	8.10	**Pipe Channel, Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
49.9	1,347	0.0025	0.45		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
9.4	347	0.0078	0.62		**Shallow Concentrated Flow, Grassland/Herbaceous** Short Grass Pasture Kv= 7.0 fps
1.9	339	0.0014	3.01	80.26	**Parabolic Channel, Cultivated Crops** W=20.00' D=2.00' Area=26.7 sf Perim=20.5' n= 0.022 Earth, clean & straight
188.4	5,853	Total			

Subcatchment B2:



Summary for Subcatchment B3:

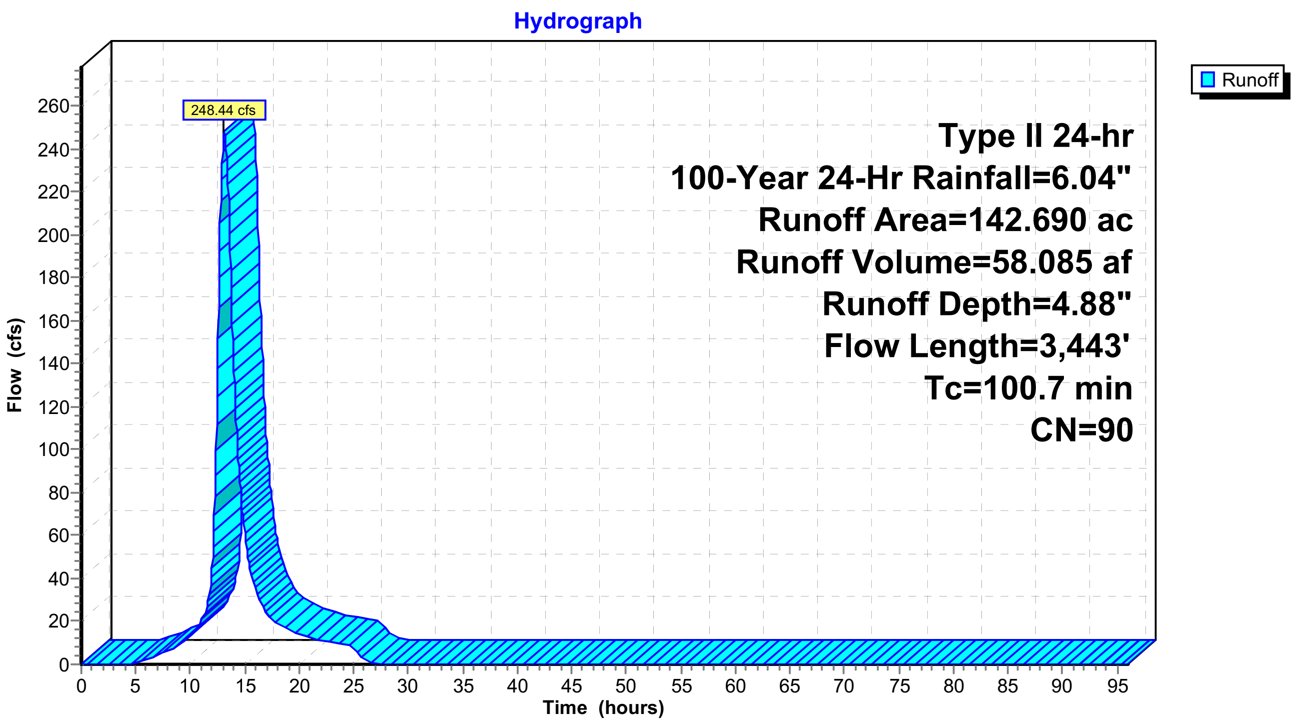
Runoff = 248.44 cfs @ 13.11 hrs, Volume= 58.085 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	142.690	90	
	142.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
86.7	3,343	0.0051	0.64		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
14.0	100	0.0119	0.12		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
100.7	3,443	Total			

Subcatchment B3:



Summary for Subcatchment B4:

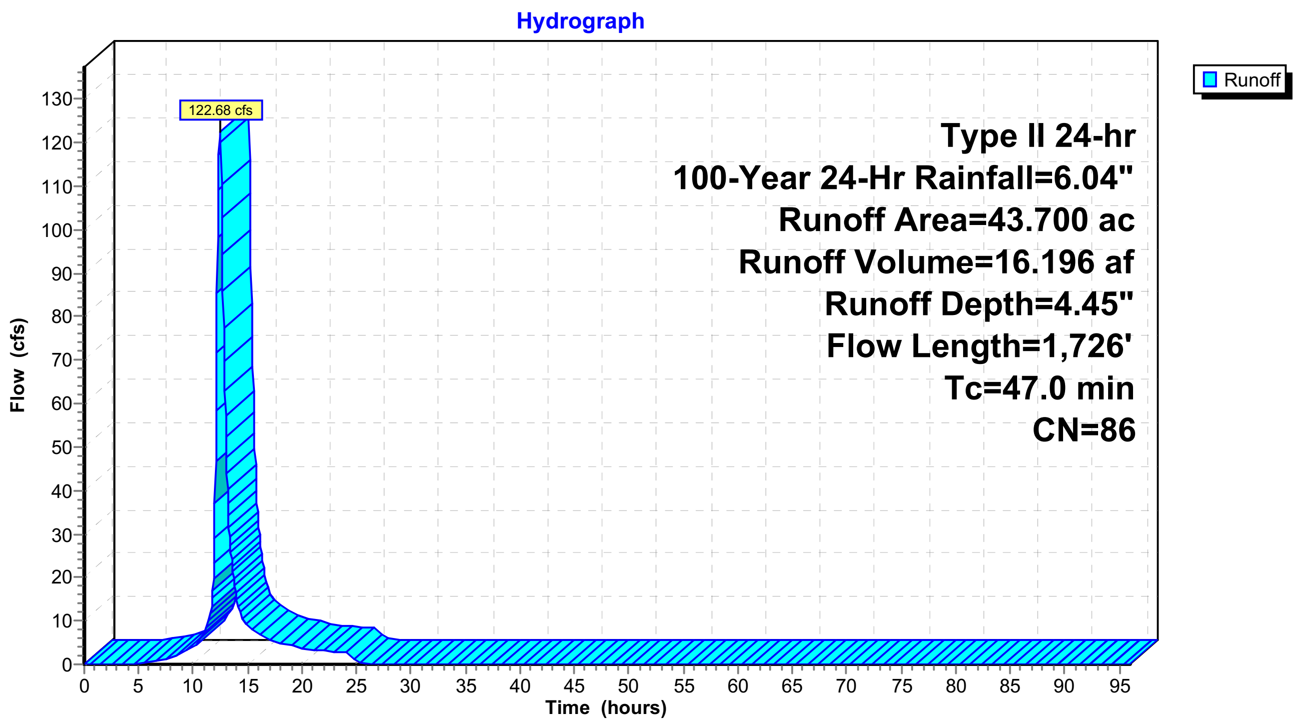
Runoff = 122.68 cfs @ 12.44 hrs, Volume= 16.196 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	43.700	86	
	43.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	1,626	0.0097	0.89		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
16.4	100	0.0080	0.10		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
47.0	1,726	Total			

Subcatchment B4:



Summary for Subcatchment B5:

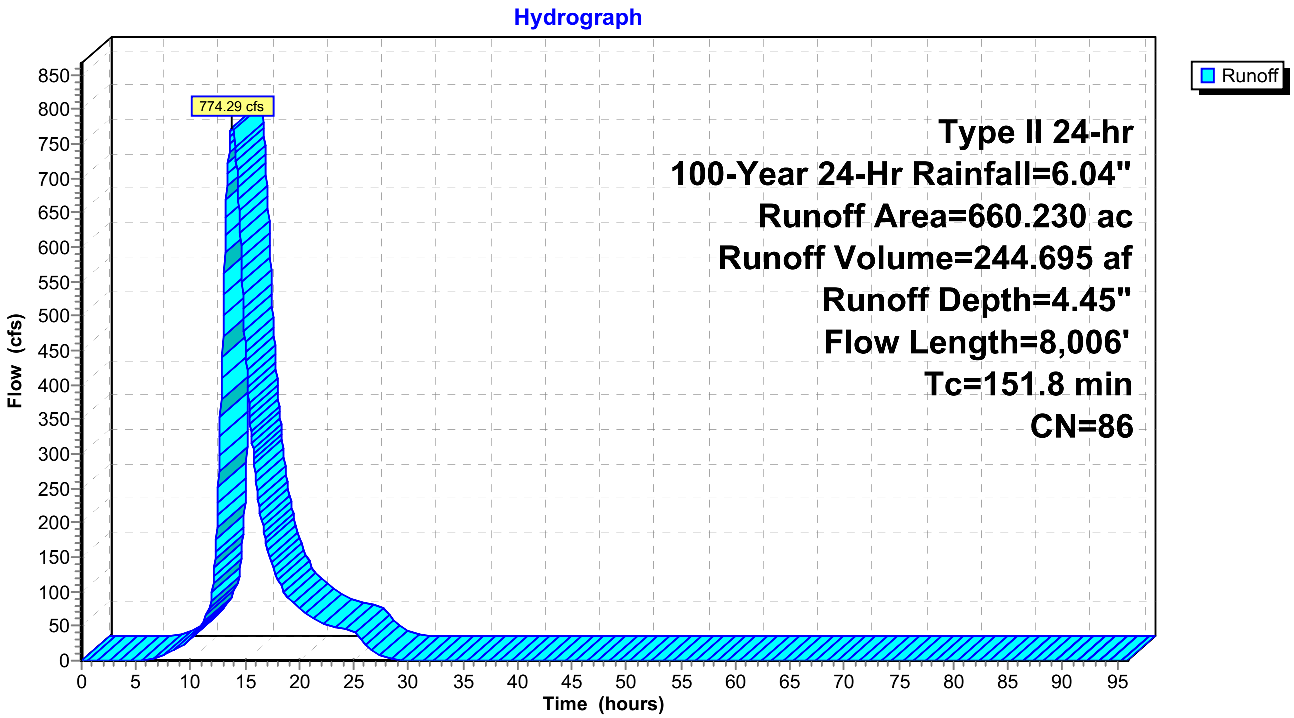
Runoff = 774.29 cfs @ 13.81 hrs, Volume= 244.695 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	660.230	86	
	660.230		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	1,926	0.0007	2.40	60.04	**Parabolic Channel, Woody Wetlands** W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
18.4	100	0.0060	0.09		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
104.6	3,995	0.0050	0.64		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
0.6	335	0.0099	9.03	225.80	**Parabolic Channel, Woody Wetlands** W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
0.2	42	0.0054	3.94	3.09	**Pipe Channel, Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	31	0.0339	9.87	7.75	**Pipe Channel, Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
14.5	1,577	0.0001	1.82	45.39	**Parabolic Channel, Woody Wetlands** W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.011 Concrete pipe, straight & clean
151.8	8,006	Total			

Subcatchment B5:



Summary for Subcatchment B6:

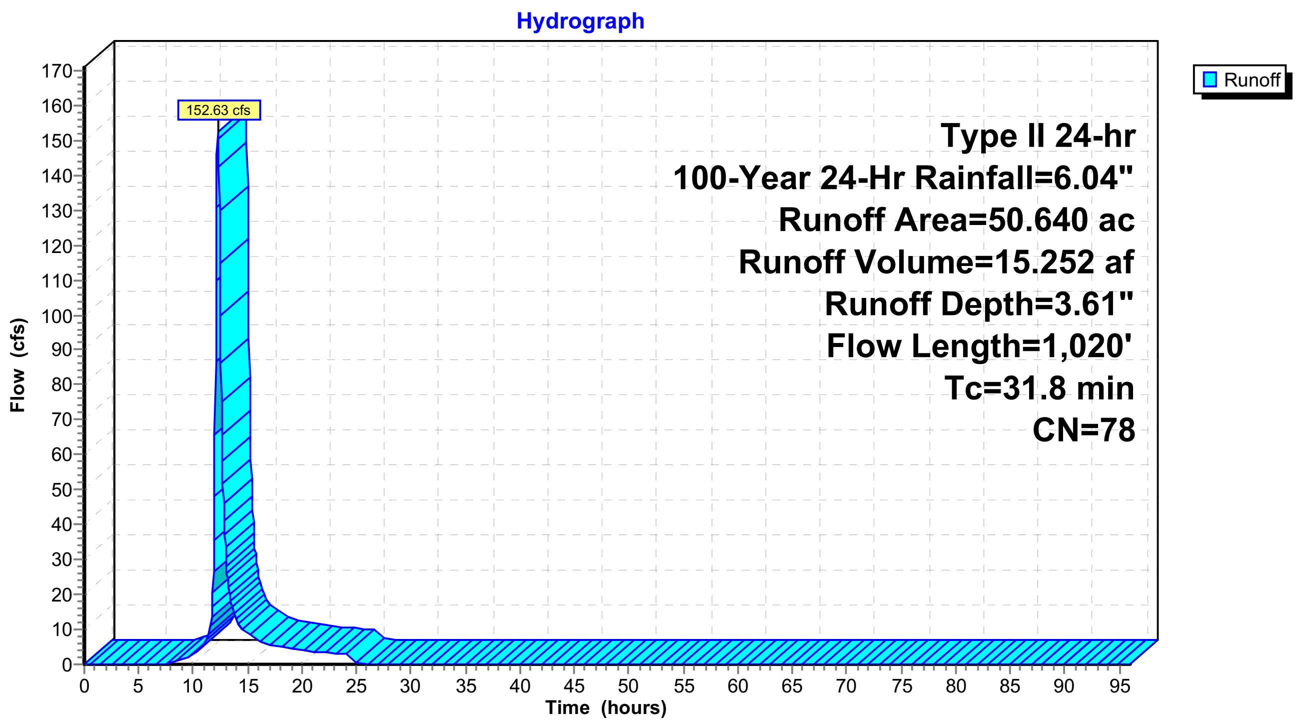
Runoff = 152.63 cfs @ 12.26 hrs, Volume= 15.252 af, Depth= 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	50.640	78	
	50.640		100.00% Pervious Area

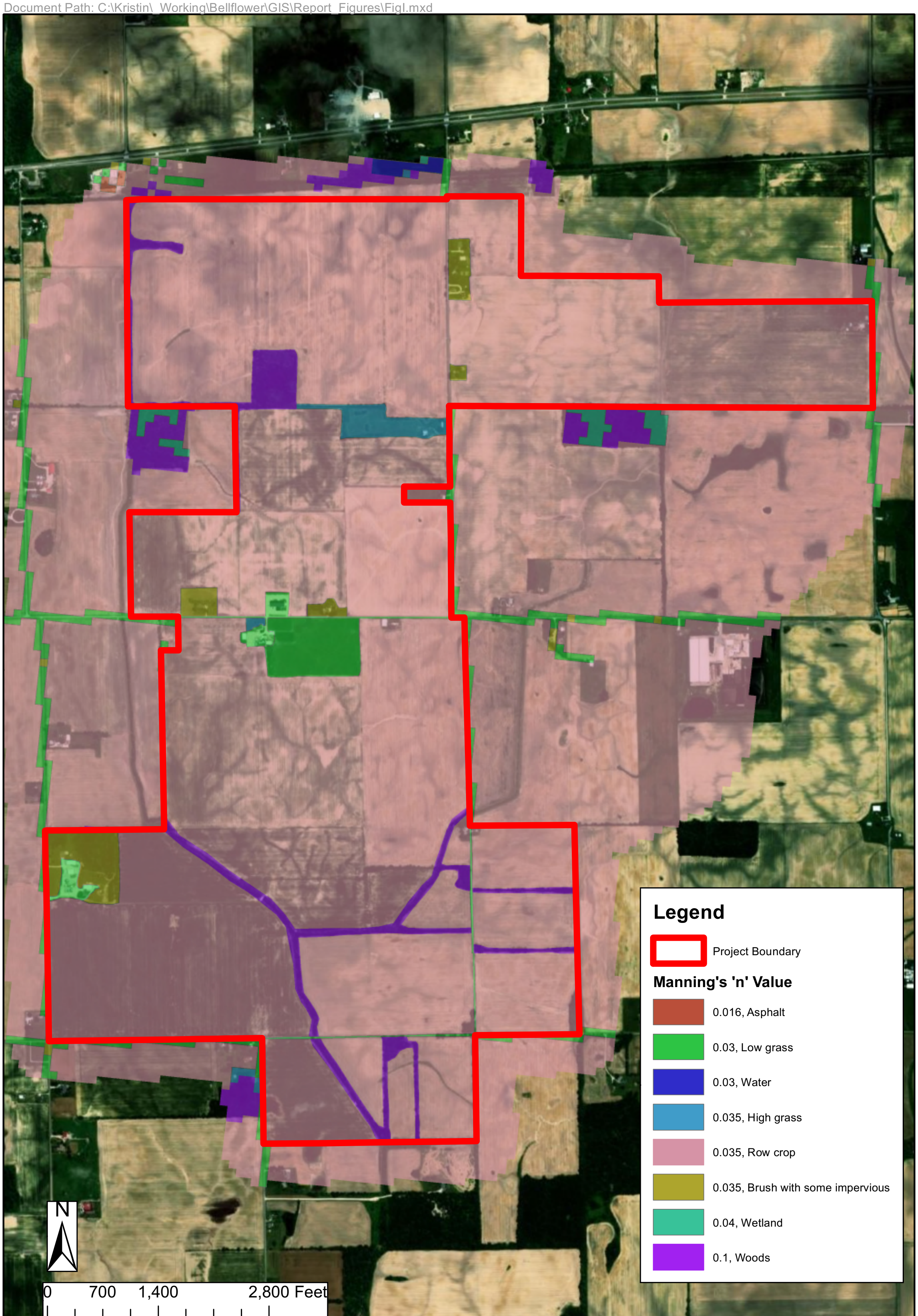
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	920	0.0103	0.91		**Shallow Concentrated Flow, Cultivated Crops** Cultivated Straight Rows Kv= 9.0 fps
15.0	100	0.0100	0.11		**Sheet Flow, Cultivated Crops** Cultivated: Residue>20% n= 0.170 P2= 2.90"
31.8	1,020	Total			

Subcatchment B6:



APPENDIX I
PRE-DEVELOPMENT MANNINGS MAP

Document Path: C:\Kristin_Working\Bellflower\GIS\Report_Figures\FigI.mxd



Source: World Street Map was obtained from ESRI Basemap.

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PROJECT NO.	20211557.001A
DRAWN:	09/2/2020
DRAWN BY:	KC
CHECKED BY:	BB
FILE NAME:	FigB.mxd

Pre-Development Manning's 'n' Map

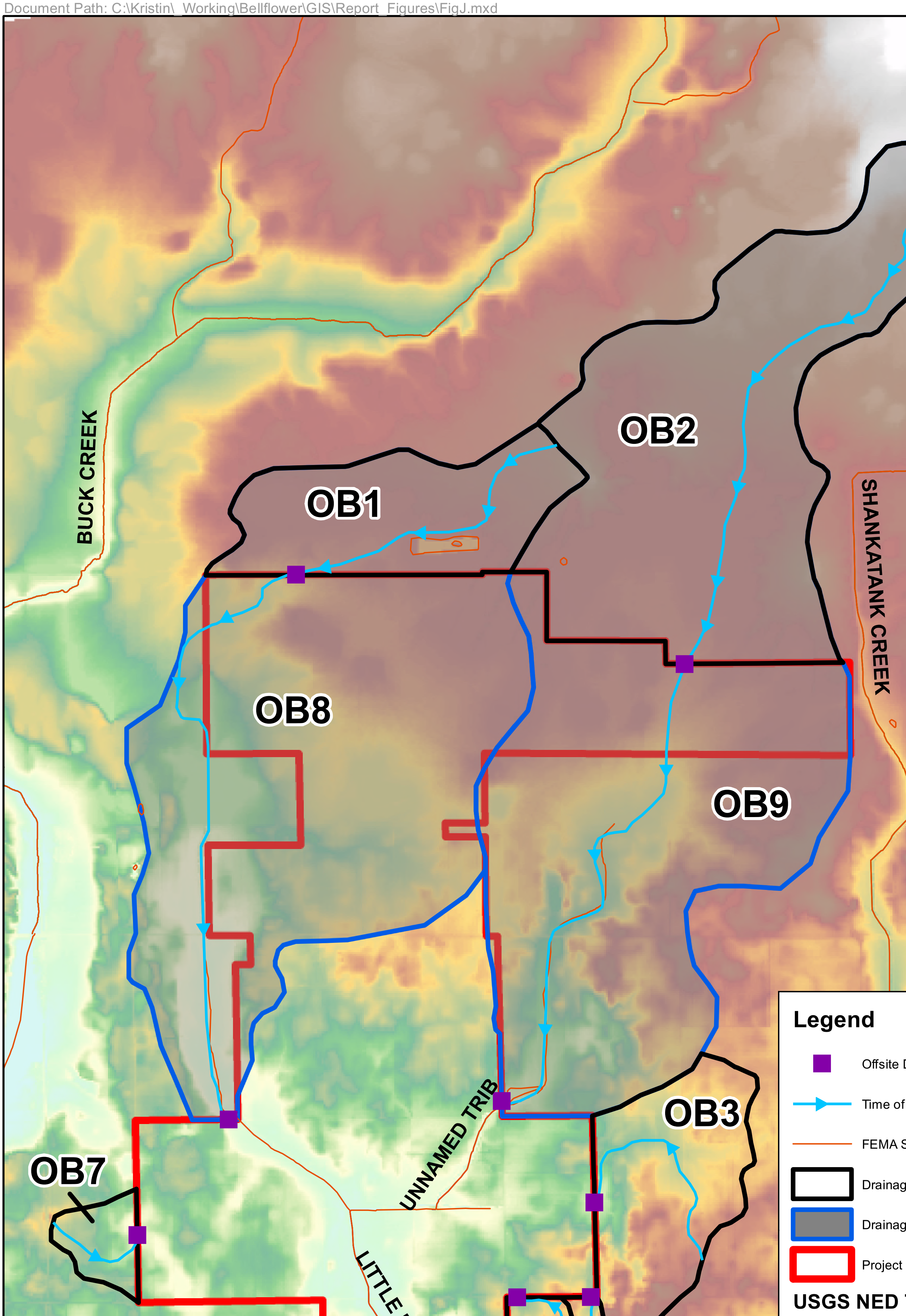
Bellflower Solar Project
LightsourceBP
Henry and Rush Counties, Indiana

APPENDIX

I

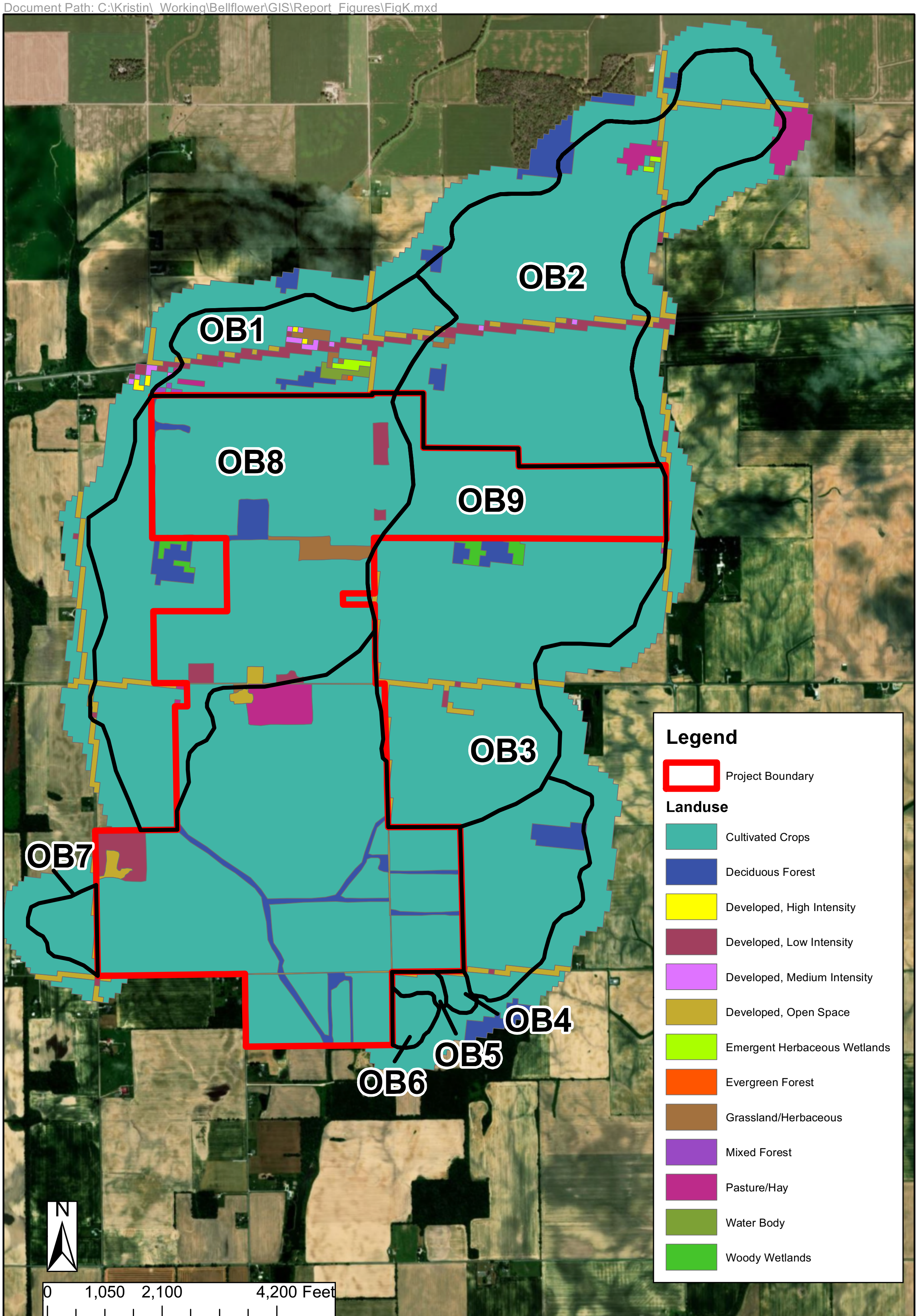
APPENDIX J
OFFSITE DRAINAGE MAP

Document Path: C:\Kristin_Working\Bellflower\GIS\Report_Figures\FigJ.mxd



APPENDIX K
OFFSITE LANDUSE MAP

Document Path: C:\Kristin_Working\Bellflower\GIS\Report_Figures\FigK.mxd



Source: World Street Map was obtained from ESRI Basemap.

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DRAWN:	9/3/2020
DRAWN BY:	KC
CHECKED BY:	BB
FILE NAME:	FigB.mxd

Offsite Landuse Map

Bellflower Solar Project
LightsourceBP
Henry and Rush Counties, Indiana

APPENDIX

K

APPENDIX L
OFFSITE CURVE NUMBERS

OB1	21	Developed, Open Space	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	1.33	84	111.91
OB1	21	Developed, Open Space	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	7.04	84	591.36
OB1	21	Developed, Open Space	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.00	79	0.26
OB1	22	Developed, Low Intensity	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.92	86	78.84
OB1	22	Developed, Low Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	6.41	86	551.13
OB1	22	Developed, Low Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	7.24	86	622.82
OB1	23	Developed, Medium Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	1.80	87	156.74
OB1	23	Developed, Medium Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.45	87	39.37
OB1	24	Developed, High Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.34	95	32.19
OB1	24	Developed, High Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.11	95	10.07
OB1	41	Deciduous Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	1.84	82	150.59
OB1	41	Deciduous Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	2.39	82	195.88
OB1	42	Evergreen Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.16	79	12.26
OB1	42	Evergreen Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.03	79	2.60
OB1	42	Evergreen Forest	Water		0.03	79	2.70
OB1	43	Mixed Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.37	82	30.19
OB1	43	Mixed Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.74	82	60.67
OB1	71	Grassland/Herbaceous	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	2.65	84	222.23
OB1	71	Grassland/Herbaceous	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.41	84	118.36
OB1	71	Grassland/Herbaceous	Water		0.17	84	14.33
OB1	81	Pasture/Hay	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.22	84	18.12
OB1	81	Pasture/Hay	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.15	84	96.57
OB1	82	Cultivated Crops	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	6.57	89	585.14
OB1	82	Cultivated Crops	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	52.64	89	4,684.6
OB1	82	Cultivated Crops	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	77.47	89	6,894.4
OB1	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.72	85	61.07
OB1	82	Cultivated Crops	Water		0.00	89	0.31
OB1	95	Emergent Herbaceous Wetlands	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.60	98	157.24
OB1	95	Emergent Herbaceous Wetlands	Water		0.62	98	60.69
				SUM:	180.09		15,921.8
						COMPOSITE CN:	**88**

OB2	22	Developed, Low Intensity┬á	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	3.06	86	262.75
OB2	22	Developed, Low Intensity┬á	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	1.46	81	117.92
OB2	22	Developed, Low Intensity┬á	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.02	86	1.43
OB2	22	Developed, Low Intensity┬á	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	7.00	86	602.23
OB2	23	Developed, Medium Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.19	87	16.88
OB2	23	Developed, Medium Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.25	87	21.81
OB2	41	Deciduous Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.12	82	91.85
OB2	41	Deciduous Forest	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.56	82	45.58
OB2	41	Deciduous Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	5.02	82	411.39
OB2	71	Grassland/Herbaceous	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.65	79	50.99
OB2	71	Grassland/Herbaceous	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.47	84	39.18
OB2	71	Grassland/Herbaceous	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.22	84	18.68
OB2	81	Pasture/Hay	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.20	84	100.81
OB2	81	Pasture/Hay	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	3.74	84	314.45
OB2	81	Pasture/Hay	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	2.30	84	193.62
OB2	82	Cultivated Crops┬á	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	205.79	89	18,314.9
OB2	82	Cultivated Crops┬á	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	12.18	85	1,035.6
OB2	82	Cultivated Crops┬á	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	100.10	89	8,908.8
OB2	82	Cultivated Crops┬á	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	192.39	89	17,123.0
OB2	82	Cultivated Crops┬á	Losantville silt loam, 2 to 6 percent slopes, eroded	D	13.95	89	1,241.1
OB2	95	Emergent Herbaceous Wetlands	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.89	98	86.80
OB2	95	Emergent Herbaceous Wetlands	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.00	98	0.38
				SUM:	565.78		50,114.8
						COMPOSITE CN:	89

DRAINAGE AREA ID	LU CODE	LAND USE DESCRIPTION	SOILS	HSG	AREA (ACRES)	CN	CN*ARE
OB3	21	Developed, Open Space	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	1.03	84	86.45
OB3	21	Developed, Open Space	Miamian clay loam, 6 to 12 percent slopes, severely eroded	C	0.61	79	47.98
OB3	21	Developed, Open Space	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.97	79	76.81
OB3	21	Developed, Open Space	Treaty silty clay loam, 0 to 1 percent slopes	B/D	0.08	84	6.46
OB3	22	Developed, Low Intensity	Miamian clay loam, 6 to 12 percent slopes, severely eroded	C	0.00	81	0.07
OB3	22	Developed, Low Intensity	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.22	81	18.01
OB3	22	Developed, Low Intensity	Treaty silty clay loam, 0 to 1 percent slopes	B/D	0.14	86	11.77
OB3	41	Deciduous Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	6.94	82	568.75
OB3	41	Deciduous Forest	Treaty silty clay loam, 0 to 1 percent slopes	B/D	2.16	82	176.96
OB3	82	Cultivated Crops	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	62.55	89	5,566.7
OB3	82	Cultivated Crops	Miamian clay loam, 6 to 12 percent slopes, severely eroded	C	12.87	85	1,094.3
OB3	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	25.22	85	2,143.7
OB3	82	Cultivated Crops	Treaty silty clay loam, 0 to 1 percent slopes	B/D	42.60	89	3,790.9
				SUM:	155.38		13,589.1
						COMPOSITE CN:	87

OB4	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	3.96	85	336.26
OB4	82	Cultivated Crops	Treaty silty clay loam, 0 to 1 percent slopes	B/D	0.96	89	85.85
				SUM:	8.29		704.84
						COMPOSITE CN:	85

DRAINAGE AREA ID	LU CODE	LAND USE DESCRIPTION	SOILS	HSG	AREA (ACRES)	CN	CN*ARE
OB5	21	Developed, Open Space	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.96	79	75.62
OB5	82	Cultivated Crops	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.09	89	7.90
OB5	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	8.46	85	719.52
				SUM:	9.51		803.04
						COMPOSITE CN:	84

DRAINAGE AREA ID	LU CODE	LAND USE DESCRIPTION	SOILS	HSG	AREA (ACRES)	CN	CN*ARE
OB6	82	Cultivated Crops	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	3.00	89	267.32
OB6	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	10.69	85	908.32
OB6	82	Cultivated Crops	Treaty silty clay loam, 0 to 1 percent slopes	B/D	2.16	89	192.26
				SUM:	15.85		1,367.9
						COMPOSITE CN:	86

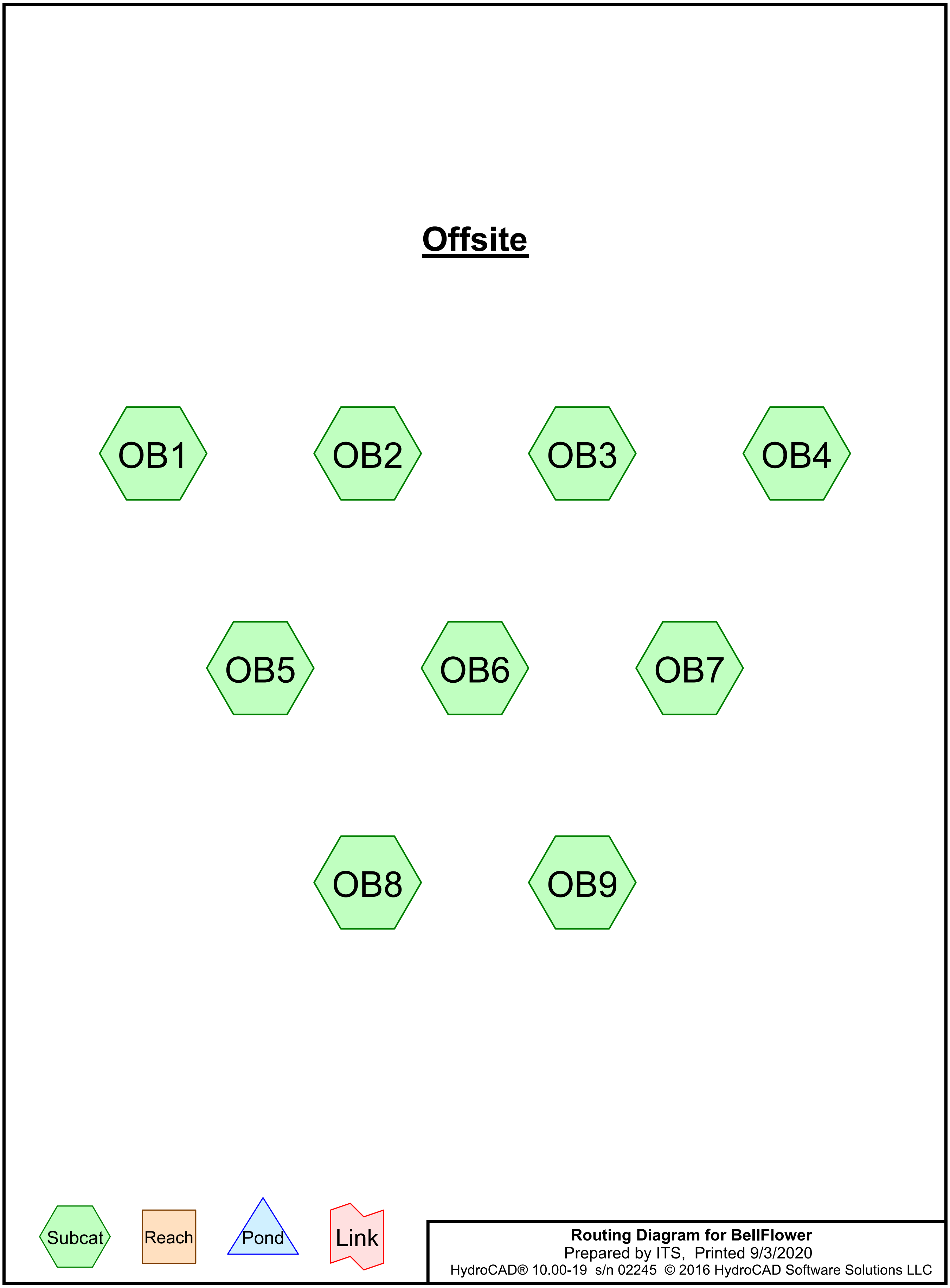
DRAINAGE AREA ID	LU CODE	LAND USE DESCRIPTION	SOILS	HSG	AREA (ACRES)	CN	CN*ARE
OB7	21	Developed, Open Space	Eldean loam, 2 to 6 percent slopes, eroded	B	0.53	69	36.65
OB7	21	Developed, Open Space	Miami silt loam, gravelly substratum, 0 to 2 percent slopes	C	1.10	79	86.63
OB7	21	Developed, Open Space	Ockley silt loam, 0 to 2 percent slopes	B	0.45	69	30.92
OB7	22	Developed, Low Intensity	Miami silt loam, gravelly substratum, 0 to 2 percent slopes	C	0.00	81	0.29
OB7	82	Cultivated Crops	Eldean loam, 2 to 6 percent slopes, eroded	B	1.61	78	125.94
OB7	82	Cultivated Crops	Miami silt loam, gravelly substratum, 0 to 2 percent slopes	C	22.23	85	1,889.6
OB7	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.46	85	38.90
OB7	82	Cultivated Crops	Ockley silt loam, 0 to 2 percent slopes	B	3.55	78	277.10
				SUM:	29.94		2,486.1
						COMPOSITE CN:	83

OB8	21	Developed, Open Space	Eldean loam, 2 to 6 percent slopes, eroded	B	0.81	69	55.58
OB8	21	Developed, Open Space	Eldean silt loam, 0 to 2 percent slopes	B	0.32	69	22.15
OB8	21	Developed, Open Space	Eldean silt loam, 2 to 6 percent slopes, eroded	B	0.38	69	25.96
OB8	21	Developed, Open Space	Ockley silt loam, 0 to 2 percent slopes	B	0.99	69	68.22
OB8	21	Developed, Open Space	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	8.34	84	700.67
OB8	21	Developed, Open Space	Westland clay loam, 0 to 1 percent slopes	B/D	1.19	84	100.02
OB8	21	Developed, Open Space	Westland silt loam	B/D	0.30	84	24.85
OB8	21	Developed, Open Space	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.11	79	8.86
OB8	21	Developed, Open Space	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.40	84	33.76
OB8	21	Developed, Open Space	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	2.83	84	237.79
OB8	22	Developed, Low Intensity	Eldean loam, 2 to 6 percent slopes, eroded	B	0.22	72	16.01
OB8	22	Developed, Low Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	9.97	86	857.84
OB8	22	Developed, Low Intensity	Westland silt loam	B/D	0.34	86	28.97
OB8	22	Developed, Low Intensity	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	1.45	81	117.54
OB8	22	Developed, Low Intensity	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	1.84	86	158.22
OB8	22	Developed, Low Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	11.95	86	1,027.6
OB8	23	Developed, Medium Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.45	87	39.37
OB8	23	Developed, Medium Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	1.80	87	156.74
OB8	24	Developed, High Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.11	95	10.07
OB8	24	Developed, High Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.34	95	32.19
OB8	41	Deciduous Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	13.48	82	1,105.7
OB8	41	Deciduous Forest	Sleeth silt loam, 0 to 2 percent slopes	B/D	0.16	82	12.81
OB8	41	Deciduous Forest	Westland silt loam	B/D	7.30	82	598.75
OB8	41	Deciduous Forest	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.34	76	25.94
OB8	41	Deciduous Forest	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.53	82	43.81
OB8	41	Deciduous Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	9.97	82	817.79
OB8	41	Deciduous Forest	Losantville silt loam, 2 to 6 percent slopes, eroded	D	0.34	82	27.76
OB8	42	Evergreen Forest	Water		0.03	79	2.70
OB8	42	Evergreen Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.03	79	2.60
OB8	42	Evergreen Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.16	79	12.26
OB8	43	Mixed Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.74	82	60.67
OB8	43	Mixed Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.37	82	30.19
OB8	71	Grassland/Herbaceous	Water		0.17	84	14.33
OB8	71	Grassland/Herbaceous	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	5.40	84	454.02
OB8	71	Grassland/Herbaceous	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.25	84	20.70
OB8	71	Grassland/Herbaceous	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	9.30	84	780.94
OB8	71	Grassland/Herbaceous	Losantville silt loam, 2 to 6 percent slopes, eroded	D	0.12	84	10.09
OB8	81	Pasture/Hay	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.15	84	96.57
OB8	81	Pasture/Hay	Westland clay loam, 0 to 1 percent slopes	B/D	0.35	84	29.60
OB8	81	Pasture/Hay	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.56	79	44.28
OB8	81	Pasture/Hay	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.67	84	56.56

OB8	82	Cultivated Crops	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	275.70	89	24,537.1
OB8	82	Cultivated Crops	Sleeth silt loam, 0 to 2 percent slopes	B/D	13.10	89	1,165.8
OB8	82	Cultivated Crops	Westland clay loam, 0 to 1 percent slopes	B/D	31.82	89	2,832.2
OB8	82	Cultivated Crops	Westland silt loam	B/D	70.64	89	6,286.9
OB8	82	Cultivated Crops	Miami silt loam, gravelly substratum, 0 to 2 percent slopes	C	4.97	85	422.57
OB8	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	18.67	85	1,587.3
OB8	82	Cultivated Crops	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	35.71	89	3,178.6
OB8	82	Cultivated Crops	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	218.98	89	19,488.9
OB8	82	Cultivated Crops	Losantville silt loam, 2 to 6 percent slopes, eroded	D	34.73	89	3,091.3
OB8	90	Woody Wetlands	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.70	98	166.64
OB8	90	Woody Wetlands	Westland silt loam	B/D	1.45	98	142.51
OB8	90	Woody Wetlands	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.16	98	15.32
OB8	95	Emergent Herbaceous Wetlands	Water		0.62	98	60.69
OB8	95	Emergent Herbaceous Wetlands	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.60	98	157.24
				SUM:	880.47		77,022.7
						COMPOSITE CN:	87

OB9	21	Developed, Open Space	Treaty silty clay loam, 0 to 1 percent slopes	B/D	0.83	84	69.71
OB9	21	Developed, Open Space	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	6.29	79	497.09
OB9	21	Developed, Open Space	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.20	84	16.93
OB9	21	Developed, Open Space	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	12.04	84	1,011.3
OB9	22	Developed, Low Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	3.15	86	270.60
OB9	22	Developed, Low Intensity	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	2.49	81	201.71
OB9	22	Developed, Low Intensity	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.02	86	1.43
OB9	22	Developed, Low Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	7.23	86	622.08
OB9	23	Developed, Medium Intensity	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.19	87	16.88
OB9	23	Developed, Medium Intensity	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.25	87	21.81
OB9	41	Deciduous Forest	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	2.04	82	167.05
OB9	41	Deciduous Forest	Treaty silty clay loam, 0 to 1 percent slopes	B/D	0.00	82	0.07
OB9	41	Deciduous Forest	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.56	82	45.58
OB9	41	Deciduous Forest	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	11.92	82	977.19
OB9	71	Grassland/Herbaceous	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.08	84	6.53
OB9	71	Grassland/Herbaceous	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.65	79	50.99
OB9	71	Grassland/Herbaceous	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	0.51	84	42.78
OB9	71	Grassland/Herbaceous	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.22	84	18.68
OB9	81	Pasture/Hay	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	1.20	84	100.81
OB9	81	Pasture/Hay	Millgrove loam	B/D	0.05	84	3.94
OB9	81	Pasture/Hay	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	0.12	79	9.84
OB9	81	Pasture/Hay	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	3.74	84	314.45
OB9	81	Pasture/Hay	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	2.31	84	194.42
OB9	82	Cultivated Crops	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	387.03	89	34,445.4
OB9	82	Cultivated Crops	Millgrove loam	B/D	0.59	89	52.69
OB9	82	Cultivated Crops	Treaty silty clay loam, 0 to 1 percent slopes	B/D	37.91	89	3,374.0
OB9	82	Cultivated Crops	Miamian clay loam, 6 to 12 percent slopes, severely eroded	C	5.34	85	454.06
OB9	82	Cultivated Crops	Miamian silt loam, New Castle Till Plain, 2 to 6 percent slopes, eroded	C	176.99	85	15,044.2
OB9	82	Cultivated Crops	Celina silt loam, 2 to 6 percent slopes, eroded	C/D	198.00	89	17,621.8
OB9	82	Cultivated Crops	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	286.19	89	25,471.3
OB9	82	Cultivated Crops	Losantville clay loam, 6 to 12 percent slopes, severely eroded	D	3.14	89	279.50
OB9	82	Cultivated Crops	Losantville silt loam, 2 to 6 percent slopes, eroded	D	13.95	89	1,241.1
OB9	90	Woody Wetlands	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	5.78	98	566.25
OB9	90	Woody Wetlands	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.48	98	46.82
OB9	95	Emergent Herbaceous Wetlands	Cyclone silty clay loam, 0 to 2 percent slopes	B/D	0.89	98	86.80
OB9	95	Emergent Herbaceous Wetlands	Crosby silt loam, New Castle Till Plain, 0 to 2 percent slopes	C/D	0.00	98	0.38
				SUM:	1,181.40		104,107.
						COMPOSITE CN:	88

APPENDIX M
OFFSITE HYDROCAD REPORT


Offsite
OB1
OB2
OB3
OB4
OB5
OB6
OB7
OB8
OB9
Subcat
Reach
Pond
Link
Routing Diagram for BellFlower
Prepared by ITS, Printed 9/3/2020
HydroCAD® 10.00-19 s/n 02245 © 2016 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1,361.490	88	(OB1, OB9)
565.780	89	(OB2)
1,035.850	87	(OB3, OB8)
8.290	85	(OB4)
9.510	84	(OB5)
15.850	86	(OB6)
29.940	83	(OB7)
3,026.710	**88**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
3,026.710	Other	OB1, OB2, OB3, OB4, OB5, OB6, OB7, OB8, OB9
3,026.710		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	3,026.710	3,026.710		OB1, OB2, OB3, OB4, OB5, OB6, OB7, OB8, OB9
0.000	**0.000**	**0.000**	**0.000**	**3,026.710**	**3,026.710**	**TOTAL AREA**	

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentOB1: Runoff Area=180.090 ac 0.00% Impervious Runoff Depth=4.66"
Flow Length=4,768' Tc=274.2 min CN=88 Runoff=140.62 cfs 70.001 af

SubcatchmentOB2: Runoff Area=565.780 ac 0.00% Impervious Runoff Depth=4.77"
Flow Length=9,111' Tc=508.6 min CN=89 Runoff=277.70 cfs 225.095 af

SubcatchmentOB3: Runoff Area=155.380 ac 0.00% Impervious Runoff Depth=4.56"
Flow Length=3,627' Tc=118.7 min CN=87 Runoff=224.99 cfs 58.986 af

SubcatchmentOB4: Runoff Area=8.290 ac 0.00% Impervious Runoff Depth=4.34"
Flow Length=814' Tc=19.9 min CN=85 Runoff=39.27 cfs 2.998 af

SubcatchmentOB5: Runoff Area=9.510 ac 0.00% Impervious Runoff Depth=4.23"
Flow Length=1,129' Tc=32.1 min CN=84 Runoff=33.18 cfs 3.355 af

SubcatchmentOB6: Runoff Area=15.850 ac 0.00% Impervious Runoff Depth=4.45"
Flow Length=972' Tc=34.6 min CN=86 Runoff=54.88 cfs 5.874 af

SubcatchmentOB7: Runoff Area=29.940 ac 0.00% Impervious Runoff Depth=4.13"
Flow Length=1,556' Tc=43.0 min CN=83 Runoff=83.64 cfs 10.301 af

SubcatchmentOB8: Runoff Area=880.470 ac 0.00% Impervious Runoff Depth=4.56"
Flow Length=14,103' Tc=449.9 min CN=87 Runoff=451.61 cfs 334.248 af

SubcatchmentOB9: Runoff Area=1,181.400 ac 0.00% Impervious Runoff Depth=4.66"
Flow Length=17,015' Tc=662.0 min CN=88 Runoff=456.18 cfs 459.210 af

Total Runoff Area = 3,026.710 ac Runoff Volume = 1,170.069 af Average Runoff Depth = 4.64"
100.00% Pervious = 3,026.710 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment OB1:

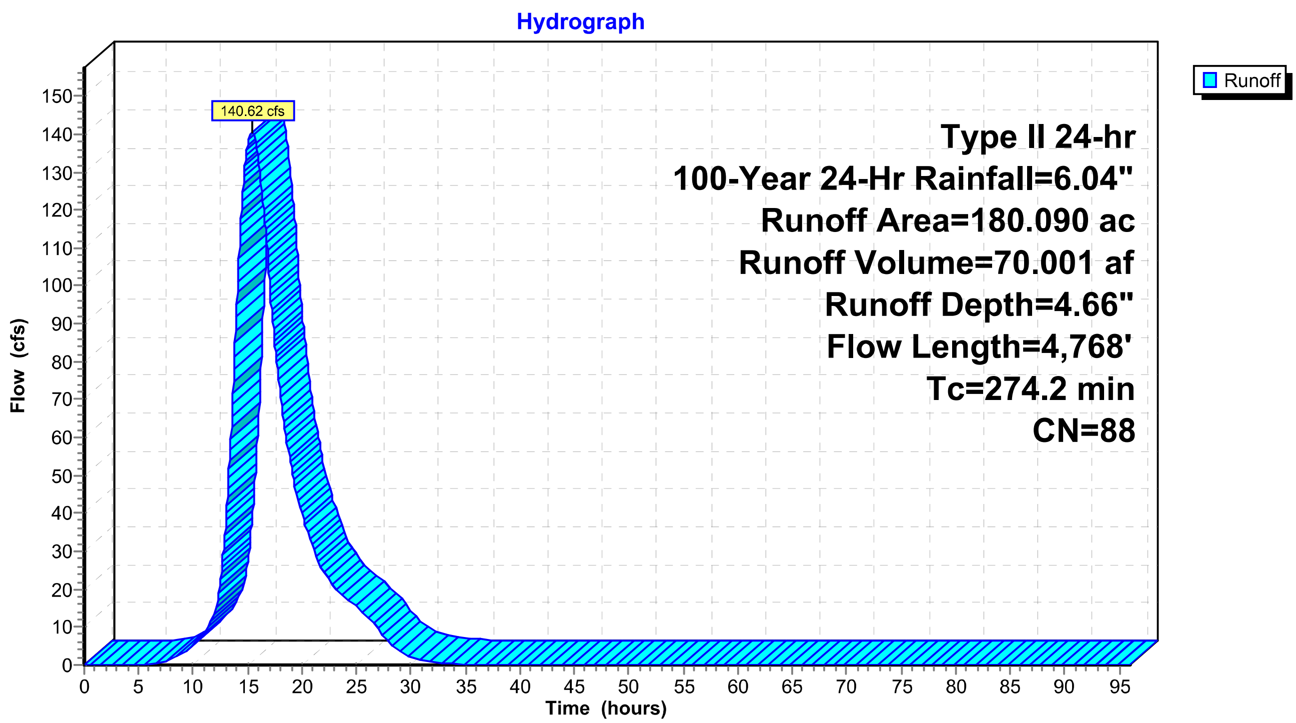
Runoff = 140.62 cfs @ 15.50 hrs, Volume= 70.001 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	180.090	88	
	180.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
176.0	1,956	0.0007	0.19		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.0	100	0.0044	0.08		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
41.5	1,327	0.0035	0.53		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
4.6	318	0.0032	1.15		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
30.1	1,067	0.0043	0.59		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
274.2	4,768	Total			

Subcatchment OB1:



Summary for Subcatchment OB2:

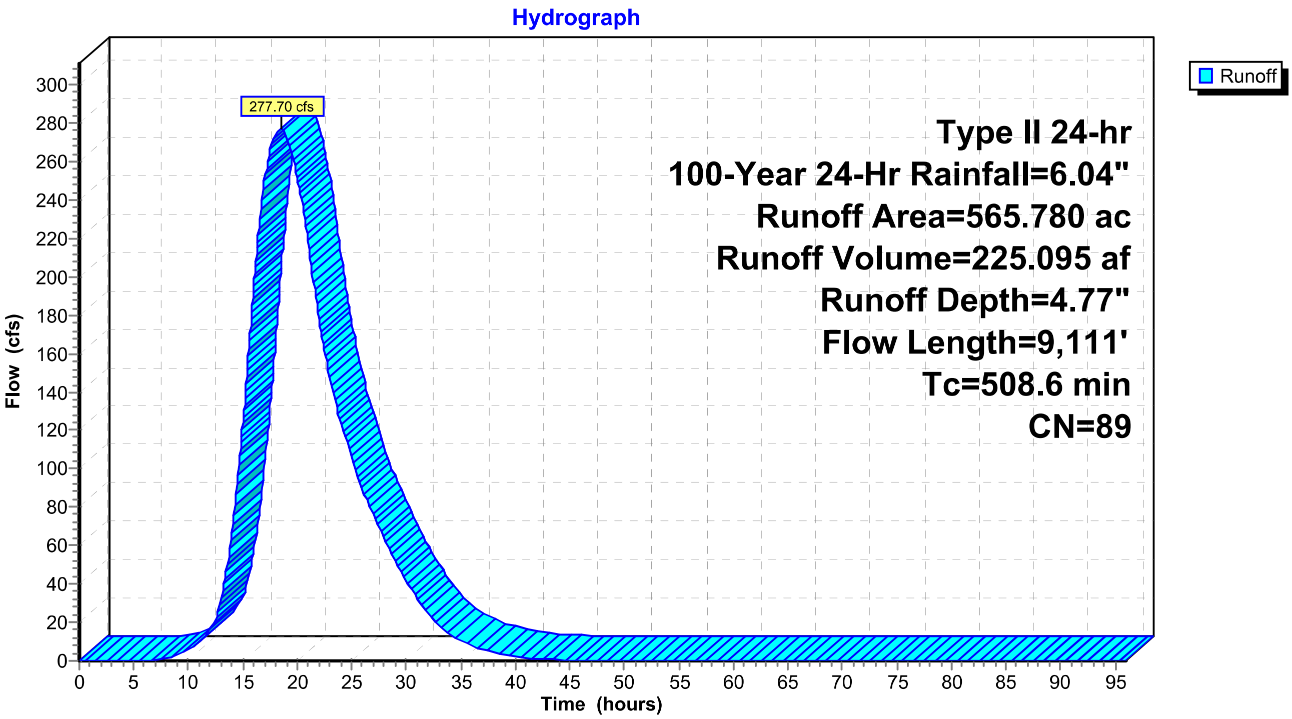
Runoff = 277.70 cfs @ 18.63 hrs, Volume= 225.095 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	565.780	89	
	565.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
102.6	3,034	0.0030	0.49		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
23.8	100	0.0036	0.07		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
17.7	842	0.0078	0.79		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
2.0	270	0.0118	2.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
167.7	1,811	0.0004	0.18		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
5.0	221	0.0013	0.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
21.2	258	0.0001	0.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
168.6	2,575	0.0008	0.25		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
508.6	9,111	Total			

Subcatchment OB2:



Summary for Subcatchment OB3:

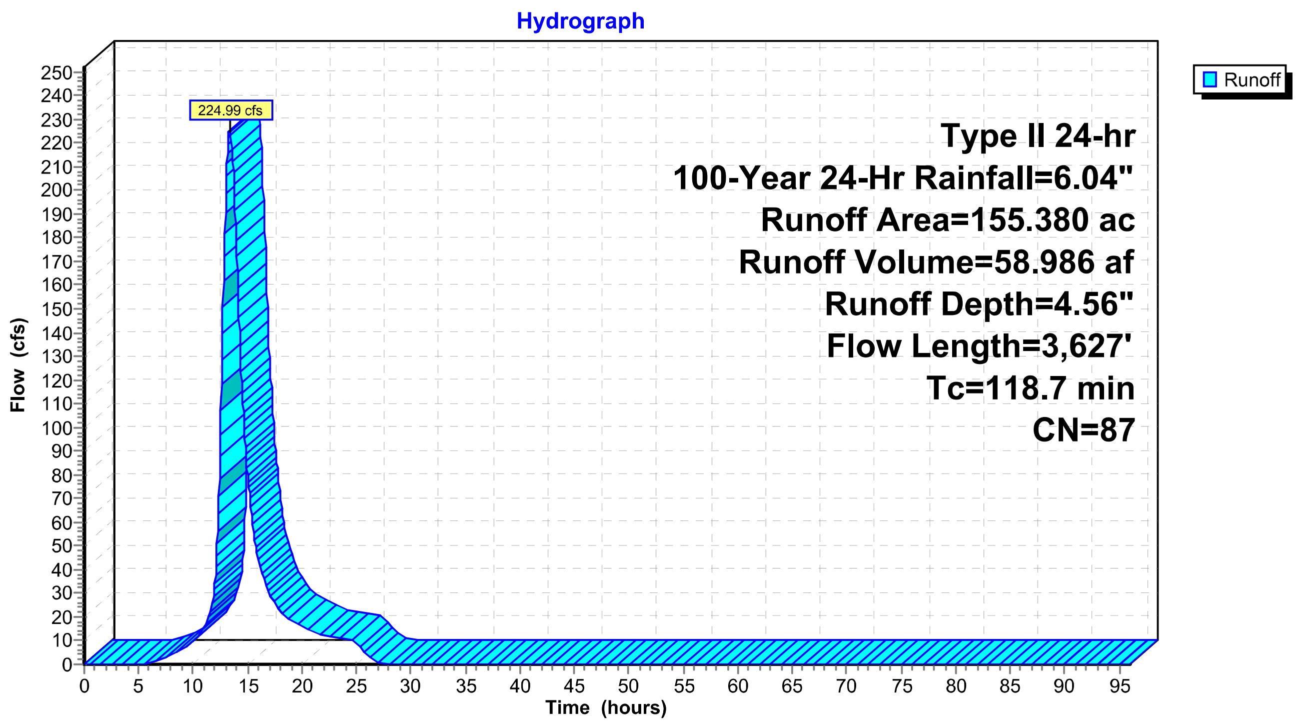
Runoff = 224.99 cfs @ 13.34 hrs, Volume= 58.986 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	155.380	87	
	155.380		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
87.3	3,527	0.0056	0.67		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
31.4	100	0.0018	0.05		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
118.7	3,627	Total			

Subcatchment OB3:



Summary for Subcatchment OB4:

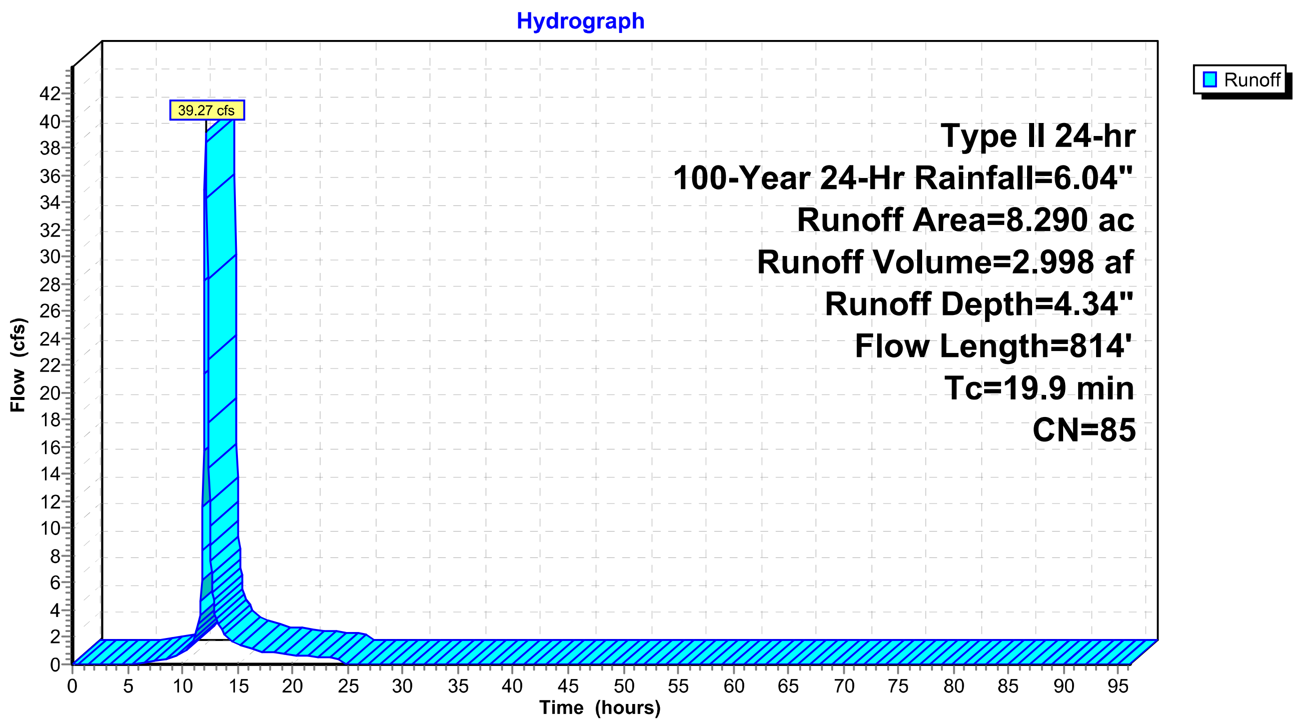
Runoff = 39.27 cfs @ 12.12 hrs, Volume= 2.998 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	8.290	85	
	8.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	714	0.0220	1.33		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.0	100	0.0248	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
19.9	814	Total			

Subcatchment OB4:



Summary for Subcatchment OB5:

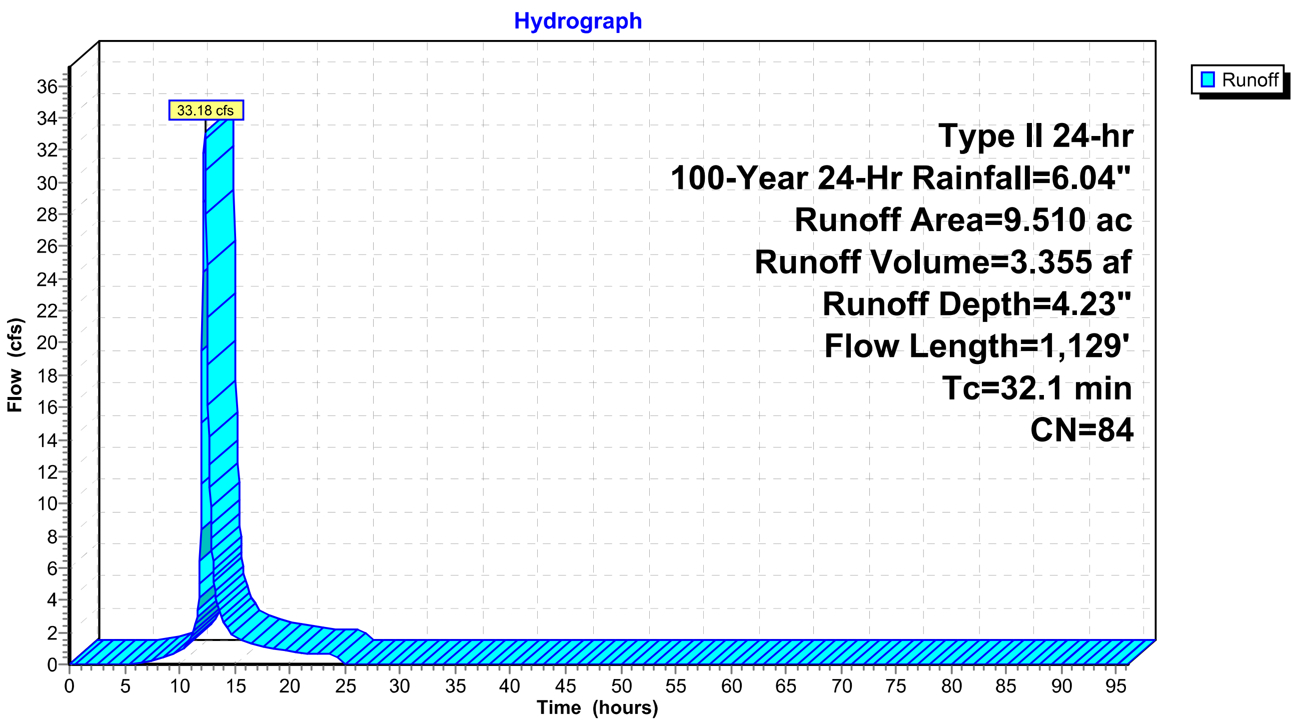
Runoff = 33.18 cfs @ 12.26 hrs, Volume= 3.355 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	9.510	84	
	9.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	1,029	0.0143	1.08		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
16.2	100	0.0095	0.10		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
32.1	1,129	Total			

Subcatchment OB5:



Summary for Subcatchment OB6:

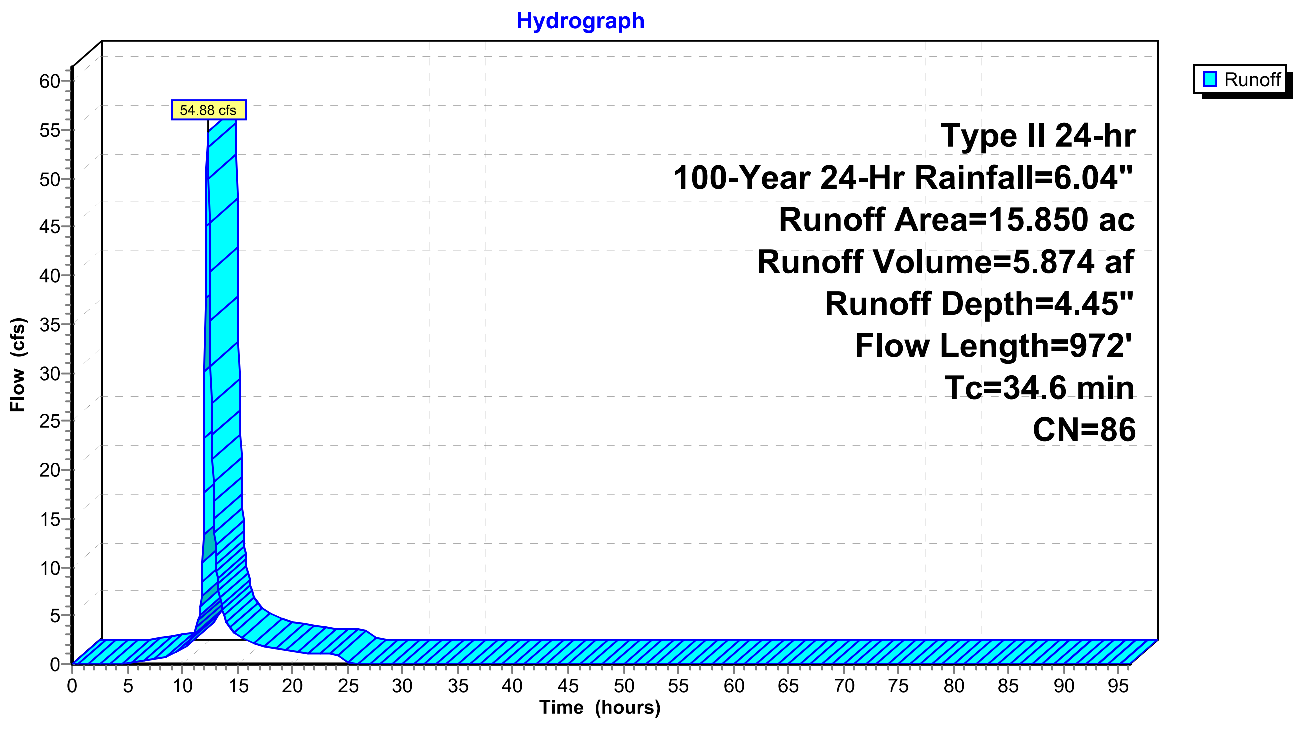
Runoff = 54.88 cfs @ 12.29 hrs, Volume= 5.874 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	15.850	86	
	15.850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	872	0.0047	0.62		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.0	100	0.0250	0.15		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
34.6	972	Total			

Subcatchment OB6:



Summary for Subcatchment OB7:

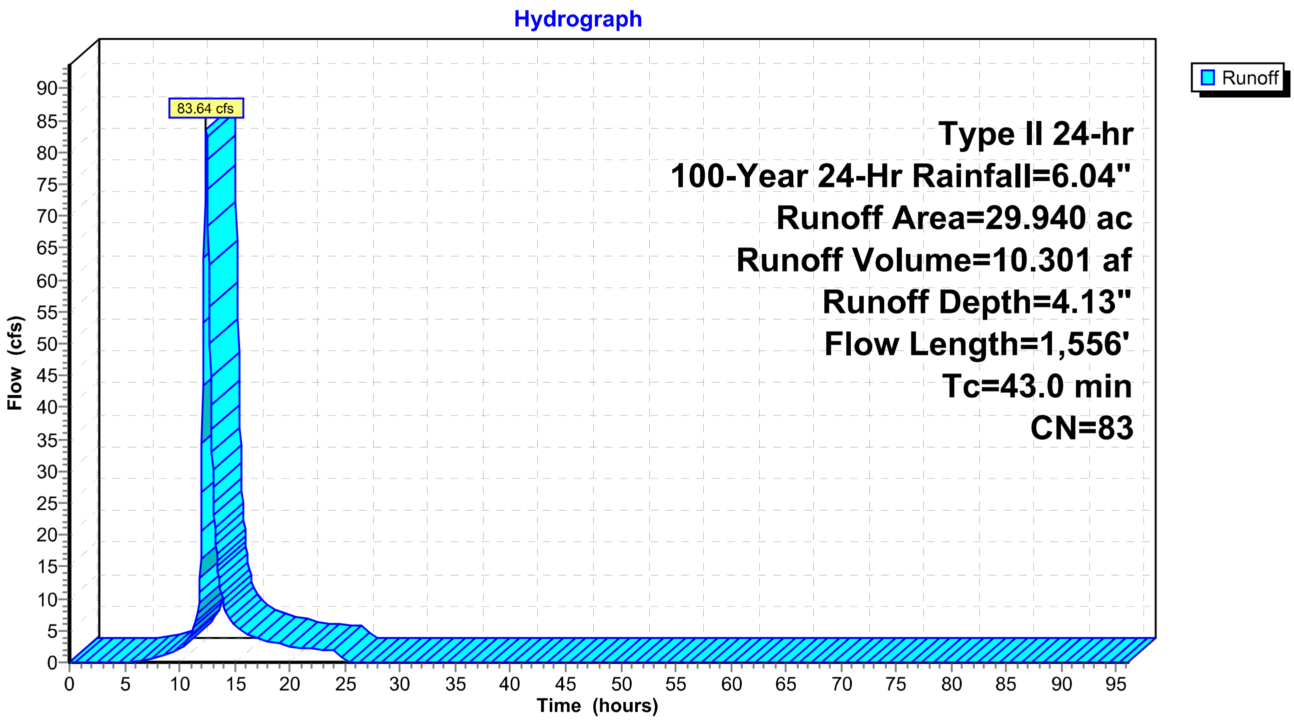
Runoff = 83.64 cfs @ 12.40 hrs, Volume= 10.301 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	29.940	83	
	29.940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.1	1,456	0.0075	0.78		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
11.9	100	0.0205	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
43.0	1,556	Total			

Subcatchment OB7:



Summary for Subcatchment OB8:

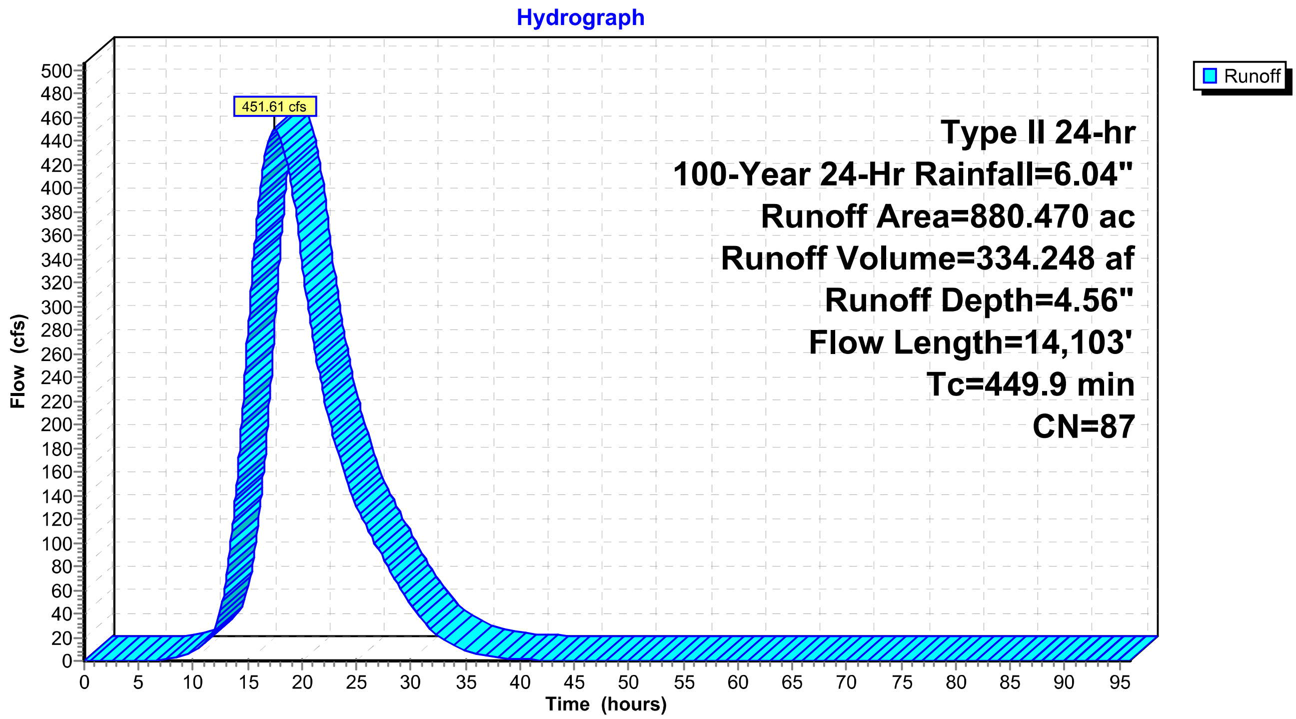
Runoff = 451.61 cfs @ 17.50 hrs, Volume= 334.248 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	880.470	87	
	880.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
176.0	1,956	0.0007	0.19		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.0	100	0.0044	0.08		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
41.5	1,327	0.0035	0.53		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
4.6	318	0.0032	1.15		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
54.2	1,965	0.0045	0.60		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
66.8	634	0.0010	0.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.1	1,932	0.0049	0.63		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
33.7	5,871	0.0011	2.91	81.39	**Trap/Vee/Rect Channel Flow,** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.022
449.9	14,103	Total			

Subcatchment OB8:



Summary for Subcatchment OB9:

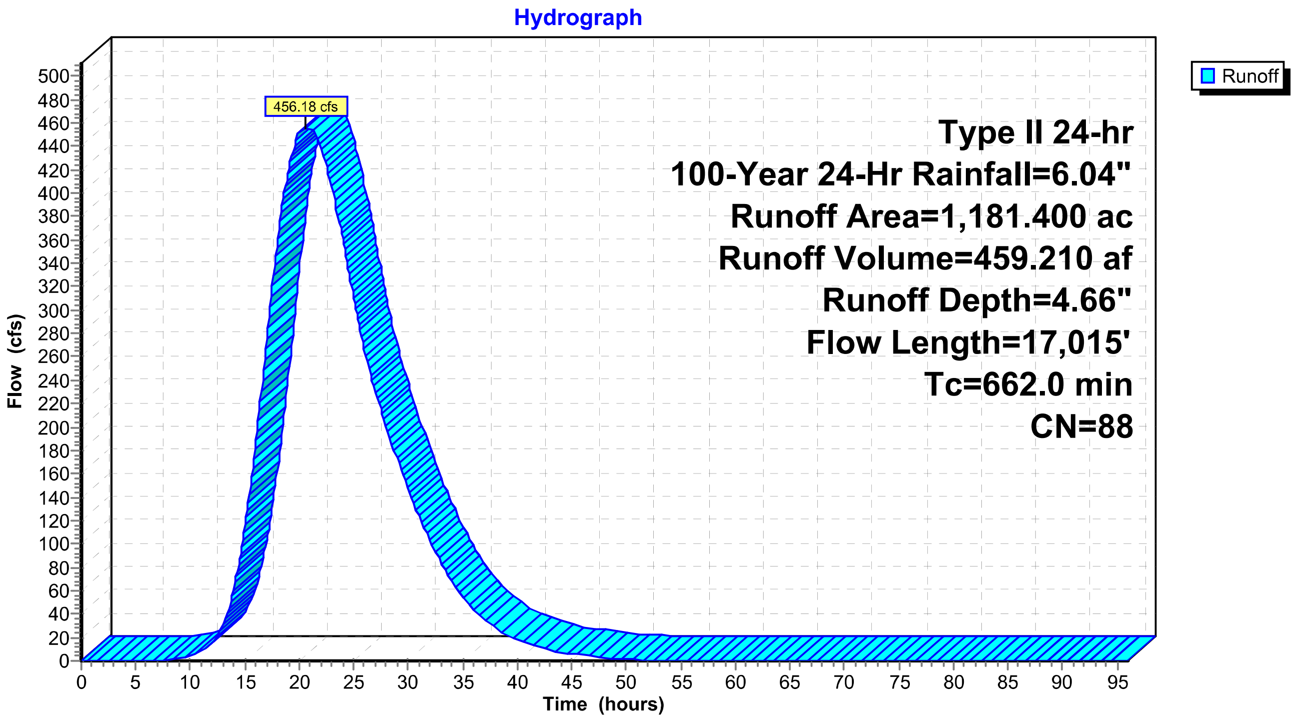
Runoff = 456.18 cfs @ 20.61 hrs, Volume= 459.210 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year 24-Hr Rainfall=6.04"

	Area (ac)	CN	Description
*	1,181.400	88	
	1,181.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
102.6	3,034	0.0030	0.49		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
23.8	100	0.0036	0.07		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.61"
17.7	842	0.0078	0.79		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
2.0	270	0.0118	2.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
167.7	1,811	0.0004	0.18		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
5.0	221	0.0013	0.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
21.2	258	0.0001	0.20		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
171.8	3,936	0.0018	0.38		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
16.4	487	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
117.6	3,112	0.0024	0.44		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
16.2	2,944	0.0012	3.04	85.01	**Trap/Vee/Rect Channel Flow,** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.022
662.0	17,015	Total			

Subcatchment OB9:



APPENDIX N

PRE-DEVELOPMENT FLOOD MAPS

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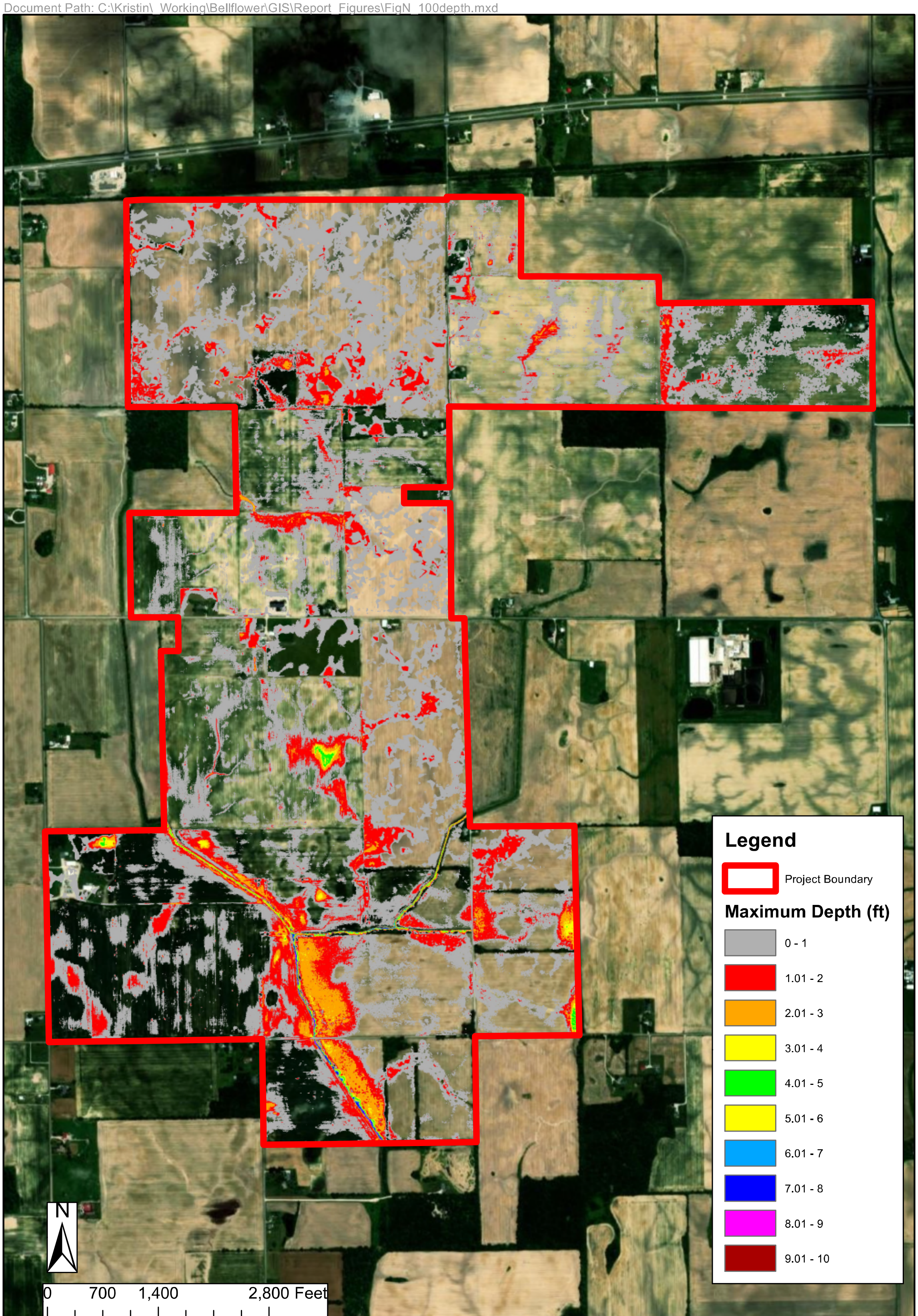

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CHECKED BY:	BB
FILE NAME:	FigB.mxd

Pre-Development Maximum 100-year, 24-hour Flood Depth Map

Bellflower Solar Project
LightsourceBP
Henry and Rush Counties, Indiana

APPENDIX

N

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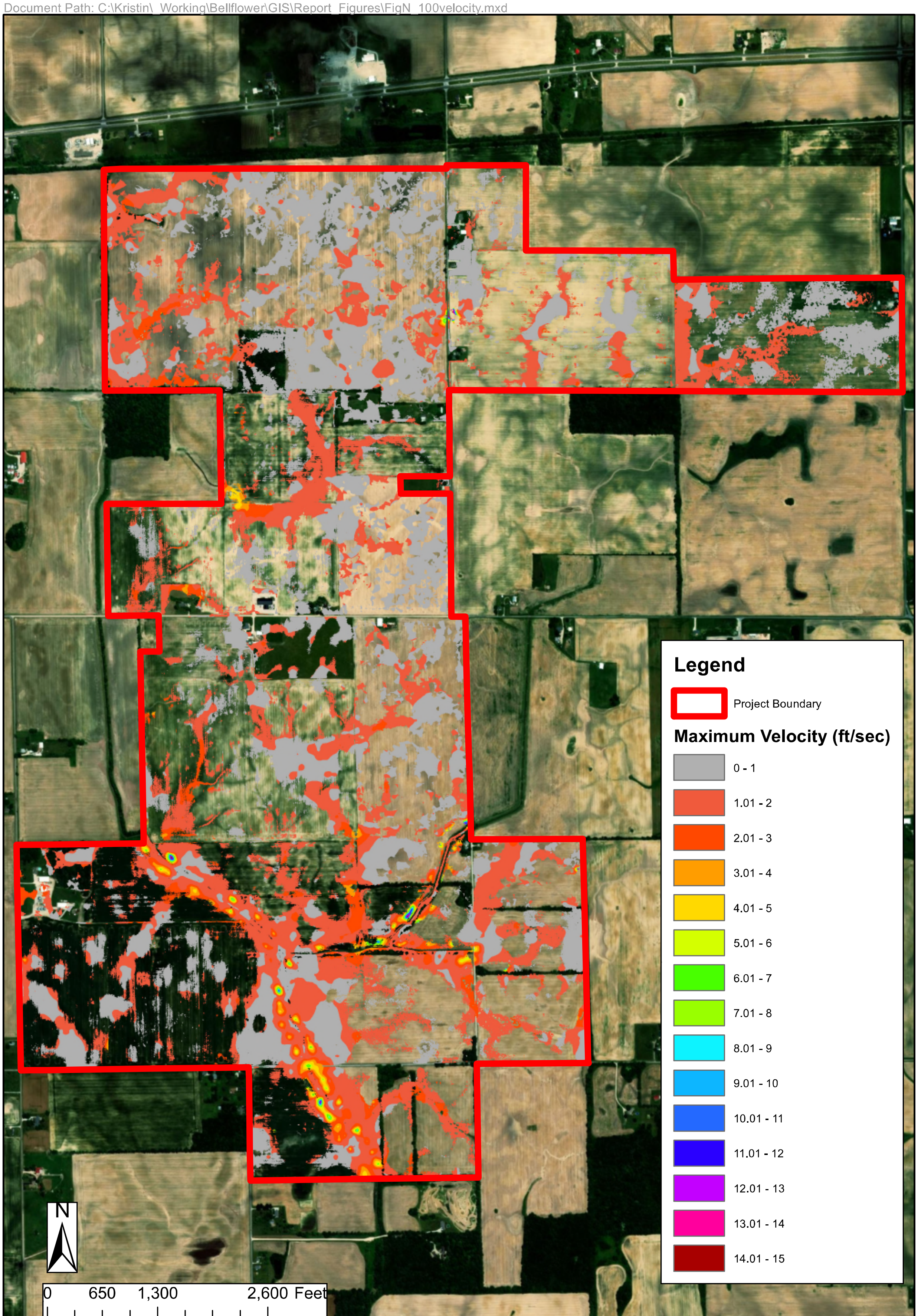

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DRAWN BY:	KC
CHECKED BY:	BB
FILE NAME:	FigB.mxd

Pre-Development Maximum 100-year, 24-hour Flood Velocity Map

Bellflower Solar Project
LightsourceBP
Henry and Rush Counties, Indiana

APPENDIX

N

October 8, 2020
Project No. 20211557.001A

Mr. Joshua Larimer
Lightsource BP
400 Montgomery St, 8th Floor
San Francisco, California 94104

Subject: **Geotechnical Investigation Report**
Bellflower Solar Project
Henry and Rush Counties, Indiana

Dear Mr. Larimer,

Kleinfelder is pleased to present this report summarizing the geotechnical investigation findings for the Bellflower Solar project. The purpose of the geotechnical investigation is to characterize the subsurface conditions and provide geotechnical recommendations for design and construction of the Bellflower Solar project. The conclusions and recommendations presented in this report are subject to the limitations presented herein. In addition, the brief by the Geotechnical Business Association (GBA, Appendix H) provides additional information regarding data interpretation and industry-standard limitations of a geotechnical investigation.

We appreciate the opportunity to provide geotechnical engineering services on this project. Should you have any questions, please contact Jennifer Carey at 303.237.6601.

Respectfully submitted,

KLEINFELDER, INC.

Derek E. Pagel, PE (PA)
Geotechnical Engineer

Jennifer Carey, PE
Project Professional

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GEOTECHNICAL INVESTIGATION REPORT
BELLFLOWER SOLAR PROJECT
HENRY AND RUSH COUNTIES, INDIANA
KLEINFELDER PROJECT NO. 20211557.001A

October 8, 2020

Report Prepared for:

Mr. Joshua Larimer
Lightsource BP
400 Montgomery St, 8th Floor
San Francisco, California 94104

GEOTECHNICAL INVESTIGATION REPORT
BELLFLOWER SOLAR PROJECT
HENRY AND RUSH COUNTIES, INDIANA

KLEINFELDER PROJECT NO. 20211557.001A

Prepared by:

Derek E. Pagel, PE*
Geotechnical Engineer
*Not Licensed in Indiana

Reviewed by:

JENNIFER CAREY
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No. 11400496
STATE OF
INDIANA
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10-08-2020

Jennifer Carey, PE
Project Professional

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303.237.6601

October 8, 2020

Kleinfelder Project No. 20211557.001A

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BELLFLOWER SOLAR PROJECT
HENRY AND RUSH COUNTIES, INDIANA

1 INTRODUCTION

This report presents the results of Kleinfelder's geotechnical investigation of the proposed Bellflower photovoltaic (PV) solar electric generation facility planned in Henry and Rush Counties, Indiana. The location of the project is shown on the Exploration Location Plan and Vicinity Map, Figure 1. Kleinfelder's services were performed in general accordance with our August 5, 2020, proposal.

The scope of Kleinfelder's geotechnical investigation consists of a subsurface exploration, laboratory testing, engineering analysis, pile load testing, and preparation of this report. The purpose of Kleinfelder's geotechnical engineering investigation is to provide design and construction recommendations for the PV array foundations, equipment pads, access roads, site preparation, and general earthwork.

In summary, the site appears to be suitable for the intended development provided the recommendations outlined in this report are properly incorporated in the design and construction phases of the project.

The conclusions and recommendations presented in this report are based on subsurface information encountered in our explorations, our site observations, and our experience with similar developments. The recommendations contained in this report are subject to the provisions and requirements outlined in the Limitations section of this report.

1.1 PROJECT DESCRIPTION

We understand the project will include the installation of ground-mounted solar PV arrays and construction of support infrastructure including gravel or soil access roads, perimeter fence, and ancillary electrical equipment.

Kleinfelder anticipates the PV panels to be attached to a single-axis tracker (SAT) system supported on driven steel piles, typically fabricated from wide-flange beams. Maximum axial and lateral loads are expected to be on the order of two to three kips each. Other components will include overhead and underground electrical conductors, inverters, transformers, and other electrical components, to be supported on piles, slabs-on-grade, or combinations of slabs and piles. Additional site development will likely include access roadways for construction and maintenance purposes.

The finished site grades had not been provided at the time this report was prepared. Kleinfelder anticipates grading within the solar array field will be limited. Earthwork cuts and fills of no more than approximately two feet are expected for equipment pads. Utility trenches are not anticipated to exceed four feet in depth.

2 FIELD EXPLORATION & LABORATORY TESTING

2.1 FIELD EXPLORATION

Subsurface conditions at the site were explored with 12 soil test borings, 4 test pits, and 4 in-situ soil electrical resistivity tests between August 24 and September 1, 2020. The approximate test locations are presented on the Exploration Location Plan and Vicinity Map, Figure 1.

Prior to Kleinfelder's field exploration, the exploration locations were cleared for underground utilities through the Indiana 811 system. Kleinfelder staked the boring locations in the field using a handheld GPS unit. Kleinfelder geotechnical staff observed drilling and test pit operations, collected soil samples, and reviewed the subsurface conditions logged in each boring and test pit. Kleinfelder visually classified the observed soils in general accordance with ASTM D2488 and the Unified Soil Classification System. Keys to the soil descriptions and symbols used to describe the subsurface conditions encountered are presented in Appendix A.

2.1.1 Exploratory Borings

Twelve borings were advanced with a Diedrich D25 track mounted drill rig using hollow stem auger drilling techniques to depths ranging from 20 to 50 feet below the ground surface (bgs). Soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-tube sampler. The sampler was first seated six inches, then driven an additional 18-inches with blows of a 140-pound auto-hammer falling 30 inches. Standard Penetration Tests (SPTs) were performed at two-foot intervals for the first 10 feet and at five-foot intervals thereafter, in general accordance with ASTM D1586. Standard Penetration Test data (SPT N-values) were used to estimate the in-situ soil strength and density. Soil samples were obtained at each test interval. Groundwater observations were recorded in each boring during drilling and the borings were subsequently backfilled with site soils after completion of drilling. Logs of the borings are presented in Appendix A.

2.1.2 Test Pits

Four test pits were excavated to depths of approximately nine feet bgs. Kleinfelder field personnel observed, manually classified, and logged the soil encountered in each test pit. Kleinfelder also obtained bulk samples from each test pit for laboratory testing. Groundwater observations were recorded in each test pit during excavation and the test pits were subsequently backfilled with the site soils. Logs of test pits are presented in Appendix A.

2.1.3 Field Resistivity Testing

Soil resistivity was measured by Kleinfelder personnel using the Wenner four-electrode method with an AEMC 6471 Soil Resistivity Meter in accordance with ASTM G57 and IEEE Standard 81 at four locations as shown in Figure 1, Exploration Location Plan and Vicinity Map. Resistance measurements were conducted within the array areas using electrode spacings of 2, 4, 6, 10, 20, 30, 50, 100, and 200 feet. The results of the field resistivity testing are presented in Appendix B.

2.2 PILE LOAD TESTING

Kleinfelder completed load testing of 30 piles installed by J&B Solar. The piles were installed in groups of 3 at 10 separate locations at the approximate locations shown in Figure 4. Each pile testing location consisted of a W6x8.5 wide flange beam that was driven to a depth of 6 feet, a W6x8.5 wide flange beam that was driven to a depth of 10, and a W6x15 wide flange beam that was driven to a depth of 8 feet. A summary of the pile installations is presented in Table 4-4 in Section 4.5.

The piles were tested under lateral and axial tension (pullout) loading. Each pile was first tested laterally by loading the pile in incremental loads up to approximately 3,000 and 4,000 pounds, W6x8.5 and W6x15 respectively, at 48 inches above grade and measuring the deflections at 4 and 48 inches above grade. After completion of lateral testing, piles were subject to axial tension testing to failure or up to approximately 12,500 pounds. Results of testing are presented in Appendix F.

2.3 LABORATORY TESTING

Laboratory testing was performed on selected samples to evaluate physical and engineering properties of the soils. The laboratory testing included the following tests performed in general accordance with the referenced standards:

- Moisture Content (ASTM D2216);
- Grain Size Distribution (ASTM D422);
- Atterberg Limits (ASTM D4318);

- Standard Proctor (ASTM D698);
- Thermal Resistivity (ASTM D5334); and
- Corrosion Suite:
    - pH of Soils (AASTHO T289),
    - Electrical Resistivity (AASHTO T288),
    - Sulfate Content (AASHTO T290),
    - Chloride Content (AASHTO T291),
    - Sulfide Content (SM 4500-S2-D), and
    - Oxidation-Reduction Potential (SM 2580 B Mod.).

Laboratory testing results are shown on the boring logs presented in Appendix A. A summary table and laboratory test results are also included in Appendix C (geotechnical testing results) and Appendix E (corrosivity analysis).

3 SITE DESCRIPTION AND GEOLOGICAL SETTING

3.1 SITE DESCRIPTION

The project site consists of approximately 878 acres of predominantly undeveloped farmland. The topography of the site is relatively flat and level with low hills and shallow valleys. The Little Blue River traverses the southwestern portion of the site. Irrigation ditches for crops are present throughout the site. Topographic relief is approximately 30 feet across the site. Ground cover at the time of our investigation consisted of predominantly of corn and soy fields. Reviews of aerial and satellite photography from 1992 through the present indicates the project site has remained mostly undeveloped, with the exception of several residential structures, rural roads, and culverts.

3.2 GEOLOGIC SETTING AND SURFACE SOILS

Based on the “Map of Surficial Deposits and Materials in the Eastern and Central United States” (Fullerton et al, 2003), the overburden deposits at the site are mapped as ground moraine and end moraine deposits (loamy till) of Holocene and late Wisconsin age. Kames, end moraines, mounds and hummocky regions may be located throughout the glaciated areas of Indiana. Boulders maybe present below the ground surface in some areas. Figure 2 shows the surficial geology of the site.

U.S. Department of Agriculture, National Resource Conservation Service (NRCS) soil surveys indicate that most of the project site is loam, silt loam, and silty clay loam. Loess generally persists to a depth of 18 inches and then loamy till lies directly underneath to the maximum depth recorded by the NRCS (80 inches).

“Bedrock Geologic Map of Indiana” (Gray et al, 1987)[1] reports the site is underlain by the Louisville Limestone through Brassfield Limestone bedrock geologic unit as well as the Whitewater Formation unit. The Louisville Limestone through Brassfield Limestone unit consists of Silurian

[1] Gray, H. H., Ault, C. H., and Keller, S. J., 1987, Bedrock geologic map of Indiana: Indiana Geological Survey Miscellaneous Map 48, scale 1:500,000.

age Sexton Creek limestone at base. The Whitewater Formation consists of skeletal limestone and calcareous shale, with dolomitic mudstone at the base.

Based upon our review of the readily available geologic information of the project site, karst features such as sinkholes, pinnacled bedrock, and other dissolution features are not anticipated to influence the site development. While the underlying bedrock consists of limestone and carbonate rich material, the surface conditions are dominated by glacial deposits greater than 50 feet thick. The presence of thick overburden material greatly reduces the risk that karst features could translate to the ground surface. PV development adds little, if any, increase load to the ground. The overall risk associated with karst features at the site is low.

3.3 SUBSURFACE CONDITIONS

The following description provides a general summary of the subsurface conditions encountered during the field exploration and further identified by the laboratory testing program. A more detailed description can be found on the Boring and Test Pit Logs presented in Appendix A.

The surface soil conditions encountered at the site generally consist of medium stiff to very stiff lean clay (CL) with various amounts of sand and gravel, overlying very stiff to hard silt (ML) and medium dense to very dense silty sand (SM) and poorly-graded sand with silt (SP-SM). These soils extended to the termination depth of each boring, ranging from approximately 20 to 50 feet bgs. Bedrock was not encountered in any of the borings.

The subsurface conditions in the test pits were generally similar to those observed in the borings. Excavation refusal was not encountered in our test pits, which extended to a depth of approximately 9 feet bgs. Groundwater was not encountered in the test pits.

Engineering properties of the soils were evaluated using field and laboratory testing and are included in Appendix C. Atterberg limits tests performed on selected samples of the soils indicated liquid limit (LL) values ranging from 35 to 38 and plasticity index (PI) values ranging from 5 to 18.

3.3.1 Groundwater

Groundwater was observed in Borings BF-B-01 through BF-B-04, BF-B-07, and BF-B-12 at depths ranging from approximately 11 to 28 feet bgs. Some fluctuation in groundwater levels can occur with climatic and seasonal variations. Fluctuations of the groundwater level, localized zones of perched water, and increased soil moisture content should be anticipated during and following rain events. Therefore, subsurface water conditions at other times may be different from those described in this report.

3.4 CORROSIVITY TEST RESULTS

SoilCor completed laboratory testing of six samples to provide data regarding corrosivity of onsite soils. These analytical laboratory tests were performed on discrete samples and do not provide a complete representation of all soil types at the site. The soil corrosion laboratory test results are general and should be considered only a random survey. The results of the chemical testing are summarized in Table 3-1 and provided in Appendix E.

Table 3-1. Summary of Laboratory Soil Corrosivity Testing

Boring No.	Depth (ft)	pH	Sulfide (mg/kg)	Chloride (mg/kg)	Sulfate (mg/kg)	Minimum Resistivity (ohm-cm)	Redox Potential Eh (mV)
BF-B-03	6-10	7.3	ND	10	ND	4,300	246
BF-B-04	6-10	7.6	ND	ND	ND	5,200	278
BF-B-05	6-10	7.6	0.56	ND	ND	5,600	275
BF-B-08	2-6	7.5	ND	ND	ND	3,900	266
BF-B-10	6-10	7.2	0.38	ND	10	4,800	251
BF-B-12	4-8	7.1	0.25	ND	ND	6,100	285

*ND- No Detection

These laboratory results were compared to the “Building Code Requirements for Reinforced Concrete”, ACI 318, to evaluate the potential of corrosion and attack to concrete. Based upon the tested sulfate concentrations, the soils have a Class S0 exposure rating for sulfate attack. ACI has no special requirements for cement type or concrete formulation for concrete in contact with soil based on the measured sulfate concentrations.

The results of the laboratory resistivity testing, as shown in Appendix E, generally indicate that there is the potential for corrosion to steel articles in contact with soils. Galvanization is typically used for protection of PV racking support piles, but additional measures such as coatings or active corrosion protection systems may be necessary depending on the design life of the system. A

Corrosion Evaluation Report, which includes recommendations for corrosion design for steel piles for the project site, is provided in Appendix G.

3.5 THERMAL RESISTIVITY

Four thermal resistivity tests were performed in the laboratory on samples obtained from the test pits. The thermal resistivity tests were performed in general accordance with IEEE Standard 442-2017-Guide for Soil Thermal Resistivity Measurements and ASTM standards. The results of the thermal resistivity testing are shown in Table 3-2 below. Graphical results of the individual thermal dry-out curves and more detailed information regarding the sample preparation are presented in Appendix D.

Table 3-2. Thermal Resistivity of Native Soil Samples

Test Location	Tested Initial Moisture Content (% dry weight)	Tested Dry Density (lb/ft^3)	Thermal Resistivity, wet (°C-cm/W)	Thermal Resistivity, dry (°C-cm/W)
TP-1	12	111	64	153
TP-2	16	98	83	215
TP-3	11	112	60	147
TP-4	9	117	56	127

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL CONCLUSIONS

The conclusions and recommendations presented below are based on the subsurface conditions observed in the explorations, laboratory test results, pile load testing, engineering analyses, and our experience with similar utility-scale solar projects. Based on the results of our field exploration and laboratory testing, the site appears to be geotechnically suitable for PV solar development.

4.2 EARTHWORK

4.2.1 Subgrade Preparation

Initial site work should consist of grubbing and stripping of vegetation, demolition, and removal of existing structures and other deleterious materials. Deleterious material should be removed for offsite disposal in accordance with local laws and regulations.

Subgrades below roadways, equipment pads, and areas planned for structural fill placement should be evaluated by an experienced geotechnical engineer or their representative prior to construction. Areas should be proof rolled with a loaded dump truck (minimum 18-kip axel load). Areas that express excessive rutting or pumping should be undercut and backfilled with structural fill per the following paragraphs. The excavations should extend horizontally beyond the construction limits, extending outward one foot for every one foot of excavation.

We recommend native soils below structural fill, equipment pads, spread foundations, and access roadways be scarified, moisture conditioned to zero to three percent above optimum moisture content, and recompacted at least eight inches below the engineered fill, access road subgrade, or base of concrete.

In the area where PV array piles will be installed, stripping of the organic materials is not required, unless there will be areas of fill in excess of 12 inches in depth. Preparation of the tilled or disturbed soils should be completed as required to facilitate array installation equipment access and will likely include minor levelling and compaction.

4.2.2 Excavation and Trenching

We anticipate the site soils can be excavated using conventional heavy-duty construction equipment. Our borings and test pits did not encounter bedrock, boulders, or other layers anticipated to present difficult excavation conditions.

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. OSHA soil type and allowable sloping must be made in the field by the contractor's OSHA-qualified "competent person" whenever personnel exposure is anticipated. Construction site safety is the responsibility of the contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations.

4.2.3 Structural Fill

Structural fill is defined as any fill that will support structural elements. Structural fill will be required for backfill of utilities and for site-grading fill. All structural fill must be free of sod, rubbish, topsoil, frozen soil, and other deleterious materials. Structural fill materials should consist of a non-expansive, mainly granular material as specified below. On-site soils may be suitable for reuse as structural fill if they meet the criteria present in Table 4-1. Import materials can also be used, if desired.

Table 4-1. Structural Fill Criteria

Gradation Requirements	
Standard Sieve Size	Percent Passing
3 inch	100
3/4 inch	80 - 100
No. 200	10 - 35
Plasticity Requirements (Atterberg Limits)	
Liquid Limit	30 or less
Plasticity Index	12 or less

A sample of any imported fill material should be submitted to the geotechnical engineer for approval and testing at least one week prior to stockpiling at the site. Structural fill should be placed according to the recommendations in Section 4.2.4.

4.2.4 Fill Placement and Compaction

Structural fill should be placed in loose lifts and in thicknesses appropriate for the compaction equipment being used. However, in no case should loose-lift thickness exceed eight inches. Structural fill should be compacted to the specifications presented in Table 4-2.

Table 4-2. Compaction Specifications

Fill Location	Fill Material Type	Minimum Percent Compaction (ASTM D698)	Moisture Content
Foundation and Roadway Subgrade Preparation or Site Grading	Clay Soil	95	0 to +3% of optimum
	Sandy Soil	95	-2 to +2% of optimum

4.2.5 Construction in Wet or Cold Weather

During construction, grade the site such that surface water can drain readily away from the excavations. Promptly pump out or otherwise remove any water that may accumulate in excavations or on subgrade surfaces and allow these areas to dry before resuming construction. The use of berms, ditches, and similar means may be used to prevent stormwater from entering the work area and to convey any water off-site efficiently.

If earthwork is performed during the winter months when freezing may occur, no grading fill, structural fill, or other fill should be placed on frosted or frozen ground, nor should frozen material be placed as fill. Frozen ground should be allowed to thaw or be completely removed prior to placement of fill. A good practice is to cover the compacted fill with a “blanket” of loose fill to help prevent the compacted fill from freezing.

4.2.6 Construction Testing and Observation

Field testing and construction observation should take place under the direction of a qualified geotechnical engineer. Furthermore, the opinions and recommendations expressed in a geotechnical report are based on interpretation of limited information obtained from the field exploration. Therefore, it is common to find that actual site conditions differ from those indicated in the report. The geotechnical engineer should remain involved throughout the project to evaluate such differing conditions as they appear, and to modify or add to the geotechnical recommendations, as necessary.

4.2.7 Surface Drainage and Final Site Grading

Positive drainage away from structures is essential to the performance of foundations and roads and should be provided during the life of the facility. Consideration should be given to improving the slope and surface drainage of areas that have ponding of surface water and/or poor surface drainage near slab foundations or roads.

4.3 SEISMIC SITE CLASS

Based on the soil conditions encountered in the borings and our knowledge of geologic conditions in the area of the site, a Site Class of ‘D’ is considered appropriate. The seismic design parameters as determined in ASCE 7-10 are summarized in Table 4-3.

Table 4-3. Seismic Design Parameters

Design Parameter	Recommended Value
Site Class	D
PGA	0.064
PGA_M	0.102
S_s	0.139
S_1	0.078
F_a	1.6
F_v	2.4
S_{MS}	0.223
S_{M1}	0.187
S_{DS}	0.148
S_{D1}	0.124

The typical soil profile encountered in our borings was predominately stiff to very stiff clay and silt and dense sand. It is our opinion that this soil profile presents negligible risk of liquefaction due to the stiff/dense soils.

4.4 FROST HEAVE CONSIDERATIONS

Frost depth at the project site is approximately thirty inches. Due to the groundwater depth at the project site, we anticipate the risk of frost action is low.

4.5 PV ARRAY FOUNDATIONS

Typical foundations used for PV arrays, such as driven steel piles, drilled piers, helical piers, ballasts, or footings will likely be feasible for use for this project. We have assumed driven steel piles are preferred. A summary of the pile installations and axial pullout load is presented in Table 4-4. Driving refusal was not encountered at any of the ten (10) test locations.

Table 4-4. Pullout Test Summary

Pile ID	Approximate Pullout Load (lb)	Embedment Depth (ft)	Drive Time (sec)
PLT-1A	12500	6	43
PLT-1B	12640	10	165
PLT-1C	4310	8	192
PLT-2A	3790	6	40
PLT-2B	12640	10	111
PLT-2C	12470	8	140
PLT-3A	12510	6	44
PLT-3B	12490	10	114
PLT-3C	not tested	8	152
PLT-4A	6250	6	53
PLT-4B	12500	10	80
PLT-4C	12480	8	130
PLT-5A	7480	6	48
PLT-5B	12590	10	116
PLT-5C	12480	8	117
PLT-6A	2440	6	28
PLT-6B	9990	10	88
PLT-6C	7500	8	112
PLT-7A	5070	6	102
PLT-7B	11900	10	412
PLT-7C	10250	8	274
PLT-8A	4410	6	36
PLT-8B	7470	10	88
PLT-8C	6260	8	97
PLT-9A	3790	6	31
PLT-9B	12640	10	70
PLT-9C	12470	8	89
PLT-10A	12640	6	194
PLT-10B	12600	10	473
PLT-10C	12600	8	403

The following design values for evaluation of axial and lateral pile capacity are based on the findings of our field investigation, laboratory testing, pile load testing, and our experience in the area. We recommend all PV support piles have a minimum driven depth of at least seven feet. Greater depths may be required to achieve structural requirements.

4.5.1 Axial Capacity

Axial capacity of driven piles may be estimated based on the perimeter of the pile and embedment depth. The perimeter of a wide-flange beam should be taken as twice the sum of the flange width and web depth. We recommend the upper one foot of soil be neglected from skin friction component of axial capacity. Based on the results of the Atterberg limits testing and the moisture contents of the samples, expansive soil risk to properly designed and installed pile foundations is judged to be negligible.

Kleinfelder evaluated the skin friction of pile based on the results of the axial pullout testing. The ultimate skin friction of driven pile foundations can be taken as 400 psf. Thus, the nominal axial load capacity of the driven piles for PV racking can be calculated using the following formula:

$$Q_{ult} = 400psf * P * (L\text{-}1ft)$$

Where: Q_{ult} = ultimate (nominal) axial capacity (pounds)
P = perimeter equal to twice the section depth plus twice the flange width (ft)
L = embedment depth (ft), neglecting the upper 1ft

For design of piles, we recommend a factor of safety of at least 1.5 for evaluation of allowable skin friction, or a resistance factor of 0.7 for design using load and resistance factored design (LRFD).

For piles in compression, end bearing can be considered additive to the skin friction. Ultimate end bearing pressure can be taken as 10,000 psf, calculated based on the box end area of the pile. For evaluation of allowable end pressure, we recommend a factor of safety of 2.5. For LRFD, we recommend a maximum a resistance factor of 0.5. The above values can be used to estimate the capacity of piles for both refusal and non-refusal installations.

4.5.2 Lateral Capacity

Lateral load response of pile foundations can be calculated with the computer program L-Pile, created by Ensoft, Inc. The stiffness of the pile and the stress-strain properties of the surrounding soils determine the lateral resistance of the foundation. Recommended LPile input parameters for the sand and clay soils encountered are included in Table 4-5.

Table 4-5. LPile Input Parameters

Parameter	Design Value
Soil Type	Stiff Clay w/o Free Water
Effective Unit Weight (pcf)	120
Cohesion (psf)	2,000

Kleinfelder developed these parameters from the results of the field and laboratory testing and pile load testing. These parameters can be used for the full depth of pile embedment. If piles will be wider than seven inches, Kleinfelder should be given the opportunity to reconsider these parameters.

4.5.3 Refusal Considerations

We recommend all PV support piles have a minimum driven depth of at least seven feet. Greater depths may be required to achieve structural requirements. Refusal is defined as no advancement after driving with full power (minimum 830 Joules) for at least 30 seconds. Piles that refuse and require additional embedment depth should be withdrawn and the pile location predrilled. Predrilled pile holes should be backfilled with compacted granular material. Compaction should be completed by tamping with a heavy tamping bar with at least three lifts.

4.6 EQUIPMENT FOUNDATIONS

We understand that some proposed structures may be supported on shallow/mat foundations. We evaluated several foundation sizes to provide allowable bearing pressures for various sizes based on the limiting factors of soil bearing capacity and estimates for 1-inch of settlement (whichever is lower). Our recommendations are based on a composite soil profile from the borings

Table 4-6. Summary of Shallow Foundation Bearing Pressures

Width (ft)	Length (ft)	Allowable Bearing Pressure (psf)
2	2	2,000
6	6	2,000
10	10	2,000

We recommend mat foundations be designed in accordance with the following criteria:

- The recommended allowable bearing pressures is 2,000 psf and includes a factor of safety of 3 with regards to bearing capacity. Any unsuitable subgrade conditions encountered in the area of mat foundations should be improved as discussed in Section 4.2.1.
- A modulus of subgrade reaction (k1) of 350 pounds per square inch per inch (pci) of deflection for a 1 ft by 1 ft plate may be used for the design of the mat foundations bearing on approved materials. This modulus value may be adjusted for the design mat width by using the equation below with B equal to the width of the mat in feet.

Modulus of subgrade reaction adjusted for size of mat in pci = = —

- To provide frost protection, mat foundations should have a minimum embedment depth of 36 inches based on the frost depth in the area of the site or as required by more stringent codes. Minimum embedment may be achieved by turned down or thickened edges at least 36-inches below surrounding grades to provide perimeter confinement to reduce water infiltration. The soils included inside the turned down edges within the entire footprint of the mat should consist of gravel (AASHTO No. 57 or equivalent). Drainage provisions should be provided to ensure surface water does not become trapped beneath the mat.
- Mat foundations should be designed to distribute the loads uniformly over the mat area.
- Minimum foundation size should be 2-feet by 2-feet.
- Post-construction total settlements of the mat foundations are estimated to be up to about 1 inch (at the sizes and allowable bearing pressures provided in Table 4-6), with post-construction differential settlements of up to about ½ inch.
- Underground utilities running parallel to the mat and lying 3 feet or shallower, generally should be located no closer than 2 feet outside of the perimeter edges of the mat slab. Deeper utilities should be located above a 1:1 (horizontal to vertical) slope projected downward from the bottom edges of the mat.
- For resistance to lateral loading, we recommend an ultimate coefficient of friction of 0.35 be utilized for calculation of friction resistance along the bottom of foundations constructed on approved subgrade soils. The vertical dead loads acting on the mat can be utilized to calculate the ultimate friction resistance. We recommend a minimum factor of safety of 1.5 when using sliding friction alone. A passive pressure coefficient of 1.7 may be used to calculate ultimate passive pressure resistance on the side of mats for resistance to sliding in Structural Fill and site soils. A moist unit weight of 115 pcf may be used to calculate passive pressures. The passive pressure can be assumed to act starting at a depth of 1-foot below

grade in level unpaved areas. A larger magnitude of movement is required to engage the full passive resistance than sliding friction. Therefore, a minimum factor of safety of 2.0 is recommended when using passive pressure in conjunction with base friction to resist lateral loads. It should be noted that the lateral load resistance values discussed above are only applicable where the concrete for foundations are either placed directly against undisturbed soils or that the voids created from the use of forming are backfilled with properly compacted soil.

During construction, foundation excavations should be observed by a representative of the Geotechnical Engineer to evaluate the supporting capabilities of the bearing materials. If unsuitable bearing conditions are encountered, the area should be over-excavated and backfilled with compacted Structural Fill at the recommendation of a representative of the Geotechnical Engineer.

The Contractor should not allow surface and/or ground water to accumulate in foundation excavations. Foundations should be placed in excavations immediately after foundation subgrades are approved by the on-site geotechnical representative. Water entering foundation excavations should be removed and the subgrade scarified, moisture conditioned, and re-compacted in accordance with Section 4.2.1 of this report, prior to foundation placement. The use of a “mud mat”, an unreinforced concrete slab (approximately 3 inches thick), may be considered for foundation subgrades to protect the subgrade from damage resulting from precipitation.

4.7 DIRECT EMBEDMENT POLES

Overhead interconnection lines are assumed to be supported on direct embedment poles. Based on the "Design Manual for High Voltage Transmission Lines" RUS Bulletin 1724E-200, the standard for installation of direct embedment poles in “good soil” is "10 percent plus 2 feet". The subsurface conditions encountered, however, are probably less than “good soils”. Longer embedment depths may be required, and the pole designer should review the logs to evaluate an appropriate depth for poles.

4.8 ACCESS ROADS

At typical solar sites, access roads are heavily used during construction, but see very low traffic volumes during the life of the installation. Vehicle types are anticipated to vary significantly, from lightly to heavily loaded trucks and construction equipment. Access road sections are typically designed based on post-construction traffic volumes, with the assumption that localized improvements and/or frequent maintenance of the roads will occur during construction. Gravel-surfaced or soil access roads are typical for these facilities.

Near surface soils encountered in the explorations were predominately lean clay with various amounts of sand with low to medium plasticity. These soils are considered fair to poor subgrade for roads, and the strength of the subgrade will be highly influenced by moisture content. We estimate these soils to have an R-value of 5 for road section design.

Performance of gravel-surface roads is greatly influenced by moisture in the subgrade soils. High subgrade moisture contents will increase the frequency and depth of rutting and ponding on the wearing surface. The use of subgrade stabilization (e.g., lime or fly-ash) or a geotextile separation fabric can improve support qualities and may be appropriate for high-traffic areas. A geotextile can also reduce rutting and maintain strength of a gravel surface course.

Based on AASHTO design criteria, we recommend a minimum wearing surface of eleven inches of aggregate pavement for a traffic load of six trucks per weekday for a year during construction. Traffic after construction is anticipated to be very limited and we recommend a wearing surface of a minimum of six inches of aggregate pavement. Wearing course should consist of imported granular material that meets the requirements of Indiana Department of Transportation Standard Specifications (2020) Section 303, Aggregate Pavements. These thicknesses assume no stabilization of the subgrade; subgrade stabilization should reduce these thickness estimates. An increased thickness of granular material may be required in isolated areas to achieve stability.

We recommend the roads be designed with cross-slope to promote drainage, and, where possible, with ditches to help drain water from the pavement subgrade and convey off-site.

Road alignments should be properly prepared by stripping all vegetation, organic soil, and deleterious materials and scarified and recompacted to a depth 12 inches below final subgrade elevation. The road alignment should be proof rolled with a fully loaded dump truck or similar vehicle. Areas that deflect, rut, or pump should be further excavated and recompacted, or stabilized.

Regular maintenance including grading and the addition of gravel should be anticipated during the facility construction because truck and heavy equipment traffic will be frequent. After construction, traffic volumes are anticipated to be very low, and mainly related to facility maintenance operations.

5 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by Lightsource BP and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by Lightsource BP. If Lightsource BP does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the interpretation or implementation of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Lightsource BP must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. Lightsource BP and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinions, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's Geotechnical Engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during foundation construction.

FIGURES

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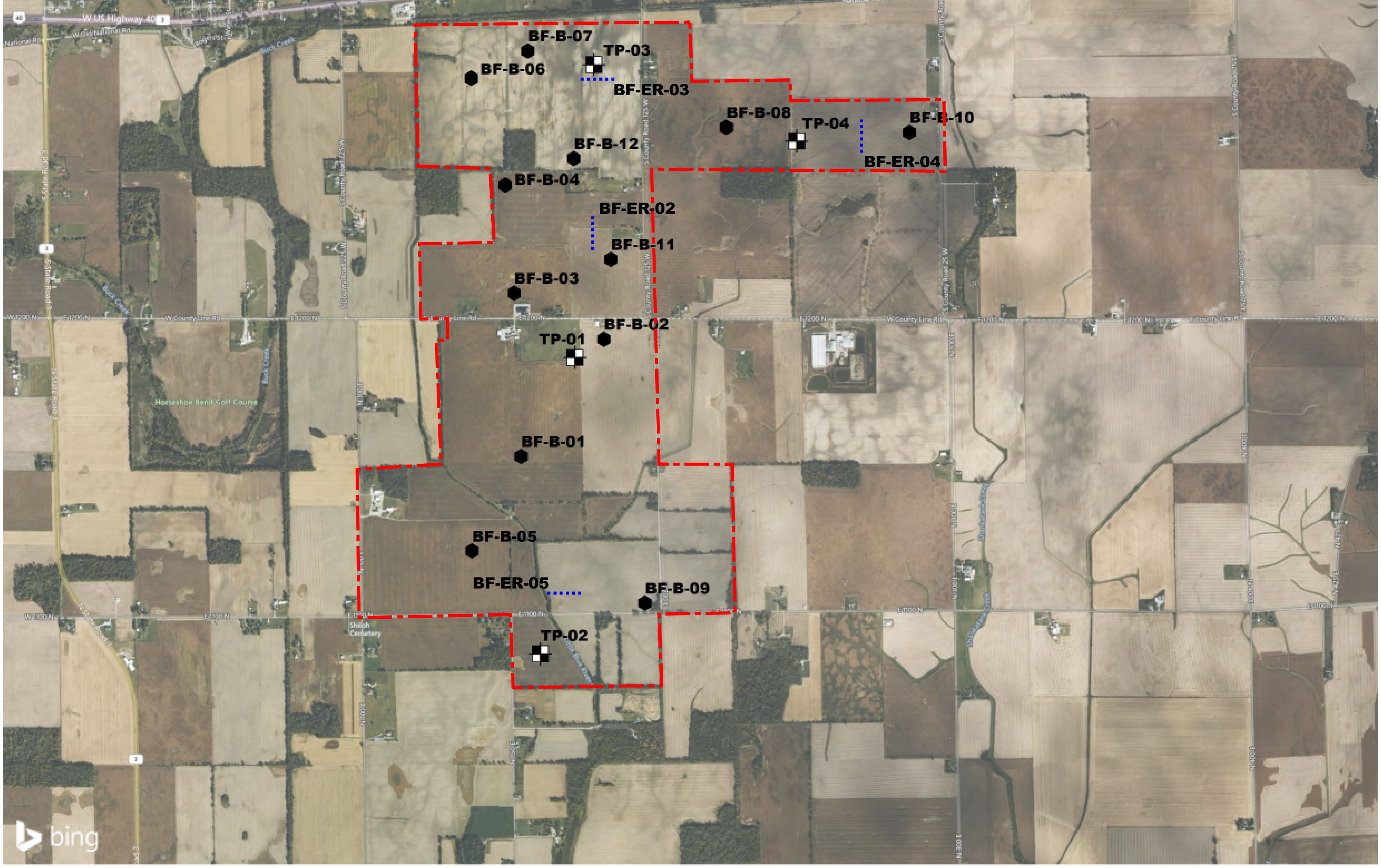

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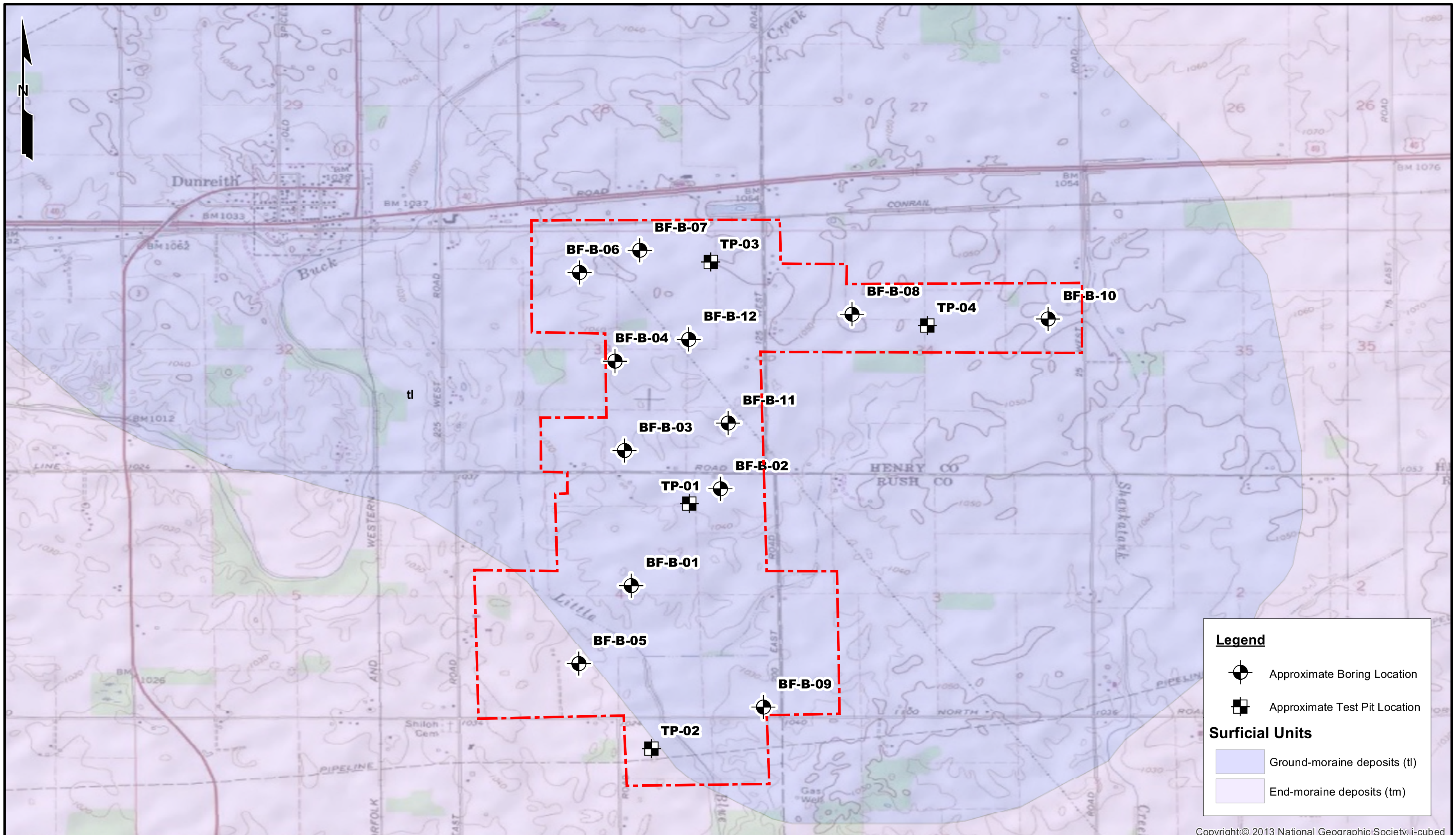

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REFERENCE
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SURFICIAL GEOLOGY MAP

Bellflower Solar Project
Henry and Rush Counties, Indiana

FIGURE 2

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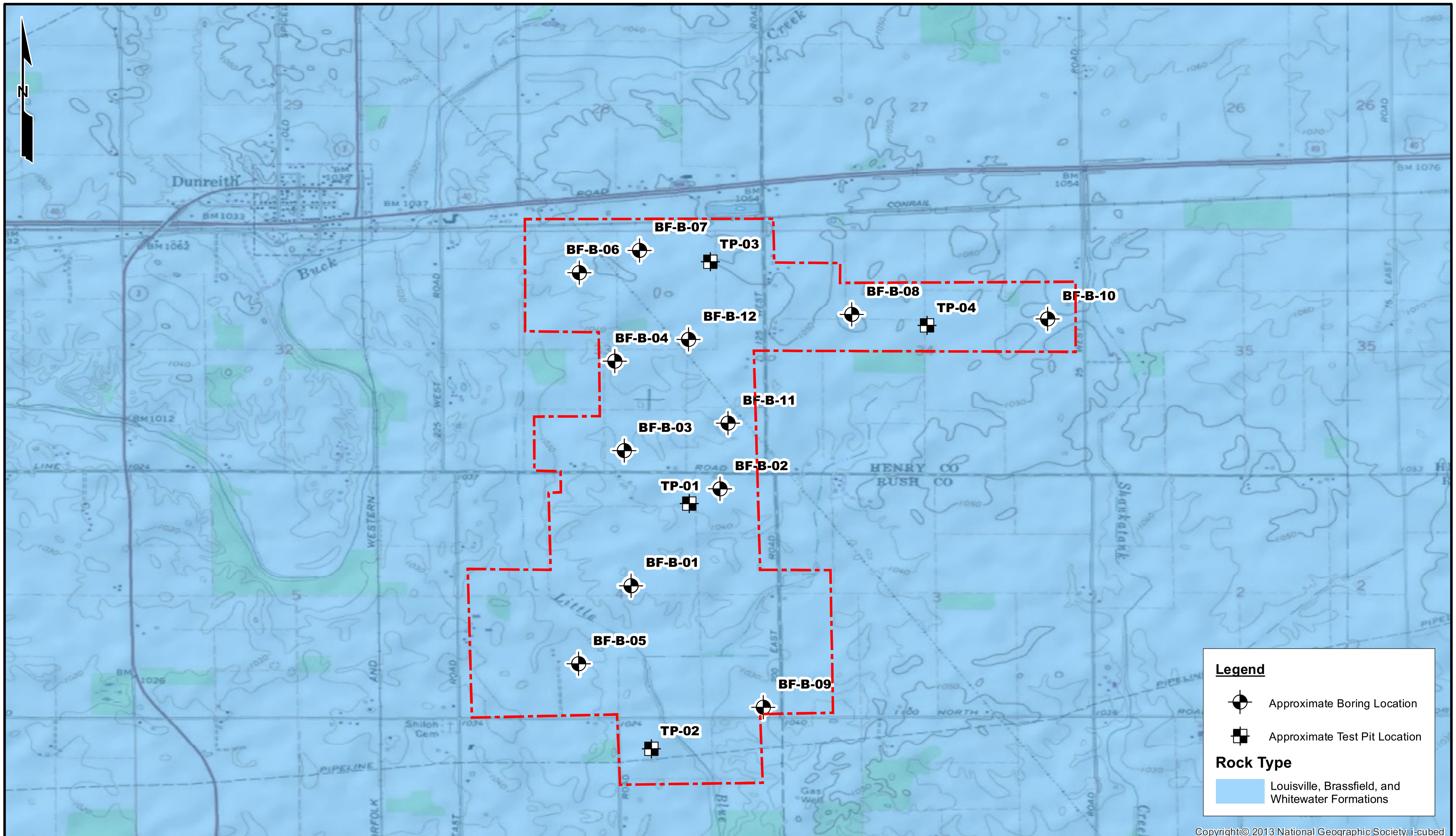

REFERENCE

GRAY, HENRY H., AULT, CURTIS, H., AND KELLER, STANLEY, J., 1987, BEDROCK GEOLOGIC MAP OF INDIANA: DEPT. OF NATURAL RESOURCES, INDIANA GEOLOGICAL SURVEY, MISCELLANEOUS MAP 48, SCALE = 1:500,000

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BEDROCK GEOLOGY MAP

Bellflower Solar Project
Henry and Rush Counties, Indiana

FIGURE
3

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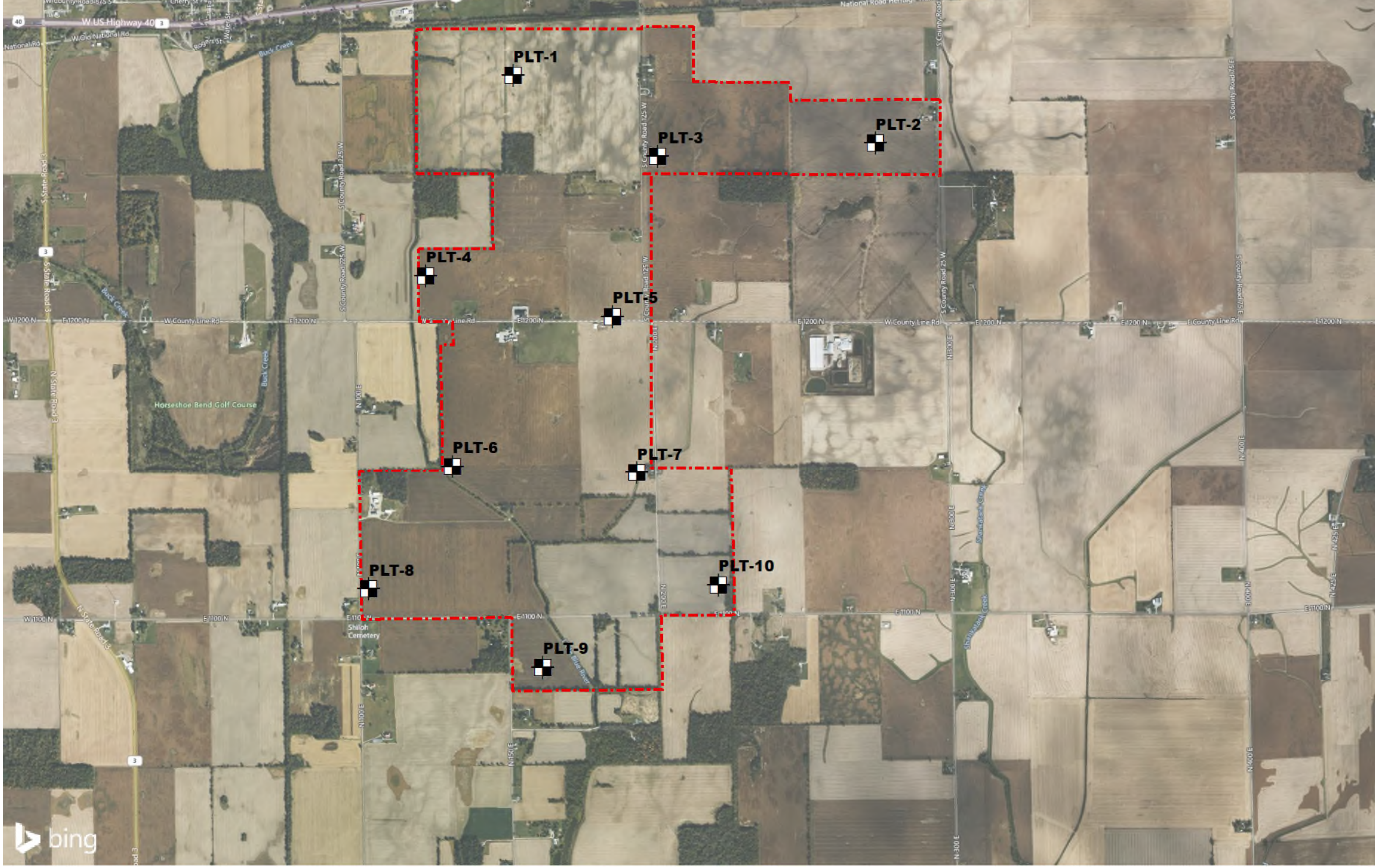

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APPENDIX A
SOIL BORING AND TEST PIT LOGS

SAMPLE/SAMPLER TYPE GRAPHICS

BULK SAMPLE

STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

- WATER LEVEL (level where first observed)
- WATER LEVEL (level after exploration completion)
- WATER LEVEL (additional levels after exploration)
- OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS

PID - Photoionization Detector

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu≥4 and 1≤Cc≤3	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu<4 and/or 1>Cc>3	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu≥4 and 1≤Cc≤3	GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu<4 and/or 1>Cc>3	GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES		GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (Half or more of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu≥6 and 1≤Cc≤3	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu<6 and/or 1>Cc>3	SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu≥6 and 1≤Cc≤3	SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu<6 and/or 1>Cc>3	SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES		SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

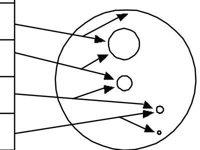
FINE GRAINED SOILS (Half or more of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit 50 or greater)	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

NOTE: USE MATERIAL DESCRIPTION ON THE LOG TO DEFINE A GRAPHIC THAT MAY NOT BE PROVIDED ON THIS LEGEND.

KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20211557.001A	GRAPHICS KEY	APPENDIX
	DRAWN BY: MGG	Bellflower Solar Project Henry and Rush Counties, Indiana	KEY-1
	CHECKED BY: DEP		
	DATE: 9/22/2020		

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



SECONDARY CONSTITUENT

	AMOUNT	
Term of Use	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N_{60} (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q_u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP <0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP <1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP <2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP <4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

PLASTICITY

DESCRIPTION	LL	PI
Non-Plastic	NP	NP
Low	< 30	< 15
Medium	30 - 50	15 - 25
High	> 50	> 25

Either the LL or the PI (or both) may be used to describe the soil plasticity. The ranges of numbers shown here do not imply that the LL ranges correlate with the PI ranges for all soils.

LL is from Casagrande, 1948. PI is from Holtz, 1959.

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.

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PROJECT NO.: 20211557.001A	SOIL DESCRIPTION KEY	APPENDIX
DRAWN BY: MGG	Bellflower Solar Project Henry and Rush Counties, Indiana	KEY-2
CHECKED BY: DEP		
DATE: 9/22/2020		

PLOTTED: 10/06/2020 01:30 PM BY: DPagel
OFFICE FILTER: DENVER
PROJECT NUMBER: 20211557.001A
gINT FILE: Klf_gint_master_2021
gINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [_KLF_GEO-LEG 2 (SOIL DESC KEY)]

Date Begin - End: 8/27/2020	**Drilling Company:** Terra Testing		**BORING LOG BF-B-01**	
Logged By: M Glassmeyer	**Drill Crew:** B. Kirkpatrick			
Hor.-Vert. Datum: NAD83 - NAVD88	**Drilling Equipment:** Diedrich D25	**Hammer Type - Drop:** 140 lb. Auto - 30 in.		
Plunge: -90 degrees	**Drilling Method:** Hollow Stem Auger			
Weather: 80°F Cloudy	**Auger Diameter:** 3.25 in. I.D.			

FIELD EXPLORATION / LABORATORY RESULTS

Latitude: 39.78057° N
Longitude: -85.41772° E
Approximate Ground Surface Elevation (ft.): 1,036
Surface Condition: Soybean Field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
	0		**~6 inches TOPSOIL**	S-1		BC=3 4 5 9	12"								
1035			**Lean CLAY (CL)**: low plasticity, light brownish gray, moist, stiff, trace sand and gravel												
			very stiff	S-2		BC=9 9 11 14	24"								
				S-3		BC=9 10 13 13	24"		10						
	5														
1030			**Clayey SAND (SC)**: fine-grained, subangular to subrounded, brown, moist, medium dense	S-4		BC=9 11 14 9	24"								
				S-5		BC=5 8 11 16	20"								
			Sandy Lean CLAY (CL): low plasticity, gray, moist, very stiff												
	10														
1025															
	▼														
			SILT (ML): low plasticity, gray, moist, very stiff, trace sand and gravel	S-6		BC=2 6 10 13	24"								
	15														
1020															
				S-7		BC=5 7 10 11	24"								
	20														
1015															
	25														
1010															

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 27, 2020.

GROUNDWATER LEVEL INFORMATION:
▼ Groundwater was observed at approximately 12 ft. below ground surface at the end of drilling.

GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 3.3 feet.

KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20211557.001A	BORING LOG BF-B-01	BORING
	DRAWN BY: MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	BF-B-01
	CHECKED BY: DEP		
	DATE: 9/21/2020		PAGE: 1 of 1

BORING LOG BF-B-02

Date Begin - End:	8/27/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	80°F Cloudy	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION

Latitude: 39.78634° N
Longitude: -85.41241° E
Approximate Ground Surface Elevation (ft.): 1,043
Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		~6 inches TOPSOIL	S-1	BC=2 2 3 5	18"								
		Lean CLAY (CL): low plasticity, light brownish gray, moist, medium stiff, trace sand and gravel											
1040		stiff	S-2	BC=7 8 7 6	12"								
	5	medium stiff	S-3	BC=2 2 3 4	24"								
		stiff	S-4	BC=4 5 6 3	24"		11						
1035		very stiff	S-5	BC=3 7 9 10	24"								
	10												
1030			S-6	BC=4 7 11 13	24"								
		SILT (ML): low plasticity, gray, moist, very stiff, trace sand and gravel											
	15												
1025		stiff	S-7	BC=3 6 8 11	24"								
	20												
1020													
	25												
1015													

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 27, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was observed at approximately 12 ft. below ground surface at the end of drilling.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.2 feet.
Caving was observed at a depth of 15 ft. below ground surface.

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-02	BORING BF-B-02
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

BORING LOG BF-B-03

Date Begin - End:	8/27/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	80°F Clear	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION — Latitude: 39.78862° N; Longitude: -85.41814° E; Approximate Ground Surface Elevation (ft.): 1,040; Surface Condition: Soybean Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	Water Content (%)
	0	**~6 inches TOPSOIL**; **Lean CLAY (CL)**: low plasticity, light brownish gray, moist, stiff, trace sand and gravel	S-1	BC=2 5 6 5	9"	
			S-2	BC=5 7 8 6	24"	23
1035	5	medium stiff	S-3	BC=1 2 3 3	4"	
		stiff	S-4	BC=6 7 7 9	24"	
		medium stiff	S-5	BC=1 3 4 8	24"	
1030	10					
		stiff	S-6	BC=4 5 9 11	24"	
1025	15					
		very stiff	S-7	BC=2 11 13 19	24"	
1020	20					
1015	25					

Other laboratory columns (USCS Symbol, Dry Unit Wt. (pcf), Passing #4 (%), Passing #200 (%), Liquid Limit, Plasticity Index (NP=NonPlastic), Additional Tests/Remarks): no entries.

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 27, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was observed at approximately 17 ft. below ground surface at the end of drilling.

GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 4.8 feet.

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PROJECT NO.: 20211557.001A
DRAWN BY: MPG
CHECKED BY: DEP
DATE: 9/21/2020

BORING LOG BF-B-03
Bellflower Solar Project
Henry and Rush Counties, Indiana

BORING
BF-B-03

PAGE: 1 of 1

BORING LOG BF-B-04

Date Begin - End:	8/27/2020	**Drilling Company:**	Terra Testing		
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick		
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger		
Weather:	75°F Cloudy	**Auger Diameter:**	3.25 in. I.D.		

FIELD EXPLORATION / LABORATORY RESULTS

Latitude: 39.79397° N
Longitude: -85.41870° E
Approximate Ground Surface Elevation (ft.): 1,042
Surface Condition: Soybean Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
	0	**~6 inches TOPSOIL**	S-1	BC=3 4 4 7	24"								
		Lean CLAY (CL): low plasticity, gray, stiff, trace sand and gravel											
1040		very stiff	S-2	BC=6 8 10 9	10"								
		medium stiff	S-3	BC=2 2 2 4	12"		13						
	5												
1035		stiff	S-4	BC=4 4 5 5	16"								
		medium stiff	S-5	BC=WH 3 4 7	24"								
	10												
1030													
		hard	S-6	BC=9 18 15 17	24"								
	15	**Silty SAND (SM)**: fine to coarse-grained, subangular to subrounded, gray, moist to wet, dense, trace gravel											
1025			S-7	BC=9 5 6 7	24"								
		Lean CLAY (CL): low plasticity, gray, moist, stiff, trace sand and gravel											
	20												
1020													
	25												
1015													

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 27, 2020.

GROUNDWATER LEVEL INFORMATION:
▼ Groundwater was observed at approximately 11 ft. below ground surface at the end of drilling.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 3.4 feet.
Caving was observed at a depth of 13 ft. below ground surface.

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-04	BORING
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	BF-B-04
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

BORING LOG BF-B-05

Date Begin - End:	8/28/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	75°F Light Rain	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION / LABORATORY RESULTS

Latitude: 39.77591° N
Longitude: -85.42086° E
Approximate Ground Surface Elevation (ft.): 1,031
Surface Condition: Soybean Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
	0	**~6 inches TOPSOIL**											
1030		**Lean CLAY (CL)**: low plasticity, light brownish gray, moist, stiff, trace sand and gravel	S-1	BC=2 3 5 5	18"								
			S-2	BC=9 7 6 3	18"								
	5	**Silty SAND (SM)**: fine to coarse-grained, subangular to subrounded, olive yellow, moist, loose, trace gravel	S-3	BC=2 5 4 9	18"		6						
1025		**Lean CLAY (CL)**: low plasticity, light brownish gray, moist, stiff, trace sand and gravel	S-4	BC=5 5 4 5	24"								
		very stiff	S-5	BC=3 7 12 19	24"								
1020	10												
		stiff	S-6	BC=3 5 6 9	24"		11						
1015	15												
			S-7	BC=3 4 4 6	18"								
1010	20												
1005	25												

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 28, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 4.5 feet.
Caving was observed at a depth of 9.5 ft. below ground surface.

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-05	BORING BF-B-05
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

BORING LOG BF-B-06

Date Begin - End:	8/24/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D-25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	75°F Clear	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION

Latitude: 39.79924° N
Longitude: -85.42083° E
Approximate Ground Surface Elevation (ft.): 1,047
Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			~3 inches TOPSOIL	S-1		BC=2 2 3 5	24"								
1045			**Lean CLAY (CL):** low plasticity, light brownish gray, moist, medium stiff, trace sand and gravel												
			stiff	S-2		BC=4 5 5 5	24"								
	5			S-3		BC=2 4 11 9	24"								
1040			very stiff	S-4		BC=10 11 13 12	24"		11						
			stiff	S-5		BC=3 5 6 5	24"								
1035	10														
			medium stiff	S-6		BC=3 3 4 6	10"								
1030	15														
			stiff	S-7		BC=5 6 9 11	24"								
1025	20														
1020	25														

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 24, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 4.5 feet.
Caving was observed at a depth of 10 ft. below ground surface.

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20211557.001A		BORING LOG BF-B-06	BORING
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	BF-B-06
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

PLOTTED: 10/06/2020 02:32 PM BY: DPagel

BORING LOG BF-B-07

Date Begin - End:	8/24/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	80°F Clear	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION

Latitude: 39.80058° N
Longitude: -85.41721° E
Approximate Ground Surface Elevation (ft.): 1,047
Surface Condition: Corn Field

LABORATORY RESULTS

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			~6 inches TOPSOIL	S-1		BC=1 5 5 7	24"								
1045			**Lean CLAY (CL):** low plasticity, light brownish gray, moist, stiff, trace sand and gravel												
			medium stiff	S-2		BC=4 4 3 3	16"								
			stiff	S-3		BC=1 3 5 7	14"		11						
	5														
1040			very stiff	S-4		BC=9 12 13 15	24"								
			stiff	S-5		BC=4 4 6 6	24"								
	10														
1035															
▽				S-6		BC=6 6 9 13	24"								2 inch thick sand seam at 13.25 feet
	15														
1030															
				S-7		BC=12 5 5 8	24"								Sand seam from 18 to 18.5 feet
	20														
1025															
	25														
1020															

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 24, 2020.

GROUNDWATER LEVEL INFORMATION:
▽ Groundwater was observed at approximately 13 ft. below ground surface during drilling.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 4.5 feet.
Caving was observed at a depth of 6 ft. below ground surface.

gINT FILE: Klf_gint_master_2021
gINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [_KLF_BORING/TEST PIT SOIL LOG]
PROJECT NUMBER: 20211557.001A
OFFICE FILTER: DENVER

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20211557.001A		BORING LOG BF-B-07	BORING BF-B-07
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

BORING LOG BF-B-08

Date Begin - End: 8/24/2020
Drilling Company: Terra Testing
Logged By: M Glassmeyer
Drill Crew: B. Kirkpatrick
Hor.-Vert. Datum: NAD83 - NAVD88
Drilling Equipment: Diedrich D25
Hammer Type - Drop: 140 lb. Auto - 30 in.
Plunge: -90 degrees
Drilling Method: Hollow Stem Auger
Weather: 90°F Clear
Auger Diameter: 3.25 in. I.D.

Latitude: 39.79677° N
Longitude: -85.40455° E
Approximate Ground Surface Elevation (ft.): 1,050
Surface Condition: Soybean Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description (FIELD EXPLORATION)	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		~6 inches TOPSOIL	S-1		BC=3 3 4 7	16"								
		Lean CLAY (CL): low plasticity, light brownish gray, moist to wet, medium stiff, trace sand and gravel												
		stiff	S-2		BC=9 7 7 6	24"								
1045	5		S-3		BC=2 7 8 12	24"								
		very stiff	S-4		BC=11 12 10 9	24"		13						
		medium stiff	S-5		BC=1 2 5 4	24"								
1040	10													
		stiff	S-6		BC=6 5 9 11	24"								
1035	15													
		very stiff	S-7		BC=4 7 9 12	24"								
1030	20													
1025	25													

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 24, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 3.6 feet.
Caving was observed at a depth of 2.5 ft. below ground surface.

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PROJECT NO.: 20211557.001A
DRAWN BY: MPG
CHECKED BY: DEP
DATE: 9/21/2020

BORING LOG BF-B-08

Bellflower Solar Project
Henry and Rush Counties, Indiana

BORING
BF-B-08

BORING LOG BF-B-09

Date Begin - End:	8/28/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	75°F Cloudy	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION

Latitude: 39.77332° N
Longitude: -85.40984° E
Approximate Ground Surface Elevation (ft.): 1,040
Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		~6 inches TOPSOIL / **Lean CLAY (CL):** low plasticity, light brownish gray, moist, stiff, trace sand and gravel	S-1	BC=2 4 8 14	12"								
		very stiff	S-2	BC=12 14 15 12	24"								
1035	5	stiff	S-3	BC=5 5 6 7	24"		11						
			S-4	BC=4 7 8 9	18"								
1030	10		S-5	BC=5 6 9 9	15"								
1025	15		S-6	BC=3 5 6 9	24"								
1020	20		S-7	BC=3 5 5 8	18"								
1015	25												

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 28, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.1 feet.
Caving was observed at a depth of 14 ft. below ground surface.

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-09	BORING BF-B-09
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
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DATE:	9/21/2020		PAGE: 1 of 1

PLOTTED: 10/06/2020 02:32 PM BY: DPagel

BORING LOG BF-B-10

Date Begin - End:	8/27/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	80°F Cloudy	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION

Latitude: 39.79649° N
Longitude: -85.39285° E
Approximate Ground Surface Elevation (ft.): 1,052
Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
	0		**~6 inches TOPSOIL**	S-1		BC=1 3 4 5	18"								
1050			**Lean CLAY (CL)**: low plasticity, light brownish gray, moist, medium stiff, trace sand and gravel												
			stiff	S-2		BC=4 5 5 5	12"		23						
	5		medium stiff	S-3		BC=2 3 1 3	3"								
1045				S-4		BC=3 2 2 3	18"								
			stiff	S-5		BC=3 5 8 8	13"								
1040	10														
			very stiff	S-6		BC=5 7 10 12	16"								
1035	15														
			stiff	S-7		BC=3 5 6 8	24"								
1030	20														
1025	25														

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 27, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 3.3 feet.
Caving was observed at a depth of 10.5 ft. below ground surface.

OFFICE FILTER: DENVER
PROJECT NUMBER: 20211557.001A
gINT FILE: Klf_gint_master_2021
gINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [_KLF_BORING/TEST PIT SOIL LOG]

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-10	BORING BF-B-10
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

BORING LOG BF-B-11

Date Begin - End:	8/25/2020	**Drilling Company:**	Terra Testing		
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick		
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger		
Weather:	75°F Clear	**Auger Diameter:**	3.25 in. I.D.		

FIELD EXPLORATION — Latitude: 39.79026° N; Longitude: -85.41194° E; Approximate Ground Surface Elevation (ft.): 1,045; Surface Condition: Con Field

LABORATORY RESULTS

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		~6 inches TOPSOIL	S-1		BC=2 3 3 5	24"								
		Sandy Lean CLAY (CL): low plasticity, light brownish gray, moist, medium stiff, trace sand and gravel												
		very stiff	S-2		BC=5 7 10 9	24"								
		stiff	S-3		BC=6 5 6 5	18"		11		96	58			
1040	5													
			S-4		BC=5 6 7 7	24"								
			S-5		BC=5 5 8 7	24"								
1035	10													
			S-6		BC=5 6 9 12	24"								
1030	15													
		very stiff	S-7		BC=5 8 10 13	24"								
1025	20													
		stiff	S-8		BC=6 7 8 11	24"		11		97	56			
1020	25													
		SILT (ML): low plasticity, gray, moist to wet, very stiff, trace sand and gravel	S-9		BC=5 8 10 13	24"								

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-11	BORING
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	BF-B-11
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 2

BORING LOG BF-B-11

Date Begin - End:	8/25/2020	**Drilling Company:**	Terra Testing
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	75°F Clear	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION / LABORATORY RESULTS

Latitude: 39.79026° N
Longitude: -85.41194° E
Approximate Ground Surface Elevation (ft.): 1,045
Surface Condition: Con Field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			SILT (ML): low plasticity, gray, moist to wet, very stiff, trace sand and gravel												
				S-10		BC=3 4 15 18	24"								
1010	35														
			Poorly graded SAND with Clay (SP-SC): medium-grained, subangular to subrounded, gray, wet, medium dense	S-11		BC=5 11 14 13	NR								
1005	40														
			very dense	S-12		BC=24 50/4"	NR								
1000	45														Heaving sands encountered at 46 feet
				S-13		BC=26 50/4"	10"								
995	50														
990	55														

The boring was terminated at approximately 50 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 25, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 4.8 feet.
Caving was observed at a depth of 18 ft. below ground surface.

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PROJECT NO.: 20211557.001A		BORING LOG BF-B-11	BORING
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	BF-B-11
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 2 of 2

BORING LOG BF-B-12

Date Begin - End:	8/26/2020	**Drilling Company:**	Terra Trsting
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger
Weather:	85°F Clear	**Auger Diameter:**	3.25 in. I.D.

Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION: Latitude: 39.79526° N; Longitude: -85.41430° E; Approximate Ground Surface Elevation (ft.): 1,044; Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
	0	**~6 inches TOPSOIL**	S-1	BC=3 3 6 8	24"								
		Sandy Lean CLAY (CL): low plasticity, light brownish gray, moist, stiff, trace sand and gravel											
		very stiff	S-2	BC=12 12 13 30	24"		11		93	53			
1040	5		S-3	BC=9 8 10 9	24"								
			S-4	BC=8 9 8 10	24"								
			S-5	BC=7 9 18 15	24"								
1035	10	**Silty SAND (SM)**: fine to coarse-grained, subangular to subrounded, gray, moist, medium dense											
1030	15		S-6	BC=8 10 13 12	24"		10		68	15			
1025	20	dense	S-7	BC=18 24 26 28	24"								
		very dense	S-8	BC=27 40 18 10	24"		15		99	67			
1020	25	**Sandy SILT (ML)**: low plasticity, gray, moist, hard, trace sand and gravel											
1015		very stiff	S-9	BC=4 11 10	16"								Spoon lost down the hole. Moved 3 feet north and resumed sampling at 28 feet.

Date Begin - End:	8/26/2020	**Drilling Company:**	Terra Trsting		**BORING LOG BF-B-12**
Logged By:	M Glassmeyer	**Drill Crew:**	B. Kirkpatrick		
Hor.-Vert. Datum:	NAD83 - NAVD88	**Drilling Equipment:**	Diedrich D25	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger		
Weather:	85°F Clear	**Auger Diameter:**	3.25 in. I.D.		

FIELD EXPLORATION — Latitude: 39.79526° N; Longitude: -85.41430° E; Approximate Ground Surface Elevation (ft.): 1,044; Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy SILT (ML): low plasticity, gray, moist, hard, trace sand and gravel												
1010			hard	S-10		BC=50/5"	5"								
	35														
1005			very stiff	S-11		BC=10 14 10	18"								
	40														
1000			very stiff	S-12		BC=6 9 10	18"								
	45														
995			hard	S-13		BC=16 20 22	18"								
	50														
990															
	55														
985															

The boring was terminated at approximately 50 ft. below ground surface. The boring was backfilled with auger cuttings and bentonite on August 26, 2020.

GROUNDWATER LEVEL INFORMATION:
▼ Groundwater was observed at approximately 28 ft. below ground surface at the end of drilling.

GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.2 feet.
Caving was observed at a depth of 33 ft. below ground surface.

PLOTTED: 10/06/2020 02:32 PM BY: DPagel

TEST PIT LOG TP-01

Date Begin - End:	8/31/2020	**Excavation Company:**	Terra Testing
Logged By:	M Glassmeyer	**Excavation Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Excavation Equip.:**	Excavator
Plunge:	-90 degrees	**Excav. Dimensions:**	4 x 8 ft
Weather:	80°F Partly Cloudy		

FIELD EXPLORATION

Latitude: 39.78545° N
Longitude: -85.41426° E
Approximate Ground Surface Elevation (ft.): 1,047
Surface Condition: Corn Field

LABORATORY RESULTS

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): moist, trace gravel										
1045				S-1		CL	12		97	60	38	18	**ASTM D698 Method B=** Max. Dry Unit Wt.: 123.5 pcf Opt. Water Content: 11.6%
	5												
1040				S-2									
	10												
1035													

The test pit was terminated at approximately 9 ft. below ground surface. The test pit was backfilled with excavated material on August 31, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.0 feet.

OFFICE FILTER: DENVER
PROJECT NUMBER: 20211557.001A
gINT FILE: Klf_gint_master_2021
gINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [_KLF_BORING/TEST PIT SOIL LOG]

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PROJECT NO.: 20211557.001A		TEST PIT LOG TP-01	BORING TP-01
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

TEST PIT LOG TP-02

Date Begin - End:	8/31/2020	**Excavation Company:**	Terra Testing
Logged By:	M Glassmeyer	**Excavation Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Excavation Equip.:**	Excavator
Plunge:	-90 degrees	**Excav. Dimensions:**	4 x 8 ft
Weather:	80°F Partly Cloudy		

FIELD EXPLORATION

Latitude: 39.77082° N
Longitude: -85.41653° E
Approximate Ground Surface Elevation (ft.): 1,027
Surface Condition: Soybean Field

LABORATORY RESULTS

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Clayey SAND (SC): moist, trace gravel										
1025				S-1		SC	20		91	45	35	15	**ASTM D698 Method B=** Max. Dry Unit Wt.: 108.8 pcf Opt. Water Content: 15.6%
	5												
1020				S-2									
	10												
1015													

The test pit was terminated at approximately 9 ft. below ground surface. The test pit was backfilled with excavated material on August 31, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.
GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.0 feet.

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PROJECT NO.: 20211557.001A		TEST PIT LOG TP-02	BORING
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	TP-02
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

TEST PIT LOG TP-03

Date Begin - End:	8/31/2020	**Excavation Company:**	Terra Testing
Logged By:	M Glassmeyer	**Excavation Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Excavation Equip.:**	Excavator
Plunge:	-90 degrees	**Excav. Dimensions:**	4 x 8 ft
Weather:	80°F Partly Cloudy		

FIELD EXPLORATION

Latitude: 39.79989° N
Longitude: -85.41299° E
Approximate Ground Surface Elevation (ft.): 1,051
Surface Condition: Corn Field

LABORATORY RESULTS

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): low plasticity, moist, trace gravel										
1050													
				S-1		CL	11		93	54	36	17	**ASTM D698 Method B=** Max. Dry Unit Wt.: 123.9 pcf Opt. Water Content: 10.8%
	5												
1045													
				S-2									
	10		The test pit was terminated at approximately 9 ft. below ground surface. The test pit was backfilled with excavated material on August 31, 2020.										
1040													

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.4 feet.

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PROJECT NO.: 20211557.001A		TEST PIT LOG TP-03	BORING TP-03
DRAWN BY:	MPG	Bellflower Solar Project Henry and Rush Counties, Indiana	
CHECKED BY:	DEP		
DATE:	9/21/2020		PAGE: 1 of 1

Date Begin - End:	8/31/2020	**Excavation Company:**	Terra Testing
Logged By:	M Glassmeyer	**Excavation Crew:**	B. Kirkpatrick
Hor.-Vert. Datum:	NAD83 - NAVD88	**Excavation Equip.:**	Excavator
Plunge:	-90 degrees	**Excav. Dimensions:**	4 x 8 ft
Weather:	80°F Partly Cloudy		

TEST PIT LOG TP-04

FIELD EXPLORATION

Latitude: 39.79609° N
Longitude: -85.40005° E
Approximate Ground Surface Elevation (ft.): 1,045
Surface Condition: Corn Field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Silty SAND (SM): moist, trace gravel										
				S-1		SM	13		95	28	35	5	**ASTM D698 Method B=** Max. Dry Unit Wt.: 129.5 pcf Opt. Water Content: 8.5%
1040	5												
				S-2									
1035	10												

LABORATORY RESULTS

The test pit was terminated at approximately 9 ft. below ground surface. The test pit was backfilled with excavated material on August 31, 2020.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
Elevation estimated from the National Elevation Dataset.
A Bad Elf handheld GPS unit was used to locate the exploration with an accuracy of 5.0 feet.

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PROJECT NO.: 20211557.001A	TEST PIT LOG TP-04		BORING TP-04
DRAWN BY: MPG	Bellflower Solar Project Henry and Rush Counties, Indiana		
CHECKED BY: DEP			
DATE: 9/21/2020			PAGE: 1 of 1

APPENDIX B
FIELD TESTING: RESISTIVITY TESTING RESULTS

Test Number: **BF-ER-05**

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Field Resistivity By Wenner Array Data Report

Project Name: Bellflower Solar Project

Project/Task Number: 20211557.001a

Test Performed By: MPG

Date: 9/1/2020

Time: 8:00 AM

Location: Henry and Rush Counties, Indiana

Array Center (lat/long): 39.773704 / -85.415476

Equipment Used (Make/Model): L&R Instruments Ultra MiniRes

Air Temp: 70° F

Surface Conditions: (grass covered, paved, etc.) Farm field

Topography: Flat

Energized Line within 50 ft : (Y/N, If Yes, please describe) No

Weather Conditions : Partly cloudy

Other Surface Conditions : (drainage/evidence of contamination or buried structures) N/A

Array Orientation	Spacing (feet) *a*	Potential Probe Depth (inches)	Current Probe Depth (inches)	Measured Resistance (ohm) *V/I*	Apparent Resistivity (ohm-m) *p*	Comments
East-West	2.0	8	8	6.30	24.1	
	4.0	8	8	5.20	39.9	
	6.0	8	8	3.50	40.2	
	10.0	8	8	2.50	47.9	
	20.0	8	8	1.40	53.7	
	30.0	8	8	1.10	63.2	
	50.0	8	8	0.67	63.8	
	100.0	8	8	0.36	68.6	
	200.0	8	8	0.20	74.7	

Comments: 1 - Test performed in general accordance with IEEE Standard 81, 2012, "Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System."

Entry By: MPG
Date: 9/23/2020

Checked By: DEP
Date: 9/25/2020

Test Number: **BF-ER-04**

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Field Resistivity By Wenner Array Data Report

Project Name: Bellflower Solar Project

Project/Task Number: 20211557.001a

Test Performed By: MPG

Date: 8/31/2020

Time: 8:00 AM

Location: Henry and Rush Counties, Indiana

Array Center (lat/long): 39.79619 / -85.396196

Equipment Used (Make/Model): L&R Instruments Ultra MiniRes

Air Temp: 70° F

Surface Conditions: (grass covered, paved, etc.) Farm field

Topography: Flat

Energized Line within 50 ft : (Y/N, If Yes, please describe) No

Weather Conditions : Partly cloudy

Other Surface Conditions : (drainage/evidence of contamination or buried structures) N/A

Array Orientation	Spacing (feet) *a*	Potential Probe Depth (inches)	Current Probe Depth (inches)	Measured Resistance (ohm) *V/I*	Apparent Resistivity (ohm-m) *p*	Comments
North-South	2.0	8	8	4.00	15.3	
	4.0	8	8	1.80	13.8	
	6.0	8	8	1.60	18.4	
	10.0	8	8	1.40	26.8	
	20.0	8	8	0.95	36.2	
	30.0	8	8	0.31	17.9	
	50.0	8	8	0.41	38.8	
	100.0	8	8	0.46	87.6	
	200.0	8	8	0.29	110.8	

Comments: 1 - Test performed in general accordance with IEEE Standard 81, 2012, "Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System."

Entry By: MPG
Date: 9/23/2020

Checked By: DEP
Date: 9/25/2020

Test Number: BF-ER-03

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Field Resistivity By Wenner Array Data Report

Project Name: Bellflower Solar Project

Project/Task Number: 20211557.001a

Test Performed By: MPG

Date: 9/1/2020

Time: 10:15 AM

Location: Henry and Rush Counties, Indiana

Array Center (lat/long): 39.799529 -85.412819

Equipment Used (Make/Model): L&R Instruments Ultra MiniRes

Air Temp: 70° F

Surface Conditions: (grass covered, paved, etc.) Farm field

Topography: Flat

Energized Line within 50 ft : (Y/N, If Yes, please describe) No

Weather Conditions : Partly cloudy

Other Surface Conditions : (drainage/evidence of contamination or buried structures) N/A

Array Orientation	Spacing (feet) *a*	Potential Probe Depth (inches)	Current Probe Depth (inches)	Measured Resistance (ohm) *V/I*	Apparent Resistivity (ohm-m) *p*	Comments
East-West	2.0	8	8	3.93	15.1	
	4.0	8	8	3.26	25.0	
	6.0	8	8	2.75	31.6	
	10.0	8	8	2.17	41.5	
	20.0	8	8	2.24	85.7	
	30.0	8	8	0.99	57.1	
	50.0	8	8	0.63	60.5	
	100.0	8	8	0.33	63.4	
	200.0	8	8	0.15	59.0	

Comments: 1 - Test performed in general accordance with IEEE Standard 81, 2012, "Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System."

Entry By: MPG
Date: 9/23/2020

Checked By: DEP
Date: 9/25/2020

Test Number: **BF-ER-02**

Field Resistivity By Wenner Array Data Report

Project Name: Bellflower Solar Project

Project/Task Number: 20211557.001a

Test Performed By: MPG

Date: 9/1/2020

Time: 12:30 PM

Location: Henry and Rush Counties, Indiana

Array Center (lat/long): 39.791045 / -85.412608

Equipment Used (Make/Model): L&R Instruments Ultra MiniRes

Air Temp: 70° F

Surface Conditions: (grass covered, paved, etc.) Farm field

Topography: Flat

Energized Line within 50 ft : (Y/N, If Yes, please describe) No

Weather Conditions : Partly cloudy

Other Surface Conditions : (drainage/evidence of contamination or buried structures) N/A

Array Orientation	Spacing (feet) *a*	Potential Probe Depth (inches)	Current Probe Depth (inches)	Measured Resistance (ohm) *V/I*	Apparent Resistivity (ohm-m) *p*	Comments
North-South	2.0	8	8	5.17	19.8	
	4.0	8	8	3.54	27.1	
	6.0	8	8	2.92	33.6	
	10.0	8	8	2.53	48.4	
	20.0	8	8	1.31	50.2	
	30.0	8	8	0.98	56.5	
	50.0	8	8	0.73	70.1	
	100.0	8	8	0.42	81.3	
	200.0	8	8	0.20	75.9	

Comments: 1 - Test performed in general accordance with IEEE Standard 81, 2012, "Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System."

Entry By: MPG
Date: 9/23/2020

Checked By: DEP
Date: 9/25/2020

APPENDIX C

LABORATORY TEST RESULTS: INDEX TESTING

BF-B-03	2.0 - 4.0	S-2	LEAN CLAY (CL)	23								
BF-B-04	4.0 - 6.0	S-3	LEAN CLAY (CL)	13								
BF-B-05	4.0 - 6.0	S-3	LEAN CLAY (CL)	6								
BF-B-05	13.0 - 15.0	S-6	LEAN CLAY (CL)	11								
BF-B-06	6.0 - 8.0	S-4	LEAN CLAY (CL)	11								
BF-B-07	4.0 - 6.0	S-3	LEAN CLAY (CL)	11								
BF-B-08	6.0 - 8.0	S-4	LEAN CLAY (CL)	13								
BF-B-09	4.0 - 6.0	S-3	LEAN CLAY (CL)	11								
BF-B-10	2.0 - 4.0	S-2	LEAN CLAY (CL)	23								
BF-B-11	4.0	S-3	SANDY LEAN CLAY (CL)	11		100	96	58				
BF-B-11	23.0	S-8	SANDY LEAN CLAY (CL)	11		100	97	56				
BF-B-12	2.0	S-2	SANDY LEAN CLAY (CL)	11		100	93	53				
BF-B-12	13.0	S-6	SILTY SAND (SM)	10		100	68	15				
BF-B-12	23.0	S-8	SILTY SAND (SM)	15		100	99	67				
TP-01	2.0 - 9.0	S-1 & S-2	SANDY LEAN CLAY (CL)	12		100	97	60	38	20	18	**ASTM D6**
												Maximum
												Optimum
TP-02	2.0 - 9.0	S-1 & S-2	CLAYEY SAND (SC)	20		100	91	45	35	20	15	**ASTM D6**
												Maximum
												Optimum
TP-03	2.0 - 9.0	S-1 & S-2	SANDY LEAN CLAY (CL)	11		100	93	54	36	19	17	**ASTM D6**
												Maximum
												Optimum
TP-04	2.0 - 9.0	S-1 & S-2	SILTY SAND (SM)	13		100	95	28	35	30	5	**ASTM D6**
												Maximum
												Optimum

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic
NA = Not Available

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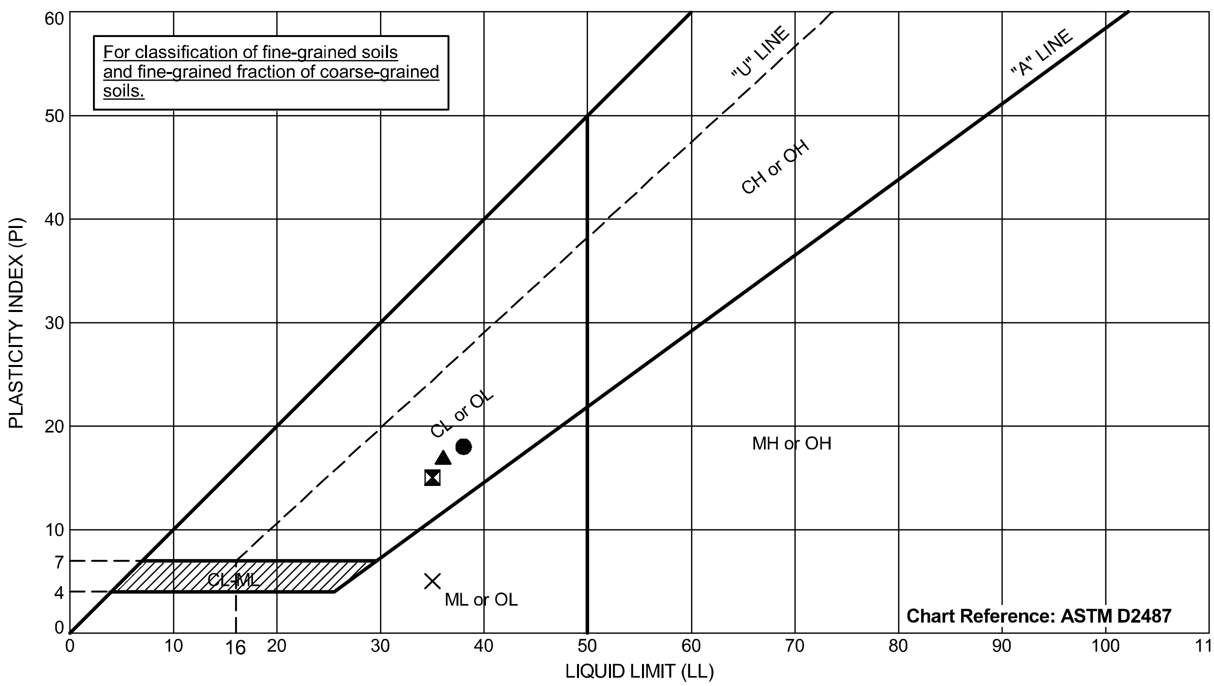
PROJECT NO.: 20211557.001A
DRAWN BY: MPG
CHECKED BY: DEP
DATE: 9/22/2020

LABORATORY T
RESULT SUMM

Bellflower Solar Pr
Henry and Rush Countie



Exploration ID	Depth (ft.)	Sample Number	Sample Description	Passing #200	LL	PL	PI
● TP-01	2 - 9	S-1 & S-2	SANDY LEAN CLAY (CL)	60	38	20	18
⊠ TP-02	2 - 9	S-1 & S-2	CLAYEY SAND (SC)	45	35	20	15
▲ TP-03	2 - 9	S-1 & S-2	SANDY LEAN CLAY (CL)	54	36	19	17
× TP-04	2 - 9	S-1 & S-2	SILTY SAND (SM)	28	35	30	5

Testing performed in general accordance with ASTM D4318.
NP = Nonplastic
NA = Not Available
NM = Not Measured

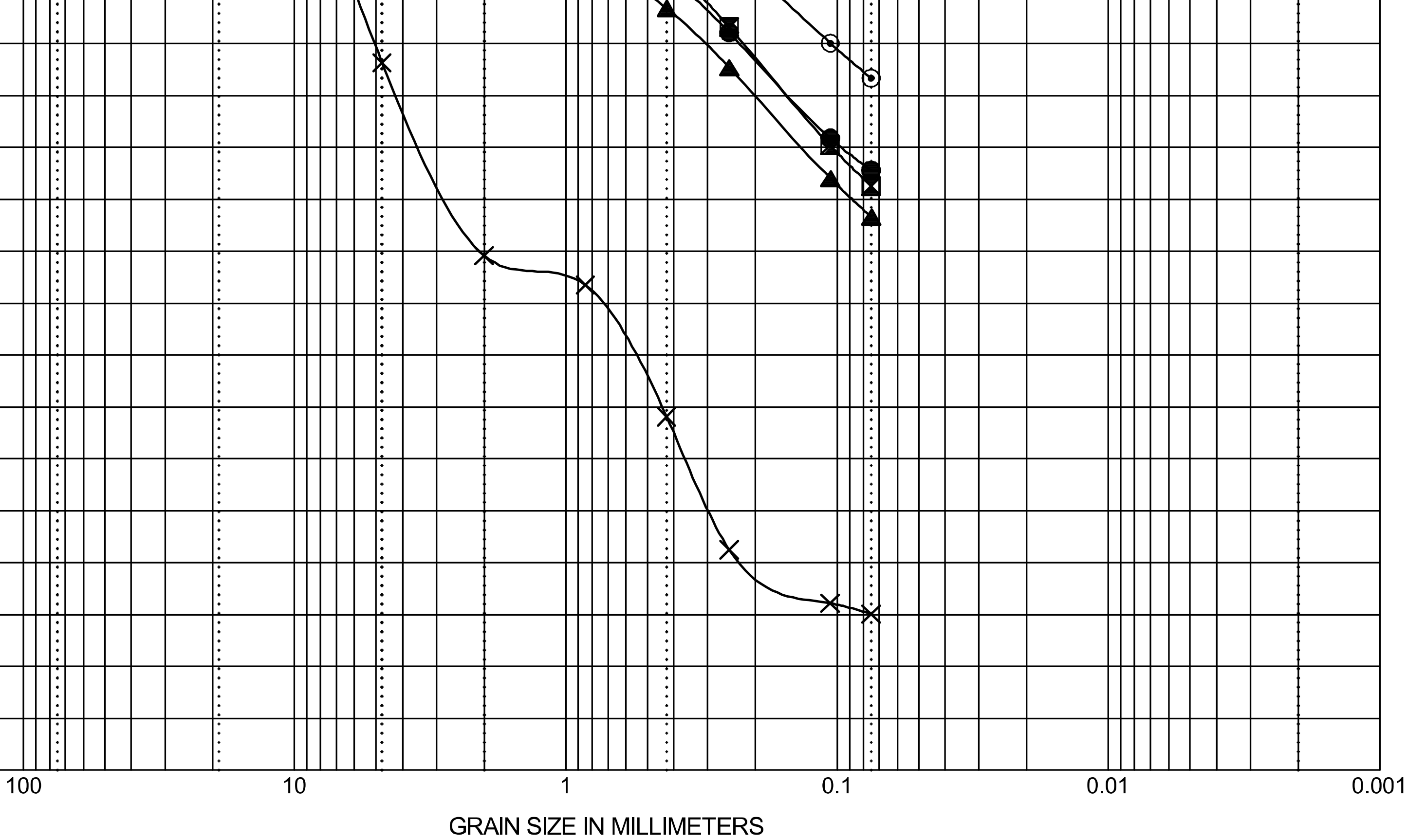
KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20211557.001A
DRAWN BY: MPG
CHECKED BY: DEP
DATE: 9/21/2020

ATTERBERG LIMITS

Bellflower Solar Project
Henry and Rush Counties, Indiana

APPENDIX
LAB-2



Depth (ft.)	Sample Number	Sample Description	LL	PL	PI
4 - 6	S-3	SANDY LEAN CLAY (CL)	NM	NM	NM
23 - 25	S-8	SANDY LEAN CLAY (CL)	NM	NM	NM
2 - 4	S-2	SANDY LEAN CLAY (CL)	NM	NM	NM
13 - 15	S-6	SILTY SAND (SM)	NM	NM	NM
23 - 25	S-8	SILTY SAND (SM)	NM	NM	NM

Depth (ft.)	D_{100}	D_{60}	D_{30}	D_{10}	Cc	Cu	Passing 3/4"	Passing #4	Passing #200	%Silt*	%Clay*
4 - 6	19	0.096	NM	NM	NM	NM	100	96	58	NM	NM
23 - 25	19	0.105	NM	NM	NM	NM	100	97	56	NM	NM
2 - 4	19	0.135	NM	NM	NM	NM	100	93	53	NM	NM
13 - 15	19	3.251	0.359	NM	NM	NM	100	68	15	NM	NM
23 - 25	19	NM	NM	NM	NM	NM	100	99	67	NM	NM

t silt-sized and clay-sized content but may not
the material with the engineering properties of silt or clay.
neter Analysis testing performed in general accordance
nalysis) and ASTM D7928 (Hydrometer Analysis).

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
Coefficients of Curvature - $C_C = (D_{30})^2 / D_{60}\ D_{10}$
D_{60} = Grain diameter at 60% passing
D_{30} = Grain diameter at 30% passing
D_{10} = Grain diameter at 10% passing

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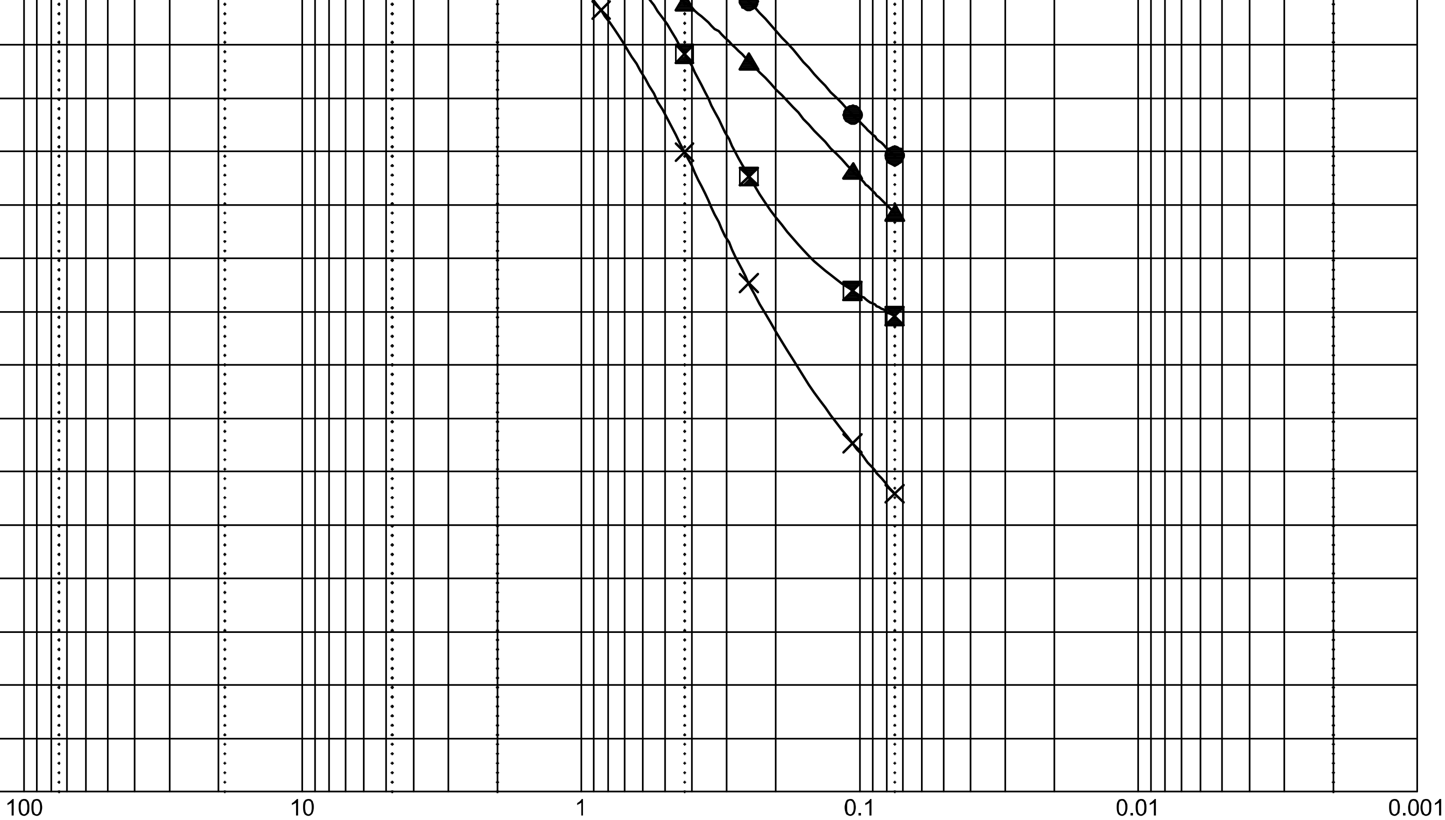
PROJECT NO.: 20211557.001A
DRAWN BY: MPG
CHECKED BY: DEP
DATE: 9/21/2020

SIEVE ANALYSIS

Bellflower Solar Project
Henry and Rush Counties, Indiana

APPENDIX
LAB-3



Depth (ft.)	Sample Number	Sample Description	LL	PL	PI
2 - 9	S-1 & S-2	SANDY LEAN CLAY (CL)	38	20	18
2 - 9	S-1 & S-2	CLAYEY SAND (SC)	35	20	15
2 - 9	S-1 & S-2	SANDY LEAN CLAY (CL)	36	19	17
2 - 9	S-1 & S-2	SILTY SAND (SM)	35	30	5

Depth (ft.)	D_{100}	D_{60}	D_{30}	D_{10}	Cc	Cu	Passing 3/4"	Passing #4	Passing #200	%Silt*	%Clay*
2 - 9	19	0.078	NM	NM	NM	NM	100	97	60	NM	NM
2 - 9	19	0.279	NM	NM	NM	NM	100	91	45	NM	NM
2 - 9	19	0.123	NM	NM	NM	NM	100	93	54	NM	NM
2 - 9	19	0.426	0.087	NM	NM	NM	100	95	28	NM	NM

t silt-sized and clay-sized content but may not
the material with the engineering properties of silt or clay.
neter Analysis testing performed in general accordance
nalysis) and ASTM D7928 (Hydrometer Analysis).

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
Coefficients of Curvature - $C_C = (D_{30})^2 / D_{60} D_{10}$
D_{60} = Grain diameter at 60% passing
D_{30} = Grain diameter at 30% passing
D_{10} = Grain diameter at 10% passing

IFELDER
: People. Right Solutions.

PROJECT NO.: 20211557.001A
DRAWN BY: MPG
CHECKED BY: DEP
DATE: 9/21/2020

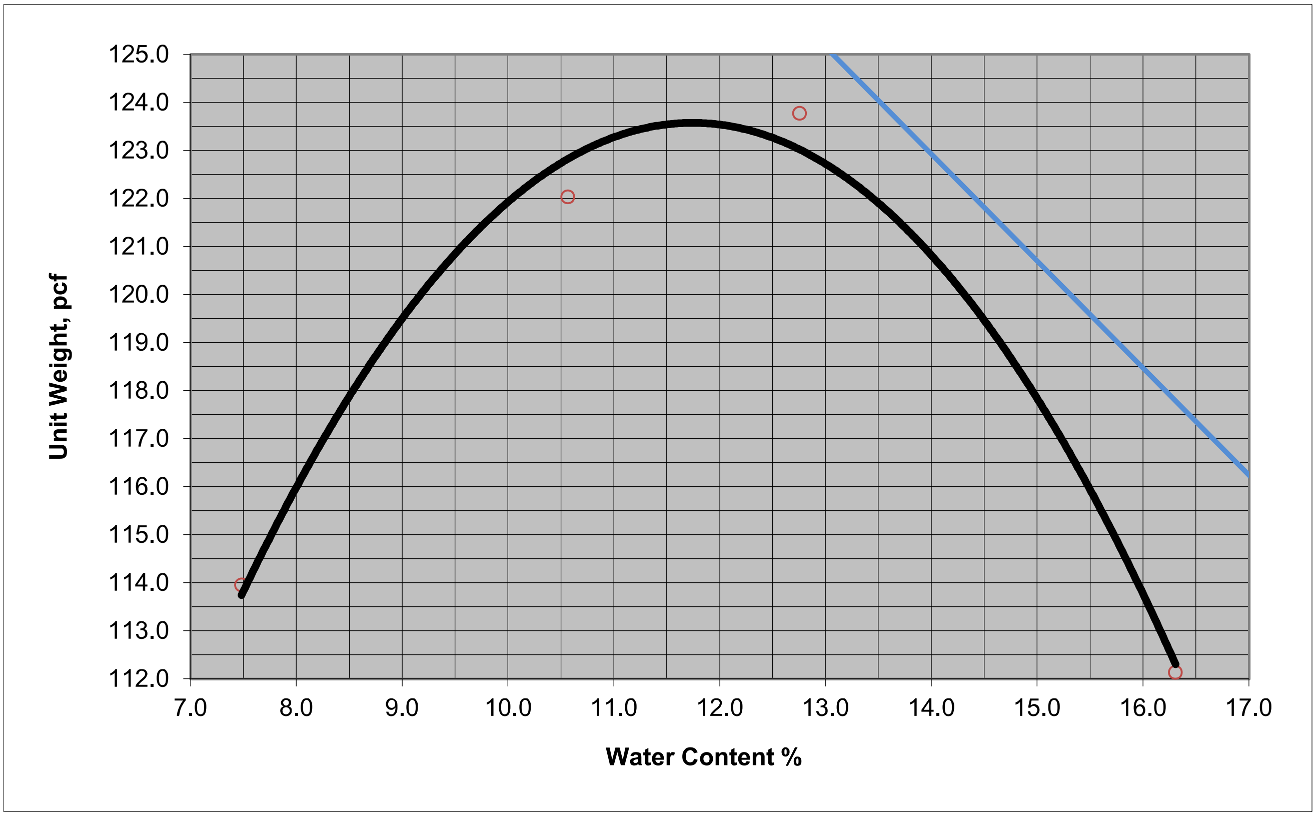
SIEVE ANALYSIS

Bellflower Solar Project
Henry and Rush Counties, Indiana

APPENDIX
LAB-4

Laboratory Compaction Characteristics of Soil

Project Number: *20211557.001A* **Project Name:** *LSBP Bellflower Project*
Client *Light Source BP*
Report Date: *September 16, 2020*
Sample: *TP-1/S-1 and S-2/2-9 ft.*
Soil Description: *Sandy Lean Clay*
Maximum Dry Density / Optimum Water Content *123.5 pcf / 11.6 %*



ASTM Method D 698: B
Preparation Method Dry
As-received Water Content % 12.5
% Retained on Controlling Sieve 0.5
Oversize Correction BSG N/A

Type of Rammer manual

APPENDIX

LAB-5

Remarks:

ASTM Test Method: ASTM D 698-12e
Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. This report may not be reproduced, except in full, without written approval of Kleinfelder.

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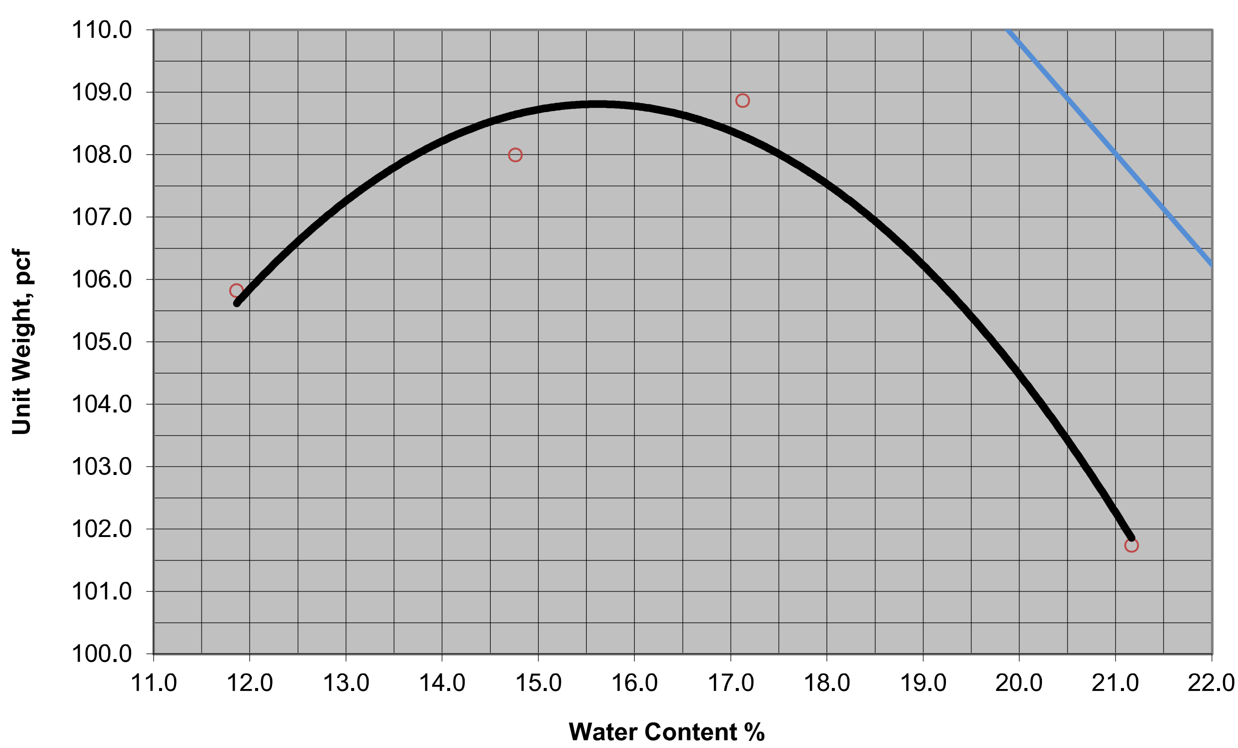
Laboratory Compaction Characteristics of Soil

Project Number: *20211557.001A* **Project Name:** *LSBP Bellflower Project*
Client *Light Source BP*
Report Date: *September 16, 2020*
Sample: *TP-2/S-1 and S-2/2-9 ft.*
Soil Description: *Clayey Sand*
Maximum Dry Density / Optimum Water Content *108.8 pcf / 15.6 %*



ASTM Method	D 698: B
Preparation Method	Dry
As-received Water Content %	19.6
% Retained on Controlling Sieve	3.1
Oversize Correction BSG	N/A

Type of Rammer manual

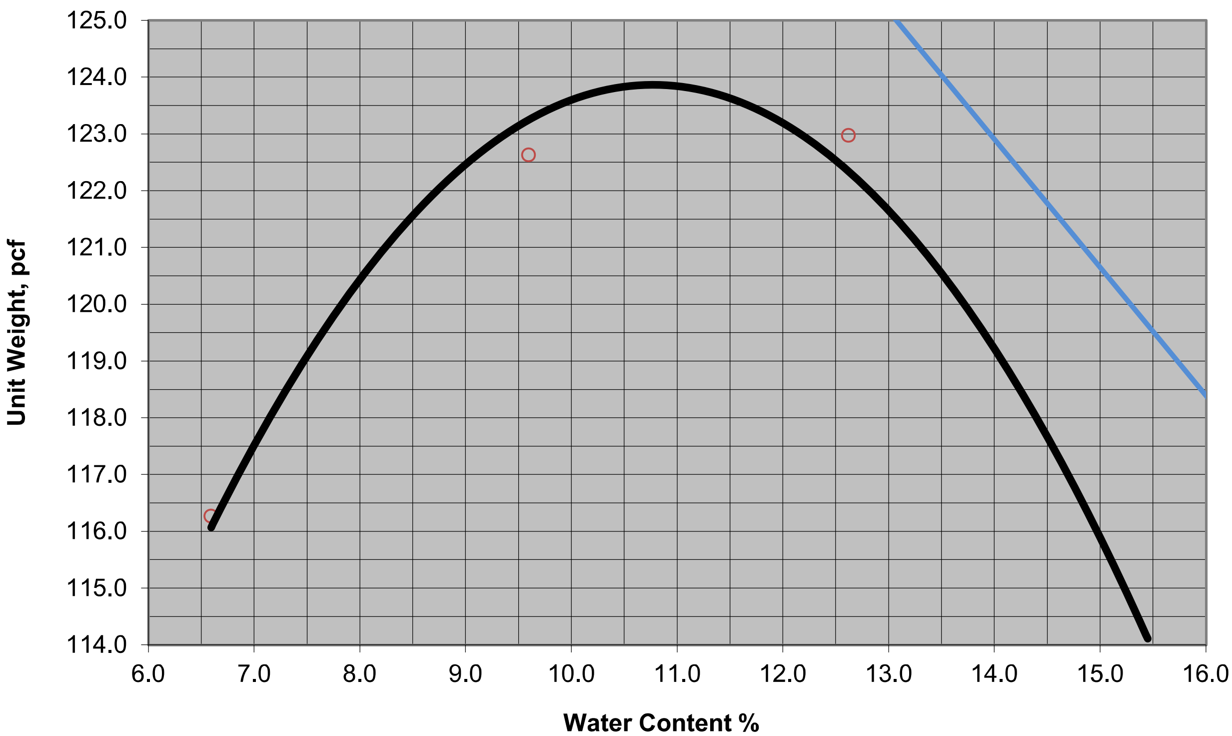
APPENDIX
LAB-6

Remarks:

ASTM Test Method: ASTM D 698-12e
Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. This report may not be reproduced, except in full, without written approval of Kleinfelder.

Laboratory Compaction Characteristics of Soil

Project Number: *20211557.001A* **Project Name:** *LSBP Bellflower Project*
Client *Light Source BP*
Report Date: *September 16, 2020*
Sample: *TP-3/S-1 and S-2/2-9 ft.*
Soil Description: *Sandy Lean Clay*
Maximum Dry Density / Optimum Water Content *123.9 pcf / 10.8 %*



ASTM Method	D 698: B
Preparation Method	Dry
As-received Water Content %	10.9
% Retained on Controlling Sieve	1.8
Oversize Correction BSG	N/A

Type of Rammer manual

APPENDIX

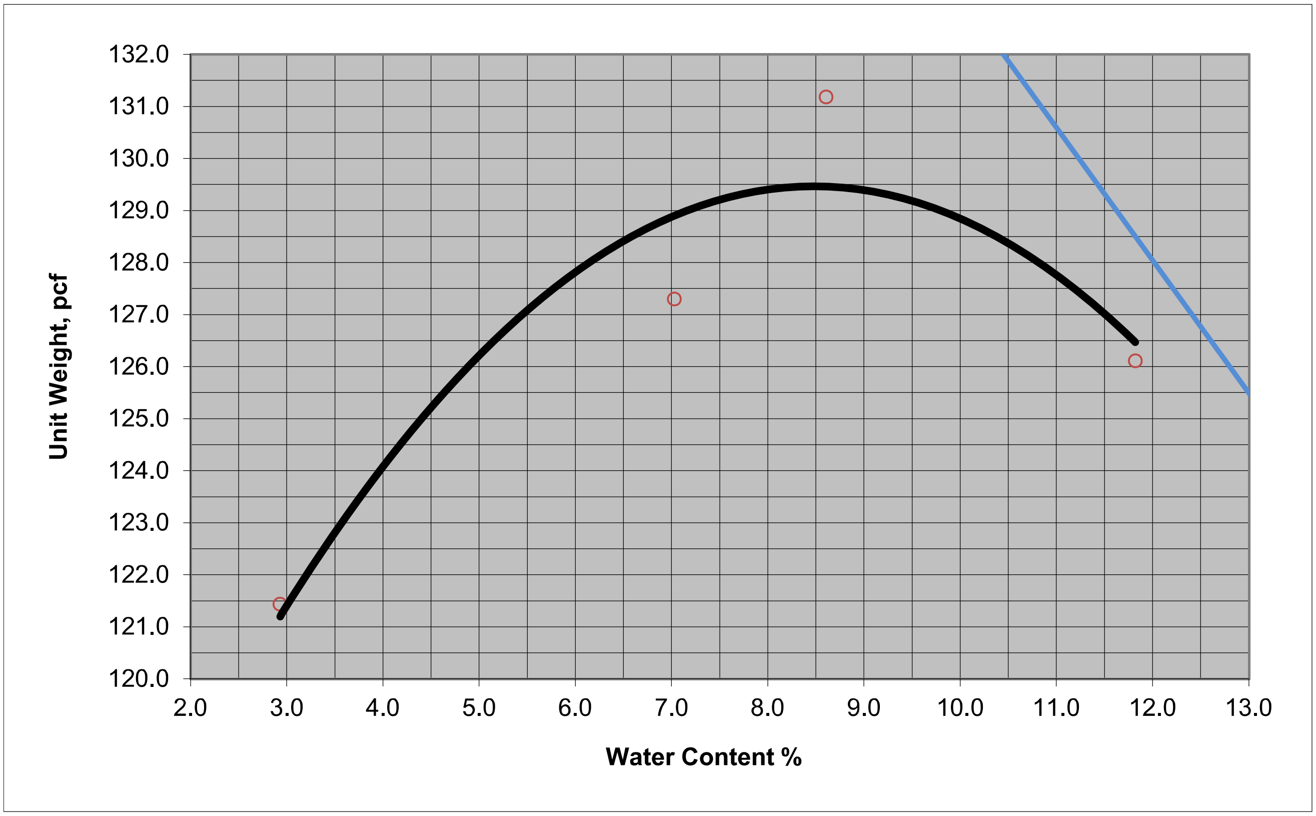
LAB-7

Remarks:

ASTM Test Method: ASTM D 698-12e
Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. This report may not be reproduced, except in full, without written approval of Kleinfelder.

Laboratory Compaction Characteristics of Soil

Project Number: *20211557.001A* **Project Name:** *LSBP Bellflower Project*
Client *Light Source BP*
Report Date: *September 16, 2020*
Sample: *TP-4/S-1 and S-2/2-9 ft.*
Soil Description: *Silty Sand*
Maximum Dry Density / Optimum Water Content *129.5 pcf / 8.5 %*



ASTM Method	D 698: B	**Type of Rammer**	manual
Preparation Method	Dry		
As-received Water Content %	12.8		
% Retained on Controlling Sieve	0.9		
Oversize Correction BSG	N/A		

APPENDIX

LAB-8

Remarks:

ASTM Test Method: ASTM D 698-12e
Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. This report may not be reproduced, except in full, without written approval of Kleinfelder.

APPENDIX D

LABORATORY TEST RESULTS: THERMAL RESISTIVITY TESTING

21239 FM529 Rd., Bldg. F
Cypress, TX 77433
Tel: 281-985-9344
Fax: 832-427-1752
info@geothermusa.com

September 30, 2020

Kleinfelder
707 17th Street, Ste 3000
Denver, CO 80202
Attn: Bradley M. Baum, MS, PMP

Re: Thermal Analysis of Native Soil Samples
Bellflower Solar Project – Project No. 20211557

The following is the report of thermal dryout characterization tests conducted on four (4) native soil samples from the referenced project sent to our laboratory.

Thermal Dryout Tests: The samples were tested at their "optimum" moisture content and 90% of the maximum dry density ***provided by Kleinfelder.*** The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dry out curves are presented in **Figures 1 to 4.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

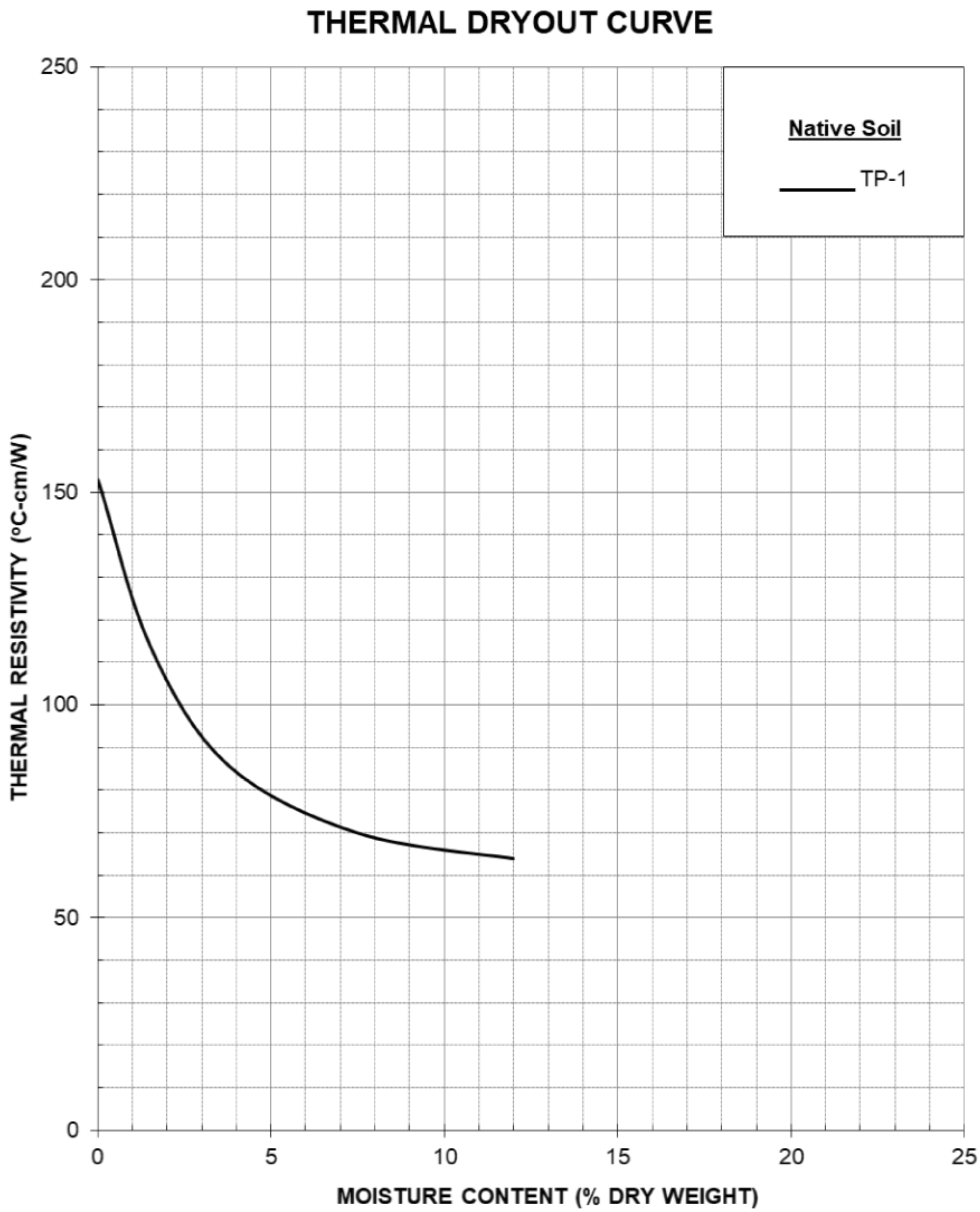
Sample ID	Soil Description (Kleinfelder)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
		Wet	Dry		
TP-1	Sandy Lean Clay	64	153	12	111
TP-2	Clayey Sand	83	215	16	98
TP-3	Sandy Lean Clay	60	147	11	112
TP-4	Silty Sand	56	127	9	117

Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Nimesh Patel

Geotherm USA



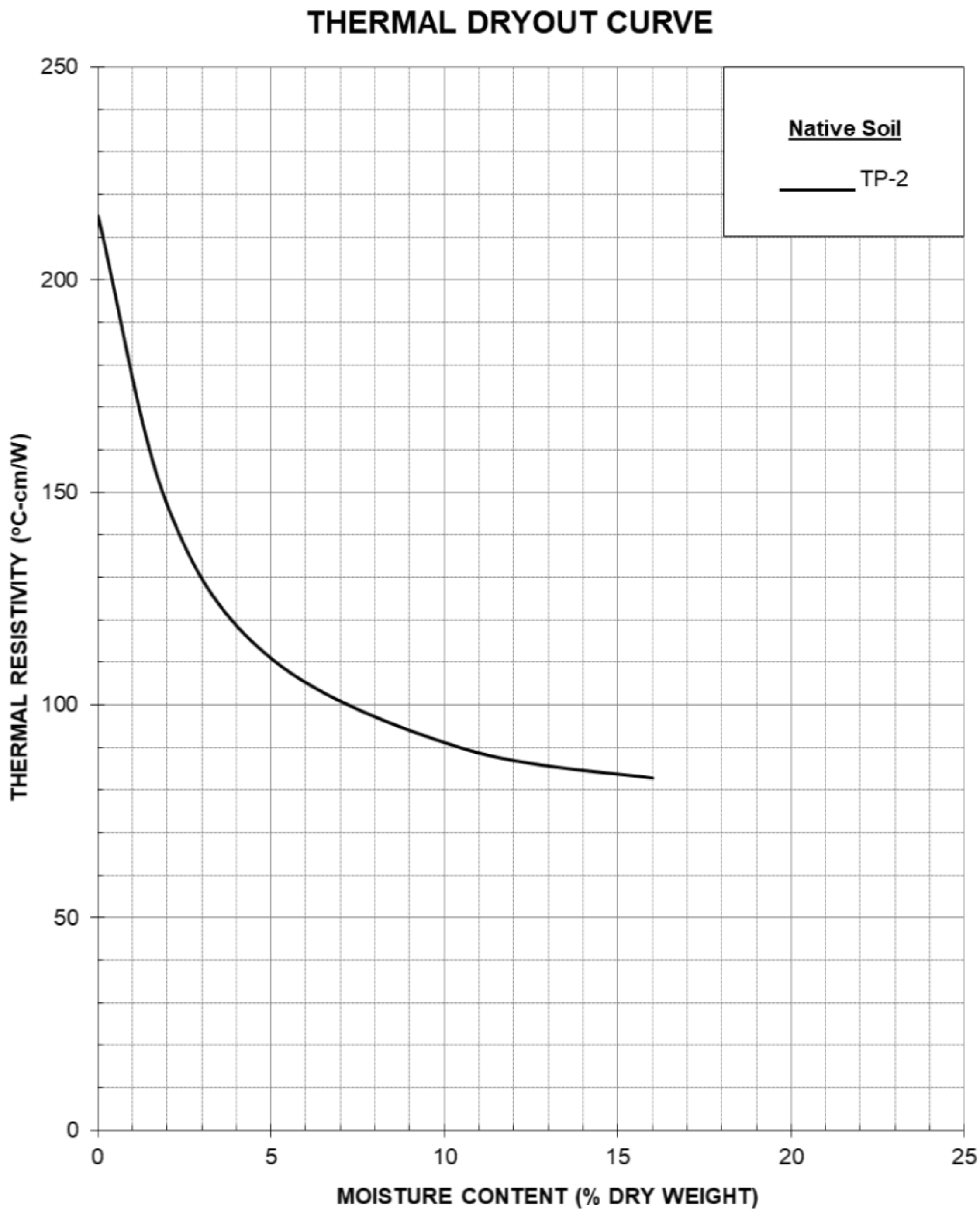
Kleinfelder (Project No. 20211557)

Thermal Analysis of Native Soils

Bellflower Solar Project

September 2020 **Figure 1**

Geotherm USA

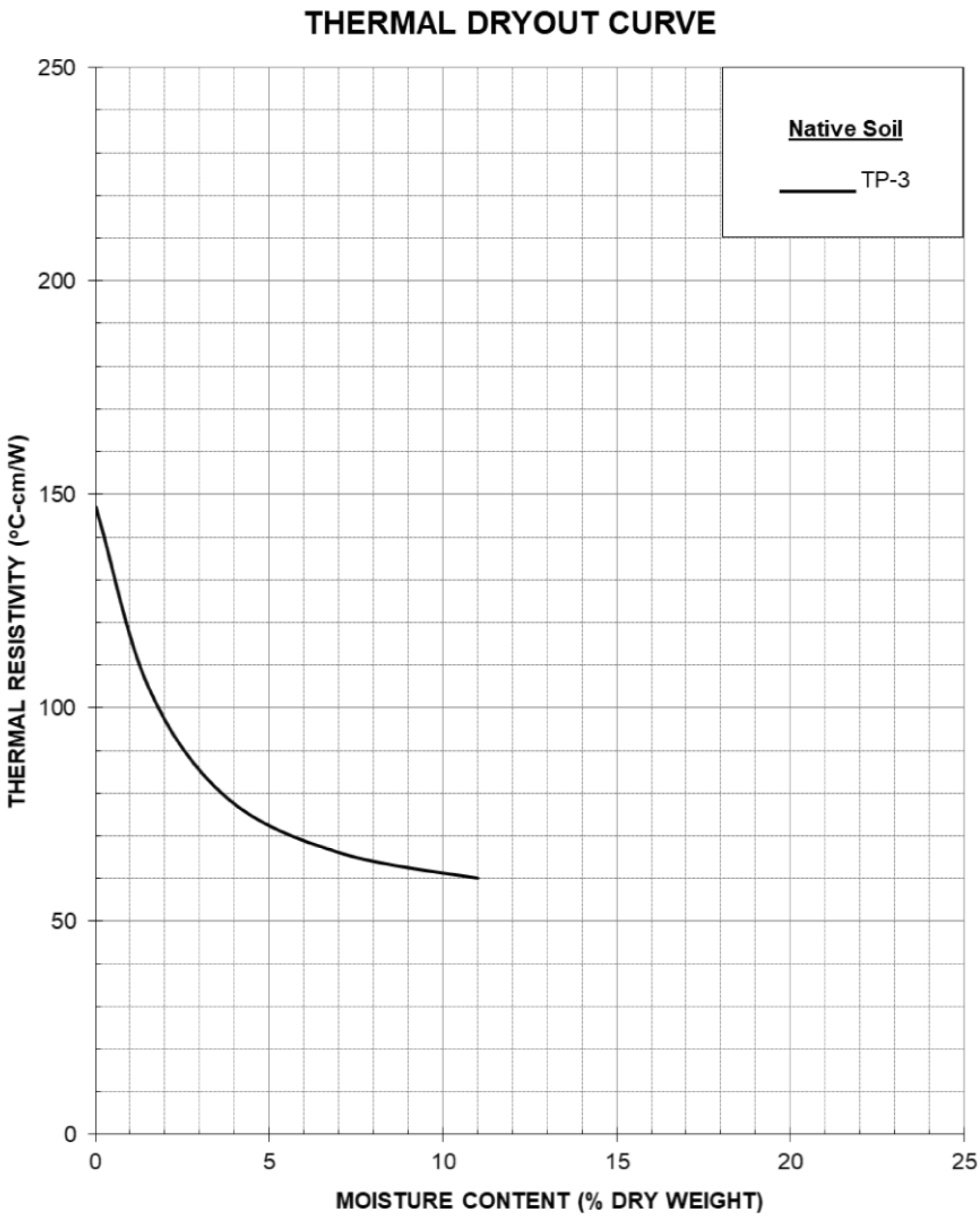


Kleinfelder (Project No. 20211557)

Thermal Analysis of Native Soils

Bellflower Solar Project

September 2020 **Figure 2**



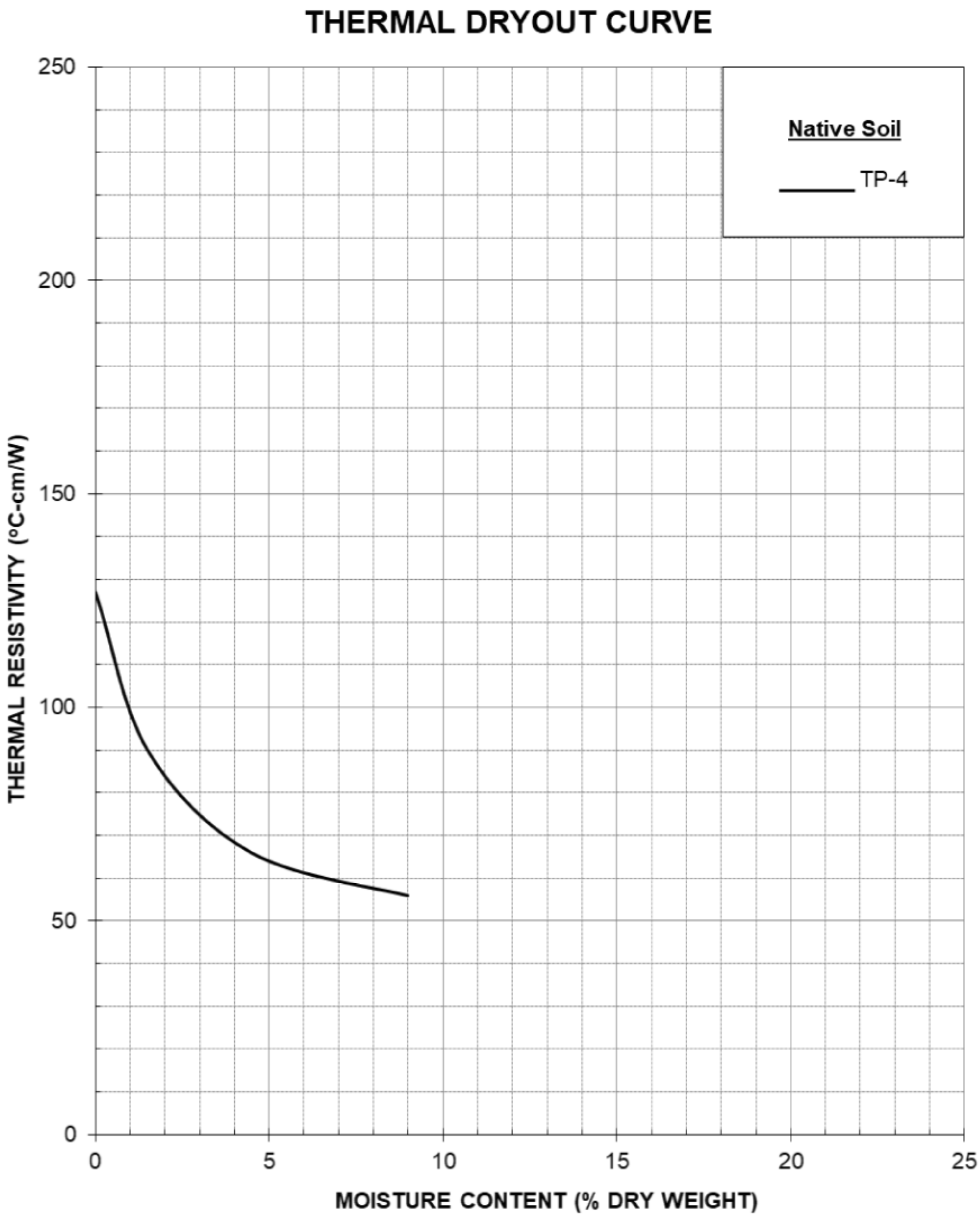
Kleinfelder (Project No. 20211557)

Thermal Analysis of Native Soils

Bellflower Solar Project

September 2020 **Figure 3**

Geotherm USA



Kleinfelder (Project No. 20211557)

Thermal Analysis of Native Soils

Bellflower Solar Project

September 2020 **Figure 4**

APPENDIX E
LABORATORY TEST RESULTS: CORROSIVITY

SoilCor
CORROSION & THERMAL SCIENCES
42184 Remington Ave, Temecula CA 92590
ph (951) 795-3135 • fx (951) 894-2683

Work Order No.: 2011268
Client: Kleinfelder, Inc.
Project No.: 20211557.001A
Project Name: LSBP - Bellflower Solar Project, IN
Report Date: September 11, 2020

Laboratory Test(s) Results Summary

The subject soil samples were processed with the U.S. Standard No. 10 Sieve and tested for pH per AASHTO T 289-91 (2018), Minimum Electrical Resistivity per AASHTO T 288-12 (2016), Sulfate Ion Content per AASHTO T 290-95 (2016) Method B, Water-Soluble Chloride Ion Content per AASHTO T 291-94 (2018) Method A and in general accordance with Standard Methods procedures for Sulfide Content (SM 4500-S2- D) and Oxidation-Reduction Potential (SM 2580 B Mod.). Redox Potential value(s) reflect temperature correction based on Light's standard solution measurements applied to the calculation in section 6 of the procedure. The results follow:

Sample Identification	pH	Minimum Resistivity (ohm-cm)	Sulfate Content (mg/kg)	Chloride Content (mg/kg)	Sulfide Content (mg/kg)	Redox Potential	
						Eh (mV)	Temp. (°C)
BF-B-03,S4/S5 @ 6-10ft	7.3	4,300	ND	10	ND	246	20.7
BF-B-04,S4/S5 @ 6-10ft	7.6	5,200	ND	ND	ND	278	20.7
BF-B-05,S4/S5 @ 6-10ft	7.6	5,600	ND	ND	0.56	275	20.9
BF-B-08,S2/S3 @ 2-6ft	7.5	3,900	ND	ND	ND	266	20.9
BF-B-010,S4/S5 @ 6-10ft	7.2	4,800	10	ND	0.38	251	21.0
BF-B-12,S3/S4 @ 4-8ft	7.1	6,100	ND	ND	0.25	285	21.1

*ND=No Detection

We appreciate the opportunity to serve you. Please do not hesitate to contact us with any questions or clarifications regarding these results or procedures.

Ahmet K. Kaya, Laboratory Manager

ASTM INTERNATIONAL ORGANIZATIONAL MEMBER

APPENDIX F
PILE LOAD TEST RESULTS

Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

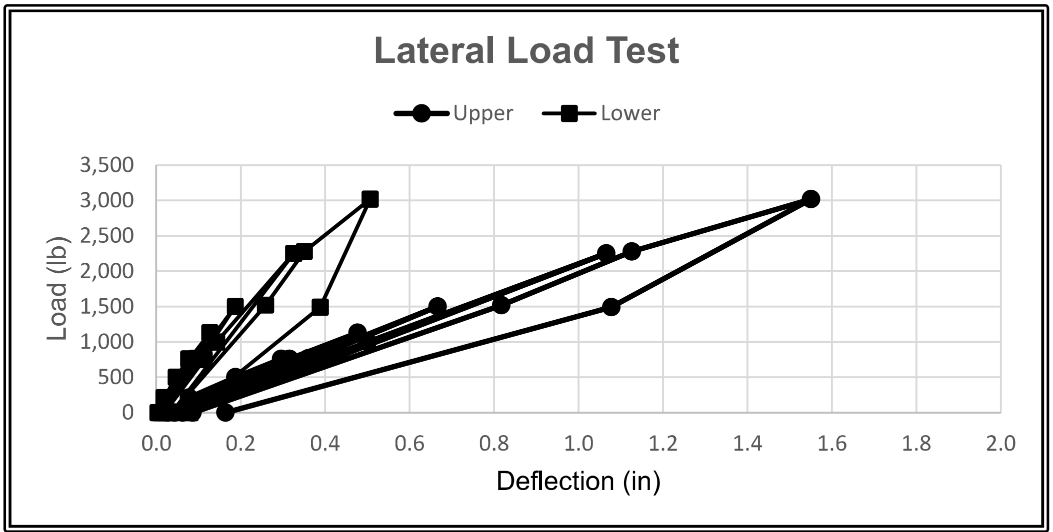
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-1**

Pile Indentifier: PLT-1A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 61 in

Load Application Height: 45 in
Upper Measurement Height: 47.5 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
210	0.077	0.019	0	0.062	0.019
500	0.188	0.047	750	0.394	0.114
760	0.296	0.076	1000	0.500	0.143
0	0.026	0.004	2250	1.066	0.326
760	0.315	0.079	0	0.086	0.037
1130	0.477	0.127	1520	0.818	0.259
0	0.044	0.011	2280	1.126	0.351
770	0.360	0.097	3020	1.551	0.507
1500	0.666	0.187	1490	1.078	0.388
0	0.062	0.019	0	0.164	0.080



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

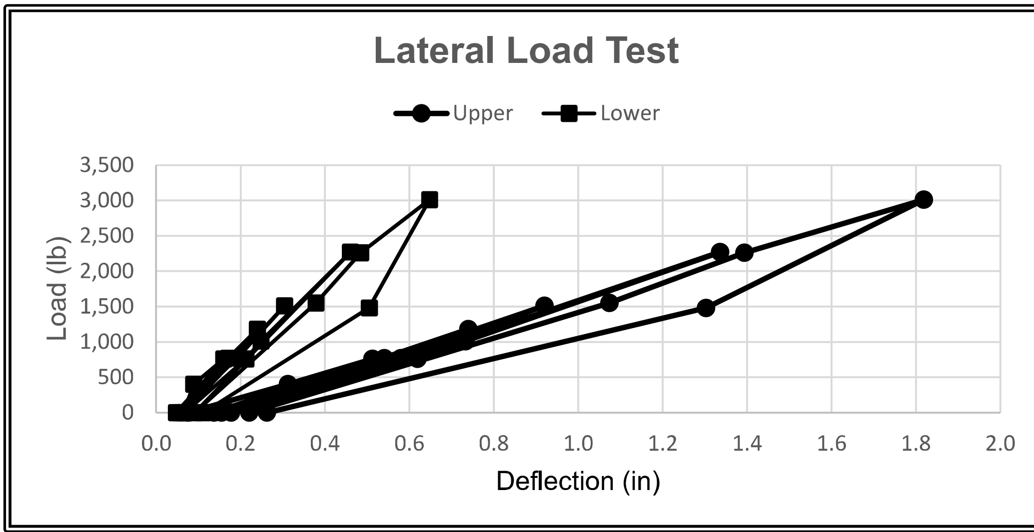
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-1**

Pile Indentifier: PLT-1B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 59 in

Load Application Height: 48 in
Upper Measurement Height: 47.75 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
0	0.075	0.066	0	0.178	0.068
400	0.312	0.089	760	0.619	0.213
760	0.513	0.161	1010	0.733	0.248
0	0.137	0.048	2270	1.336	0.461
770	0.541	0.172	0	0.220	0.091
1180	0.740	0.240	1550	1.074	0.379
0	0.155	0.056	2260	1.394	0.485
770	0.580	0.192	3010	1.819	0.648
1510	0.920	0.305	1480	1.303	0.505
0	0.178	0.068	0	0.263	0.112



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

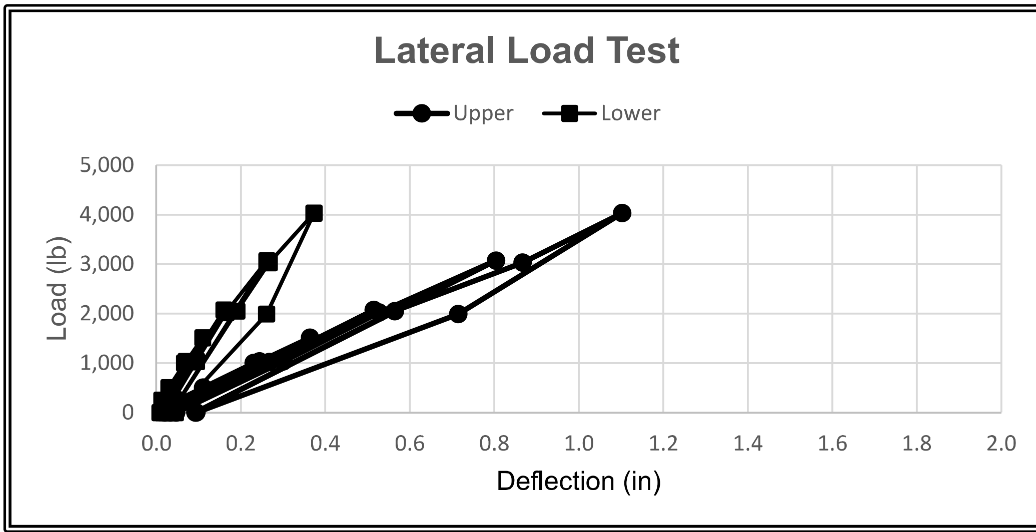
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-1**

Pile Indentifier: PLT-1C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 58 in

Load Application Height: 48 in
Upper Measurement Height: 47.75 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
250	0.052	0.013	0	0.047	0.022
500	0.111	0.030	1030	0.300	0.095
1000	0.231	0.067	2020	0.527	0.165
0	0.021	0.009	3070	0.804	0.262
1030	0.244	0.071	0	0.092	0.035
1510	0.364	0.110	2050	0.565	0.190
0	0.033	0.016	3030	0.867	0.267
1020	0.268	0.081	4030	1.102	0.373
2070	0.515	0.161	1990	0.715	0.261
0	0.047	0.022	0	0.095	0.045



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

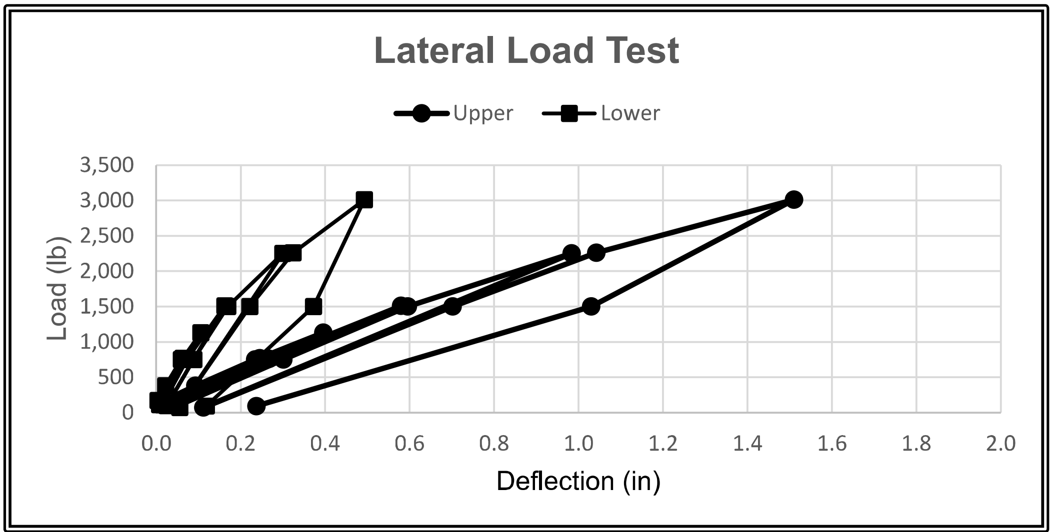
Technician: CE/MG
Test Date: 9/15/2020

Test Location: **PLT-2**

Pile Indentifier: PLT-2A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 61 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
170	0.019	0.004	100	0.053	0.026
380	0.093	0.022	750	0.301	0.089
750	0.234	0.059	1500	0.596	0.170
110	0.016	0.008	2250	0.984	0.300
770	0.246	0.063	70	0.112	0.056
1130	0.396	0.106	1500	0.703	0.222
110	0.032	0.015	2260	1.042	0.324
760	0.268	0.073	3010	1.510	0.493
1510	0.580	0.163	1500	1.031	0.373
100	0.053	0.026	90	0.238	0.119



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

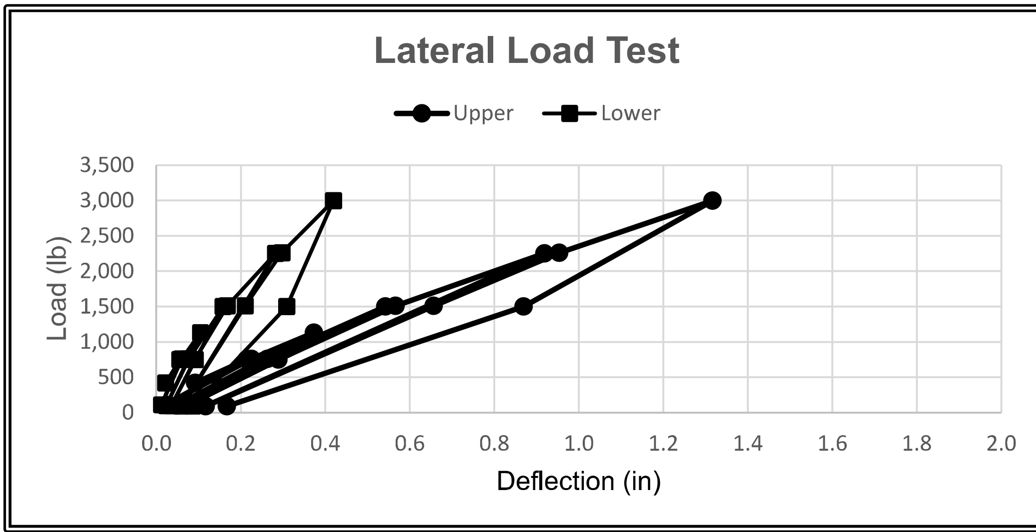
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-2**

Pile Indentifier: PLT-2B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			100	0.073	0.036
420	0.092	0.022	750	0.289	0.092
750	0.214	0.056	1510	0.567	0.168
110	0.024	0.012	2250	0.919	0.282
760	0.225	0.060	90	0.117	0.060
1130	0.373	0.105	1510	0.657	0.211
100	0.049	0.024	2260	0.954	0.297
760	0.264	0.077	3000	1.317	0.419
1500	0.543	0.158	1500	0.870	0.309
100	0.073	0.036	90	0.168	0.086



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

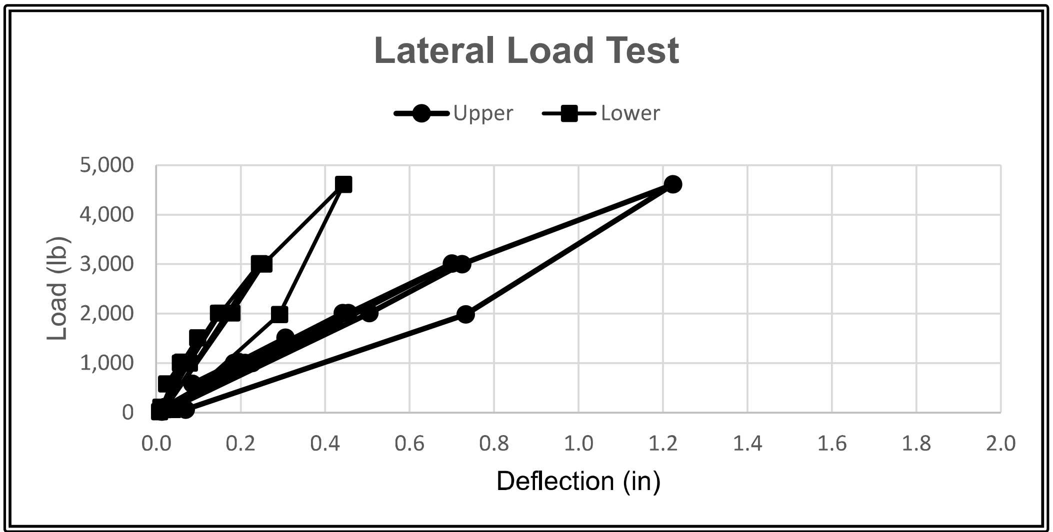
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-2**

Pile Indentifier: PLT-2C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 61 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			100	0.026	0.015
580	0.086	0.025	1000	0.228	0.078
1000	0.185	0.057	2010	0.456	0.152
20	0.014	0.008	3010	0.700	0.244
1020	0.195	0.062	70	0.032	0.020
1510	0.307	0.098	2010	0.505	0.179
110	0.020	0.011	3000	0.725	0.255
1000	0.211	0.069	4610	1.224	0.444
2010	0.442	0.147	1980	0.733	0.292
100	0.026	0.015	60	0.070	0.040



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

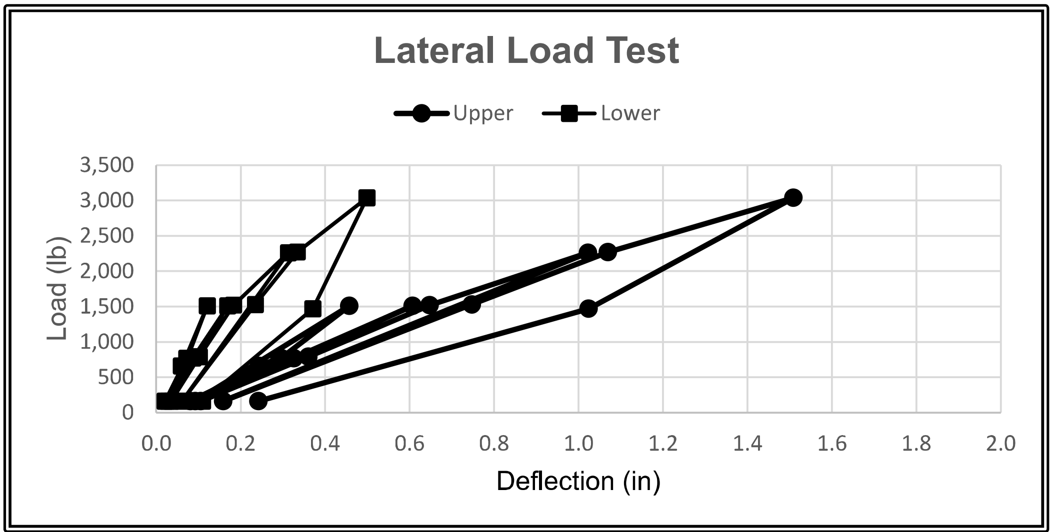
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-3**

Pile Indentifier: PLT-3A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			160	0.106	0.036
660	0.244	0.059	790	0.361	0.102
770	0.292	0.072	1520	0.648	0.183
160	0.081	0.021	2260	1.022	0.313
770	0.296	0.074	160	0.159	0.061
1510	0.458	0.121	1530	0.748	0.235
160	0.093	0.027	2270	1.070	0.334
770	0.326	0.087	3040	1.509	0.499
1510	0.607	0.170	1470	1.024	0.371
160	0.106	0.036	160	0.243	0.110



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

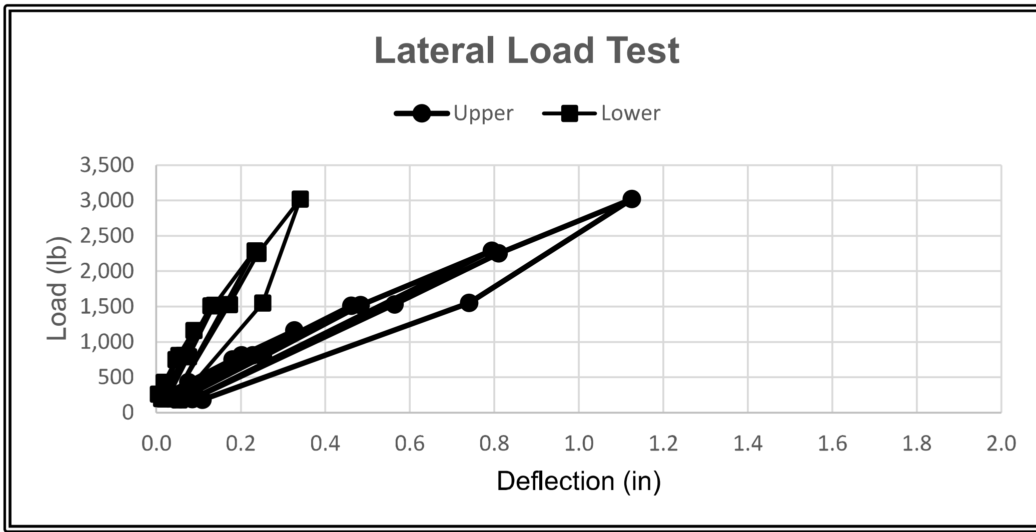
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-3**

Pile Indentifier: PLT-3B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 59 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
260	0.021	0.005	190	0.057	0.026
430	0.076	0.019	790	0.253	0.076
750	0.181	0.047	1520	0.484	0.137
200	0.028	0.012	2290	0.794	0.234
810	0.202	0.053	190	0.085	0.040
1160	0.327	0.089	1530	0.564	0.173
190	0.044	0.019	2250	0.811	0.241
810	0.229	0.065	3020	1.126	0.341
1510	0.462	0.129	1550	0.741	0.252
190	0.057	0.026	180	0.109	0.055



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

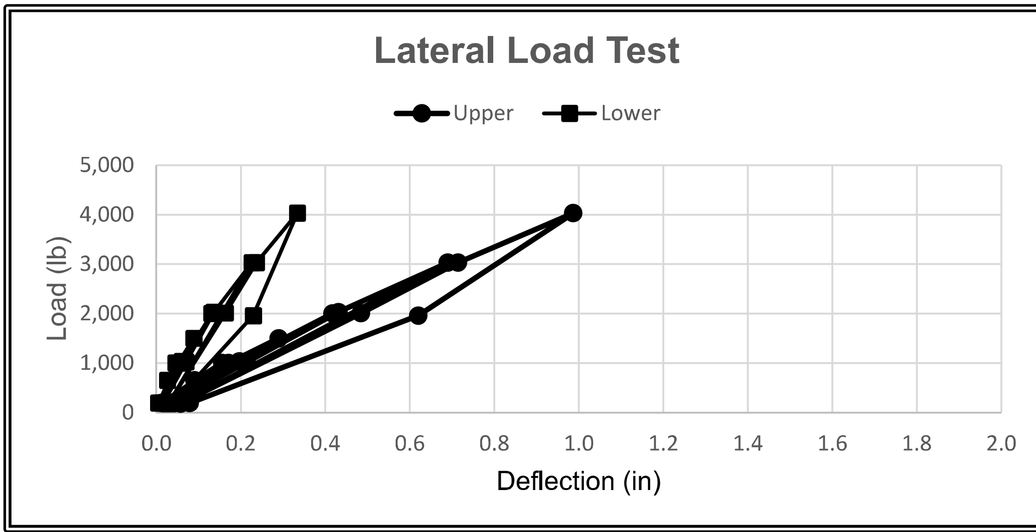
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-3C**

Pile Indentifier: PLT-3C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 62 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			190	0.035	0.017
650	0.091	0.027	1020	0.214	0.070
1000	0.156	0.047	2030	0.431	0.137
190	0.012	0.006	3030	0.690	0.227
1000	0.171	0.051	180	0.058	0.029
1500	0.290	0.089	2010	0.485	0.164
190	0.023	0.011	3030	0.714	0.237
1030	0.197	0.062	4030	0.987	0.334
2000	0.417	0.132	1960	0.620	0.230
190	0.035	0.017	190	0.079	0.040



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

Technician: CE/MG
Test Date: 9/12/2020

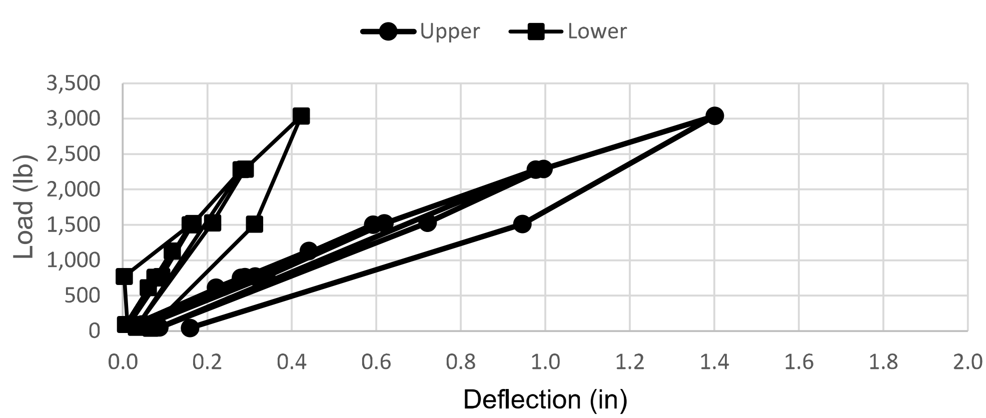
Test Location: **PLT-4**

Pile Indentifier: PLT-4A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			90	0.056	0.014
610	0.221	0.060	770	0.340	0.092
750	0.280	0.076	1520	0.619	0.167
90	0.027	0.007	2280	0.978	0.280
760	0.289	0.077	50	0.087	0.032
1130	0.440	0.117	1530	0.722	0.213
90	0.045	0.011	2290	0.996	0.290
770	0.314	0.003	3040	1.401	0.423
1500	0.593	0.159	1510	0.946	0.312
90	0.056	0.014	40	0.159	0.067

Lateral Load Test



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

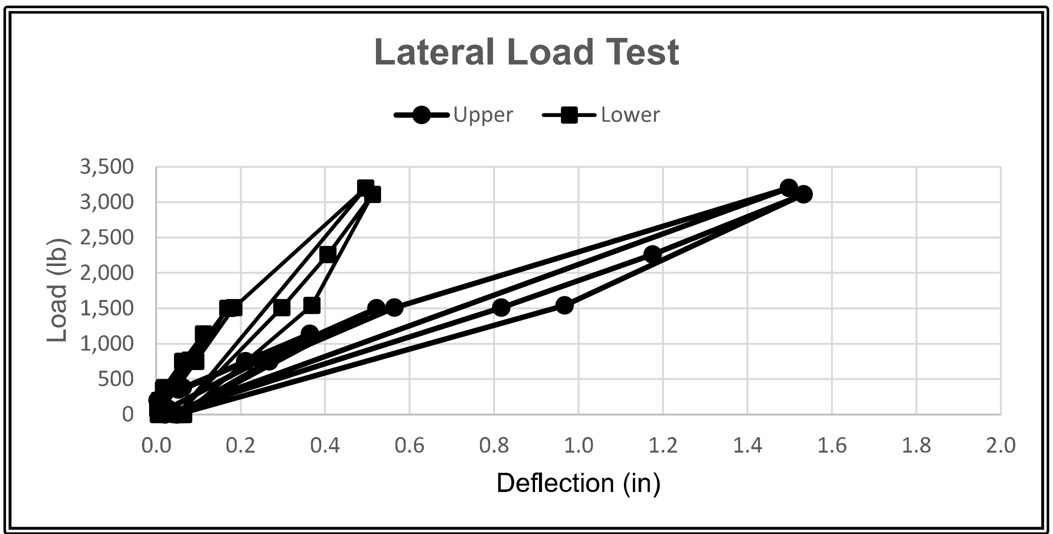
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-4B**

Pile Indentifier: PLT-4B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
350	0.053	0.016	0	0.048	0.005
380	0.063	0.019	750	0.268	0.094
750	0.213	0.062	1510	0.564	0.184
200	0.004	0.008	3200	1.498	0.496
750	0.211	0.064	0	0.021	0.051
1140	0.364	0.112	1510	0.818	0.298
80	0.028	0.003	2260	1.175	0.407
770	0.248	0.080	3110	1.533	0.512
1500	0.522	0.169	1540	0.968	0.369
0	0.048	0.005	0	0.049	0.065



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

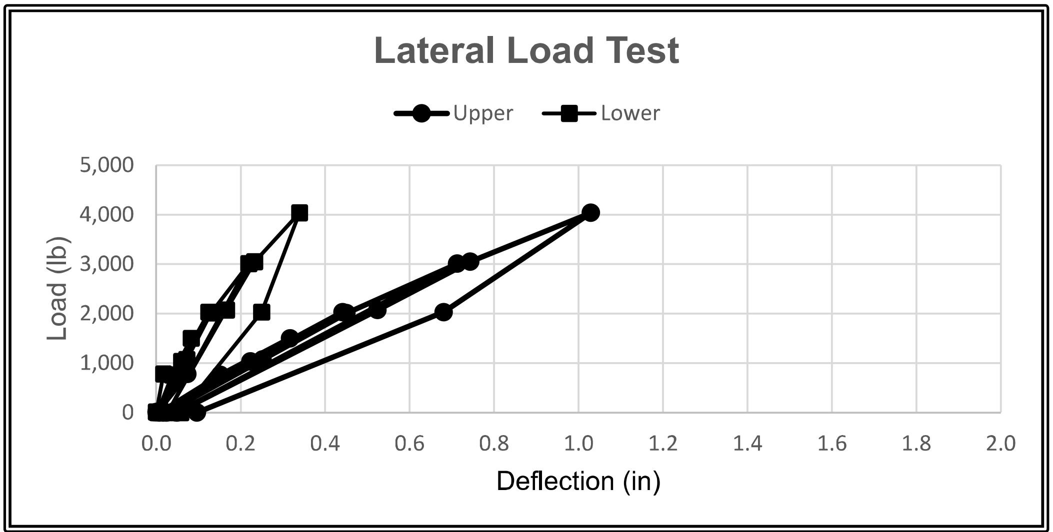
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-4**

Pile Indentifier: PLT-4C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
10	0.002	0.000	0	0.024	0.012
780	0.074	0.017	1070	0.252	0.073
			2010	0.451	0.129
0	0.008	0.003	3010	0.713	0.220
760	0.152	0.038	0	0.049	0.028
1500	0.317	0.083	2070	0.524	0.166
0	0.017	0.008	3050	0.743	0.233
1030	0.223	0.060	4040	1.029	0.339
2030	0.442	0.125	2030	0.681	0.250
0	0.024	0.012	0	0.097	0.058



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

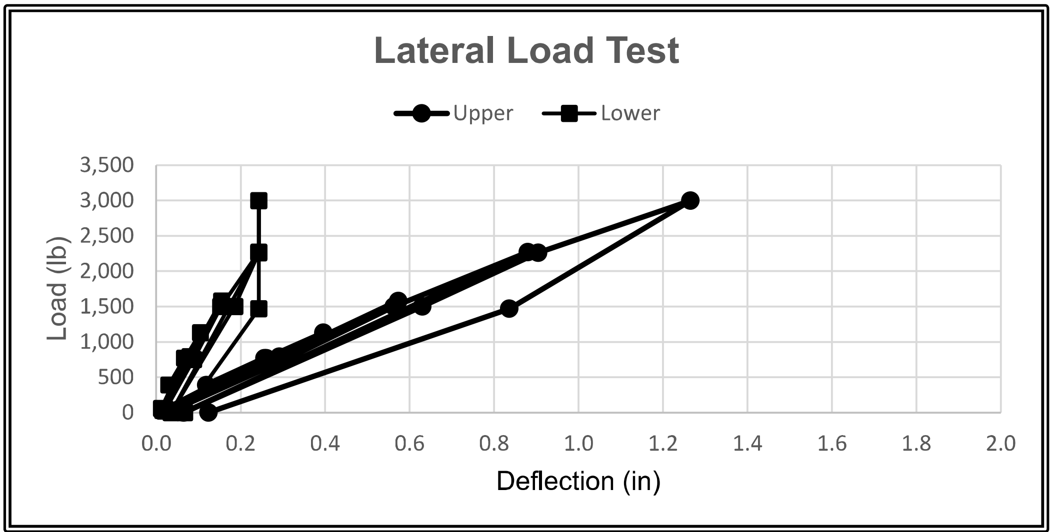
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-5**

Pile Indentifier: PLT-5A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			20	0.036	0.020
390	0.118	0.030	750	0.306	0.089
770	0.256	0.067	1500	0.563	0.153
60	0.026	0.012	2270	0.880	0.243
770	0.261	0.069	0	0.065	0.035
1130	0.396	0.104	1500	0.630	0.186
30	0.029	0.015	2260	0.904	0.243
790	0.291	0.080	3000	1.265	0.243
1580	0.573	0.154	1470	0.836	0.243
20	0.036	0.020	0	0.123	0.067



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

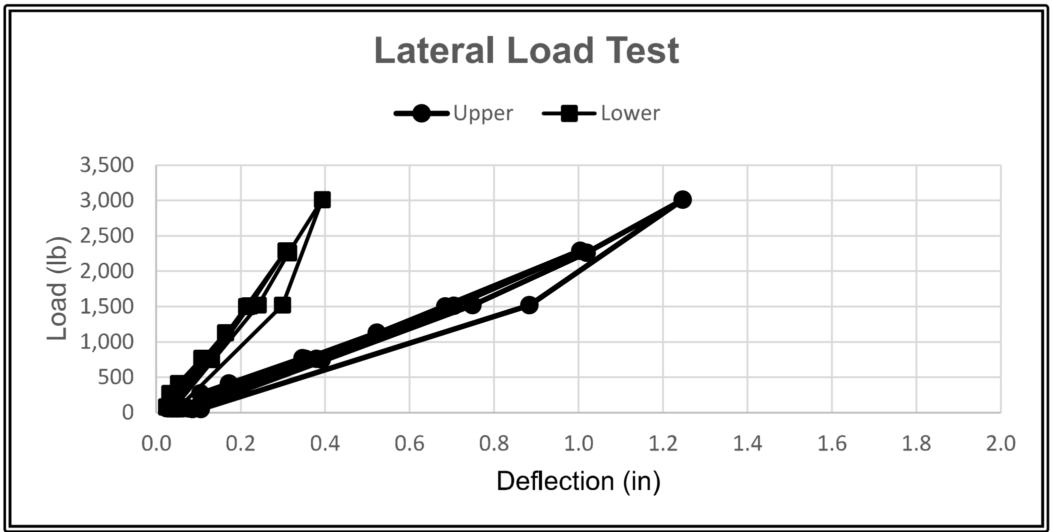
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-5**

Pile Indentifier: PLT-5B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
270	0.105	0.032	60	0.076	0.034
410	0.172	0.053	750	0.393	0.131
770	0.347	0.108	1510	0.705	0.221
80	0.059	0.025	2290	1.004	0.307
760	0.353	0.111	50	0.086	0.040
1130	0.523	0.164	1520	0.749	0.242
70	0.070	0.030	2260	1.019	0.313
760	0.379	0.123	3010	1.247	0.393
1500	0.685	0.214	1520	0.884	0.299
60	0.076	0.034	50	0.106	0.050



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

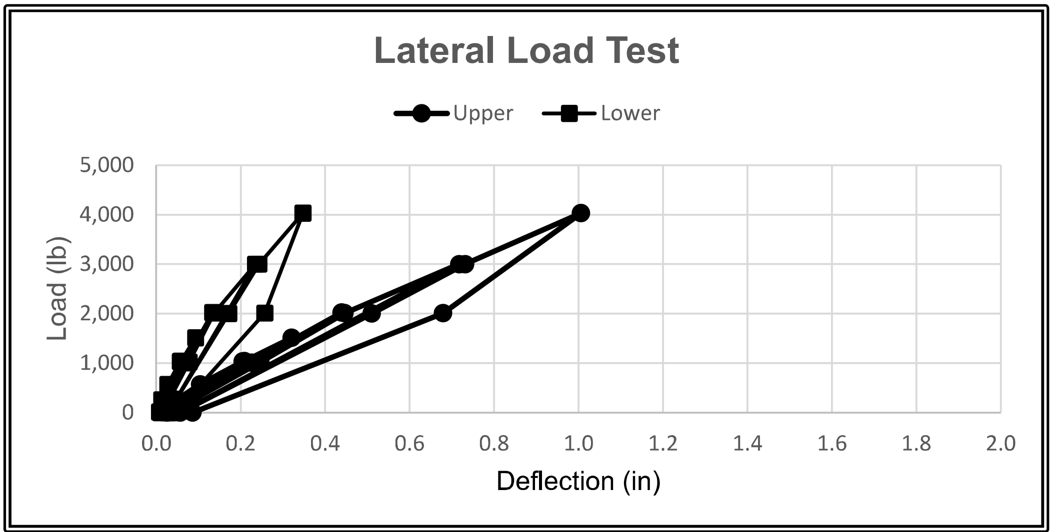
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-5**

Pile Indentifier: PLT-5C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
260	0.049	0.013	10	0.035	0.016
570	0.104	0.028	1020	0.246	0.078
1030	0.205	0.057	2010	0.446	0.137
10	0.018	0.008	3000	0.718	0.235
1040	0.209	0.059	0	0.057	0.028
1510	0.321	0.093	2000	0.511	0.172
0	0.026	0.011	3000	0.732	0.243
1010	0.226	0.067	4030	1.006	0.347
2020	0.440	0.133	2010	0.680	0.257
10	0.035	0.016	0	0.086	0.046



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

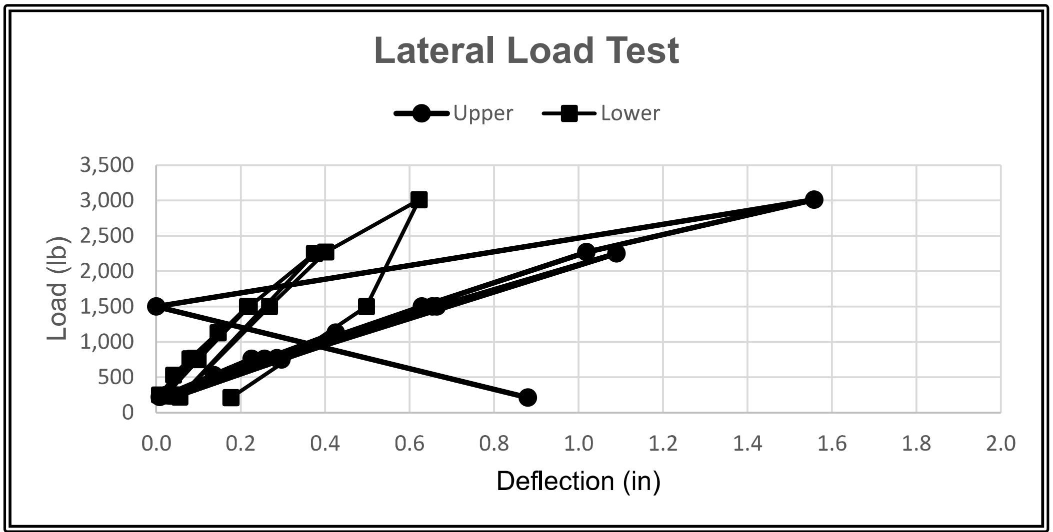
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-6**

Pile Indentifier: PLT-6A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			240	0.051	0.021
530	0.137	0.041	750	0.297	0.099
760	0.226	0.081	1500	0.665	0.220
250	0.024	0.008	2250	1.090	0.375
760	0.257	0.080	220	0.009	0.056
1130	0.425	0.147	1500	0.629	0.268
240	0.033	0.012	2270	1.019	0.402
770	0.286	0.092	3010	1.558	0.622
1500	0.654	0.216	1500	0.000	0.498
240	0.051	0.021	210	0.880	0.177



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

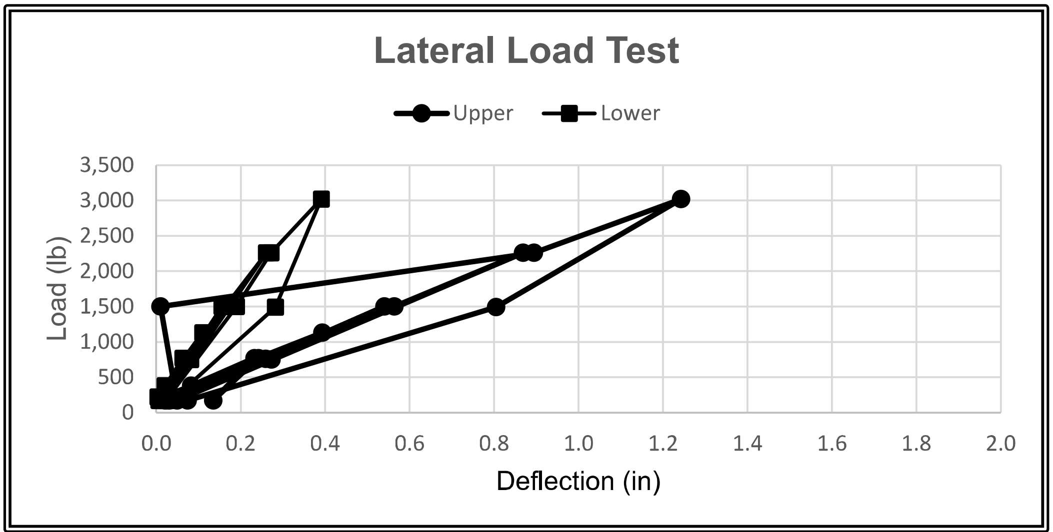
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-6**

Pile Indentifier: PLT-6B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
220	0.017	0.004	170	0.031	0.014
380	0.083	0.021	750	0.273	0.081
770	0.233	0.063	1500	0.564	0.164
170	0.135	0.007	2260	0.869	0.261
770	0.242	0.066	170	0.050	0.022
1130	0.394	0.110	1500	0.010	0.190
170	0.022	0.010	2260	0.895	0.272
760	0.260	0.074	3020	1.243	0.391
1500	0.540	0.156	1490	0.805	0.282
170	0.031	0.014	170	0.075	0.036



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

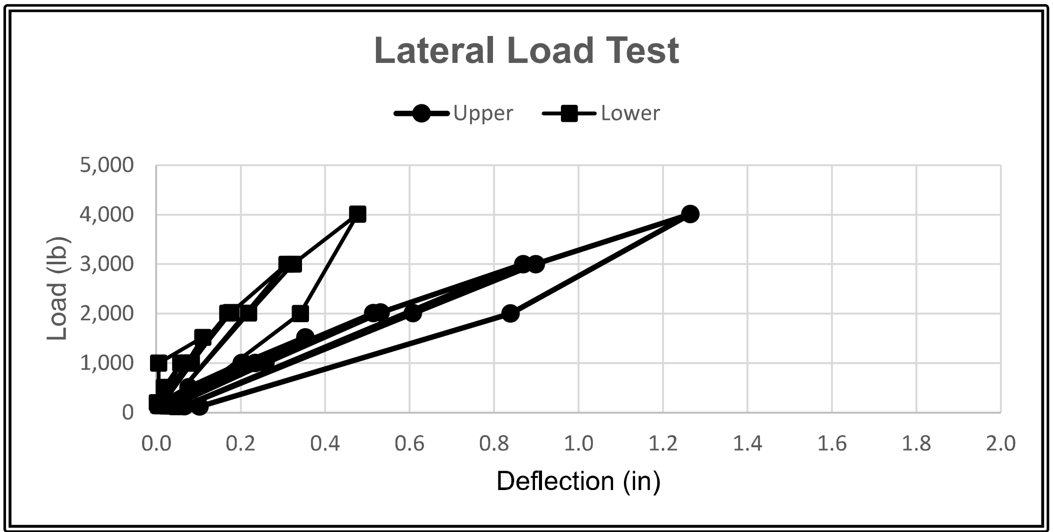
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-6**

Pile Indentifier: PLT-6C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
200	0.011	0.002	140	0.038	0.013
510	0.077	0.019	1000	0.259	0.083
1000	0.203	0.058	2020	0.531	0.177
150	0.018	0.006	3000	0.870	0.310
1000	0.207	0.006	130	0.067	0.028
1520	0.353	0.111	2010	0.609	0.219
140	0.028	0.009	3000	0.899	0.325
1000	0.235	0.072	4010	1.265	0.477
2010	0.514	0.170	2000	0.839	0.341
140	0.038	0.013	120	0.103	0.050



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

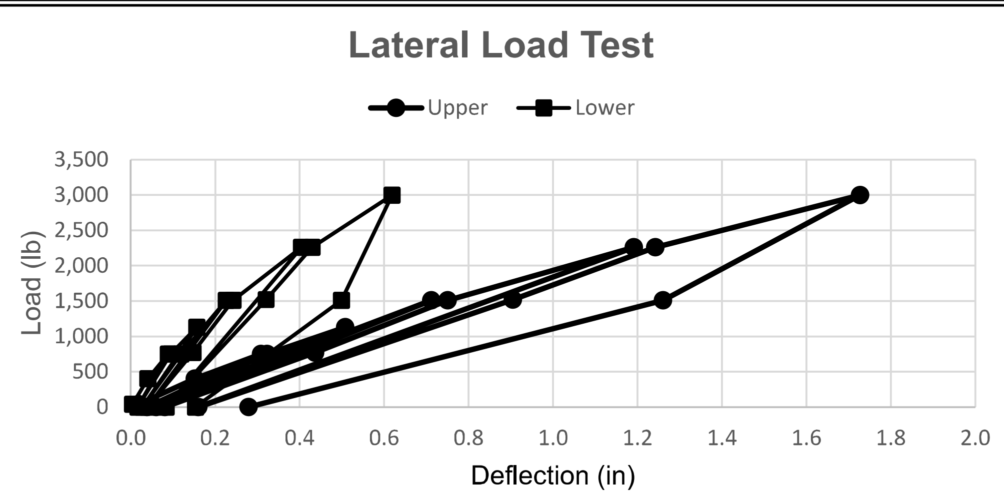
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-7**

Pile Indentifier: PLT-7A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
40	0.019	0.004	0	0.081	0.040
400	0.152	0.041	770	0.437	0.148
750	0.309	0.089	1510	0.751	0.242
0	0.039	0.017	2260	1.192	0.405
750	0.323	0.095	0	0.160	0.084
1130	0.509	0.156	1520	0.905	0.321
0	0.061	0.028	2260	1.243	0.430
750	0.376	0.119	3000	1.727	0.619
1510	0.712	0.227	1510	1.261	0.499
0	0.081	0.040	0	0.279	0.153



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

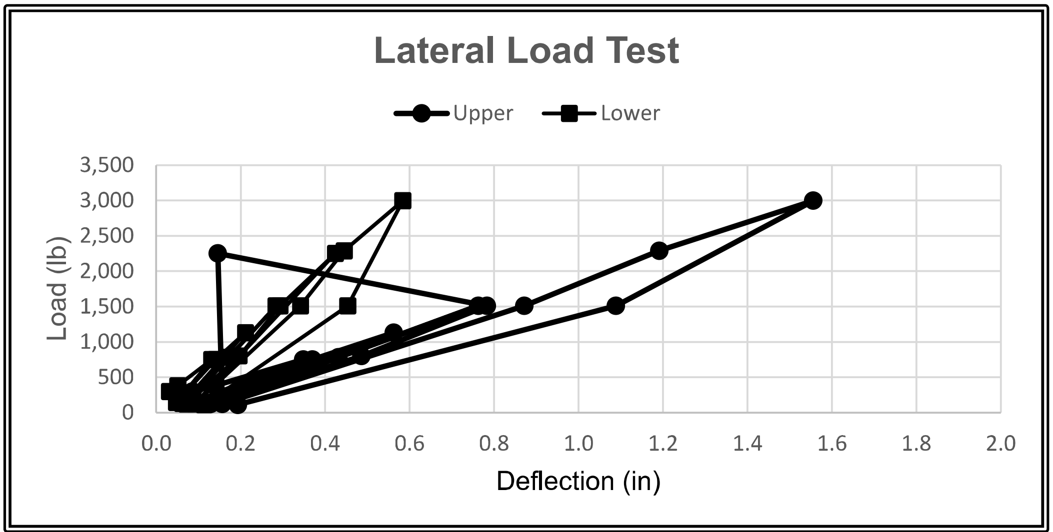
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-7**

Pile Indentifier: PLT-7B
Pile Type: W6x8.5
Embedment Depth: 10.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
300	0.086	0.031	120	0.129	0.072
380	0.139	0.051	800	0.486	0.196
750	0.348	0.132	1510	0.784	0.293
140	0.088	0.048	2250	0.146	0.424
750	0.370	0.141	120	0.157	0.090
1130	0.562	0.211	1510	0.872	0.342
130	0.112	0.062	2290	1.192	0.445
780	0.432	0.171	3000	1.556	0.584
1510	0.763	0.284	1510	1.089	0.454
120	0.129	0.072	110	0.194	0.114



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

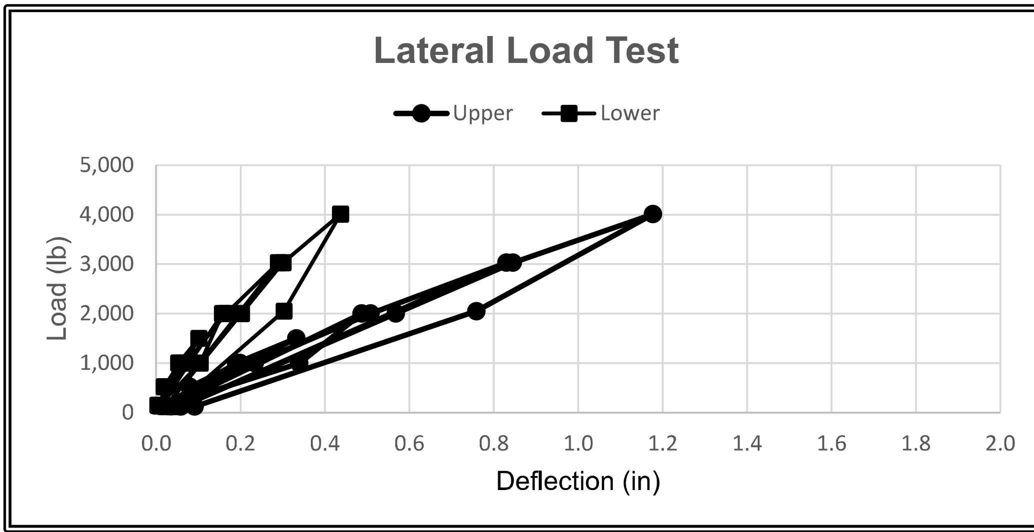
Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-7**

Pile Indentifier: PLT-7C
Pile Type: W6x15
Embedment Depth: 8.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
			130	0.036	0.010
520	0.080	0.019	1000	0.234	0.071
1000	0.199	0.056	2000	0.509	0.166
150	0.019	0.004	3030	0.830	0.290
1000	0.190	0.053	120	0.059	0.022
1500	0.333	0.102	2000	0.568	0.202
140	0.025	0.007	3030	0.846	0.301
1000	0.340	0.105	4010	1.177	0.437
2000	0.487	0.157	2050	0.759	0.303
130	0.036	0.010	120	0.092	0.042



Lateral Pile Test Results

Project Name: **Bellflower Solar Project**
Project Number: **20211557.001A**
Client Name: **Lightsource BP**

Technician: CE/MG
Test Date: 9/12/2020

Test Location: **PLT-8**

Pile Indentifier: PLT-8A
Pile Type: W6x8.5
Embedment Depth: 6.00 ft
Pile Reveal: 60 in

Load Application Height: 48 in
Upper Measurement Height: 48 in
Lower Measurement Height: 4 in

Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)	Load (lb)	Top Gauge Deflection (in)	Lower Gauge Deflection (in)
210	0.045	0.011	60	0.067	0.028
380	0.110	0.027	750	0.351	0.106
760	0.252	0.066	1500	0.621	0.177
70	0.016	0.007	2260	1.031	0.312
740	0.257	0.067	60	0.170	0.073
1140	0.422	0.114	1530	0.790	0.249
70	0.039	0.016	2260	1.099	0.338
770	0.304	0.086	3010	1.621	0.525
1500	0.592	0.168	1340	1.137	0.412
60	0.067	0.028	40	0.371	0.164