APPENDIX B – EKPC SITING MATRIX

Client Name:	EKPC
Project Name:	Site Selection Study
Project Location	Kentucky
Project Number:	148883
Current Version:	0
Study Type:	Siting Study
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Disclaimer: Calculations performed herein by 1898 & Co. are based upon information provided by the client and derived from third party sources. 1898 & Co. has not conducted an independent analysis of the information and, therefore, cannot be held responsible for the accuracy of the information provided.

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SCORING MATRIX

Major Category/ Criterion	Category/Criterion Weight	Criterion Composite Weight	Rating Criteria	Criteria Scores	Campbellsville 2	Campbellsville 3	Campbellsville 4	Campbellsville 5	Campbellsville 6	Campbellsville 7	Lancaster 1	Lancaster 2	Liberty 1	Liberty 2	Liberty 3	Liberty 4	Liberty 5	Lebanon 1	Lebanon 2	Lebanon 3	Lebanon 4	Stanford 1	Stanford 2	Stanford 3
Electrical Transmission	25.0%																							
Transmission Interconnection Cost	30.0%	7.5%	Low anticipated substation & transmission line cost Moderate anticipated substation & transmission line cost High anticipated substation & transmission line cost	50 30 10	50	50	50	50	50	50	30	30	50	50	30	30	30	30	30	10	30	10	10	10
Transmission System Upgrade Cost (214 net MW)	20.0%	5.0%	Low anticipated transmission system upgrade cost Moderate anticipated transmission system upgrade cost High anticipated transmission system upgrade cost	50 30 10	30	30	30	30	30	30	30	30	30	30	50	50	50	10	10	10	50	30	30	30
Transmission System Support	50.0%	12.5%	No violations without added capacity banks No violations with added capacity banks Violations remain with added capacity banks	50 30 10	30	30	30	30	30	30	30	30	50	50	50	50	50	30	30	30	30	30	30	30
Weighted Category Score	100%	25%			36.00	36.00	36.00	36.00	36.00	36.00	####	####	####	####	####	####	####	26.00	26.00	####	####	####	####	####
Fuel Supply Delivery	30.0%																							
Natural Gas Pipeline Distance	40.0%	12.0%	< 1 Miles 1 - 3 Miles > 3 Miles	50 30 10	50	50	50	50	50	50	30	50	50	50	50	50	50	50	50	50	30	50	50	50
Natural Gas Pipeline Preference	40.0%	12.0%	Columbia Gulf Transmission Co Tennessee Gas Pipeline Co Texas Eastern Transmission LP	50 30 10	30	30	30	30	30	30	30	30	10	10	50	50	50	30	30	30	30	50	50	50
Fuel Supply Competition	20.0%	6.0%	Multiple gas pipelines within 2 miles Multiple gas pipelines within 5 miles Multiple gas pipelines not available within 5 miles	50 30 10	10	10	10	10	10	10	50	30	50	50	30	30	30	10	10	10	10	30	30	30
Weighted Category Score	100%	30%			####	####	####	34.00	34.00	34.00	####	38.00	####	####	####	####	####	####	####	####	26.00	####	####	####
Site Development	15.0%																							
Potential Community Conflict	20.0%	3.0%	Park, Churches, Meeting Hall, Hospital > 4 miles Park, Churches, Meeting Hall, Hospital 1-4 miles Park, Churches, Meeting Hall, Hospital < 1 mile	50 30 10	10	10	10	10	30	10	10	30	30	30	30	30	30	30	50	30	10	50	30	30
Accessibility	20.0%	3.0%	Highly accessible site (Entry Road(s), Highways) Moderately accessible site (Entry Road(s), Highways) Non-accessible site (Entry Road(s), Highways)	50 30 10	50	50	30	50	30	50	50	30	50	50	30	30	30	30	10	50	50	30	50	50
Constructability	25.0%	3.8%	Favorable terrain / Clearing impacts Moderate terrain / Clearing impacts Unfavorable terrain / Clearing / Floodplain impacts	50 30 10	30	50	50	50	10	50	30	30	30	10	30	30	30	50	50	30	50	30	10	10
Existing Use	15.0%	2.3%	Industrialized / Brownfield site area Agricultural site area Undisturbed site area	50 30 10	30	30	30	30	30	30	30	30	30	10	30	30	30	30	30	30	50	30	30	30
Useful Acreage	15.0%	2.3%	> 45 Acres 25-45 Acres < 25 Acres	50 30 10	50	50	50	50	50	50	50	50	50	10	50	50	50	50	50	50	50	50	30	50
Expandability	5.0%	0.8%	> 400 Acres Adjacent (total parcels) 100 - 400 Acres Adjacent < 100 Acres Adjacent	50 30 10	30	30	10	30	30	50	30	30	10	10	30	30	10	10	30	10	30	50	10	30
Weighted Category Score	100%	15%			33.00	38.00	33.00	38.00	28.00	39.00	33.00	33.00	36.00	22.00	33.00	33.00	32.00	37.00	38.00	36.00	41.00	38.00	28.00	32.00
Environmental	15.0%																							
Nearest Noise Receptor	10.0%	1.5%	> 1 Mile 0.25 - 1 Mile < 0.25 Mile	50 30 10	10	10	30	10	30	30	10	10	10	10	10	10	30	10	10	10	30	10	10	10
Environmental Justice	10.0%	1.5%	Demographic Index falls within the 0 to 35th percentile Demographic Index falls within the 35th to 67th percentile Demographic Index falls within the 67th to 100th percentile	50 30 10	50	50	50	50	50	50	50	50	30	30	30	30	30	30	30	30	30	30	30	30
Wetlands	25.0%	3.8%	High Probability of Avoiding Wetlands Moderate Probability of Avoiding Wetlands Low Probability of Avoiding Wetlands	50 30 10	50	50	50	50	30	30	50	10	30	30	30	50	50	50	50	50	30	10	50	30
Floodplains	25.0%	3.8%	Entire Site Outside of 100-year Floodplain Portion of Site within 100-year Floodplain/Floodplain Site Within 100-year Floodplain	50 30 10	50	50	50	50	50	50	50	50	10	10	50	50	30	50	50	30	50	30	50	30
Archeological & Cultural Resource Risk	20.0%	3.0%	Low Potential for Impacts Moderate Potential for Impacts High Potential for Impacts	50 30 10	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Sensitive Species Risk	10.0%	1.5%	Low Potential for Impacts Moderate Potential for Impacts High Potential for Impacts	50 30 10	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Weighted Category Score	100%	15%			####	####	####	44.00	41.00	41.00	####	####	27.00	27.00	37.00	####	39.00	####	####	37.00	39.00	27.00	####	32.00
Permitting	15%																							
Water Permitting	30.0%	4.5%	Low Potential for Impacts Moderate Potential for Impacts High Potential for Impacts	50 30 10	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	30	50	50	50
Air Permitting	30.0%	4.5%	Attainment Zone Non-Attainment; Moderate Potential for Schedule Impacts Non-Attainment; Major Potential for Schedule Impacts	50 30 10	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Class 1 Areas	30.0%	4.5%	Greater than 150 kilometers from Class I Areas 100 to 150 from a Class I Areas Less than 100 kilometers from Class I Area	50 30 10	10	10	10	10	10	10	30	30	10	10	10	10	10	10	10	10	10	30	30	30
FAA Considerations	10.0%	1.5%	> 4 miles away from the nearest airport w/ runway > 3,200 ft 3 - 4 miles away from the nearest airport w/ runway > 3,200 < 3 miles away from the nearest airport w/ runway > 3,200	50 30 10	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Weighted Category Score	100%	15%			38.00	38.00	38.00	38.00	38.00	38.00	####	####	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	32.00	####	####	####
Total Composite Score	100%	100%			36.45	37.20	36.75	37.20	35.25	36.90	35.85	35.55	36.85	34.75	41.00	41.75	41.15	34.25	34.40	31.85	33.10	36.15	36.90	36.00

SITE DATA SUMMARY

Category	Item	01	02	03	04	05	06	07	08
Site Data	Site Name	Campbellsville 2	Campbellsville 3	Campbellsville 4	Campbellsville 5	Campbellsville 6	Campbellsville 7	Lancaster 1	Lancaster 2
	City	Saloma	Saloma	Saloma	Saloma	Hobson	Saloma	Lancaster	Lancaster
	County	Taylor	Taylor	Taylor	Taylor	Taylor	Taylor	Gerrard	Gerrard
	State	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky
	Physical Location								
	Address/Cross Streets	State Hwy 744, Wade Ln, and Hill Ln	State Hwy 744 and Shreve Rd	Sanders Road	Sanders Rd and Hobson Rd	Pleasant Hill Church Rd and Feather Creek Rd	W Saloma Rd and Shreve Rd	Lexington Rd, Burdette Knob Rd, and Camp Dick Rd N	Fox Church Rd
	Latitude (Y)	37°24'23.40"N	37°24'28.23"N	37°25'21.88"N	37°25'18.39"N	37°26'17.51"N	37°24'4.17"N	37°41'15.13"N	37°40'16.84"N
	Longitude (X)	85°24'25.82"W	85°23'53.92"W	85°23'35.52"W	85°23'7.37"W	85°22'22.28"W	85°23'56.34"W	84°39'7.03"W	84°39'6.68"W
	Coordinates	37°24'23.40"N, 85°24'25.82"W	37°24'28.23"N, 85°23'53.92"W	37°25'21.88"N, 85°23'35.52"W	37°25'18.39"N, 85°23'7.37"W	37°26'17.51"N, 85°22'22.28"W	37°24'4.17"N, 85°23'56.34"W	37°41'15.13"N, 84°39'7.03"W	37°40'16.84"N, 84°39'6.68"W
Electrical Transmission	Interconnection (New/Addition to	Addition	Addition	Addition	Addition	Addition	Addition	Addition	Addition
	Substation Cost	Low	Low	Low	Low	Low	Low	Low	Low
	Distance to Nearest Existing Substation	0.76	0.29	1.11	1.14	2.46	0.49	3.77	2.77
	Nearest Existing Substation	New North Taylor County	New North Taylor County	New North Taylor County	New North Taylor County	New North Taylor County	New North Taylor County	West Garrard	West Garrard
	Interconnection Substation Name	New North Taylor County	New North Taylor County	New North Taylor County	New North Taylor County	New North Taylor County	New North Taylor County	West Garrard	West Garrard
	Distance to Transmission Line	0.52	0.25	0.27	0.09	0.46	0.03	0.21	0.83
	Transmission Line Name	Green County to Taylor County Junction 161 kV	Green County to Taylor County Junction 161 kV	Saloma Tap to Saloma 161 kV	Saloma Tap to Marion County 161 kV	Saloma Tap to Marion County 161 kV	Green County to Taylor County Junction 161 kV	Brown North to Alcade 345 kV	Brown to North Alcade 345 kV
	Interconnection Voltage	161 kV	161 kV	161 kV	161 kV	161 kV	161 kV	345 kV	345 kV
	Interconnection Location (Substation / Transmission Line)	Substation	Substation	Substation	Substation	Substation	Substation	Substation	Substation
	Transmission Cost	Low	Low	Low	Low	Low	Low	Moderate	Moderate
	Transmission Interconnection Cost	Low	Low	Low	Low	Low	Low	Moderate	Moderate
	Transmission System Upgrade Cost	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Cooper Station Decommissioning Impact								
	Electrical Distance to Cooper	0.2206	0.2206	0.2206	0.2206	0.2206	0.2206	0.1133	0.1133
Fuel Supply Delivery	Natural Gas Line Distance (miles)								
	Distance (miles)	0.01	0.16	0.12	0.15	0.02	0.35	1.31	0.23
	Pipeline Name	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co
	Natural Gas Pipeline Distance	50	50	50	50	50	50	30	50
	Natural Gas Pipeline Preference	30	30	30	30	30	30	30	30
	Pipeline Owner	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc
	Pipeline Diameter (in)	24+	24+	24+				24+	24+
	POI Latitude (Y)	37°24'24.00"N	37°24'30.69"N	37°25'18.62"N	37°25'20.06"N	37°26'16.59"N	37°24'15.06"N	37°40'10.07"N	37°40'5.85"N
	POI Longitude (X)	85°24'26.34"W	85°24'4.23"W	85°23'28.61"W	85°23'13.88"W	85°22'20.78"W	85°24'16.40"W	84°38'41.98"W	84°39'0.24"W
	POI Coordinates	37°24'24.00"N, 85°24'26.34"W	37°24'30.69"N, 85°24'4.23"W	37°25'18.62"N, 85°23'28.61"W	37°25'20.06"N, 85°23'13.88"W	37°26'16.59"N, 85°22'20.78"W	37°24'15.06"N, 85°24'16.40"W	37°40'10.07"N, 84°38'41.98"W	37°40'5.85"N, 84°39'0.24"W
	Fuel Supply Competition								
	Description	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 2 Pipelines within 5 miles: 2	Pipelines within 2 miles: 1 Pipelines within 5 miles: 2
Site Development	Potential Community Conflict								
	Distance (miles)	0.64	0.21	0.82	0.91	2.24	0.64	0.86	1.83
	Name	Saloma Baptist Church	Saloma Baptist Church	Saloma Baptist Church	Saloma Baptist Church	Saloma Baptist Church	Saloma Baptist Church	Camp Dick Robinson Elementary School	Camp Dick Robinson Elementary School
	Accessibility								
	Description	W Saloma Rd: paved, 2-lane Wade Ln: paved, 1-lane and Hill Ln: paved, 1-lane	State Hwy 744: paved, 2-lane Shreve Rd: gravel, 1-lane	Sanders Road: gravel, 1-lane	(Hobson Rd) Route 744: paved, 2-lane Sanders Rd: Paved, 1-lane	Pleasant Hill Church Rd:paved, 1-lane Feather Creek Rd: paved, 1-lane	W Saloma Rd: paved, 2-lane Shreve Rd: gravel, 1-lane	Lexington Rd: paved, 2-lane Burdette Knob Rd: paved, 1-lane Camp Dick Rd N: paved, 2-lane	Fox Church Rd: paved, 1-lane
	Constructability								
	Description	Slope: 4.2% Tree coverage: None Wetlands: None Rolling hills	Slope: 1.6% Tree coverage: None Wetlands: None Moderately flat	Slope: 8.6% Tree coverage: Minimal Wetlands: Easily avoidable Moderately flat	Tree coverage: Minimal Wetlands: Small pond toward the southeastern corner; easily avoidable Some sloping	Tree coverage: Moderate towards borders, minimal towards center Wetlands: small strip of wetland extends toward the middle Rolling hills	Tree coverage: Minimal tree coverage with the exception of one patch that extends toward the center of the property Wetlands: small riverine wetland would be moderately difficult to avoid Moderately flat	Slope: 5.1% Tree coverage: Minimal Wetlands: Easily avoidable Moderately flat with small hills	Slope: 4.2% Tree Coverage: Minimal Wetlands: Riverine wetland would be difficult to avoid Flat
	Expandability								
	Initial Parcel	Parcel Size (acres): 73.3 Owner(s): Reynolds, Michael K and Susan	Parcel Size (acres): 48 Owner(s): Shreve, Ricky	Parcel Size (acres): 130.2 Owner(s): Skaggs, Birdie	Parcel Size (acres): 107.22 Owner(s):	Parcel Size (acres): 183.14 Owner(s):	Parcel Size (acres): 257.1 Owner(s):	Parcel Size (acres): 136.8 Owner(s): Montgomery, Dwight and Della	Parcel Size (acres): 55.3 Owner(s): Montgomery, Dwight
	Adjacent Expansion Parcel(s)	Excess on initial parcel: 28.3 Adjacent parcels: 2 Total adjacent acreage: 86.7 Total Expansion Acreage: 115	Excess on initial parcel: 3 Adjacent parcels: 2 Total adjacent acreage: 280.0 Total Expansion Acreage: 283	Excess on initial parcel: 34.6 Adjacent parcels: 3 Total adjacent acreage: 62.6 Total Expansion Acreage: 97.2	Excess on initial parcel: 51.5 Adjacent parcels: 3 Total adjacent acreage: 305 Total Expansion Acreage: 356.5	Excess on initial parcel: 69 Adjacent parcels: 9 Total adjacent acreage: 305 Total Expansion Acreage: 374	Excess on initial parcel: 186 Adjacent parcels: 10 Total adjacent acreage: 604 Total Expansion Acreage: 790	Excess on initial parcel: 91.8 Adjacent parcels: 2 Total adjacent acreage: 187 Total Expansion Acreage: 278.8	Excess on initial parcel: 10.3 Adjacent parcels: 2 Total adjacent acreage: 263.0 Total Expansion Acreage: 273.3
	Existing Use								
	Description	The site is currently used as 95.4% crops and 4.6% other.	The site is currently used as 97.1% crops and 2.9% other.	The site is currently used as 54.6% crops, 23.5% forest, 17.3% grass/pasture, and 4.6% other.	The site is currently used as 81.5% grass/pasture, 6.2% forest, and 12.3% other.	The site is currently 58.0% corn, 25.3% forest, 10.7% grass/pasture, and 6.0% other.	The site is currently 86.1% corn, 5.8% forest, 5.5% grass/pasture, and 2.6% other.	The site is currently used as 89.1% grass/pasture, 6.5% crops, and 4.4% other.	The site is currently used as 95.5% grass/pasture and 4.5% other.
Environmental	Nearest Receptor (miles)								
	Distance (miles)	0.16	0.12	0.38	0.21	0.33	0.41	0.19	0.21
	Description	Farmhouse	Farmhouse	Farmhouse	Farmhouse	Farmhouse	Farmhouse	Farmhouse	House
	Environmental Justice								
	Description (2-mile buffer, percentile)	29	25	21	26	26	26	23	20
	Wetlands								
	Description	No wetlands located on the parcel.	No wetlands located on the parcel.	Small riverine wetland located on the eastern edge of the parcel. Wetland would be easily avoidable.	One minor riverine wetland present in northern portion, forested area.	Small riverine wetland crosses western edge of parcel and flows towards center of parcel. Wetland would be moderately difficult to avoid.	Small riverine wetland that extends from southeastern edge of parcel and flows towards center of parcel. Small riverine wetland crosses northwestern corner of parcel. Wetlands would be moderately difficult to avoid.	Small riverine wetland located on the northwestern corner of the parcel. Wetland would be easily avoidable.	Small riverine wetland runs through the parcel from southwest corner and ending in the northeastern quarter of the site. Wetland would be difficult to avoid.
	Floodplains								
	Description	No floodplains located on the parcel. 1% annual chance flood hazard associated with Flat Run located approximately 0.47 miles southeast of the proposed site.	No floodplains located on the parcel. 1% annual chance flood hazard associated with Flat Run located approximately 0.79 miles southeast of the proposed site.	No floodplains located on the parcel. 1% annual chance flood hazard associated with Big Pitman Creek located approximately 0.35 miles north of the proposed site.	No floodplains on parcel. 1% annual chance flood hazard associated with Big Pitman Creek located approximately 0.48 miles northwest of the site.	No floodplains on parcel. 1% annual chance flood hazard associated with Big Pitman Creek located approximately 0.55 miles northeast of the site.	Minor presence of Zone A in south/southeast portion of site. Flood zone follows edge of parcel and will not have a significant impact on development.	No floodplains located on the parcel. 1% annual chance flood hazard located approximately 0.97 miles southwest of the proposed site.	No floodplains located on the parcel. 1% annual chance flood hazard located approximately 0.37 miles west of the proposed site on the adjacent parcel.
	Archeological & Cultural Resource Risk								
	Description	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on the parcel. The NRHP-listed Sanders, Durham House is located approximately one-half mile north of the parcel.	Low potential for impacts as no NRHP Public properties in close proximity.	Low potential for impacts as no NRHP Public properties in close proximity.	Low potential for impacts as no NRHP Public properties in close proximity.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.
	Sensitive Species Risk								
	Description	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include the monarch butterfly and pink mucket.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include the monarch butterfly and pink mucket.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include the monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include the Monarch Butterfly, Whooping Crane and Pink Mucket.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include the Monarch Butterfly, Whooping Crane and Pink Mucket.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include the Monarch Butterfly, Whooping Crane and Pink Mucket.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, northern riffleshell, rabbitsfoot, monarch butterfly, and Short's bladderpod.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, northern riffleshell, rabbitsfoot, monarch butterfly, and Short's bladderpod.

Category	Item	09	10	11	12	13	14	15	16
Site Data	Site Name	Liberty 1	Liberty 2	Liberty 3	Liberty 4	Liberty 5	Lebanon 1	Lebanon 2	Lebanon 3
	City	Liberty	Liberty	Liberty	Liberty	Liberty	Lebanon	Lebanon	Lebanon
	County	Casey	Casey	Casey	Casey	Casey	Marion	Marion	Marion
	State	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky
	Physical Location								
	Address/Cross Streets	KY-49	KY-49	Carr Sasser Rd	Ronalds Clements Rd and Carr Sasser Rd	Upper Brush Creek Rd and Shucks Creek Rd	Sulphur Springs Rd and Helm Schoolhouse Rd	Penick Rd	Bradfordsville Rd, Josh Cox Rd, and Calvary Rd
	Latitude (Y)	37°26'20.98"N	37°25'28.15"N	37°22'9.00"N	37°22'15.04"N	37°23'37.73"N	37°33'23.50"N	37°33'48.16"N	37°31'29.44"N
	Longitude (X)	85° 0'38.51"W	85° 0'26.41"W	84°57'28.76"W	84°57'2.91"W	84°55'34.19"W	85°12'42.31"W	85° 8'39.22"W	85°13'19.66"W
	Coordinates	37°26'20.98"N, 85° 0'38.51"W	37°25'28.15"N, 85° 0'26.41"W	37°22'9.00"N, 84°57'28.76"W	37°22'15.04"N, 84°57'2.91"W	37°23'37.73"N, 84°55'34.19"W	37°33'23.50"N, 85°12'42.31"W	37°33'48.16"N, 85° 8'39.22"W	37°31'29.44"N, 85°13'19.66"W
Electrical Transmission	Interconnection (New/Addition to	Addition	Addition	New	New	New	New	New	New
	Substation Cost	Low	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Distance to Nearest Existing Substation	0.81	0.23	4.9	5.06	5.15	3.32	6.4	3.17
	Nearest Existing Substation	Casey County	Casey County	Casey County	Casey County	Casey County	Marion Industrial Park	Marion County	Marion Industrial Park
	Interconnection Substation Name	Casey County	Casey County	New South Casey County	New South Casey County	New South Casey County	New East Marion County	New East Marion County	New East Marion County
	Distance to Transmission Line	0.81	0.19	0.41	0.03	2.03	1.02	2.17	2.83
	Transmission Line Name	Casey County to Liberty 161 kV	Casey County to Liberty 161 kV	Casey County to Liberty 161 kV	Casey County to Liberty 161 kV	Casey County to Liberty 161 kV	Marion County to Casey County 161 kV	Marion County to Casey County 161 kV	Marion County to Casey County 161 kV
	Interconnection Voltage	161 kV	161 kV	161 kV	161 kV	161 kV	161 kV	161 kV	161 kV
	Interconnection Location (Substation / Transmission Line)	Substation	Substation	Transmission Line	Transmission Line	Transmission Line	Transmission Line	Transmission Line	Transmission Line
	Transmission Cost	Low	Low	Low	Low	Moderate	Moderate	Moderate	High
	Transmission Interconnection Cost	Low	Low	Moderate	Moderate	Moderate	Moderate	Moderate	High
	Transmission System Upgrade Cost	Moderate	Moderate	Low	Low	Low	High	High	High
	Cooper Station Decommissioning Impact								
	Electrical Distance to Cooper	0.1191	0.1191	0.1005	0.1005	0.1005	0.1559	0.1559	0.1559
Fuel Supply Delivery	Natural Gas Line Distance (miles)	Tennessee (3.18 mi); Columbia (5.80 mi)	Tennessee (2.36 mi); Columbia (4.85 mi)	Tennessee (2.12 mi); Texas (4.72 mi)	Tennessee (2.28 mi); Texas (4.89 mi)	Tennessee (2.06 mi); Texas (4.35 mi)			
	Distance (miles)	0.75	0.07	0.28	0.08	0.62	0.11	0.01	0.07
	Pipeline Name	Texas Eastern Transmission LP	Texas Eastern Transmission LP	Columbia Gulf Transmission Co	Columbia Gulf Transmission Co	Columbia Gulf Transmission Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co	Tennessee Gas Pipeline Co
	Natural Gas Pipeline Distance	50	50	50	50	50	50	50	50
	Natural Gas Pipeline Preference	10	10	50	50	50	30	30	30
	Pipeline Owner	Enbridge Energy Partners LP	Enbridge Energy Partners LP	TC Energy Corp	TC Energy Corp	TC Energy Corp	Kinder Morgan Inc	Kinder Morgan Inc	Kinder Morgan Inc
	Pipeline Diameter (in)	30	30	30	30	30	24+	24+	24+
	POI Latitude (Y)	37°25'47.54"N	37°25'30.06"N	37°21'52.81"N	37°22'12.34"N	37°23'9.34"N	37°33'27.80"N	37°33'48.52"N	37°31'26.92"N
	POI Longitude (X)	85° 0'12.27"W	85° 0'31.20"W	84°57'25.32"W	84°56'58.67"W	84°55'14.88"W	85°12'47.18"W	85° 8'39.50"W	85°13'16.32"W
	POI Coordinates	37°25'47.54"N, 85° 0'12.27"W	37°25'30.06"N, 85° 0'31.20"W	37°21'52.81"N, 84°57'25.32"W	37°22'12.34"N, 84°56'58.67"W	37°23'9.34"N, 84°55'14.88"W	37°33'27.80"N, 85°12'47.18"W	37°33'48.52"N, 85° 8'39.50"W	37°31'26.92"N, 85°13'16.32"W
	Fuel Supply Competition								
	Description	Pipelines within 2 miles: 2 Pipelines within 5 miles: 2	Pipelines within 2 miles: 2 Pipelines within 5 miles: 3	Pipelines within 2 miles: 1 Pipelines within 5 miles: 3	Pipelines within 2 miles: 1 Pipelines within 5 miles: 3	Pipelines within 2 miles: 1 Pipelines within 5 miles: 3	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1	Pipelines within 2 miles: 1 Pipelines within 5 miles: 1
Site Development	Potential Community Conflict								
	Distance (miles)	1.95	1.04	2.03	2.34	3.19	1.64	4.43	2.60
	Name	Lighthouse Church	Lighthouse Church	Carrs Chapel First Church of God	Carrs Chapel First Church of God	Wilson Cemetery	Glasscock Elementary School	Glasscock Elementary School	Calvary Elementary School
	Accessibility								
	Description	KY-49: paved, 2-lane	KY-49: paved, 2-land	Carr Sasser Rd: paved, 1-lane	Ronalds Clements Rd: paved/gravel, 1-lane Carr Sasser Rd: paved, 1-lane	Upper Brush Creek Rd: paved/gravel, 1-lane	Sulphur Springs Rd: paved, 1-lane Helm Schoolhouse Rd: paved, 1-lane	Penick Rd: paved/gravel, 1-lane	Bradfordsville Rd: paved, 2-lane Josh Cox Rd: paved, 1-lane Calvary Rd: paved, 1-lane
	Constructability								
	Description	Slope: 14.1% Tree coverage: None Wetlands: Easily avoidable Hilly throughout, but 45 acres of flat land is available	Slope: 15.0% Tree coverage: Moderate Wetlands: Pond could be in proposed site area Large hills cover the property except a flat, 10.8-acre portion	Slope: 6.5% Tree coverage: Minimal Wetlands: Riverine wetlands moderately difficult to avoid Moderately flat	Slope: 9.2% Tree coverage: Minimal Wetlands: Easily avoidable Moderately flat	Slope: 4.3% Tree Coverage: Minimal Wetlands: Easily Avoidable Flat	Slope: 2.8% Tree coverage: Minimal Wetlands: Easily avoidable Flat	Slope: 6.8% Tree coverage: None Wetlands: Easily avoidable Flat	Slope: 10.9% Tree coverage: None Wetlands: Easily avoidable Moderately flat
	Expandability								
	Initial Parcel	Parcel Size (acres): 369.4 Owner(s): Beelier, James O and Patricia	Parcel Size (acres): 49.1 Owner(s): Cox, John W and Paula	Parcel Size (acres): 93.2 Owner(s): Brewer, April Clements	Parcel Size (acres): 54.1 Owner(s): Cain, Bevelry Jean	Parcel Size (acres): 313.7 Owner(s): Unknown	Parcel Size (acres): 70.2 Owner(s): Parkers Pride Farms LLLP	Parcel Size (acres): 133.7 Owner(s): Hardin, William Todd and Jill Lenora	Parcel Size (acres): 250.8 Owner(s): Raley, Joseph Dennis and Janice
	Adjacent Expansion Parcel(s)	Excess on initial parcel: 10 Adjacent parcels: 0 Total adjacent acreage: 0 Total Expansion Acreage: 10	Excess on initial parcel: 0 Adjacent parcels: 1 Total adjacent acreage: 5.9 Total Expansion Acreage: 0	Excess on initial parcel: 26.6 Adjacent parcels: 1 Total adjacent acreage: 148 Total Expansion Acreage: 174.6	Excess on initial parcel: 0 Adjacent parcels: 3 Total adjacent acreage: 229.7 Total Expansion Acreage: 229.7	Excess on initial parcel: 42.7 Adjacent parcels: 0 Total adjacent acreage: 0 Total Expansion Acreage: 42.7	Excess on initial parcel: 24.2 Adjacent parcels: 1 Total adjacent acreage: 71.4 Total Expansion Acreage: 95.6	Excess on initial parcel: 54.7 Adjacent parcels: 5 Total adjacent acreage: 64.4 Total Expansion Acreage: 119.1	Excess on initial parcel: 40.3 Adjacent parcels: 1 Total adjacent acreage: 14.2 Total Expansion Acreage: 54.5
	Existing Use								
	Description	The site is currently used as 61.7% grass/pasture, 24.9% forest, 10% crops, and 3.4% other.	The site is currently used as 47.9% grass/pasture, 36.3% forest, 5.4% crops, and 10.4% other.	The site is currently used for 73.2% crop, 15.6% forest, and 11.2% other.	The site is currently used as 77.6% grass/pasture, 21% forest, and 1.4% other.	The site is currently used as 50.0% forest, 49.2% grass/pasture, and 0.8% other.	The site is currently used as 93.1% crop and 6.9% other.	The site is currently used as 57.7% crop, 28.6% grass/pasture, 11.5% forest, and 2.2% other.	The site is currently used as 57.7% forest, 25.1% grass/pasture, 13.7% corn, and 3.5% other.
Environmental	Nearest Receptor (miles)								
	Distance (miles)	0.21	0.16	0.18	0.20	0.35	0.18	0.20	0.17
	Description	Farmhouse	House	Farmhouse on the property	Farmhouse	Farmhouse	Farmhouse	House	Farmhouse on the property
	Environmental Justice								
	Description (2-mile buffer, percentile)	52	51	42	42	42	59	54	39
	Wetlands								
	Description	Small riverine wetlands run along the northern border, southwestern border, and eastern corner of the parcel. Three small ponds located on the site. Wetlands would be moderately difficult avoidable.	Small pond located on the parcel. Wetland would be moderately difficult to avoid due to small amount of favorable land.	Small riverine wetlands located in the southwestern and northeastern corners of the property. Wetland would be moderately difficult to avoid.	Small riverine wetlands located along the northern corner and southeastern edge of the parcel. Wetlands would be easily avoidable.	No wetlands located on the parcel.	Small pond located on the northwestern edge of the parcel. Wetland would be easily avoidable.	Riverine wetlands running along the northeastern edge of the parcel and the southwestern portion of the parcel. Small ponds located on the parcel. Wetlands would be easily avoidable.	Riverine wetlands located along the southeastern portion and the northwestern corner of the parcel. One large pond located in the northwestern corner of the parcel. Small pond located in the southern portion of the parcel. Wetlands would be easily
	Floodplains								
	Description	1% annual chance flood hazard associated with Big South Fork covers the majority of the proposed site. Very low probability of avoidance.	1% annual chance flood hazard associated with Big South Fork covers the majority of the proposed site. Very low probability of avoidance.	No floodplains located on the parcel. 1% annual change flood hazard associated with Reynold Creek located approximately 0.74 miles northeast of the proposed site.	No floodplains located on the parcel. 1% annual change flood hazard associated with Reynold Creek located approximately 0.37 miles northeast of the proposed site on	1% annual chance flood hazard associated with Brush Creek located on the southern tip of the parcel. Floodplains would be easily avoided.	No floodplains located on the parcel. 1% annual chance flood hazard located approximately 0.05 miles to the southwest and 0.11 miles to the southeast of the proposed	No floodplains located on the parcel. 1% annual chance flood hazard located approximately 0.60 miles to the southwest of the proposed site.	1% annual chance flood hazard located on northeastern edge of the parcel. This floodplain has a very high probability of avoidance.
	Archeological & Cultural Resource Risk								
	Description	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.	No historic properties were identified on or near the parcel.
	Sensitive Species Risk								
	Description	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, rabbitsfoot, orangefoot pimpleback, pink mucket, ring pink, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, rabbitsfoot, orangefoot pimpleback, pink mucket, ring pink, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, northern riffleshell, rabbitsfoot, pink mucket, ring pink, rough pigtoe, snuffbox mussel, spectacleacase, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, northern riffleshell, rabbitsfoot, pink mucket, ring pink, rough pigtoe, spectacleacase, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, northern riffleshell, rabbitsfoot, pink mucket, ring pink, rough pigtoe, spectacleacase, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, rabbitsfoot, orangefoot pimpleback, pink mucket, ring pink, snuffbox mussel, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, rabbitsfoot, orangefoot pimpleback, pink mucket, ring pink, snuffbox mussel, and monarch butterfly.	IPaC results indicate that the northern long-eared bat (Myotis septentrionalis), Indiana bat, and gray bat (Myotis grisecens) are potentially occurring in all proposed sites. Other identified species include clubshell, fanshell, rabbitsfoot, orangefoot pimpleback, pink mucket, ring pink, snuffbox mussel, and monarch butterfly.

Major Category	Category Weight	Criterion	Scoring	Criterion Weight	Equivalent Pts (100 Pt Scale)
Electrical Transmission	25%	Transmission Interconnection Cost		30.0%	7.5%
		Low anticipated substation & transmission line cost	50		
		Moderate anticipated substation & transmission line cost	30		
		High anticipated substation & transmission line cost	10		
		Transmission System Upgrade Cost (214 net MW)		20.0%	5.0%
		Low anticipated transmission system upgrade cost	50		
		Moderate anticipated transmission system upgrade cost	30		
		High anticipated transmission system upgrade cost	10		
		Transmission System Support		50.0%	12.5%
		No violations without added capacity banks	50		
		No violations with added capacity banks	30		
		Violations remain with added capacity banks	10		
Fuel Supply Delivery	30%	Natural Gas Pipeline Distance		40.0%	12.0%
		< 1 Miles	50		
		1 - 3 Miles	30		
		> 3 Miles	10		
		Natural Gas Pipeline Preference		40.0%	12.0%
		Columbia Gulf Transmission Co	50		
		Tennessee Gas Pipeline Co	30		
		Texas Eastern Transmission LP	10		
		Fuel Supply Competition		20.0%	6.0%
		Multiple gas pipelines within 2 miles	50		
		Multiple gas pipelines within 5 miles	30		
		Multiple gas pipelines not available within 5 miles	10		
Site Development	15%	Potential Community Conflict		20.0%	3.0%
		Park, Churches, Meeting Hall, Hospital > 4 miles	50		
		Park, Churches, Meeting Hall, Hospital 1-4 miles	30		
		Park, Churches, Meeting Hall, Hospital < 1 mile	10		
		Accessibility		20.0%	3.0%
		Highly accessible site (Entry Road(s), Highways)	50		
		Moderately accessible site (Entry Road(s), Highways)	30		
		Non-accessible site (Entry Road(s), Highways)	10		
		Constructability		25.0%	3.8%
		Favorable terrain / Clearing impacts	50		
		Moderate terrain / Clearing impacts	30		
		Unfavorable terrain / Clearing / Floodplain impacts	10		
		Existing Use		15.0%	2.3%
		Industrialized / Brownfield site area	50		
		Agricultural site area	30		
		Undisturbed site area	10		
		Useful Acreage		15.0%	2.3%
		> 45 Acres	50		
		25-45 Acres	30		
		< 25 Acres	10		
		Expandability		5.0%	0.8%
		> 400 Acres Adjacent (total parcels)	50		
		100 - 400 Acres Adjacent	30		
		< 100 Acres Adjacent	10		
Environmental	15%	Nearest Noise Receptor		10.0%	1.5%
		> 1 Mile	50		
		0.25 - 1 Mile	30		
		< 0.25 Mile	10		
		Environmental Justice		10.0%	1.5%
		Demographic Index falls within the 0 to 35th percentile	50		
		Demographic Index falls within the 35th to 67th percentile	30		
		Demographic Index falls within the 67th to 100th percentile	10		
		Wetlands		25.0%	3.8%
		High Probability of Avoiding Wetlands	50		
		Moderate Probability of Avoiding Wetlands	30		
		Low Probability of Avoiding Wetlands	10		
		Floodplains		25.0%	3.8%
		Entire Site Outside of 100-year Floodplain	50		
		Portion of Site within 100-year Floodplain/ Floodplain	30		
		Site Within 100-year Floodplain	10		
		Archeological & Cultural Resource Risk		20.0%	3.0%
		Low Potential for Impacts	50		
		Moderate Potential for Impacts	30		
		High Potential for Impacts	10		
		Sensitive Species Risk		10.0%	1.5%
		Low Potential for Impacts	50		
		Moderate Potential for Impacts	30		
		High Potential for Impacts	10		
Permitting	15%	Water Permitting		30.0%	4.5%
		Low Potential for Impacts	50		
		Moderate Potential for Impacts	30		
		High Potential for Impacts	10		
		Air Permitting		30.0%	4.5%
		Attainment Zone	50		
		Non-Attainment; Moderate Potential for Schedule Impacts	30		
		Non-Attainment; Major Potential for Schedule Impacts	10		
		Class 1 Areas		30.0%	4.5%
		Greater than 150 kilometers from Class I Areas	50		
		100 to 150 from a Class I Areas	30		
		Less than 100 kilometers from Class I Area	10		
		FAA Considerations		10.0%	1.5%
		> 4 miles away from the nearest airport w/ runway > 3,200	50		
		5 - 4 miles away from the nearest airport w/ runway > 3,200	30		
		< 5 miles away from the nearest airport w/ runway > 3,200	10		

Criterion	Criterion Weight	Composite Weight
Electrical Transmission (25%)		
Transmission Interconnection Cost	30.0%	7.5%
Transmission System Upgrade Cost (214 r	20.0%	5.0%
Transmission System Support	50.0%	12.5%
Fuel Supply Delivery (30%)		
Natural Gas Pipeline Distance	40.0%	12.0%
Natural Gas Pipeline Preference	40.0%	12.0%
Fuel Supply Competition	20.0%	6.0%
Site Development (15%)		
Potential Community Conflict	20.0%	3.0%
Accessibility	20.0%	3.0%
Constructability	25.0%	3.8%
Existing Use	15.0%	2.3%
Useful Acreage	15.0%	2.3%
Expandability	5.0%	0.8%
Environmental (15%)		
Nearest Noise Receptor	10.0%	1.5%
Environmental Justice	10.0%	1.5%
Wetlands	25.0%	3.8%
Floodplains	25.0%	3.8%
Archeological & Cultural Resource Risk	20.0%	3.0%
Sensitive Species Risk	10.0%	1.5%
Permitting (15%)		
Water Permitting	30.0%	4.5%
Air Permitting	30.0%	4.5%
Class 1 Areas	30.0%	4.5%
FAA Considerations	10.0%	1.5%

CANDIDATE SITE AREA EVALUATION SUMMARY CHART

SITE SCORES - LINKED TO 'Scoring Summary - Table' SHEET - DO NOT MODIFY

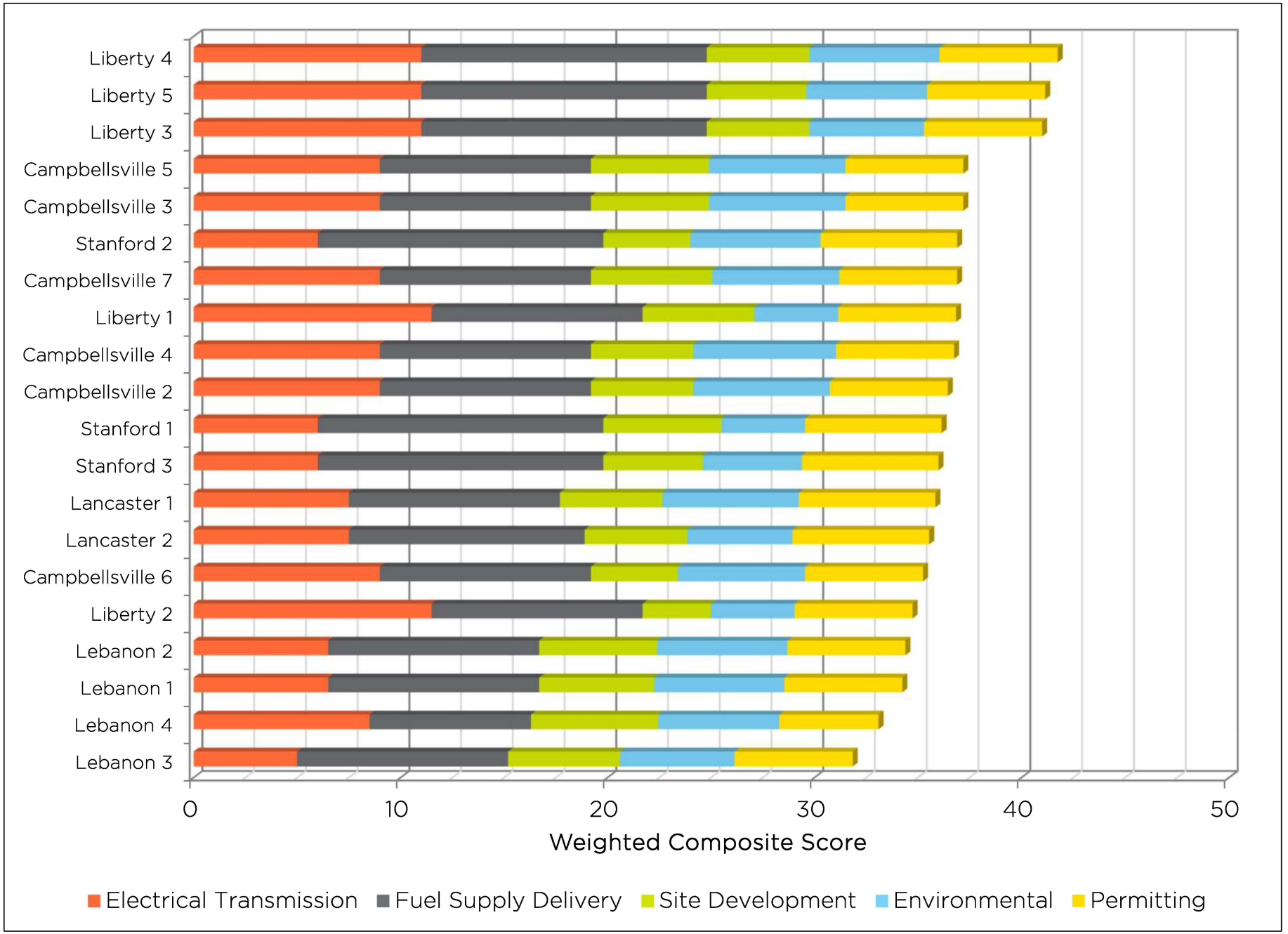
Major Category	Weight	Campbellsville 2	Campbellsville 3	Campbellsville 4	Campbellsville 5	Campbellsville 6	Campbellsville 7	Lancaster 1	Lancaster 2	Liberty 1	Liberty 2	Liberty 3	Liberty 4	Liberty 5	Lebanon 1	Lebanon 2	Lebanon 3	Lebanon 4	Stanford 1	Stanford 2	Stanford 3
Electrical Transmission	25%	36.00	36.00	36.00	36.00	36.00	36.00	30.00	30.00	46.00	46.00	44.00	44.00	44.00	26.00	26.00	20.00	34.00	24.00	24.00	24.00
Fuel Supply Delivery	30%	34.00	34.00	34.00	34.00	34.00	34.00	34.00	38.00	34.00	34.00	46.00	46.00	46.00	34.00	34.00	34.00	26.00	46.00	46.00	46.00
Site Development	15%	33.00	38.00	33.00	38.00	28.00	39.00	33.00	33.00	36.00	22.00	33.00	33.00	32.00	37.00	38.00	36.00	41.00	38.00	28.00	32.00
Environmental	15%	44.00	44.00	46.00	44.00	41.00	41.00	44.00	34.00	27.00	27.00	37.00	42.00	39.00	42.00	42.00	37.00	39.00	27.00	42.00	32.00
Permitting	15%	38.00	38.00	38.00	38.00	38.00	38.00	44.00	44.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	32.00	44.00	44.00	44.00
Total Composite Score	100%	36.45	37.20	36.75	37.20	35.25	36.90	35.85	35.55	36.85	34.75	41.00	41.75	41.15	34.25	34.40	31.85	33.10	36.15	36.90	36.00

WEIGHTED SITE SCORES - LINKED TO TABLE ABOVE AND ADJUSTED BY CATEGORY WEIGHT - DO NOT MODIFY

Major Category	Weight	Campbellsville 2	Campbellsville 3	Campbellsville 4	Campbellsville 5	Campbellsville 6	Campbellsville 7	Lancaster 1	Lancaster 2	Liberty 1	Liberty 2	Liberty 3	Liberty 4	Liberty 5	Lebanon 1	Lebanon 2	Lebanon 3	Lebanon 4	Stanford 1	Stanford 2	Stanford 3
Electrical Transmission	25%	9.00	9.00	9.00	9.00	9.00	9.00	7.50	7.50	11.50	11.50	11.00	11.00	11.00	6.50	6.50	5.00	8.50	6.00	6.00	6.00
Fuel Supply Delivery	30%	10.20	10.20	10.20	10.20	10.20	10.20	10.20	11.40	10.20	10.20	13.80	13.80	13.80	10.20	10.20	10.20	7.80	13.80	13.80	13.80
Site Development	15%	4.95	5.70	4.95	5.70	4.20	5.85	4.95	4.95	5.40	3.30	4.95	4.95	4.80	5.55	5.70	5.40	6.15	5.70	4.20	4.80
Environmental	15%	6.60	6.60	6.90	6.60	6.15	6.15	6.60	5.10	4.05	4.05	5.55	6.30	5.85	6.30	6.30	5.55	5.85	4.05	6.30	4.80
Permitting	15%	5.70	5.70	5.70	5.70	5.70	5.70	6.60	6.60	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	4.80	6.60	6.60	6.60
Total Composite Score	100%	36.45	37.20	36.75	37.20	35.25	36.90	35.85	35.55	36.85	34.75	41.00	41.75	41.15	34.25	34.40	31.85	33.10	36.15	36.90	36.00

RANKED WEIGHTED SITE SCORES - LINKED TO TABLE ABOVE - DO NOT MODIFY

Major Category	Weight	Lebanon 3	Lebanon 4	Lebanon 1	Lebanon 2	Liberty 2	Campbellsville 6	Lancaster 2	Lancaster 1	Stanford 3	Stanford 1	Campbellsville 2	Campbellsville 4	Liberty 1	Campbellsville 7	Stanford 2	Campbellsville 3	Campbellsville 5	Liberty 3	Liberty 5	Liberty 4
Electrical Transmission	25%	5.00	8.50	6.50	6.50	11.50	9.00	7.50	7.50	6.00	6.00	9.00	9.00	11.50	9.00	6.00	9.00	9.00	11.00	11.00	11.00
Fuel Supply Delivery	30%	10.20	7.80	10.20	10.20	10.20	10.20	11.40	10.20	13.80	13.80	10.20	10.20	10.20	10.20	13.80	10.20	10.20	13.80	13.80	13.80
Site Development	15%	5.40	6.15	5.55	5.70	3.30	4.20	4.95	4.95	4.80	5.70	4.95	4.95	5.40	5.85	4.20	5.70	5.70	4.95	4.80	4.95
Environmental	15%	5.55	5.85	6.30	6.30	4.05	6.15	5.10	6.60	4.80	4.05	6.60	6.90	4.05	6.15	6.30	6.60	6.60	5.55	5.85	6.30
Permitting	15%	5.70	4.80	5.70	5.70	5.70	5.70	6.60	6.60	6.60	6.60	5.70	5.70	5.70	5.70	6.60	5.70	5.70	5.70	5.70	5.70
Total Composite Score	100%	31.85	33.10	34.25	34.40	34.75	35.25	35.55	35.85	36.00	36.15	36.45	36.75	36.85	36.90	36.90	37.20	37.20	41.00	41.15	41.75


Liberty 4
Liberty 5
Liberty 3
Campbellsville 5
Campbellsville 3
Stanford 2
Campbellsville 7
Liberty 1
Campbellsville 4
Campbellsville 2
Stanford 1
Stanford 3
Lancaster 1
Lancaster 2
Campbellsville 6
Liberty 2
Lebanon 2
Lebanon 1
Lebanon 4
Lebanon 3
0
10
20
30
40
50
Weighted Composite Score
Electrical Transmission
Fuel Supply Delivery
Site Development
Environmental
Permitting

1898 & CO℠

PART OF BURNS McDONNELL

9400 Ward Parkway
Kansas City, MO

816-605-7800
1898andCo.com

APPENDIX B – PROPERTY VALUE IMPACT STUDY

Kirkland Appraisals, LLC

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August 27, 2024

Bryan Durant, P.E.
Burns & McDonnell
250 W. Main Street, Suite 2110
Lexington, KY 40507

RE: Liberty RICE Project, Carr Sasser Road, Liberty, Casey County, KY

Mr. Durant,

At your request, I have considered the impact of a 214 MW natural gas electric generating facility using reciprocating internal combustion engine (RICE) generators proposed to be constructed on a portion of a 93.93-acre tract of land located off Carr Sasser Road, Liberty, Casey County, Kentucky. Specifically, I have been asked to give my professional opinion on the proposed RICE plant will have any impact on adjoining property value and whether "the location and character of the use, if developed according to the plan as submitted and approved, will be in harmony with the area in which it is to be located."

To form an opinion on these issues, I have researched existing RICE plants in other states, visited the exterior of an existing RICE plant, researched articles through the Appraisal Institute and other studies, and discussed the likely impact with other real estate professionals. I have not been asked to assign any value to any specific property.

This letter is a limited report of a real property appraisal consulting assignment. My client is Burns & McDonnell represented to me by Mr. Bryan Durant. My findings support the Kentucky Siting Board Application. The effective date of this consultation is August 27, 2024.

While based in NC, I am also a Kentucky State Certified General Appraiser #5522.

Conclusion

The adjoining properties are mostly well set back from the proposed RICE facility and supplemental vegetation is proposed to enhance the areas where the existing trees do not currently provide a proper screen. The closest and only adjoining home will be 735 feet from the RICE facility and the average distance being 1,262 feet. The project proposes to include a landscaping screen between the closest home and the proposed facility.

The switchyard component that is similar to a substation has the closest home at 215 feet with an average distance to adjoining homes of 1,340 feet.

Based on the data and analysis in this report, it is my professional opinion that the RICE facility proposed at the subject property including the landscaping screen will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located.

If you have any questions, please contact me.

Sincerely,

Richard C. Kirkland, Jr., MAI
NC Certified General Appraiser A4359
KY Certified General Appraiser #5522

Table of Contents

I. Proposed Project and Adjoining Uses

Proposed Use Description

This 214 MW natural gas electric generating facility using reciprocating internal combustion engine (RICE) generators proposed to be constructed on a portion of a 93.93-acre tract of land located off Carr Sasser Road, Liberty, Casey County, Kentucky.

Adjoining Properties

I have considered adjoining uses and included a map to identify each parcel's location. Based on the current site plan the closest and adjoining home is a trailer that will be 735 feet from the closest part of the RICE facility. However, the adjoining switchyard will be approximately 215 feet from the nearest home identified as Parcel 4 in the adjoining parcel map.

According to Bryan Durant, the parking area identified on the site plan will be used during construction and then restored to grass. Similarly, the equipment laydown yards will be used as needed during construction, but would be returned to a grass state at the end of construction.

Adjoining land is primarily a mix of agricultural and industrial uses with a nearby trailer and some small vacant parcels of residential land.

The breakdown of those uses by acreage and number of parcels is summarized below.

Adjoining Use Breakdown

	Acreage	**Parcels**
Agricultural	66.12%	27.27%
Agri/Res	31.37%	27.27%
Residential	2.21%	36.36%
Commercial	0.30%	9.09%
Total	**100.00%**	**100.00%**

GIS Aerial Map

Proposed Site Layout

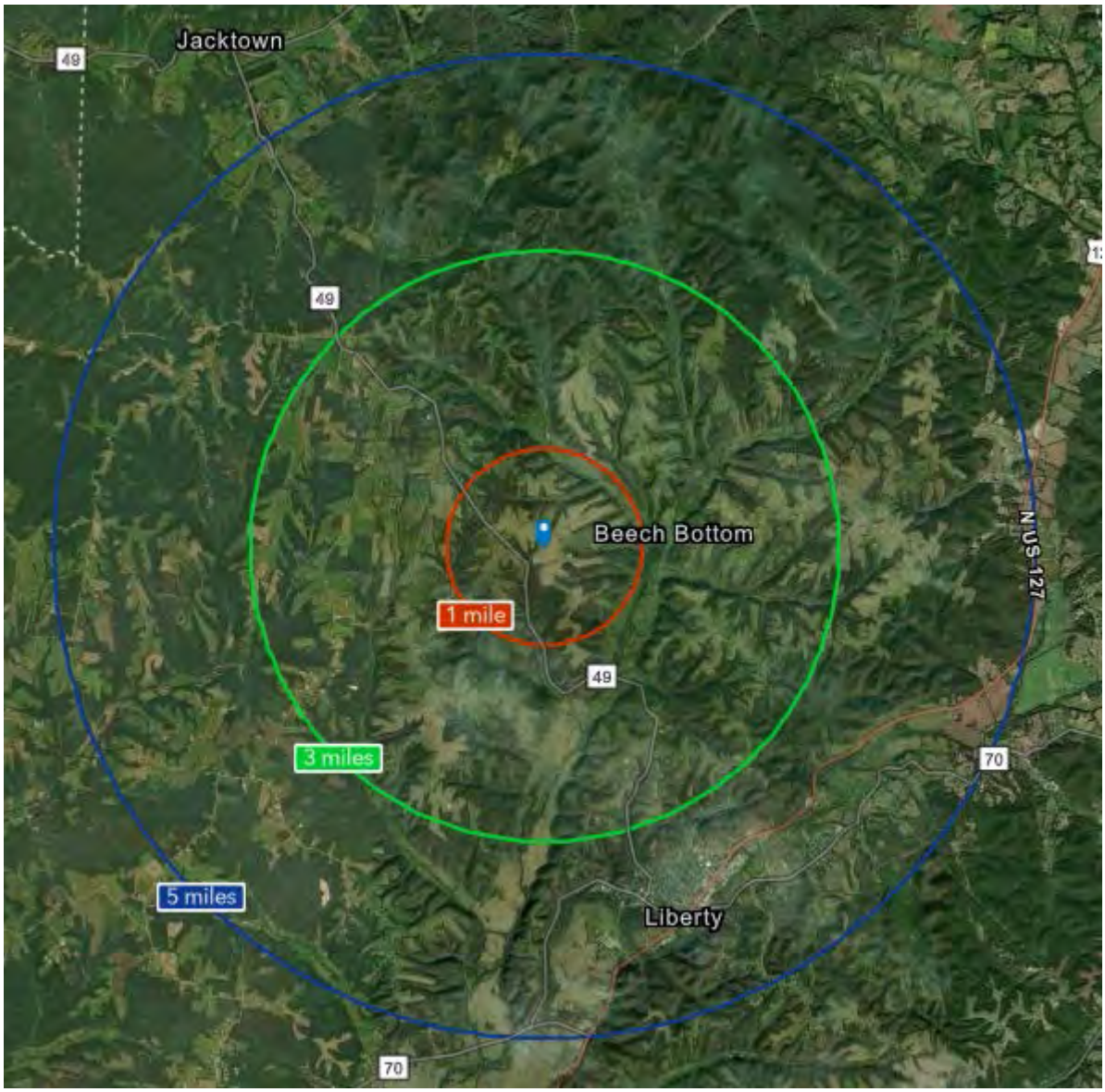
Adjoining Uses

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	RICE Distance	Switchyard Distance
1	050-36	Clements	89.68	Agri/Res	10.40%	9.09%	2,130	2,605
2	050-37	Troxell	5.00	Residential	0.58%	9.09%	1,350	1,350
3	066-27	Brewer	119.94	Agri/Res	13.90%	9.09%	1,610	1,075
4	050-39	Cain	0.50	Residential	0.06%	9.09%	735	215
5	066-32	Cain	44.59	Agricultural	5.17%	9.09%	N/A	N/A
6	066-32A	Cain	7.42	Residential	0.86%	9.09%	750	780
7	066-32A-1	Cain	2.58	Commercial	0.30%	9.09%	N/A	N/A
8	067-01	Porter	450.00	Agricultural	52.16%	9.09%	N/A	N/A
9	050-41	Russell	61.00	Agri/Res	7.07%	9.09%	990	1580
10	050-40A	Demrow	6.13	Residential	0.71%	9.09%	1,270	1,775
11	050-40	Marvel	75.87	Agricultural	8.79%	9.09%	N/A	N/A
		Total	**862.710**		**100.00%**	**100.00%**	1,262	1,340
						Min	735	215

II. Demographics

I have pulled the following demographics for a 1-mile, 3-mile and 5-mile radius around the proposed facility.

I note that there is a population has remained relatively flat in all three rings of this breakdown and projections continue to forecast relatively flat population growth.



esri
THE SCIENCE OF WHERE

Housing Profile

42539, Liberty, Kentucky
Ring: 1 mile radius

Prepared by Esri
Latitude: 37.36992
Longitude: -84.95814

Population		Households	
2020 Total Population	89	2024 Median Household Income	$46,268
2024 Total Population	97	2029 Median Household Income	$50,000
2029 Total Population	100	2024-2029 Annual Rate	1.56%
2024-2029 Annual Rate	0.61%		

	Census 2020		2024		2029	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	40	100.0%	43	100.0%	44	100.0%
Occupied	40	100.0%	43	100.0%	44	100.0%
Owner	32	80.0%	35	81.4%	36	81.8%
Renter	8	20.0%	8	18.6%	8	18.2%
Vacant	6	15.0%	0	0.0%	0	0.0%

	2024		2029	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	36	100.0%	36	100.0%
<$50,000	2	5.6%	2	5.6%
$50,000-$99,999	4	11.1%	4	11.1%
$100,000-$149,999	2	5.6%	1	2.8%
$150,000-$199,999	14	38.9%	14	38.9%
$200,000-$249,999	7	19.4%	7	19.4%
$250,000-$299,999	5	13.9%	6	16.7%
$300,000-$399,999	2	5.6%	2	5.6%
$400,000-$499,999	0	0.0%	0	0.0%
$500,000-$749,999	0	0.0%	0	0.0%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	0	0.0%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$185,714		$189,286	
Average Value	$186,111		$190,278	

Census 2020 Housing Units	Number	Percent
Total	40	100.0%
Housing Units In Urbanized Areas	0	0.0%
Rural Housing Units	40	100.0%

Census 2020 Owner Occupied Housing Units by Mortgage Status	Number	Percent
Total	32	100.0%
Owned with a Mortgage/Loan	16	50.0%
Owned Free and Clear	16	50.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2024 and 2029. U.S. Census Bureau 2020 decennial Census data.

August 26, 2024

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Housing Profile

42539, Liberty, Kentucky
Ring: 3 mile radius

Prepared by Esri
Latitude: 37.36992
Longitude: -84.95814

Population		Households	
2020 Total Population	1,022	2024 Median Household Income	$43,460
2024 Total Population	1,079	2029 Median Household Income	$46,355
2029 Total Population	1,106	2024-2029 Annual Rate	1.30%
2024-2029 Annual Rate	0.50%		

	Census 2020		2024		2029	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	505	100.0%	531	100.0%	538	100.0%
Occupied	417	82.6%	438	82.5%	446	82.9%
Owner	330	65.3%	351	66.1%	360	66.9%
Renter	87	17.2%	87	16.4%	86	16.0%
Vacant	80	15.8%	93	17.5%	92	17.1%

	2024		2029	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	351	100.0%	359	100.0%
<$50,000	28	8.0%	25	7.0%
$50,000-$99,999	42	12.0%	37	10.3%
$100,000-$149,999	24	6.8%	21	5.8%
$150,000-$199,999	129	36.8%	133	37.0%
$200,000-$249,999	58	16.5%	62	17.3%
$250,000-$299,999	46	13.1%	53	14.8%
$300,000-$399,999	19	5.4%	22	6.1%
$400,000-$499,999	2	0.6%	2	0.6%
$500,000-$749,999	3	0.9%	4	1.1%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	0	0.0%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$181,589		$186,278	
Average Value	$183,903		$191,992	

Census 2020 Housing Units	Number	Percent
Total	505	100.0%
Housing Units In Urbanized Areas	0	0.0%
Rural Housing Units	505	100.0%

Census 2020 Owner Occupied Housing Units by Mortgage Status	Number	Percent
Total	329	100.0%
Owned with a Mortgage/Loan	164	49.8%
Owned Free and Clear	165	50.2%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2024 and 2029. U.S. Census Bureau 2020 decennial Census data.

August 26, 2024

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THE SCIENCE OF WHERE

Housing Profile

42539, Liberty, Kentucky
Ring: 5 mile radius

Prepared by Esri
Latitude: 37.36992
Longitude: -84.95814

Population		Households	
2020 Total Population	4,866	2024 Median Household Income	$39,793
2024 Total Population	4,953	2029 Median Household Income	$43,216
2029 Total Population	4,972	2024-2029 Annual Rate	1.66%
2024-2029 Annual Rate	0.08%		

	Census 2020		2024		2029	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	2,283	100.0%	2,304	100.0%	2,294	100.0%
Occupied	1,959	85.8%	1,963	85.2%	1,952	85.1%
Owner	1,366	59.8%	1,400	60.8%	1,404	61.2%
Renter	593	26.0%	563	24.4%	548	23.9%
Vacant	339	14.8%	341	14.8%	342	14.9%

	2024		2029	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	1,400	100.0%	1,404	100.0%
<$50,000	150	10.7%	133	9.5%
$50,000-$99,999	193	13.8%	169	12.0%
$100,000-$149,999	195	13.9%	172	12.3%
$150,000-$199,999	310	22.1%	319	22.7%
$200,000-$249,999	209	14.9%	218	15.5%
$250,000-$299,999	107	7.6%	122	8.7%
$300,000-$399,999	101	7.2%	114	8.1%
$400,000-$499,999	50	3.6%	57	4.1%
$500,000-$749,999	46	3.3%	55	3.9%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	39	2.8%	45	3.2%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$176,129		$185,737	
Average Value	$220,464		$236,538	

Census 2020 Housing Units	Number	Percent
Total	2,283	100.0%
Housing Units In Urbanized Areas	0	0.0%
Rural Housing Units	2,283	100.0%

Census 2020 Owner Occupied Housing Units by Mortgage Status	Number	Percent
Total	1,366	100.0%
Owned with a Mortgage/Loan	654	47.9%
Owned Free and Clear	712	52.1%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2024 and 2029. U.S. Census Bureau 2020 decennial Census data.

August 26, 2024

III. Methodology and Discussion of Issues

Standards and Methodology

I conducted this analysis using the standards and practices established by the Appraisal Institute and that conform to the Uniform Standards of Professional Appraisal Practice. The analyses and methodologies contained in this report are accepted by all major lending institutions, and they are used in Kentucky and across the country as the industry standard by certified appraisers conducting appraisals, market analyses, or impact studies and are considered adequate to form an opinion of the impact of a land use on neighboring properties. These standards and practices have also been accepted by the courts at the trial and appellate levels and by federal courts throughout the country as adequate to reach conclusions about the likely impact a use will have on adjoining or abutting properties.

The aforementioned standards compare property uses in the same market and generally within the same calendar year so that fluctuating markets do not alter study results. Although these standards do not require a linear study that examines adjoining property values before and after a new use (e.g. a RICE facility) is developed, some of these studies do in fact employ this type of analysis. Comparative studies, as used in this report, are considered an industry standard.

The type of analysis employed is a Matched Pair Analysis or Paired Sales Analysis. This methodology is outlined in **The Appraisal of Real Estate**, Twelfth Edition by the Appraisal Institute pages 438-439. It is further detailed in **Real Estate Damages**, Third Edition, pages 33-36 by Randall Bell PhD, MAI. Paired sales analysis is used to support adjustments in appraisal work for factors ranging from the impact of having a garage, golf course view, or additional bedrooms. It is an appropriate methodology for addressing the question of impact of an adjoining RICE facility. The paired sales analysis is based on the theory that when two properties are in all other respects equivalent, a single difference can be measured to indicate the difference in price between them. Dr. Bell describes it as comparing a test area to control areas. In the example provided by Dr. Bell he shows five paired sales in the test area compared to 1 to 3 sales in the control areas to determine a difference. I have used 3 sales in the control areas in my analysis for each sale developed into a matched pair.

Determining what is an External Obsolescence

An external obsolescence is a use of property that, because of its characteristics, might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts. Determining whether a use would be considered an external obsolescence requires a study that isolates that use, eliminates any other causing factors, and then studies the sales of nearby versus distant comparable properties. The presence of one or a combination of key factors does not mean the use will be an external obsolescence, but a combination of these factors tend to be present when market data reflects that a use is an external obsolescence.

External obsolescence is evaluated by appraisers based on several factors. These factors include but are not limited to:

1) Traffic. RICE facilities are not significant traffic generators.

2) Odor. RICE facilities do not produce a noticeable odor.

3) Noise. While RICE facilities can generate significant noise, noise abatement technologies will be applied to the plant. This work will be covered in a separate report and the plant will adhere to local noise ordinances.

4) Environmental. RICE facilities do not produce toxic or hazardous waste as part of normal operation.

5) Appearance/Viewshed. This is an area that potentially applies to RICE facilities. However, RICE facilities are generally required to provide setbacks and landscaping buffers to address that concern.

6) Other factors. Stigma is another possible concern related to a RICE facility.

Market Imperfection

Throughout this analysis, I have specifically considered the influence of market imperfection on data analysis. Market imperfection is the term that refers to the fact that unlike a can of soup at the supermarket or in your online shopping cart, real estate cannot be comparison shopped for the best price and purchased at the best price for that same identical product. Real estate products are always similar and never identical. Even two adjacent lots that are identical in almost every way, have a slight difference in location. Once those lots are developed with homes, the number of differences begin to multiply, whether it is size of the home, landscaping, layout, age of interior upfit, quality of interior upfit, quality of maintenance and so on.

Neoclassical economics indicates a perfectly competitive market as having the following: A large number of buyers and sellers (no one person dominates the market), no barriers or transaction costs, homogeneous product, and perfect information about the product and pricing. Real estate is clearly not homogeneous. The number of buyers and sellers for a particular product in a particular location is limited by geography, financing, and the limited time period within a property is listed. There are significant barriers that limit the liquidity in terms of time, costs and financing. Finally, information on real estate is often incomplete or partial – especially at the time that offers are made and prices set, which is prior to appraisals and home inspections. So real estate is very imperfect based on this definition and the impact of this is readily apparent in the real estate market.

What appear to be near-identical homes that are in the same subdivision will often sell with slight variations in price. When multiple appraisers approach the same property, there is often a slight variation among all of those conclusions of value, due to differences in comparables used or analysis of those comparables. This is common and happens all of the time. In fact, within each appraisal, after making adjustments to the comparables, the appraiser will typically have a range of values that are supported that often vary more than +/-5% from the median or average adjusted value.

Based on this understanding of market imperfection, it is important to note that very minor differences in value within an impact study do not necessarily indicate either a negative or positive impact. When the impacts measured fall within that +/-5%, I consider this to be within typical market variation/imperfection. Therefore, it may be that there is a negative or positive impact identified if the impact is within that range, but given that it is indistinguishable from what amounts to the background noise or static within the real estate data, I do not consider indications of +/-5% to support a finding of a negative or positive impact.

Impacts greater than that range are, however, considered to be strong indications of impacts that fall outside of typical market imperfection. I have used this as a guideline while considering the impacts identified within this report.

Steps Involved in the Analysis

The paired sales analysis employed in this report follows the following process:

1. Identify sales of property adjoining/nearby existing RICE facilities.
2. Compare those sales to similar property that does not adjoin an existing RICE facility.
3. Confirmation of sales are noted in the analysis write-ups.
4. Distances from the homes to panels are included as a measure of the setbacks.

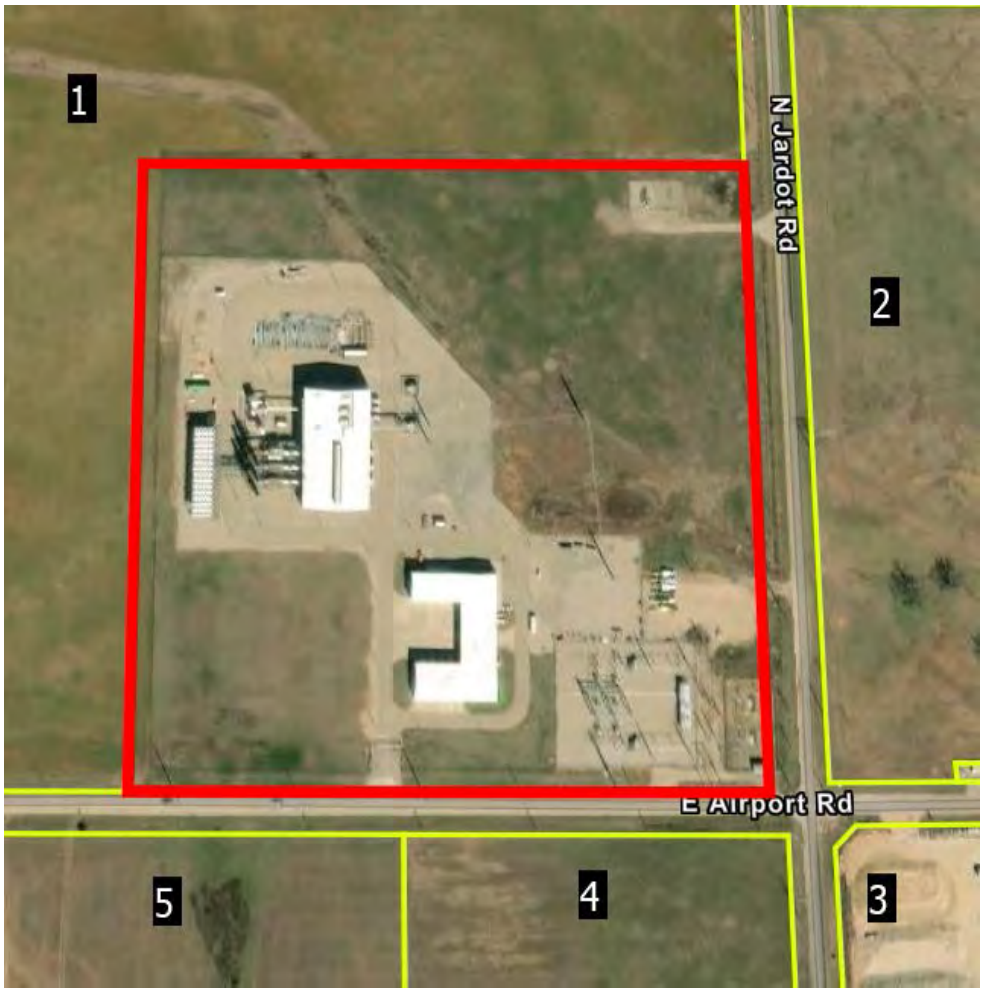
Sale/Resale analysis employed in this report follows the following process:

1. Identify sales of property adjoining/nearby existing RICE facilities.
2. Compare those sales to earlier sales of the same property prior to construction of the RICE facility. Adjustments for time are based on the Federal Housing Finance Agency (FHFA) Home Price Index (HPI) for that area to appreciate the earlier home price to a current home price based on that index of nearby homesales. This allows us to see if there was any impact on the sales price from Before and After the RICE facility.
3. Confirmation of sales are noted in the analysis write ups and research into possible repairs/neglect between the two sales dates.
4. Distances from the homes to panels are included as a measure of the setbacks.

IV. Research on RICE Facilities

I have identified 15 RICE facilities across the United States for analysis. These facilities were specifically chosen based on proximity to adjoining/nearby housing and are not intended to reflect an average site for such a facility. As I am testing for home value impacts as typically the most sensitive use to adjoining externalities, I focused on areas that were most likely to provide usable data for the analysis.

1: E. Airport Road, Stillwater, OK



This project was built in 2015 and located on 24.42 acres for a 56 MW project. The map above shows no adjoining residential uses. The following map shows the closest homes to the northeast at 1,210 feet away and the closest home to the southeast at 1,680 feet.

None of these homes sold recently. The closest nearby homes that have sold are to the south along N. Jardot Road at Crazy Horse Avenue where I identified a brick duplex at 1818-1820 E Crazy Horse Avenue. It sold on October 2, 2023 for $265,000 for this 3,348 s.f. duplex built in 2007. This duplex was sold out of an assemblage of all of the units so there was no prior usable sale for a Sale/Resale Analysis. This duplex appears to be hitting the market with other duplexes in the area by the same developer which makes it challenging to use this comparable sale for an effective paired sales analysis. I have not attempted one for this reason.

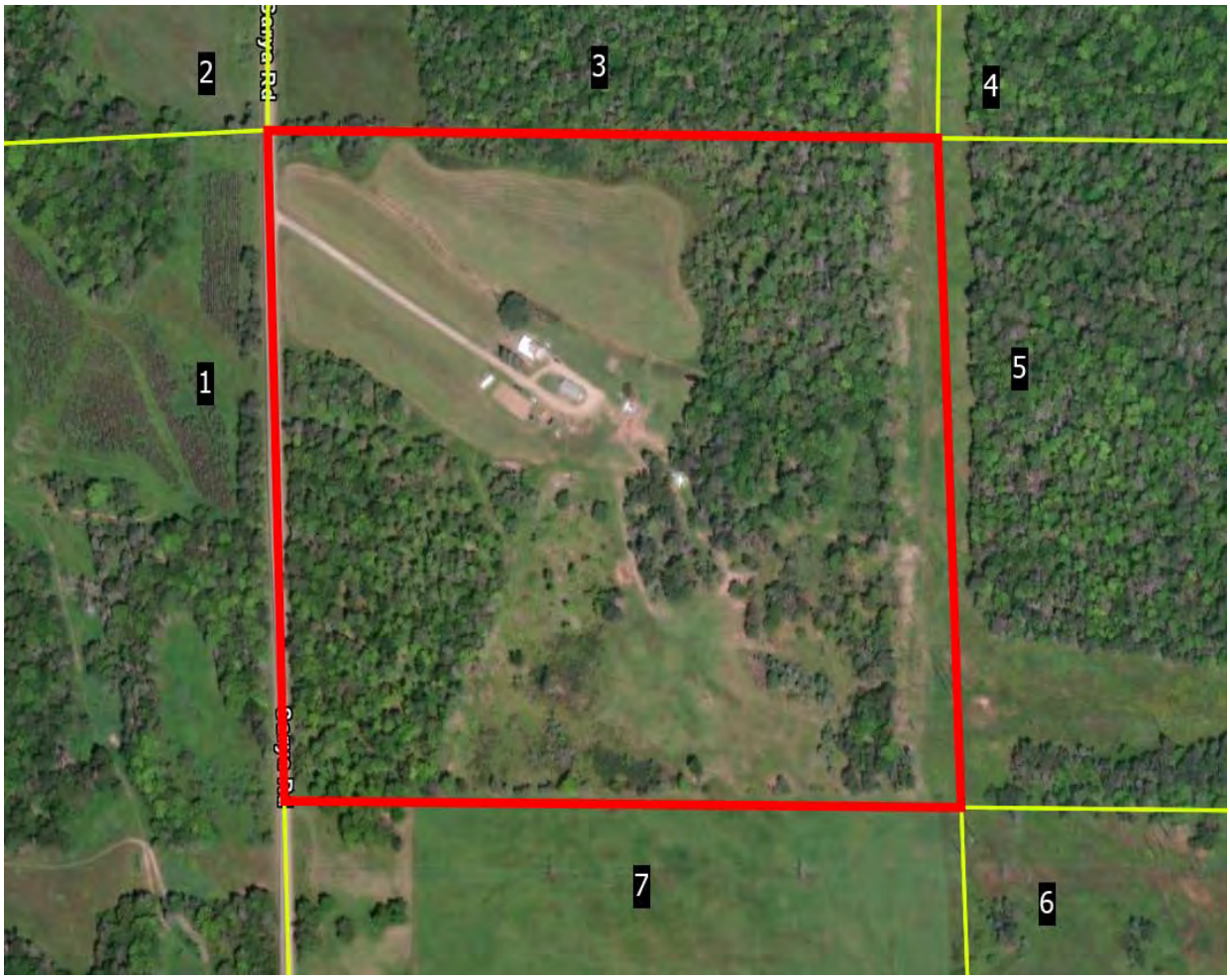

Stillwater Energy Center 56MW AcreValue
E Airport Rd
E Airport Rd
E Eastland Dr
E Marcus Ave

2: 8161 Jim Christal Road, Denton, TX

This project was built in 2017 and located on a portion of 157.20 acres for a 220 MW project. The map above shows two adjoining residential uses with improved homes and a number of vacant tracts under 20 acres. The closest adjoining home is 2,550 feet from the RICE facility and 1,875 feet from the nearest related power plant building. However, there are related buildings on the same tract as close as 1,370 feet from the nearest home just northwest of adjoining Parcel 6. This is the closest home despite not being on an adjoining parcel.

The closest adjoining home sale that I found was 9231 Jim Christal Road that sold on January 17, 2022. This home is through multiple tracts of vegetated land and 4,460 feet from the closest point at the RICE facility. For these reasons I have not attempted a paired sales or Sale/Resale analysis on this property.

3 – 16017 Sarya Road, Pelkie, MI

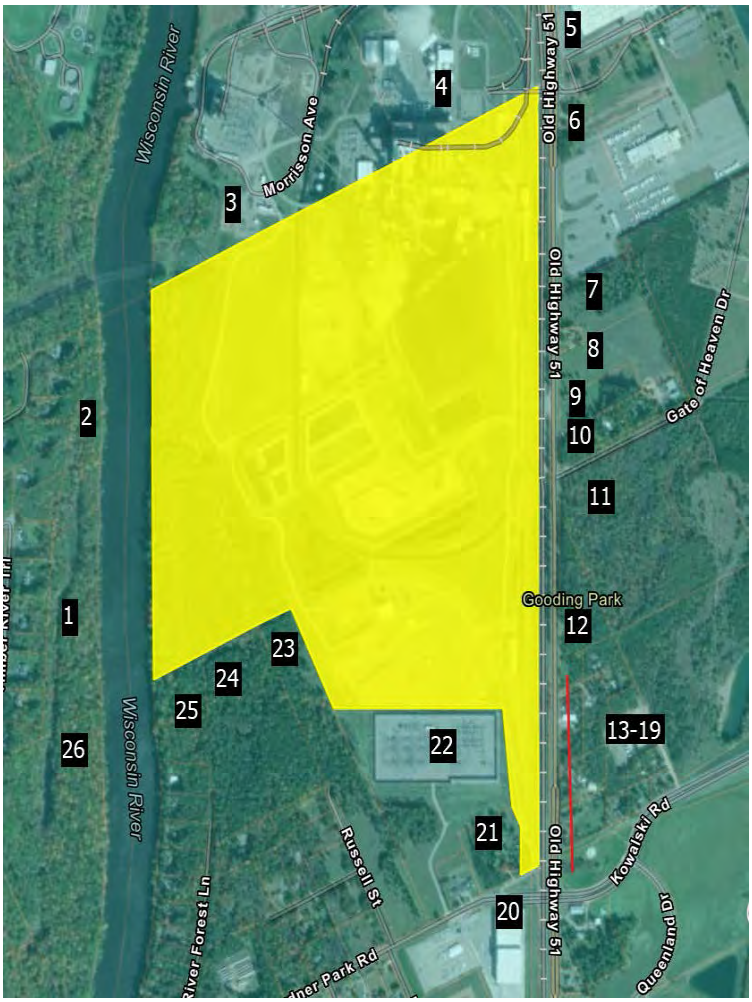


This facility was built in 2019 on a portion of a 44.33-acre tract. The GIS image above does not show the facility so the following map from GoogleEarth is included. The closest adjoining home is 1,255 feet to the southwest of the facility or 1,730 feet to the RICE building itself.

The closest recent sale is to the north and is a very small older structure that was advertised as a "nice, comfortable, no frills camp." This home sold in 2021 for $45,000 for a 905 s.f. structure on 4 acres. This same hold last sold in 2019 for $23,000. The home value increased by nearly 100% since that time, but likely is due to repairs and this does not make for a strong candidate for a Sale/Resale analysis or paired sales analysis.

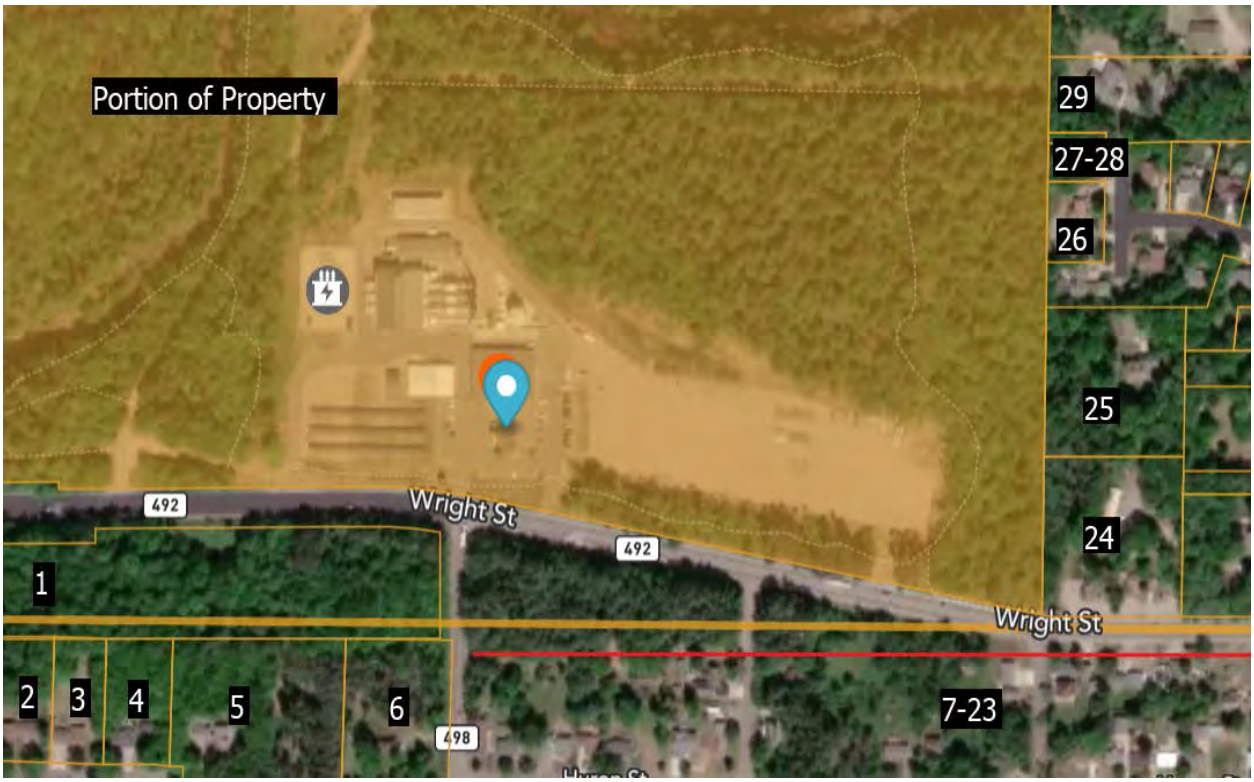

Sarya
A.J. Mihm Generating Station 54 MW
16017 Sarya
Sarya

4 – 2499 Old Highway 51, Kronenwetter, WI



This facility was built in 2022 on a portion of a 275.31-acre tract that includes an existing coal power plant. The closest adjoining home is 140 feet from power plant improvements and 1,820 feet away from the RICE plant. But given the coal plant, this does not make for a good paired sales or Sale/Resale analysis.

5 – 2200 Wright Street, Marquette, MI



This facility was built in 2017 on a portion of a 298.79-acre tract. The closest adjoining home is 480 feet away from the nearest power plant improvement and 750 feet from the RICE facility. This facility has a number of nearby residential uses for consideration.

I considered a sale of a home at 2233 Evergreen Lane that sold on July 9, 2024 for $295,000 for a 2,026 s.f., 5 BR, 3 BA, full unfinished basement, built in 1946, on 0.56 acres. The purchase price works out to $145.61 per s.f. This home was being sold with a $10,000 allowance for floor repairs. I spoke with Adam Karki with Re/Max 1st Realty about this home sale. He indicated that the nearby natural gas plant had no impact on the marketing of the home or the sales price. He also noted that the buyer was not interested in updating the floors or the associated rebate.

I have considered a Sale/Resale analysis for this home as it sold on March 7, 2014 for $179,000. The FHFA HPI does not have an area inclusive to Marquette, so I have used the zip code designation annually per year since 2014 which shows annual increases for an expected increase in value to $311,925. This suggests an impact of $16,000, or 5.13%, due to the RICE facility that is 540 feet from the nearest power plant building and 790 feet from that RICE facility. There are significant trees in between the home and the facility, which also helps to address appearance concerns.

I also considered some nearby comparable sales that are further from the natural gas plant for a paired sales analysis as shown below.

Nearby Residential Sales After RICE Approved

Parcel	RICE	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	2233 Evergreen	0.56	7/9/2024	$295,000	1946	2,026	$145.61	5/3	Drive	1.5 Story	Unfin Bsmt
	Not	2100 Longyear	0.17	6/6/2024	$299,900	1970	2,085	$143.84	5/2	2-Car	Tri Level	
	Not	1515 Birch	0.42	2/17/2023	$303,000	1959	2,003	$151.27	3/2	Gar	Ranch	Prt Fin B
	Not	1706 Mildred	0.22	9/29/2023	$310,000	1967	1,889	$164.11	3/2	2-Car	2 Story	

RICE	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	2233 Evergreen								$295,000			790 RICE
Not	2100 Longyear	$834	$5,000	-$17,994	-$3,395	$10,000	-$15,000		$279,345	5%		540 Power plant
Not	1515 Birch	$12,971		-$9,848	$1,392	$10,000	-$10,000		$307,515	-4%		
Not	1706 Mildred	$7,419		-$16,275	$8,993	$10,000	-$15,000		$305,137	-3%		
											-1%	

After adjustments, the three paired sales show impacts ranging from -4% to +5% with an average finding of -1%. The most recent sale is the one that actually shows a positive impact on property value and suggests that the time adjustments may be a little aggressive for the other two sales in this market. However, the most recent sale is somewhat complicated by being closer to Lake Superior (seen on the east side of the map) but also adjoins a multifamily use and diagonally across the street from a ballpark. I will therefore rely on all three of these sales equally, which supports a finding of 0% impact.

For this one sale I have found a broker opinion of 0%, a sale/resale impact of -5% and a paired sales analysis of -1%. The sale/resale impact was based on a 10-year growth period which is the most significant adjustment considered in these three approaches to value and therefore deemed the least reliable. I therefore conclude based on the paired sales analysis and broker comments that this sale supports a finding of no impact on property value for a home at 790 feet where there are visual separations (trees) between the home and the RICE home or 540 feet from other power plant structures.

I also considered two home sales that are further away but nearby to the east of this facility (just east of parcels 24 and 25 on the adjoining parcel map). These homes are at 1,380 feet from the RICE facility.

The first is 1947 Granite Avenue that sold on June 21, 2022 for $327,000 for a 1,597 s.f. split-level home with 3 BR, 2 BA, built in 1974 on 0.49 acres with 2 car garage. The price per square foot works out to $204.76.

Adjoining Residential Sales After RICE Approved

Parcel	RICE	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
	Adjoins	1947 Granite	0.49	6/21/2022	$327,000	1974	1,597	$204.76	3/2	2-Car	Split
	Not	2202 Fitch	0.32	7/18/2022	$255,250	1970	1,500	$170.17	2/1	2-Car	Ranch
	Not	1909 Bancroft	0.24	5/9/2022	$280,000	1971	1,738	$161.10	3/2	2-Car	Ranch
	Not	1521 Lincoln	0.18	9/19/2022	$289,000	1961	1,740	$166.09	4/2	Drive	Ranch

RICE	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	1947 Granite								$327,000			1380 RICE
Not	2202 Fitch	-$1,162		$2,553	$6,602	$20,000			$283,243	13%		1210 Power
Not	1909 Bancroft	$2,029		$2,100	-$9,086				$275,043	16%		
Not	1521 Lincoln	-$4,384	$5,000	$9,393	-$9,500		$20,000		$309,508	5%		
											12%	

After adjustments, this home shows a positive impact ranging from +5% to +16%. The primary reason that I believe this shows that is while this home is located near the RICE facility, it is also in close proximity to the Dead River (shown to the north of this area). This home does not have direct view or access to the preserved land or river, but it is not uncommon to find significant premiums for adjacency to such natural features that are known to have long-term protected preservation from development. For this reason, I will not rely heavily on this indicator, though it does strongly support the finding of no impact for the home that was closer.

The second home sale that I identified is next to this at 1945 Granite Street and it sold on May 16, 2024 for $335,000 for a 1,674 s.f. ranch with 2 BR, 2 BA. I did not run a paired analysis on this home sale as I expect it to show the same enhancement from nearby preserved land which would also make it difficult to rely on for analysis. I did however consider a sale/resale analysis as that should incorporate whatever enhancement the area is providing in both sales figures so it provides for a straightforward analysis.

This home sold previously on February 2, 2017 for $200,000 after having been listed in November 2016 for $210,000.

The FHFA HPI does not have an area inclusive to Marquette, so I have used the zip code designation annually per year since 2017 which shows annual increases that work out to a 1.6606 multiplier to that $200,000, for an expected increase in value to $332,120. This suggests a positive impact of $3,780, or +1%, due to the RICE facility that is 1,390 feet from that home or the closest power plant structure is 1,295 feet away. There are significant trees in between the home and the facility, which also helps to address appearance concerns.

I conclude that the data from 1495 Granite Street provides a strong indication of no impact on value at 1,390 feet from the RICE facility or 1,295 feet from related power plant structures.

6 – 3030 Vierling Drive East, Shakopee, MN

This facility was built in 2016 on a 6.09-acre tract. The adjoining uses include apartments to the west and townhomes to the south. The townhomes were located here prior to the RICE plant and are now 405 feet from the nearest point of the facility. The apartments were built after the RICE plant and are now 460 feet from the facility with an additional closer pad still available for construction.

The townhomes appear to be run as townhome apartments and there are no sales for consideration. The closest nearby home sale that I identified is to the southwest at 2779 Jade Circle E that sold on September 1, 2022 for $450,000 for a 4 BR, 3 BA, 2,618 s.f. 2-story home, with 2-car garage, built in 1989 on 0.36 acres. That home is 1,070 feet away with an estate home separating that home from the facility. The prior sale of that home was in 2002 and I consider a 20 year sale/resale analysis to be of minimal value and therefore did not attempt that analysis.

7 – 1011 N 3rd Street, Alexandria, LA

This facility was built around 2017 adjoining an existing natural gas powerplant. The adjoining uses include homes to the southwest at 840 feet from the power plant and RICE facility, but those same homes are closer to other buildings associated with the natural gas plant that was here since 1965 at distances as close as 280 feet. Given the earlier natural gas plant, I have not attempted any analysis associated with the nearby homes.

8 – 1125 Geddie Road, Tallahassee, FL

This facility was built in 2018 adjoining an existing powerplant on a portion of a 232.54-acre tract. The adjoining uses include homes as close as 560 feet to power plant buildings and as close as 1,250 feet from the RICE plant Given the earlier power plant, I have not attempted any analysis associated with the nearby homes.

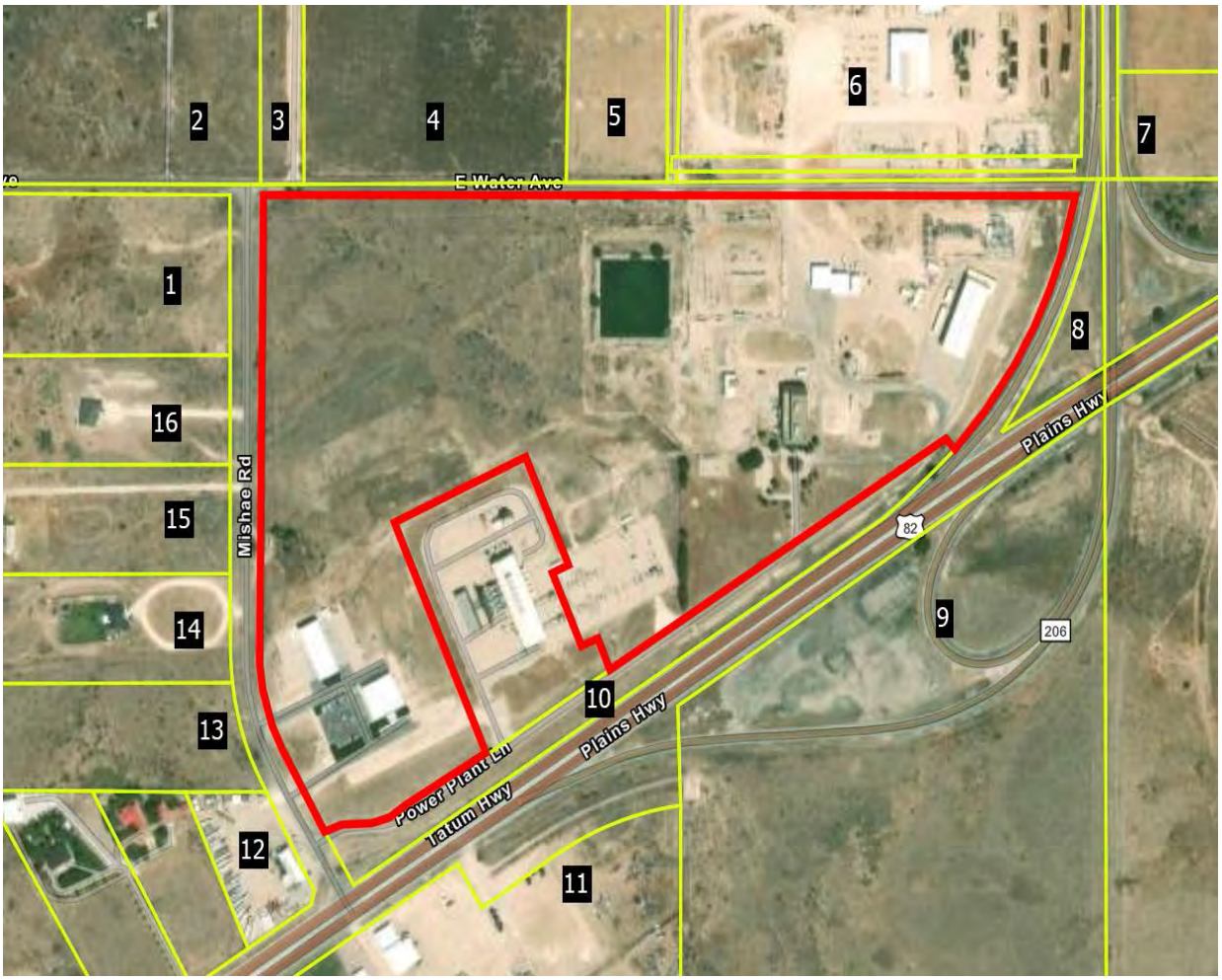
9 – 133 Clark-Mizelle Road, Benndale, MS

This facility was built in 2019 on a 7.00-acre parcel. This replaced an older facility at the site. The adjoining uses include homes as close as 495 feet to the RICE building (Parcel 1 with the house located just north of adjoining parcel 2) and as close as 480 feet from related power plant structures. Since the GIS does not show the plant, I have included the Google Earth image as shown below.

Given the older plant at this site, I cannot do a sale/resale analysis.

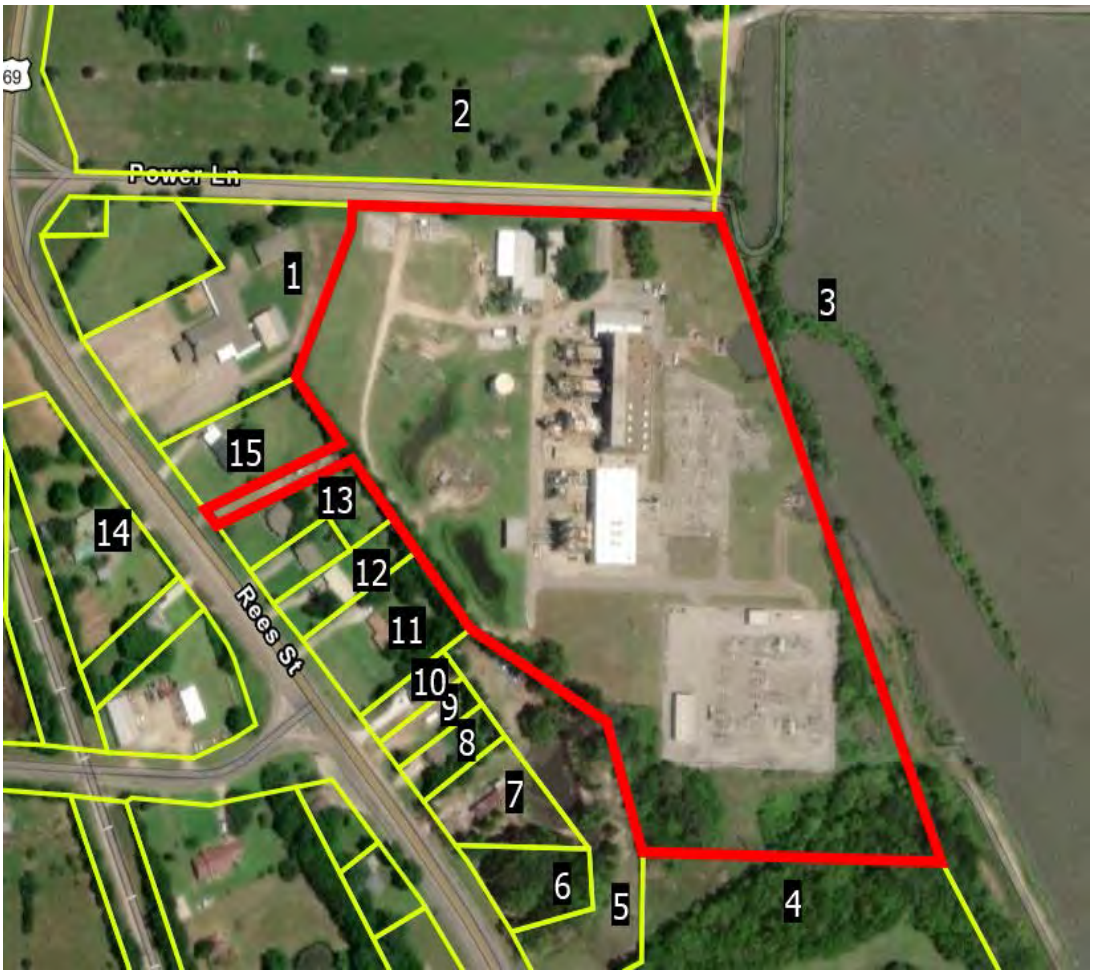

Benndale 22.7 MW
Cooperative Power Plant

10 – 2023 Power Plant Lane, Lovington, NM



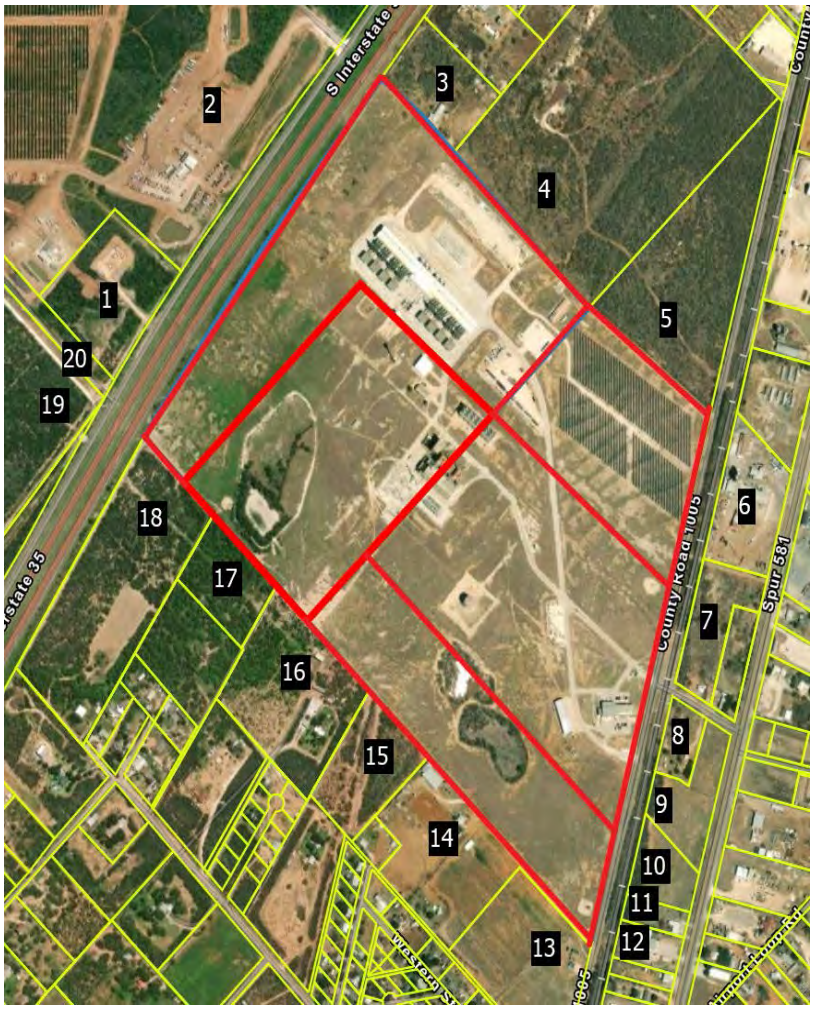
This facility was built in 2011 on a portion of a 69.65-acre tract. Additional buildings were built following that construction including the two closest to the adjoining parcels identified as 12, 13 and 14. The closest adjoining home is 525 feet away from power plant buildings and located on Parcel 14. The closest home to the RICE building is 1,030 feet away with intervening buildings separating them. Since additional buildings were constructed closer to that home it is difficult to use that for a paired sales analysis due to the potential for impacts from those other buildings. I therefore have not attempted any analysis from this facility.

11 – 4201 Power Lane, Greenville, TX



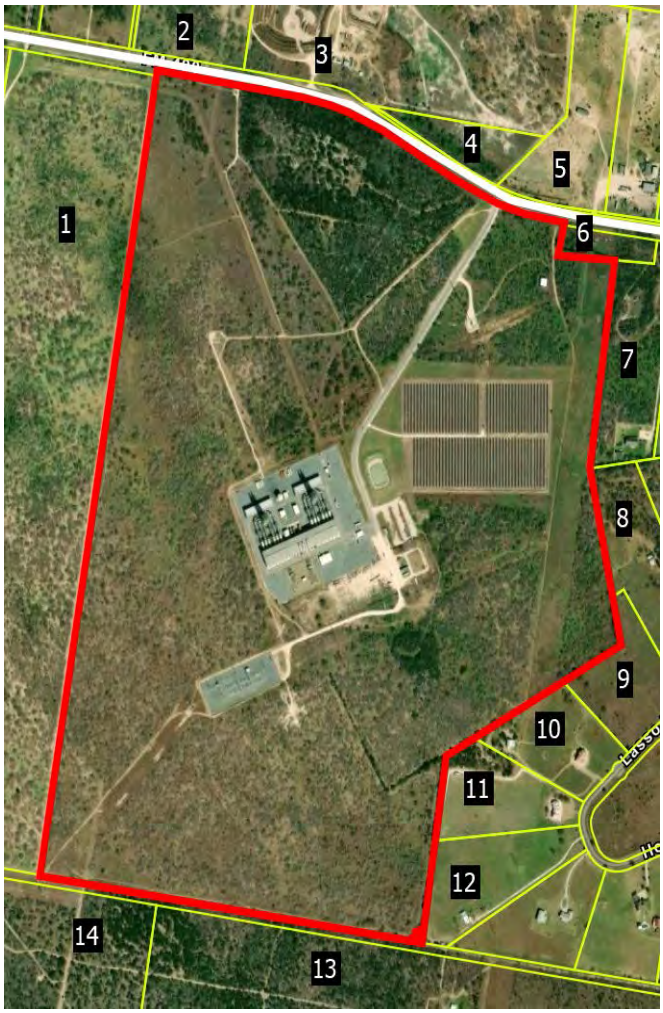
This facility was built in 2009 on a portion of a 20.23-acre tract. This was built on land currently used for an ongoing power facility which makes it difficult to use this for a paired sales analysis or sale/resale analysis. The closest adjoining home is 250 feet from the RICE facility and 220 feet from the nearest power plant structure. There are seven homes closer than 300 feet to this facility and the average distance from home to the RICE facility is 463 feet.

12 – 2393 County Road 1005, Pearsall, TX



This facility was built around 2012 on a portion of a 205.75-acre tract. This was built on land currently used for an ongoing power facility which makes it difficult to use this for a paired sales analysis or sale/resale analysis. The closest adjoining home is 420 feet from the nearest power plant structure and 690 feet from the RICE facility.

13 – 23601 FM 490, Edinburg, TX



This facility was built in 2015 on a portion of a 339-acre tract. A solar farm was added to this facility in 2018 and a substation in 2021. The closest adjoining home is 550 feet from a power plant structure and 2,070 feet from the RICE facility.

Adjoining Parcel 12 shown above sold on May 24, 2024 for $225,000 for a 10.44-acre lot with an improved with a metal barn with two canopies and a travel trailer. I reached out to Michael Karam with Coldwell Banker La Mansion, the listing broker for his thoughts on this transaction. The existing barn and the trailer complicate this sale somewhat as to how much value was attributed to those features. Without knowing how those were considered, it is difficult to compare this land to other tracts in the area. However, I did compare this to 3214 W Lasso Trail that sold on September 6, 2022 for $199,000 for an 8.07-acre tract in the same community. Nearby homes in this area are selling in the $1,000,000 range and the difference between an 8-acre tract and a 10-acre tract is not expected to have a substantial difference as they are all supporting similar price range homes – essentially these are lot values and not acreage values. I have adjusted upward by 10% for the additional acreage as it is still better to have 10 acres than 8. Adjusting for the time difference from 3rd Quarter 2022 to 2nd Quarter 2024, based on the state average of 2.82% and also upward by 10% for size, I derive a total adjustment of 13% for an indicated value of $224,870. This rounds exactly to the purchase price which supports a finding of no impact on this lot value. The likely homesite on this lot is approximately 2,240 feet from the RICE facility.

14 – Goodman Energy Center, Hays, KS

This facility was built in 2008 on a portion of a 157.10-acre tract. The closest adjoining residential use is 750 feet away from the power plant structures and 1,845 feet from the RICE facility.

I did not identify any nearby residential sales in the last few years. The closest home sale was over a mile away to the northeast off Feedlot Road. I have not attempted any further analysis on this facility.

Summary of Findings

Sales Data
The sales data shown adjoining the RICE facilities are focused on the Marquette Facility and Red Gate Facility.

The Marquette facility included a nearby home at 540 feet from a power plant structure and 790 feet from the RICE facility that the broker confirmed had no impact on value and the paired sales analysis supported a finding of no impact on value. The sale/resale analysis suggested a -5% impact but given that required adjusting an old sales price over a 10-year period, it is considered less reliable than the paired sales analysis and the broker comments.

The Marquette facility also included a nearby home sale at 1,210 feet from power plant buildings and 1,380 feet from the RICE facility that showed a significant premium after the RICE facility was built. I did not rely heavily on that indication as the home has some nearby preserved land, which I was not able to adequately address in the analysis and likely was the cause of that significant positive impact.

The Marquette facility also included a nearby home sale at 1,295 feet from power plant buildings and 1,390 feet from the RICE facility that adjoins the home noted above that I was able to do a sale/resale analysis. This analysis was able to naturally incorporate that nearby preserved land impact as that was the case in both the sale and the resale. That analysis supported a finding of no impact on home value.

The Red Gate facility included a lot sale that paired sales supports a finding of no impact on lot value. Similar lots on that same street further from the site are selling at comparable prices and being improved with homes selling at or above $1,000,000. The likely home site on this adjoining lot is approximately 2,240 feet from the RICE facility and 1,875 feet from power plant structures.

The sales data strongly supports a finding of no impact on home value at distances as close at 790 feet from a RICE facility or 540 feet from other power plant structures. That is not to say that at 780 feet there is an impact, just that the closest sold home that I could research was at 790 feet and showed no sign of an impact. The broker for that home clearly stated that it was not a factor in pricing and had no bearing on the sales price, which was supported by the paired sales analysis.

Demographic Data

The RICE facilities described and shown on the following pages are summarized below in terms of adjoining uses distance to the closest home from the RICE facility as well as the average distance to adjoining homes. The subject property shows a similar proximity to residential uses and there is only 1 adjoining home which is further than the average and median distances identified.

#	Name	City	County	State	Acres	Adjoin Parcels	Adjoin Residential Parcels	% Adjoin Parcels Residential	RICE Closest Home	RICE Avg. Dist Home	Other Closest Home	Other Avg. Dist Home
0	**Subject**	**Liberty**	**Casey**	**KY**	**93.93**	**11**	**4**	**27%**	**735**	**1,262**	**215**	**1,340**
1	Stillwater	Stillwater	Payne	OK	24.42	5	2	40%	N/A	N/A	N/A	N/A
2	Denton	Denton	Denton	TX	157.2	14	9	64%	2,550	2,593	1,875	1,945
3	A.J.	Pelkie	Baraga	MI	44.33	7	0	0%	1,730	1,730	1,255	1,255
4	Weston	Kronenwetter	Marathon	WI	275.31	25	13	52%	1820	3099	140	773
5	Marquette	Marquette	Marquette	MI	298.79	30	30	100%	750	1,264	480	1,088
6	Shakopee	Shakopee	Scott	MN	6.09	10	5	50%	350	429	N/A	N/A
7	DG Hunter	Alexandria	Rapides	LA	N/A	N/A	N/A	N/A	845	N/A	280	N/A
8	Arvah	Tallahasse	Leon	FL	232.54	21	13	62%	1250	1,783	560	1,231
9	Benndale	Benndale	George	MS	7	5	4	80%	495	495	480	480
10	LCEC	Lovington	Lea	NM	69.65	16	9	56%	1030	1,543	525	975
11	Tom Darte	Greenville	Hunt	TX	20.23	15	11	73%	250	463	220	480
12	Pearsall	Pearsall	Frio	TX	205.75	20	9	45%	690	2,445	420	958
13	Red Gate	Edinburg	Hidalgo	TX	339	14	9	64%	2070	2,399	550	1,583
14	Goodman	Hays	Ellis	KS	157.1	10	0	0%	1845	2,323	750	968
15	Antelope	Abernathy	Hale	TX	143.83	8	0	0%	N/A	N/A	N/A	N/A
					138.3447		**Average**	49%	1,206	1,714	628	1,067
					143.83		**Median**	52%	938	1,730	480	1,032
					339		**High**	100%	2,550	3,099	1,875	1,945
					6.09		**Low**	0%	250	429	140	480

The subject property only has one adjoining home and that is an older home located 735 feet from the RICE facility and 215 feet from the switchyard. That home is across the street and given the proximity to the switchyard and lack of vegetation, the developer has indicated that they will be planting a landscaping screen in this area. I would recommend a double row of 6-foot evergreen trees along that road frontage to screen this closest home as well as a related property further south – essentially stretching from Adjoining Parcel 4 through Adjoining Parcel 7. The other homes are further away and/or screened by existing vegetation near the southwest corner of the subject property. The landscaping screen would be consistent with the sales data identified where nearby homes had intervening vegetation to provide some screening.

The RICE facilities identified above include homes as close as 140 feet to power plant structures and as close as 250 feet of RICE facilities. The average closest distance between adjoining homes and RICE facilities is 1,206 feet and the median is 938 feet. The average closest distance for other power plant structures is 628 feet and the median is 480 feet.

The closest home at the subject property is at very similar distances to the middle of the range identified though at the lower end of the range. The closest adjoining home is an older home with an assessed value substantially lower than the average home value identified in the demographics for this area, which is less likely to absorb negative impacts on property value. The second closest home is at the end of Carr Sasser Road and has a commercial use ongoing right behind that home that would be closer and more impactful than the proposed use.

Most of the adjoining property to this proposed facility is agricultural or agricultural/residential use with little demand for new residential development in the area as shown earlier by the demographics projection based on the census data.

The next chart shown below shows population within a radius of the subject property and the comparable RICE facilities as well as median income and housing profiles. This shows a median population within 1 mile of the facilities is lower than at the subject and the average is higher, which provides for a good bracketing on population density for the subject property. Bracketing the areas considered increases the reliability of the data from those areas as we are not focusing on areas superior or inferior, but a range of areas at or near the population density of the subject property. The median incomes and average home values are bracketed by the overall range which is important, but both the average and median incomes and the average and median home values are higher for this set of facilities than what is at the subject property. This means that on average the areas considered are superior to the subject property, which still makes for a reliable analysis, but does suggest that there is a greater potential for negative impacts in this data set than likely at the subject property. This is because at higher price points and incomes, buyers have greater ability to act on market preferences. The data still brackets the subject site and considered a reliable data set for this analysis.

The specific sites from this set that provided market data are Marquette and Red Gate which both have higher median incomes and average housing prices than the subject property. The average home price at Red Gate is $185,000, though I note that the nearby housing identified at the RICE plant were selling at $1,000,000 with the adjoining lot to the RICE plant selling for $225,000, which would typically support a home value of over $1,000,000 based on that market and typical lot-to-home ratios.

	2024 1 - Mile Demographics			2024 3-Mile Demographics			County Demo.		State Demo.	
Name	Popl.	Med Inc.	Avg. Hous	Popl.	Med Inc.	Avg. House	Med Inc.	Avg. Hous	Med Inc.	Avg. House
Subject	**214**	**$46,141**	**$184,122**	**1,079**	**$43,460**	**$183,903**	**$39,824**	**$193,688**	**$62,002**	**$262,387**
Stillwater	19	$60,354	$237,500	467	$63,522	$274,053	$49,427	$297,143	$62,129	$260,715
Denton	78	$117,375	$351,136	15,360	$58,682	$447,629	$108,671	$534,849	$77,169	$373,415
A.J.	53	$39,508	$182,609	370	$39,403	$195,469	$56,437	$196,937	$71,476	$296,468
Weston	478	$82,924	$275,316	13,909	$95,790	$273,878	$75,478	$297,038	$75,654	$346,449
Marquette	1,924	$61,162	$247,479	20,255	$54,842	$316,924	$63,957	$301,231	$71,476	$296,468
Shakopee	8,338	$88,128	$340,268	42,696	$104,851	$433,780	$114,175	$491,380	$86,801	$412,139
DG Hunter	28	$31,818	$158,333	660	$42,343	$166,035	$55,881	$200,010	$55,017	$224,613
Arvah	940	$80,295	$207,824	9,878	$43,420	$178,472	$65,255	$391,170	$74,715	$474,788
Benndale	28	$31,818	$158,333	660	$42,343	$166,035	$55,881	$200,010	$55,017	$224,613
LCEC	202	$76,676	$331,364	8,539	$74,965	$253,709	$72,458	$241,628	$62,263	$318,576
Tom Darte	845	$63,894	$317,472	10,784	$51,581	$179,438	$74,161	$314,023	$77,169	$373,415
Pearsall	684	$81,139	$244,127	9,337	$53,180	$192,621	$55,258	$259,656	$77,169	$373,415
Red Gate	15	$41,089	$185,000	513	$40,245	$216,608	$51,068	$186,385	$77,169	$373,415
Goodman	18	$118,327	$405,556	3,108	$104,893	$379,536	$62,743	$286,089	$72,627	$283,011
Antelope	12	$50,000	$262,500	2,947	$69,676	$208,065	$54,059	$171,409	$77,169	$373,415
Average	911	$68,300	$260,321	9,299	$62,649	$258,817	$67,661	$291,264	$71,535	$333,661
Median	78	$63,894	$247,479	8,539	$54,842	$216,608	$62,743	$286,089	$74,715	$346,449
High	8,338	$118,327	$405,556	42,696	$104,893	$447,629	$114,175	$534,849	$86,801	$474,788
Low	12	$31,818	$158,333	370	$39,403	$166,035	$49,427	$171,409	$55,017	$224,613

Conclusion

The RICE facilities researched include sales data for homes priced at $295,000 within 790 feet from the RICE facility and 540 feet from the other power plant structures are showing no sign of any impact. I have additional sales data at greater distances that show the same result.

The closest home at the subject property is 735 feet and that is for an older home. The distance involved is greater than the minimum distances identified and very similar to the distance showing no impact for a home at $295,000. The current assessed value for this closest home is $59,000. The proposed plan is to provide a double row of 6-foot trees at time of planting along that road frontage to provide a screen to soften the view. I therefore conclude that no impact on the value of this property is anticipated.

The next closest home that I identified is further away and is currently much closer to an ongoing commercial operation that has a much greater impact on that property. That home has an assessed value of $47,000. Based on the proposed landscaping screen along this corridor, I do not foresee any negative impact on property value based on the sales data.

V. Specific Factors Related To Impacts on Value

I have completed a number of Impact Studies related to a variety of uses and I have found that the most common areas for impact on adjoining values typically follow a hierarchy with descending levels of potential impact. I will discuss each of these categories and how they relate to a RICE facility.

1. Hazardous material
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

1. Hazardous material

The proposed RICE engines are subject to 40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engins (RICE) and 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. These standards require limits on CO emissions, formaldehyde, NOx and VOCs.

Concerns over those emissions could be reasonable and if I were to find any impact on market value on homes near these facilities, then this is a category that I would consider as a possible reason for that impact. However at the distances identified I have found no impact in the market and therefore consider this category not applicable at these distances.

2. Odor

I did not detect any specific odor related to the facility that I visited. I do not see a basis for an impact based on odor.

3. Noise

While RICE facilities can generate significant noise, noise abatement technologies will be applied to the plant. This work will be covered in a separate report and the plant will adhere to local noise ordinances.

I therefore do not consider this a category of concern for this facility at distances similar to the comparable facilities.

4. Traffic

After construction, there will be limited employees that would work in rotating shifts. Assuming the facility complies with any suggestions from the traffic study for this project, I do not consider this a category of concern for this facility.

5. Stigma

There is likely some stigma associated with a RICE plant given it is a natural gas power plant, but closely tied with the concerns over emissions. If I were to find any impact on market value on homes near these facilities, then this is a category that I would consider as a possible reason for that impact. However at the distances identified I have found no impact in the market and therefore consider this category not applicable at these distances.

6. Appearance

The appearance of the facility is industrial in nature, but this facility will be located in an isolated area with significant trees screening one side and a proposed landscaping screen on the other side. The nearby homes are in proximity to a commercial/industrial operation on Carr Sasser Road which is unscreened. The distances indicated with a landscaping screen are supported by the market data. I do not see any basis for an impact on property value from the appearance.

7. Conclusion

On the basis of the factors described above, it is my professional opinion that the proposed RICE facility will not negatively impact adjoining property values. The only categories of impact of note is hazardous material and stigma, which is addressed through setbacks. The matched pair data and sale/resale analysis supports that conclusion.

VI. Certification

I certify that, to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct;

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions;

3. I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved;

4. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

5. My engagement in this assignment was not contingent upon developing or reporting predetermined results;

6. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of the appraisal;

7. The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute;

8. My analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

9. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

10. I have not made a personal inspection of the property that is the subject of this report, and;

11. No one provided significant real property appraisal assistance to the person signing this certification.

12. As of the date of this report I have completed the continuing education program for Designated Members of the Appraisal Institute;

13. I have not performed services, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

Disclosure of the contents of this appraisal report is governed by the bylaws and regulations of the Appraisal Institute and the National Association of Realtors.

Neither all nor any part of the contents of this appraisal report shall be disseminated to the public through advertising media, public relations media, news media, or any other public means of communications without the prior written consent and approval of the undersigned.

Richard C. Kirkland, Jr., MAI
State Certified General Appraiser

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Professional Experience

Kirkland Appraisals, LLC, Raleigh, N.C. — 2003 – Present
Commercial appraiser

Hester & Company, Raleigh, N.C.
Commercial appraiser — 1996 – 2003

Professional Affiliations

MAI (Member, Appraisal Institute) designation #11796 — 2001
NC State Certified General Appraiser # A4359 — 1999
VA State Certified General Appraiser # 4001017291
SC State Certified General Appraiser # 6209
KY State Certified General Appraiser # 5522
TN State Certified General Appraiser # 6240
FL State Certified General Appraiser # RZ3950
GA State Certified General Appraiser # 321885
MI State Certified General Appraiser # 1201076620
PA State Certified General Appraiser # GA004598
OH State Certified General Appraiser # 2021008689
IN State Certified General Appraiser # CG42100052
IL State Certified General Appraiser # 553.002633
LA State Certified General Appraiser # APR.05049-CGA
TX State Certified General Appraiser # 1380528 G

Education

Bachelor of Arts in English, University of North Carolina, Chapel Hill — 1993

Continuing Education

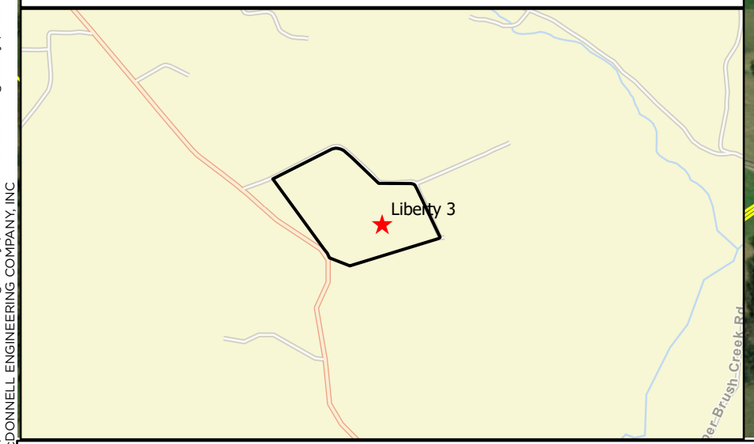
Michigan Appraisal Law	2024
Uniform Standards of Professional Appraisal Practice Update	2024
ASFMRA Integrated Approaches to Value (A360)	2024
ASFMRA Best in Business Ethics	2023
Appraising Natural Resources Series – Oil, Gas & Minerals	2023
Appraisal of Industrial and Flex Buildings	2023
Commercial Land Valuation	2023
Fair Housing, Bias and Discrimination	2023
Pennsylvania State Mandated Law for Appraisers	2023
What NOT to Do (NCDOT Course)	2023
The Income Approach – A Scope of Work Decision	2023
Valuation of Residential Solar	2022
Residential Property Measurement and ANSI	2022
Business Practices and Ethics	2022

Uniform Standards of Professional Appraisal Practice Update	2022
Sexual Harassment Prevention Training	2021
Appraisal of Land Subject to Ground Leases	2021
Michigan Appraisal Law	2020
Uniform Standards of Professional Appraisal Practice Update	2020
Uniform Appraisal Standards for Federal Land Acquisitions (Yellow Book)	2019
The Cost Approach	2019
Income Approach Case Studies for Commercial Appraisers	2018
Introduction to Expert Witness Testimony for Appraisers	2018
Appraising Small Apartment Properties	2018
Florida Appraisal Laws and Regulations	2018
Uniform Standards of Professional Appraisal Practice Update	2018
Appraisal of REO and Foreclosure Properties	2017
Appraisal of Self Storage Facilities	2017
Land and Site Valuation	2017
NCDOT Appraisal Principles and Procedures	2017
Uniform Standards of Professional Appraisal Practice Update	2016
Forecasting Revenue	2015
Wind Turbine Effect on Value	2015
Supervisor/Trainee Class	2015
Business Practices and Ethics	2014
Subdivision Valuation	2014
Uniform Standards of Professional Appraisal Practice Update	2014
Introduction to Vineyard and Winery Valuation	2013
Appraising Rural Residential Properties	2012
Uniform Standards of Professional Appraisal Practice Update	2012
Supervisors/Trainees	2011
Rates and Ratios: Making sense of GIMs, OARs, and DCFs	2011
Advanced Internet Search Strategies	2011
Analyzing Distressed Real Estate	2011
Uniform Standards of Professional Appraisal Practice Update	2011
Business Practices and Ethics	2011
Appraisal Curriculum Overview (2 Days – General)	2009
Appraisal Review - General	2009
Uniform Standards of Professional Appraisal Practice Update	2008
Subdivision Valuation: A Comprehensive Guide	2008
Office Building Valuation: A Contemporary Perspective	2008
Valuation of Detrimental Conditions in Real Estate	2007
The Appraisal of Small Subdivisions	2007
Uniform Standards of Professional Appraisal Practice Update	2006
Evaluating Commercial Construction	2005
Conservation Easements	2005
Uniform Standards of Professional Appraisal Practice Update	2004
Condemnation Appraising	2004
Land Valuation Adjustment Procedures	2004
Supporting Capitalization Rates	2004
Uniform Standards of Professional Appraisal Practice, C	2002
Wells and Septic Systems and Wastewater Irrigation Systems	2002
Appraisals 2002	2002
Analyzing Commercial Lease Clauses	2002
Conservation Easements	2000
Preparation for Litigation	2000
Appraisal of Nonconforming Uses	2000
Advanced Applications	2000
Highest and Best Use and Market Analysis	1999
Advanced Sales Comparison and Cost Approaches	1999

Advanced Income Capitalization	1998
Valuation of Detrimental Conditions in Real Estate	1999
Report Writing and Valuation Analysis	1999
Property Tax Values and Appeals	1997
Uniform Standards of Professional Appraisal Practice, A & B	1997
Basic Income Capitalization	1996

APPENDIX C – SITE LEGAL BOUNDARIES

General Site: Liberty 3
Parcel Size (Acres): 93.2
Electrical Transmission Line Intersection Distance (miles): 0.41
Transmission Line Name: Casey County to Liberty 161 kV
Substation Distance (miles): 4.9
Natural Gas Pipeline Intersection Distance (miles): 0.28
Natural Gas Pipeline: Columbia Gulf Transmission Co
Nearest Potential Community Conflict (miles): 2.03; Church



Site
Electrical Transmission
Natural Gas

USA Flood Hazard
1% Annual Chance Flood Hazard

WETLAND TYPE
Freshwater Emergent Wetland
Freshwater Pond
Riverine

0 0.1 0.21 0.42 Miles

N

Source: ESRI and Burns & McDonnell Engineering.

EKPC RICE Siting Study:
Liberty 3

1898 & CO. PART OF BURNS & MCDONNELL

Issued: December 1, 2022

Scale For Microfilming
Millimeters
Inches

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
D	08/23/24	WRL		ADJUSTED PLANT LOCATION FOR 1000'-0" SETBACK
C	06/04/24	WRL		ADDED SEAL AIR FAN
B	03/21/24	WRL		ADDED COMBINED STACK LAYOUT AND SWITCHYARD
A	03/04/24	WRL		MIRRORED LAYOUT

SITE PLAN
0 100' 200'
SCALE IN FEET
NORTH

BURNS McDONNELL

designed
detailed W. LESNIAK

EAST KENTUCKY POWER COOPERATIVE

LIBERTY SITE 3
12 x 18MW GAS RECIP ENGINE PLANT
OVERALL SITE PLAN OPTION B
BASED ON WARTSILA ENGINES

project 157785
contract
drawing **GA120 – D**
rev.
sheet of sheets
file 157785_12X18MW-GA120-LIBRTY3-OPTB.DWG

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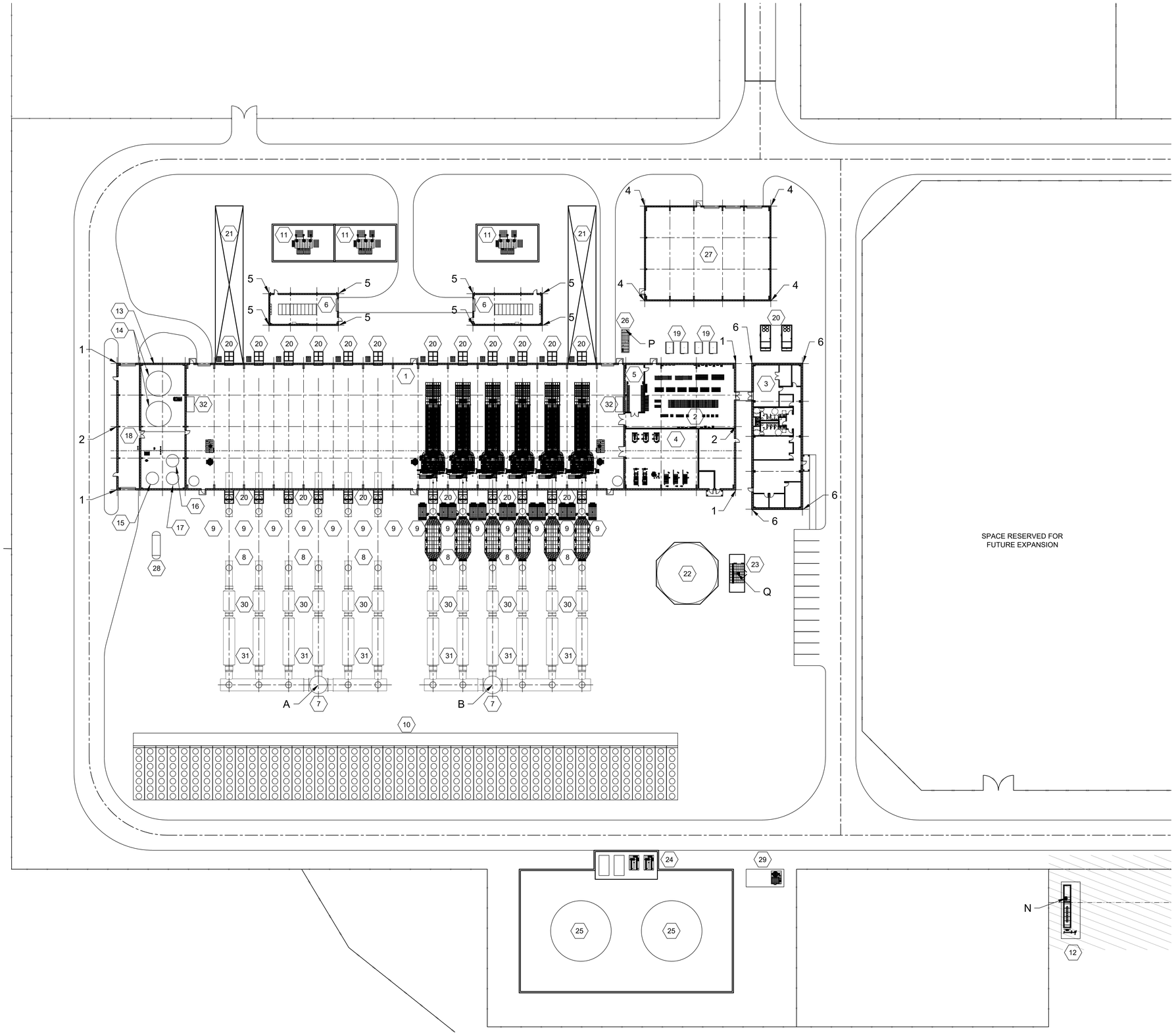

EQUIP COORDS

ITEM	NORTHING	EASTING	HEIGHT
N	N: 2018196.704	E: 1870322.119	25'-0"
P	N: 2018684.617	E: 1870617.902	25'-0"
Q	N: 2018532.597	E: 1870469.324	15'-0"

STACK COORDS

ITEM	NORTHING	EASTING
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B	N: 2018681.917	E: 1870317.258

BUILDING HEIGHTS

ITEM	HEIGHT
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2	45'-0"
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4	25'-0"
5	23'-0"
6	15'-0"

SITE KEY

1	ENGINE HALL
2	LOW VOLTAGE ROOM
3	ADMIN-CONTROL AREA
4	MECHANICAL ROOM
5	BATTERY ROOM
6	MEDIUM VOLTAGE BLDG
7	SILENCERS - STACKS
8	SELECTIVE CATALYTIC REDUCER
9	CHARGE AIR FILTER
10	RADIATORS
11	STEP-UP TRANSFORMER AND CONTAINMENT
12	GAS CONDITIONING
13	OIL-UREA CONTAINMENT
14	UREA TANK
15	NEW LUBE OIL TANK
16	SERVICE LUBE OIL TANK
17	WASTE LUBE OIL TANK
18	OIL-UREA / AMMONIA UNLOADING STATION
19	STATION TRANSFORMER
20	HVAC UNITS
21	HEAVY HAUL
22	FIRE WATER TANK
23	FIRE PUMPS
24	FUEL PUMPS
25	LIQUID FUEL TANKS WITH CONTAINMENT
26	AUX GENERATOR
27	WAREHOUSE
28	OIL WATER SEPARATOR
29	GAS FILTER/SEPARATOR
30	RESONATOR
31	HORIZONTAL SILENCER
32	SEAL AIR FAN

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
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C	06/04/24	WRL		ADDED SEAL AIR FAN
B	04/29/24	WRL		ADDED COORDINATES FOR STACKS AND EQUIPMENT
A	03/04/24	WRL		PRELIMINARY MIRRORED SINGLE STACK LAYOUT

POWER BLOCK ENLARGED PLAN

0 16' 32' 64'
SCALE IN FEET

TRUE NORTH 21°0'0" NORTH
PLAN NORTH

BURNS McDONNELL

designed | detailed W. LESNIAK

EAST KENTUCKY POWER COOPERATIVE

LIBERTY SITE 3
12 x 18MW GAS RECIP ENGINE PLANT
SINGLE STACK OPTION B
ENLARGED PLAN

project 157785 | contract

drawing GA122 – rev. D

sheet of sheets

file 157785_12X18MW-GA122-LIBRTY3-SNGLESTK-OPTB.

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Scale For Microfilming: Millimeters / Inches

APPENDIX D – SOUND STUDY REPORT

BURNS McDONNELL

EAST KENTUCKY POWER COOPERATIVE

SOUND STUDY REPORT

LIBERTY RICE POWER PLANT

PROJECT NO. 157785

REVISION 1

AUGUST 2024

CONTENTS

TABLES

List of Abbreviations

Abbreviation	Term/Phrase/Name
ANSI	American National Standards Institute
BOP	Balance of Plant
CadnaA	Computer Aided Noise Abatement
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
EKPC	East Kentucky Power Cooperative
Hz	Hertz
ISO	International Organization for Standardization
L_{dn}	day-night average sound level
L_{eq}	equivalent-continuous sound level
L_{10}	10-percentile exceedance sound level
L_{50}	50-percentile exceedance sound level
L_{90}	90-percentile exceedance sound level
MP	measurement point
mph	miles per hour
Project	Liberty RICE Power Plant
PWL	sound power level
RICE	Reciprocating Internal Combustion Engine
SPL	sound pressure level
USEPA	United States Environmental Protection Agency

Executive Summary

Burns & McDonnell conducted a sound study for the East Kentucky Power Cooperative (EKPC) Liberty Power Plant (Project), located in Casey County, Kentucky. The Project is a reciprocating internal combustion engine (RICE) power generation facility which is expected to include 12 Wartsila W18V50DF RICE units housed inside a building and associated balance-of-plant (BOP) equipment.

The objectives of this study were to identify the applicable noise regulations, model operational sound levels of the Project, and compare Project-generated sound levels to the applicable noise regulations. As of this version of the report, the existing ambient sound level measurements have not been completed. However, measurements were conducted at a nearby location which were used to estimate the ambient sound levels for this area.

The State of Kentucky does not have applicable noise statutes which limit noise from the Project nor does Casey County. In the absence of regulatory limits, Project sound levels were compared to industry guidelines to limit noise impacts on the surrounding community. For A-weighted sound levels, the United States Environmental Protection Agency (USEPA) has guidance to limit sound levels at nearby residential receptors to a constant sound level of less than 48.6 dBA. In the interest of potential low-frequency impacts, the American National Standards Institute (ANSI) standard, ANSI S12.9, provides guidance that low-frequency sound levels in the 16, 31.5, and 63-Hertz (Hz) octave bands less than 65 dB generally result in minimal annoyance. This would be approximately equivalent to a C-weighted sound level of 68 dBC for sources with strong low frequency content.

The Project operational sound levels are expected to be generally in-line with recommended noise criteria provided by USEPA and ANSI S12.9, with only slight exceedances at a few receptor locations. However, it should be noted that the USEPA guidelines and the ANSI document are not intended to be construed as regulatory limits as they do not consider cost or engineering feasibility associated with additional mitigation. Instead, these should be used only as guidance for minimizing the potential for noise impacts on the surrounding community.

1.0 Acoustical Terminology

The term “sound level” is often used to describe two different sound characteristics: sound power and sound pressure. Every source that produces sound has a sound power level (PWL). The PWL is the acoustical energy emitted by a sound source and is an absolute number that is not affected by the surrounding environment. The acoustical energy produced by a source propagates through media as pressure fluctuations. These pressure fluctuations, also called sound pressure levels (SPL), are what human ears hear and microphones measure.

Sound is physically characterized by amplitude and frequency. The amplitude of sound is measured in decibels (dB) as the logarithmic ratio of a sound pressure to a reference sound pressure (20 micropascals). The reference sound pressure corresponds to the typical threshold of human hearing. To the average listener, a 3-dB change in a continuous broadband sound is generally considered “just barely perceptible”; a 5-dB change is generally considered “clearly noticeable”; and a 10-dB change is generally considered a doubling (or halving, if the sound is decreasing) of the apparent loudness.

Sound waves can occur at many different wavelengths, also known as the frequency. Frequency is measured in hertz (Hz) and is the number of wave cycles per second that occur. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz. Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the lower and higher frequencies. As such, the A-weighting scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels, or dBA. For reference, the A-weighted sound pressure level and subjective loudness associated with some common sound sources are listed in Table 1-1. The C-weighting scale (dBC) has more of an emphasis on low frequency content than the A-weighting scale and is generally used to describe the low frequency characteristics of sound levels (e.g., “rattling” or “rumbling” associated with sound levels).

Sound in the environment is constantly fluctuating, as when a car drives by, a dog barks, or a plane passes overhead. Therefore, sound metrics have been developed to quantify fluctuating environmental sound levels. These metrics include the exceedance sound level. The exceedance sound level is the sound level exceeded during “x” percent of the sampling period and is also referred to as a statistical sound level. Common exceedance sound level values are the 10-, 50-,90-percentile exceedance sound levels, denoted by L_{10}, L_{50}, and L_{90}. The equivalent-continuous sound level (L_{eq}) is the arithmetic average of the varying sound over a given time period and is the most common metric used to describe sound. The USEPA uses a noise metric called the day-night average sound level (L_{dn}) which is a 24-hour average sound level, with a 10-dBA penalty applied to sound measured during nighttime hours (10:00 PM to 7:00 AM).

Table 1-1: Typical Sound Pressure Levels Associated with Common Sound Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment
140	Deafening	Jet aircraft at 75 feet
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 feet
120	Threshold of feeling	Elevated train
110	Very loud	Jet flyover at 1,000 feet
100		Motorcycle at 25 feet
90	Moderately loud	Propeller plane flyover at 1,000 feet
80		Diesel truck (40 mph) at 50 feet
70	Loud	B-757 cabin during flight
60	Moderate	Air-conditioner condenser at 15 feet
50	Quiet	Private Office
40		Farm field with light breeze, birdcalls
30	Very quiet	Quiet residential neighborhood
20		Rustling leaves
10	Just audible	--
0	Threshold of hearing	--

Sources:
(1) Adapted from *Architectural Acoustics*, *M. David Egan, 1988*
(2) *Architectural Graphic Standards*, Ramsey and Sleeper, 1994

2.0 Applicable Regulations & Criteria

State and local noise regulations were reviewed to determine Project noise limits. The State of Kentucky, nor Casey County, have applicable noise statutes which limit noise from the Project. In the absence of local noise limits, Project sound levels can be compared to USEPA guidelines and the ANSI S12.9 standard.

2.1 USEPA Guidelines

In 1974 the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* As part of this document, the recommended noise limit is a day-night level, L_{dn}, of 55 dBA at the nearest noise sensitive receptors (i.e., residents). This would be equal to an equivalent continuous sound level, L_{eq}, of 48.6 dBA for a constant source operating continuously (i.e., 24-hours). The USEPA notes that these recommended sound levels are not to be construed as regulatory limits as they do not account for costs or feasibility associated with meeting these target sound levels. However, they are generally appropriate levels to protect the health and welfare of the community.

2.2 ANSI S12.9 Part 4

Since there is potential for low-frequency noise to be emitted from the Project, ANSI S12.9 Part 4 provides informative guidance for sounds with strong low-frequency content. Section D.2 states the following:

> *"Generally, annoyance is minimal when octave-band sound pressure levels are less than 65 dB at 16, 31.5, and 63-Hz midband frequencies."*

For sounds with strong low-frequency content, this would be approximately equivalent to a C-weighted sound level of 65 to 70 dBC. A target sound level of 68 dBC for the Project falls within this range and should help minimize the potential for low-frequency impacts based on the guidance from the ANSI standard.

3.0 Sound Level Measurements

Ambient sound level measurements have not been conducted at the Liberty site. However, sound level measurements were conducted at the previous Campbellsville site which is approximately 22 miles northwest of the Liberty site. Since both sites are rural areas in a similar region, relatively close to each other, and both similar distances away from rural highways and major interstates, the ambient measurements at Campbellsville have been used to approximate the existing ambient sound levels at Liberty. The following Table 3-1 shows the estimated ambient sound levels at the nearby residents to the Project, based on previous measurements conducted at the Campbellsville site.

Table 3-1: Estimated Ambient Sound Levels (from Campbellsville Measurements)

Location	Average Ambient Sound Level (dBA)				Average Ambient Sound Level (dBC)			
	Daytime L_{eq}	Daytime L_{90}	Nighttime L_{eq}	Nighttime L_{90}	Daytime L_{eq}	Daytime L_{90}	Nighttime L_{eq}	Nighttime L_{90}
Nearby Residents	43	33	38	32	63	53	58	55

**Daytime hours are 7:00 AM to 10:00 PM*

4.0 Modeled Sound Levels

Operational sound levels for the proposed Project were performed using the Computer Aided Noise Abatement (CadnaA) modeling software. Equipment sound levels used for modeling were based on a combination of supplier provided data and in-house data based on experience with similar make and sized equipment. This model was used for determining expected sound levels due to the Project and the associated impacts to the existing ambient sound levels at the nearest noise sensitive receptors.

4.1 Sound Modeling Methodology and Input Parameters

Predictive noise modeling was performed using the industry-accepted sound modeling software CadnaA, version 2024. The software is a scaled, three-dimensional program, which considers air absorption, terrain, ground absorption, and reflections and shielding for each piece of noise-emitting equipment, and then predicts sound pressure levels at discrete locations and over a gridded area based on input source sound levels. The model calculates sound propagation based on International Organization for Standardization (ISO) 9613-2:1996, General Method of Calculation. ISO 9613-2 assesses the sound level propagation based on the octave band center-frequency range from 31.5 to 8,000 Hz.

The ISO standard considers sound propagation and directivity. The sound-modeling software calculates omnidirectional, downwind sound propagation using worst-case directivity factors, in tandem with user-specified directivities and propagation properties. Empirical studies accepted within the industry have demonstrated that modeling may over-predict sound levels in certain directions, and as a result, modeling results generally are considered a conservative measure of the Project's actual sound level.

The modeled atmospheric conditions were assumed to be calm, and the temperature and relative humidity were left at the program's default values. Reflections and shielding were considered for sound waves encountering physical structures. Sound levels around the site can be influenced by the sound reflections from physical structures onsite. The area surrounding the Project has mild elevation changes, which scatter and absorb the sound waves. Thus, terrain was included to account for surface effects such as ground absorption. Average ground absorption for the Project site and surrounding area was set to a value of 0.5 to account for the mix of hard pavement and soft vegetative ground. The modeling assumptions are outlined in Table 4-1. This model is exclusive of noise sources not associated with the Project (e.g., traffic noise and local fauna). Only Project sound levels have been evaluated.

The Project general is included as Figure A-1 of Appendix A. The modeled equipment octave-band sound levels for each piece of equipment are included in Appendix B. A summary of the Project's expected acoustical design is shown in Table 4-2.

Table 4-1: Sound Modeling Parameters

Model Input	Parameter Value
Ground Absorption	0.5
Number of Reflections	2
Receptor Height	5 feet above grade
Terrain	USGS topographic land data
Temperature	50 °F
Humidity	70%

Table 4-2: Project Expected Acoustical Design

Equipment	QTY	Base Sound Level[a,b]	Notes
Wartsila Equipment			
RICE Engine	12	L_w = 128 dBA	Inside RICE Hall, Roof - STC 50 Min, Walls - STC 55 Min + Absorptive Layer
RICE Exhaust Exit	2	L_w = 99 dBA	Includes SCR + Resonator + 45 dBA Silencer
RICE Exhaust Duct	12	$L_{w''}$ = 93 dBA/m	Insulated Duct
Charge Air Intake	24 (2 ea.)	L_w = 96 dBA	Intake 45 dB Silencer
Radiator	12 (1 ea.)	L_w = 96 dBA	Noise Level 4
Roof Ridge Vent	1	L_w = 108 dBA	From RICE Hall Interior Calc'd SPL w/ Ridge Vent Silencer
MAU/Relief	24	L_w = 99 dBA	From RICE Hall Interior Calc'd SPL
BOP Equipment			
GSU Transformer	3	L_p = 85 dBA at 3 feet	Estimated
Small Transformers	4	L_p = 70 dBA at 3 feet	Estimated
HVAC Units	2	L_w = 95 dBA	Estimated
Misc. Pumps, Heaters, etc.		L_p = 85 dBA at 3 feet	Estimated

(a) L_p – Sound pressure level at specified distance
(b) L_w – Sound power level, $L_{w''}$ – Sound power level per unit area

4.2 Sound Modeling Results

The Project will operate at fairly constant sound levels when operational. Therefore, steady-state sound level predictions were completed. A worst-case, full-load scenario with all 12 engines operating at 100% load was used for the modeling scenario. The predicted overall steady-state operational A-weighted sound levels, which do not include contributions from ambient sound sources, are shown with 5-dB contours in Figure A-2 of Appendix A. Predicted overall C-weighted sound levels are shown with 5-dB contours in Figure A-3 of Appendix A.

The Project-generated sound levels were calculated at the nearest residential properties. Table 4-3 includes the predicted Project sound levels at the nearest residential receptors.

Table 4-3: Modeled Sound Level Results

Location	Assumed Ambient Sound Level[a]		Model Predicted Project-Only Sound Level[b]		Project Target Noise Criteria	
	dBA	dBC	dBA	dBC	dBA	dBC
R1	32	53	48	65	48.6	68
R2	32	53	50	67	48.6	68
R3	32	53	47	64	48.6	68
R4	32	53	43	60	48.6	68
R5	32	53	42	60	48.6	68
R6	32	53	45	63	48.6	68
R7	32	53	52	71	48.6	68
R8	32	53	52	70	48.6	68

(a) Lowest of the daytime/nighttime measured sound levels from Campbellsville measurements
(b) Model-predicted Project sound level

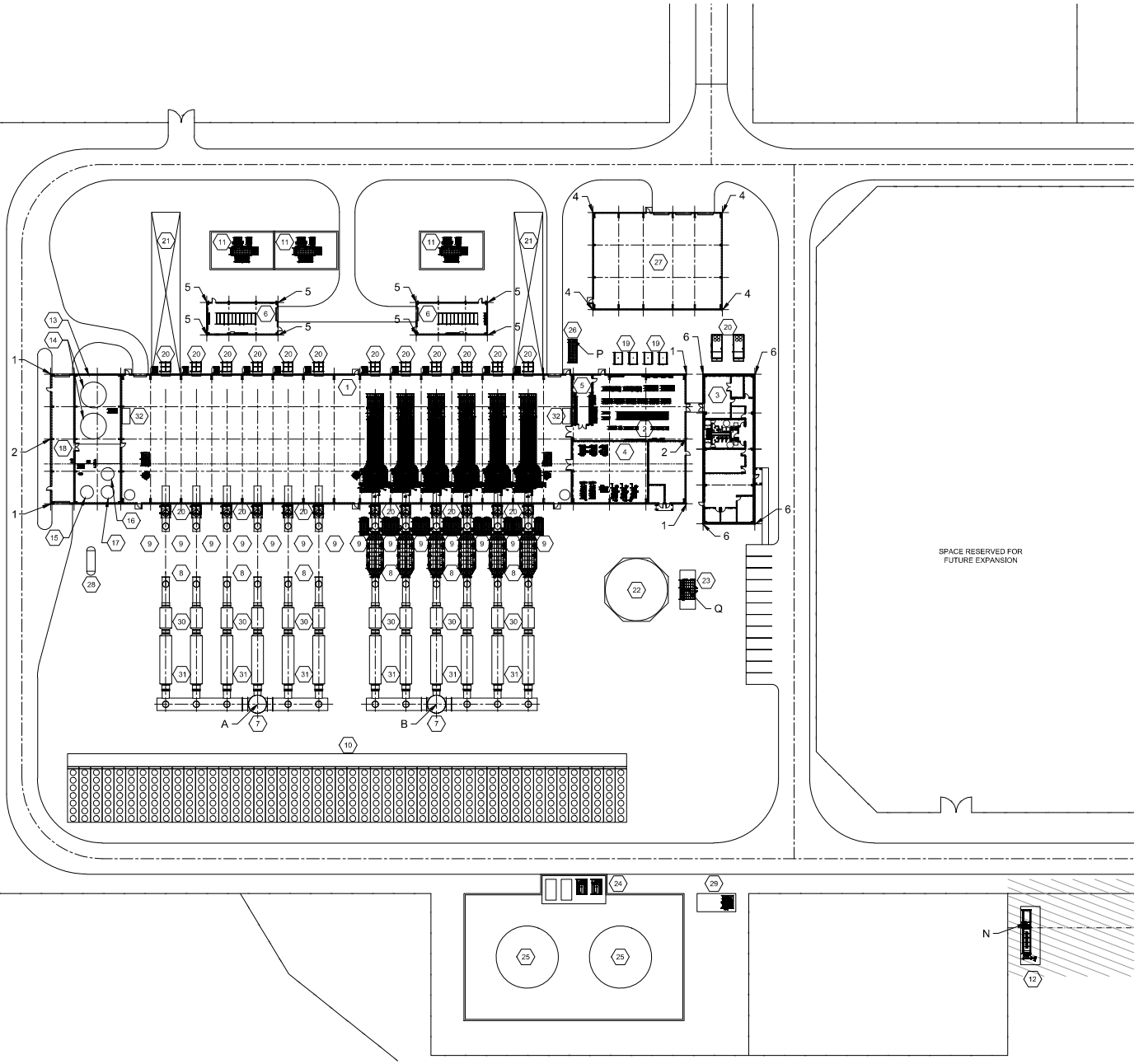
As shown in Table 4-3, the Project sound levels during full-load operations are expected to slightly exceed the recommended noise levels from USEPA and ANSI S12.9 at only some of the receptors, but sound levels are generally consistent with the recommended levels.

5.0 Conclusions

Burns & McDonnell conducted a preliminary sound study for the proposed Liberty Project. This preliminary study consists of predictive sound modeling of the Project to analyze potential offsite sound impacts from operation of the Project. Ambient sound levels for this site have been estimated based on previous ambient monitoring of a nearby site with a similar environment near rural highways.

There were no identified regulatory noise limits for the Project. Guidance from the USEPA and ANSI S12.9 could be used as target criteria to minimize potential for A-weighted and C-weighted sound level impacts on the nearby residential receptors. The Project as currently designed is expected to contribute a maximum sound level of approximately 52 dBA and 71 dBC at the nearest residential noise sensitive receptor, R7, located west of the Project site. This is slightly above the recommended noise criteria provided by USEPA and ANSI S12.9, but as previously stated these targets are only being used as guidance and are not to be interpreted as regulatory limits. In general, the Project sound levels are consistent with the intent of the recommended guidelines as most receptors are below the recommended guidance sound levels and the few exceedances to the recommended levels are less than 5 dB above the recommended sound levels.

APPENDIX A – FIGURES



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14	UREA TANK
15	NEW LUBE OIL TANK
16	SERVICE LUBE OIL TANK
17	WASTE LUBE OIL TANK
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27	WAREHOUSE
28	OIL WATER SEPARATOR
29	GAS FILTER/SEPARATOR
30	RESONATOR
31	HORIZONTAL SILENCER
32	SEAL AIR FAN

Figure A-1 General Arrangement

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
D	08/23/24	WRL		ADJUSTED PLANT LOCATION FOR 1000'-0" SETBACK
C	06/04/24	WRL		ADDED SEAL AIR FAN
B	04/29/24	WRL		ADDED COORDINATES FOR STACKS AND EQUIPMENT
A	03/04/24	WRL		PRELIMINARY MIRRORED SINGLE STACK LAYOUT

POWER BLOCK ENLARGED PLAN

SCALE IN FEET

TRUE NORTH 21°0'0" EAST

PLAN NORTH

BURNS McDONNELL

designed

detailed W. LESNIAK

EAST KENTUCKY POWER COOPERATIVE

LIBERTY SITE 3
12 x 18MW GAS RECIP ENGINE PLANT
SINGLE STACK OPTION B
ENLARGED PLAN

project 157785 | contract

drawing GA122 | rev. D

sheet of sheets

file 157785_12X18MW-GA122-LIBRTY3-SNGLESTK-OPTB.

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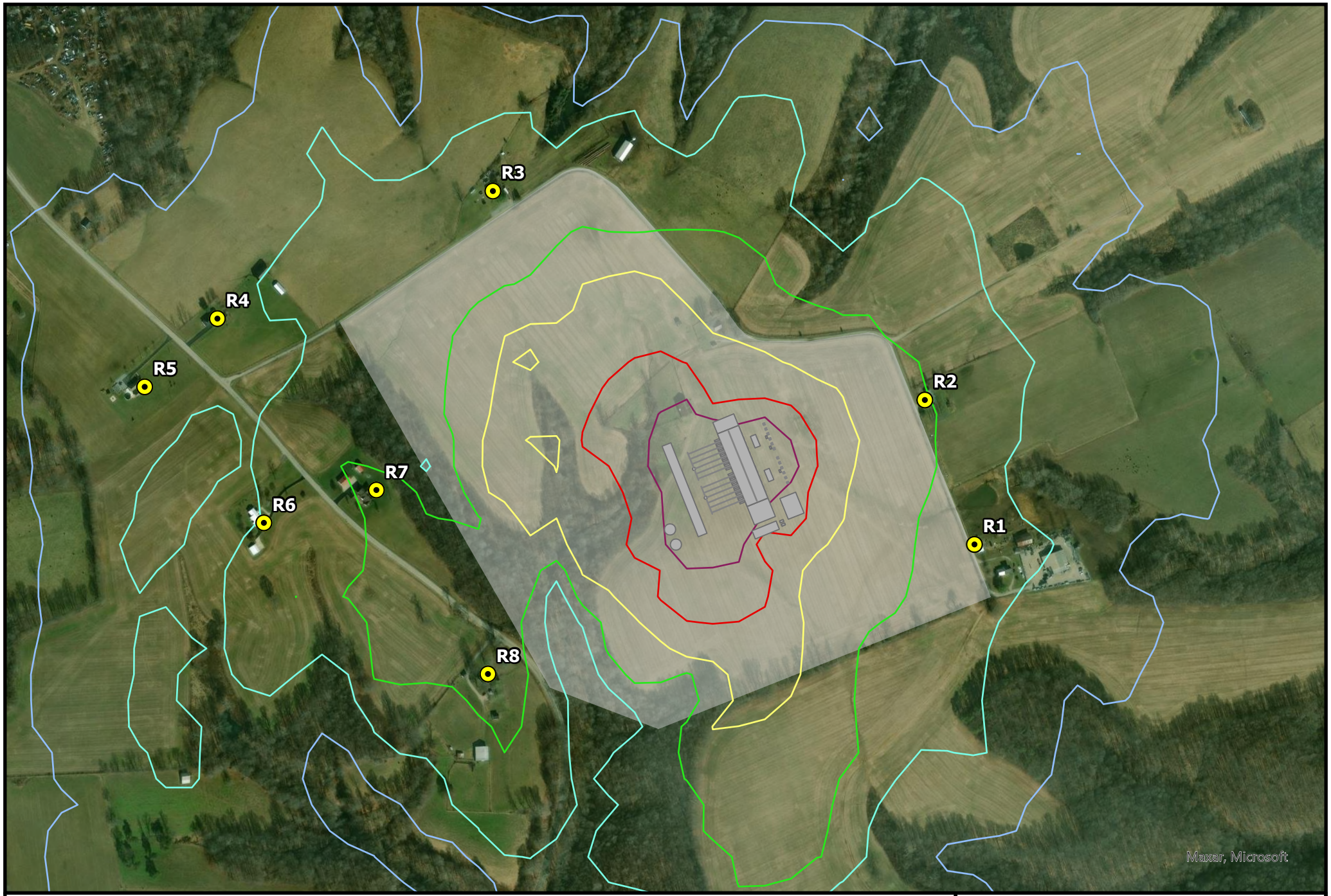

LEGEND

- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- Property Boundary
- Structures
- Receivers

REFERENCE

0 0.08 0.16
MILES

0 0.08 0.16
KILOMETERS

N

Figure A-2 - RICE 100% Load (12 Units)
Project Design Sound Level Contours (dBA)

LOCATION:	Casey County, KY
CLIENT:	EKPC
PROJ. NO.:	157785
CREATED:	08/28/2024

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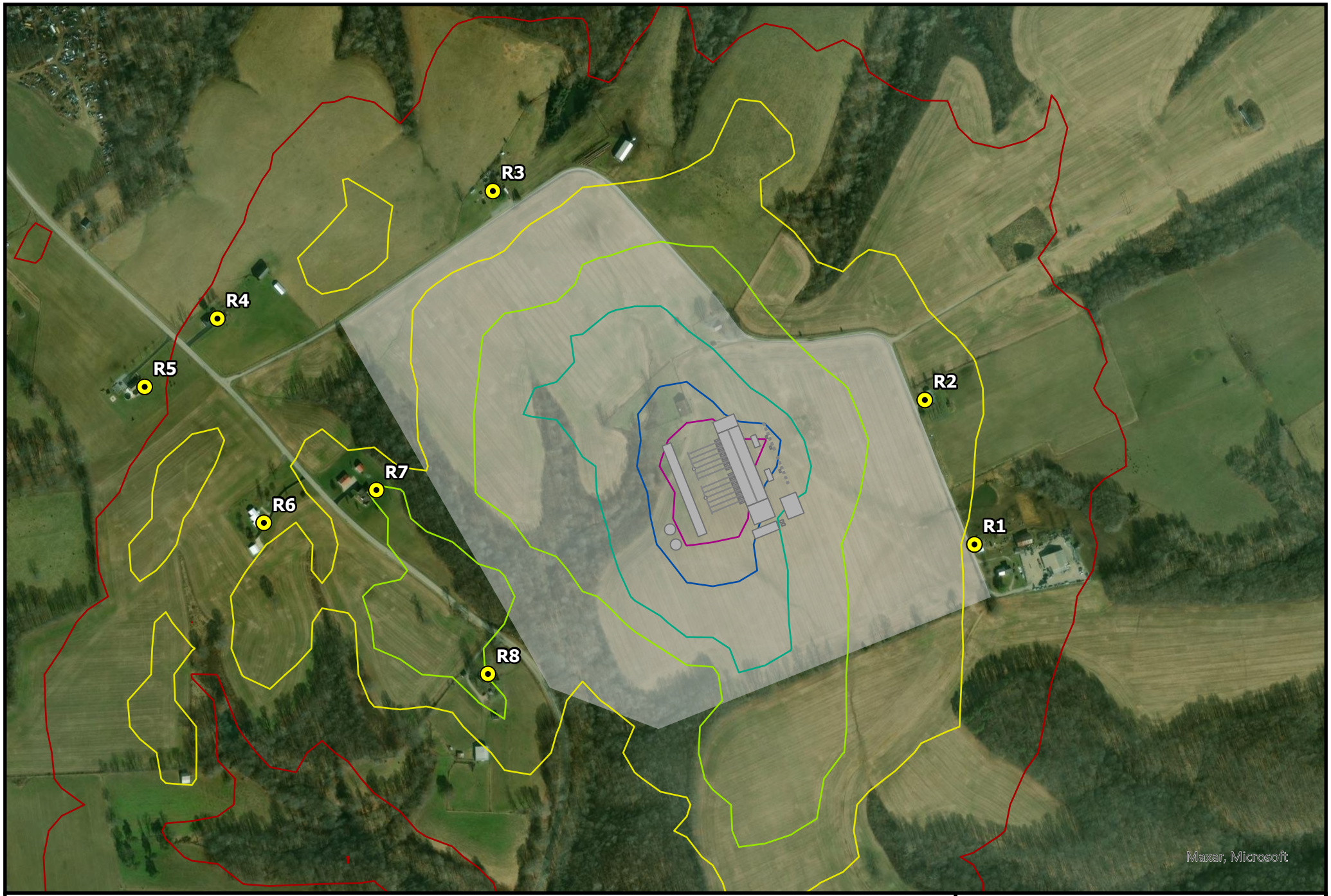
Path: Z:\Clients\ENR\EKPC\157785_REC\PSTUDY\7_Studies\Permitting\Modeling\Noise\GIS\Liberty GIS\Liberty GIS.aprx • Coordinate System: • Units:



LEGEND

- 60 dBC
- 65 dBC
- 70 dBC
- 75 dBC
- 80 dBC
- 85 dBC
- Property Boundary
- Structures
- Receivers

REFERENCE

0 0.08 0.16
MILES

0 0.08 0.16
KILOMETERS

N

Figure A-3 - RICE 100% Load (12 Units)
Project Design Sound Level Contours (dBC)

LOCATION:	Casey County, KY
CLIENT:	EKPC
PROJ. NO.:	157785
CREATED:	08/28/2024

BURNS McDONNELL
www.burnsmcd.com

Path: Z:\Clients\EN\R\EKPC\157785_REC\PSTUDY\7_Studies\Permitting\Modeling\Noise\GIS\Liberty GIS\Liberty GIS.aprx • Coordinate System: • Units:

APPENDIX B – MODELED SOUND POWER LEVELS

Appendix B - Base Design Modeled Sound Power Levels

EKPC

Liberty RICE - 12 Engine Layout

Name	Number of Sources	Sound Power Level (dB)[1] Octave Band Frequency (Hz)									Overall (dBA)	Notes
		31.5	63.0	125	250	500	1000	2000	4000	8000		
Fuel Pump	2	79	91	87	90	91	94	89	77	58	**97**	Estimated
Gas Heater	2	104	101	99	94	91	87	80	76	72	**93**	Estimated
MAU Intake	12	107	98	98	96	95	93	93	88	83	**99**	Calculated from interior equipment
MAU Relief	12	107	98	98	96	95	93	93	88	83	**99**	Calculated from interior equipment
Small Transformer	4	90	87	88	85	88	85	80	78	68	**90**	Estimated
Stack Exit	2	114	112	109	103	96	78	64	67	69	**99**	Wartsila Stack + Res Silencer + SCR + 45 dB Silencer
Combined Exhaust Ducts (dB/m)	4	71	70	54	46	48	42	29	33	22	**63**	Calculated from combined duct sound levels
RICE Exhaust Duct - Resonator Section (dB/m)	12	78	83	77	73	76	79	66	66	55	**91**	Wartsila Duct + Res Silencer + SCR
RICE Exhaust Duct - SCR Section (dB/m)	12	99	91	77	73	76	79	66	66	55	**91**	Wartsila Duct + SCR
RICE Exhaust Duct - Silencer Section (dB/m)	12	63	62	46	39	40	34	21	25	14	**52**	Wartsila Duct + Res Silencer + SCR + 45 dB Sil.
RICE Exhaust Duct - Pre SCR (dB/m)	12	102	97	86	85	88	91	78	78	67	**103**	Wartsila Insulated Exhaust Duct
Ridge Vent	1	108	96	91	80	77	76	83	82	79	**108**	Calculated from RICE Hall Interior Sources + Silencer
Engine Hall Roof	1	118	100	93	89	93	72	66	60	55	**91**	Calc from RICE Hall Interior (includes TL losses from roof assembly)
HVAC Unit	2	73	78	83	93	93	90	88	83	73	**95**	Estimated
Radiator (Total)	1	125	112	112	107	104	102	97	92	84	**107**	In-house sound levels
Step Up Transformer	3	103	100	101	98	101	98	93	91	81	**102**	Estimated
Engine Hall Walls	1	104	91	88	82	75	67	64	56	45	**78**	Calc from RICE Hall Interior (includes TL losses from wall assembly)
Exhaust Stack Wall	2	95	91	87	81	72	53	12	9	5	**76**	Estimated combined in-duct levels
RICE Hall	1	112	104	104	103	103	101	102	98	93	**108**	Calculated from interior equipment and wall/roof absorption
RICE Unit	12	132	124	124	124	123	122	123	119	113	**128**	In-house, housed inside building

Notes:

1. All sound levels are inclusive of mitigation included in the base design only


BURNS McDONNELL

APPENDIX E – TRAFFIC STUDY

Technical Memorandum

Date: August 30, 2024

To: East Kentucky Power Cooperative, Inc.

From: Burns & McDonnell

Subject: EKPC Liberty Rice Traffic Assessment

Table of Contents

Project Description

East Kentucky Power Cooperative, Inc. (EKPC) plans to construct the Liberty RICE Plant approximately four miles north of Liberty, KY. This facility will have a 24-hour staffed control room and on-site maintenance personnel. This traffic study analyzes the construction and permanent traffic generated by the facility and sight distance availability at the intersection of KY-49 and Carr Sasser Rd.

The intersection of KY-49 and Carr Sasser Rd will be impacted by the site traffic and has been modeled and reviewed for capacity. KY-49 is a north-south undivided 2-lane road with no pedestrian facilities and a posted speed limit of 55 miles per hour. Carr Sasser Rd is an east-west 2-lane road with an assumed speed limit of 25 mph. A site map is provided in Appendix A.

Existing Traffic Volumes

Traffic counts were collected utilizing available Kentucky Transportation Cabinet (KYTC) traffic volume data to establish historical daily traffic volumes in the project area. 2022 KYTC traffic counts on KY-49, approximately 1000 feet north of the intersection of Carr Sasser Rd and KY-49, indicate the following volume data that was used to support this assessment. The raw data is provided in Appendix B.

- AADT – 1,018
- K Factor – 12.40
- D Factor – 58.00
- % Peak Trucks – 3.98%

Vehicle Trip Generation

During construction, an estimated 450 vehicles are expected during both AM and PM peak hours. After construction is completed, the permanent traffic during peak hours is anticipated to be approximately 20 vehicles. Using the D Factor above, a 60/40 split is used for existing traffic volume, and this same split is used for vehicles generated by construction. Two different scenarios are analyzed for both AM and PM peak hours during both construction conditions and post-construction conditions to account for directionality being primarily from the south or north. AM scenario 1 has the 60% split traveling from Liberty on KY-49 NB and the 40% split traveling to the site on KY-49 SB. AM scenario 2 has the 40% split traveling from Liberty on KY-49 NB and the 60% split traveling to the site on KY-49 SB. PM scenario 1 has the 60% split turning left onto KY-49 SB from Carr Sasser Rd and the 40% split turning right onto KY-49 NB. PM scenario 2 has 40% split turning left onto KY-49 SB from Carr Sasser Rd and the 60% split

turning right onto KY-49 NB. It is assumed that all traffic volume generated by construction will enter the site in the AM and exit the site in the PM. A volume diagram during construction conditions is provided in Appendix C. Table 1 presents the construction-generated traffic volume for all scenarios.

	Scenario	Direction of Volume	Traffic Volume (veh)
Construction	AM Scenario 1	Enter from KY-49 NB	270
		Enter from KY-49 SB	180
	AM Scenario 2	Enter from KY-49 NB	180
		Enter from KY-49 SB	270
	PM Scenario 1	Exit to KY-49 NB	180
		Exit to KY-49 SB	270
	PM Scenario 2	Exit to KY-49 NB	270
		Exit to KY-49 SB	180
Post-Construction	AM Scenario 1	Enter from KY-49 NB	12
		Enter from KY-49 SB	8
	AM Scenario 2	Enter from KY-49 NB	8
		Enter from KY-49 SB	12
	PM Scenario 1	Exit to KY-49 NB	8
		Exit to KY-49 SB	12
	PM Scenario 2	Exit to KY-49 NB	12
		Exit to KY-49 SB	8

Table 1: Traffic Volume Scenarios

Existing Conditions Analysis

Synchro 12 was used to analyze the level of service, delay, and queue lengths of the critical roadway serving the project site (KY-49). Synchro 12 uses Highway Capacity Manual (HCM) 7th Edition methodology to determine the level of service. For this analysis, it was assumed that the current traffic volume on Carr Sasser Rd is negligible and that no vehicles enter or exit Carr Sasser Rd from KY-49 aside from vehicles generated from the project. Table 2 presents the level of service results during construction conditions, and Table 3 presents the level of service results during construction conditions.

Construction												
	AM Peak Hour						PM Peak Hour					
	Scenario 1			Scenario 2			Scenario 1			Scenario 2		
Metric	NB	SB	WB	NB	SB	WB	NB	SB	WB	NB	SB	WB
LOS	A	A	A	A	A	A	A	A	B	A	A	B
Delay (sec)	0	6.77	0	0	6.68	0	0	0	13.76	0	0	12.95
95th Percentile Q (veh)	0	1	0	0	1	0	0	0	4	0	0	4

Table 2: Construction Conditions Level of Service

Post - Construction												
	AM Peak Hour						PM Peak Hour					
	Scenario 1			Scenario 2			Scenario 1			Scenario 2		
Metric	NB	SB	WB	NB	SB	WB	NB	SB	WB	NB	SB	WB
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay (sec)	0	1.01	0	0	1.10	0	0	0	9.12	0	0	8.90
95th Percentile Q (veh)	0	0	0	0	1	0	0	0	1	0	0	1

Table 3: Post-Construction Conditions Level of Service

The worst-case morning peak-hour scenario was identified as AM Scenario 2 during construction, while the worst-case afternoon peak-hour scenario was identified as PM Scenario 1 during construction. The Synchro analysis indicates that the intersection of KY-49 Carr Sasser Rd is expected to operate at LOS B or better operations and with minimal 95th percentile queues during both peak hours. LOS D or better operations are typically considered acceptable, and no mitigation is needed. Full Synchro reports are provided in Appendix D.

Sight Distance Evaluation

A sight distance evaluation was performed at the intersection of KY-49 and Carr Sasser Rd to ensure that safe and efficient access will be provided to the project site. The available sight distance was determined based on procedures outlined in *A Policy on Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials (AASHTO). The available sight distance was then compared to the minimum required stopping sight distance (SSD) and intersection sight distance (ISD) for the assumed design speed of 55 mph for KY-49.

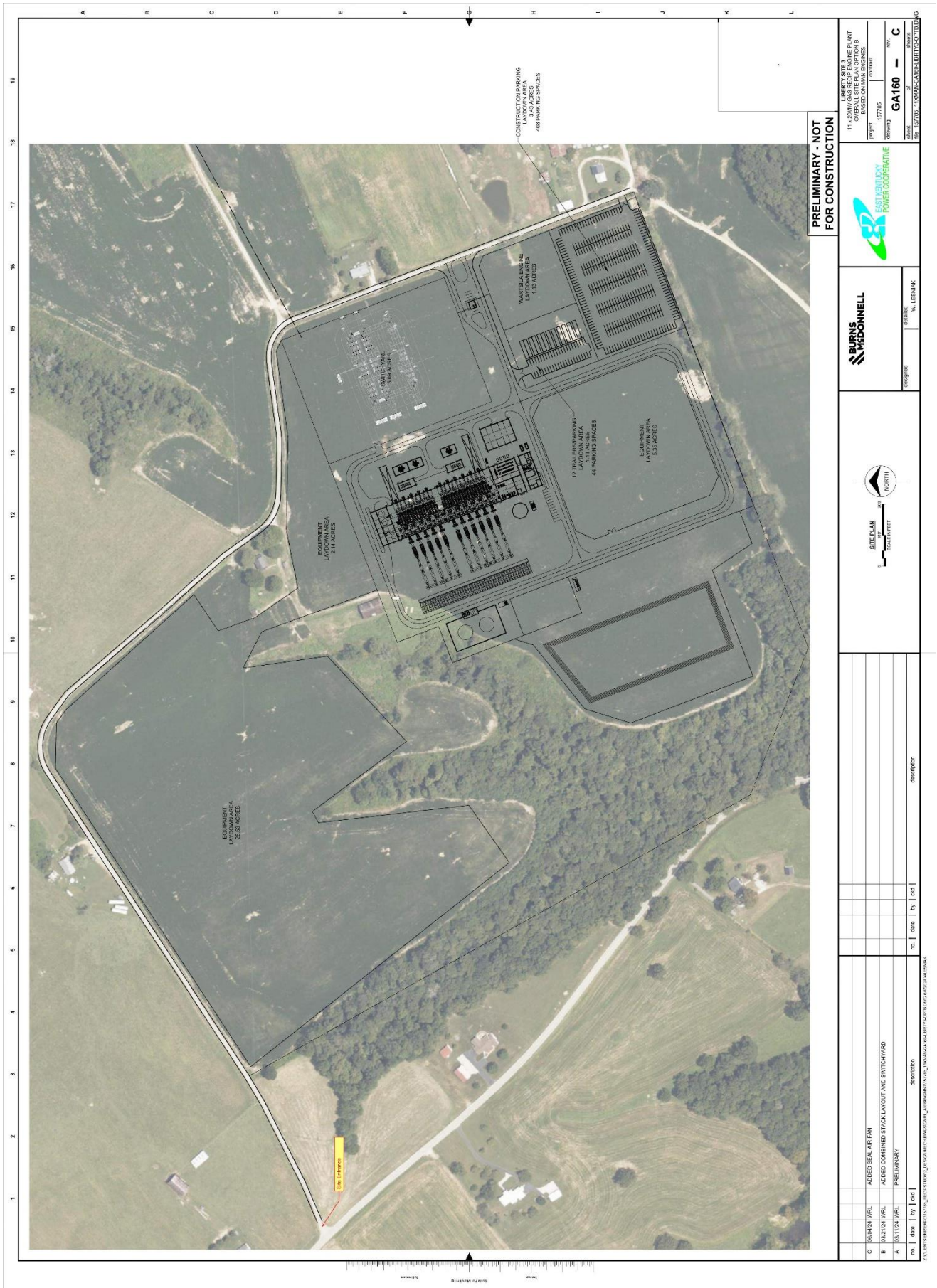
Based on a review of the roadway geometry and obstructions, it is determined that there is sufficient SSD and sufficient ISD at the KY-49 and Carr Sasser Rd intersection. The full evaluation is provided in Appendix E.

Conclusions

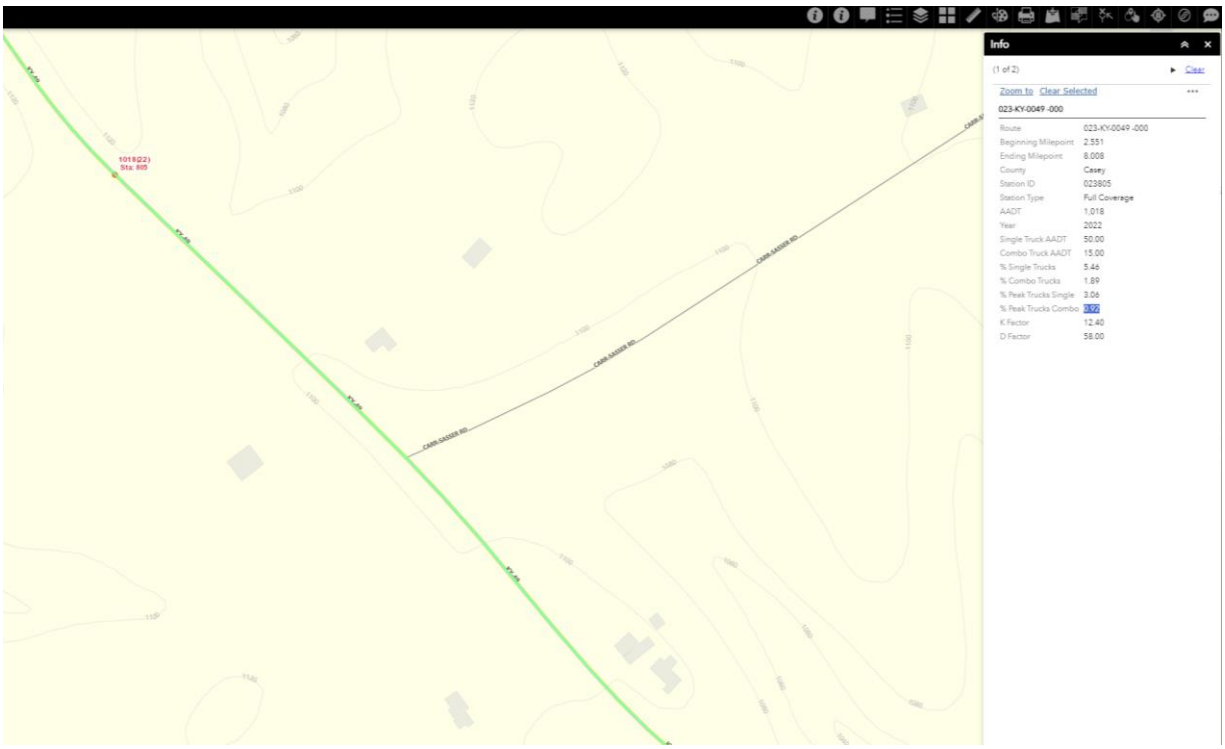
The peak construction workforce levels for the proposed power facility are expected to generate 450 vehicles during both AM and PM peak hours and reduce to 20 for peak hours post-construction. A capacity analysis of the intersection of Carr Sasser Rd and KY-49 indicates the roadway capacity is more than sufficient for this increase in traffic volume during both construction and post-construction conditions. Additionally, a sight distance assessment analyzing both stopping sight distance and intersection sight distance concludes that there is sight distance greater than required at the intersection.

Appendix

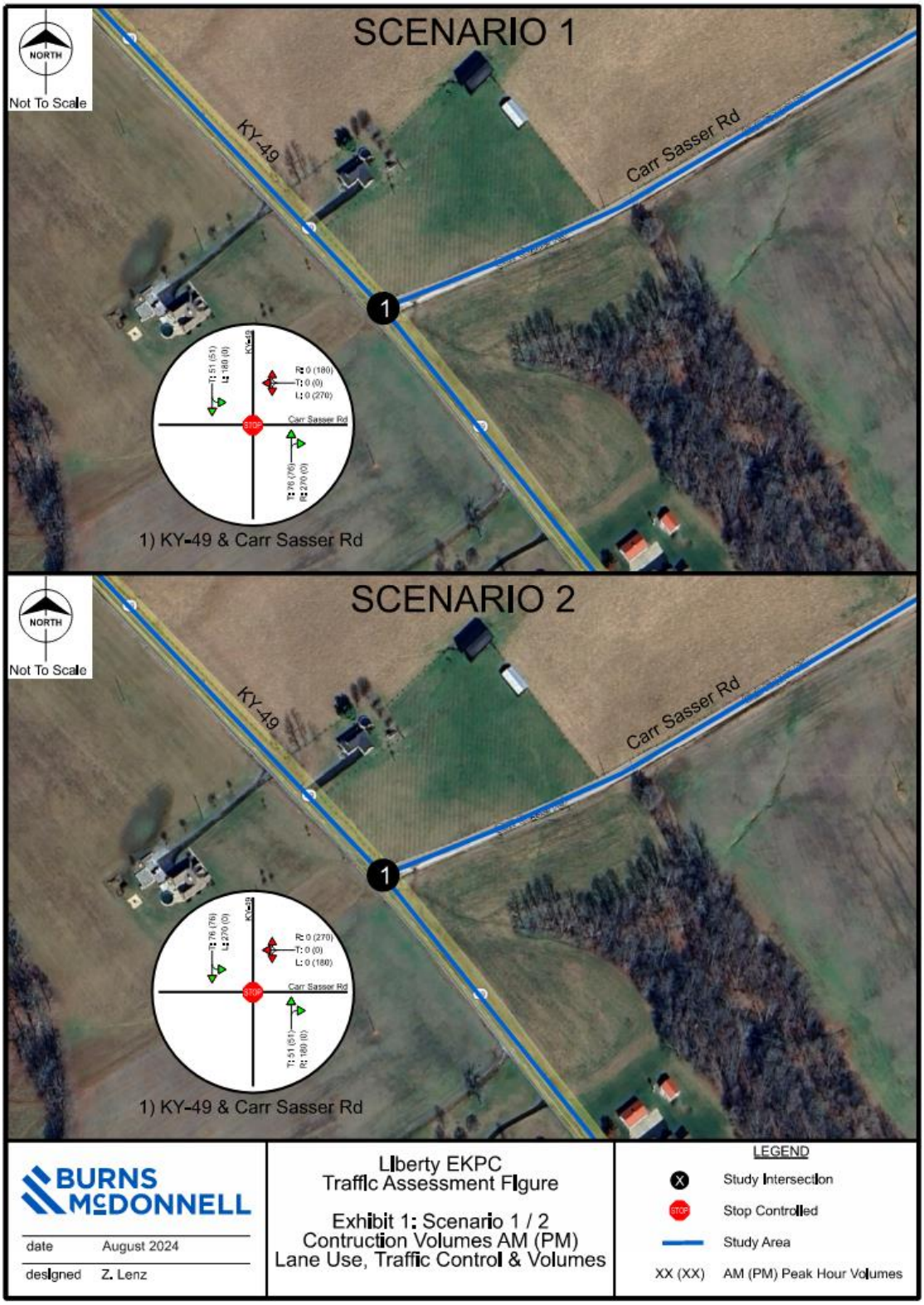
Appendix A: Site Map


PRELIMINARY - NOT FOR CONSTRUCTION
CONSTRUCTION PARKING LAYDOWN AREA 4.4 ACRES 408 PARKING SPACES
WARTSILA ENGINE LAYDOWN AREA 1.13 ACRES
SWITCHYARD 8.59 ACRES
12 TRAILER/STAFF PARKING LAYDOWN AREA 1.13 ACRES 44 PARKING SPACES
EQUIPMENT LAYDOWN AREA 5.35 ACRES
EQUIPMENT LAYDOWN AREA 2.14 ACRES
EQUIPMENT LAYDOWN AREA 25.59 ACRES
Site Entrance
SITE PLAN
NORTH
BURNS MCDONNELL
EAST KENTUCKY POWER COOPERATIVE
LIBERTY SITE 1
11 x 20MW GAS RECIP ENGINE PLANT
OVERALL SITE PLAN OPTION B
BASED ON MAN ENGINES
project 157785
drawing GA160 – C
sheet of sheets
file 157785_11XMAN-GA160-LIBRTY1-OPTB.DWG
designed
drafted W. LEBHAR
C 06/04/24 WRL ADDED SEAL AIR FAN
B 03/21/24 WRL ADDED COMBINED STACK LAYOUT AND SWITCHYARD
A 03/11/24 WRL PRELIMINARY
no. date by chkd description

Appendix B: KYTC Traffic Volume Data



Appendix C: Volume Figure



Appendix D: Synchro Reports

HCM 7th TWSC
4: 08/26/2024

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	180	51	76	270
Future Vol, veh/h	0	0	180	51	76	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	0	0	196	55	83	293

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	676	229	376	0	-	0
Stage 1	229	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	416	805	1171	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	344	805	1171	-	-	-
Mov Cap-2 Maneuver	344	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	640	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	0	6.77	0
HCM LOS	A		

Minor Lane/Major Mvmt	NWT	NWRWBLn1	SEL	SET
Capacity (veh/h)	-	- -	1135	-
HCM Lane V/C Ratio	-	- -	0.167	-
HCM Control Delay (s/veh)	-	- 0	8.7	0
HCM Lane LOS	-	- A	A	A
HCM 95th %tile Q(veh)	-	- -	0.6	-

HCM 7th TWSC
4: 08/26/2024

Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	270	76	51	180
Future Vol, veh/h	0	0	270	76	51	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	0	0	293	83	55	196

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	823	153	251	0	-	0
Stage 1	153	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	341	888	1303	-	-	-
Stage 1	870	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	260	888	1303	-	-	-
Mov Cap-2 Maneuver	260	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	505	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	0	6.68	0
HCM LOS	A		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	-	1243	-
HCM Lane V/C Ratio	-	-	-	0.225	-
HCM Control Delay (s/veh)	-	-	0	8.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.9	-

HCM 7th TWSC
4: 08/26/2024

Intersection	
Int Delay, s/veh	10.7

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	270	180	0	51	76	0
Future Vol, veh/h	270	180	0	51	76	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	293	196	0	55	83	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	138	83	83	0	-	0
Stage 1	83	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	850	971	1502	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	962	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	850	971	1502	-	-	-
Mov Cap-2 Maneuver	850	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	962	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	13.76	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	895	1502	-
HCM Lane V/C Ratio	-	-	0.546	-	-
HCM Control Delay (s/veh)	-	-	13.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	3.4	0	-

HCM 7th TWSC
4: 08/26/2024

Intersection	
Int Delay, s/veh	10.1

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	180	270	0	76	51	0
Future Vol, veh/h	180	270	0	76	51	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	196	293	0	83	55	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	138	55	55	0	-	0
Stage 1	55	-	-	-	-	-
Stage 2	83	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	850	1006	1537	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	936	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	850	1006	1537	-	-	-
Mov Cap-2 Maneuver	850	-	-	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	936	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	12.95	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	937	1537	-
HCM Lane V/C Ratio	-	-	0.522	-	-
HCM Control Delay (s/veh)	-	-	13	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	3.1	0	-

HCM 7th TWSC
4: 08/29/2024

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	8	51	76	12
Future Vol, veh/h	0	0	8	51	76	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	0	0	9	55	83	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	162	89	96	0	-	0
Stage 1	89	-	-	-	-	-
Stage 2	73	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	824	963	1486	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	945	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	819	963	1486	-	-	-
Mov Cap-2 Maneuver	819	-	-	-	-	-
Stage 1	924	-	-	-	-	-
Stage 2	945	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	0	1.01	0
HCM LOS	A		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	-	244	-
HCM Lane V/C Ratio	-	-	-	0.006	-
HCM Control Delay (s/veh)	-	-	0	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 7th TWSC
4: 08/29/2024

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	12	76	51	18
Future Vol, veh/h	0	0	12	76	51	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	0	0	13	83	55	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	174	65	75	0	-	0
Stage 1	65	-	-	-	-	-
Stage 2	109	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	811	993	1512	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	804	993	1512	-	-	-
Mov Cap-2 Maneuver	804	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	911	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	0	1.01	0
HCM LOS	A		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	-	245	-
HCM Lane V/C Ratio	-	-	-	0.009	-
HCM Control Delay (s/veh)	-	-	0	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 7th TWSC
4: 08/29/2024

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	12	8	0	51	76	0
Future Vol, veh/h	12	8	0	51	76	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	13	9	0	55	83	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	138	83	83	0	-	0
Stage 1	83	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	850	971	1502	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	962	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	850	971	1502	-	-	-
Mov Cap-2 Maneuver	850	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	962	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	9.12	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	895	1502	-
HCM Lane V/C Ratio	-	-	0.024	-	-
HCM Control Delay (s/veh)	-	-	9.1	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

HCM 7th TWSC
4: 08/29/2024

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	8	12	0	76	51	0
Future Vol, veh/h	8	12	0	76	51	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	9	13	0	83	55	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	138	55	55	0	-	0
Stage 1	55	-	-	-	-	-
Stage 2	83	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	850	1006	1537	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	936	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	850	1006	1537	-	-	-
Mov Cap-2 Maneuver	850	-	-	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	936	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s/v	8.93	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	937	1537	-
HCM Lane V/C Ratio	-	-	0.023	-	-
HCM Control Delay (s/veh)	-	-	8.9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Appendix E: Sight Distance Evaluation

Stopping Sight Distance

V = Speed (mph)	V = 55 mph
G = Grade (%)	G = 0 %
t = Brake Reaction Time (s)	t = 2.5 s
a = Deceleration Rate (ft/s^2)	a = 11.2 ft/s^2

Brake Reaction Distance = 1.47Vt = 1.47(55)(2.5)
Brake Reaction Distance = 205 ft

Braking Distance = $V^2/(30((a/32.2)+(G/100))) = 55^2/(30((11.2/32.2)+(0/100)))$
Braking Distance = 290 ft

Stopping Sight Distance = Brake Reaction Distance + Braking Distance
Stopping Sight Distance = 495 ft

Source: A Policy on Geometric Design of Highways and Streets, 2018, 7th Edition, prepared by AASHTO, p. 3-4, 3-4.

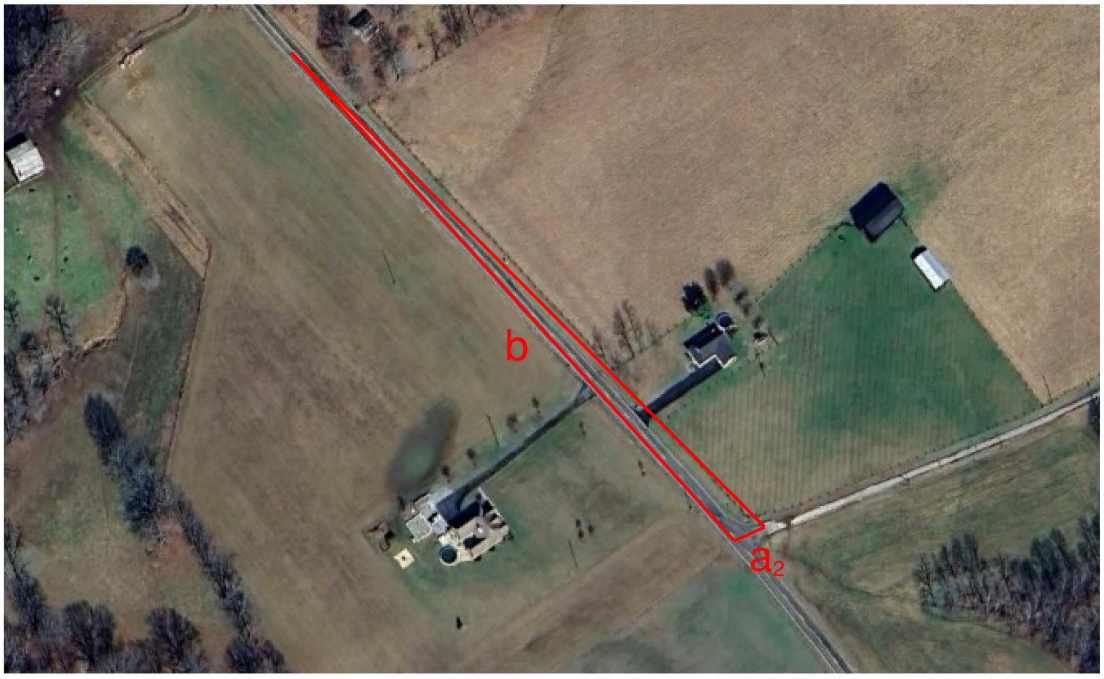
Intersection Sight Distance

V = Speed (mph)	V = 55 mph
t_g = Time Gap (s)	t_g = 7.5 s Passenger Car Left Turn
	t_g = 9.5 s Single-Unit Truck Left Turn
	t_g = 11.5 s Combination Truck Left Turn
	t_g = 6.5 s Passenger Car Right Turn
	t_g = 8.5 s Single-Unit Truck Right Turn
	t_g = 10.5 s Combination Truck Right Turn

Intersection Sight Distance = 1.47Vt = 1.47(55)(11.5)
Intersection Sight Distance = 930 ft (Combination Truck Left Turn)

Intersection Sight Distance = 1.47Vt = 1.47(55)(10.5)
Intersection Sight Distance = 850 ft (Combination Truck Right Turn)

Source: A Policy on Geometric Design of Highways and Streets, 2018, 7th Edition, prepared by AASHTO, p. 9-44, 9-45.



b = 930 ft
a_2 = 36 ft

b = 850 ft
a_1 = 24 ft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