

## Community Advisory Group route options data table

6/25/14

### Overview

The table below presents data for the 18 route options across the Energize Eastside project area. Page 1 includes additional information on route options related to cost, constructability, permitability, and other considerations provided by Puget Sound Energy (PSE) at Community Advisory Group Meeting #4a on June 25, 2014. Pages 2 through 5 present data organized by evaluation factor, and page 6 presents supplemental "near" data, i.e. within 600 feet of proposed route options. Route options are represented by tree names (e.g. "Ash," "Aspen," "Cedar," etc) and are listed in alphabetical order with their corresponding route segment combinations.

Color coding (white to dark purple) indicates where the cell value falls within the range for the data row, with white indicating a low value (or fewer potential impacts to a factor) and purple indicating a high value (or more potential impacts to a factor). This table will be used by Community Advisory Group members to discuss route options.

Data	Description	Unit	Data Range		Route Options																	
			Min (advantage)	Max (disadvantage)	Ash A-C-D-F-G1-I-K2-M-N	Aspen A-C-E-G2-I-K1-L-N	Cedar A-C-E-G2-G1-H-L-N	Cherry A-B-F-G1-I-K1-L-N	Cottonwood A-C-D-F-G1-G2-J-M-N	Dogwood A-C-D-F-G1-G2-J-K2-K1-L-N	Elm A-C-D-F-H-K1-K2-M-N	Fir A-C-E-J-K2-K1-L-N	Laurel A-C-D-F-H-L-N	Magnolia A-C-D-F-G1-I-K1-L-N	Maple A-B-F-H-L-N	Oak A-C-E-G2-I-K2-M-N	Pine A-B-F-G1-I-K2-M-N	Poplar A-B-F-G1-G2-J-K2-K1-L-N	Redwood A-C-E-G2-G1-H-K1-K2-M-N	Spruce A-B-F-H-K1-K2-M-N	Sycamore A-B-F-G1-G2-J-M-N	Willow A-C-E-J-M-N
<b>Additional information - Cost, constructability, permitability, maintainability, longevity, future flexibility, length</b>																						
Cost*	Cost to construct.	USD (Millions)	\$154	\$289	\$267	\$186	\$169	\$289	\$259	\$250	\$249	\$181	\$245	\$273	\$261	\$176	\$285	\$252	\$169	\$266	\$277	\$154
	Estimated monthly increase to average residential customer.	USD	\$0.90	\$1.69	\$1.56	\$1.09	\$0.99	\$1.69	\$1.52	\$1.46	\$1.46	\$1.06	\$1.43	\$1.60	\$1.53	\$1.03	\$1.67	\$1.47	\$0.99	\$1.56	\$1.62	\$0.90
Constructability*	Ease of construction.	Less Difficult ↓ Neutral ↔ or More Difficult ↑	Less Difficult ↓	More Difficult ↑	↑	↓	↓	↔	↑	↔	↔	↔	↓	↓	↓	↔	↑	↔	↔	↔	↑	↑
Permitability *	Ease of permitting.	Less Difficult ↓ Neutral ↔ or More Difficult ↑	Less Difficult ↓	More Difficult ↑	↔	↑	↑	↑	↔	↑	↔	↑	↑	↑	↑	↔	↔	↑	↔	↔	↔	↔
Maintainability *	Ease of maintenance.	Less Difficult ↓ Neutral ↔ or More Difficult ↑	Less Difficult ↓	More Difficult ↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Longevity*	Estimated year when the next 230 kV line for a second Eastside transformer is needed.	Year	2038	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2034	2038
Future Flexibility*	Percent of route on existing corridor.	Percent	100%	10%	61%	47%	48%	10%	71%	36%	61%	56%	31%	29%	10%	83%	39%	19%	79%	40%	50%	100%
Length*	Length of corridor.	Miles	16.15	22.14	17.70	17.88	18.06	19.46	18.62	21.69	17.61	19.22	17.78	19.01	18.23	16.59	18.15	22.14	17.50	18.06	19.07	16.15

\*Data not included in the blind evaluation data table because they were not measurable or did not apply to all route options.

Data	Description	Unit	Data Range		Route Options																	
			Min	Max	Ash A-C-D-F-G1-I-K2-M-N	Aspen A-C-E-G2-I-K1-L-N	Cedar A-C-E-G2-G1-H-L-N	Cherry A-B-F-G1-I-K1-L-N	Cottonwood A-C-D-F-G1-G2-J-M-N	Dogwood A-C-D-F-G1-G2-J-K2-K1-L-N	Elm A-C-D-F-H-K1-K2-M-N	Fir A-C-E-J-K2-K1-L-N	Laurel A-C-D-F-H-L-N	Magnolia A-C-D-F-G1-I-K1-L-N	Maple A-B-F-H-L-N	Oak A-C-E-G2-I-K2-M-N	Pine A-B-F-G1-I-K2-M-N	Poplar A-B-F-G1-G2-J-K2-K1-L-N	Redwood A-C-E-G2-G1-H-K1-K2-M-N	Spruce A-B-F-H-K1-K2-M-N	Sycamore A-B-F-G1-G2-J-M-N	Willow A-C-E-J-M-N
<b>Evaluation factor - Avoids residential areas</b>																						
Residential Tax Accounts	Residential tax payers within 25 feet of a corridor (based on King County assessor data).	Count of Tax Accounts	1,217	1,935	1,608	1,713	1,730	1,506	1,607	1,935	1,621	1,750	1,829	1,896	1,439	1,425	1,218	1,545	1,522	1,231	1,217	1,422
Residential Use*	Residential use within 25 feet of a corridor without existing transmission lines (based on King County assessor data).	Count of Parcels	5	285	6	126	173	238	6	127	53	126	174	127	285	5	117	238	52	164	117	5
	Residential use within 25 feet of a corridor (based on King County assessor data).	Count of Parcels	433	711	455	502	531	577	549	567	500	634	456	433	600	524	599	711	575	644	693	616
<b>Evaluation factor - Avoids sensitive community land uses</b>																						
Schools	School use within 25 feet of a corridor (based on King County assessor data and Google Earth).	Count	1	8	4	2	2	6	5	4	4	3	1	3	4	3	7	7	5	7	8	4
Religious Service Institutions	Religious Service Institution use within 25 feet of a corridor (based on King County assessor data and Google Earth).	Count	2	11	9	5	3	8	5	4	5	3	2	6	4	8	11	6	6	7	7	4
Parks	Park use within 25 feet of a corridor (based on King County assessor data).	Count of Parcels	10	18	14	11	11	12	16	18	16	15	12	14	10	11	12	16	15	14	14	13
Recreation	Recreational use within 25 feet of a corridor (based on King County assessor data).	Count of Parcels	6	18	6	14	12	13	7	17	8	17	10	12	11	8	7	18	10	9	8	7
Trails	Count of trails within 25 feet of a corridor (based on King County Trails File).*	Count	3	10	7	10	9	7	5	9	8	10	8	9	6	8	5	7	9	6	3	6
	Length of trails within 25 feet of a corridor (based on King County Trails File).	Miles	1.97	5.27	3.33	4.95	4.86	3.97	3.27	5.24	3.47	4.91	5.19	5.27	3.89	3.01	2.03	3.93	3.15	2.17	1.97	2.95
Historic Sites	Registered Historic Sites within a half mile of corridor.	Count	2	6	5	3	3	2	5	2	5	3	2	2	2	6	5	2	6	5	5	6
Child Care*	Child Care Facilities within 25 feet of a corridor (based on King County assessor data and Google Earth).	Count of Parcels	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	1	0	1	1	0

\*Data not included in the blind evaluation data table because they were not measurable or did not apply to all route options.

Data	Description	Unit	Data Range		Route Options																	
			Min	Max	Ash A-C-D-F-G1-I-K2-M-N	Aspen A-C-E-G2-I-K1-L-N	Cedar A-C-E-G2-G1-H-L-N	Cherry A-B-F-G1-I-K1-L-N	Cottonwood A-C-D-F-G1-G2-J-M-N	Dogwood A-C-D-F-G1-G2-J-K2-K1-L-N	Elm A-C-D-F-H-K1-K2-M-N	Fir A-C-E-J-K2-K1-L-N	Laurel A-C-D-F-H-L-N	Magnolia A-C-D-F-G1-I-K1-L-N	Maple A-B-F-H-L-N	Oak A-C-E-G2-I-K2-M-N	Pine A-B-F-G1-I-K2-M-N	Poplar A-B-F-G1-G2-H-K2-K1-L-N	Redwood A-C-E-G2-G1-H-K1-K2-M-N	Spruce A-B-F-H-K1-K2-M-N	Sycamore A-B-F-G1-G2-J-M-N	Willow A-C-E-J-M-N
<b>Evaluation factor - Avoids sensitive environmental areas</b>																						
Wildlife	Number of State Documented wildlife species presence per state Priority Habitat and Species Data. Includes known salmonid species present.	Species Count	20	30	25	20	25	21	25	26	30	22	29	24	26	21	22	23	26	27	22	21
Wetlands	Wetlands identified within 50 feet on both sides of corridor centerline (either from GIS data or field reconnaissance). This information is based on visual observations and does not include delineations.	Count	24	60	24	44	47	47	25	51	33	51	41	38	50	30	33	60	39	42	34	25
Stream Crossings	Streams identified within 50 feet both sides of corridor centerline (based on GIS layers and field reconnaissance).	Count	18	49	19	43	45	29	19	46	23	49	32	30	31	32	18	45	36	22	18	22
High Slope Instability	High Instability within 25 feet of the right-of-way (based on WA DNR Slope Stability Rating Area).	Percent of Corridor	3.53	6.86	4.00	3.53	5.18	3.88	3.79	4.50	5.69	5.63	6.12	3.64	6.86	3.95	4.29	4.78	4.99	6.19	4.05	4.94
Medium Slope Instability	Medium Instability within 25 feet of the right-of-way (based on WA DNR Slope Stability Rating Area).	Percent of Corridor	4.38	6.99	4.62	4.82	6.00	4.38	4.84	5.41	5.44	6.99	5.82	4.38	6.06	5.09	4.65	5.51	5.62	5.57	4.90	6.67
Low Slope Instability	Low Instability within 25 feet of the right-of-way (based on WA DNR Slope Stability Rating Area).	Percent of Corridor	0.97	2.89	1.27	1.46	1.92	0.97	1.62	1.65	1.74	2.62	1.80	0.99	1.92	1.77	1.29	1.71	1.85	1.82	1.68	2.89
Steep Slopes	Slopes greater than 40% within 25 feet of the right-of-way derived from King County LiDAR elevation.	Percent of Corridor	9.24	18.10	11.29	11.78	14.01	13.21	9.24	12.66	15.61	14.44	15.82	11.98	18.10	10.99	12.43	13.71	14.18	17.28	10.13	9.91
Moderately Steep Slopes	Slopes greater than 20% and less than 40% within 25 feet of the right-of-way derived from King County LiDAR elevation.	Percent of Corridor	15.82	21.25	15.82	18.90	20.51	17.59	17.59	17.71	17.76	20.49	19.11	17.00	20.26	17.57	16.26	18.26	19.02	18.45	18.26	21.25
Fault lines	Number of faults that are within 25 feet of the corridor derived from WADNR fault data set.	Count	5	11	5	5	6	5	11	11	6	7	6	5	6	5	5	11	6	6	11	7

\*Data not included in the blind evaluation data table because they were not measurable or did not apply to all route options.

Data	Description	Unit	Data Range		Route Options																	
			Min	Max	Ash A-C-D-F-G1-I-K2-M-N	Aspen A-C-E-G2-I-K1-L-N	Cedar A-C-E-G2-G1-H-L-N	Cherry A-B-F-G1-I-K1-L-N	Cottonwood A-C-D-F-G1-G2-J-M-N	Dogwood A-C-D-F-G1-G2-J-K2-K1-L-N	Elm A-C-D-F-H-K1-K2-M-N	Fir A-C-E-J-K2-K1-L-N	Laurel A-C-D-F-H-L-N	Magnolia A-C-D-F-G1-I-K1-L-N	Maple A-B-F-H-L-N	Oak A-C-E-G2-I-K2-M-N	Pine A-B-F-G1-I-K2-M-N	Poplar A-B-F-G1-G2-J-K2-K1-L-N	Redwood A-C-E-G2-G1-H-K1-K2-M-N	Spruce A-B-F-H-K1-K2-M-N	Sycamore A-B-F-G1-G2-J-M-N	Willow A-C-E-J-M-N
<b>Evaluation factor - Protects mature vegetation</b>																						
Tree Removal	Total number of trees greater than 4-inch (dbh) that would require removal or work. The following methods were used to develop the tree estimates: LiDAR, Google Earth, and/or field reconnaissance.	Tree Total >4-inch (dbh)	7,756	12,374	8,084	9,049	9,566	9,853	8,699	11,898	9,125	11,078	9,706	9,377	10,182	7,756	8,560	12,374	8,985	9,601	9,175	7,879
<b>Evaluation factor - Protects health and safety</b>																						
Fuel Pipeline*	Liquid fuel pipelines present with existing high voltage transmission lines.	Miles	0.60	16.15	9.11	7.23	7.23	0.60	11.94	6.61	9.11	9.59	4.25	4.25	0.60	12.56	5.93	2.96	12.56	5.93	8.29	16.15
Polychlorinated Biphenyl (PCB) Levels*	None of the equipment proposed along any segment or as part of substation improvements will contain PCBs.	Additional PCBs	0	>0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EMF*	EMF levels are design and operationally dependent; however, all levels will be below published World Health Organization (W.H.O.) and Institute of Electrical and Electronics Engineers (IEEE) recommended exposure levels.	Below Recommended W.H.O and IEEE Levels	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\*Data not included in the blind evaluation data table because they were not measurable or did not apply to all route options.

**Utilizes opportunity areas**

The following table presents data for the “utilizes opportunity areas” evaluation factor. Please note that for these data, a white color means there are more opportunity areas whereas a purple color indicates fewer opportunity areas.

Data	Description	Unit	Data Range		Route Options																	
			Max (More Opportunities)	Min (Fewer Opportunities)	Ash A-C-D-F-G1-I-K2-M-N	Aspen A-C-E-G2-I-K1-L-N	Cedar A-C-E-G2-G1-H-L-N	Cherry A-B-F-G1-I-K1-L-N	Cottonwood A-C-D-F-G1-G2-J-M-N	Dogwood A-C-D-F-G1-G2-JK2-K1-L-N	Elm A-C-D-F-H-K1-K2-M-N	Fir A-C-E-J-K2-K1-L-N	Laurel A-C-D-F-H-L-N	Magnolia A-C-D-F-G1-I-K1-L-N	Maple A-B-F-H-L-N	Oak A-C-E-G2-I-K2-M-N	Pine A-B-F-G1-I-K2-M-N	Poplar A-B-F-G1-G2-JK2-K1-L-N	Redwood A-C-E-G2-G1-H-K1-K2-M-N	Spruce A-B-F-H-K1-K2-M-N	Sycamore A-B-F-G1-G2-J-M-N	Willow A-C-E-J-M-N
<b>Evaluation factor - Utilizes opportunity areas</b>																						
Existing Infrastructure	Miles of existing overhead transmission infrastructure.	Miles	16.59	8.95	14.65	13.44	12.16	11.27	15.59	14.20	13.47	14.76	9.18	11.50	8.95	16.59	14.42	13.97	16.45	13.24	15.36	16.15
Existing Land Use	Industrial present use within 25 feet of a corridor (based on King County assessor data).	Count of Parcels	37	6	25	16	17	19	36	37	26	7	27	26	20	15	18	30	16	19	29	6
Type of right-of-way*	Miles of railroad right-of-way with adjacent existing overhead transmission infrastructure.	Miles	2.50	0.00	0.00	2.50	2.50	2.50	0.00	2.50	0.00	2.50	2.50	2.50	2.50	0.00	0.00	2.50	0.00	0.00	0.00	0.00
	Corridor length on Eastside Rail Corridor or railroad right-of-way.	Miles	8.92	0.02	1.33	5.02	6.12	7.82	1.33	6.33	2.43	5.02	7.43	6.33	8.92	0.02	2.82	7.82	1.12	3.92	2.82	0.02
	Corridor length on public road right-of-way.	Miles	8.04	0.98	5.81	2.86	1.45	7.57	4.52	5.87	4.76	2.33	3.23	5.40	5.40	3.27	7.98	8.04	2.98	6.93	6.69	0.98
	Cross-country transmission corridor length.	Miles	16.15	3.63	10.81	10.26	10.26	3.63	13.17	9.64	10.81	12.62	7.28	7.28	3.63	13.79	7.16	5.99	13.79	7.16	9.52	16.15
Road access for construction*	Access from roads using typical bucket truck equipment based on King County parcels and ArcGIS Basemap imagery.	Miles	12.00	1.68	6.38	6.97	5.38	11.60	5.02	9.71	5.53	6.37	7.48	9.31	9.77	4.04	8.67	12.00	3.43	7.82	7.31	1.68

\*Data not included in the blind evaluation data table because they were not measurable or did not apply to all route options.

**Supplemental data**

The following table includes “near” data (within 600 feet of proposed route options). It is provided as supplemental to the “adjacent” data (within 25 feet of proposed route options) above.

Data	Description	Unit	Data Range		Route Options																	
			Min	Max	Ash A-C-D-F-G1-I-K2-M-N	Aspen A-C-E-G2-I-K1-L-N	Cedar A-C-E-G2-G1-H-L-N	Cherry A-B-F-G1-I-K1-L-N	Cottonwood A-C-D-F-G1-G2-J-M-N	Dogwood A-C-D-F-G1-G2-J-K2-K1-L-N	Elm A-C-D-F-H-K1-K2-M-N	Fir A-C-E-J-K2-K1-L-N	Laurel A-C-D-F-H-L-N	Magnolia A-C-D-F-G1-I-K1-L-N	Maple A-B-F-H-L-N	Oak A-C-E-G2-I-K2-M-N	Pine A-B-F-G1-I-K2-M-N	Poplar A-B-F-G1-G2-J-K2-K1-L-N	Redwood A-C-E-G2-G1-H-K1-K2-M-N	Spruce A-B-F-H-K1-K2-M-N	Sycamore A-B-F-G1-G2-J-M-N	Willow A-C-E-J-M-N
<b>Near (within 600 feet) data</b>																						
Schools	School use within 600 feet of a corridor (based on King County assessor data and Google Earth).	Count	3	13	9	5	4	11	10	9	8	6	3	6	6	8	12	12	9	11	13	7
	Number of students attending schools within 600 feet of a corridor (based on King County assessor data and Google Earth). Some attendance data not readily available.*	Count	671	17,925	16,292	2,304	671	2,769	15,766	7,778	17,925	5,044	3,405	5,038	1,136	13,558	14,023	5,509	15,191	15,656	13,497	13,032
Religious Service Institutions	Religious Service Institution use within 600 feet of a corridor (based on King County assessor data and Google Earth).	Count	5	16	16	8	7	13	13	11	13	5	7	12	7	12	16	11	13	13	13	7
Trails	Count of trails within 600 feet of a corridor (based on King County Trails File).	Count	8	15	13	13	15	12	11	15	15	13	15	15	12	11	10	12	15	12	8	9
	Length of trails within 600 feet of a corridor (based on King County Trails File).*	Miles	9.18	20.72	12.66	16.88	17.42	16.50	11.45	20.72	14.78	18.82	19.16	18.78	16.89	10.76	10.39	18.45	13.04	12.50	9.18	9.55
Residential Use*	Residential Use within 600 feet of a corridor (based on King County assessor data).	Count of Parcels	2,723	4,114	3,272	3,002	3,077	3,072	3,778	3,572	3,463	3,764	2,723	2,736	3,059	3,538	3,608	3,908	3,817	3,799	4,114	3,970
	Residential Use within 600 feet of a corridor that have no existing transmission lines (based on King County assessor data).	Count of Parcels	7	794	42	216	398	612	43	251	224	215	432	250	794	8	404	613	190	586	405	7
Industrial/Medical/Retail/Business Use*	Industrial, Medical, Retail/Business use within 600 feet of a corridor (based on King County assessor data).	Count of Parcels	123	335	335	189	159	223	325	312	279	123	266	322	210	202	279	256	172	223	269	136
Industrial Use*	Industrial present use within 600 feet of a corridor (based on King County assessor data).	Count of Parcels	39	115	80	71	78	39	107	115	75	54	83	88	47	63	44	79	70	39	71	46

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