Appendix K

Rail Traffic Technical Information

Section K.1
Rail Characteristics and Operations: A Primer

A number of elements dictate how freight trains will operate and function along a rail line. These elements include train personnel, signalization along the tracks, and traffic control.

Train Personnel

The crew of a train generally consists of two people: the conductor and the engineer. The engineer operates the locomotive under the direction of the conductor. The conductor is in charge of the train. Except in emergency situations, instructions from suitable authority, or situations provided for in the operating rules and instructions, the conductor determines when the train should move, whether it should move forward or backward, and when and where the train should stop. The conductor and engineer are stationed in the cab of the leading locomotive. When it is necessary for the conductor to leave the locomotive to operate switches, couple cars, uncouple cars, or other duties, the conductor communicates with the engineer by hand signals or radio.

The train dispatcher (dispatcher) supervises operation on an assigned segment or segments of line. The dispatcher issues instructions to conductors, engineers, and maintenance forces along the line, and issues authority to occupy or travel on the main track.

Signals

Except at very low speed, the stopping distance of a train is often substantially greater than the sight distance of the engineer operating the train. A signal system effectively increases the engineer's sight distance, allowing higher speed than could be allowed without the signal system. The signal system is typically configured with red/yellow/green lights similar to highway traffic signals, on masts along the line. The lights have a slightly different meaning from those of a traffic signal. Red means stop, but yellow means the line is clear of trains to the next signal but the next signal is red. Green means that the line is clear of trains at least to the second signal down the line. The length of track between signals is called a block, and the system of signals is called Automatic Block System (ABS).

Sometimes, a signal may be in place to provide information about the position of a switch. Such signals may be limited to red for stop and green for proceed.

A system known as positive block may be used in lieu of a signal system. In positive block, each train is assigned a segment of line in which no other trains are allowed. The engineer may proceed at the speed limit to the end of the authorized section without worrying about encountering other trains.

Under some circumstances, a method of operation called Restricted Speed is in effect. It may be used in conjunction with permission to pass a red signal or it may be used in lieu of signals. Restricted speed is a maximum of 20 miles per hour, but the train must be able to stop within half the range of vision. Curves, weather, darkness, or other conditions may require the engineer to move the train at

substantially less than the 20 miles per hour definition of Restricted Speed, and/or substantially less than the local speed limit.

Traffic Control

Traffic control is the management of the use of the main track by trains and track maintenance forces. Trains cannot divert whenever they encounter another train or maintenance work on the track. A train delayed when encountering maintenance work on the track may then delay other trains many miles distant. On the other hand, track maintenance work may be delayed waiting for a train to pass, only to have that train stop further down the line to wait for a train in the opposite direction.

The train dispatcher manages the use of the main track by trains and maintenance forces. The dispatcher determines where trains must wait for other trains, whether trains must wait for track maintenance or track maintenance must wait for trains, authorizes trains and maintenance forces to occupy the main track within specific limits for a specific amount of time.

The train dispatcher may issue authority by way of a controlled signal system, known as Centralized Traffic Control (CTC), by written orders, or by voice communication without the use of written orders. CTC is ABS with dispatcher ability to make specific signals red for management of traffic, and typically to route trains through switches to alternate tracks by remote control. CTC implements logic that prevents trains moving in opposite directions from being authorized simultaneously on the same segment of track. Multiple trains may be authorized in the same direction on a segment of track, but all of them except the first one must move at Restricted Speed.

CTC is a proven system that has been in use in the railroad industry for over 80 years. There have been many changes in the specific electronics but the core system operates as it has since inception.

CTC is expensive to install and maintain. In lieu of CTC, traffic control on light traffic lines may be in the form of written orders, generally known as Track Warrant Control (TWC). TWC includes very specific and strict procedures for generating, transmitting, recording, and executing the instructions. The train dispatcher communicates with the conductor and/or engineer of a train or with the foreman in charge of a track maintenance crew, and issues specific instructions including the end points of the authority, the time allowed, and other instructions. The dispatcher generates the authority form on a computer system that checks for overlapping authority, then transmits the instructions by voice radio to the recipient. The recipient must write the instructions (which includes some writing of information and some checking boxes on the form, each relating to a specific preprinted instruction) as they are received. The information must be copied without mistake. Corrections are not allowed. The recipient must read the completed form to the dispatcher, who checks the repeated information against the original form, word for word and number for number. Only when the instructions have been repeated correctly does the dispatcher put the instructions in effect by issuing a time that the instructions on the form are in effect.

The recipient must report to the dispatcher, using a specified procedure, indicating that the line is clear and the authority is no longer in use.

TWC is a proven system that has been in use on US railroads for over 30 years. It is derived from another written order system that was in use for over 100 years, altogether about 150 years of proven safe operation.

In limited local areas in which a substantial amount of yard or industrial switching is conducted, Yard Limit operation is used. In yard limits, all trains must proceed prepared to stop within half the range of vision (Restricted Speed). Further authority is not needed to occupy the main track; however, the dispatcher may give verbal instructions by radio in order to ensure that train movements are not delayed by local switching.

Dispatching

The level of traffic on the Puget Sound & Pacific Railroad (PS&P) rail line does not support the use of CTC for traffic control, nor ABS. Traffic is controlled with TWC, which also provides positive block train separation. Yard Limits operation is used at Centralia, Elma, and Aberdeen/Hoquiam.

Trains and maintenance forces communicate among themselves, with local supervisors, and with the train dispatcher by two-way radio using frequencies assigned for the purpose by the Association of American Railroads, and cell phone.

Following distance is substantial when trains are under TWC control. Since TWC is a positive block system, a train must report clear of a segment of track before it can be occupied by another train. This arrangement can be time-consuming and labor-intensive for the dispatcher. The crew of the lead train must report to the dispatcher that the train has passed an identifiable landmark with all of the cars in the train. There is a procedure for this transaction. The dispatcher must then contact the crew of the second train and issue authority to use the main track between its location and the location that the train has reported passing. The entire process can take five to ten minutes, so a practical following distance is generally close to an hour.

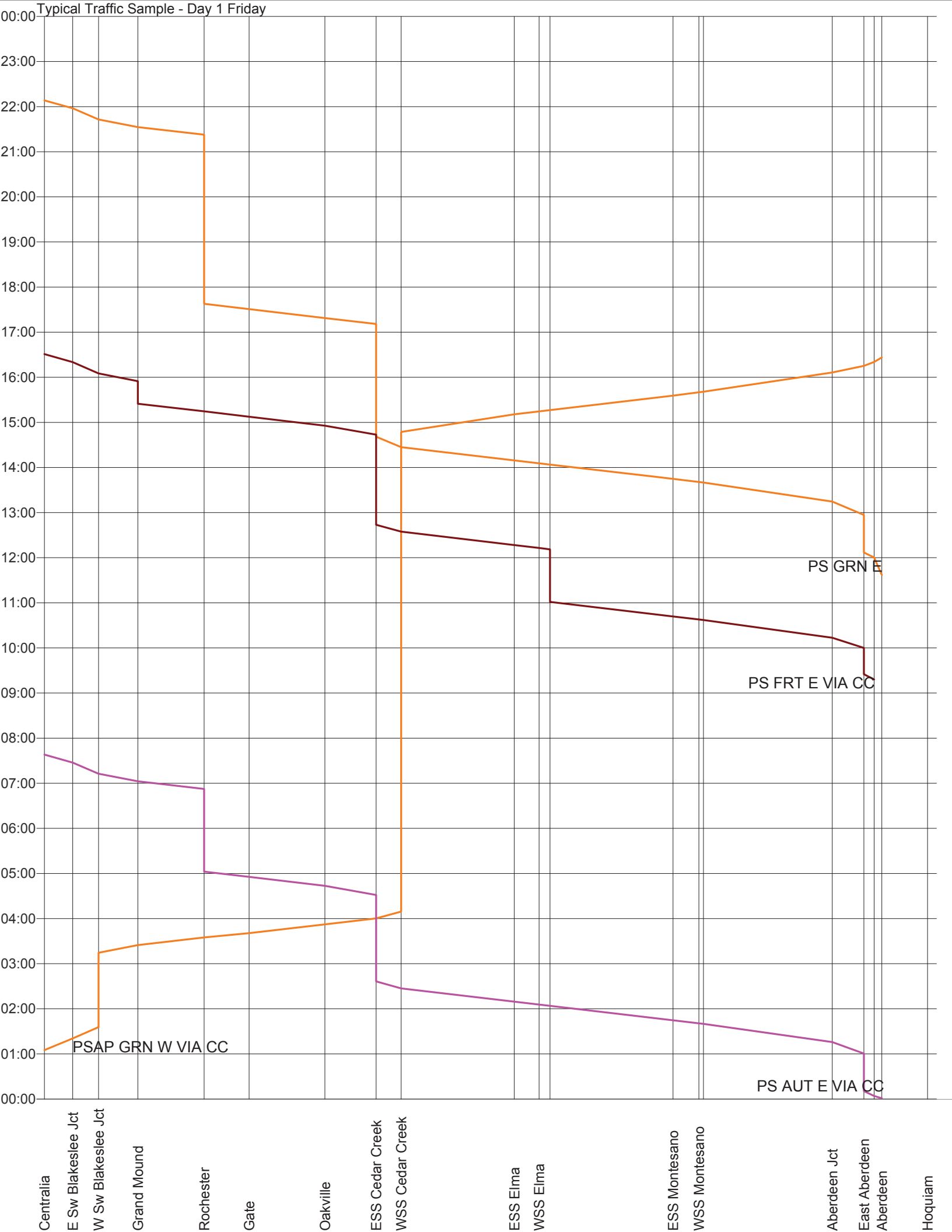
The PS&P dispatcher is located in St. Albans, Vermont . This is a centralized dispatching office used by many of the Genessee and Wyoming subsidiary railroads. The situation is not substantially different from the operation of today's shortline railroads when they were branches of today's Class 1 railroads. One dispatcher was typically assigned one or more branch lines in addition to a segment of main line. Some assignments consisted of several branch lines, sometimes distributed over several states. The arrangement is also similar to the arrangement of the Class 1 railroad operation controlled from centralized control centers that are distant from the area being controlled.

Table 1. Common Railroad Terms and Characteristics

Track Components	What does this mean and why is it important?
Track Structure	Track structure has four elements: rails, ties, ballast and sub-ballast. Rails are made of steel. Even though the steel is very hard, the rail wears out, just as highway pavement wears out. The ties, typically made of wood or concrete, support the rails. Ballast is crushed rock used to support the ties and keep the track in correct alignment. Sub-ballast is a finer grade of crushed rock placed beneath the ballast to divert water from the ballast and distribute the weight of the track to the sub-grade below. The condition of each of these elements dictates the weight and type of equipment that can be used on the track, as well as the speeds allowed on the track.
Number of Tracks and Sidings	The number of tracks affects the capacity of the line. Two tracks (also called double track) have more capacity (the number of trains that can move through the area) than one track (single track). Sidings also increase the capacity of a rail line. Sidings located along the line allow faster trains to overtake slower trains without affecting train traffic on the other track. The capacity of the rail line and the reliability of operation are affected by the time required to move between sidings.
Grade	The steepness of the track dictates the types of trains that can use the rail line. Typical grades for freight trains do not exceed 2%, while grades for passenger trains can be as high as 4%.
Curves	The tightness of the curve dictates the speed that a train can travel. The higher the degree, the tighter the curve, the slower the speed.
Speed Regulations	Train speed limits are generally regulated by the Federal Railroad Administration. The Code of Federal Regulations (CFR) (49 CFR 213, Track Safety Standards) establishes classes of track with associated speed limits and detailed physical requirements for tracks in a given class. In Washington State, speeds may also be restricted by the Washington Utilities and Transportation Commission.
Width (Gage and Track Centers)	The rails of a railroad track are spaced 56.5 inches apart (the gage of track). To allow sufficient clearance between vehicles on adjacent tracks, the tracks are spaced at least fifteen feet apart (the track centers). Recent Federal Railroad Administration Safety Regulations dictate that if rail traffic is to continue while maintenance is performed on an adjacent track, the tracks must be placed at least 25 feet apart from the center of each track. This is often referred to as 25-foot centerline.
Length	Each track that is not a through-route must be long enough to serve the intended purpose. Just as a parking space for a tractor-trailer must be of sufficient length for the vehicle, a railroad track must be long enough to hold even the longest train. Depending on the type of train traffic handled, the length of a typical freight train can be between 7,000 feet and 10,000 feet.
Rail Yard	Series of railroad tracks for storing, sorting, or loading/unloading, railroad cars and/or locomotives. Railroad yards are normally built where there is a need to store cars while they are not being loaded or unloaded, or are waiting to be assembled into trains. Railroad yards have many tracks in parallel for keeping rolling stock stored off the mainline, so that they do not obstruct the flow of traffic. Railroad cars are moved around by specially designed yard switchers, a type of locomotive. Cars

Track Components	What does this mean and why is it important?
	in a railroad yard may be sorted by numerous categories, including railroad company, loaded or unloaded, destination, car type, or whether they need repairs.
Railroad Operations	**What does this mean and why is it important?**
Signals and Traffic Control	Signals help extend the engineer's sight distance and therefore allow greater speeds. Traffic control determines which trains can use which tracks—it increases safety and movement of trains.
Traffic	The number and type of trains along a rail line relate directly to capacity. The more trains that are put on a track, the more the need for additional track signals and controls. Without these signals and controls, the speed and capacity of the rail line would diminish as traffic increases.
Running Time	Running time is the amount of time for a train to travel between two points. Running time is used to determine capacity of the railroad.
Double In	This refers to separating a train or string of cars into more than one track when the tracks will not accommodate the entire string of cars or train. See Section K.5, *Doubling and Clearing*, for illustrations.
Double Out	This refers to aligning rail cars in one track to the cars in another in order to assemble a train or string of cars that will not fit in any of the tracks. See K.5, *Doubling and Clearing*, for illustrations.
Coupling	Coupling is a mechanism used to connect two or more rail cars.
Switching	Switching is a type of operation done within and near the limits of a yard. It generally consists of breaking down and building up trains, storing and classifying cars, serving industries within and near yard limits, and other related purposes.

Section K.2
Stringlines and Data Tables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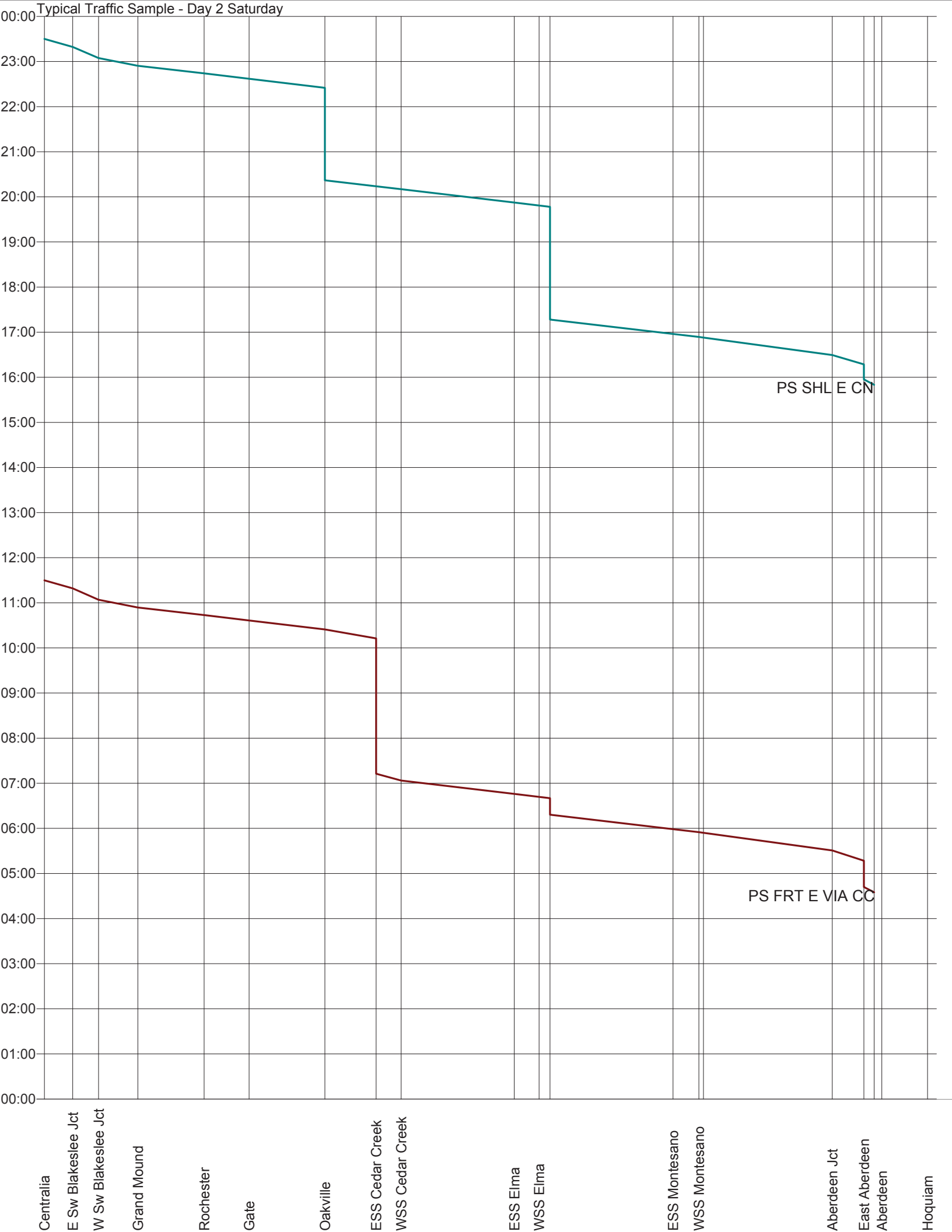
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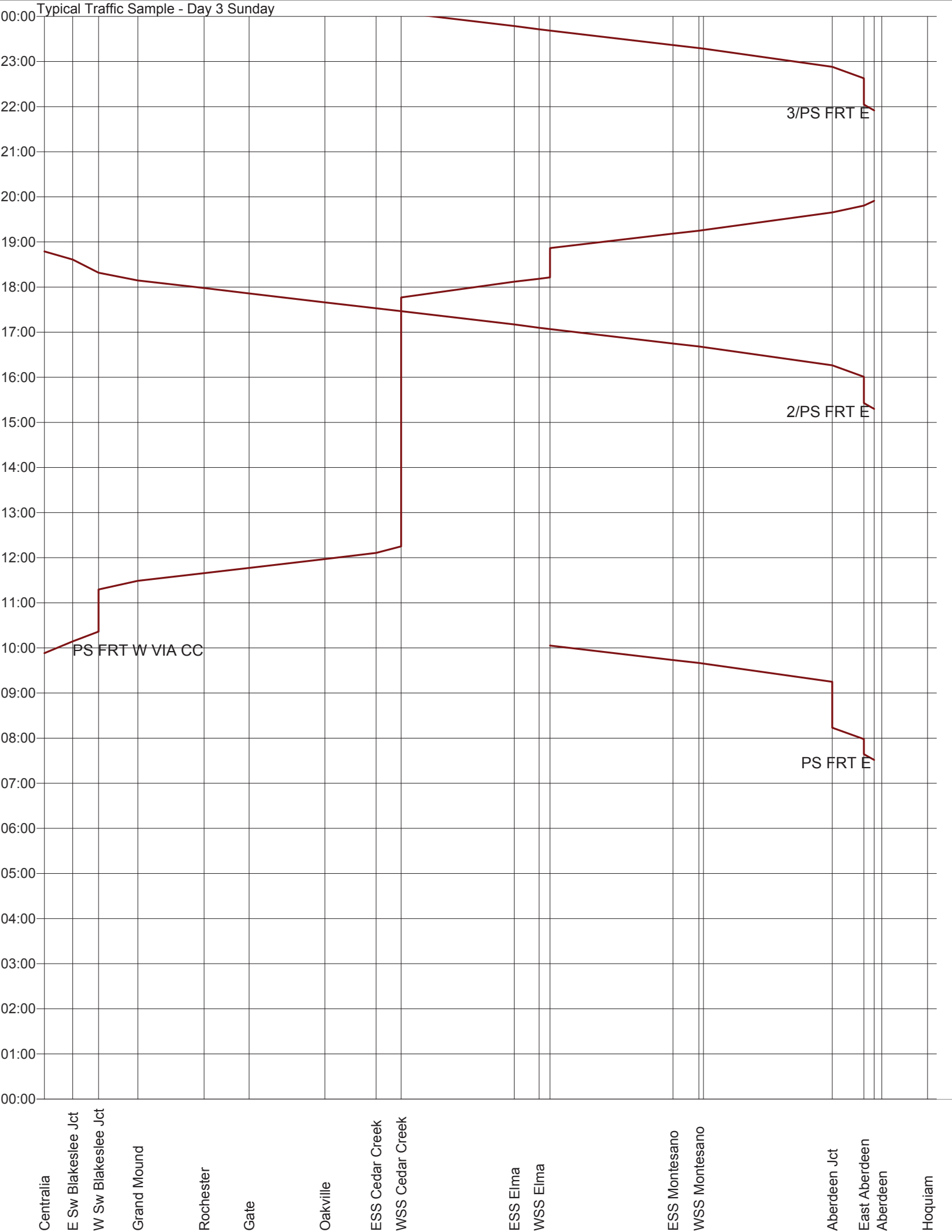
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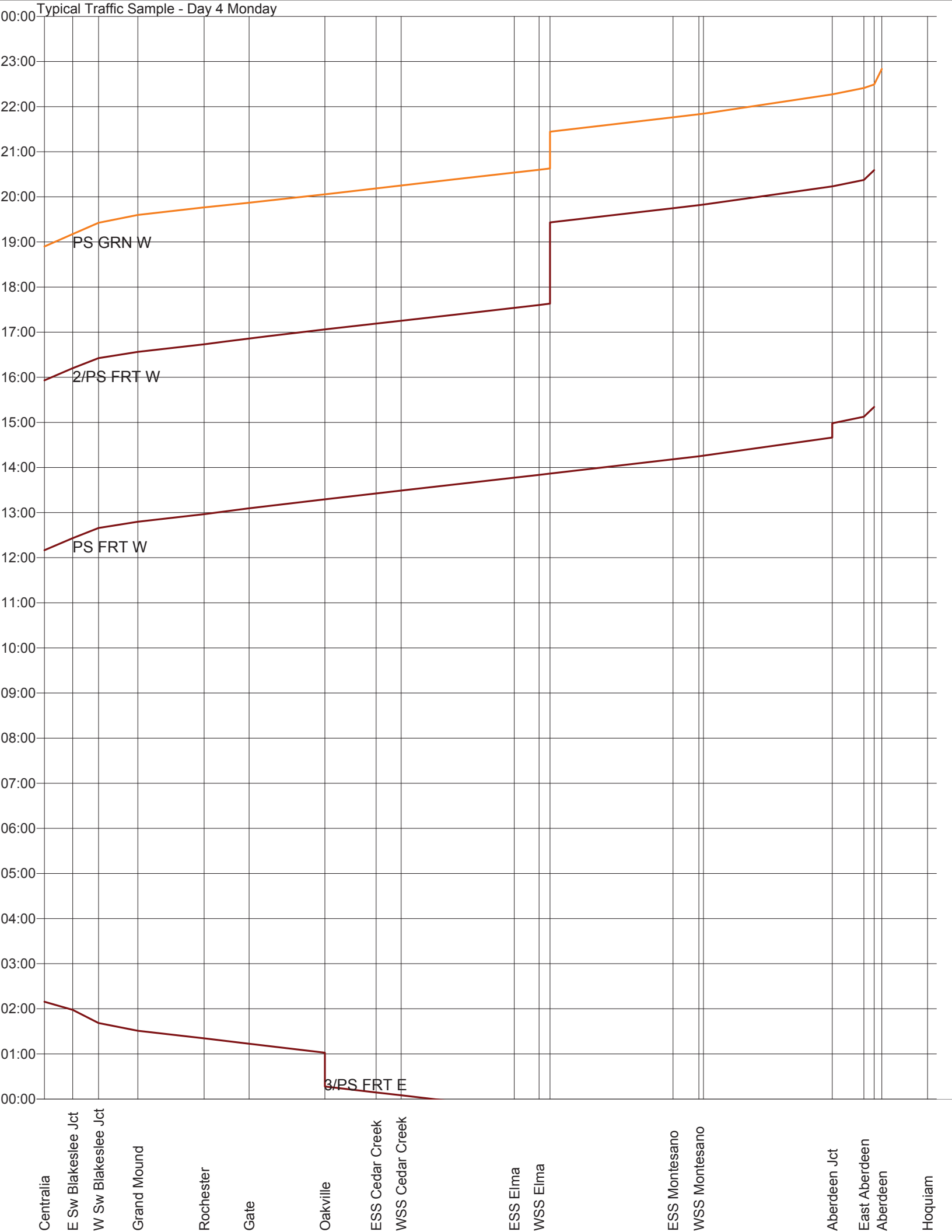
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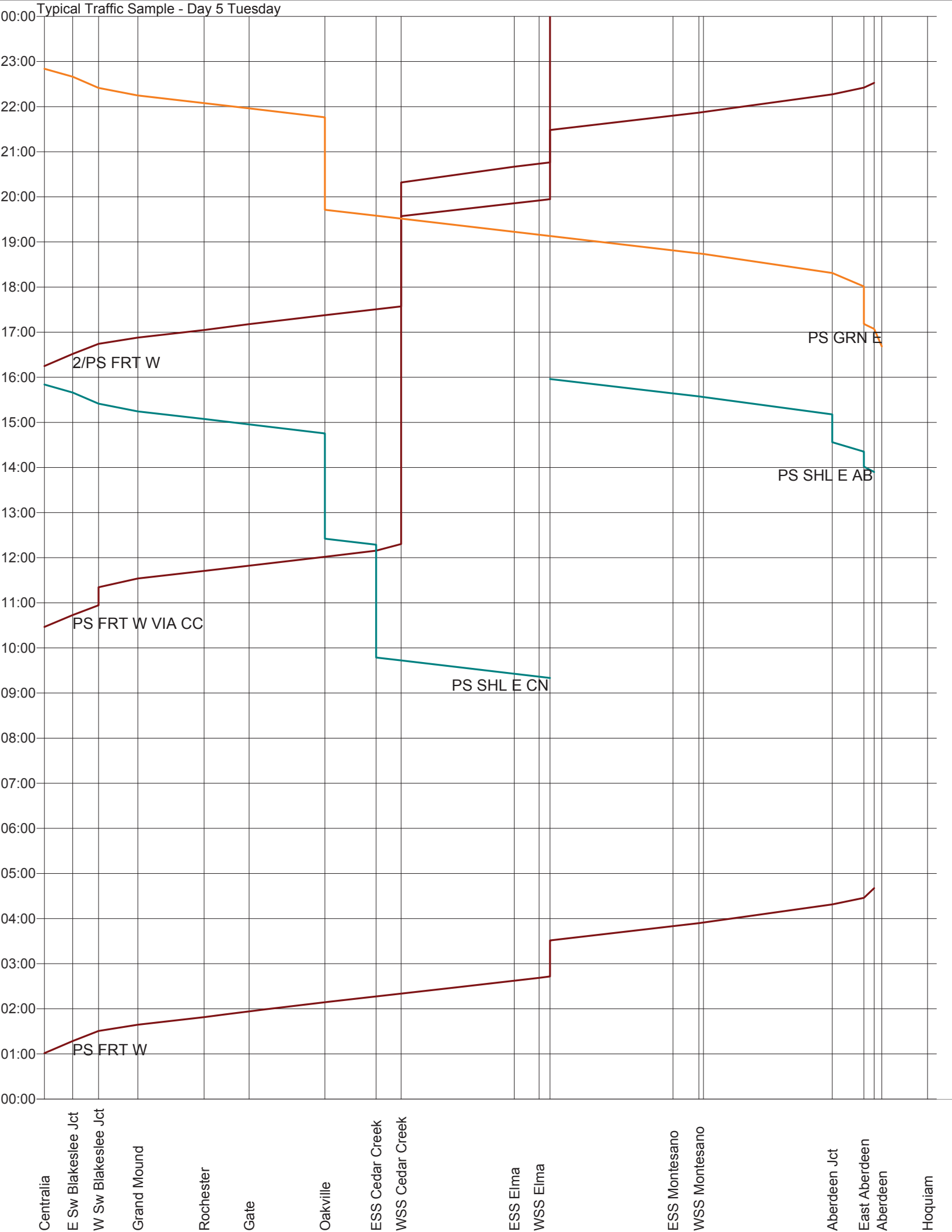
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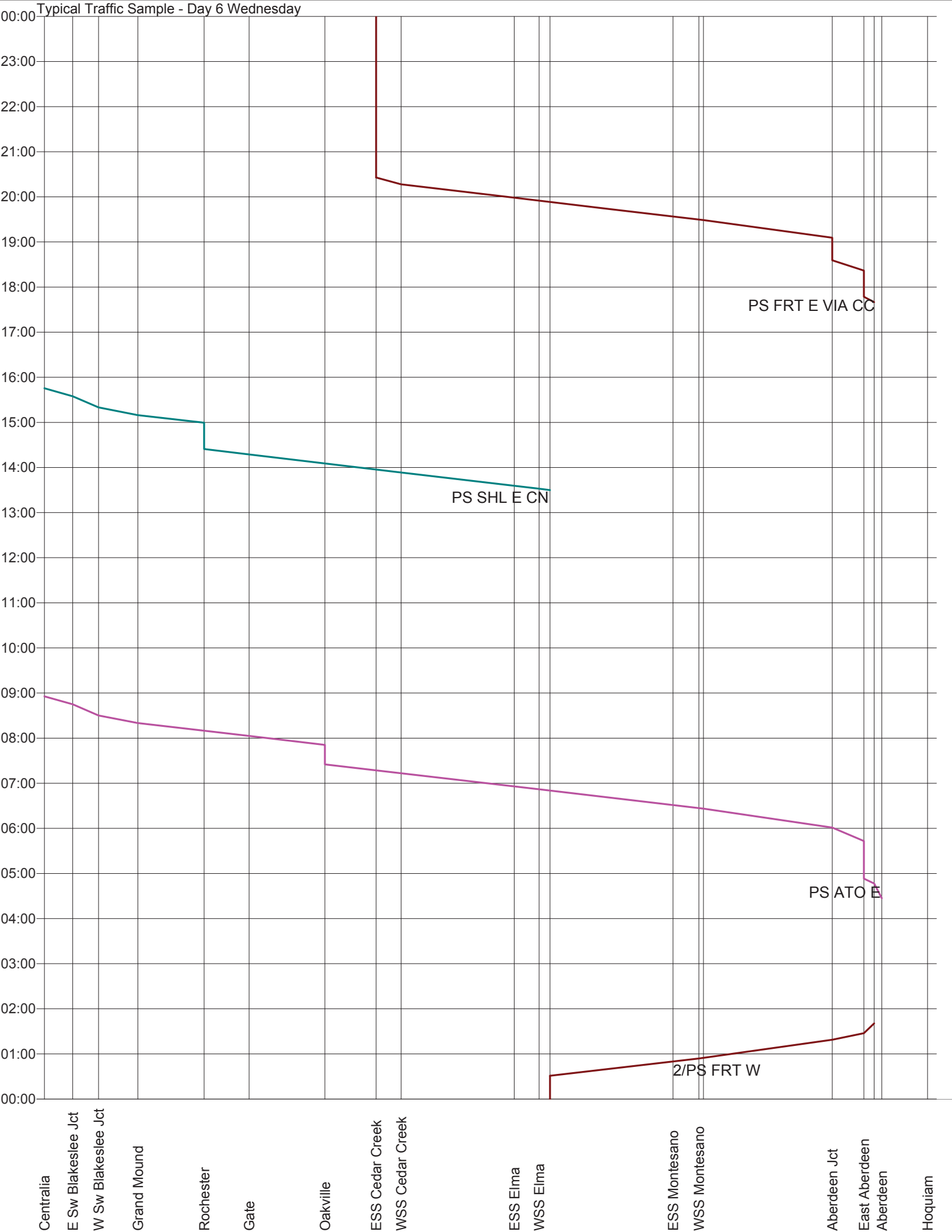
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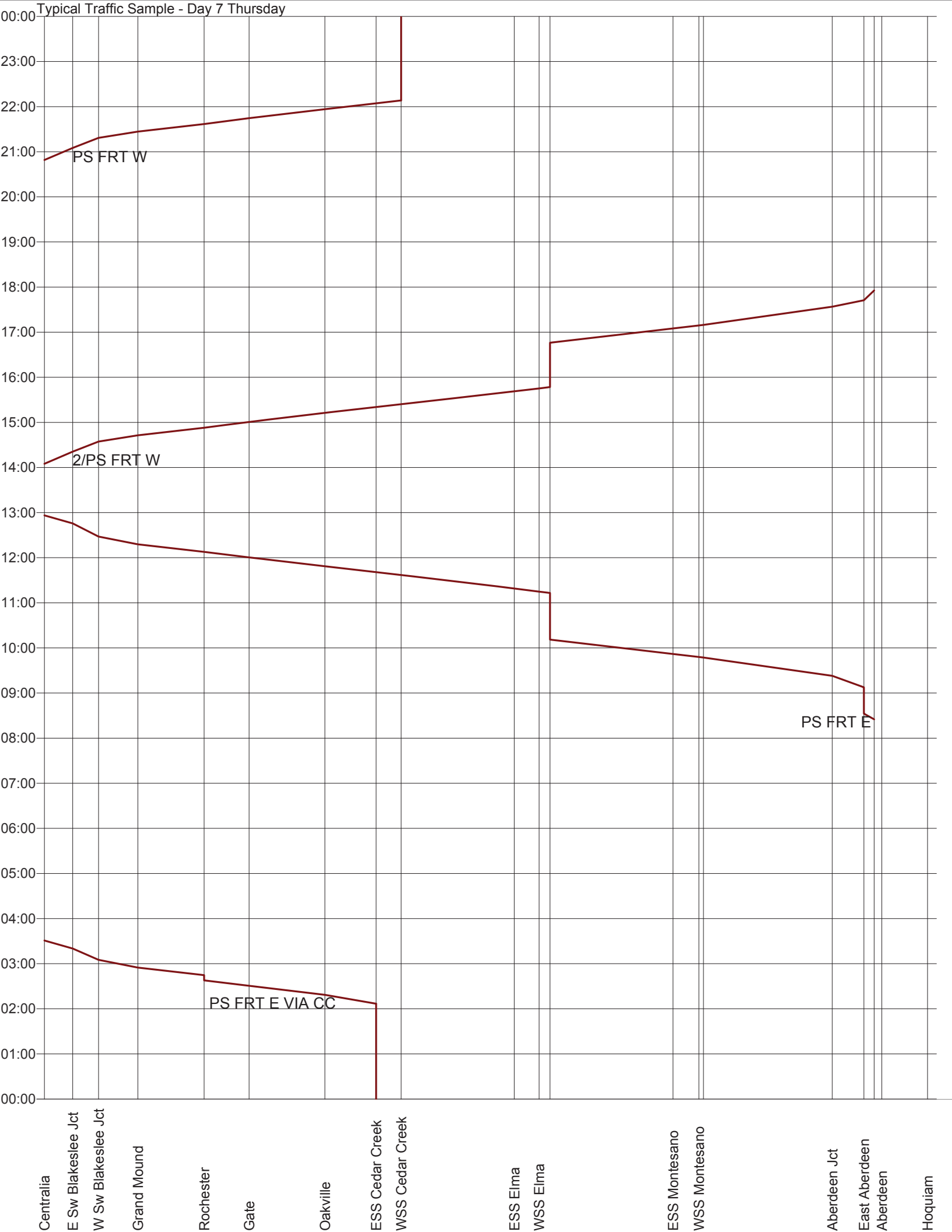
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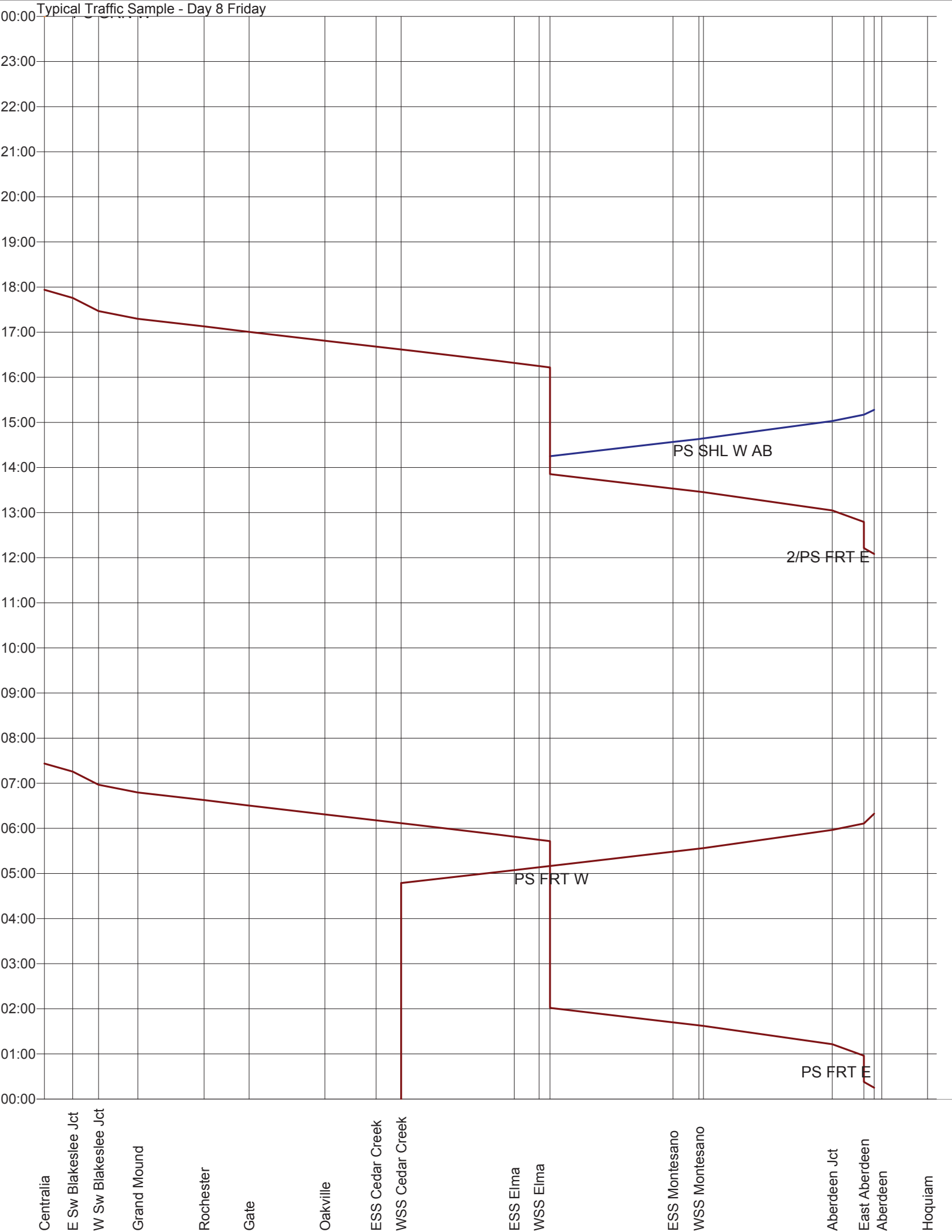
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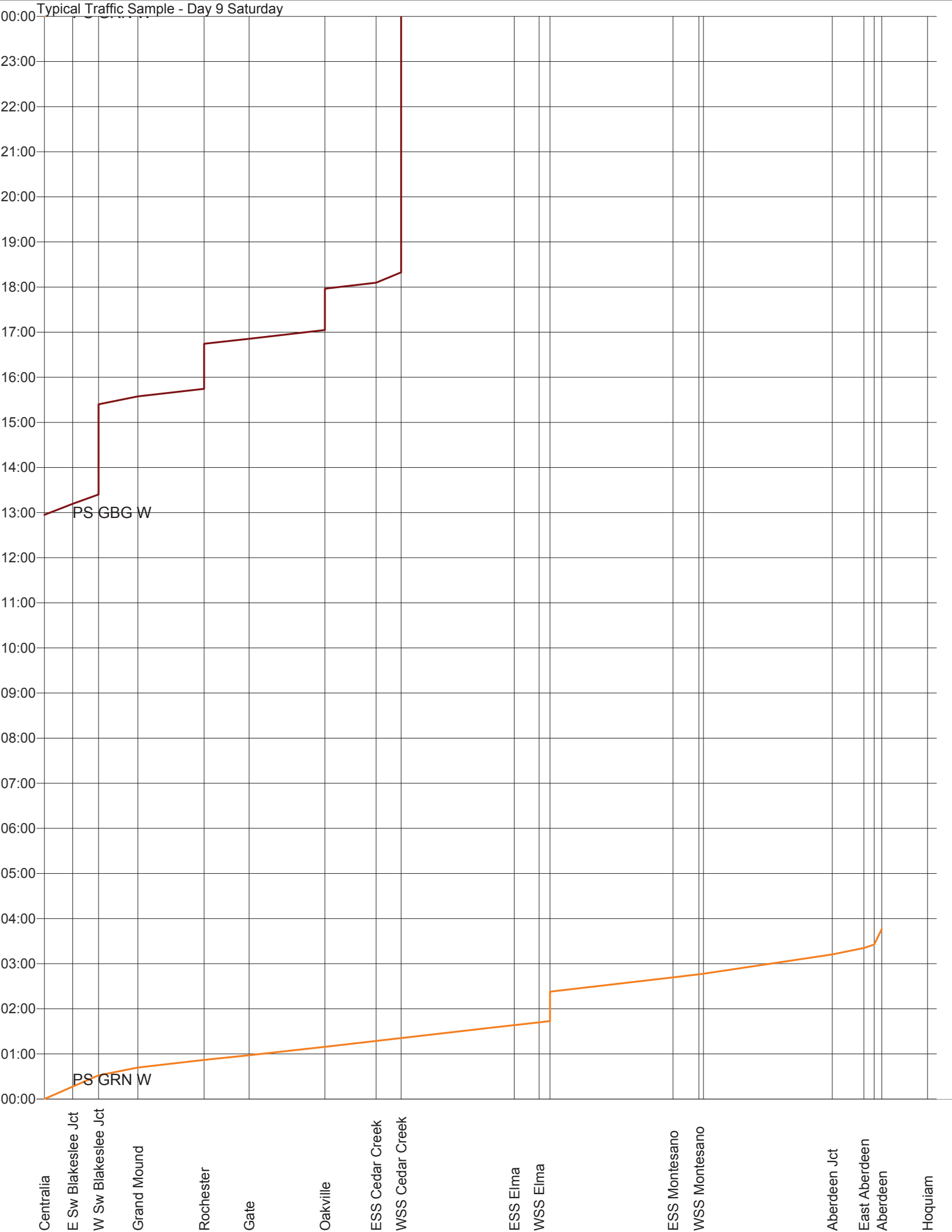
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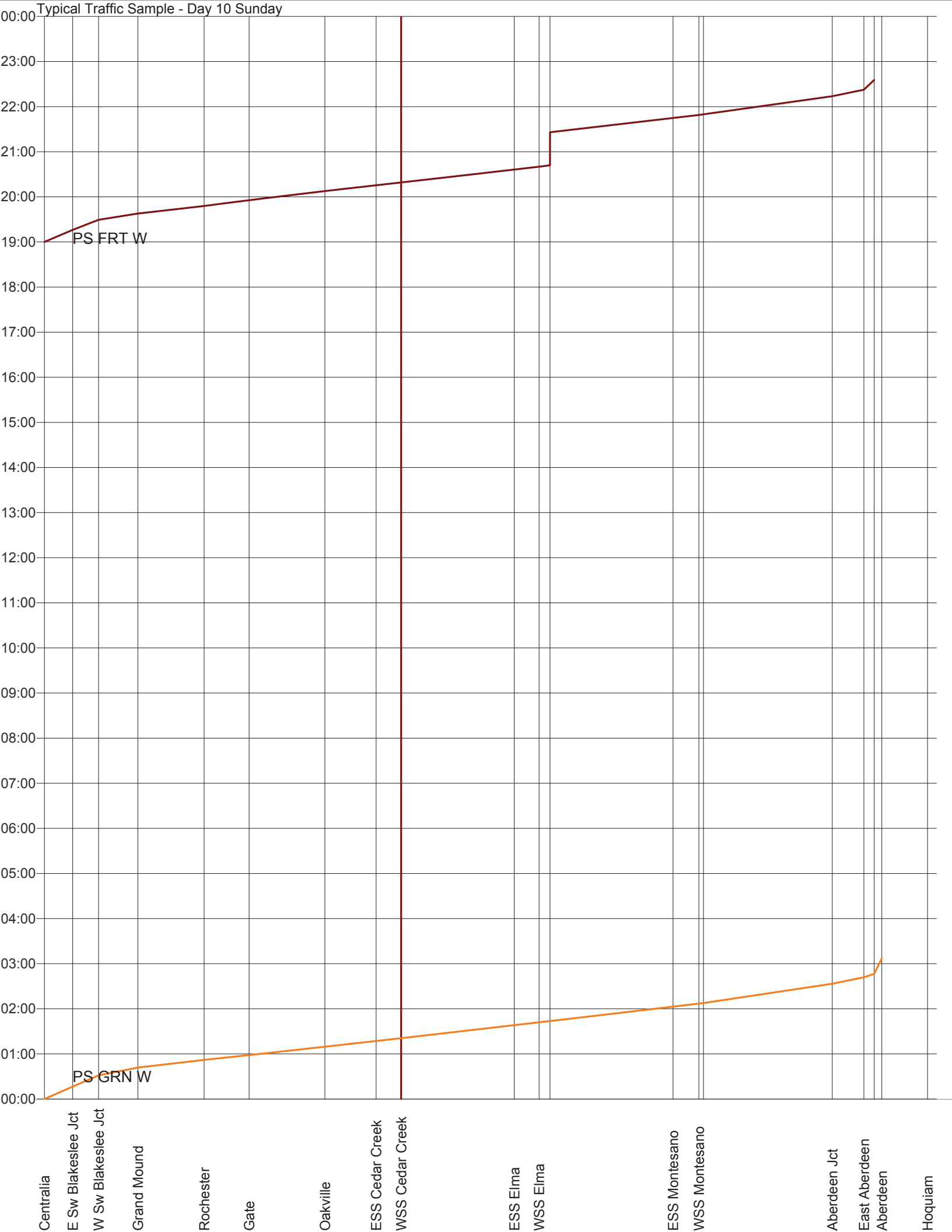
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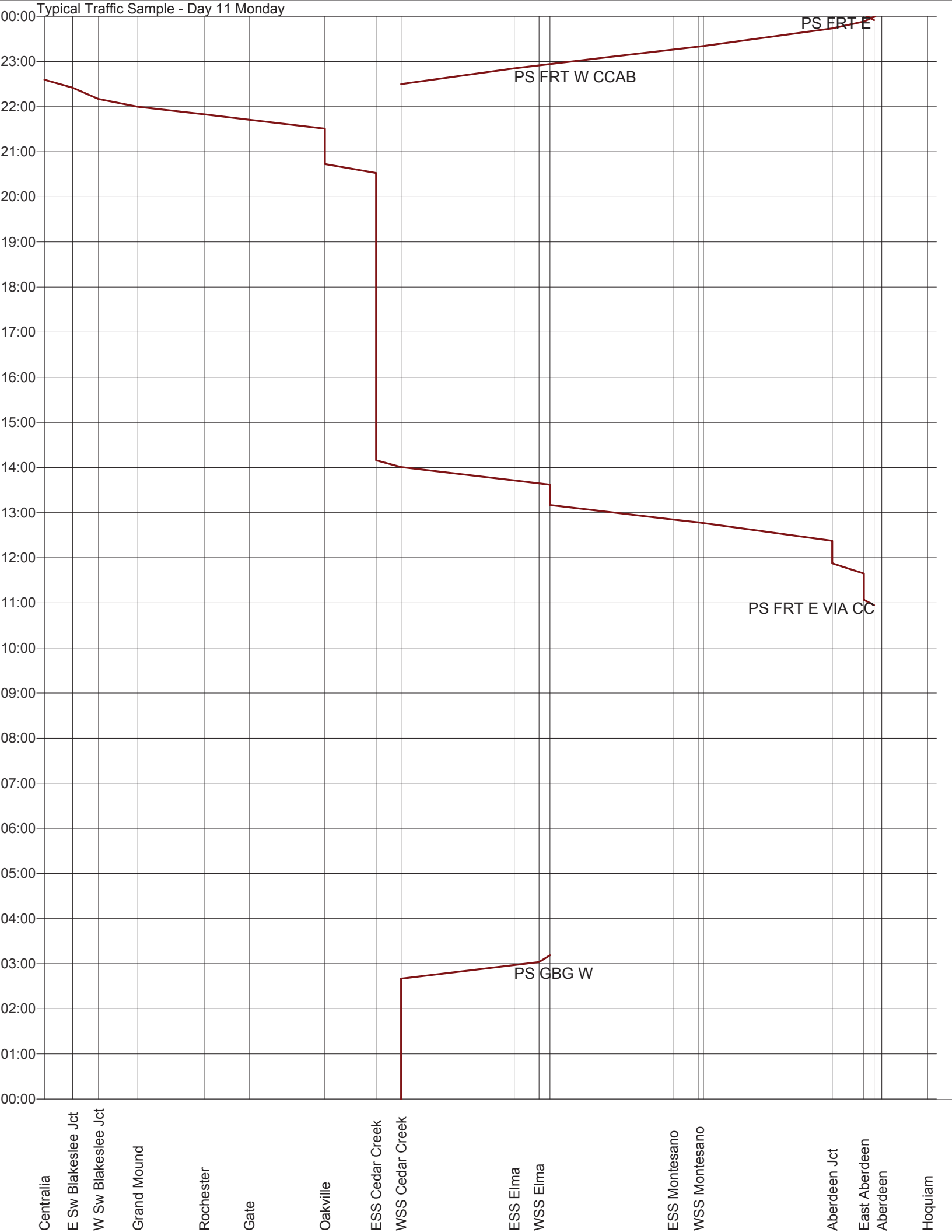
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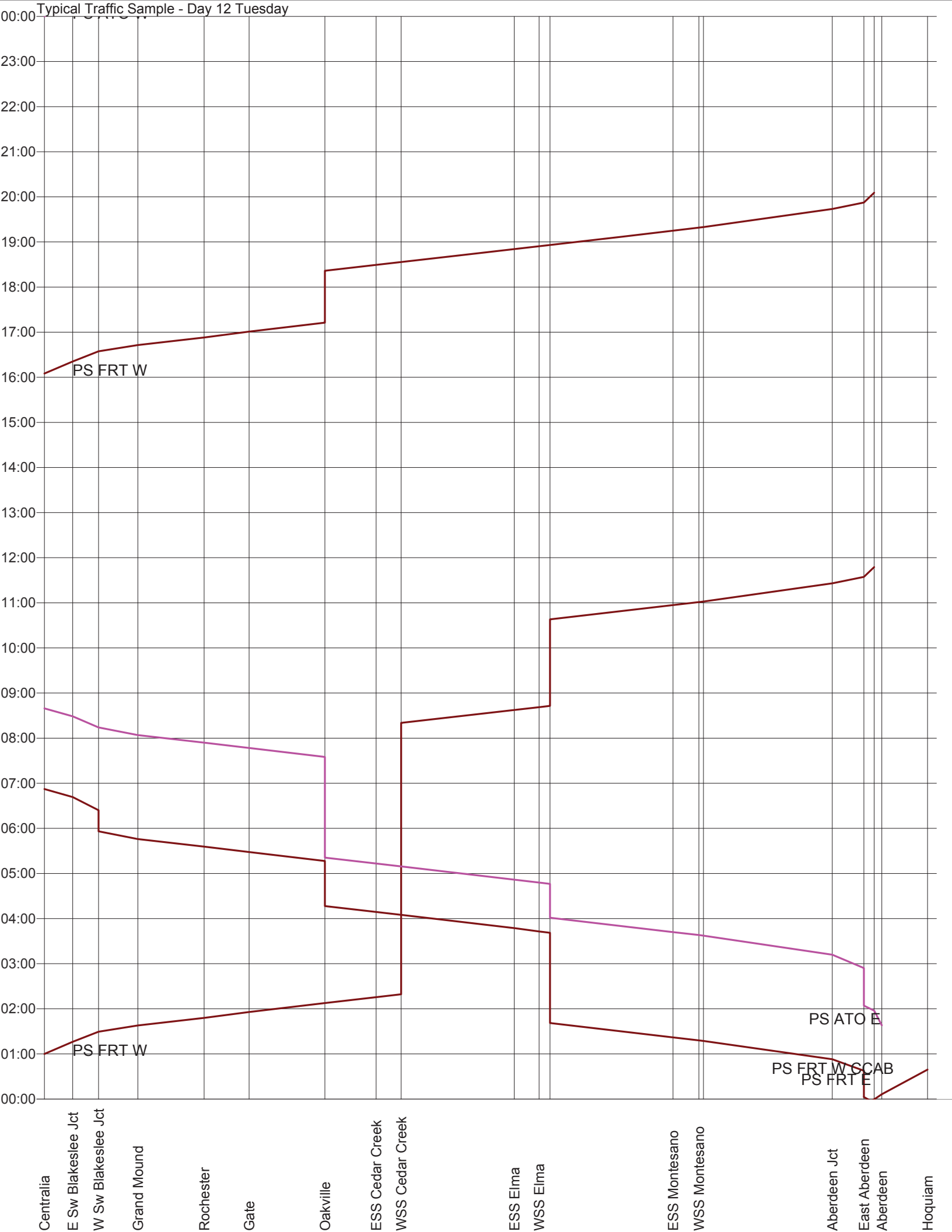
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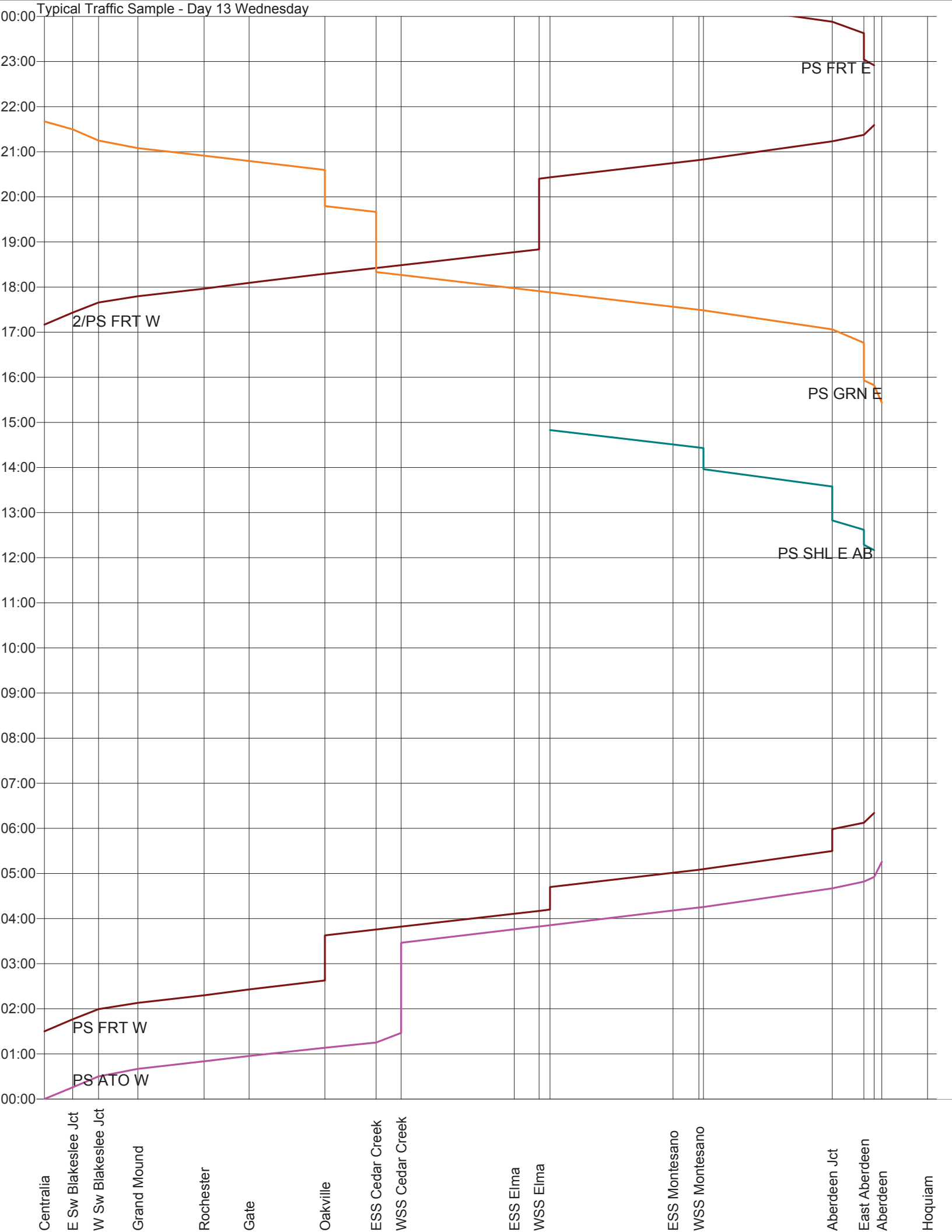
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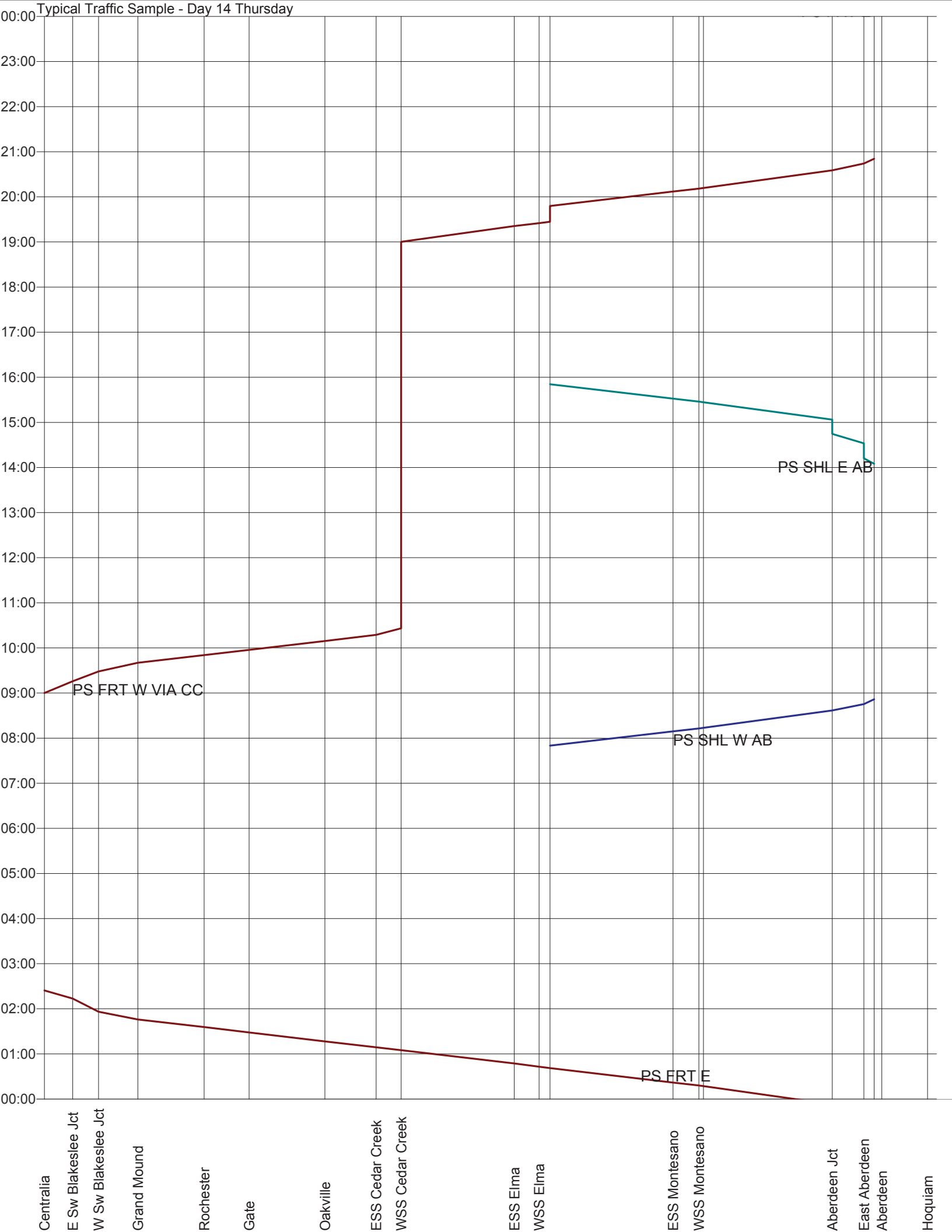
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Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
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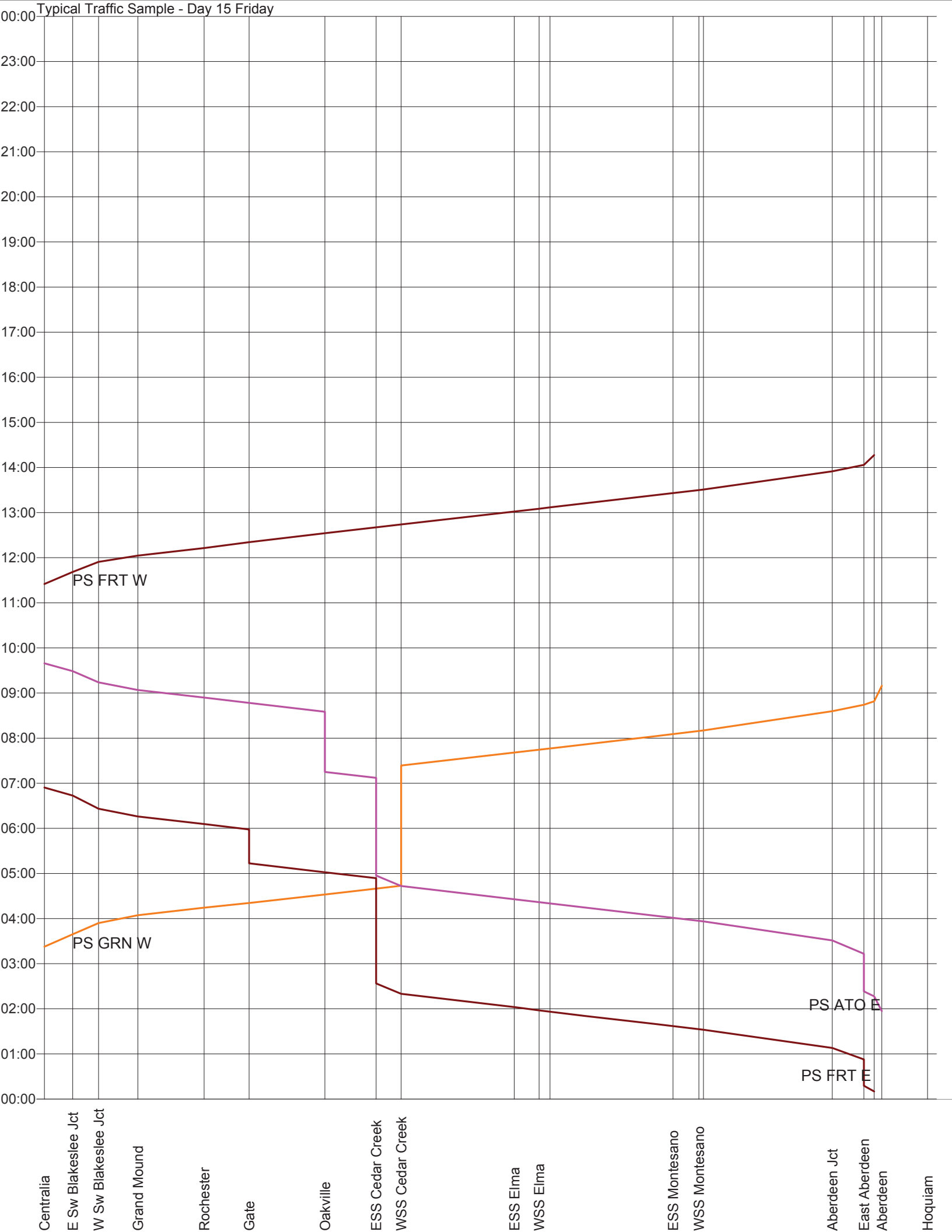
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 15 Friday
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PS FRT W
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Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
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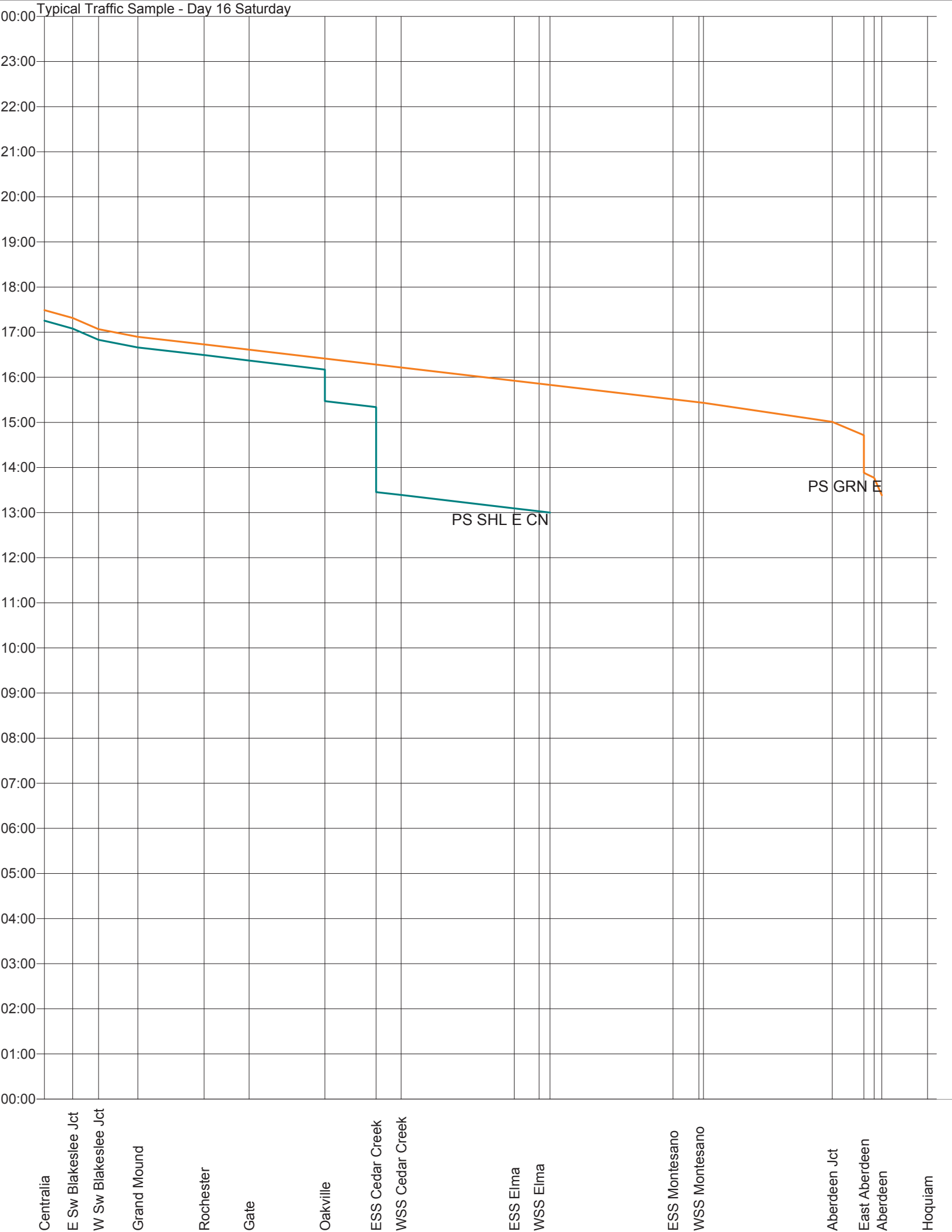
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 16 Saturday
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PS GRN E
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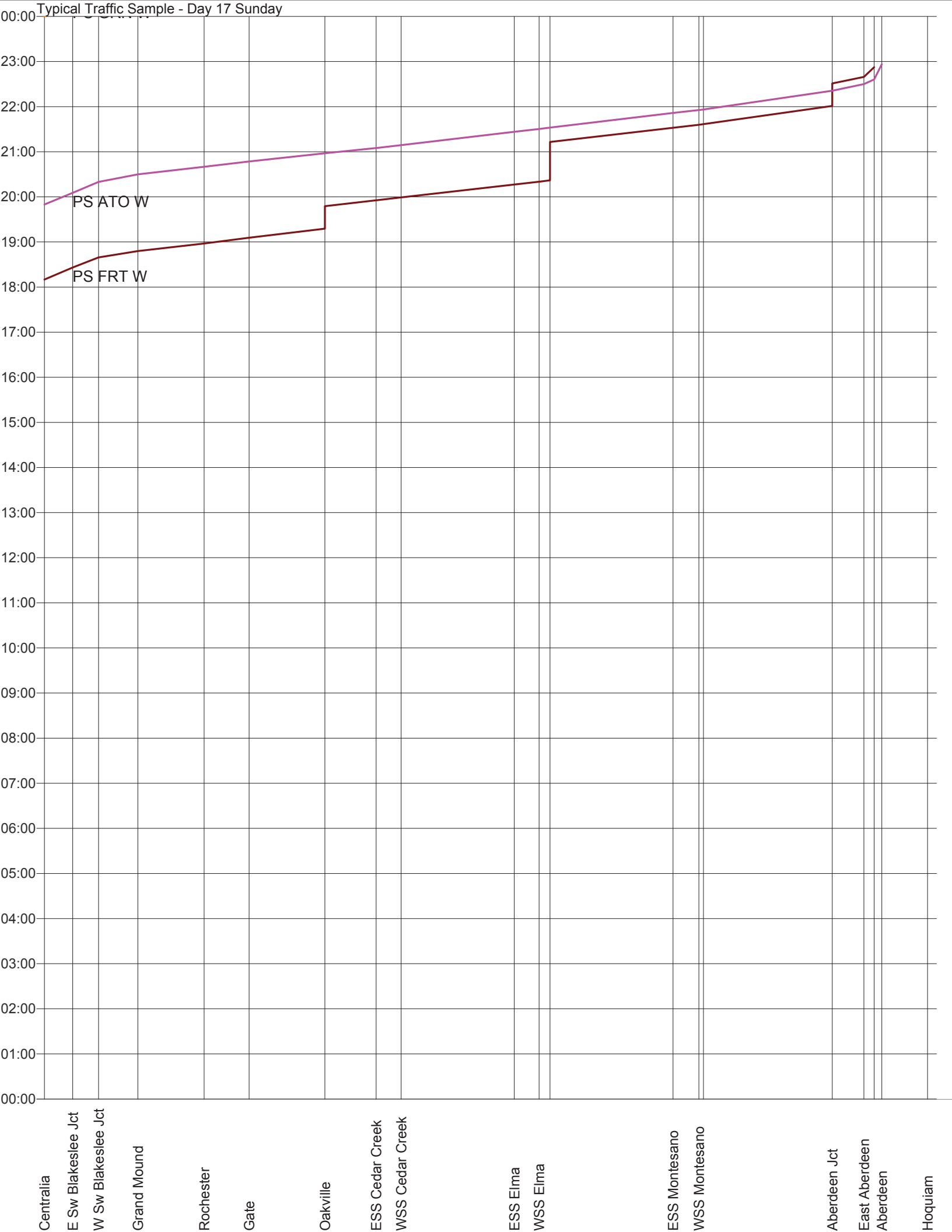
Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 17 Sunday
00:00
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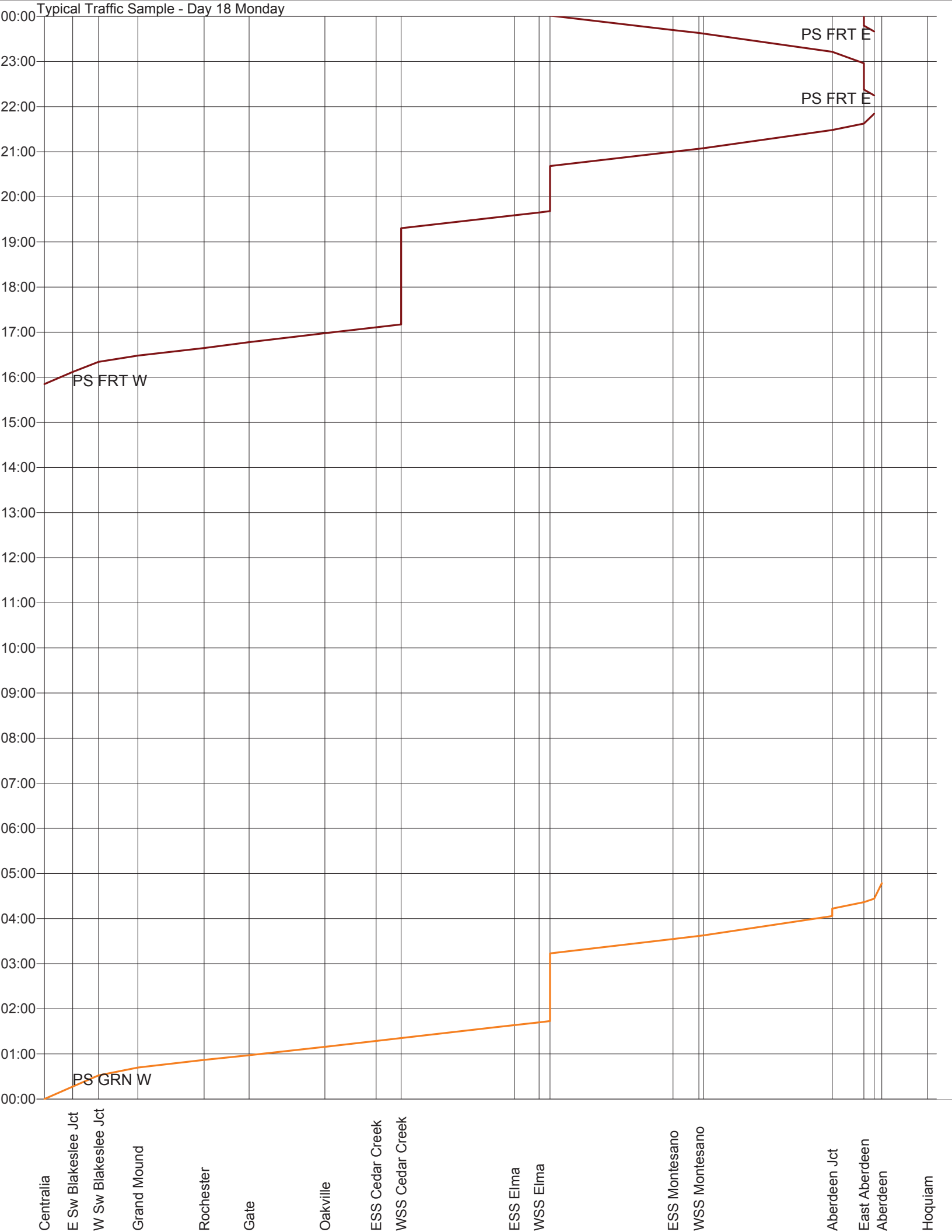
Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 18 Monday
00:00
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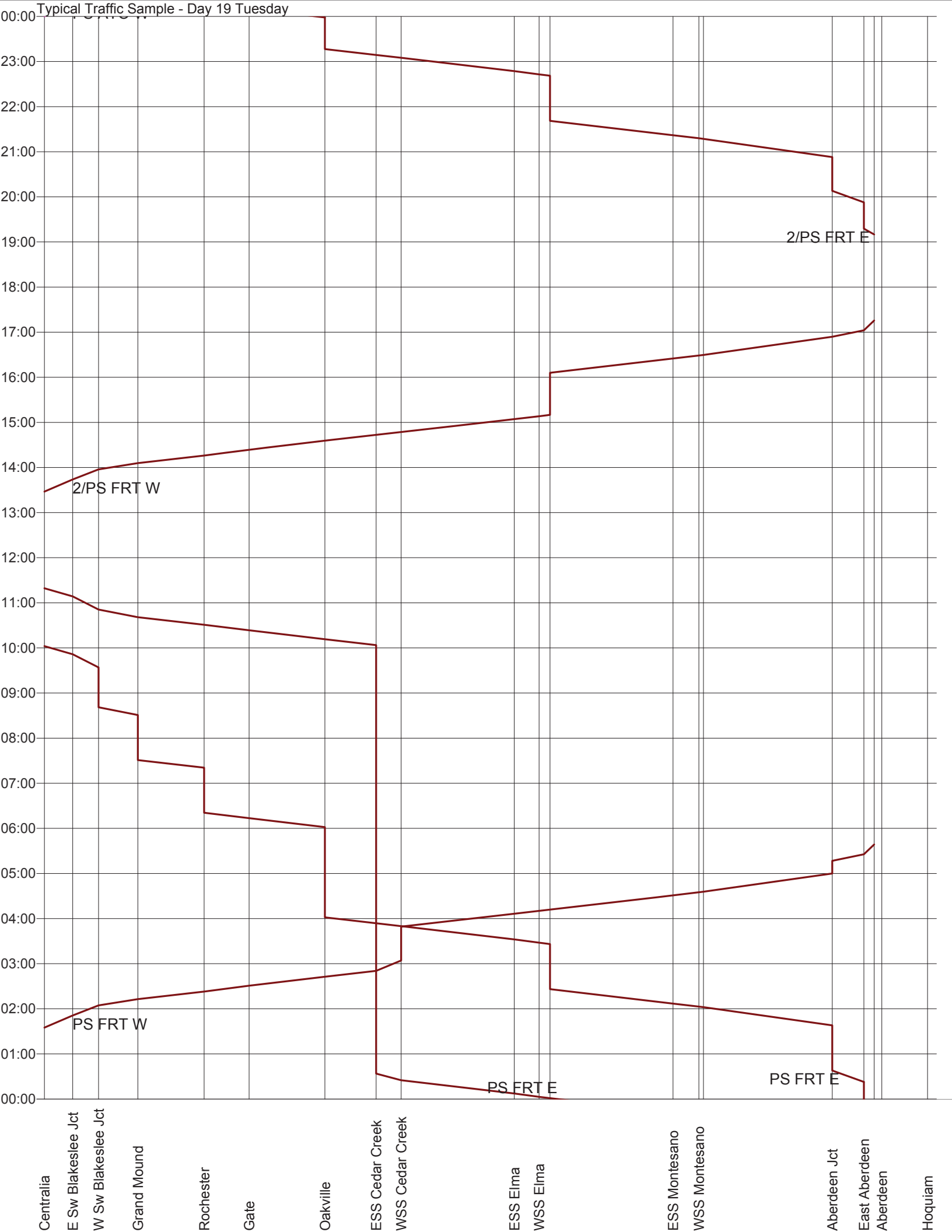
Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 19 Tuesday
00:00
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Centralia
E Sw Blakeslee Jct
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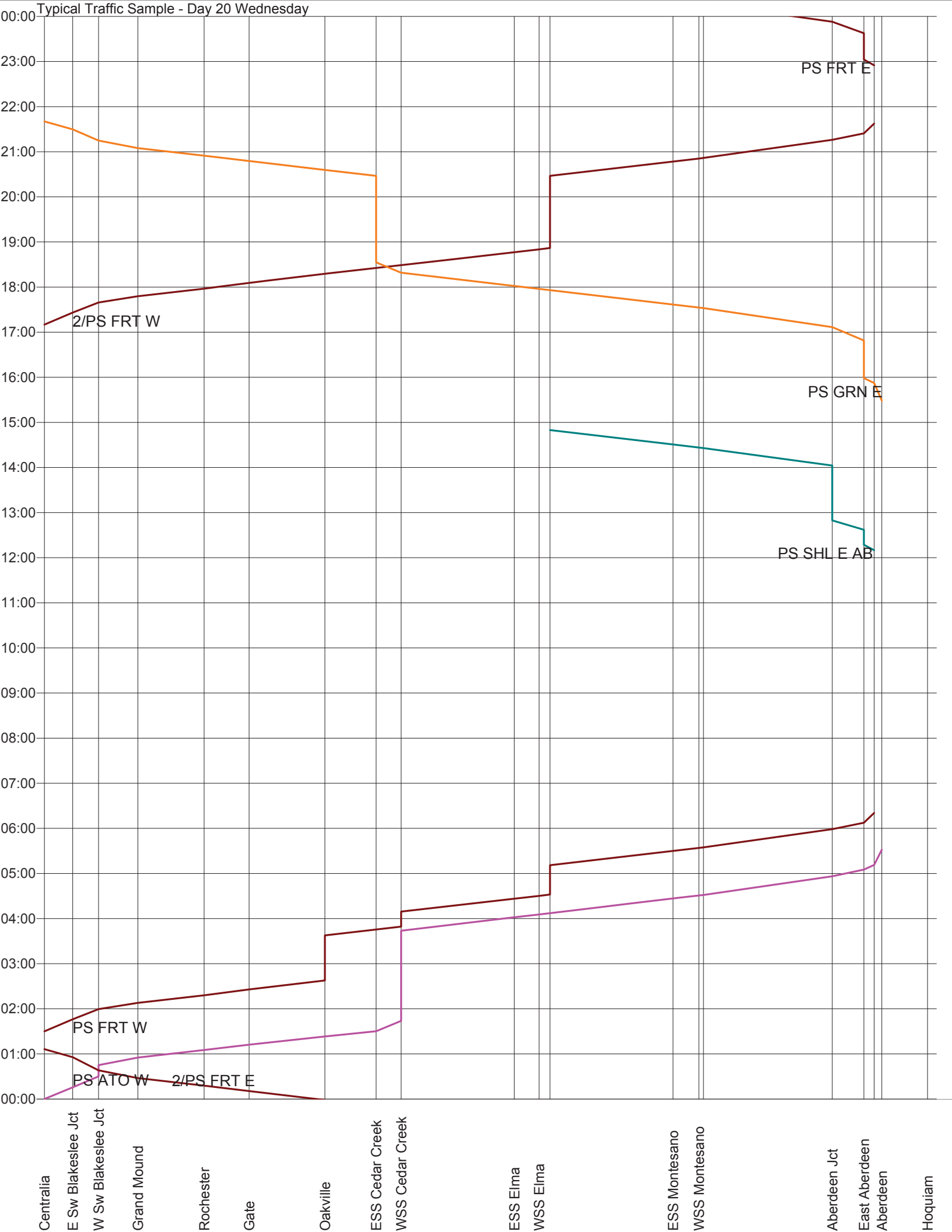
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 20 Wednesday
00:00
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Centralia
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Grand Mound
Rochester
Gate
Oakville
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ESS Montesano
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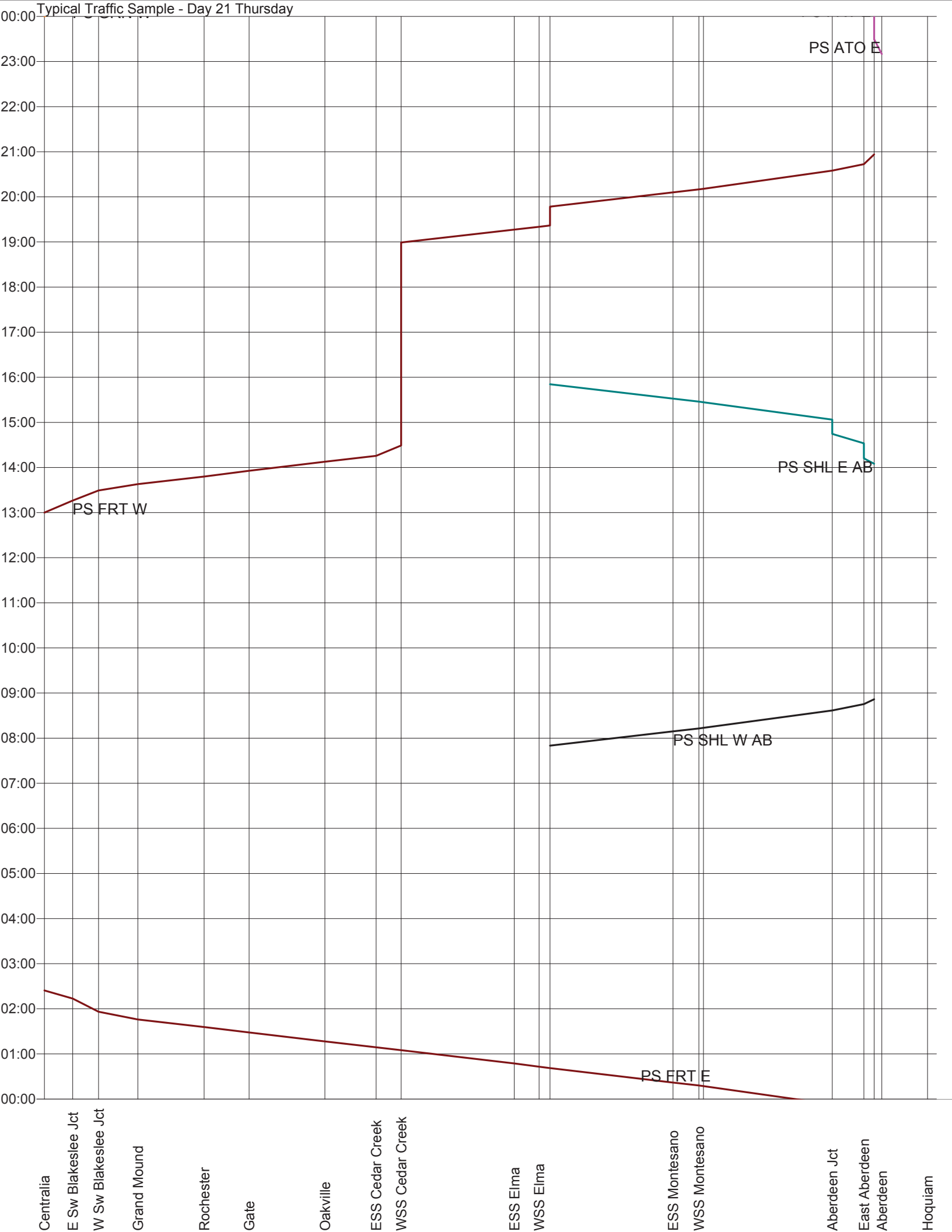
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 21 Thursday
00:00
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Centralia
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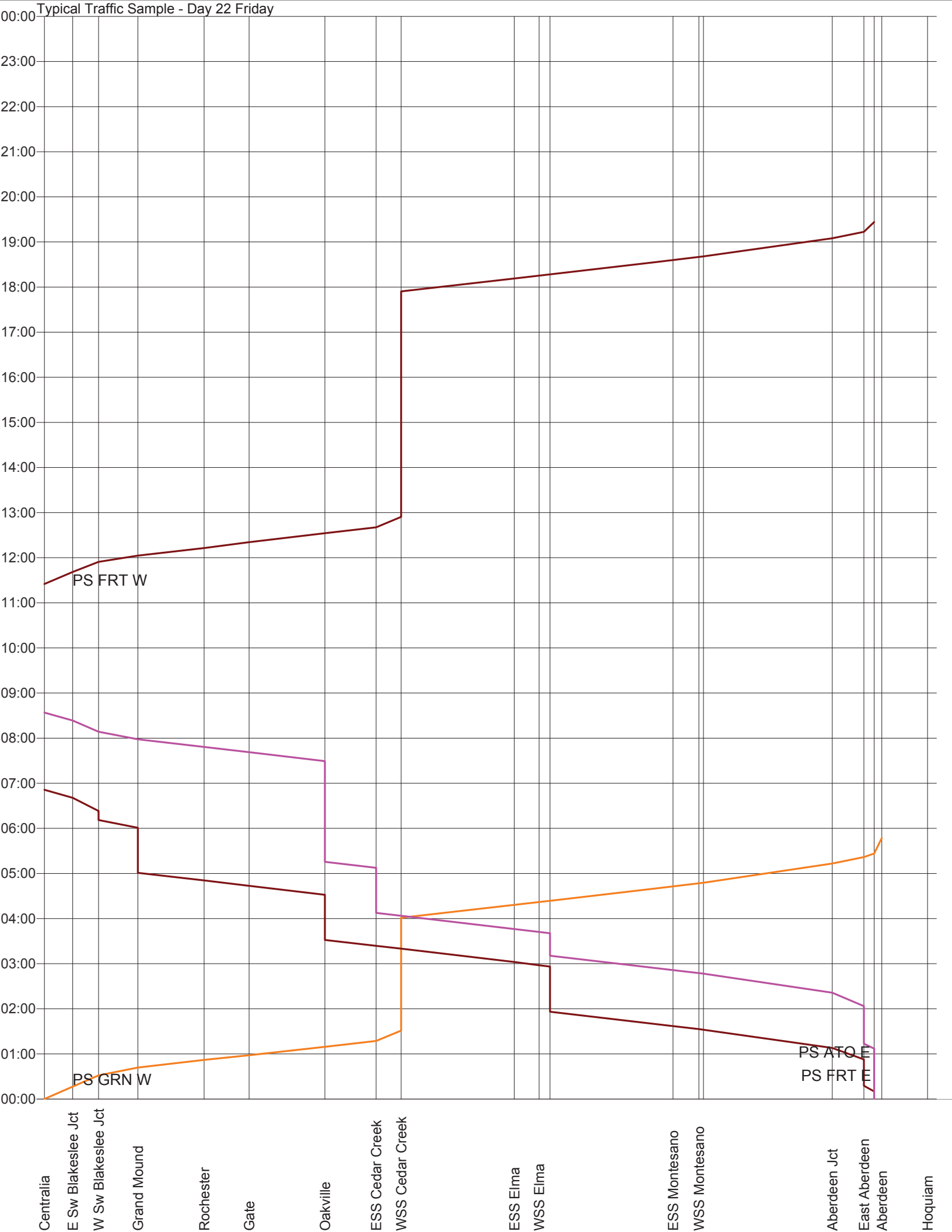
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 22 Friday
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Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
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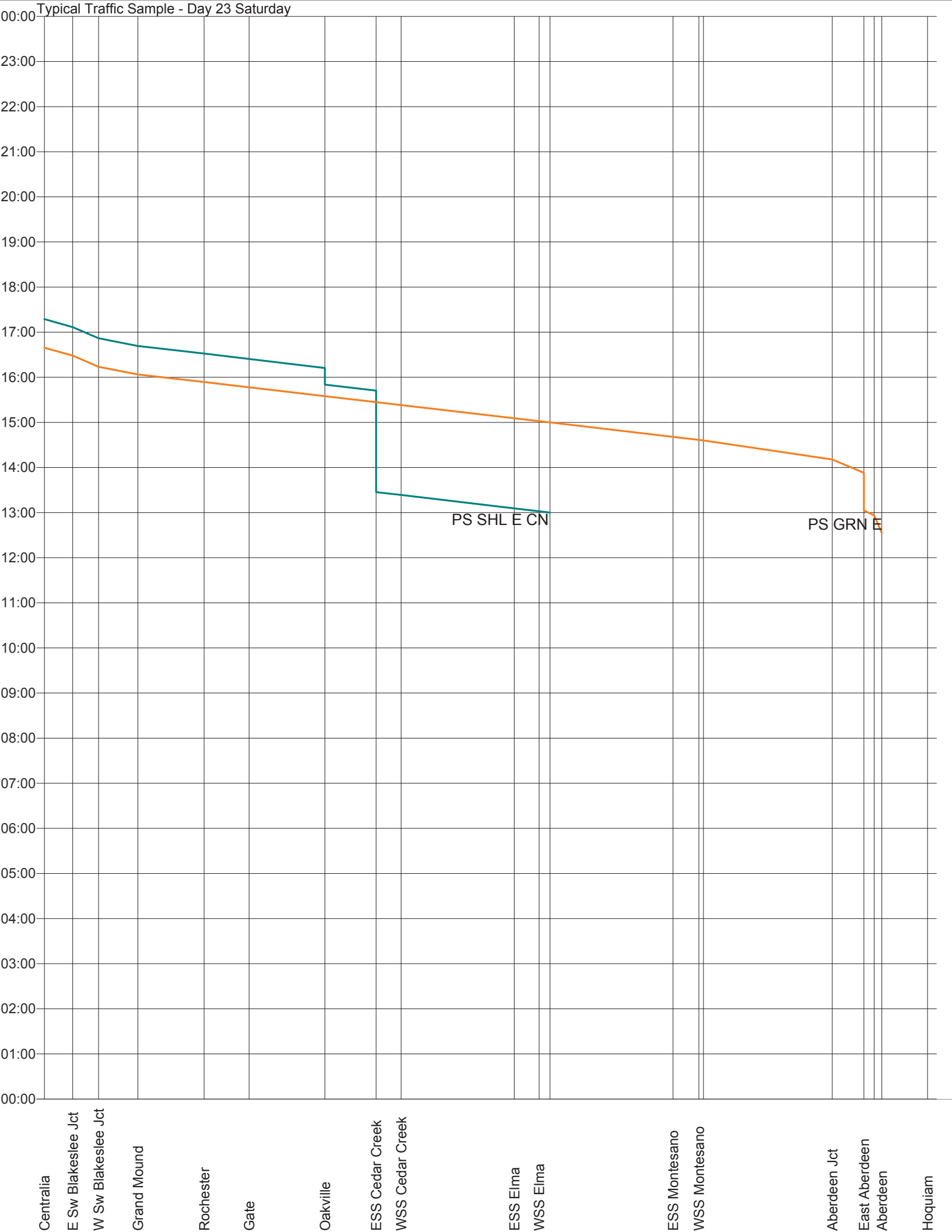
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 23 Saturday
00:00
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Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
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ESS Montesano
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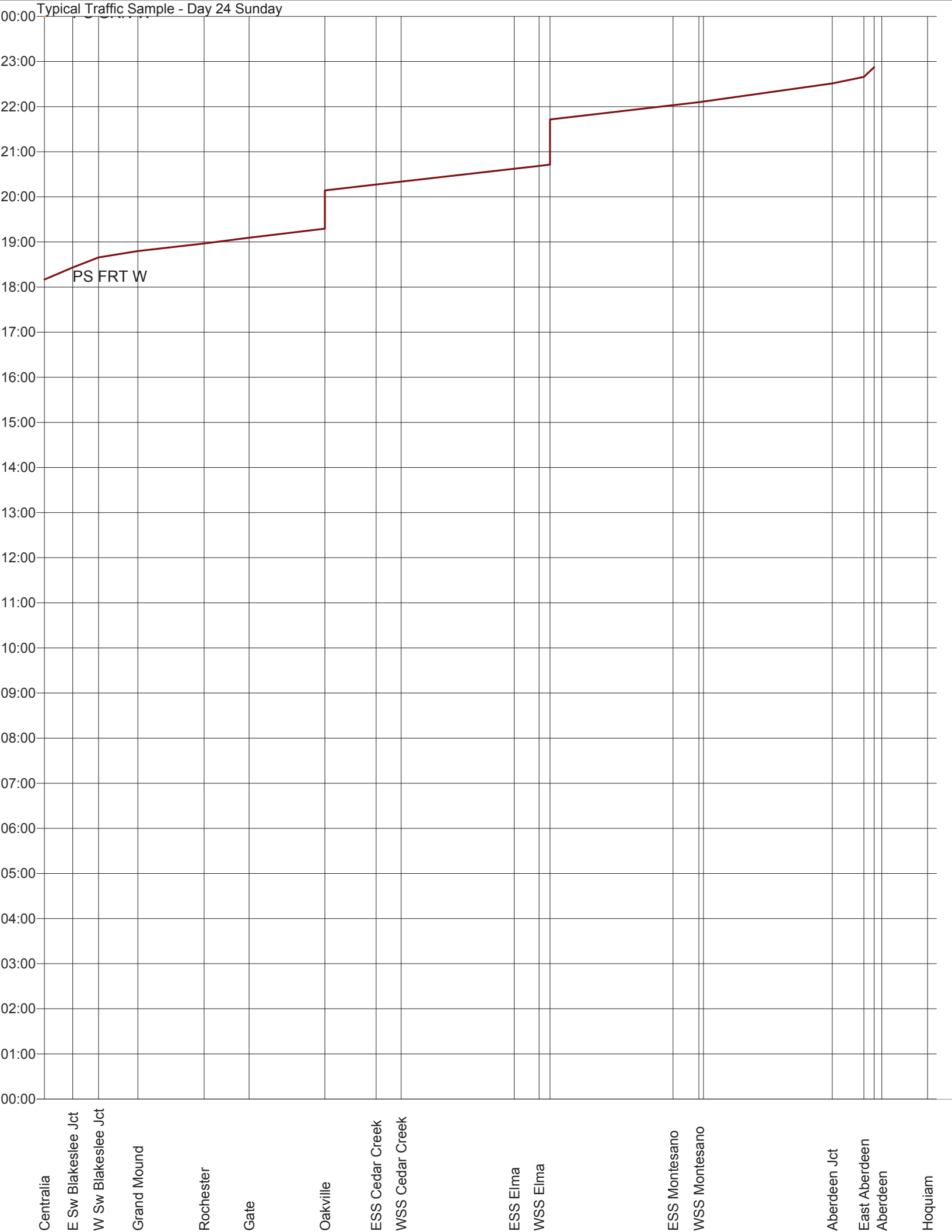
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 24 Sunday
00:00
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Centralia
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Grand Mound
Rochester
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Oakville
ESS Cedar Creek
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ESS Montesano
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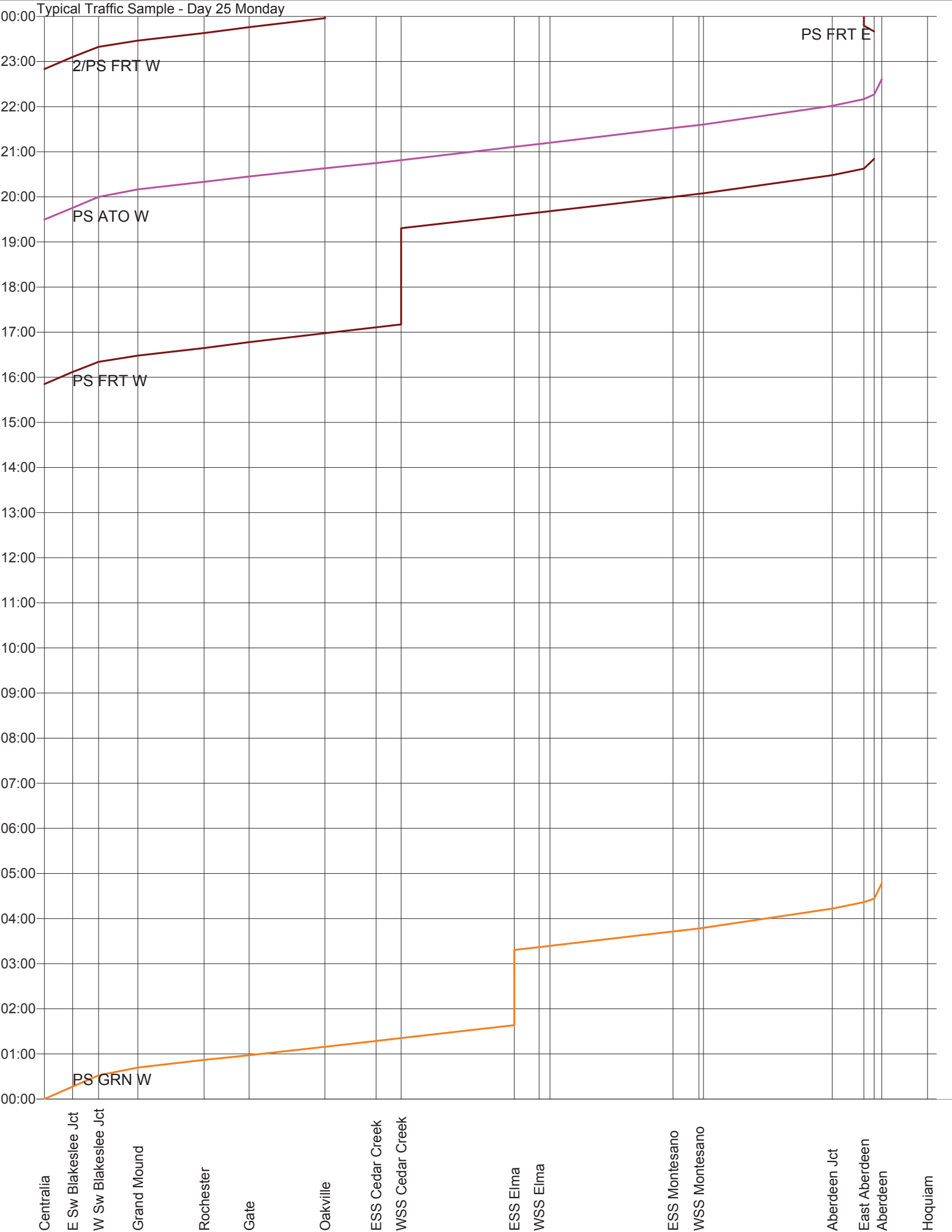
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 25 Monday
00:00
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Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
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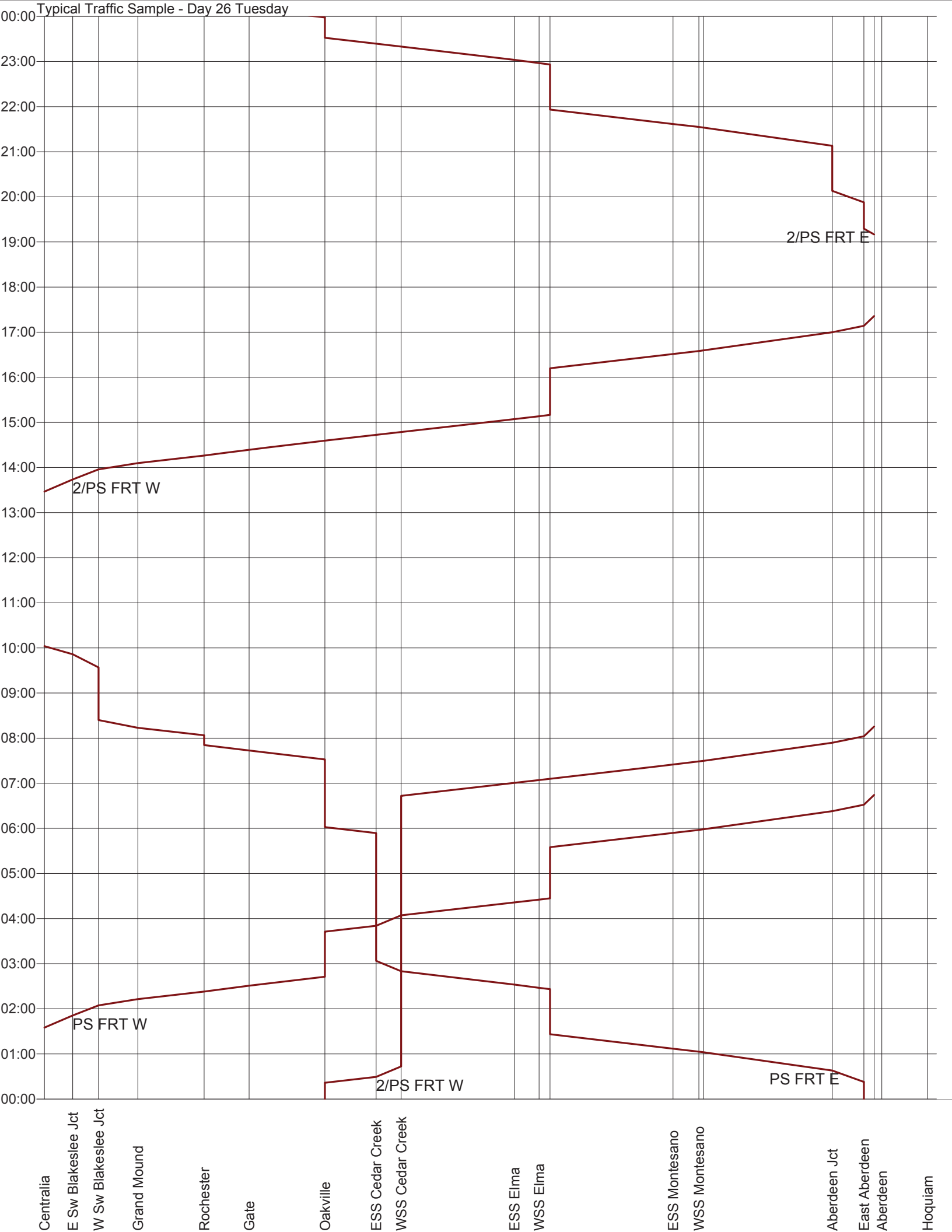
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 26 Tuesday
00:00
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Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
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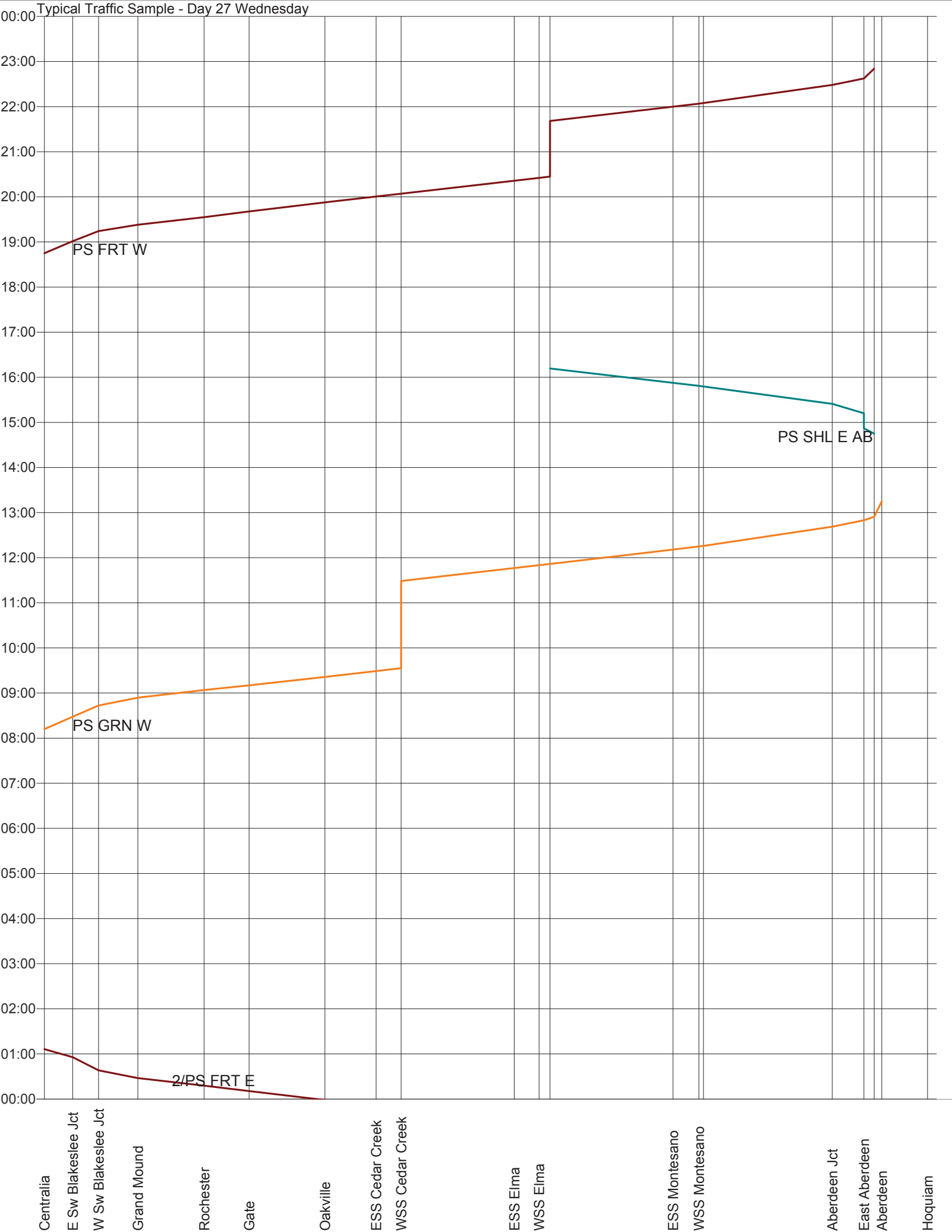
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 27 Wednesday
00:00
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PS FRT W
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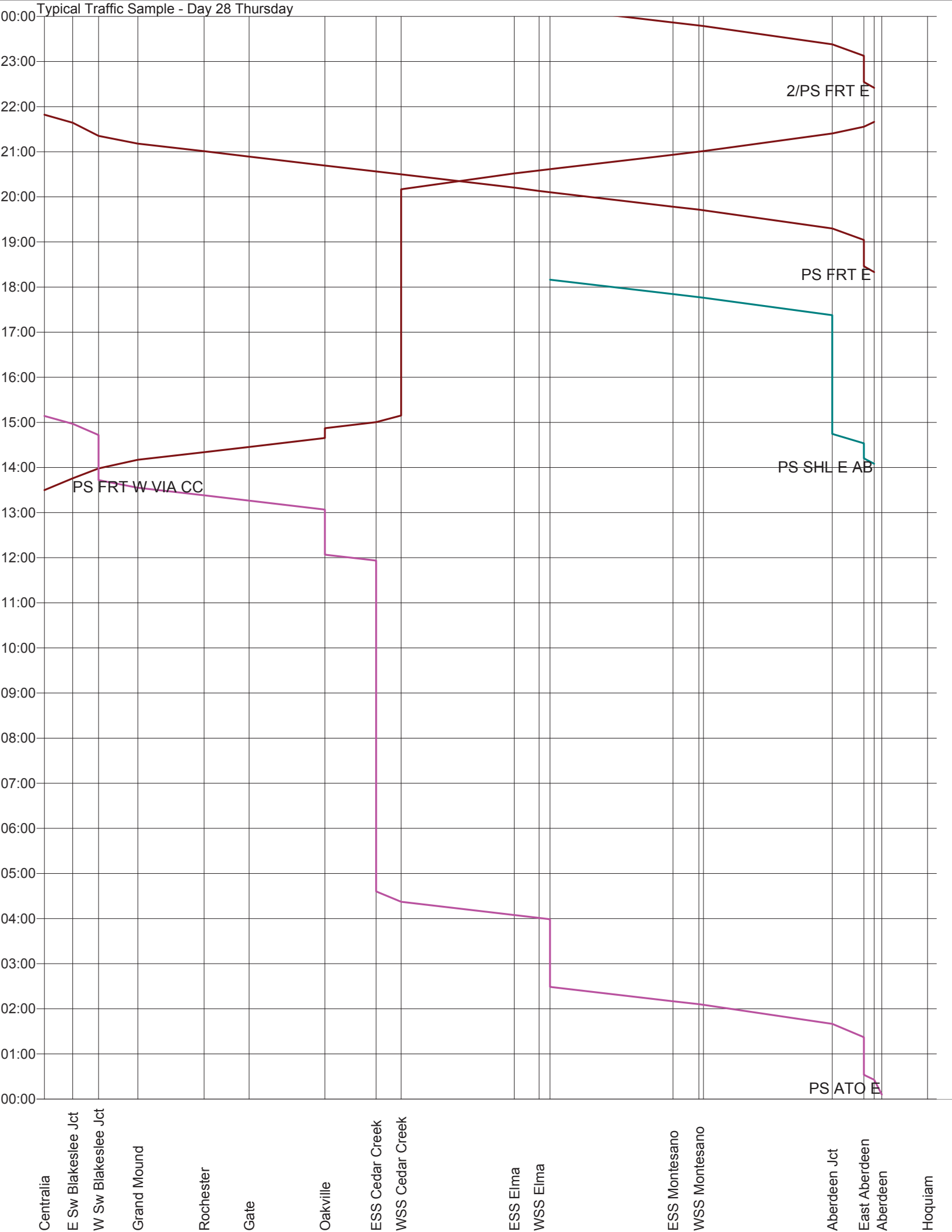
PS GRN W
2/PS FRT E
Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 28 Thursday
00:00
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PS ATO E
Centralia
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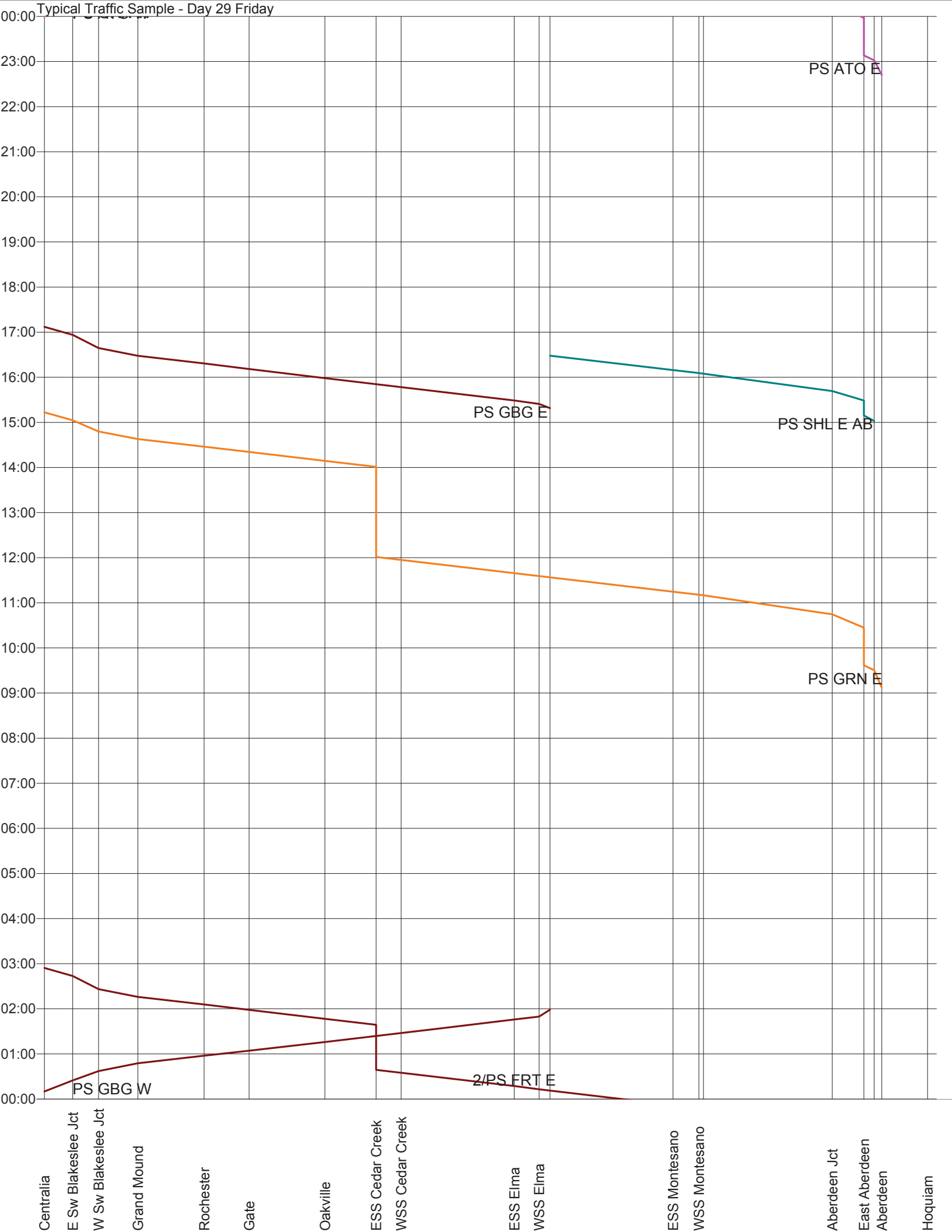
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 29 Friday
00:00
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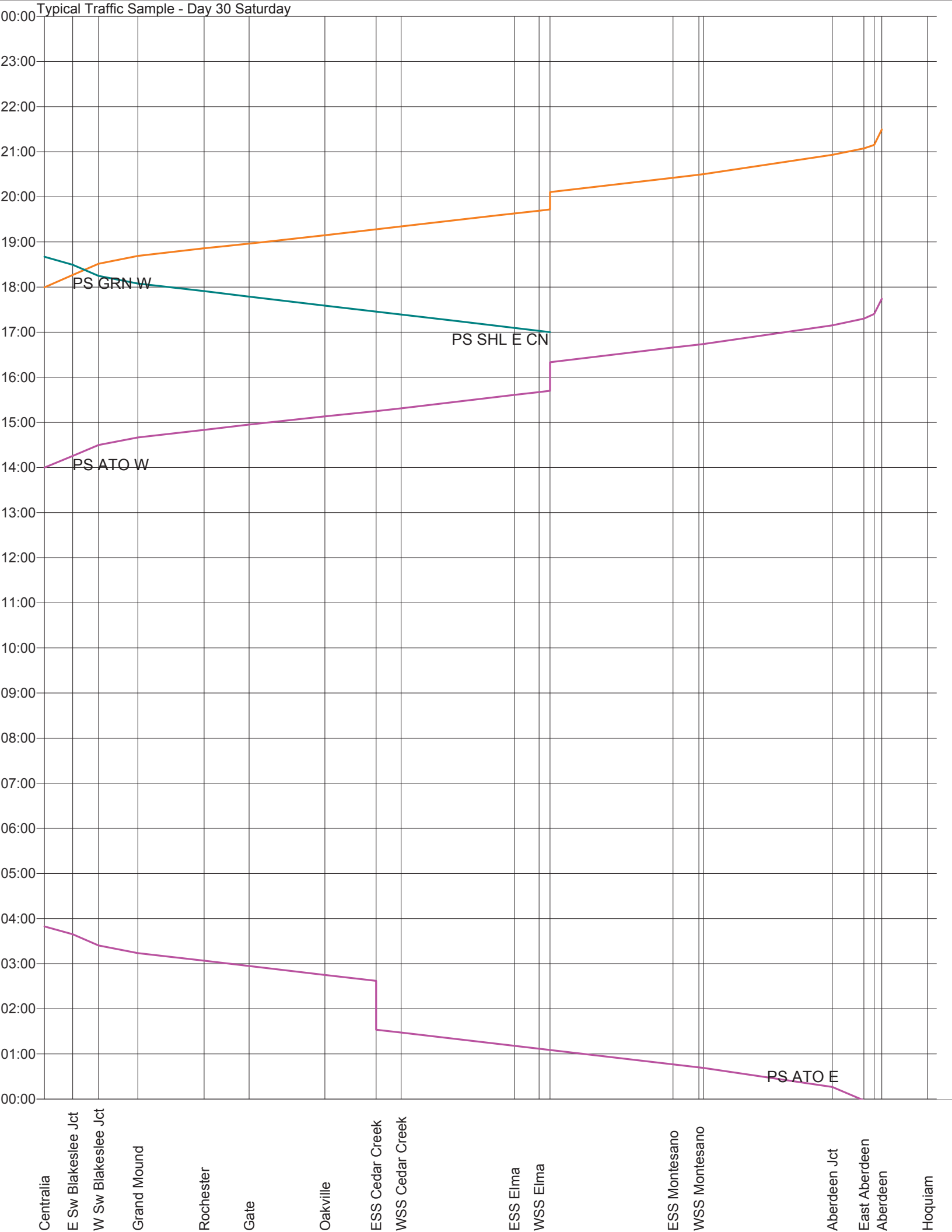
PS SHL E AB
PS GRN E
PS GBG W
2/PS FRT E
Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam


Typical Traffic Sample - Day 30 Saturday
00:00
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PS GRN W
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PS ATO W
PS ATO E
Centralia
E Sw Blakeslee Jct
W Sw Blakeslee Jct
Grand Mound
Rochester
Gate
Oakville
ESS Cedar Creek
WSS Cedar Creek
ESS Elma
WSS Elma
ESS Montesano
WSS Montesano
Aberdeen Jct
East Aberdeen
Aberdeen
Hoquiam

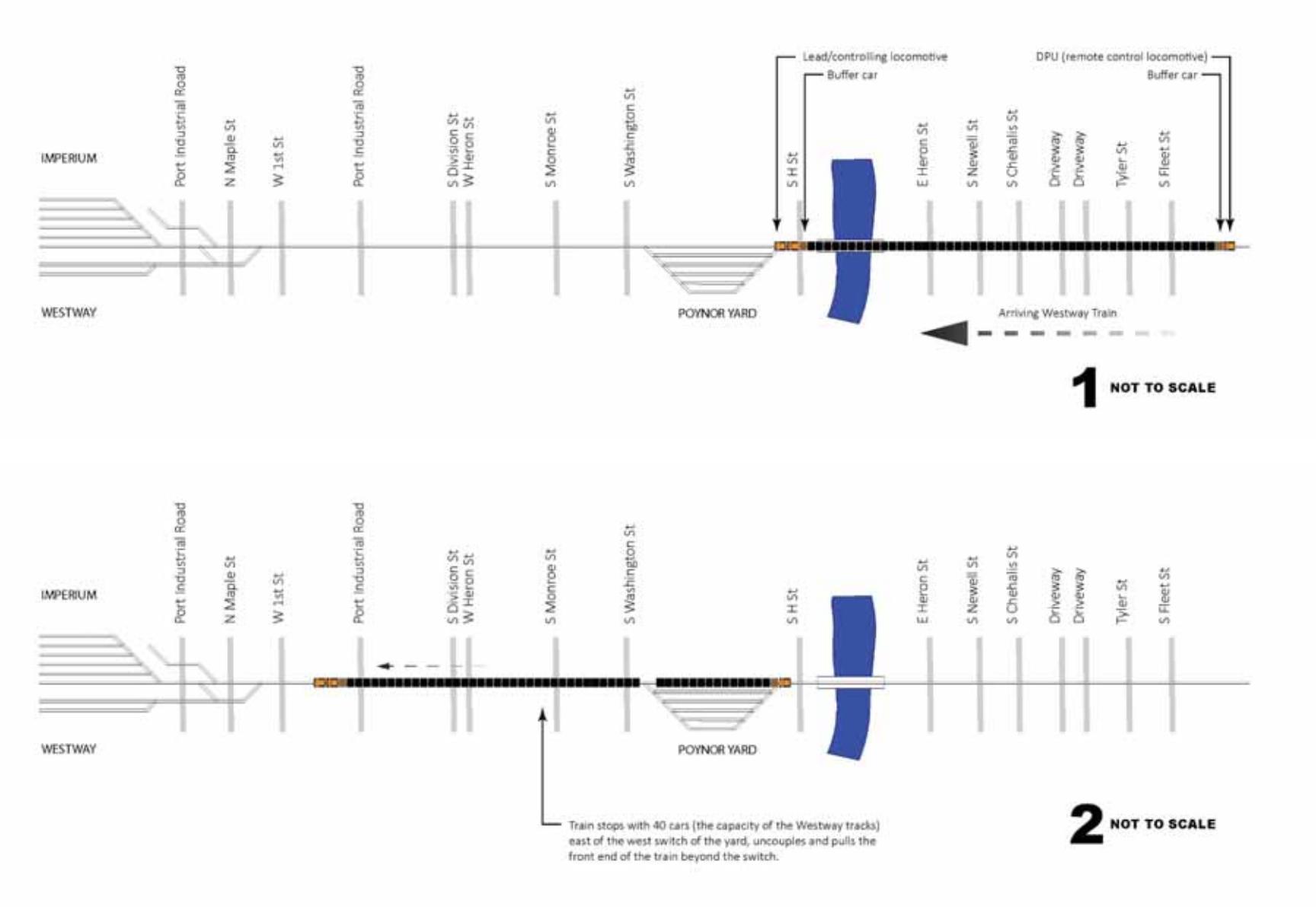
Train Name	Station Name	DEPT	Station Name	ARRV	Total Cars	Ld	Mty	Gross Weight (tons)	Total Length (feet)	HP	HP/T	Locos	Notes
CENT TURN-31	ABERDEEN	0045-1	ESSCC	224A	65	0	65	1950	3980	12000	3.1	4	TIE DOWN CEDAR CREEK
GRAIN	CENTRALIA	115A	ESSCC	419A	99	99	0	12500	6400	9000	1.5	3	TIE DOWN CEDAR CREEK
AUTO	ESSCC	422A	CENTRALIA	729A	65	0	65	1950	3980	12000	3.1	4	FROM CEDAR CREEK
CENT TURN-01	ABERDEEN	953A	ESSCC	1245	65	15	40	2865	3910	4000	1.3	2	TIE DOWN CEDAR CREEK
GRAIN	ABERDEEN	1230	CENTRALIA	2145-01	108	0	108	3215	6330	12000	3.3	3	2 CREWS
HARBOR TURN	ESSCC	1440	ABERDEEN	1630-01	99	99	0	12500	6400	9000	1.5	3	FROM CEDAR CREEK
EXTRA 02	ABERDEEN	510 A	ESSCC	0713 AM	71	0	71	2130	3500	3000	1.5	1	TIE DOWN CEDAR CREEK
SHELTON-TURN-02	ABERDEEN	1550	CENTRALIA	2310	87	64	23	8100	5450	12000	1.5	4	
EXTRA-03	ABERDEEN	751A	ELMA	1000	60	0	60	1800	3600	12000	6.2	3	
GRAIN-03	ABERDEEN	1553	CENTRALIA	1505	99	0	99	2670	6870	12000	4.2	3	
MANIFEST-03	CENTRALIA	953A	ESSCC	1215	65	50	15	5900	3950	8000	1.3	2	
CENT TURN-03	ESSCC	1646	ABERDEEN	1955	67	52	16	6323	4050	12000	1.5	4	FROM CEDAR CREEK
CENT TURN-03	ABERDEEN	2230	CENTRALIA	203-04	60	0	60	1800	3600	6000	3.1	2	
EXTRA -04	CENTRALIA	1210	ABERDEEN	1515	0	0	0	0	0	0	0	2	LITE POWER
GRAIN -04	CENTRALIA	1904	ABERDEEN	2245	100	100	0	13000	6500	12000	1	3	
CENT TURN -04	CENTRALIA	1556	ABERDEEN	2030	60	60	0	6000	3600	6000	1	2	
EXTRA -04	CENTRALIA	0101-05	ABERDEEN	0435-05	66	38	28	5100	4310	6000	1.2	2	
BANGOR TURN-05	ELMA	0920-05	CENTRALIA	1550	75	75	0	8200	4450	16000	4	4	2 CREWS
CENT TURN -05	CENTRALIA	1028	ESSCC	1218	95	95	0	12320	6654	12000	1	3	TIE DOWN CEDAR CREEK
EXTRA -05	ESSCC	2019	ABERDEEN	2247	95	95	0	12320	6654	12000	1	3	FROM CEDAR CREEK
SHELTON-TURN-05	ABERDEEN	1414	ELMA	1558	38	26	12	3200	2400	12000	4.1	4	
GRAIN -5	ABERDEEN	1734	CENTRALIA	2230	109	0	109	3310	6450	12000	4.2	4	
CENT TURN -05	CENTRALIA	1615	ABERDEEN	0120-06	72	45	27	5810	4210	8000	1.4	2	
AUTO-06	ABERDEEN	0520A	CENTRALIA	0835A	64	0	64	1930	3640	12000	6	4	
SHELTON-TURN-06	ELMA	1330	CENTRALIA	1545	94	46	48	7200	6100	12000	1.6	4	
CENT TURN -06	ABERDEEN	1815	ESSCC	2026	100	0	100	3000	6200	9000	3	3	TIE DOWN CEDAR CREEK
CENT TURN -7	CENTRALIA	2049	ABERDEEN	0614A	76	39	37	6450	4650	18000	4.1	6	
CENT TURN -7	ESSCC	0207-08	CENTRALIA	331	100	0	100	3000	6200	9000	3	3	FROM CEDAR CREEK
MANIFEST-07	ABERDEEN	900AM	CENTRALIA	1250	41	38	3	4200	2670	9000	3.3	3	
EXTRA -07	CENTRALIA	1405	ABERDEEN	1750	75	75	0	7500	5200	8000	1.1	2	
CENT TURN -08	ABERDEEN	0050A	CENTRALIA	758A	68	0	68	1940	4850	8000	4	2	
EXTRA -08	ABERDEEN	1240	CENTRALIA	1710	95	0	95	2750	6000	9000	3.3	3	
SHELTON TURN	ELMA	1415	ABERDEEN	1600	26	10	16	1450	1510	8000	3.5	4	
GARBAGE-09	CENTRALIA	1257	ESSCC	1710	48	0	48	1460	3123	9000	5.8	3	
GRAIN-09	CENTRALIA	1820	ABERDEEN	2145	102	102	0	12800	6450	12000	1	3	
GRAIN-10	CENTRALIA	100AM	ABERDEEN	1230	108	108	0	13400	6750	12000	0.9	3	2 CREWS
CENT -TURN 10	CENTRALIA	1900	ABERDEEN	2230	82	72	10	9432	6345	12000	1.3	3	
EXTRA -11	ESSCC	2230	ABERDEEN	0005-12	25	18	7	2815	1850	8000	3.3	4	FROM CEDAR CREEK
GARBAGE-11	WSSCC	0240A	ELMA	0338A	48	0	48	1510	3200	9000	6	3	
MANIFEST -11	ABERDEEN	1132	ESSCC	1410	87	41	46	6410	4810	9000	2	3	TIE DOWN CEDAR CREEK
CENT TURN-11	ESSCC	2032	CENTRALIA	2236	60	60	0	2215	3610	9000	1.2	3	FROM CEDAR CREEK
CENT TURN-12	ABERDEEN	0030A	CENTRALIA	646AM	94	0	95	2790	6400	9000	2.6	3	
AUTO-12	ABERDEEN	231A	CENTRALIA	0819AM	65	0	65	1945	3960	8000	4	2	
MANIFEST -12	ESSCC	0821A	ABERDEEN	1142	87	41	46	6450	5280	9000	1.3	3	
CENT TURN-12	CENTRALIA	1605	ABERDEEN	2000	58	58	0	5800	3670	6000	1	2	

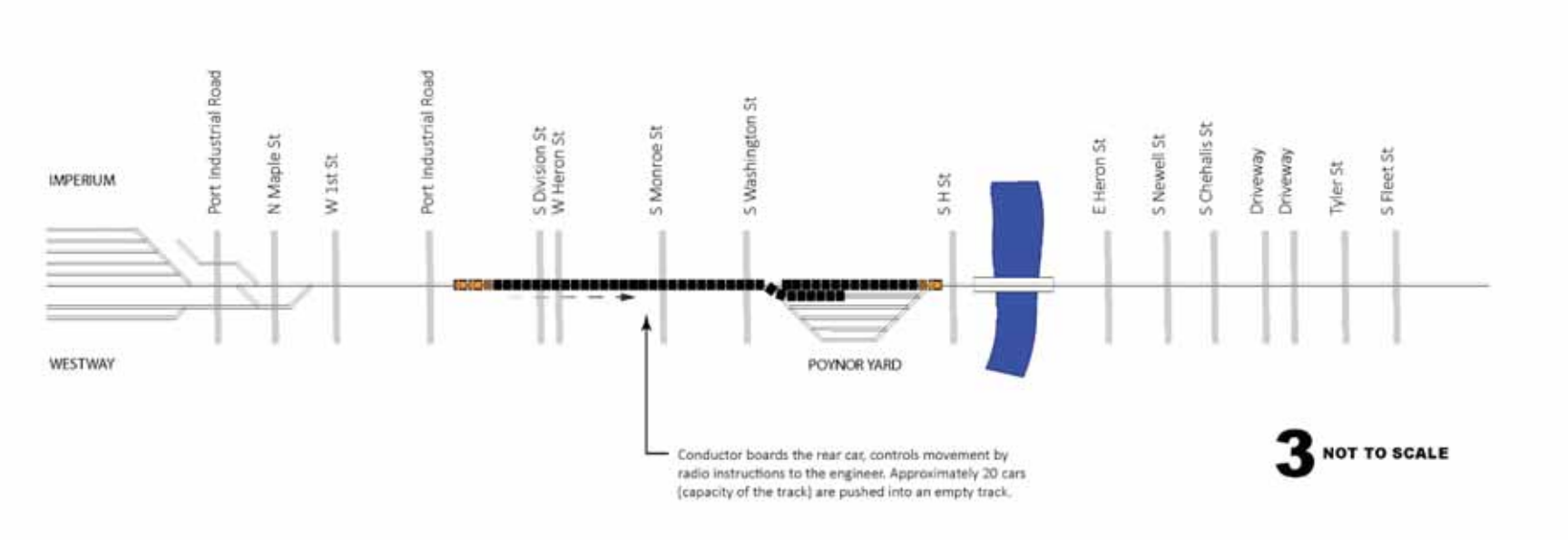
CENT TURN -13	CENTRALIA	130	ABERDEEN	615	51	23	28	3850	3210	6000	1.5	3	
SHELTON TURN -13	ABERDEEN	1230	ELMA	1450	43	9	34	1830	2810	8000	4.2	4	
GRAIN -13	ABERDEEN	1532	CENTRALIA	2030	111	0	1111	3330	6660	9000	3	3	
CENT TURN -13	CENTRALIA	1710	ABERDEEN	2130	88	56	32	7800	5400	8000	1	2	
AUTO -13	CENTRALIA	2136	ESSCC	2305	32	32	0	3600	2150	9000	2.6	3	TIE DOWN CEDAR CREEK
CENT TURN -13	ABERDEEN	2330PM	CENTRALIA	0220AM	50	20	30	3500	3240	6000	1.5	2	
SHELTON TURN -14	ELMA	750AM	ABERDEEN	900	25	21	4	2450	2610	6000	2.2	3	
SHELTON TURN -14	ABERDEEN	1425	ELMA	1551	14	4	10	1850	900	8000	4.4	4	
CENT TURN	ESSCC	1900	ABERDEEN	2051	48	35	13	4200	3100	8000	2	4	
CENT TURN -14/15	ABERDEEN	0045 -15	CENTRALIA	645	80	58	22	7400	5600	8000	1.1	3	2 CREWS
AUTO-15	ABERDEEN	200AM	CENTRALIA	0830A	80	0	80	2400	6300	9000	3.3	3	2 CREWS
GRAIN	CENTRALIA	323A	ABERDEEN	1452	101	101	0	13500	6410	12000	0.9	3	2 CREWS
EXTRA 15	CENTRALIA	1125	ESSCC	1300	60	0	60	1800	3600	9000	3.7	3	
GRAIN -16	ABERDEEN	1326	CENTRALIA	1515	108	0	107	3330	6660	9000	2.8	3	
SHELTON TURN	ESSCC	1520	CENTRALIA	1715	76	75	1	7800	4900	9000	1.2	3	FROM CEDAR CREEK
CENT TRN 17	CENTRALIA	1810	ABERDEEN	2247	90	59	31	7100	6300	8000	1	2	
CENT TRN 18	ABERDEEN	2250	ESSCC	0030AM	9	3	6	510	540	8000	16	4	TIE DOWN CEDAR CREEK
GRAIN -18	CENTRALIA	0843A	ABERDEEN	1315	97	97	0	9800	6250	12000	1.2	3	
CENT TRN 18	CENTRALIA	1551	ABERDEEN	2045	49	20	29	4100	3450	6000	1.5	2	
AUTO -18	CENTRALIA	1930	ESSCC	2321	73	73	0	7300	4900	8000	1.1	2	
CENT TRN 18/19	ABERDEEN	0015-19	CENTRALIA	956	42	36	6	4100	3450	6000	1.5	2	2 CREWS
CENT TURN 19	CENTRALIA	135 AM	ABERDEEN	533	70	0	70	2100	4600	8000	4	2	
EXTRA -19	CENTRALIA	1328	ABERDEEN	1710	86	74	12	8100	4950	8000	1	2	
CENT TURN 19	ABERDEEN	1945	CENTRALIA	0100 am	18	0	18	640	1400	6000	10	2	
GRAIN -20	CENTRALIA	812	ABERDEEN	1300	109	109	0	13000	6700	12000	0.9	3	
SHELTON TURN 20	ABERDEEN	1505	ELMA	1615	47	7	40	2100	3400	8000	4	4	
CENT TURN -20	CENTRALIA	1845	ABERDEEN	2245	105	91	14	10400	6700	12000	1.2	4	
AUTO -21	ABERDEEN	0009AM	CENTRALIA	258A	65	0	65	1940	4200	8000	4	2	
MANIFEST 21	CENTRALIA	1330	ESSCC	1500	38	13	25	2210	2400	4000	2	2	
SHELTON TURN	ABERDEEN	1425	ELMA	1810	22	19	2	2100	1240	8000	4	4	WORK
CENT TURN -21	ABERDEEN	1855	CENTRALIA	2135	96	0	96	2850	6300	9000	3.2	3	
CENT TURN -21	WSSCC	2010	ABERDEEN	2115	38	13	25	2210	2400	4000	2	2	
CENT TURN -21/22	ABERDEEN	2300-21	CENTRALIA	1358	36	33	3	3600	2150	6000	1.6	2	2 CREWS
GARBAGE -22	CENTRALIA	0010A	ESSCC	0150AM	78	78	78	8400	4800	9000	1	3	TIE DOWN CEDAR CREEK
GRAIN-22	ABERDEEN	1000	CENTRALIA	1453	96	0	96	3210	6100	9000	3	3	
GARBAGE -22 R/C	WSSCC	1430	CENTRALIA	1700	78	78	78	8400	4800	9000	1	3	FROM CEDAR CREEK
SHELTO TURN-22	ABERDEEN	1522	ELMA	1620	29	14	15	2810	2100	6000	2.2	3	
AUTO-22	ABERDEEN	2245	CENTRALIA	0232A	70	0	70	2100	4300	8000	4	2	
AUTO-23	CENTRALIA	1400	ABERDEEN	1723	42	42	0	4200	2850	8000	2	2	
SHELTO TURN-23	ELMA	1700	CENTRALIA	1820	19	7	12	1040	1450	10000	10	5	
GRAIN-23	CENTRALIA	1800	ABERDEEN	2115	109	109	0	13900	6800	12000	0.9	3	
CENT TURN-24	CENTRALIA	710AM	WSSCC	910A	49	49	0	4900	3500	8000	1.5	2	TIE DOWN CEDAR CREEK
CENT TURN-24	CENTRALIA	1815	ABERDEEN	2147	87	58	29	7456	5230	8000	1	2	
CENT TURN-24	ABERDEEN	2315	CENTRALIA	120AM	29	9	20	1540	2100	8000	4	4	
GRAIN -25	ABERDEEN	830	CENTRALIA	1230	109	0	109	3300	6543	12000	3.8	4	
CENT TURN-25	CENTRALIA	1730	ABERDEEN	2050	48	37	11	4600	2850	8000	1.6	2	
SHELTO TURN-25	CENTRALIA	1249	ELMA	1418	40	8	32	1900	2650	8000	4.2	4	
GRAIN -25	WSSCC	1500	ABERDEEN	1828	49	0	4900	4900	3500	8000	1.5	2	
GRAIN -26	CENTRALIA	2232	ABERDEEN	0341-27	97	97	0	12500	6300	12000	1	3	

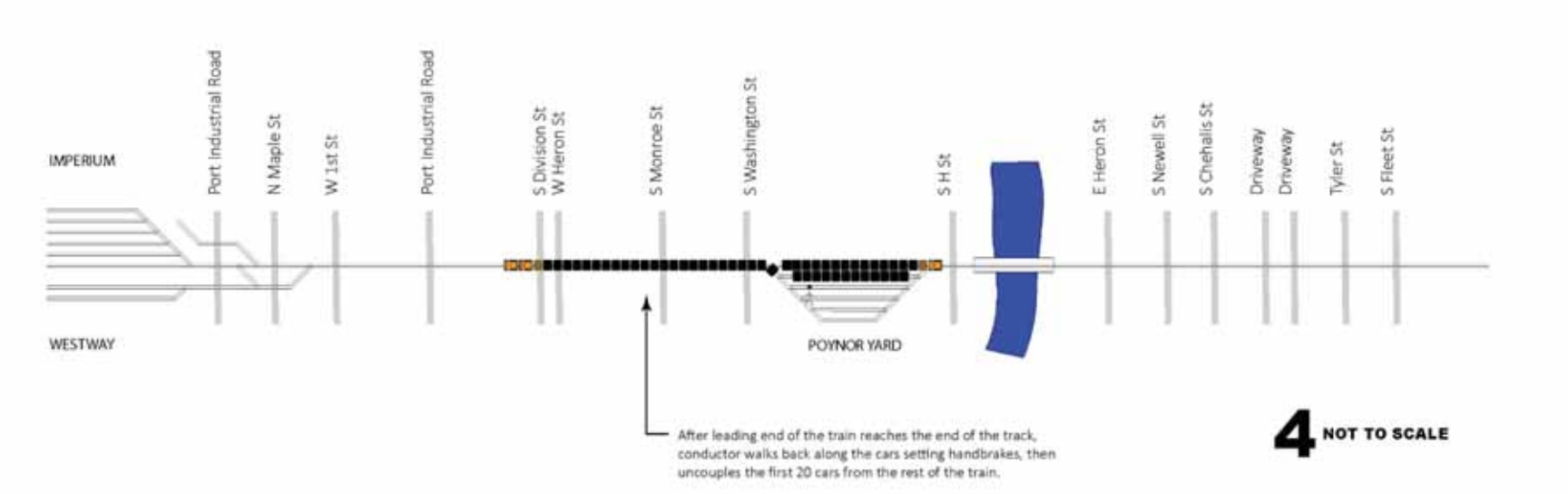
AUTO -26	ABERDEEN	2320	CENTRALIA	0205AM	70	0	70	2100	4200	8000	4	2	
SHELTON TURN 26	ELMA	1300	ABERDEEN	1415	24	18	6	2400	1800	8000	3.3	3	
GRAIN -26---2ND	CENTRALIA	1613	ABERDEEN	1945	110	110	0	14500	7200	1200	0.8	3	
CENT TURN-26	CENTRALIA	1645	ABERDEEN	2154	56	28	27	4100	3850	4000	1	2	
CENT TURN-26	ABERDEEN	2330	CENTRALIA	220	31	13	18	2100	2200	4000	2	2	
SHELTON TURN 27	ABERDEEN	1201	ELMA	1315	25	2	23	850	1510	8000	9	4	
GRAIN-27	ABERDEEN	1250	CENTRALIA	1620	97	0	97	3100	6600	12000	4	3	
AUTO -27	CENTRALIA	1300	ABERDEEN	0030AM	64	64	0	6700	4200	8000	1.3	2	2 CREWS
AUTO -27	ABERDEEN	1832	CENTRALIA	2350	68	0	68	2100	4200	12000	6	4	
AUTO -28	CENTRALIA	0636A	WSSCC	828	69	69	0	7100	4870	8000	1.1	2	TIE DOWN CEDAR CREEK
AUTO -29	ESSCC	2340PM	ABERDEEN	0100AM-30	69	69	0	7100	4870	8000	1.1	2	FROM CEDAR CREEK
GRAIN -29	CENTRALIA	2334	ABERDEEN	0215AM	100	100	0	13000	6300	16000	1.4	4	
GRAIN -29	ABERDEEN	1000	CENTRALIA	1500	107	0	107	3300	6600	12000	3.3	4	
SHELTON TURN 29	CENTRALIA	1115	ESSCC	1304	69	3	66	2600	4358	6000	2.4	3	TIE DOWN CEDAR CREEK
EXTRA 29	ABERDEEN	2100	CENTRALIA	2330	70	0	70	2100	4200	9000	4.5	3	
ELMA X 30	CENTRALIA	1836	ESSCC	2005	66	66	0	6000	4100	12000	2	4	TIE DOWN CEDAR CREEK
GRAIN -30	CENTRALIA	1947	ABERDEEN	0300 -01	106	106	0	13600	6800	12000	0.9	3	

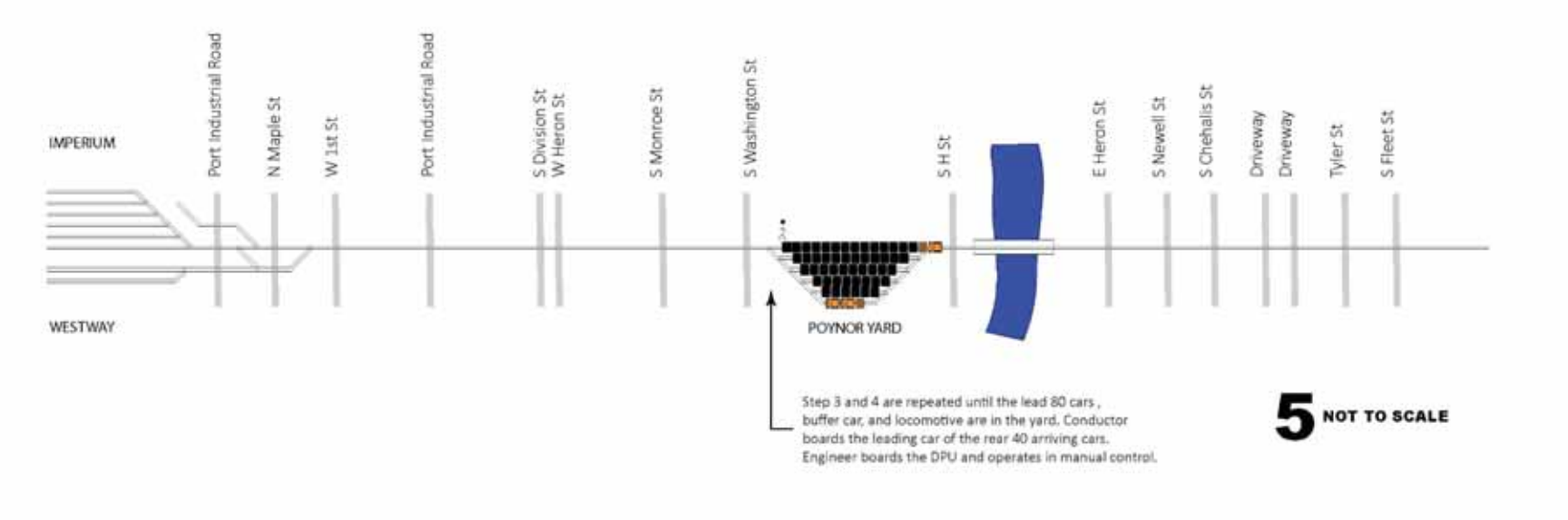
Section K.3

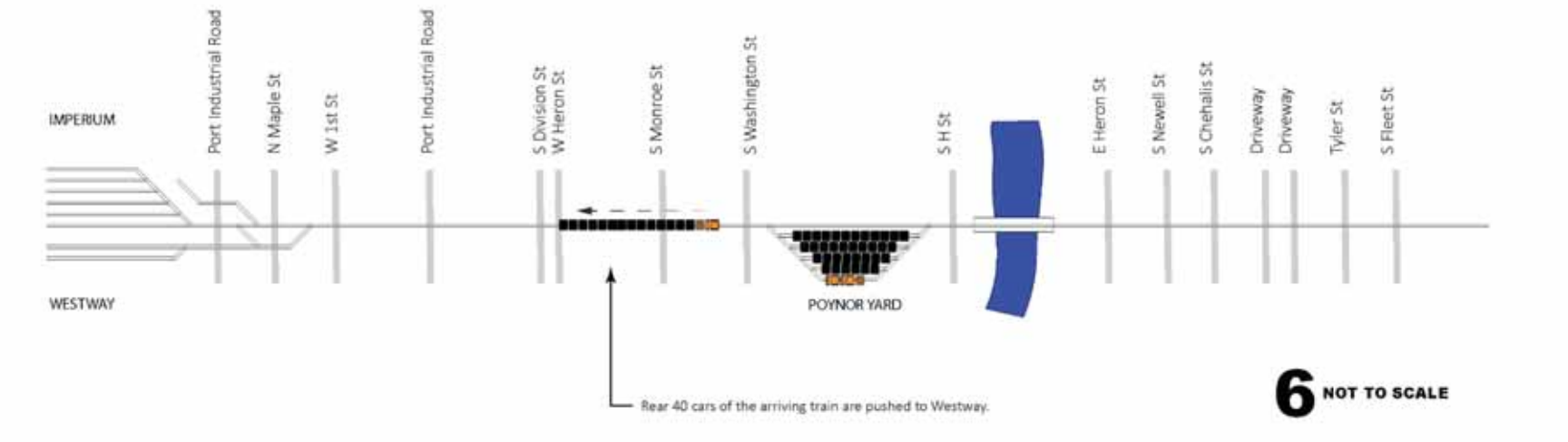
Proposed Switching Operations

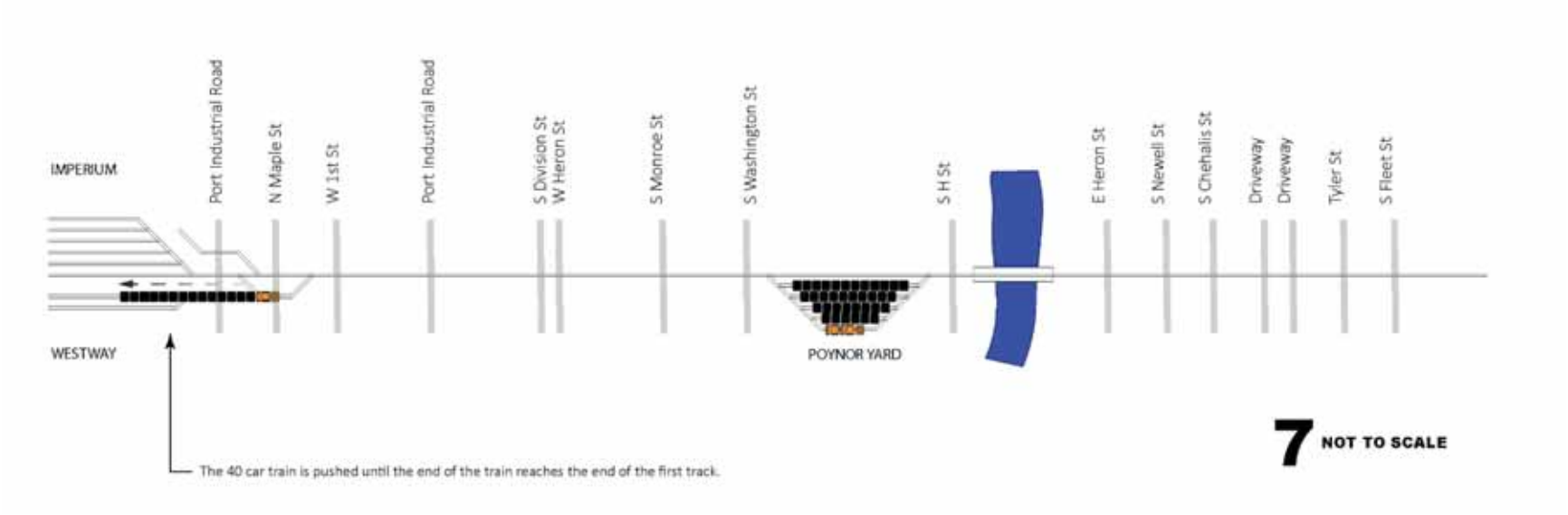

Lead/controlling locomotive
Buffer car
DPU (remote control locomotive)
Buffer car
IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Arriving Westway Train
1 NOT TO SCALE
IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Train stops with 40 cars (the capacity of the Westway tracks) east of the west switch of the yard, uncouples and pulls the front end of the train beyond the switch.
2 NOT TO SCALE

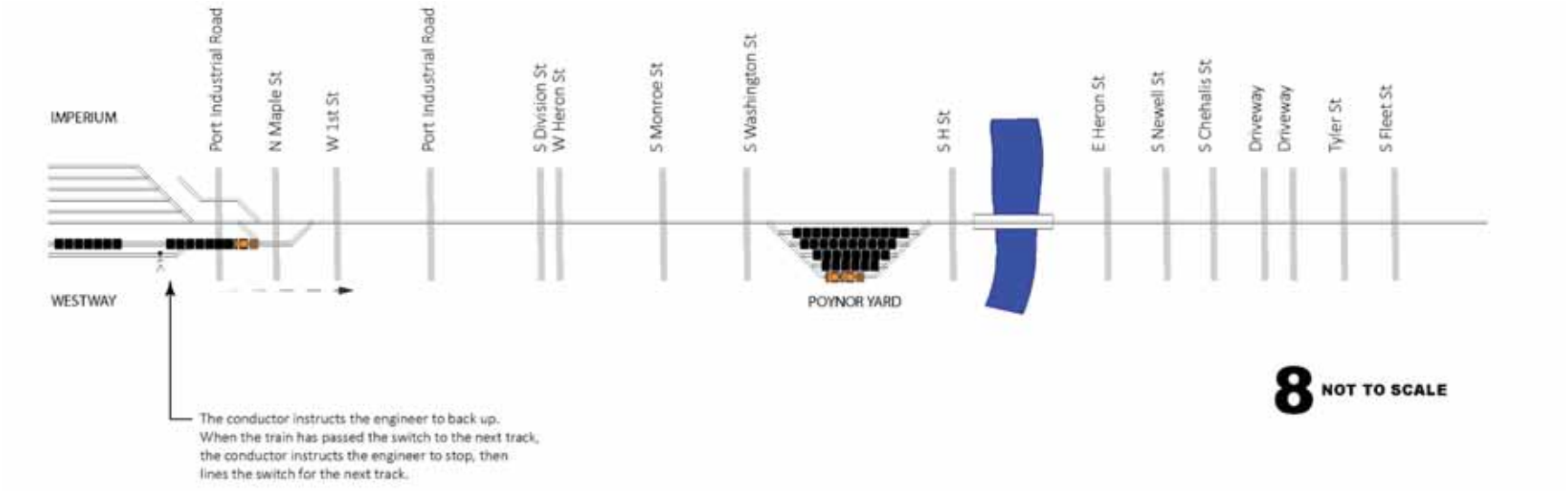

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Conductor boards the rear car, controls movement by radio instructions to the engineer. Approximately 20 cars (capacity of the track) are pushed into an empty track.
3 NOT TO SCALE

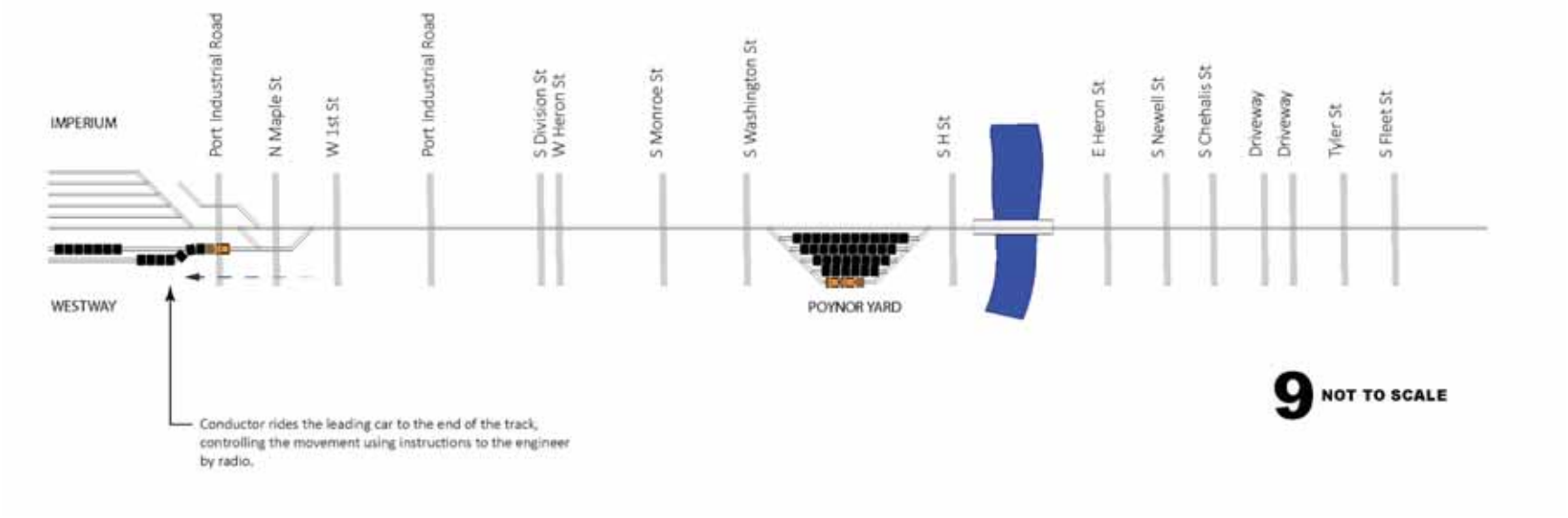

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
After leading end of the train reaches the end of the track, conductor walks back along the cars setting handbrakes, then uncouples the first 20 cars from the rest of the train.
4 NOT TO SCALE


IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Step 3 and 4 are repeated until the lead 80 cars , buffer car, and locomotive are in the yard. Conductor boards the leading car of the rear 40 arriving cars. Engineer boards the DPU and operates in manual control.
5 NOT TO SCALE

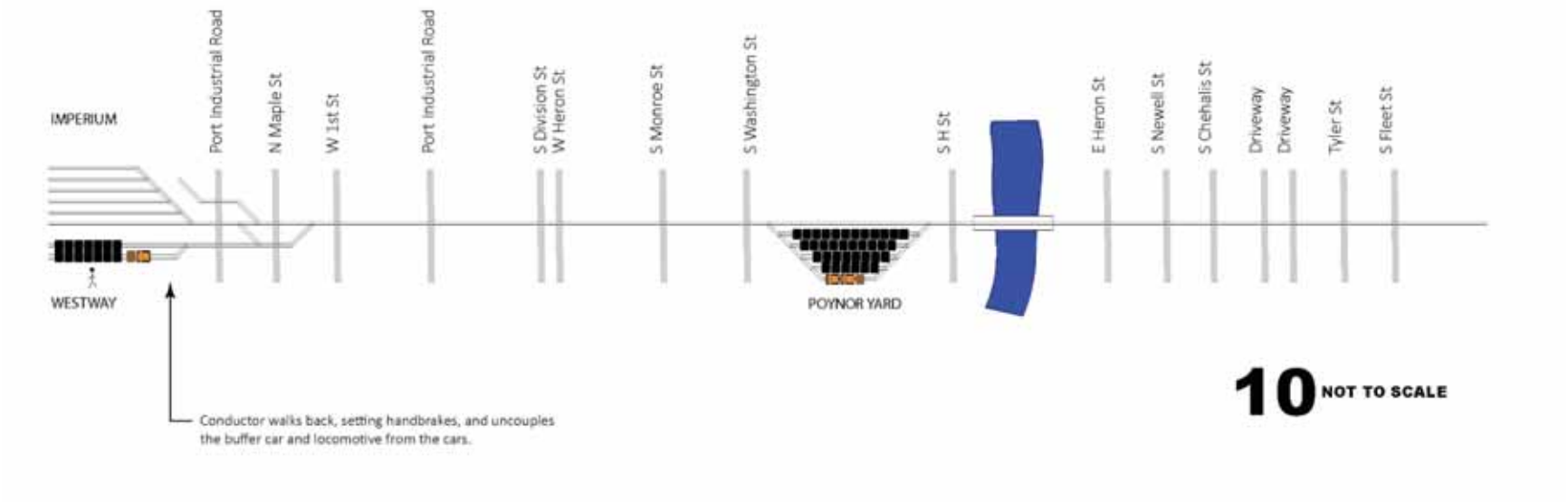

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Rear 40 cars of the arriving train are pushed to Westway.
6 NOT TO SCALE


IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
The 40 car train is pushed until the end of the train reaches the end of the first track.
7 NOT TO SCALE

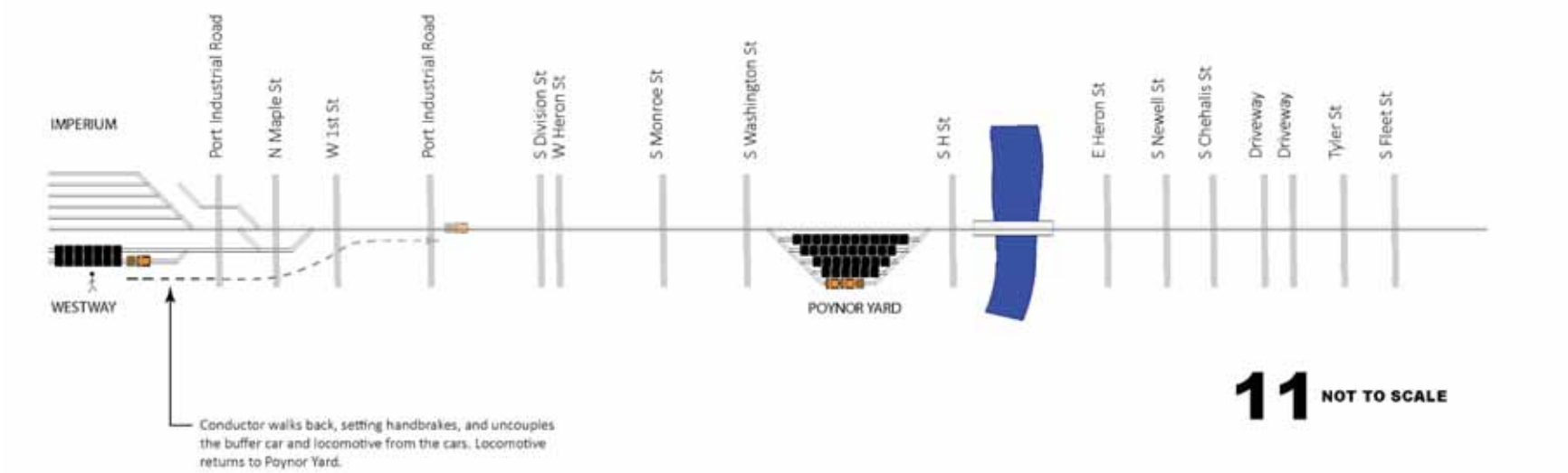

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
The conductor instructs the engineer to back up.
When the train has passed the switch to the next track,
the conductor instructs the engineer to stop, then
lines the switch for the next track.
8 NOT TO SCALE



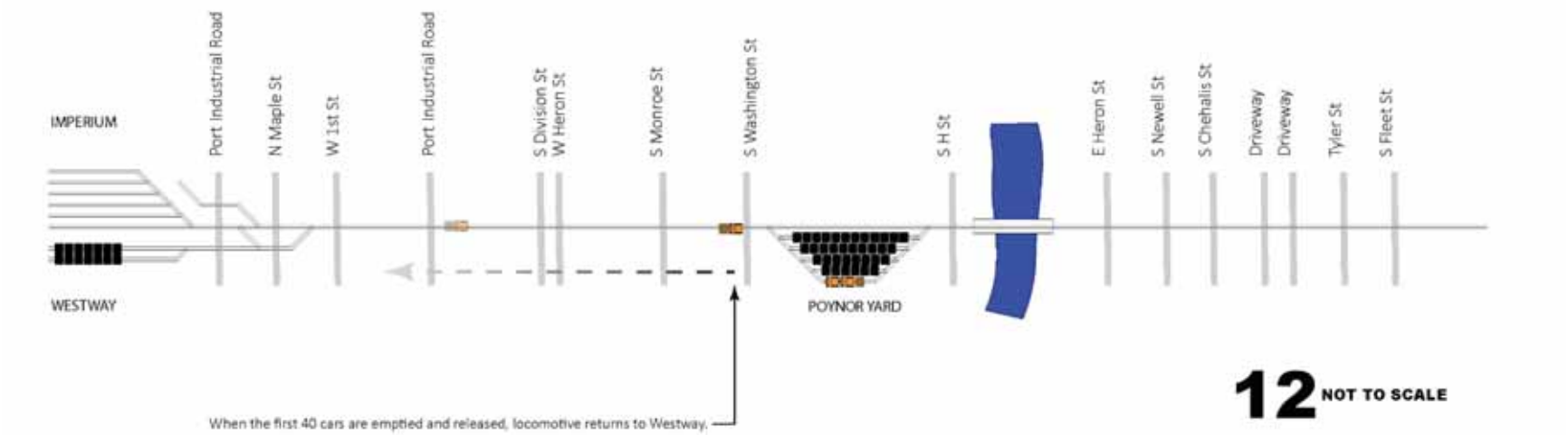
9 NOT TO SCALE



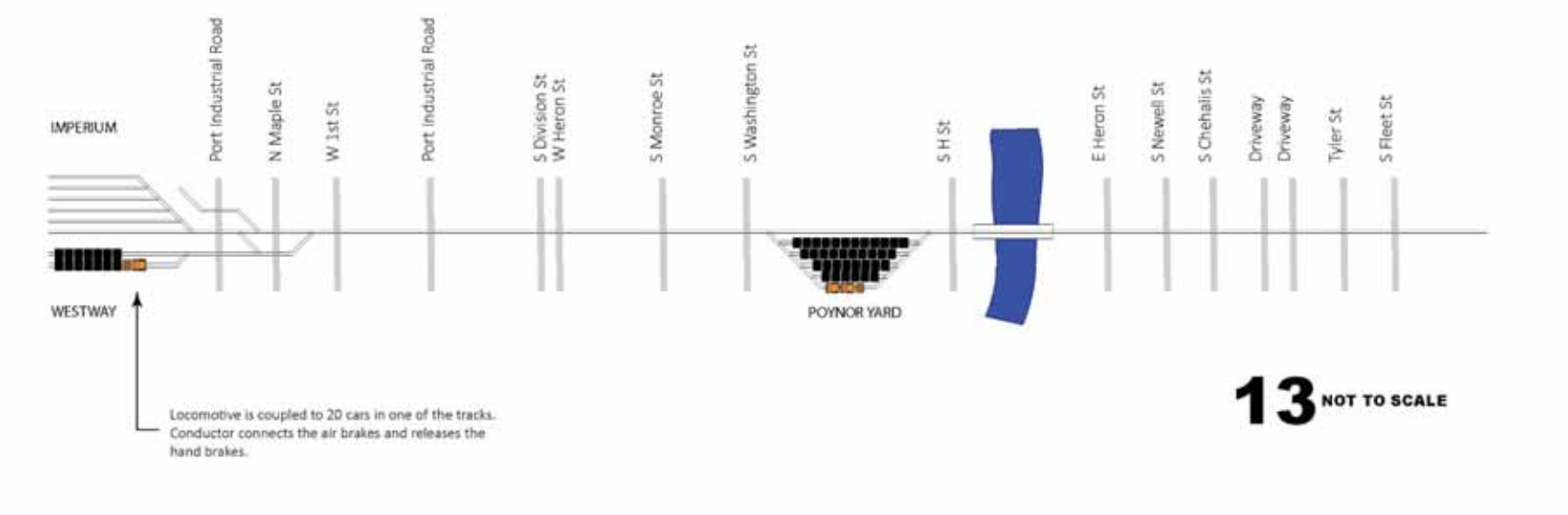
10 NOT TO SCALE

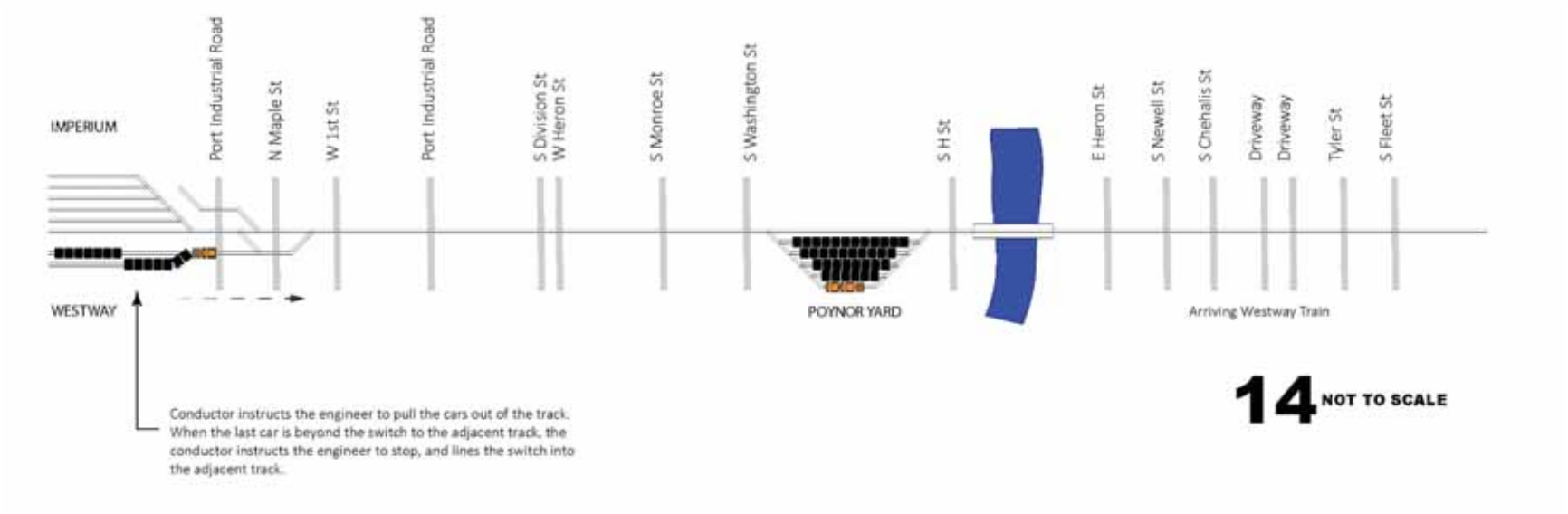


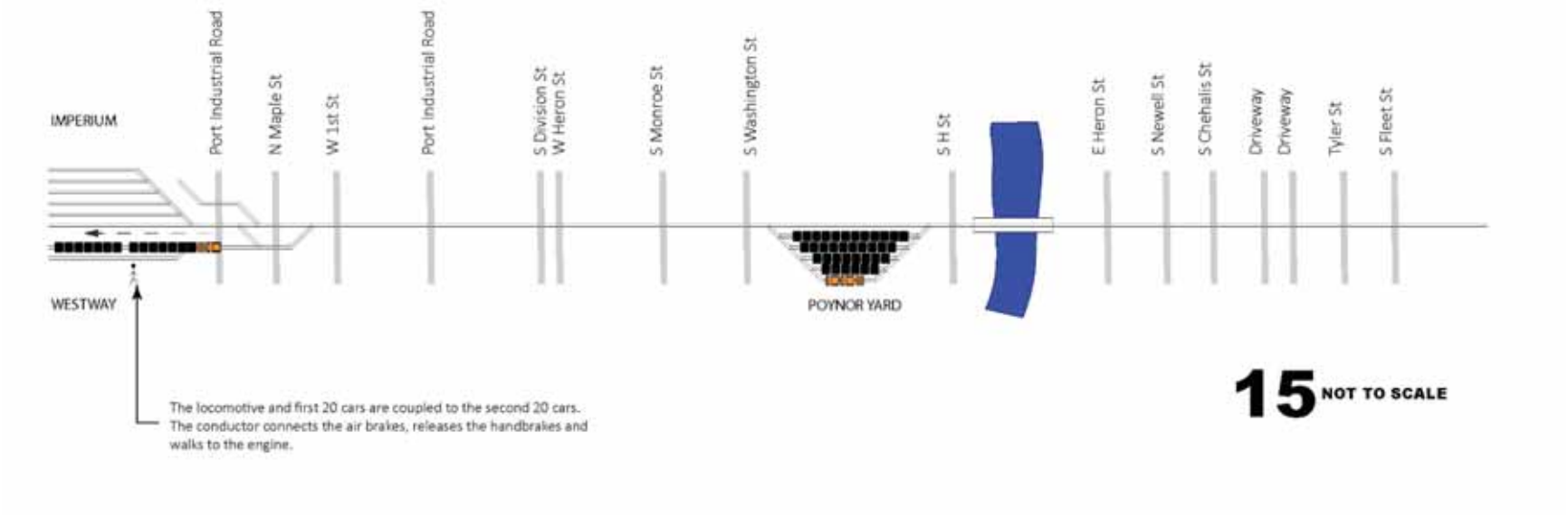
11 NOT TO SCALE

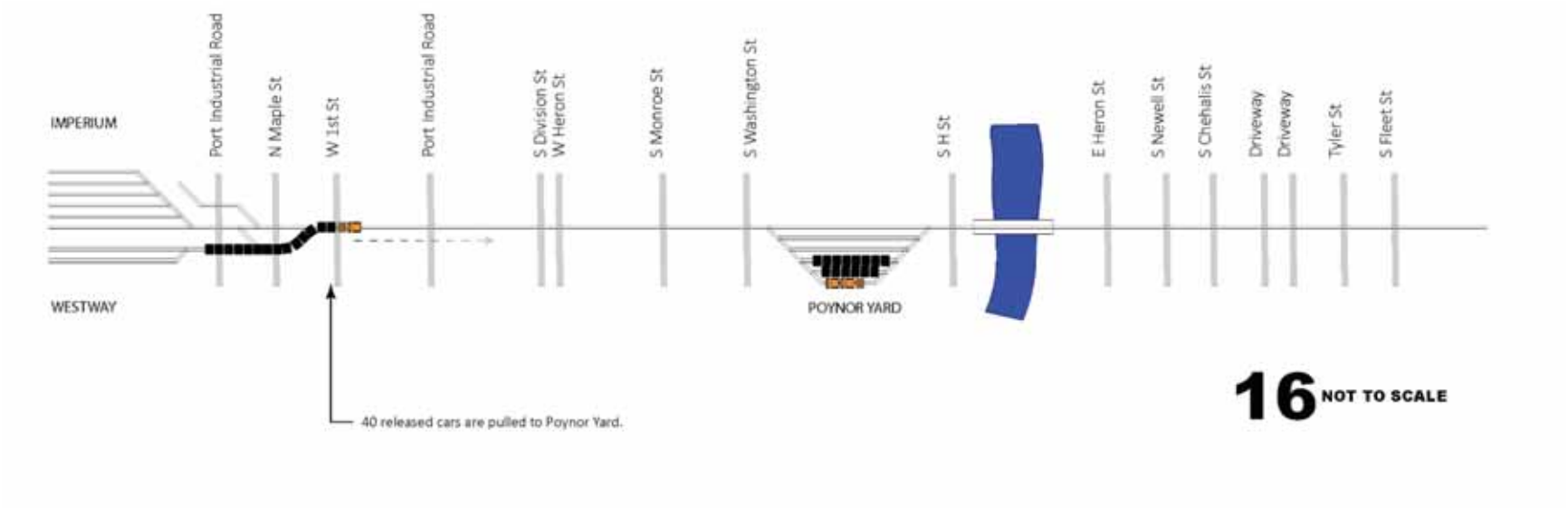


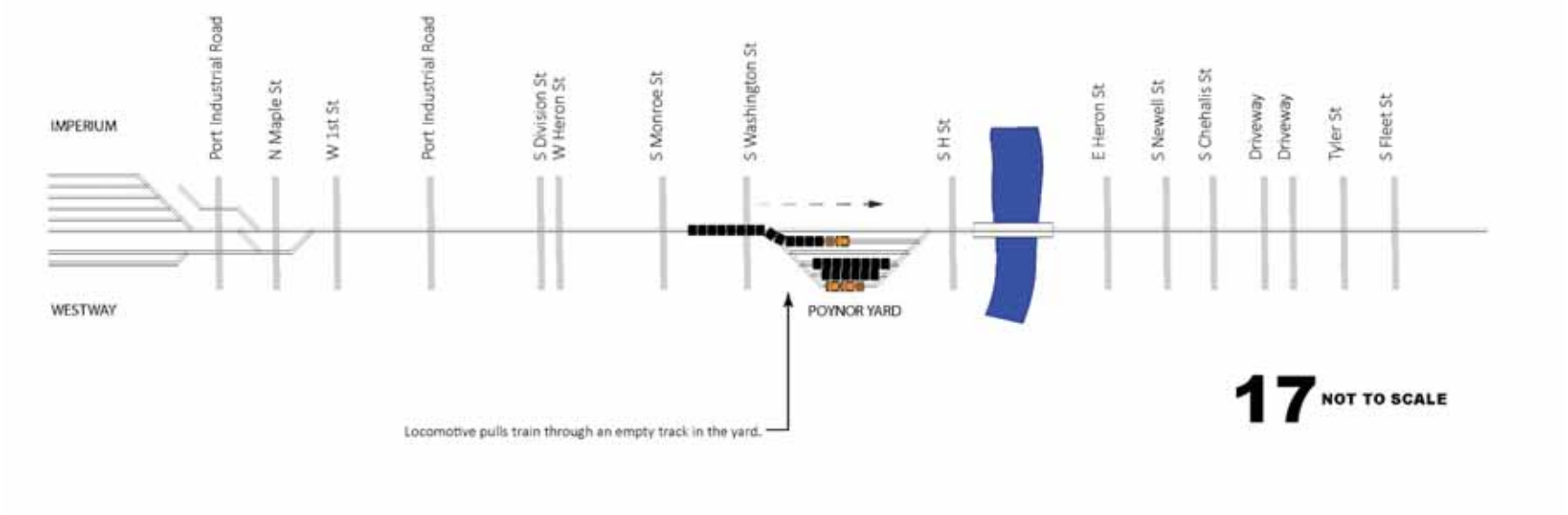
12 NOT TO SCALE

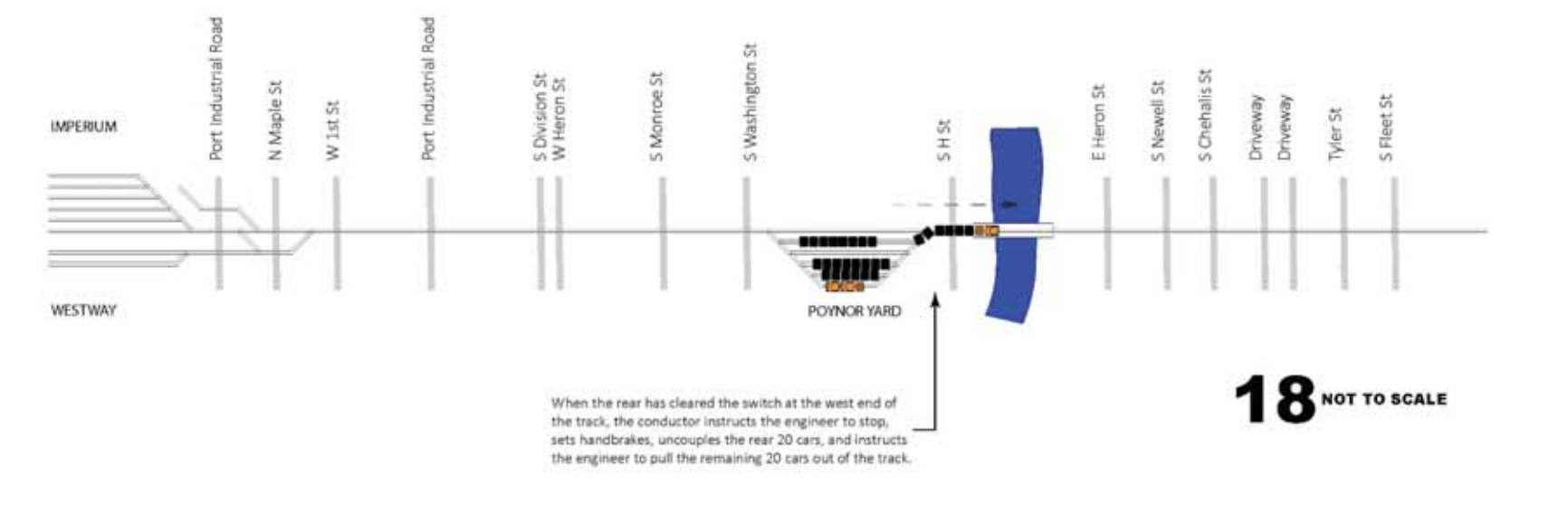

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Locomotive is coupled to 20 cars in one of the tracks. Conductor connects the air brakes and releases the hand brakes.
13 NOT TO SCALE

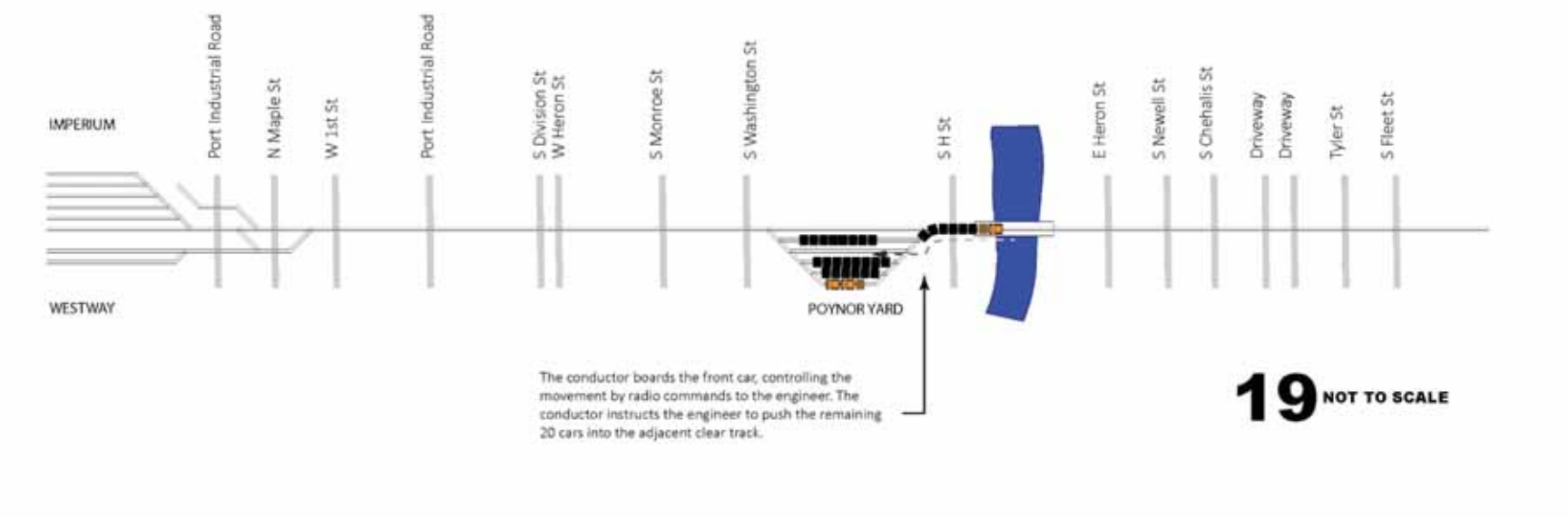

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Arriving Westway Train
Conductor instructs the engineer to pull the cars out of the track. When the last car is beyond the switch to the adjacent track, the conductor instructs the engineer to stop, and lines the switch into the adjacent track.
14 NOT TO SCALE

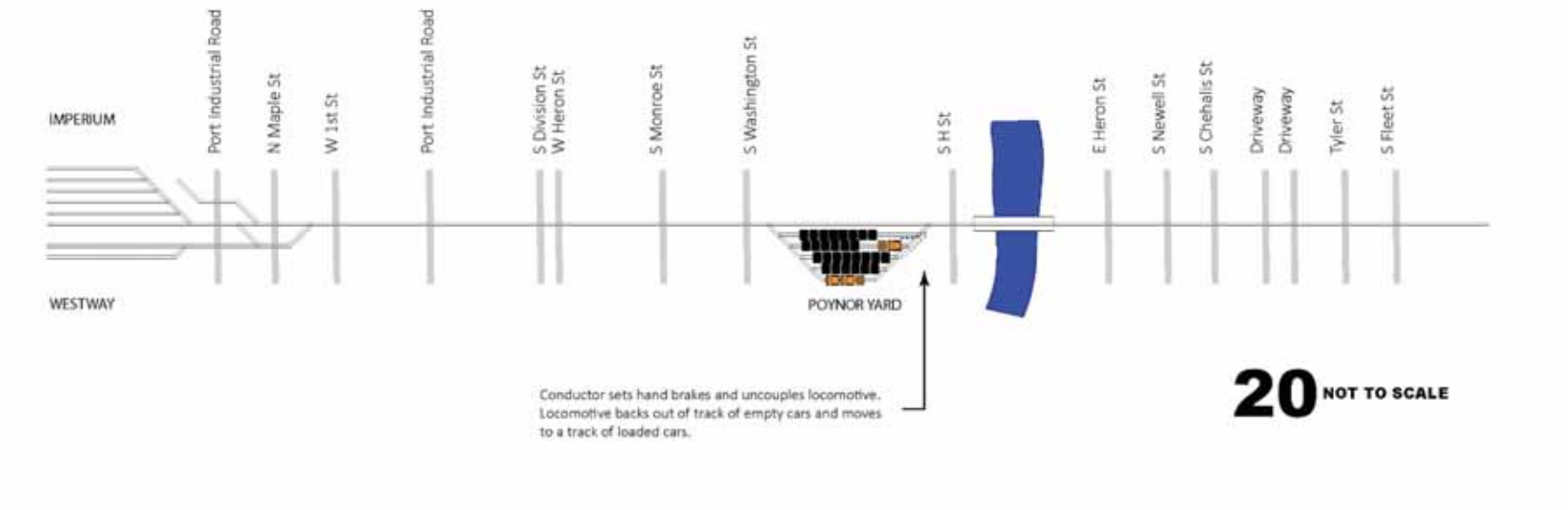

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
The locomotive and first 20 cars are coupled to the second 20 cars. The conductor connects the air brakes, releases the handbrakes and walks to the engine.
15
NOT TO SCALE

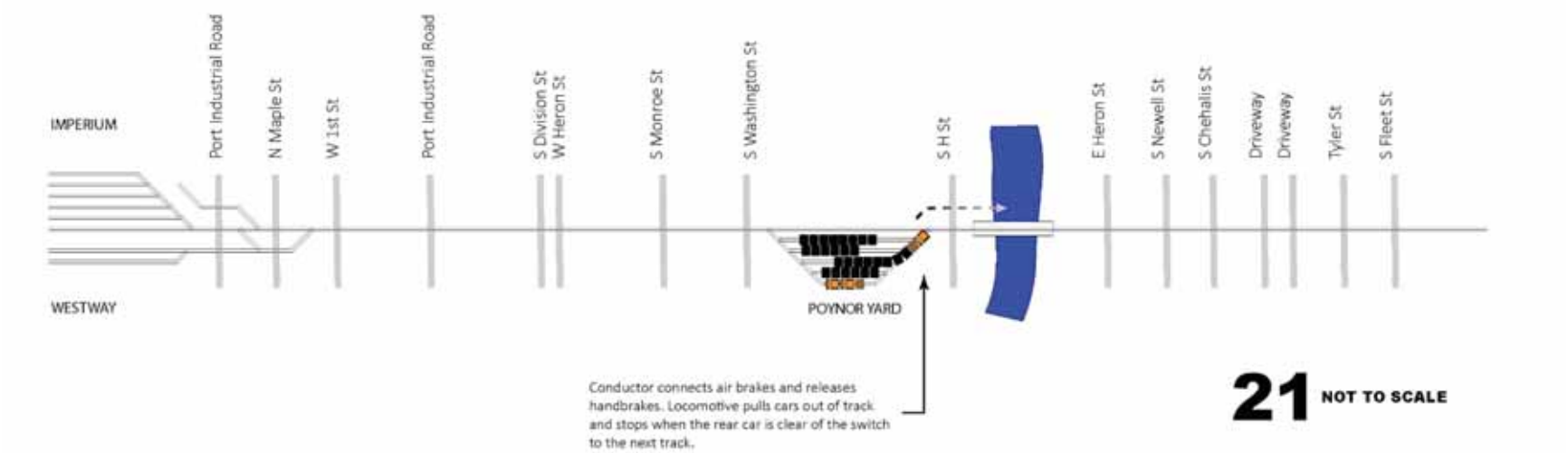

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
40 released cars are pulled to Poynor Yard.
16
NOT TO SCALE

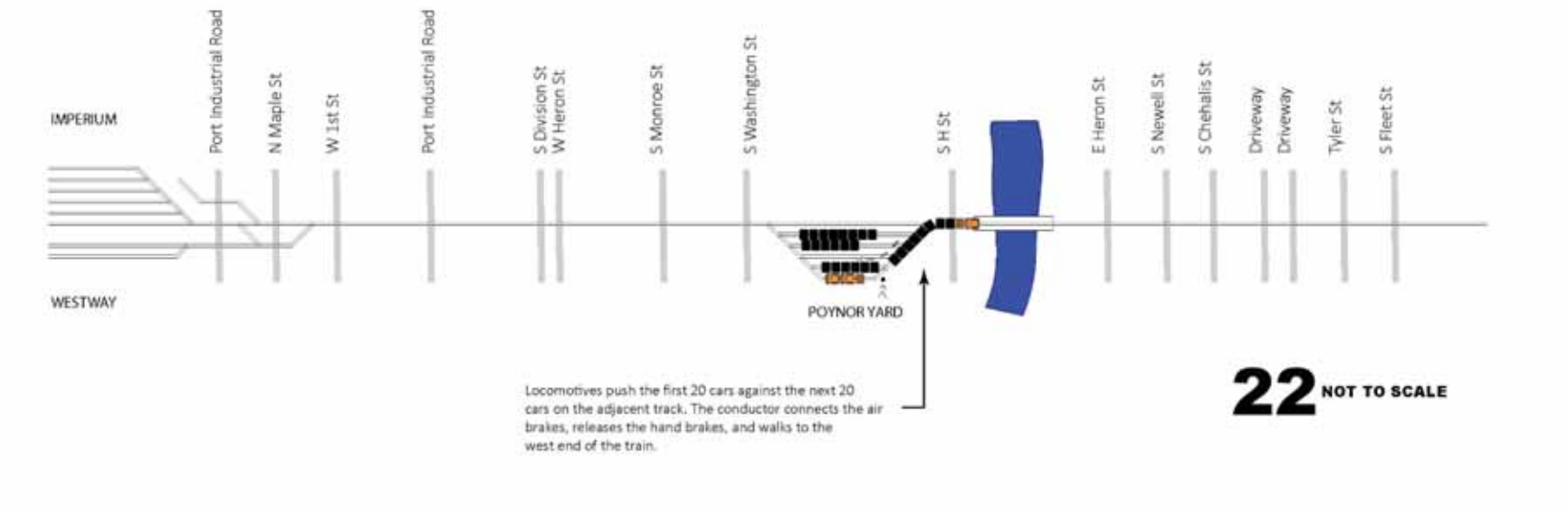

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Locomotive pulls train through an empty track in the yard.
17
NOT TO SCALE

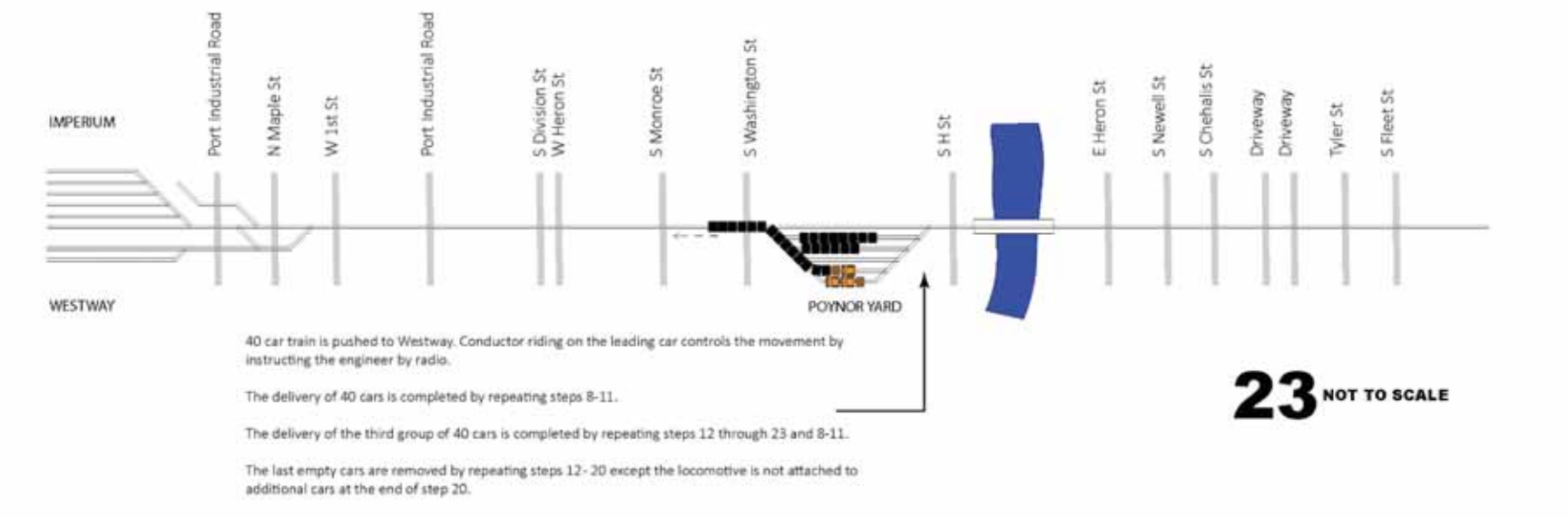

IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
When the rear has cleared the switch at the west end of the track, the conductor instructs the engineer to stop, sets handbrakes, uncouples the rear 20 cars, and instructs the engineer to pull the remaining 20 cars out of the track.
18
NOT TO SCALE


IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
The conductor boards the front car, controlling the movement by radio commands to the engineer. The conductor instructs the engineer to push the remaining 20 cars into the adjacent clear track.
19
NOT TO SCALE


IMPERIUM
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
WESTWAY
POYNOR YARD
Conductor sets hand brakes and uncouples locomotive. Locomotive backs out of track of empty cars and moves to a track of loaded cars.
20
NOT TO SCALE

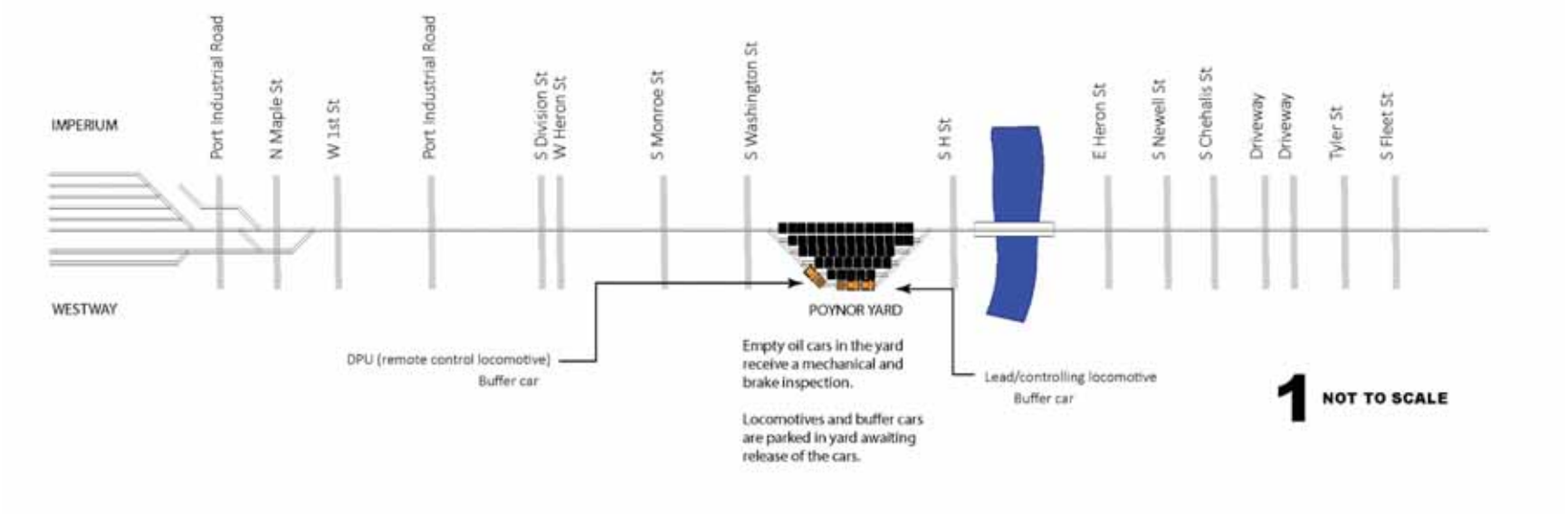

IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
Conductor connects air brakes and releases handbrakes. Locomotive pulls cars out of track and stops when the rear car is clear of the switch to the next track.
21 NOT TO SCALE

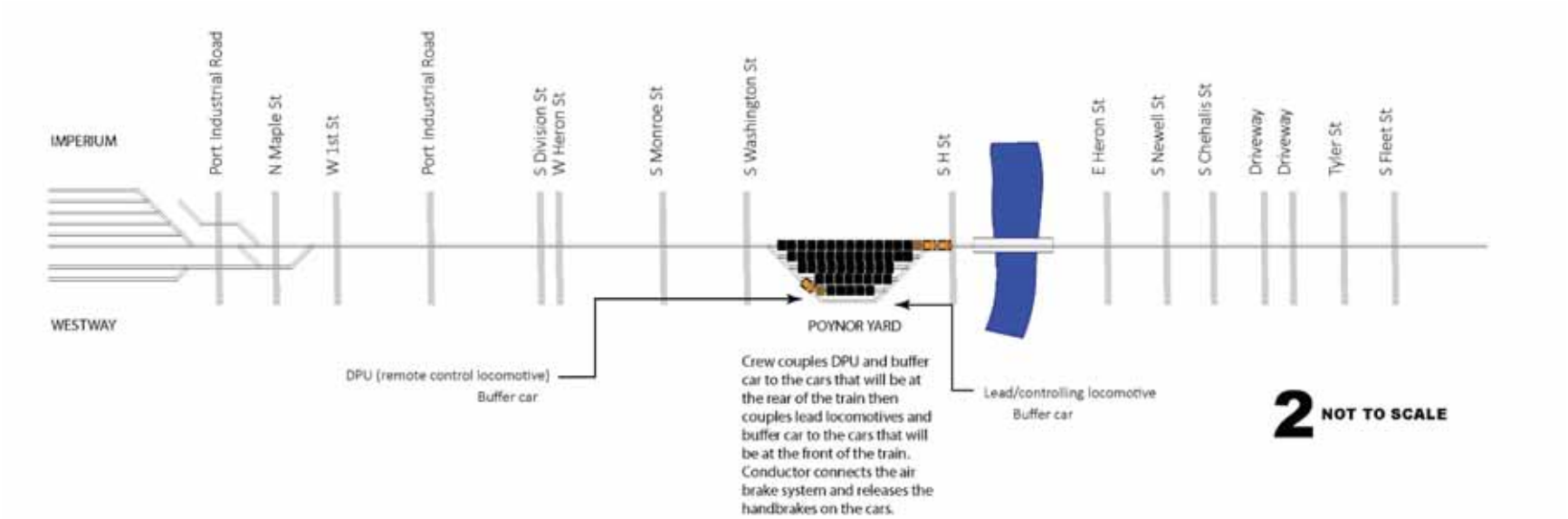

IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
Locomotives push the first 20 cars against the next 20 cars on the adjacent track. The conductor connects the air brakes, releases the hand brakes, and walks to the west end of the train.
22 NOT TO SCALE

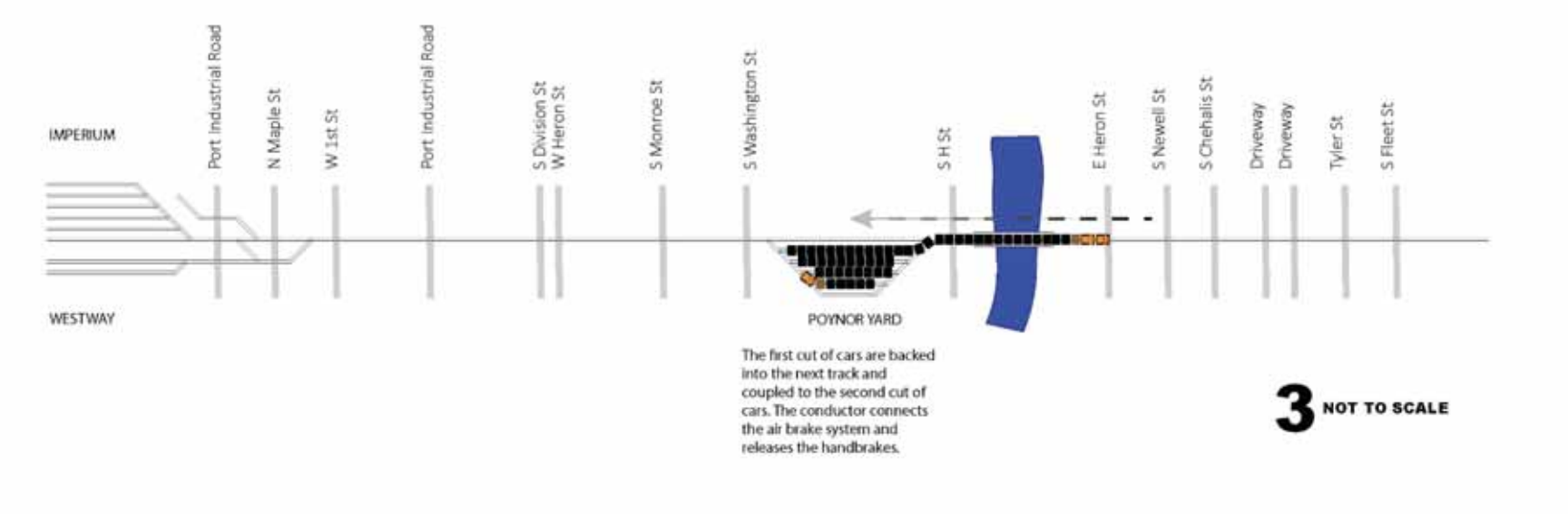

IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
40 car train is pushed to Westway. Conductor riding on the leading car controls the movement by instructing the engineer by radio.
The delivery of 40 cars is completed by repeating steps 8-11.
The delivery of the third group of 40 cars is completed by repeating steps 12 through 23 and 8-11.
The last empty cars are removed by repeating steps 12 - 20 except the locomotive is not attached to additional cars at the end of step 20.
23
NOT TO SCALE

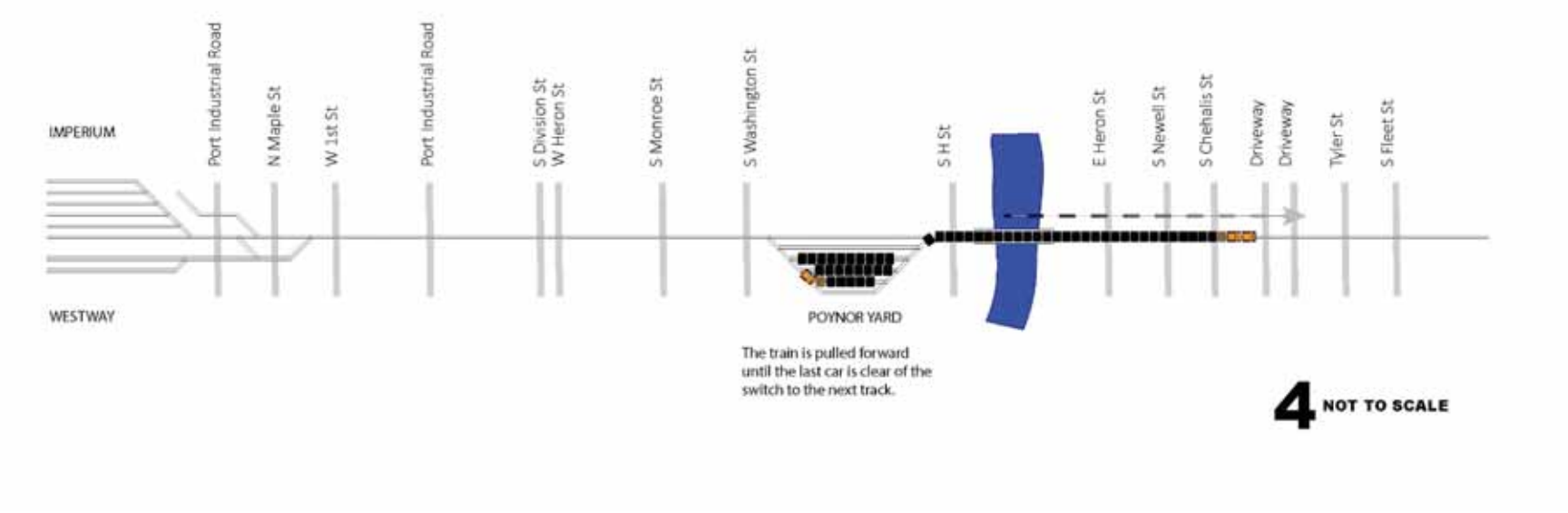
Section K.4

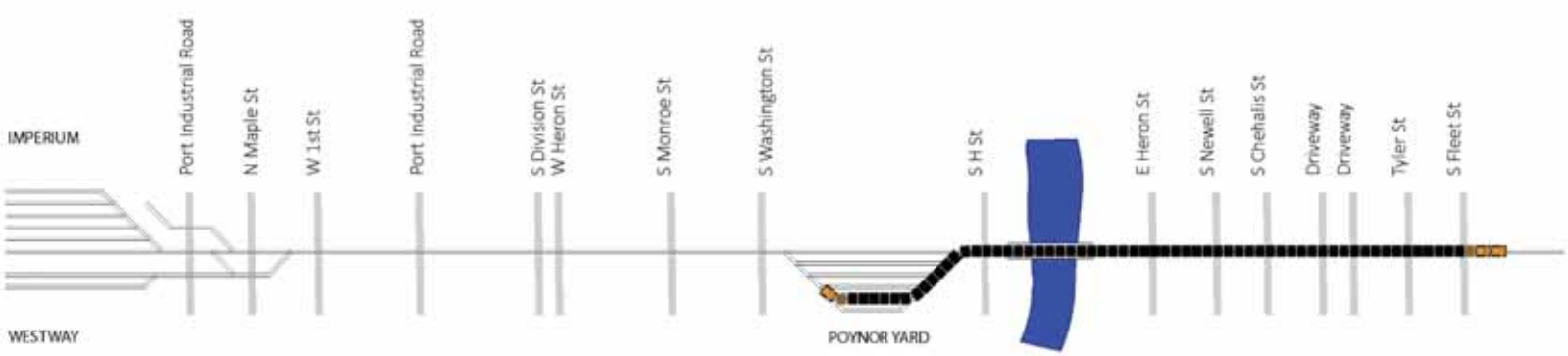
Poynor Yard Switching Operations for Rail Car Inspections


IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
DPU (remote control locomotive)
Buffer car
Empty oil cars in the yard receive a mechanical and brake inspection.
Locomotives and buffer cars are parked in yard awaiting release of the cars.
Lead/controlling locomotive
Buffer car
1
NOT TO SCALE


IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
DPU (remote control locomotive)
Buffer car
Crew couples DPU and buffer car to the cars that will be at the rear of the train then couples lead locomotives and buffer car to the cars that will be at the front of the train. Conductor connects the air brake system and releases the handbrakes on the cars.
Lead/controlling locomotive
Buffer car
2
NOT TO SCALE

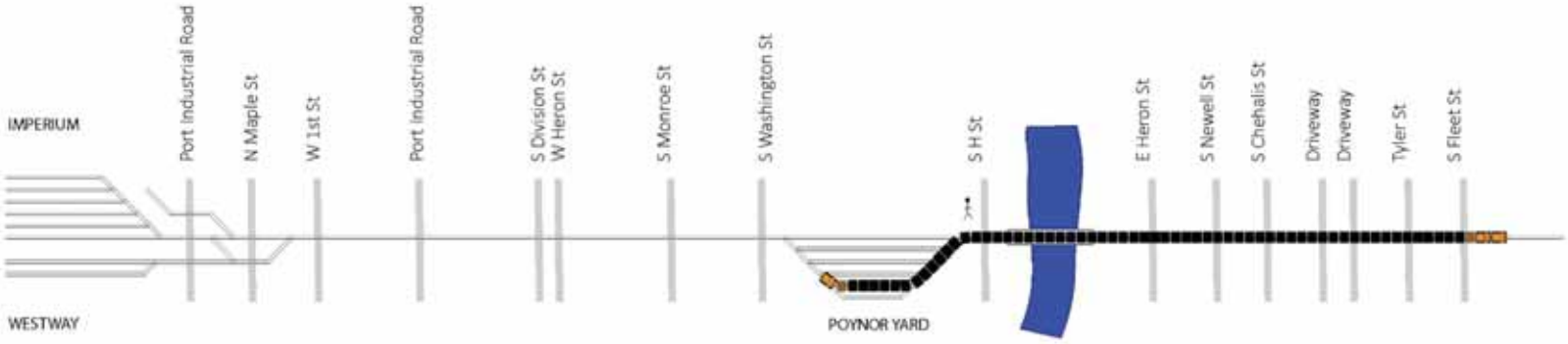

IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
The first cut of cars are backed into the next track and coupled to the second cut of cars. The conductor connects the air brake system and releases the handbrakes.
3 NOT TO SCALE


IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
POYNOR YARD
The train is pulled forward until the last car is clear of the switch to the next track.
4 NOT TO SCALE



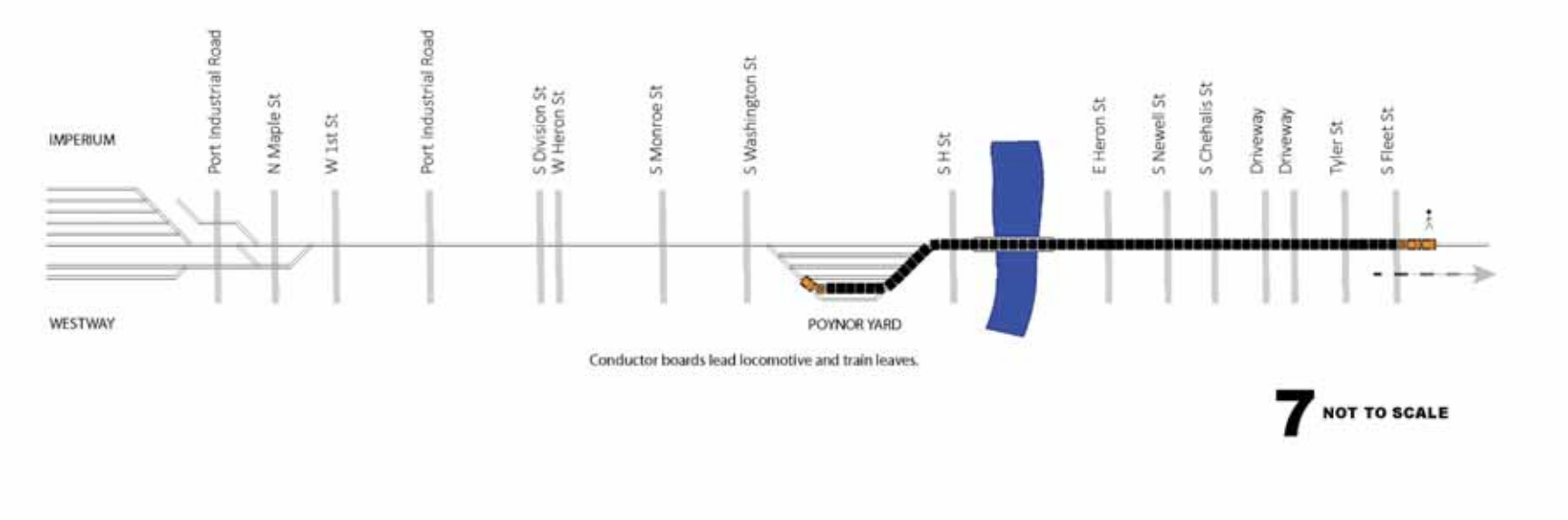
Repeat steps 3 and 4 until the entire train is coupled, the air brake system is connected, and the handbrakes are released.

5 NOT TO SCALE



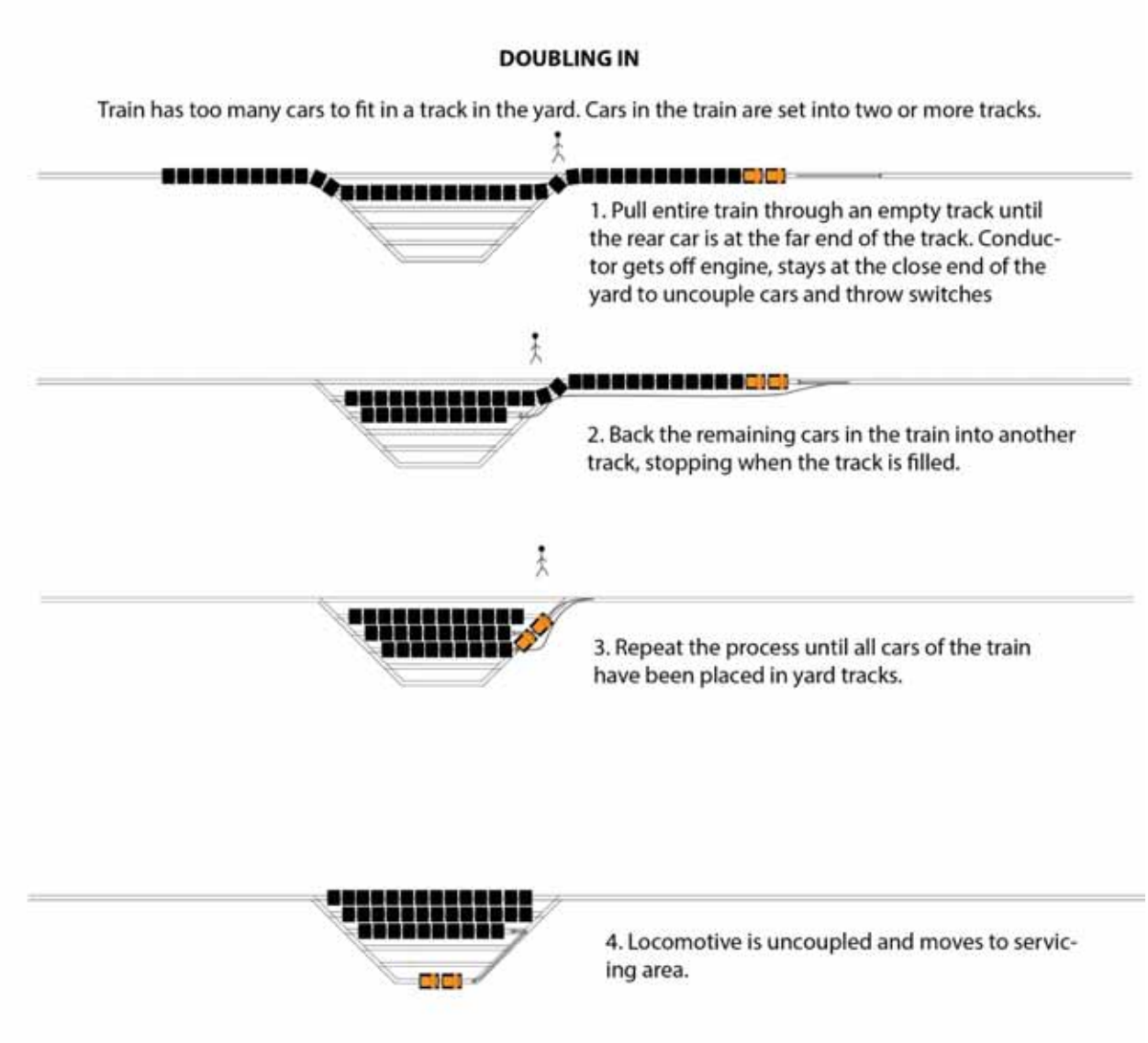
When all coupling is completed and train is ready to leave, conductor walks to the lead locomotive.

6 NOT TO SCALE


IMPERIUM
WESTWAY
Port Industrial Road
N Maple St
W 1st St
Port Industrial Road
S Division St
W Heron St
S Monroe St
S Washington St
POYNOR YARD
S H St
E Heron St
S Newell St
S Chehalis St
Driveway
Driveway
Tyler St
S Fleet St
Conductor boards lead locomotive and train leaves.
7
NOT TO SCALE

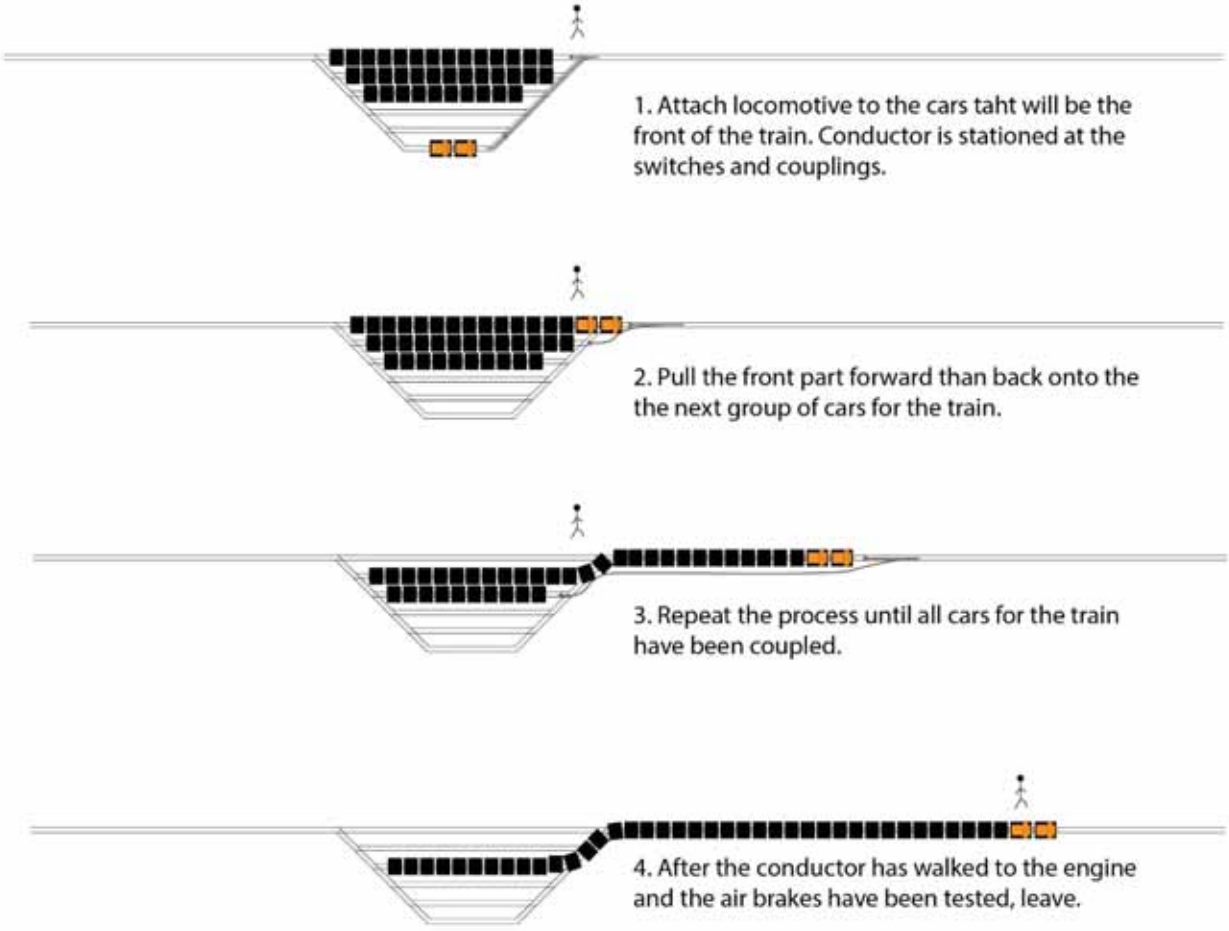
Section K.5

Doubling and Clearing


DOUBLING IN
Train has too many cars to fit in a track in the yard. Cars in the train are set into two or more tracks.
1. Pull entire train through an empty track until the rear car is at the far end of the track. Conductor gets off engine, stays at the close end of the yard to uncouple cars and throw switches
2. Back the remaining cars in the train into another track, stopping when the track is filled.
3. Repeat the process until all cars of the train have been placed in yard tracks.
4. Locomotive is uncoupled and moves to servicing area.

DOUBLING OUT

Train will have too many cars to fit in a track in the yard. Cars for the train are located in two or more tracks.



CLEARING A CROSSING WHILE DOUBLING IN OR OUT

While doubling in or out, a train may pull out of the yard far enough to clear a crossing near the switches. If other crossings are also blocked, the delay will increase at those crossings.