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Appendix A

2014 SFMTA TRANSIT SERVICE INFORMATION

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2014 SFMTA Transit Service Information

Table A-1: North Beach / Fisherman's Wharf Transit Service – Spring 2014

Route / Line	Weekday Frequency				Weekday Passgrs.	Weekend Frequency		
	8a-	12p	5p	8p		8a	2p	8p
1 – California	4	5	4	10	26,010*	12	8	20
8X – Bayshore Express	8	9	8	12	23,811*	8	8	15
8AX – Bayshore 'A' Express	8	-	8	-	4,633*	#		
8BX – Bayshore 'B' Express	8	-	8	-	6,105*	#		
30 – Stockton	7	6	4	15	25,904*	12	4	15
30X – Marina Express	5	-	8	-	2,825*	#		
41 – Union	8	-	8	-	3,221*	##		
45 – Union-Stockton	10	12	12	12	11,790*	12	10	15
10 – Townsend	20	20	20	-	5,841**	20	20	-
47 – Van Ness	10	9	10	20	12,678**	12	10	15
12 – Folsom-Pacific	20	20	20	30	Data error	20	20	30
27 – Bryant	15	15	15	20	6,844*	20	20	20
19 – Polk	15	15	15	20	8,344*	20	15	20
39 - Coit	9:15A 1 st bus	20	20	-	451*	9:15A 1 st bus	20	-
82X – Levi Plaza Express	15	-	15	-	824*	#		
Cable Car (Powell-Mason)	10	8	8	8	10,569^	10	8	8
Cable Car (Powell-Hyde)	10	8	8	8	10,725^	10	8	8
Cable Car (California)	6	8	8	12	6,344^	20	10	10
F – Market (Embarcadero)	7	7	6	15	17,937^	12	7	15

inbound AM / outbound PM – weekdays ## inbound and outbound AM & PM – weekdays

* Fall 2012 data ** Spring 2012 data ^ Spring 2007 data

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Appendix B

SFMTA TRAFFIC COUNT DATA

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SFMTA TRAFFIC COUNT DATA

Table B-1

T-Third - Phase 3
Traffic Count Data - North Beach Corridor
Area

NORTH-SOUTH

Street	Cross Street	Direction	Day	AM Peak	PM Peak	Date
Columbus Avenue	Beach	N	1,613	113	141	08-19-14
	Beach	S	1,651	82	130	08-19-14
	Broadway	N	9,423	528	915	09-13-01
	Broadway	S	12,369	1,199	671	09-13-01
	Chestnut	N	7,852	NC	NC	02-16-95
	Chestnut	S	7,458	NC	NC	02-16-95
	Francisco	N	5,053	296	450	07-01-10
	Francisco	S	5,251	363	333	07-01-10
	Francisco	N	5,377	269	496	06-30-10
	Francisco	S	5,169	367	335	06-30-10
	Greenwich	N	5,872	270	594	03-18-08
	Greenwich	S	6,686	562	425	03-18-08
Powell Street	Lombard	N	1,646	122	128	05-20-08
	Lombard	S	1,816	127	154	05-20-08
	Lombard	N	1,690	126	121	05-21-08
	Lombard	S	1,928	125	158	05-21-08
	Union	N	2,979	NC	NC	03-10-98
Mason Street	Broadway	N	864	96	76	03-05-01
	Broadway	S	1,434	118	133	03-05-01
	Lombard	N	1,189	82	105	05-20-08
	Lombard	S	2,204	124	188	05-20-08
	Lombard	N	1,439	100	112	05-21-08
	Lombard	S	2,256	151	189	05-21-08
	Columbus	N	2,198	171	181	12-16-05
	Columbus	S	4,193	274	349	12-16-05
Stockton Street	North Point	N	2,153	NC	NC	12-21-98
	North Point	S	1,067	NC	NC	12-21-98
	Pacific	N	2,622	148	220	02-26-01
	Pacific	S	7,025	493	534	02-26-01
	Pacific	N	3,191	NC	NC	10-25-95
	Pacific	S	7,279	NC	NC	10-25-95
	Pacific	N	3,117	206	231	04-28-01
	Pacific	N	2,763	220	224	04-29-01
	Pacific	S	8,461	415	579	06-02-01
	Pacific	S	7,617	366	474	06-03-01

Grant	Broadway	S	2,340	185	162	11-04-05
Leavenworth	Beach	N	1,739	111	130	08-19-14
	Beach	S	2,467	142	201	08-19-14
Taylor Street	No Counts Available					
Jones Street	No Counts Available					

EAST - WEST

Street	Cross Street	Direction	Day	AM Peak	PM Peak	Date
Bay Street	Jones	W	12,589	NC	NC	09-09-96
	Jones	E	13,736	NC	NC	09-09-96
	Jones	W	9,114	395	979	07-23-12
	Jones	E	9,879	1,302	552	08-22-12
Broadway	Kearny	W	9,877	517	920	08-15-12
	Kearny	E	11,931	1,282	640	08-15-12
	Kearny	W	10,059	503	823	08-16-12
	Kearny	E	12,359	1,283	638	08-16-12
	Mason	W	468	NC	NC	01-29-98
	Mason	E	915	NC	NC	01-29-98
	Stockton	W	12,135	NC	NC	04/30/97
	Stockton	E	15,346	NC	NC	04/30/97
Chestnut	Hyde	W	1,449	85	180	03-14-01
	Hyde	E	1,285	181	133	03-14-01
	Leavenworth	W	1,543	81	169	03-15-00
	Leavenworth	E	951	168	66	03-15-00
Francisco	Columbus	W	754	44	71	06-30-10
	Columbus	E	461	35	41	06-30-10
	Columbus	W	705	38	58	07-01-10
	Columbus	E	399	30	43	07-01-10
	Stockton	W	945	55	85	12-01-08
Lombard	Columbus	W	2,432	NC	NC	12-28-94
	Columbus	E	1,737	NC	NC	12-28-94
	Columbus	W	2,098	NC	NC	08-31-98
	Columbus	E	651	NC	NC	08-31-98
	Hyde	E	7,632	480	652	05-22-99
	Hyde	E	11,950	791	1,022	05-22-99
	Hyde	E	11,128	770	1,010	05-23-99
	Hyde	E	5,574	405	526	05-26-99
	Hyde	E	5,142	337	433	06-12-99
	Hyde	E	3,809	233	335	05-25-13
	Hyde	E	2,893	250	233	05-26-13
	Hyde	E	2,780	212	252	05-27-13
	Hyde	E	2,428	230	316	07-13-13
	Larkin	E	4,153	310	373	05-18-02
	Larkin	E	3,441	218	349	05-19-02



	Larkin	E	2,657	207	215	05-20-02
	Larkin	E	3,720	328	302	05-25-02
	Larkin	E	3,487	293	315	05-26-02
	Larkin	E	3,641	295	346	05-27-02
	Larkin	E	2,638	206	276	05-28-02
Beach	Columbus	W	2,152	134	192	08-19-14
	Columbus	E	2,267	134	163	08-19-14
North Point	Hyde	W	3,419	NC	NC	10-25-95
	Hyde	E	5,093	NC	NC	10-25-95
	Jones	W	4,612	NC	NC	11-05-96
	Jones	E	5,199	NC	NC	11-05-96
	Powell	W	2,940	166	252	06-08-13
	Powell	E	2,207	151	168	06-09-13
	Powell	W	3,233	167	320	06-17-03
	Powell	E	5,181	296	430	06-17-03
	Stockton	W	2,551	NC	NC	12-21-98
	Stockton	E	3,853	NC	NC	12-21-98
	Stockton	W	3,026	NC	NC	12-22-98
	Stockton	E	4,241	NC	NC	12-22-98
	The Embarcadero	W	2,710	NC	NC	11-04-96
	The Embarcadero	E	4,010	NC	NC	11-04-96
Pacific	Jones	W	2,500	NC	NC	03-27-96
	Jones	E	2,223	NC	NC	03-27-96
Union	Powell	W	4,752	NC	NC	03-09-98
	Powell	E	3,876	NC	NC	03-09-98



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Appendix C

DETAILED DESCRIPTIONS OF CONCEPT ALIGNMENT OPTIONS

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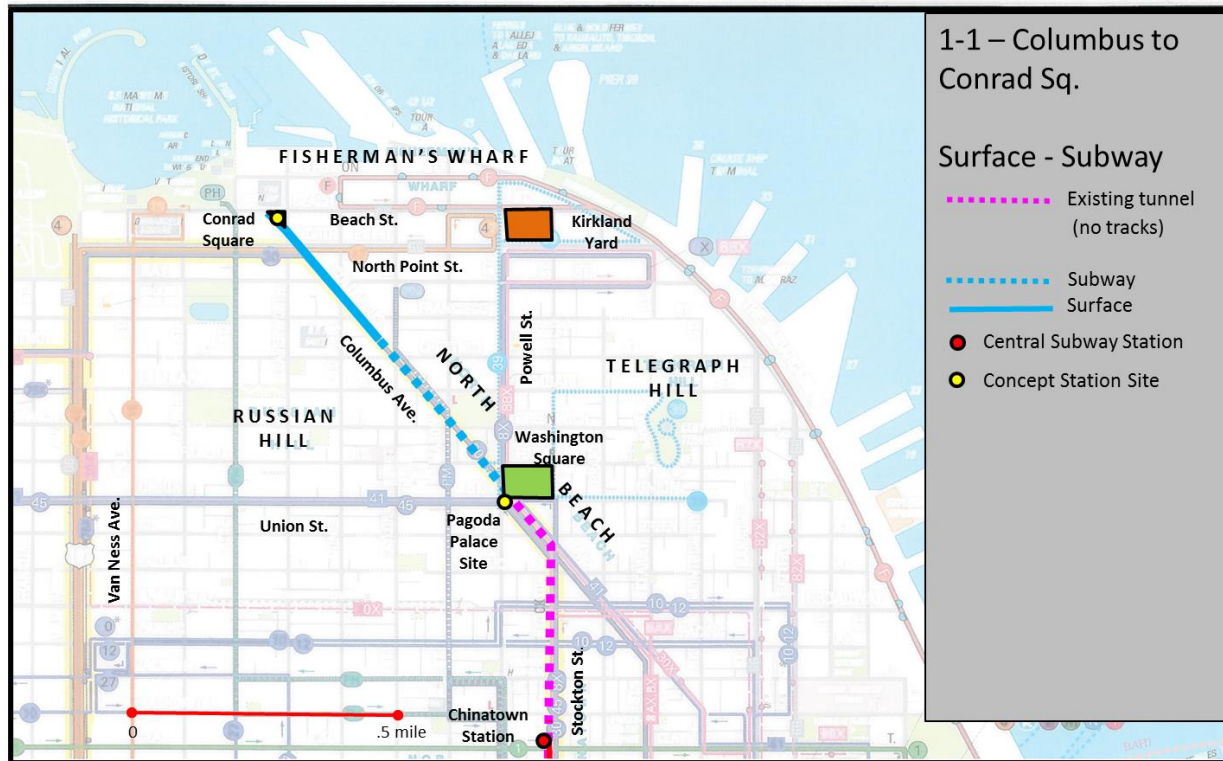


DETAILED DESCRIPTIONS OF CONCEPT ALIGNMENT OPTIONS

Concept Alignment 1-1:

Columbus Avenue – surface: (North Beach to Conrad Square)

Figure C-1 – Concept Alternative Alignment 1-1



Concept Alignment 1-1 would have the subway tracks surface north of Washington Square in the center of Columbus Avenue and continue north to a terminal at Conrad Square Park (Columbus / Beach / Leavenworth). A station would be built in the Conrad Square area as the Fisherman’s Wharf station. Preliminary design of a stub end terminal and station show closure of the last block of Columbus Avenue to local traffic only is required to provide adequate space to accommodate the most basic plans. A single X crossover track prior to the terminal station would be the only opportunity to assist with LRT storage and operations. Space does not exist for a tail track unless a larger piece of the park is removed, or parking on an adjacent street is removed. The small station terminal and single crossover design is not a desirable option.

The distance from Washington Square to Conrad Square is approximately 3,200 feet from the north end of a North Beach station to the south end of a Conrad Square station. All intersections are signalized, except Francisco and Leavenworth and Beach at Conrad Square, which are controlled by stops signs. Total distance of track (both

directions) is approximately 6,400 feet. A tail track north of Conrad Square or parallel to the station platform is not included in the measurement estimate.

Columbus Avenue has a consistent street width of 80 feet from Washington Square to the end of the street at Conrad Square. The sidewalks in this area are 10 feet wide on each side of the street, leaving 60 feet of street roadway space. The street is striped for four traffic lanes (two in each direction) with a narrow median along most of the seven blocks between the two squares. A small five lane section with an exclusive northbound left turn lane exists on the block between Jones Street and Bay Street. Parallel parking extends along most of the seven block area. The general assumption in this concept study is that a surface line north of Washington Square would operate using an exclusive right-of-way in the center of Columbus Avenue, which would decrease through traffic to two lanes (one in each direction). A less favorable street design would be a blend of exclusive right-of-way and shared right-of-way. Shared right-of-way would occur at locations where inadequate space for exclusive right-of-way is present. T-Third - Phase 2 drawings of the surface alignment between Caltrain and the subway portal west of the Brannan Street station show a width of 26 feet, which is slightly larger than two standard traffic lanes.

The Powell-Mason cable car line extends on the street in both direction for two blocks between Mason Street and Taylor Street. The cable car is a narrow gauge railway (3 feet 6 inch track width), while an LRT would be standard gauge railway (4 feet 8.5 inch width). The slot of the cable car system and the track gauge width present added design complexity with a surface option in this area, because the two systems could not easily share tracks.

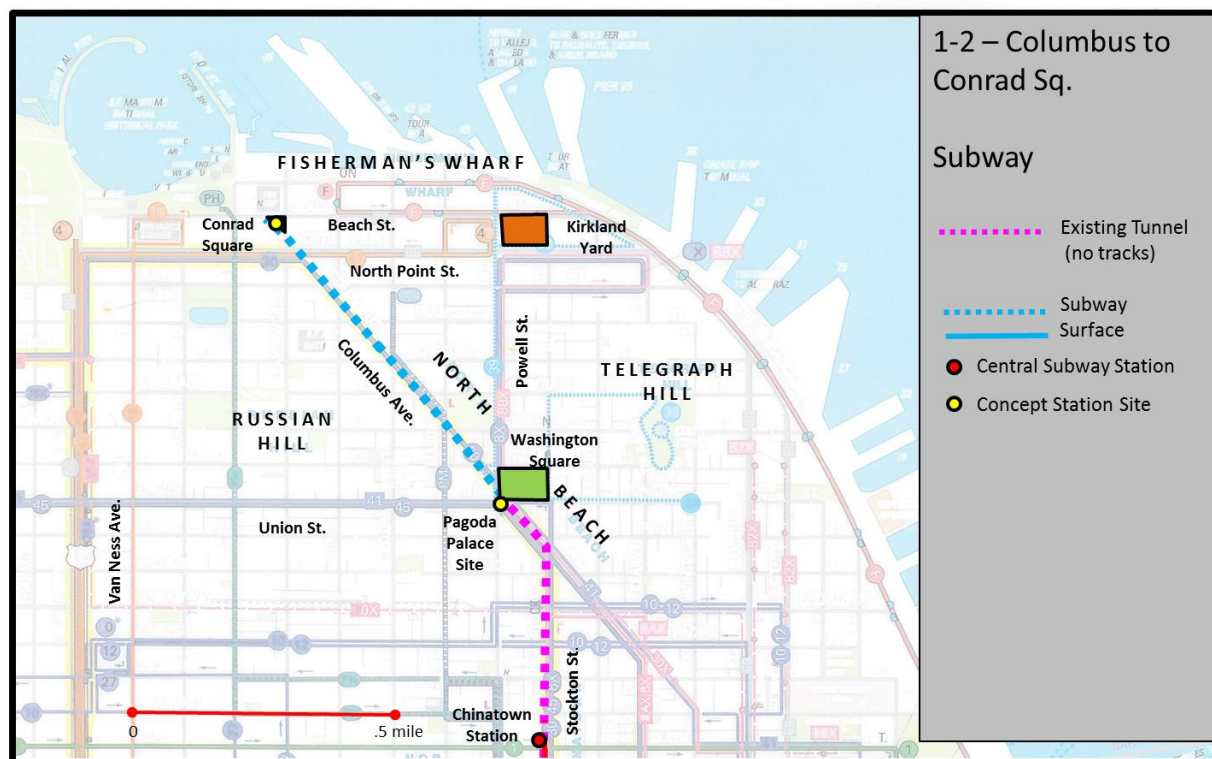
The surface option of concept alignment 1-1 was analyzed in the early stages of the Central Subway project (T-Third – Phase 2). In the document Conceptual Alternative Downtown Rail Alignment Study (2006), alternative “Base Case 3 – plus Fisherman’s Wharf” listed three concepts: 1) a tunnel between Chinatown and North Beach, with a portal at Washington Square and surface stations on Columbus at Filbert and between Bay and North Point (terminal), 2) same as #1, but a longer tunnel with a North Beach subway station at Washington Square and a surface station between Bay and North Point (terminal), and 3) an all surface route between Chinatown and Fisherman’s Wharf utilizing the Stockton Street Tunnel with stations at Columbus and Union (North Beach) and Columbus and Bay Streets (Fisherman’s Wharf). Concept # 1 called for a “tail track” to be extended to Beach Street, but this item was not mentioned in descriptions for concepts #2 and #3.

The dimensions of Conrad Square (a triangle shaped piece of property) are 95 feet X 80 feet X 120 feet – without sidewalks, and 115 feet X 105 feet X 175 feet including sidewalks. This is too small for a surface terminal, station and turnaround for LRT vehicles. The Fisherman’s Wharf Public Realm Plan project (2011) developed by the SF Planning Department included a concept to modify the Columbus Avenue leg that is adjacent to the left side of Conrad Square. If the Columbus Avenue leg is closed, the dimensions of the site increase to approximately 170 feet X 210 feet X 250 feet.

In the Public Realm plan the redesigned street is narrowed to reduce traffic, increase parking and neighborhood public space. The closed street may also be large enough to allow for a cross-over track style of terminal turnaround, but is too small for a simple loop turnaround unless the WB mixed traffic on Beach Street and the southbound mixed traffic lane on Leavenworth Streets are used. In 2014, Conrad Square faces three hotels (Holiday Inn, Argonaut Hotel and Courtyard by Marriott), the Cannery Shopping Center, and a block of mixed use retail and housing.

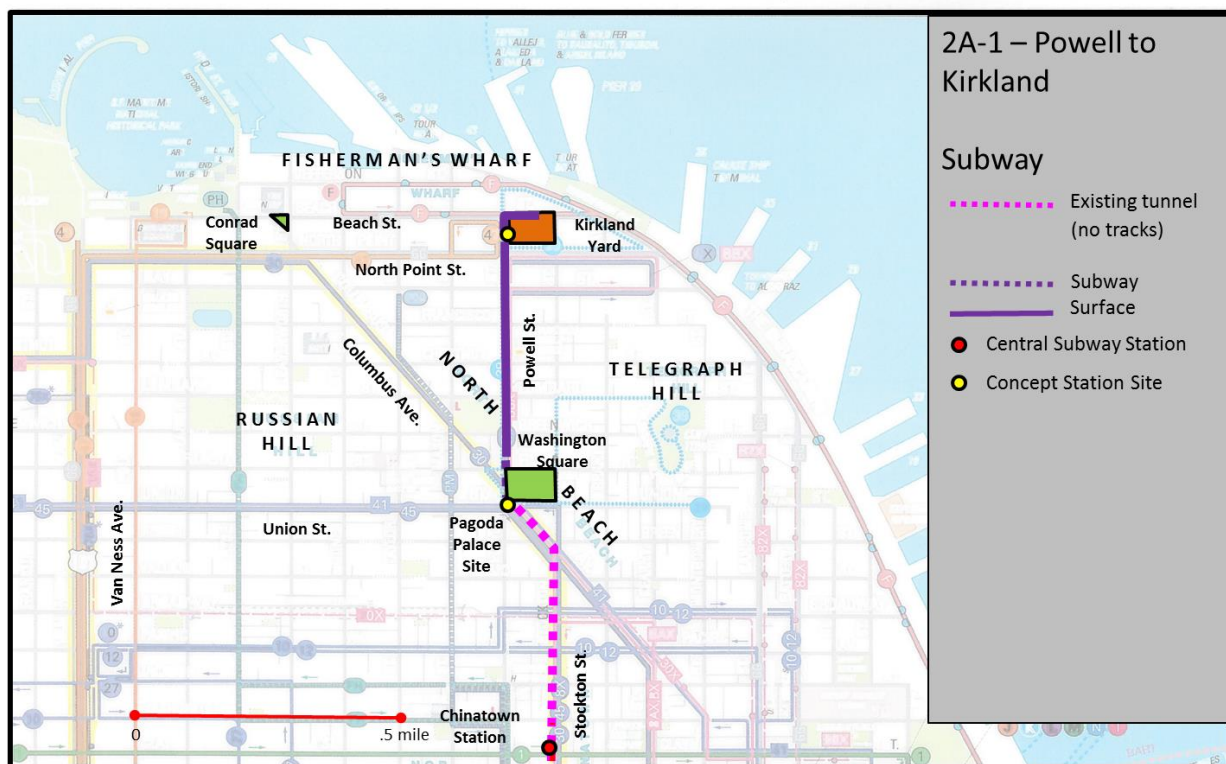
Use of the Conrad Square area, which is currently configured as a small park, may have federal Department of Transportation (DOT) Section 4f issues if some of the space is used for an LRT terminal and turnaround.

**Concept Alignment 1-2:
Columbus Avenue – subway: (North Beach to Conrad Square)
Figure C-2 - Concept Alternative Alignment 1-2**



Alignment 1-2 follows the same route as alignment 1-1, but the LRT tracks remain below grade in a subway. A station would be built in the Conrad Square area as the Fisherman’s Wharf station. The distance from Washington Square to Conrad Square is approximately 3,200 feet. Total distance of track (both directions) is approximately 6,400 feet. A tail track north of Conrad Square is not included in the measurement. As stated in alignment 1-1, the dimensions of Conrad Square do not appear advantageous for a surface turnaround (loop or cross-over style) terminal turnaround, so the assumption for alignment 1-2 is the turnaround would be underground.

**Concept Alignment 2A-1:
Powell Street – surface: North Beach to Kirkland Yard)
Figure C-3 – Concept Alternative Alignment 2A-1**



Alignment 2A-1 would have the subway tracks surface north of Washington Square on Powell Street. The portal block has not been identified. The LRT tracks would continue north on Powell Street to a Fisherman’s Wharf station and terminal located at North Point Street at the site of the SFMTA owned Kirkland Transportation Division (Kirkland Yard), which is an active motor bus division. The distance from Washington Square to the Kirkland Yard is approximately 2,350 feet. All intersections are controlled by 4-way stops, except Bay and North Point Streets, which are both signalized. Total distance of track (both directions) is approximately 4,700 feet.

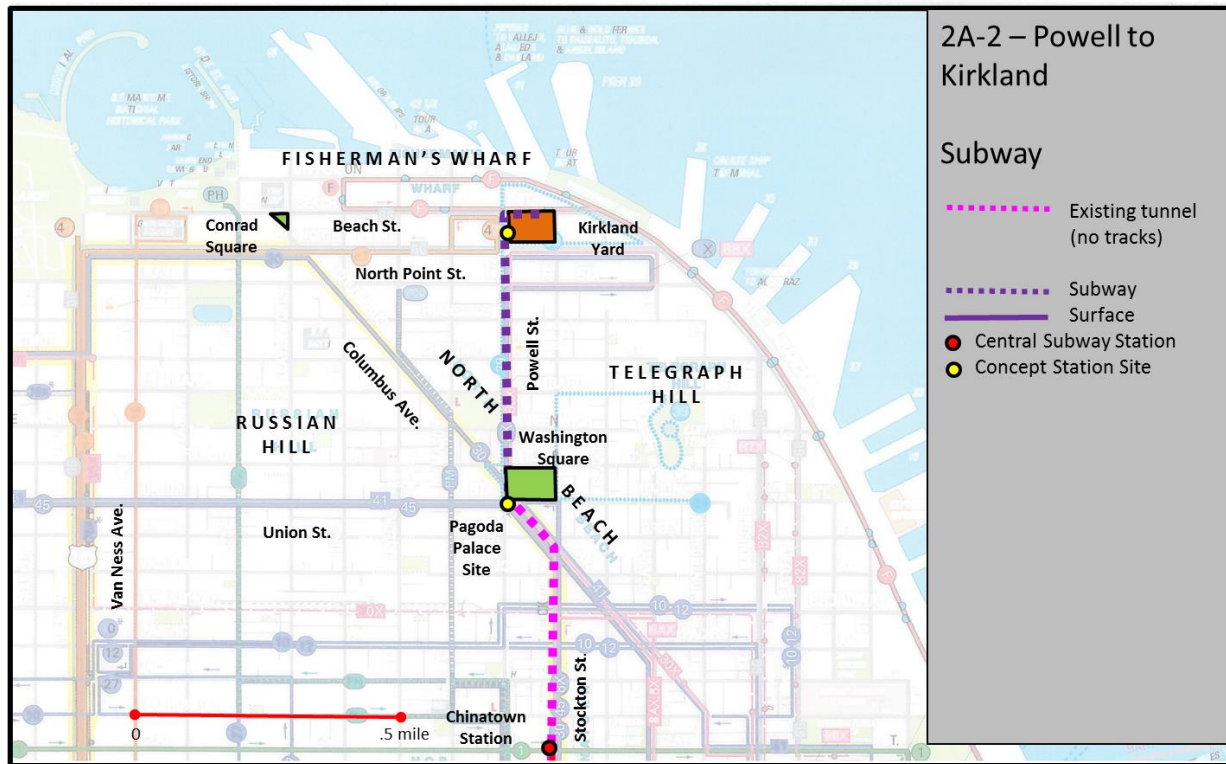
Powell Street has a consistent street width of 67-68 feet for the six blocks between Washington Square and Kirkland Yard. Sidewalks measure 12-13 feet on each side of the street, leaving 41-44 feet of street roadway space. Currently all blocks allow parallel parking on both sides of the street (16 feet), which leaves 25-28 feet for two lanes of mixed traffic (one lane in each direction). Central Subway – Phase 2 drawings of the surface alignment between Caltrain and the subway portal west of the Brannan Street station show a width of 26 feet, which is slightly larger than two standard traffic lanes. Therefore, surface operations of an LRT along this corridor would almost certainly utilize a shared right-of-way with mixed traffic.

Multiple options exist for a turnaround design at the north end of this alignment. The Kirkland Yard site would be the site of a station and a turnaround. A double X cross-over is assumed. Adjacent to the Kirkland Yard on three sides are apartment buildings, and the Pier 39 parking garage is adjacent on the north side across Beach Street. A rebuilt Kirkland Division facility has been an SFMTA desire for many years, so it would appear there are many options to design a combined LRT station / turnaround and bus facility together.

Alternatively, Stockton Street instead of Powell Street could serve as the alignment route, but use of Stockton Street would require that the subway traverse Washington Square in order to align with Stockton Street, and a northern portal would likely need to be located north of Francisco Street as it has two blocks with 11%-13% grades as it crosses the shoulder of Telegraph Hill. For these reasons it was considered inferior to Powell Street for this alignment and not analyzed further.

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**Concept Alignment 2A-2:
Powell Street – subway: (North Beach to Kirkland Yard)
Figure C-4 – Concept Alternative Alignment 2A-2**

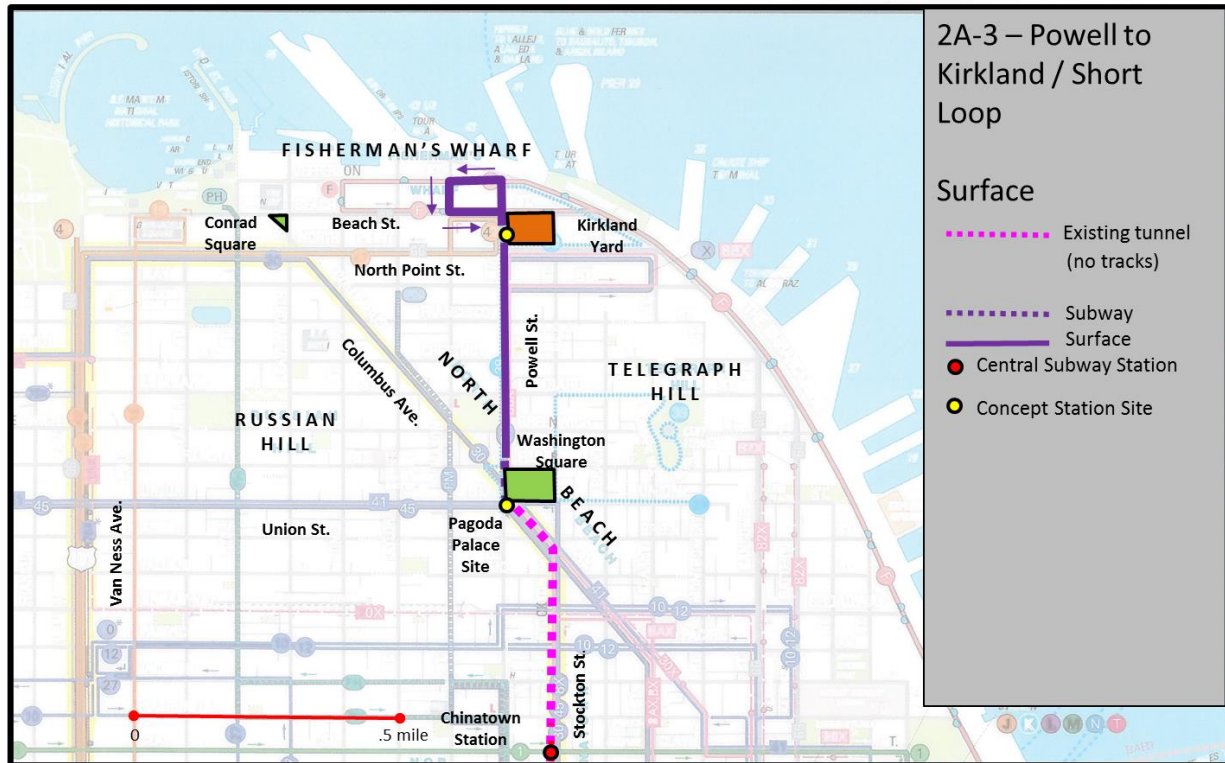


Alignment 2A-2 follows the same route as alignment 2A-1, but the LRT tracks remain below grade in a subway. The LRT tracks would continue north on Powell Street to a Fisherman’s Wharf station and terminal located at North Point Street at the site of the SFMTA owned Kirkland Transportation Division (Kirkland Yard) which is a motor bus division that has been active since 1950. The distance from Washington Square to the Kirkland Yard is approximately 2,350 feet. The total distance (both directions Washington Square to Kirkland) is 4,700 feet.

The turnaround (loop or crossover turnaround) would be underground. A concept to use a shallow subway with a portal and then use the Kirkland Yard site as a surface station with a surface turnaround (loop or “X” cross-over turnaround) wasn’t found to be feasible in the Constructability analysis. Adjacent to the Kirkland Yard on three sides are apartment buildings, and the Pier 39 parking garage is adjacent on the north side across Beach Street.

**Concept Alignment 2A-3:
Powell Street – surface: (North Beach to Kirkland Yard) + surface (Powell,
Jefferson, Mason & Beach)**

Figure C-5 – Concept Alternative Alignment 2A-3

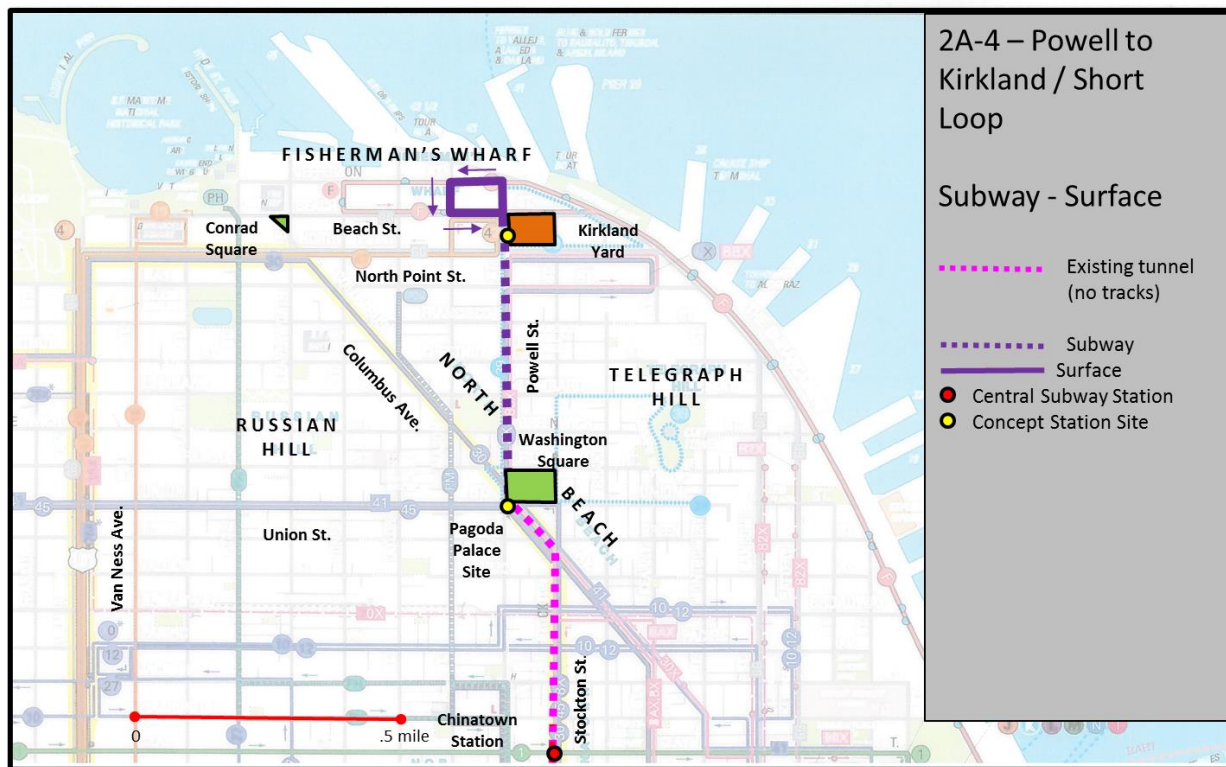


Alignment 2A-3 follows the same route up Powell Street and must address the same design and operations issues as the 2A-1 alignment, but instead of stopping at a Kirkland Yard station and turnaround onsite of the yard property, this option would utilize two one block sections of new surface track on Powell Street and Mason Street, and existing F-Line streetcar track to make a one-way loop along Powell, Jefferson, Mason and Beach Streets before returning to the Kirkland Yard area to head south. By using the short loop all turnaround terminal actions would be off the Kirkland Yard site. The distance of the one-way loop turnaround is approximately 2,000 feet. All five intersections in the extended one-way loop are signalized. The total distance for tracks (both directions Washington Square to Kirkland and the one-way loop) is 6,700 feet. At 2030 estimated service levels, this concept would require a total of 24 T-Line trains and 12 F-Line streetcars in the peak hour to share two one block segments of track. This would equal a train passing a fixed point at 1 minute 40 second intervals – assuming they are equally spaced during the peak hour. The service level of 36 trains (LRT + F-Line) per hour would be very challenging to operate and maintain in a partially mixed traffic right of way. Fisherman’s Wharf commercial business leaders have previously have stated their opposition to LRT operations on the F-Line historic

streetcar tracks. All trains would be required to pass one existing F-Line platform between Powell and Mason Streets on the Embarcadero. T-Line trains would likely need to serve this station, because they would be interspersed with F-Line streetcars, and the option to skip stations does not appear to be feasible. The high likelihood of bunching with an F-Line streetcar will be almost constant during the peak period of service. For many reasons, the turnaround concept is not a desirable option. The remainder of information about this option – aside from the turnaround loop - is the same as option 2A-1.

**Concept Alignment 2A-4:
Powell Street – subway: (North Beach to Kirkland Yard) + surface (Powell, Jefferson, Mason & Beach)**

Figure C-6 – Concept Alternative Alignment 2A-4



Alignment 2A-4 follows the same route up Powell Street and must address the same design and operations issues as the 2A-2 alignment, but instead of stopping at a Kirkland Yard station, and turning around at Kirkland, this option would utilize a small section of new surface track and existing F-Line streetcar track to make a one-way loop along Powell, Jefferson, Mason and Beach Streets before returning to the Kirkland Yard area to head south. By using the short loop all turnaround terminal activities would be off the Kirkland Yard site.

The distance of the one-way loop turnaround is approximately 2,000 feet. All five intersections in the extended one-way loop are signalized. The total distance for tracks (both directions Washington Square to Kirkland and the one-way loop) is 6,700 feet. At 2030 estimated service levels, this concept would require a total of 24 T-Line trains and 12 F-Line streetcars in the peak hour to share two one block segments of track. This would equal a train passing a fixed point at 1 minute 40 second intervals – assuming they are equally spaced during the peak hour. The service level of 36 trains (LRT + F-Line) per hour would be very challenging to operate and maintain in a partially mixed traffic right of way. Fisherman’s Wharf commercial business leaders previously have stated their opposition to LRT operations on the F-Line historic streetcar tracks. All trains would be required to pass one existing platform between Powell and Mason Streets on the Embarcadero that is currently served by the F-Line. T-Line trains would likely need to serve this station, because they would be interspersed with F-Line streetcars and the option to skip stations does not appear to be feasible. The high likelihood of bunching with an F-Line train will be almost constant during the peak period of service. For many reasons, the turnaround concept is not a desirable option. The remainder of information about this option – aside from the turnaround loop - is the same as option 2A-2.

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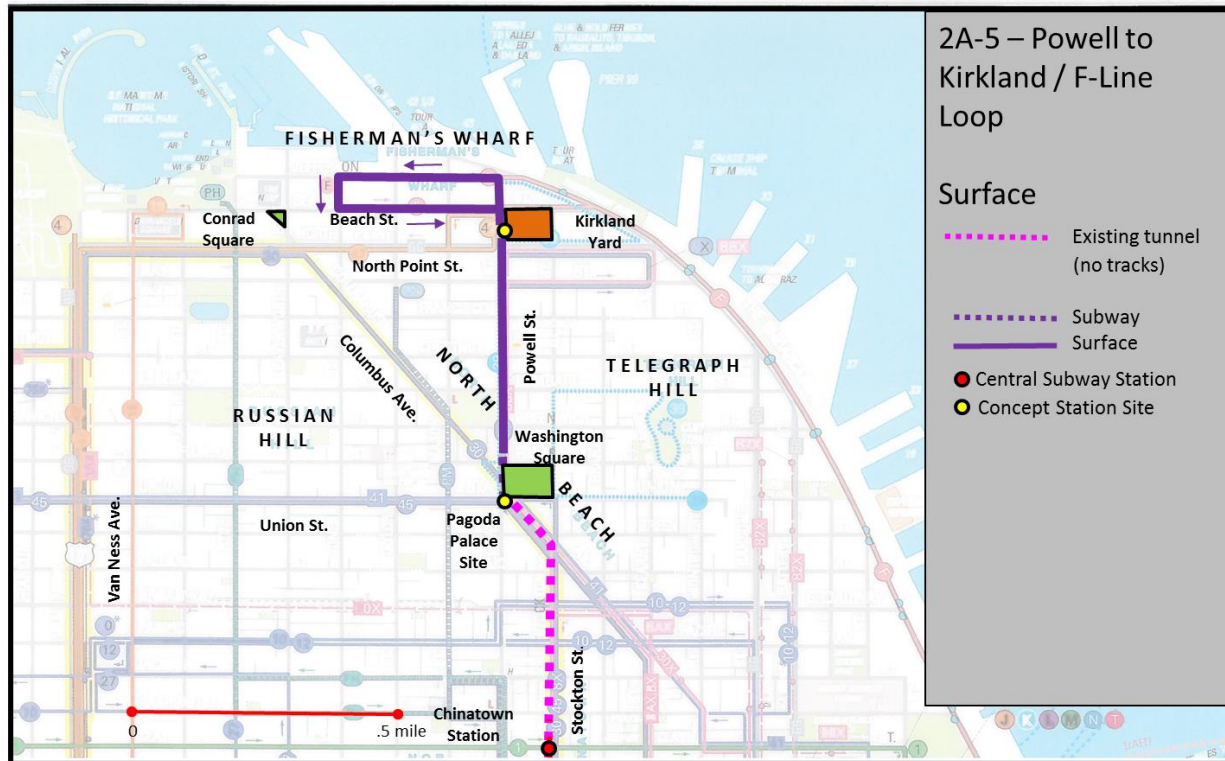


THIRD STREET

To Fisherman's Wharf

**Concept Alignment 2A-5:
Powell Street – surface: (North Beach to Kirkland Yard) + surface: (Powell +
F-Route Loop)**

Figure C-7 – Concept Alternative Alignment 2A-5



Alignment 2A-5 follows the same route up Powell Street and must address the same design and operations issues as the 2A-1 alignment, but instead of stopping at Kirkland Yard, this option would utilize one block of new surface track on Powell Street and existing F-Line streetcar track to make a one-way loop along Powell, Jefferson, Jones and Beach Streets before returning to the Kirkland Yard area to head south. By using the F-Line Loop all turnaround terminal activities would be off the Kirkland Yard site. The distance of the new track and F-Line Loop based extension and turnaround is approximately 3,850 feet. All nine intersections in the F-Line Loop are signalized. The total distance for tracks (both directions Washington Square to Kirkland plus the one-way loop) is 8,550 feet.

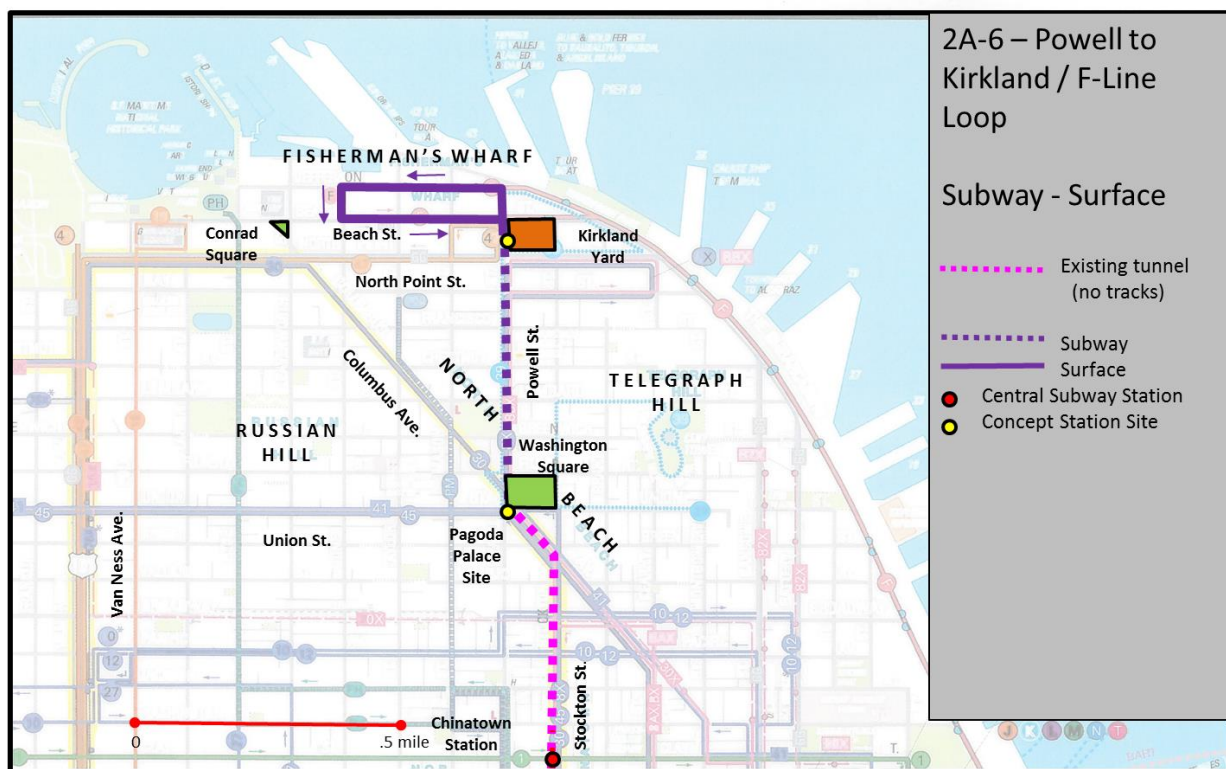
At 2030 estimated service levels, this concept would require a total of 24 T-Line trains and 12 F-Line streetcars in the peak hour to share a seven block segment of track. This would equal a train passing a fixed point at 1 minute 40 second intervals – assuming they are equally spaced during the peak hour. The service level of 36 trains (LRT + F-Line) per hour would be very challenging to operate and maintain in a partially mixed traffic right of way. Fisherman’s Wharf business leaders previously have stated their

opposition to LRT operations on the F-Line historic streetcar tracks. All trains would be required to pass the F-Line layover location on Jones Street and four existing station platforms between Powell and Mason Streets on the Embarcadero that are currently served by the F-Line. T-Line trains would likely need to serve these stations, because they would be interspersed with F-Line streetcars and the option to skip stations does not appear to be feasible. The high likelihood of bunching with an F-Line train will be almost constant during the peak period of service. For many reasons, the turnaround concept is not a desirable option.

The remainder of information about this option – aside from the turnaround - is the same as option 2A-1.

**Concept Alignment 2A-6:
Powell Street – subway: (North Beach to Kirkland Yard) + surface: (Powell + F-Route Loop)**

Figure C-8 – Concept Alternative Alignment 2A-6



Alignment 2A-6 follows the same route up Powell Street and must address the same design and operations issues as the 2A-2 alignment, but instead of stopping at Kirkland Yard, this option would utilize a new one block section of surface track on Powell Street, and existing F-Line streetcar track to make a one-way loop along Powell, Jefferson, Jones and Beach Streets before returning to the Kirkland Yard area to head south. By

using the F-Line Loop all turnaround terminal activities would be off the Kirkland Yard site.

The distance of the new track and F-Line Loop based extension and turnaround is approximately 3,850 feet. All nine intersections in the F-Line Loop are signalized. The total distance for tracks (both directions Washington Square to Kirkland plus the one-way loop) is 8,550 feet.

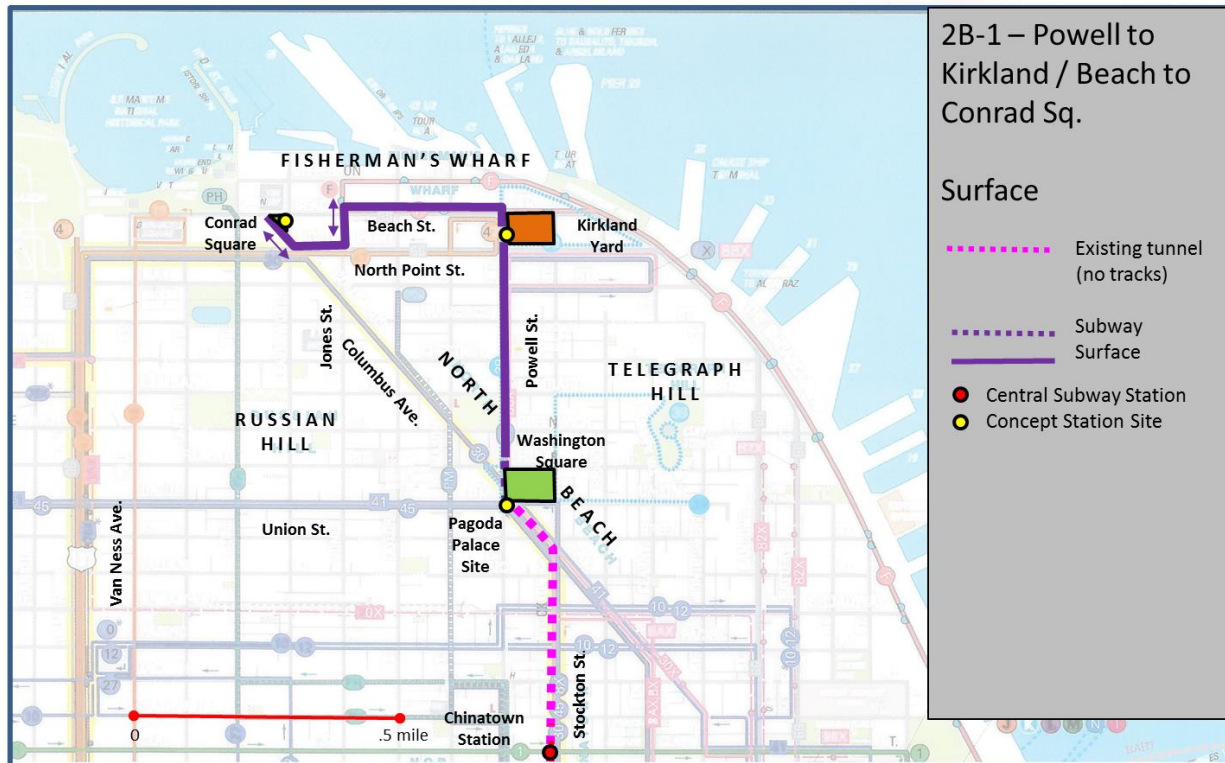
At 2030 estimated service levels, this concept would require a total of 24 T-Line trains and 12 F-Line streetcars in the peak hour to share a seven block segment of track. This would equal a train passing a fixed point at 1 minute 40 second intervals – assuming they are equally spaced during the peak hour. The service level of 36 trains (LRT + F-Line) per hour would be very challenging to operate and maintain in a partially mixed traffic right of way. Fisherman's Wharf business leaders previously have stated their opposition to LRT operations on the F-Line historic streetcar tracks. All trains would be required to pass the F-Line layover location on Jones Street and four existing station platforms between Powell and Mason Streets on the Embarcadero that are currently served by the F-Line. T-Line trains would likely need to serve these stations, because they would be interspersed with F-Line streetcars and the option to skip stations does not appear to be feasible. The high likelihood of bunching with an F-Line train will be almost constant during the peak period of service. For many reasons, the turnaround concept is not a desirable option.

The remainder of information about this option – aside from the turnaround - is the same as option 2A-2.

This area intentionally left blank.

**Concept Alignment 2B-1:
Powell Street – surface: (North Beach to Kirkland Yard) surface: (Powell, Beach
Street to Conrad Square)**

Figure C-9 – Concept Alternative Alignment 2B-1



Alignment 2B-1 follows the same route up Powell Street and must address the same design and operations issues as the 2A-1 alignment, but instead of stopping at Kirkland Yard, this option would utilize a one block section of new surface track on Powell Street, and turn left on a new three block section of track on the north side of Beach Street, followed by a one block segment on Jones Street, and a one-block segment on North Point Street to continue to a surface terminal at Conrad Square.

LRT trains would then turnaround and return east on new track on North Point Street, and Jones Street, and then utilize existing F-Line tracks for three blocks on the south side of Beach Street to return to Kirkland Yard. Seven of eight intersections in this surface option are signalized. Only the triangular intersections at Conrad Square are controlled using stop signs. The distance of this Beach Street loop based extension and turnaround is approximately 4,700 feet. The total distance for tracks (both directions Washington Square to Kirkland, plus both directions on Beach Street) is 9,400 feet.

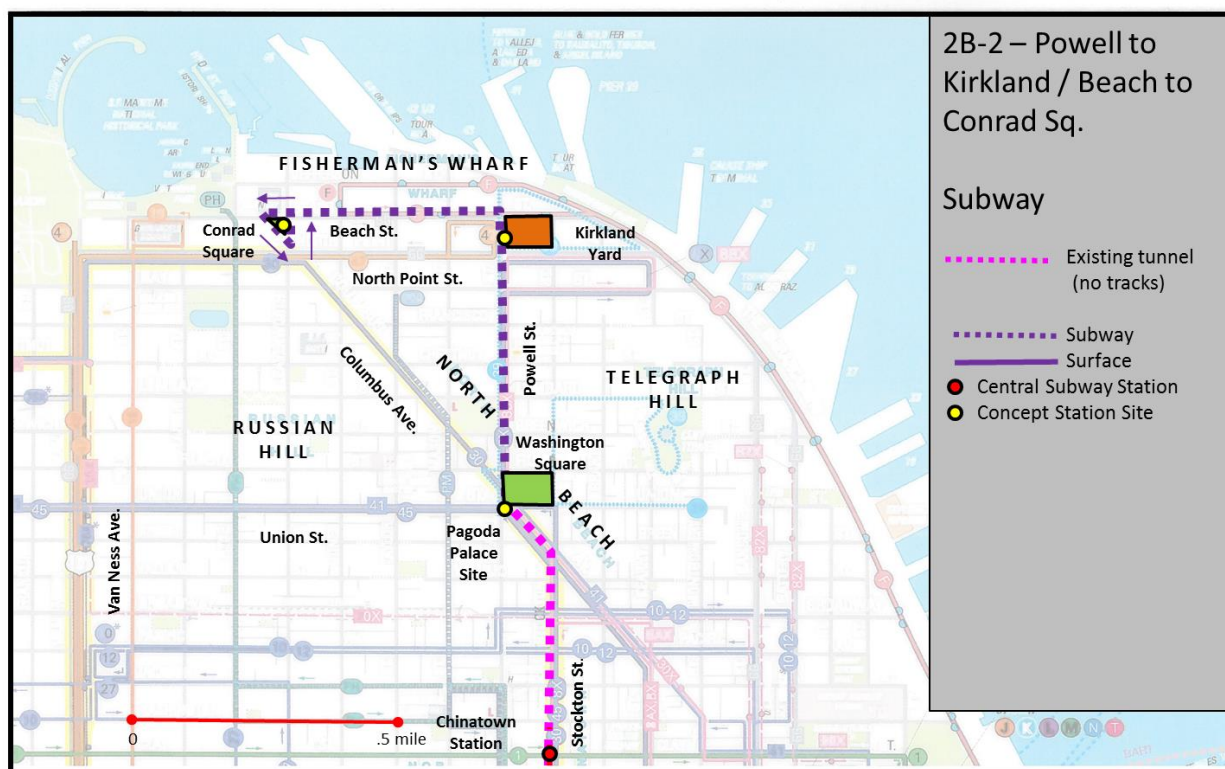
At 2030 estimated service levels, this concept would require a total of 24 T-Line trains and 12 F-Line streetcars in the peak hour to share a three block segment of track. This

would equal a train passing a fixed point at 1 minute 40 second intervals – assuming they are equally spaced during the peak hour. The service level of 36 trains (LRT + F-Line) per hour would be very challenging to operate and maintain in a partially mixed traffic right of way. All trains would be required to pass one existing station platform between Jones Street and Powell on Beach Street that is currently served by the F-Line. T-Line trains would likely need to serve this station, because they would be interspersed with F-Line streetcars and the option to skip stations does not appear to be feasible. The high likelihood of bunching with an F-Line train will be almost constant during the peak period of service.

The remainder of information about this option is the same as option 2A-1.

**Concept Alignment 2B-2:
Powell Street – subway: (North Beach to Kirkland Yard) + subway: (Kirkland Yard to Conrad Square)**

Figure C-10 – Concept Alternative Alignment 2B-2

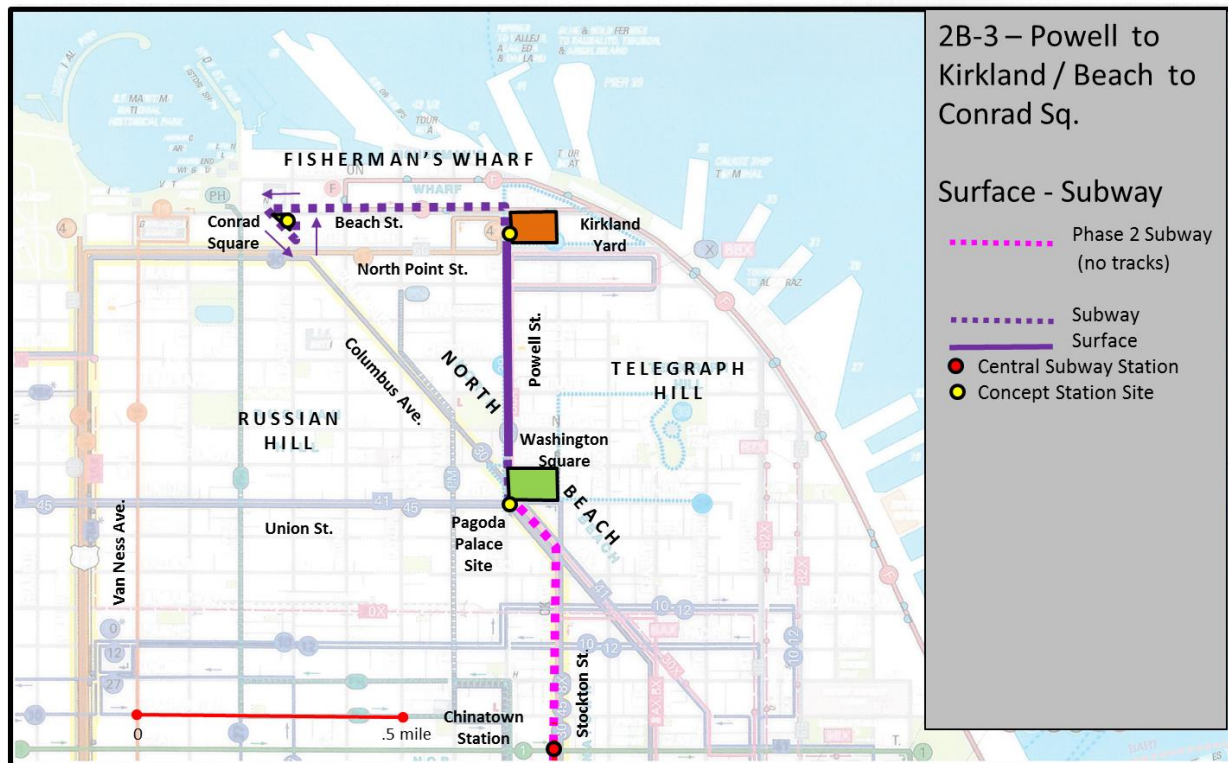


Alignment 2B-2 follows the same route up Powell Street as alignment 2B-1, or 2A-1, but like alignment 2A-2, it is in a subway to a station at Kirkland Yard. The alignment then continues via subway to a station and terminal at or near Conrad Square. Southbound LRT train operation would be the opposite of the northbound described route. The distance of this Powell Street + Beach Street alignment is approximately 4,750 feet. The

total distance (both directions Washington Square to Kirkland plus both directions Kirkland to Conrad Square under Beach Street) is 9,500 feet. Not shown on the map above are curved turns at Kirkland and Conrad Square that would extend outward into the next block under private properties to allow for subway operations to occur that are smoother and quicker than a surface operation.

**Concept Alignment 2B-3:
Powell Street – surface: (North Beach to Kirkland Yard) + subway: (Kirkland Yard to Conrad Square)**

Figure C-11 – Concept Alternative Alignment 2B-3

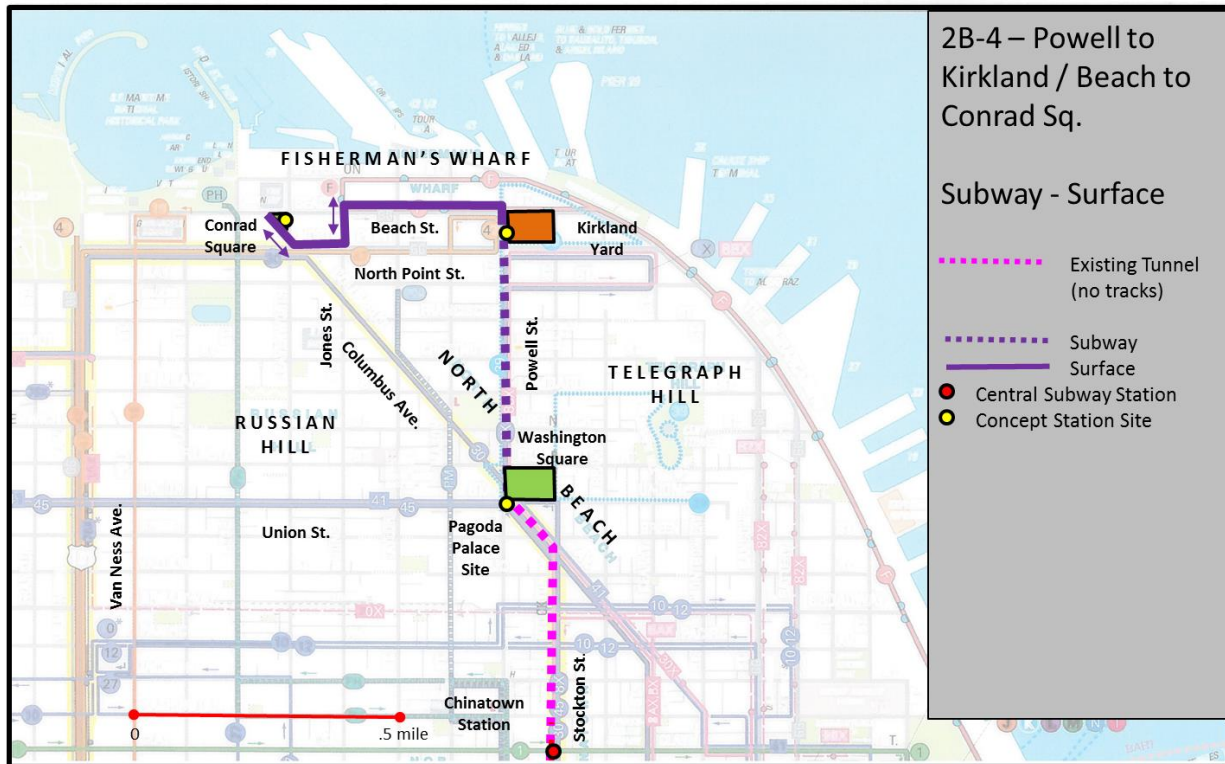


Alignment 2B-3 follows the same route up Powell Street, and must address the same design and operations issues as the 2A-1 alignment, but instead of stopping at Kirkland Yard, this option would have the trains enter an underground portal near the Kirkland Yard to continue via subway to a terminal at or near Conrad Square. Southbound LRT train operation would be the opposite of the northbound described route.

Preliminary analysis in the Constructability report found this concept to be not feasible due to the need for severe grades to transition between the surface and subway alignments necessitated by a requirement for a deep subway tunnel under Beach Street. Since this concept alignment was found to be not feasible, all further analysis was stopped.

**Concept Alignment 2B-4:
Powell Street – subway: (North Beach to Kirkland Yard) + surface: (Powell, Beach Street to Conrad Square)**

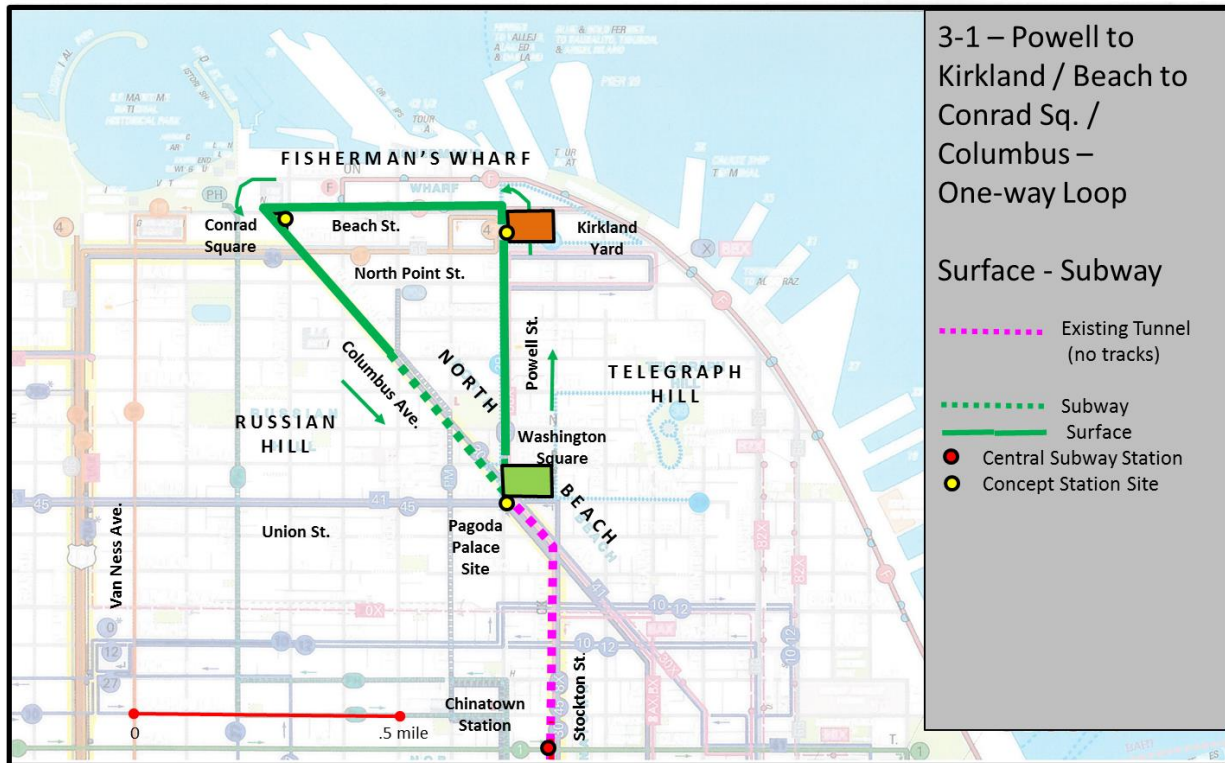
Figure C-12 – Concept Alternative Alignment 2B-4



Alignment 2B-4 follows the same route up Powell Street and must address the same design and operations issues as the 2A-2 alignment, but instead of stopping at Kirkland Yard after coming to the surface, this option would utilize a one block section of new surface track on Powell Street, and turn left on a new three block section of track on the north side of Beach Street, followed by a one block segment on Jones Street, and a one-block segment on North Point Street to continue to a surface terminal at Conrad Square.

Preliminary analysis in the Constructability report found this concept to be not feasible due to the need for severe grades to transition between the surface and subway alignments necessitated by a requirement for a deep subway tunnel under Beach Street. Since this concept alignment was found to be not feasible, all further analysis was stopped.

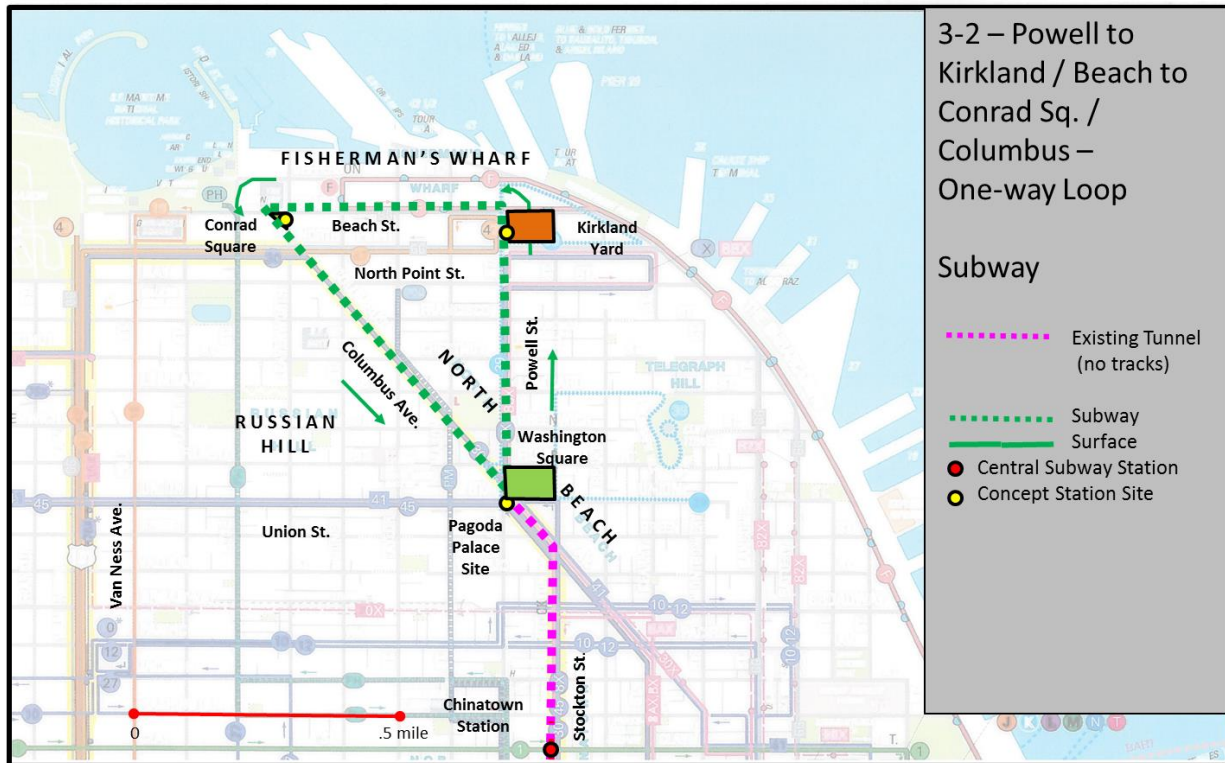
**Concept Alignment 3-1:
One-Way Loop: Powell Street – subway: (North Beach to Kirkland) + surface: (Kirkland Yard to Conrad Square + surface: (Conrad Square to North Beach)**
Figure C-13 – Concept Alternative Alignment 3-1



Alignment 3-1 consists of a one-way loop between North Beach and the Fisherman’s Wharf area. Trains would operate via a surface alignment (same as alignment 2A-1) after they come to the surface via a portal north of Washington Square. Once on the surface they would operate via Powell Street to Kirkland Yard, continue west on Beach Street to Conrad Square, and finally turn south on Columbus Avenue to head back to the North Beach station. North of Chestnut Street they would re-enter a subway portal before continuing south.

The approximate total distance of this one-way loop is 5,650 feet. Due to space limitations at Conrad Square, a station and terminal would be located at Kirkland Yard, with a smaller second station located be built at Conrad Square. The smaller footprint of a single loop concept appears to fit within the limited space at Conrad Square, but this requires additional analysis.

**Concept Alignment 3-2:
One-Way Loop: Powell Street – subway: (North Beach to Kirkland) + subway:
(Kirkland Yard to Conrad Square + subway: (Conrad Square to North Beach))
Figure C-14 – Concept Alternative Alignment 3-2**



Alignment 3-2 consists of a one-way loop between North Beach and the Fisherman’s Wharf area. Trains would operate via a subway alignment (same as alignment 2A-2) to Kirkland Yard, continue west beneath Beach or North Point Street to Conrad Square, and finally turn south beneath Columbus Avenue to head back to the North Beach station.

The approximate total distance of this one-way loop is 5,650 feet. Not shown on the map above are curved turns at Kirkland and Conrad Square that would extend outward into the next block under private properties to allow for subway operations to occur that are smoother and quicker than a surface operation.