

trains and southbound New Haven Line trains would share the same center platform, would support a more convenient across-platform transfer between Waterbury Branch and New Haven Line trains and would avoid the complicated relocation of electric utilities within the wye.

The conceptual capital cost for constructing this alternative would be \$73.0 million (2008 dollars).

→ **Wilbur Cross Parkway (W-14)**

Another new station alternative would add a Waterbury Branch station where the branch crosses under the Wilbur Cross Parkway (CT-15), roughly halfway between Devon and the existing Derby-Shelton Station (Figures 7-14 through 7-16).

The station would be accessed from Wellington Road, via either Wheelers Farms Road or the Wilbur Cross Parkway-Milford Parkway interchange ramp. Wellington Road would be extended, crossing under the Wilbur Cross-Milford Parkway ramp to a new parking structure east of the station. A second access road connecting the parking structure to Oronoque Road to the south could also be constructed.

The purpose of this station would be to capture customers who currently access Bridgeport and other New Haven Line stations via CT-8 from the north, reducing automobile congestion south of CT-15. A station at this location could also provide a convenient rail connection for commuters who travel on CT-15 or the Milford Parkway. However, the grading and structures required to overcome the steep slopes on the site would add to the construction cost of this alternative. Steep slopes and site constraints would also prevent the station from functioning as a multi-modal bus-to-rail transfer station.

The conceptual capital cost for constructing this alternative would be \$41.0 million (2008 dollars).

7.1.4.2 Existing Station Alternatives

Several Long List alternatives propose improvements to existing Waterbury Branch stations. Derby-Shelton and Waterbury stations were identified as potential locations for expanded multi-modal transfer hubs where passengers would have robust connections between rail and bus, as well as expanded station parking. Significant improvements to parking and bus facilities are only examined for these stations, though more modest upgrades could potentially be added to others.

The potential relocation of Seymour Station to a new site north of the Naugatuck River adjacent to property owned by Haynes Development was not included on the Long List of Alternatives because development plans at the site are still in the early stages. This concept, which would place the station along the proposed Beacon Falls Passing Siding – South Option described in Alternative W-10, has community support and will be considered in the future if the Haynes master plan is implemented, and would not be precluded by any of the other Long List commuter rail alternatives.

→ **Expanded Multi-Modal Station at Derby-Shelton Alternative 1 (W-15)**

This alternative would replace the existing boarding area with a 680-foot high-level platform north of the existing station building on the west side of the track (Figures 7-17 and 7-18). No additional track or siding would be added. Operationally, a Derby-Shelton multi-modal hub

would function as a transfer hub between commuter rail and other modes, with rail and bus schedules adjusted to better accommodate intermodal connections. Waterbury Branch rail service could be operated either as a shuttle service between Waterbury and Derby, with all passengers transferring at the expanded Derby-Shelton Station, or as a mix of shuttle and Bridgeport service. Combined with one of the passing siding alternatives described in Section 3.3.4, introducing shuttle service between Waterbury and Derby would allow additional Waterbury Branch trains to be operated, because shuttles would only have to travel half the distance of trains that currently make the full trip from Waterbury to Bridgeport.

There are several options for improving bus transfer facilities and/or expanding parking at Derby-Shelton. Parking Option A would add four bus bays adjacent to the existing station building and the relocated platform, with additional surface parking created under the CT-8 viaduct (Figure 7-19). Parking Option B would locate the bus bays under CT-8, with expanded surface parking north and northwest of the station building (Figure 7-20). Parking Option C would maximize bus facilities at the expense of creating new surface parking, with four bus bays adjacent to the station building and 4 bays under CT-8 (Figure 7-21).

Parking Options D, E, and F would replace the Valley Transit facility on the northern portion of the site with parking, either surface or structured (Figures 7-22 through 7-24). Option D would add this parking facility to Option A; Option E would add parking to Option B; and Option F would add parking to Option C. Options D, E, and F would require the relocation of Valley Transit to another site and the removal of an underground fuel tank behind the Valley Transit building.

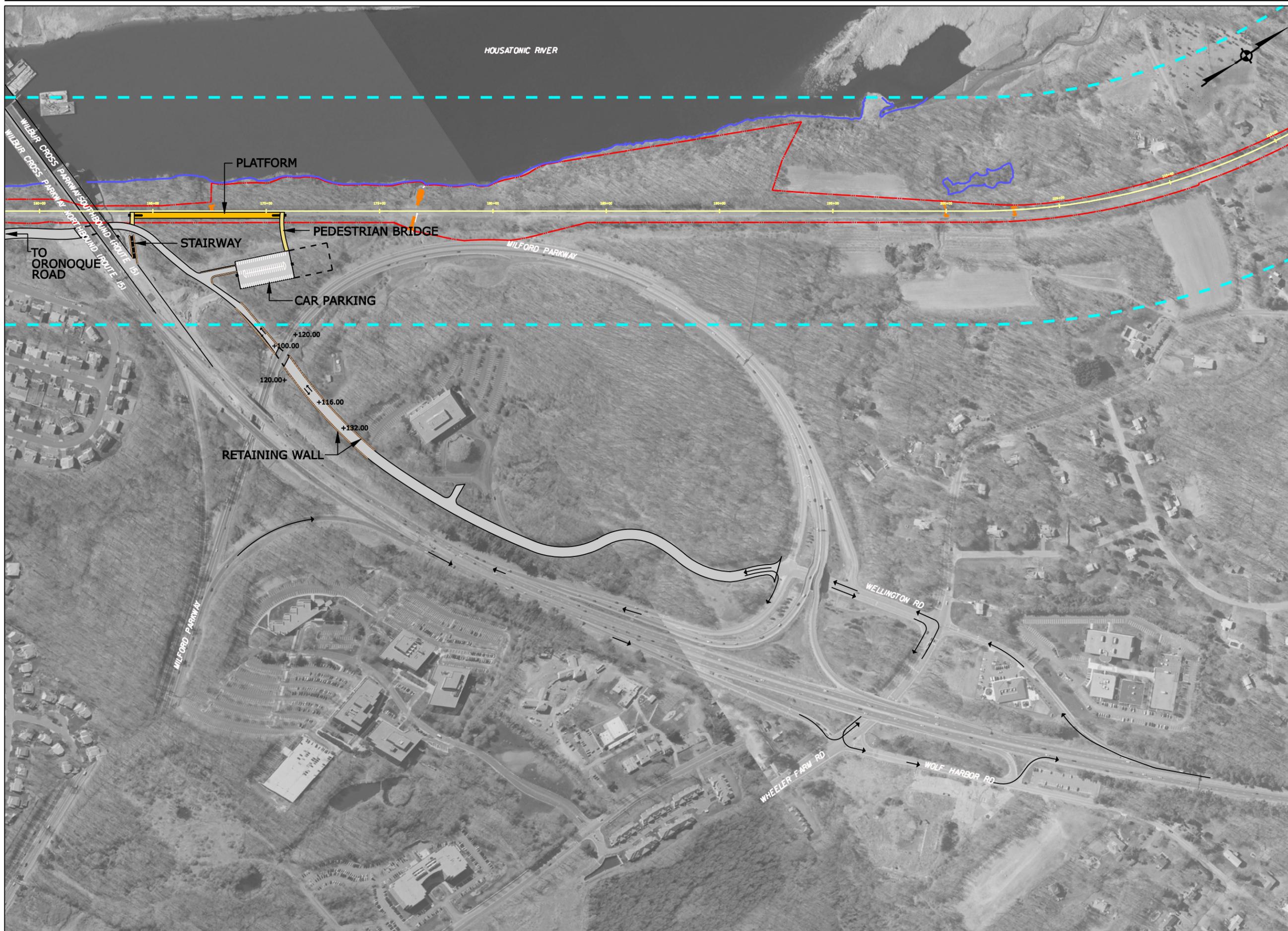
The Town of Derby owns the large parcel of land east of the track, along the Naugatuck River. This land could potentially be developed as a mixed-use transit-oriented development, with ground-level retail and residential units above, as well as additional parking. To access this parcel, a pedestrian overpass could be constructed from the platform over the track, and N. Division Street could be extended to provide vehicular access (Figure 7-17). The September 2009 *Waterbury Branch TOD Report* discusses this and other TOD opportunities along the corridor in more detail.

The conceptual capital cost for constructing this alternative would be \$3.0 million (2008 dollars).

→ **Expanded Multi-Modal Station at Derby-Shelton Alternative 2 (W-16)**

Under this alternative, a siding would be constructed east of the existing track, beginning at the north end of the station building and continuing north approximately 3,700 feet before tying back into the main track (see discussion of Derby siding in Section 7.1.3.3). The existing boarding area would be replaced with a 680-foot center platform between the main track and the siding, with an overpass providing pedestrian access between the platform, the parking area, and the potential TOD site to the east. A conceptual plan and section for this alternative are shown in Figures 7-25 and 7-26.

This alternative, combined with one of the passing siding alternatives described in Section 7.1.3.3, would support shuttle service between Waterbury and Derby, which would allow additional Waterbury Branch trains to operate on the branch. The two-track center platform configuration of this alternative would also provide a convenient across-platform transfer for passengers changing trains at the station.



LEGEND

- EXISTING R.R. TRACK
- R.O.W.
- RAIL STUDY CORRIDOR
- MILE POST MARKER
- R.R. STRUCTURES, PLATFORMS
- WATERCOURSE
- CHANNEL ENCROACHMENT LINE
- R.R. STATION PARKING
- SIDING/NEW R.R. TRACK

Figure 7-14:
Wilbur Cross
Station

CROSSING DATA

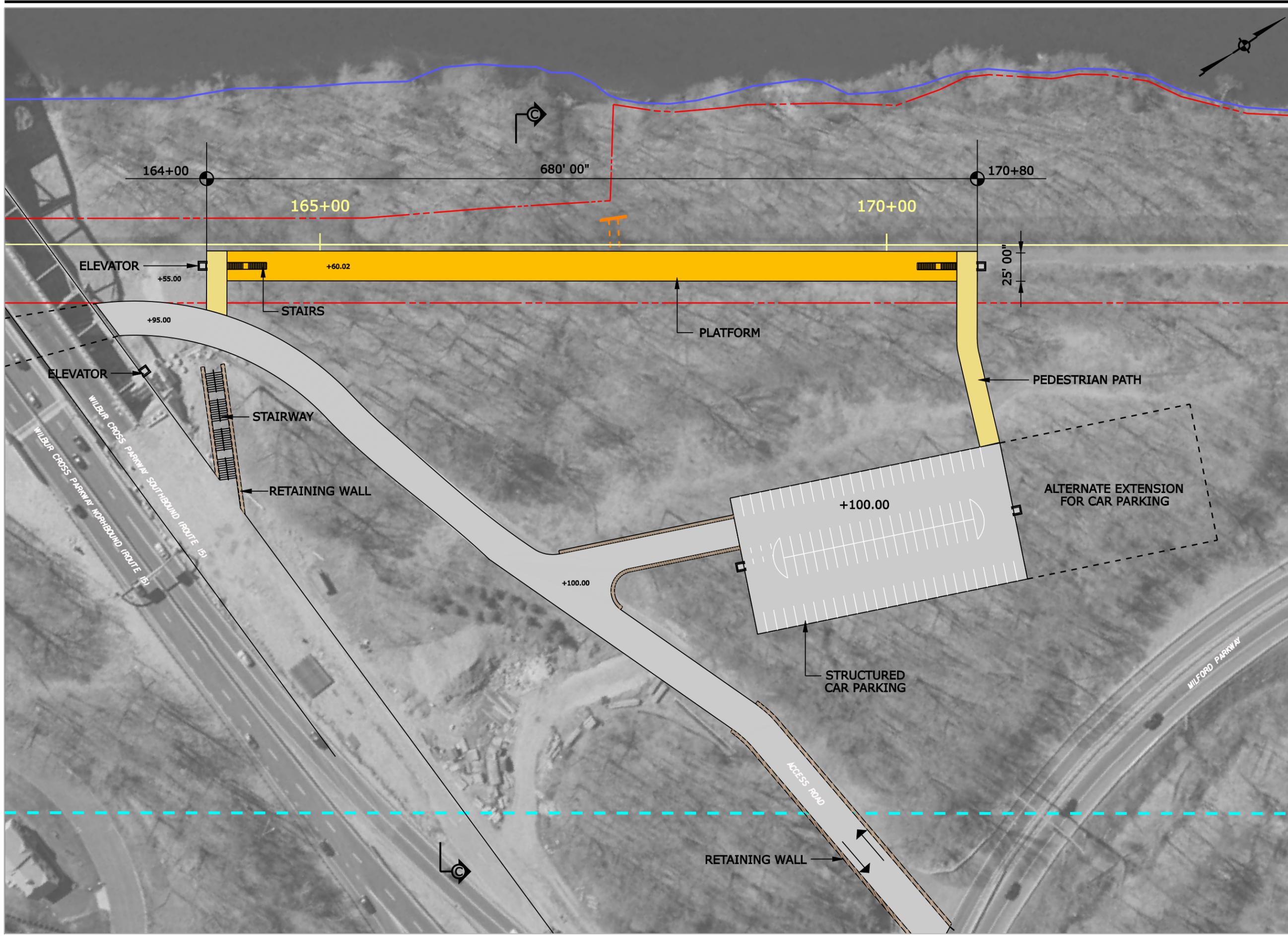
MILE	CROSSING STREET/FEATURE
6.16	UG STAMFORD RD. OD
	AG - AT GRADE
	UG - UNDERGRADE
	OH - OVERHEAD
	OPEN DECK



WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
WILBUR CROSS
R.R. STATION PLAN





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - XX MILE POST MARKER
 - R.R. STRUCTURES, PLATFORMS
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-15:
Wilbur Cross
Station Detail

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.16	UG STAMFORD RD. 00

AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK



WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
WILBUR CROSS
R.R. STATION PLAN



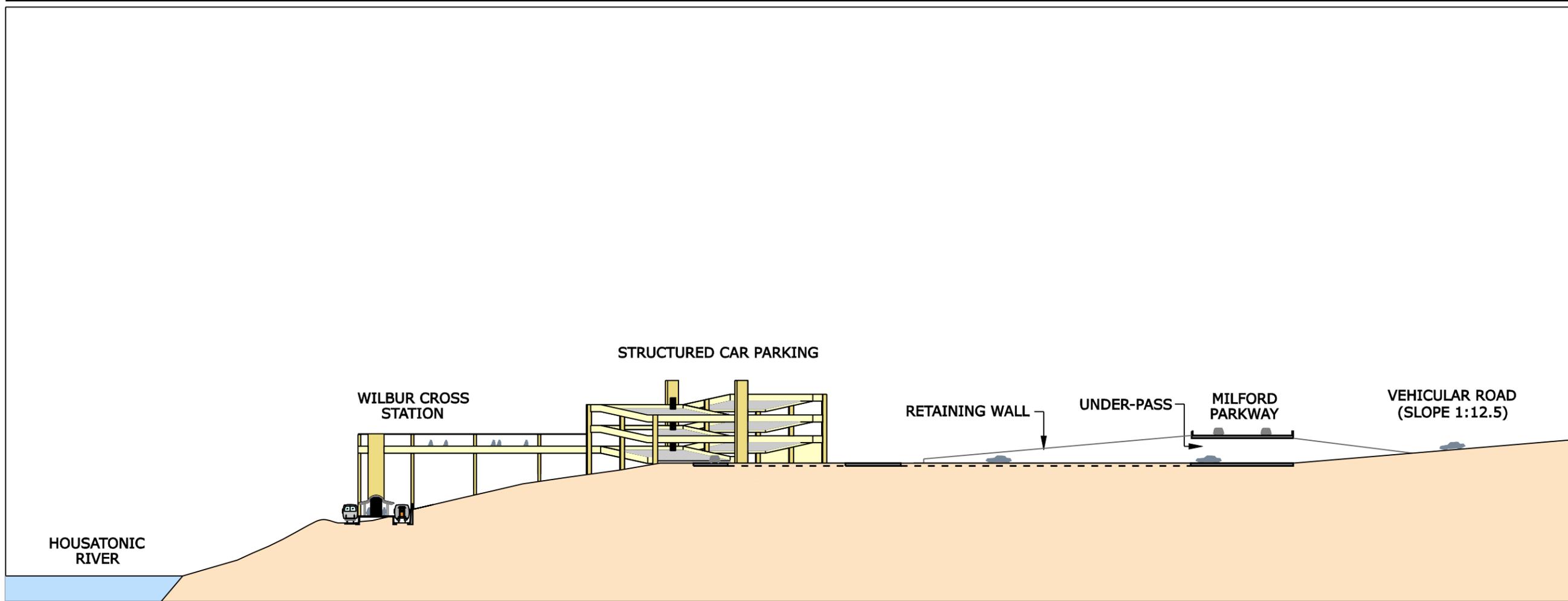


Figure 7-16:
Wilbur Cross
Station Section

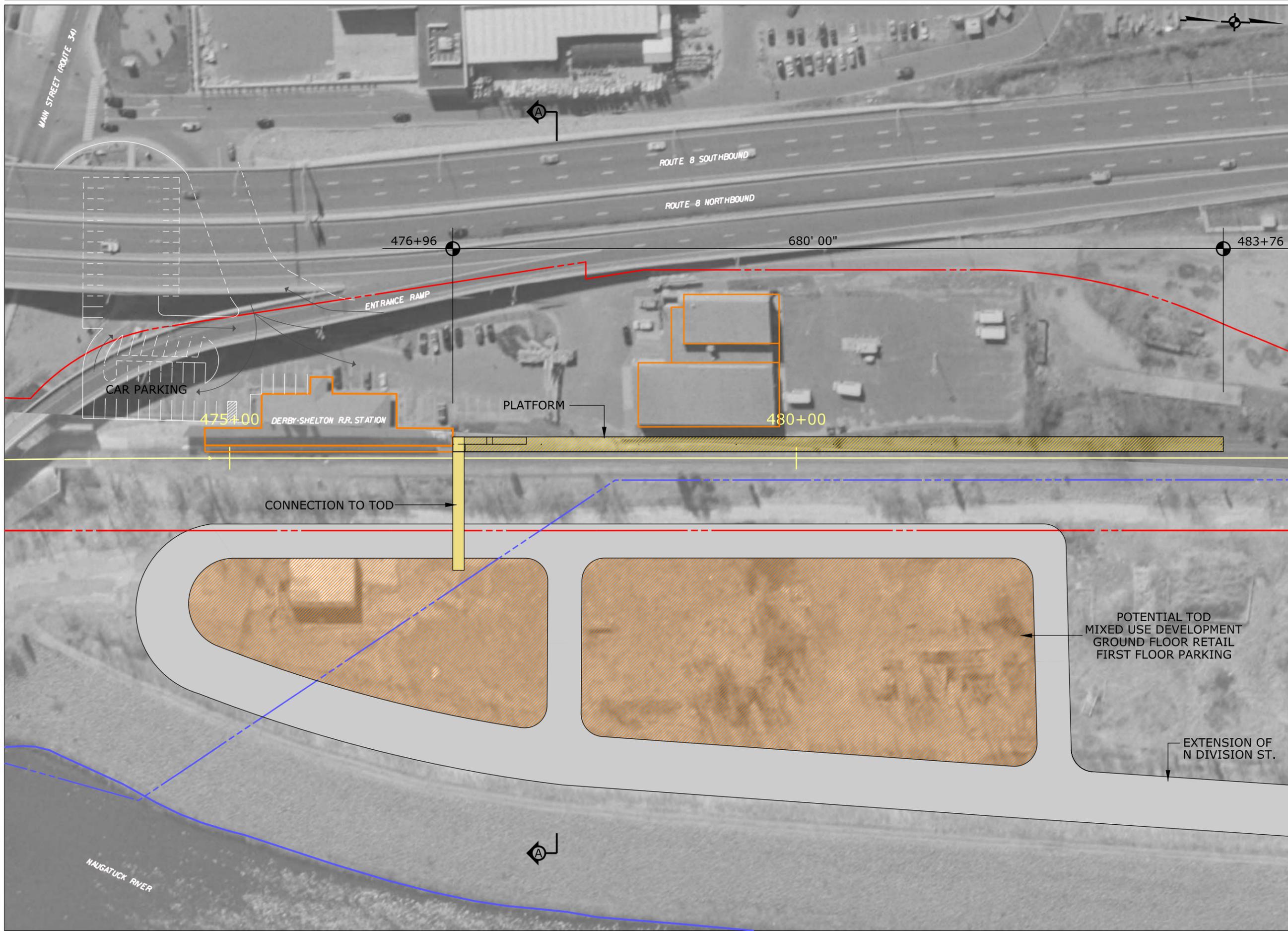
SECTION C - C



WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
WILBUR CROSS R.R. STATION
SECTION





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

**Figure 7-17:
Derby-Shelton
Multi-Modal Station
Alternative 1**

CROSSING DATA

MILE	CROSSING STREET/FEATURE	TYPE
6.16	UG STAMFORD RD. 00	UG
		OPEN DECK

AG - AT GRADE
UG - UNDERGRADE
OH - OVERHEAD



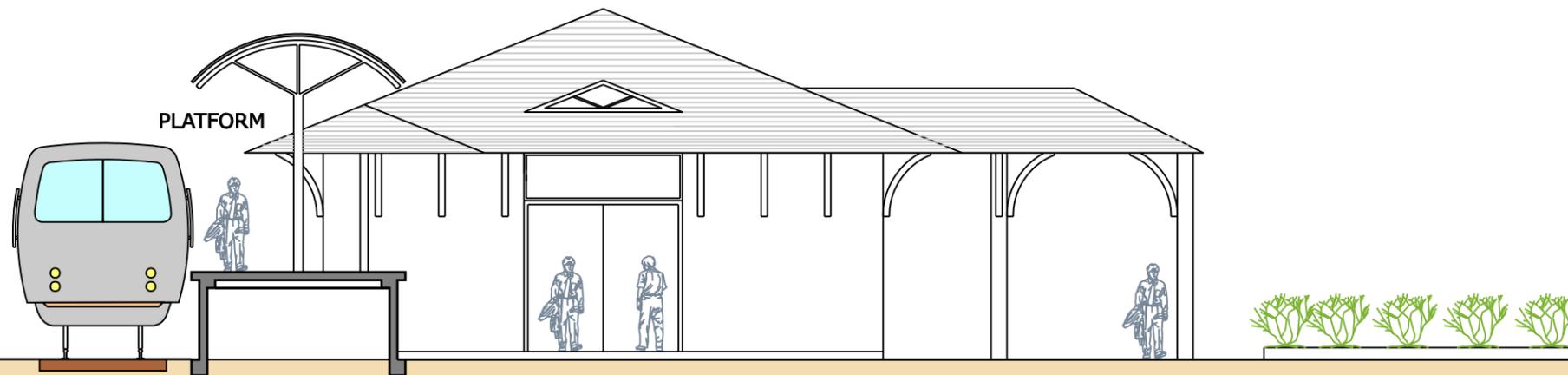
POTENTIAL TOD
MIXED USE DEVELOPMENT
GROUND FLOOR RETAIL
FIRST FLOOR PARKING

EXTENSION OF
N DIVISION ST.

WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
DERBY-SHELTON STATION
ALTERNATIVE - 1
PROPOSED PLAN





SECTION A - A

Figure 7-18:
Derby-Shelton Multi-
Modal Station
Alternative 1
Section



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*WATERBURY BRANCH LINE
DERBY SHELTON R.R. STATION
SECTION DETAIL*



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- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-19:
Derby-Shelton
Multi-Modal Station
Parking Option A

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.16	UG STAMFORD RD. 00

AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK



WATERBURY AND NEW CANAAN
 BRANCH LINES
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 PROJECT NO. 170-2562

WATERBURY BRANCH LINE
 DERBY-SHELTON STATION
 PARKING OPTION A
 PROPOSED PLAN





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-20:
Derby-Shelton
Multi-Modal Station
Parking Option B

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.16	UG STAMFORD RD. OD

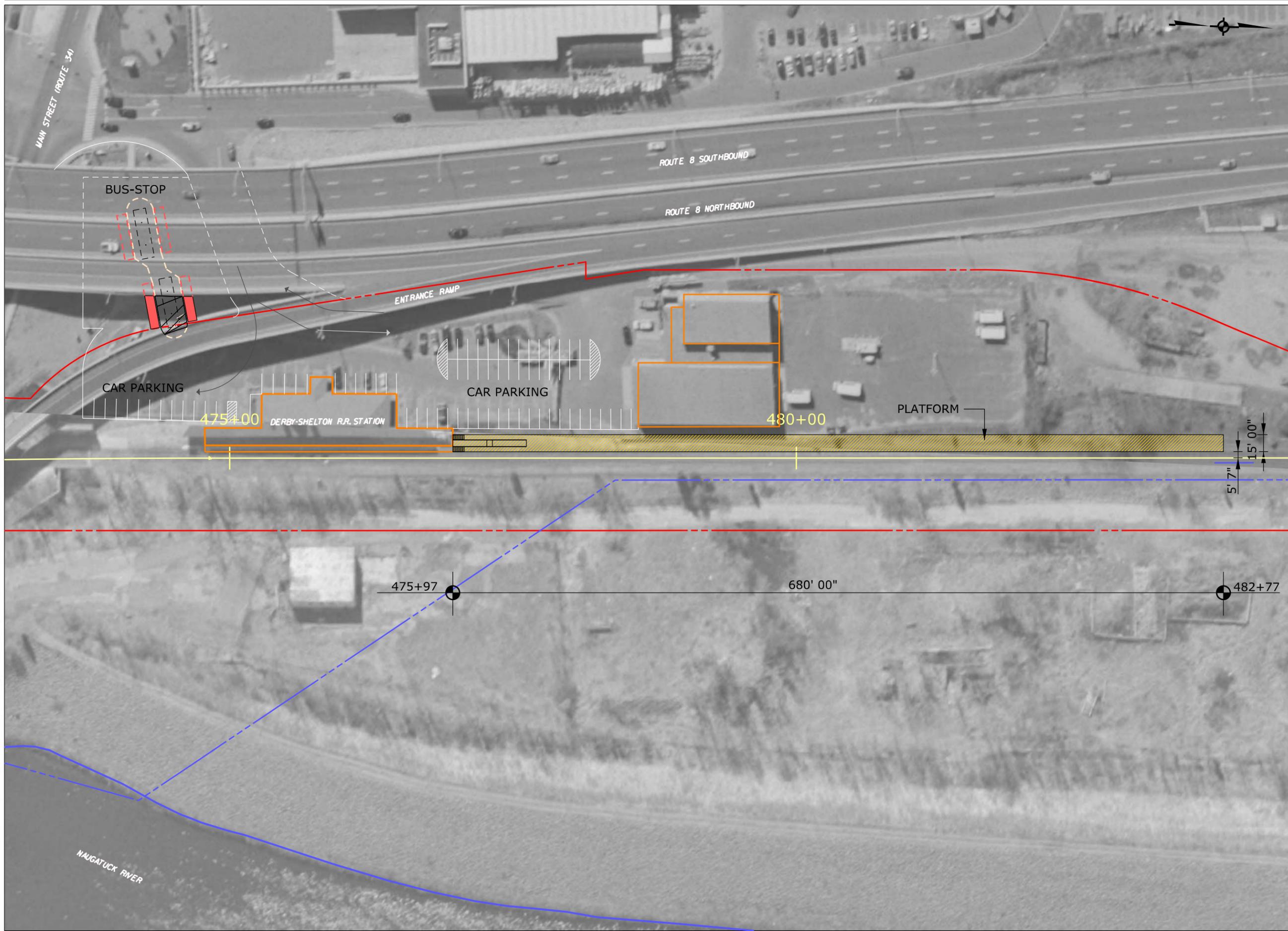
AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK



WATERBURY AND NEW CANAAN
BRANCH LINES
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PROJECT NO. 170-2562

WATERBURY BRANCH LINE
DERBY-SHELTON STATION
PARKING OPTION B
PROPOSED PLAN



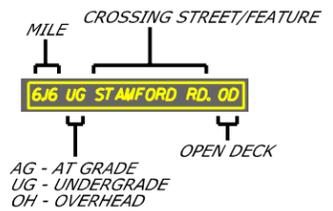


LEGEND

- EXISTING R.R. TRACK
- R.O.W.
- RAIL STUDY CORRIDOR
- MILE POST MARKER
- R.R. STRUCTURES
- PLATFORM, EXISTING
- PLATFORM, PROPOSED
- WATERCOURSE
- CHANNEL ENCROACHMENT LINE
- R.R. STATION PARKING
- SIDING/NEW R.R. TRACK

**Figure 7-21:
Derby-Shelton
Multi-Modal Station
Parking Option C**

CROSSING DATA



WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
DERBY-SHELTON STATION
PARKING OPTION C
PROPOSED PLAN





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-22:
Derby-Shelton
Multi-Modal Station
Parking Option D

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.6	UG STAMFORD RD. 00

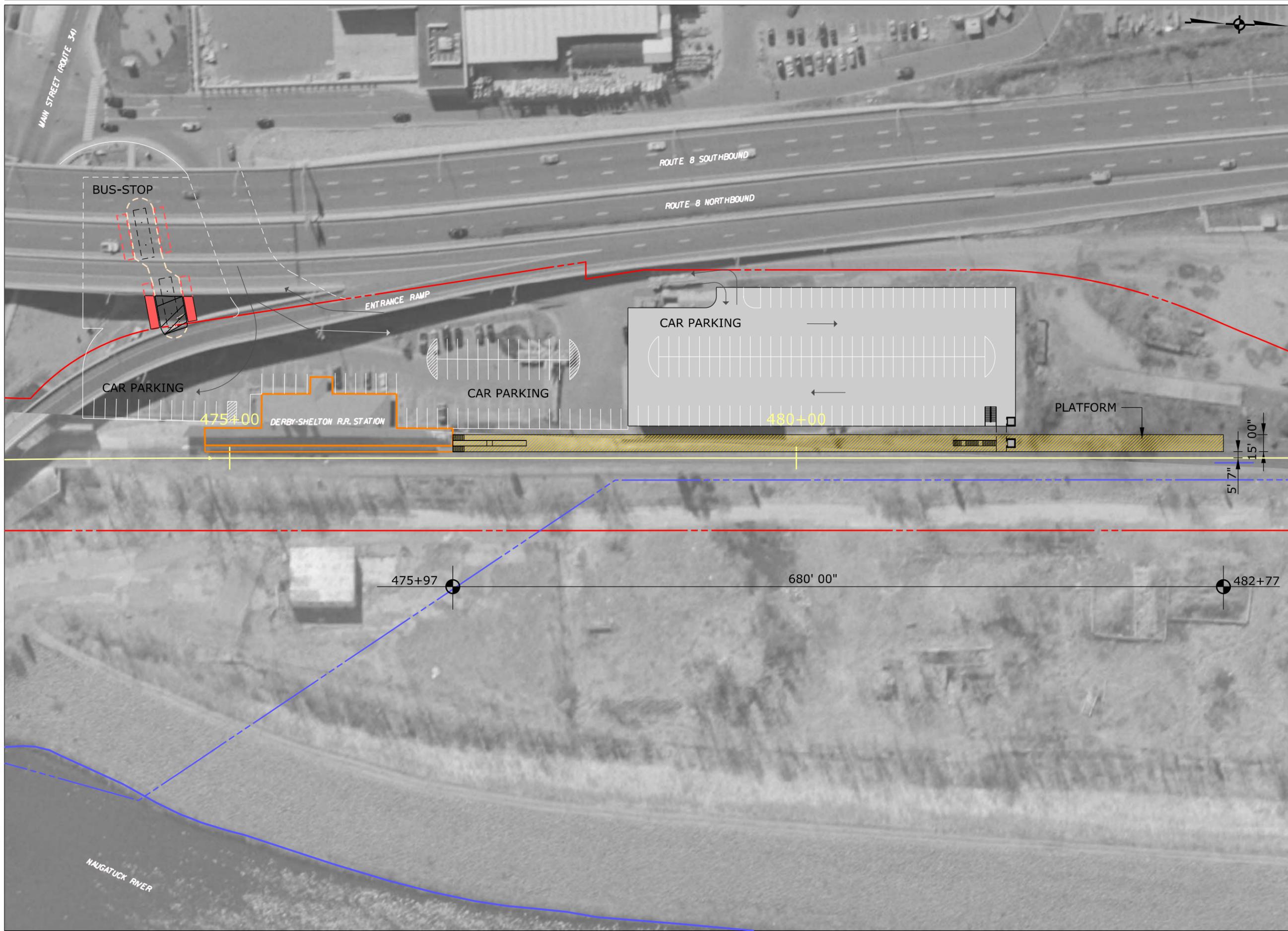
AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK



WATERBURY AND NEW CANAAN
 BRANCH LINES
 NEEDS & FEASIBILITY STUDY
 PROJECT NO. 170-2562

WATERBURY BRANCH LINE
 DERBY-SHELTON STATION
 PARKING OPTION D
 PROPOSED PLAN





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-23:
Derby-Shelton
Multi-Modal Station
Parking Option E

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.6	UG STAMFORD RD. 00

AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK



WATERBURY AND NEW CANAAN
 BRANCH LINES
 NEEDS & FEASIBILITY STUDY
 PROJECT NO. 170-2562

WATERBURY BRANCH LINE
 DERBY-SHELTON STATION
 PARKING OPTION E
 PROPOSED PLAN





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-24:
Derby-Shelton
Multi-Modal Station
Parking Option F

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.6	UG STAMFORD RD. 00

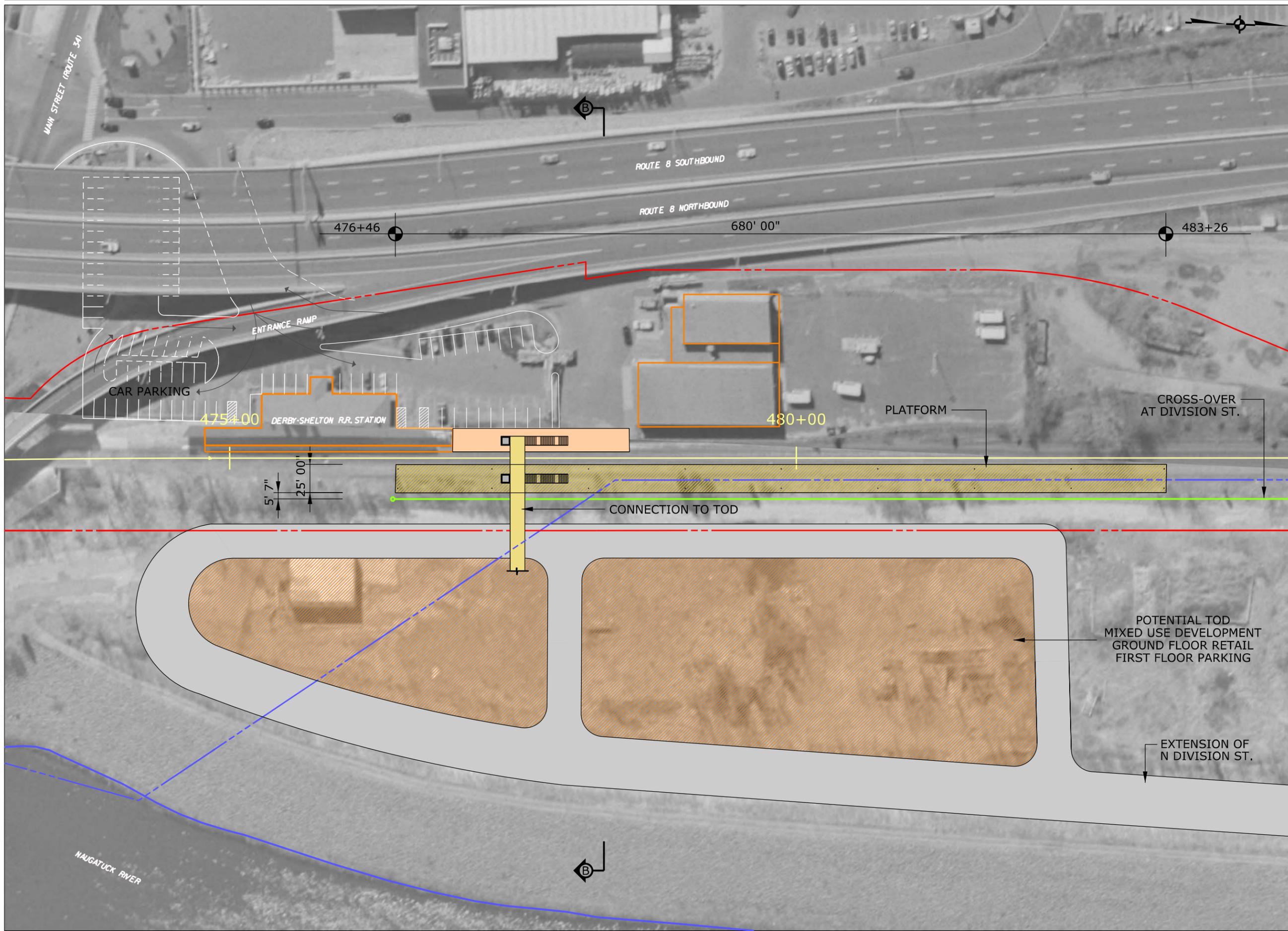
AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK



WATERBURY AND NEW CANAAN
 BRANCH LINES
 NEEDS & FEASIBILITY STUDY
 PROJECT NO. 170-2562

WATERBURY BRANCH LINE
 DERBY-SHELTON STATION
 PARKING OPTION F
 PROPOSED PLAN





- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

**Figure 7-25:
Derby-Shelton
Multi-Modal Station
Alternative 2**

CROSSING DATA

MILE	CROSSING STREET/FEATURE
6.16	UG STAMFORD RD. 00

AG - AT GRADE
 UG - UNDERGRADE
 OH - OVERHEAD
 OPEN DECK

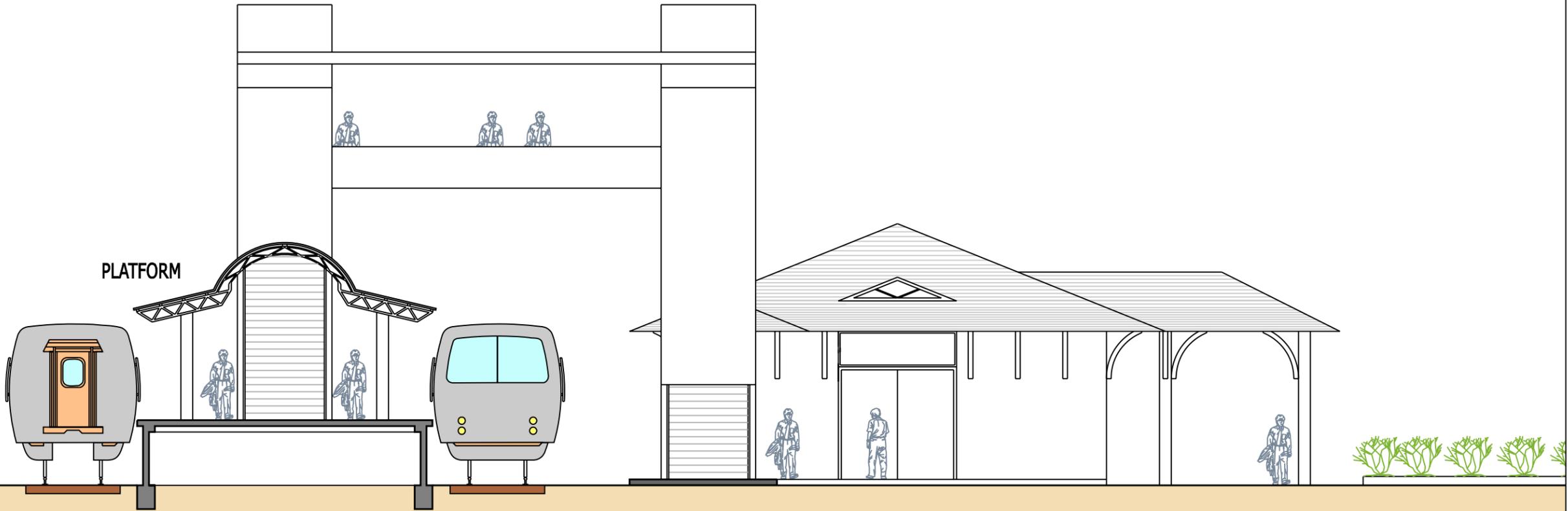


WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
DERBY-SHELTON STATION
ALTERNATIVE - 2
PROPOSED PLAN



Figure 7-26:
Derby-Shelton Multi-
Modal Station
Alternative 2
Section



SECTION B - B

SCALE IN FEET
0 5 10

*WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562*

*WATERBURY BRANCH LINE
DERBY SHELTON R.R. STATION
SECTION DETAIL*



The same six parking options and the TOD opportunity described for Expanded Multi-Modal Station at Derby-Shelton Alternative 1 could be applied to this alternative.

The conceptual capital cost for constructing this alternative would be \$13.0 million (2008 dollars).

→ Expanded Multi-Modal Station at Derby-Shelton Alternative 3 (W-17)

This alternative would be combined with the Double Track from Devon to Derby-Shelton Alternative (Section 7.1.3.2), with the second track continuing through the station area and tying back into the main track north of the station. Two 680-foot side platforms would be constructed adjacent to the tracks, with two overpasses providing pedestrian access between platforms and the potential TOD site to the east. A conceptual plan and section for this alternative are shown in Figures 7-27 and 7-28.

This alternative, combined with one of the passing siding alternatives, would support shuttle service between Waterbury and Derby, allowing additional Waterbury Branch trains to operate on the branch. The same six parking options and the TOD opportunity described for Expanded Multi-Modal Station at Derby-Shelton Alternative 1 could be applied to this alternative.

The conceptual capital cost for constructing this alternative would be \$143.0 million (2008 dollars).

→ Expanded Multi-modal Station at Waterbury (W-18)

This alternative would upgrade Waterbury Station to enhance transfers between rail and bus. Two bus bays would be added, as well as additional surface or structured parking. The existing high-level platform would be lengthened to 680 feet to accommodate an eight-car train consist. This alternative would also include five storage tracks in order to increase storage capacity at the northern end of the branch, a key operational need on the branch (Figure 7-29). The conceptual capital cost for constructing the alternative would be \$40.0 million (2008 dollars).

The Waterbury Development Corporation (WDC) is currently conducting a separate study of a Waterbury multi-modal station adjacent to the existing rail station. The proposed WDC concept would expand station parking and facilitate transfers between transit services by re-routing buses from the existing local bus “pulse point” on the Waterbury Green one-half mile away to the station, linking several of the area’s transit services. If both projects move forward, CTDOT will work with WDC to ensure that improvements in the Waterbury Station area are coordinated.

→ Relocated Naugatuck Platform (W-19)

This alternative would relocate the existing Naugatuck Station platform, replacing the existing boarding area with a 680-foot high-level elevated platform above the Maple Street/Water Street intersection, south of the existing station (Figure 7-2). Because the existing station is located on a curve, any high-level platform (even one shorter than 680 feet) would have to be relocated to a tangent section of track north or south of the station. The south location proposed here would coordinate with a planned parking structure, as well as existing and planned downtown development. Stairs would allow passengers to descend at either end of the platform, an elevator would be provided south of Maple Street, and a pedestrian walkway would directly connect an upper level of the planned parking structure with the platform.

The conceptual capital cost for constructing this alternative would be \$21.0 million (2008 dollars).

7.1.5 Other Mode Alternatives

This section describes a variety of build alternatives for replacing or supplementing existing passenger rail service on the Waterbury Branch with other transit modes. Schedules described for these alternatives are only conceptual and intended to demonstrate the level of service that would be achieved by that alternative. If one of these alternatives is advanced, final schedules would be developed by the appropriate transit service providers prior to implementation.

7.1.5.1 Rapid Transit Alternatives

Two alternatives would replace existing commuter rail with modes of rapid transit, largely using existing Waterbury Branch right-of-way for exclusive transit service.

→ Light Rail Transit (W-20)

Under the Light Rail Transit (LRT) alternative, commuter rail service on the Waterbury Branch would be replaced with light rail service operating on its own dedicated set of tracks. LRT is a form of rail-based transit utilizing lightweight passenger vehicles, typically powered electrically by overhead catenary lines.

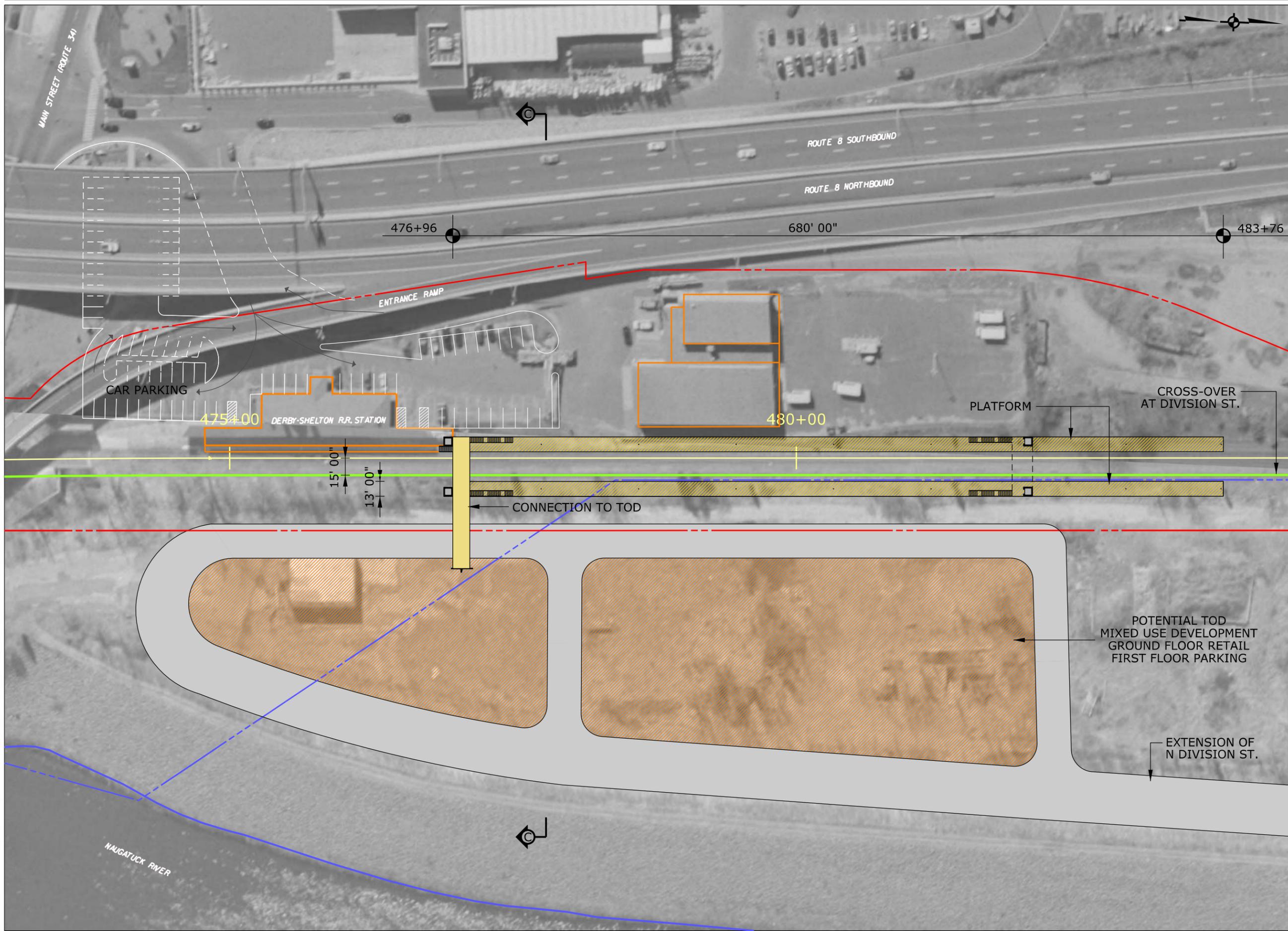
In order to mirror the service characteristics and travel markets served by an improved Waterbury Branch, it is assumed that, wherever possible, the LRT alternative would operate on a double-tracked rail line operating parallel to the Waterbury Branch and serving all stations currently served by the Waterbury Branch. Conceptual plans for the alignment and stations are provided in Appendix B – Waterbury Branch, LRT Alternative Drawings.

Existing freight rail service on the Waterbury Branch would be maintained under this alternative. As the Federal Railroad Administration requires sufficient spatial separation of freight traffic from passenger traffic in a shared corridor, it is assumed that any light rail track centerlines would be a distance of at least 25 feet from the Waterbury Branch track centerline; where this separation would not be possible, barriers would be constructed to separate the two lines. To accommodate this required separation, additional right-of-way would have to be acquired. A typical section of the combined railroad and LRT alignment is shown in Figure 7-30.

The alignment would begin at a new light rail station at Devon, adjacent to the wye where the Waterbury Branch meets the New Haven Line mainline. The alignment would continue north along the eastern edge of the Waterbury Branch right-of-way until reaching a new light rail station at Wilbur Cross Parkway.

From Wilbur Cross Parkway, the alignment would continue north along the eastern edge of the Waterbury Branch right-of-way, and cross over the Naugatuck River on a new bridge to reach the existing Derby-Shelton Station. The alignment would then continue for approximately one mile between the existing railroad and the Naugatuck River, crossing the river on a new bridge to serve the existing Ansonia Station. The alignment would then continue north. At Cone Pond, the right-of-way would narrow.

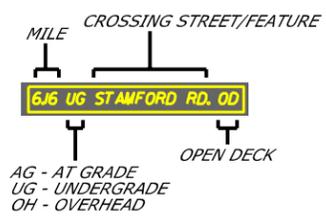
The alignment would then continue north, operating between the railroad and CT-115 (S. Main Street) until reaching Seymour Station. From here, the alignment would cross the Naugatuck



- LEGEND**
- EXISTING R.R. TRACK
 - R.O.W.
 - RAIL STUDY CORRIDOR
 - MILE POST MARKER
 - R.R. STRUCTURES
 - PLATFORM, EXISTING
 - PLATFORM, PROPOSED
 - WATERCOURSE
 - CHANNEL ENCROACHMENT LINE
 - R.R. STATION PARKING
 - SIDING/NEW R.R. TRACK

Figure 7-27:
Derby-Shelton
Multi-Modal Station
Alternative 3

CROSSING DATA



POTENTIAL TOD
 MIXED USE DEVELOPMENT
 GROUND FLOOR RETAIL
 FIRST FLOOR PARKING

WATERBURY AND NEW CANAAN
 BRANCH LINES
 NEEDS & FEASIBILITY STUDY
 PROJECT NO. 170-2562

WATERBURY BRANCH LINE
 DERBY-SHELTON STATION
 ALTERNATIVE - 3
 PROPOSED PLAN





Figure 7-28:
Derby-Shelton Multi-
Modal Station
Alternative 3
Section

SECTION C - C



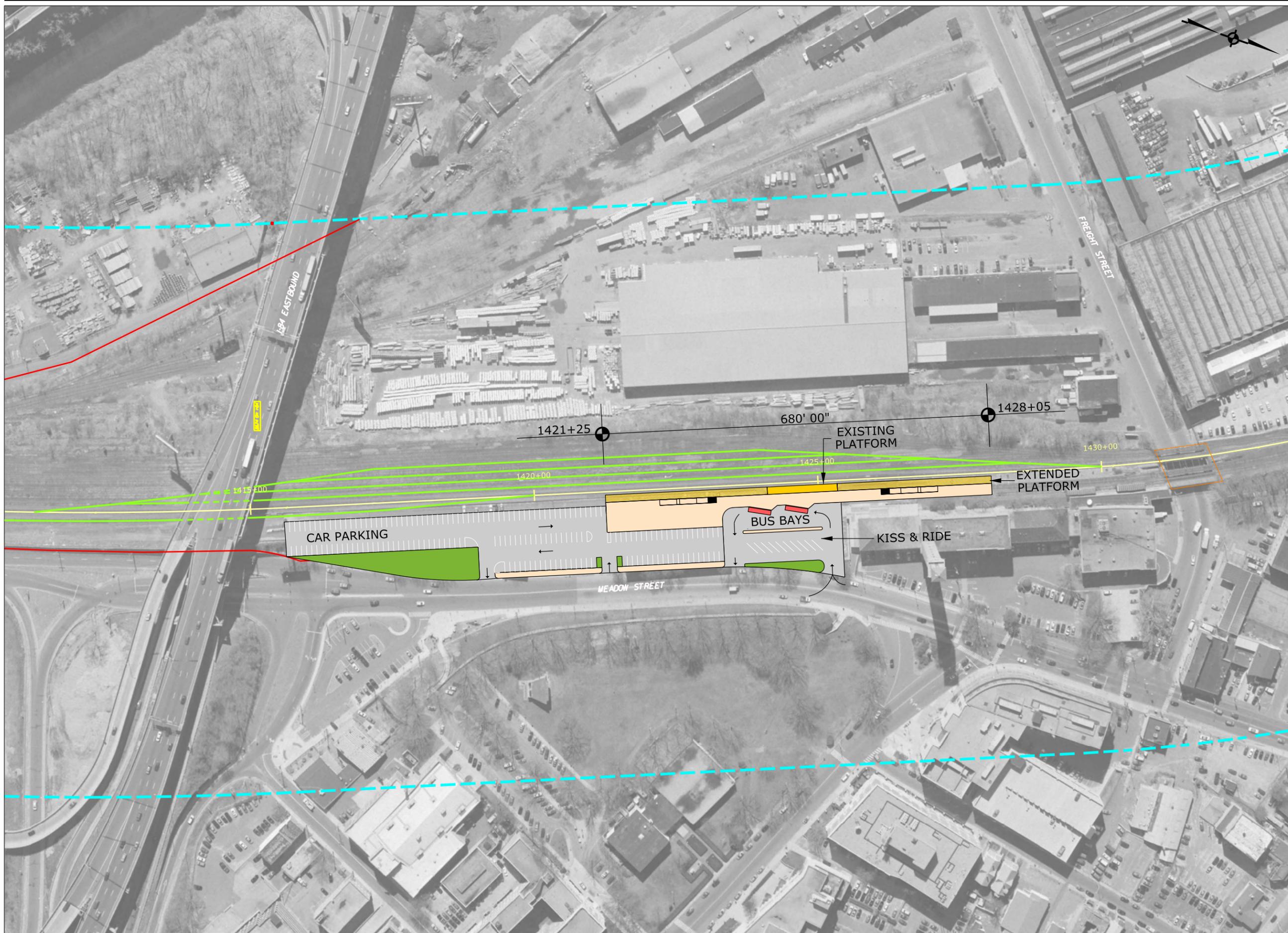
*WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562*

*WATERBURY BRANCH LINE
DERBY SHELTON R.R. STATION
SECTION DETAIL*



CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PARSONS

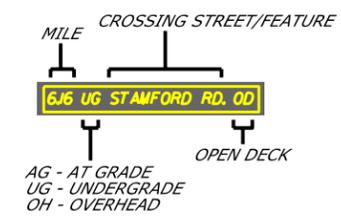


LEGEND

- EXISTING R.R. TRACK
- R.O.W.
- RAIL STUDY CORRIDOR
- MILE POST MARKER
- R.R. STRUCTURES
- PLATFORM, EXISTING
- PLATFORM, PROPOSED
- WATERCOURSE
- CHANNEL ENCROACHMENT LINE
- R.R. STATION PARKING
- SIDING/NEW R.R. TRACK

**Figure 7-29:
Waterbury Multi-Modal Station**

CROSSING DATA



WATERBURY AND NEW CANAAN
BRANCH LINES
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PROJECT NO. 170-2562

WATERBURY BRANCH LINE

EXTENDED WATERBURY
STATION PLATFORM
PROPOSED PLAN



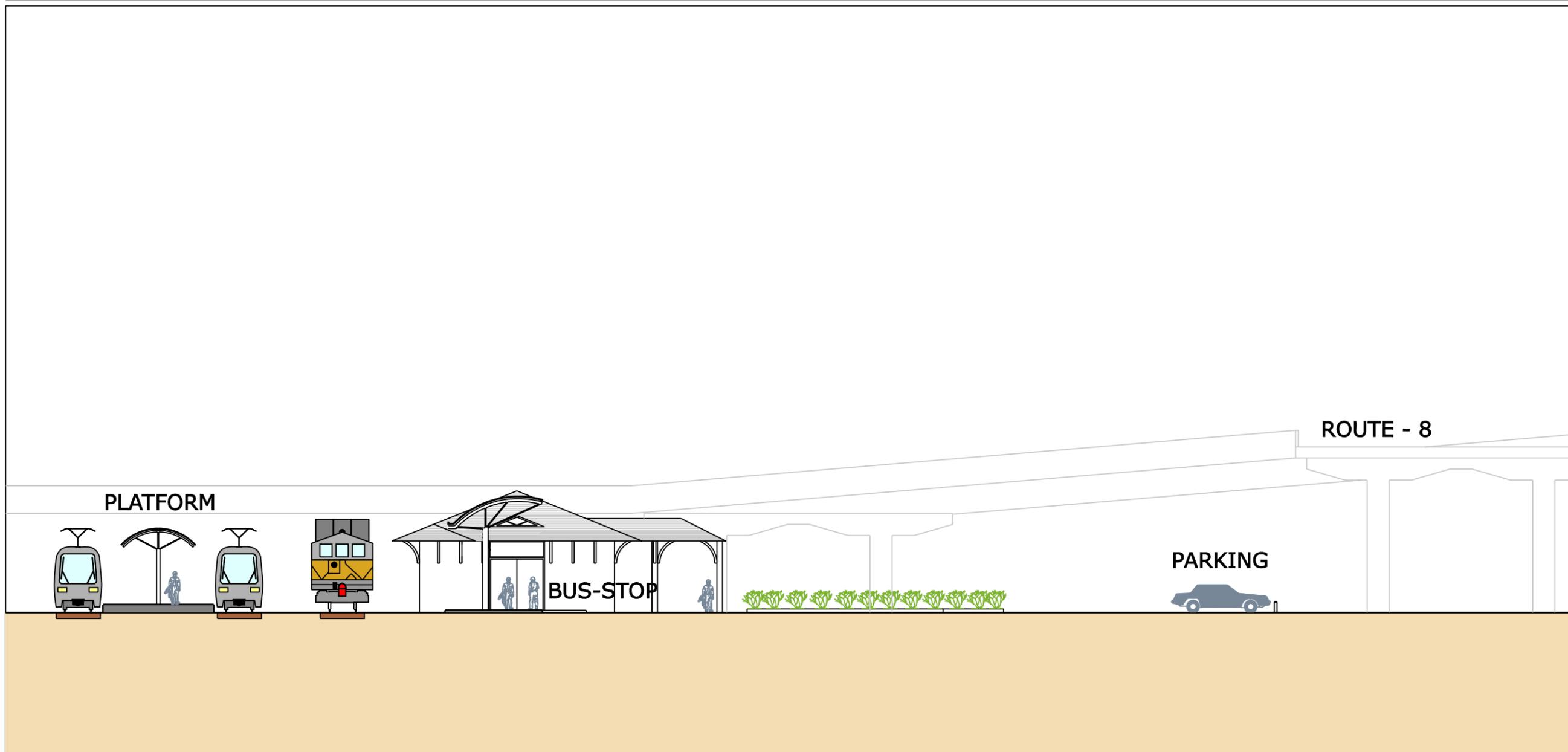


Figure 7-30:
Typical LRT Section

SECTION A - A

SCALE IN FEET
0 10 20

WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
DERBY-SHELTON LRT STATION
SECTION



River on a new crossing to continue to parallel the Waterbury Branch. The line would continue north to serve Beacon Falls Station. Between Beacon Falls Station and Naugatuck Station, the right-of-way narrows and slopes down to the Naugatuck River; it might be necessary to build an embankment to carry one or two of the transit tracks. The alignment would then continue north from Naugatuck Station and terminate at the existing Waterbury Station.

Operations Plan

The LRT alternative is designed to provide a higher frequency of service than the existing commuter rail service. It is assumed that light rail services would operate every 20 minutes during peak hours, and every 30 minutes in the midday and evening. The schedule could be refined to allow for pulse transfers between the light rail service and train services on the New Haven Line.

Stations and Facilities

Light rail stations would use shorter platforms than the existing commuter rail service. Where the light rail line would be separated by the Waterbury Branch from parking and adjoining streets, pedestrian crossings would be provided. Depending on lines-of-sight and anticipated volumes of freight traffic, these crossings would be grade-separated to minimize conflicts between rail and pedestrian traffic. The existing rail stations would be preserved to allow for ticket vending and other passenger amenities.

It would be necessary to identify a location for a light rail maintenance facility along the line to store and maintain all light rail vehicles. Based on maintenance facilities constructed for similar LRT systems, a minimum of 10 to 12 acres would be necessary, although additional space might be required, depending on the location and geometry of the site.

Vehicles

It is assumed that the LRT alternative would use low-floor light rail vehicles operating in one- or two-car trains. The LRT service would require a total fleet of 11 light rail vehicles: 9 for peak operations and 2 additional to maintain a 20 percent spare ratio.

Cost

The conceptual capital cost for constructing this alternative would be \$2,690.0 million (2008 dollars).

→ Bus Rapid Transit (W-21)

Under this alternative, commuter rail service on the Waterbury Branch would be replaced with bus rapid transit (BRT), a reliable, premium bus service with station and vehicle amenities comparable to the existing rail service. In order to mirror the service characteristics and travel markets served by an improved Waterbury Branch, it is assumed that, wherever possible, the BRT alternative would operate in a two-lane, dedicated transitway operating parallel to the Waterbury Branch and serving all stations currently served by the Waterbury Branch. Conceptual plans for the alignment and stations are provided in Appendix B – Waterbury Branch, BRT Alternative Drawings.

Like the LRT alternative, freight rail service would be maintained on the branch. As the Federal Railroad Administration requires sufficient spatial separation of freight traffic from passenger traffic in a shared corridor, it is assumed that the BRT transitway would be a distance of at least

25 feet from the Waterbury Branch track centerline; where this separation is not possible, barriers would be constructed to separate the two lines. To accommodate this required separation, additional right-of-way would have to be acquired.

The alignment would begin at the Bridgeport Station. Due to right-of-way constraints in downtown Bridgeport, the BRT Alternative would operate in mixed traffic, using signal prioritization and queue jumpers wherever possible to provide travel time savings compared to general auto traffic. The alignment would continue north from the station along Water Street to Fairfield Avenue, where it would turn west and continue to CT-8. The alignment would turn north onto CT-8, where BRT vehicles would operate in mixed traffic until reaching Derby.

In Derby, the alignment would leave CT-8, exit at Main Street, and continue into Derby-Shelton Station. The alignment would then continue for approximately one mile on a dedicated two-lane transitway between the existing railroad and the Naugatuck River. At Division Street, the BRT alignment would leave the transitway and continue north to Pershing Drive, where it would then continue north to Bridge Street. The alignment would turn east on Bridge Street, crossing the Naugatuck and then turning north on W. Main Street to serve the existing Ansonia Station. Immediately north of the station, the alignment would transition back to a dedicated transitway parallel to the existing railroad. At Cone Pond, the right-of-way would narrow; Figure 7-31 illustrates a typical section of the alignment in this area.

The alignment would then continue north, operating between the railroad and CT-115 (S. Main Street) until reaching Seymour Station. From here, the alignment would cross the Naugatuck River on a new crossing, continuing to parallel the Waterbury Branch. The line would then continue north to serve Beacon Falls Station. Between Beacon Falls Station and Naugatuck Station, the right-of-way narrows and slopes down to the Naugatuck River; it might be necessary to build an embankment to carry one or two of the transit lanes; a typical section for this portion of the alignment is shown in Figure 7-32.

The alignment would continue north from Naugatuck Station, transitioning from a dedicated alignment to mixed traffic operations at Washington Street in Waterbury. The alignment would turn west along Washington Street, north along Leonard Street, then north onto Bank Street and Meadow Street, terminating at the existing Waterbury Station.

Operations Plan

As the BRT alternative is intended to replace rail service on the Waterbury Branch, the operations plan was developed with commuter rail passengers in mind. The schedule is designed to allow “pulse transfers” between BRT vehicles and trains at Bridgeport Station. In the evening peak hour, BRT vehicles at Bridgeport Station would not depart until trains outbound from New York City arrived. In the morning peak hour, BRT services would be scheduled to arrive five minutes before trains.

Table 7-3 provides a sample schedule based on estimated 2030 travel times. On average, peak period BRT services would operate every 21 minutes, although the frequency of service would vary in order to allow BRT vehicles to wait for outbound trains on the New Haven Line. Arranging the schedule in this manner would allow seamless transfers between BRT and commuter rail services for 12 of the 20 trains in the evening peak hour. While this schedule

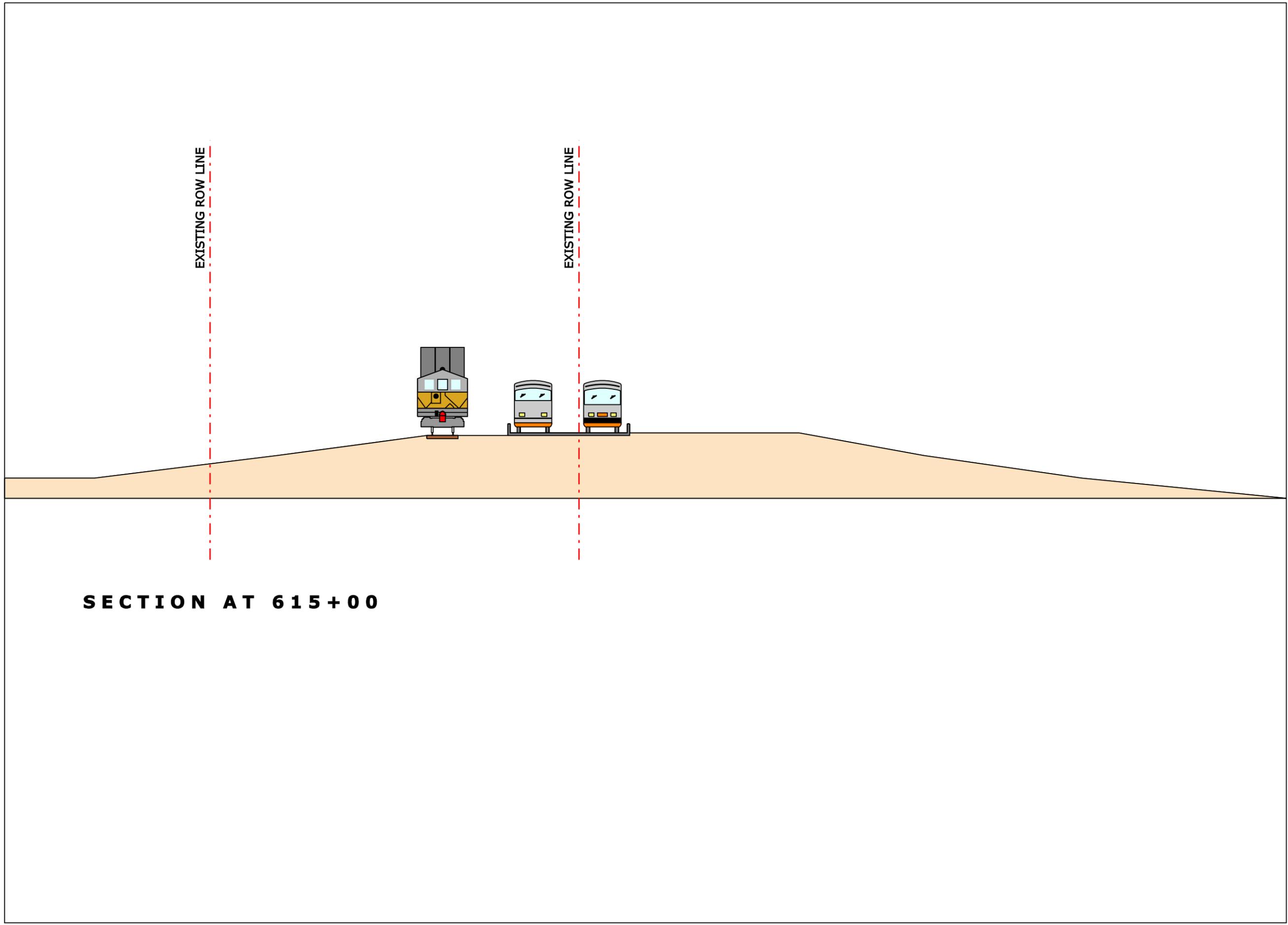


Figure 7-31:
BRT Section at Cone
Pond Road, north of
Ansonia Station



WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562

WATERBURY BRANCH LINE
BRT WATERBURY SECTION



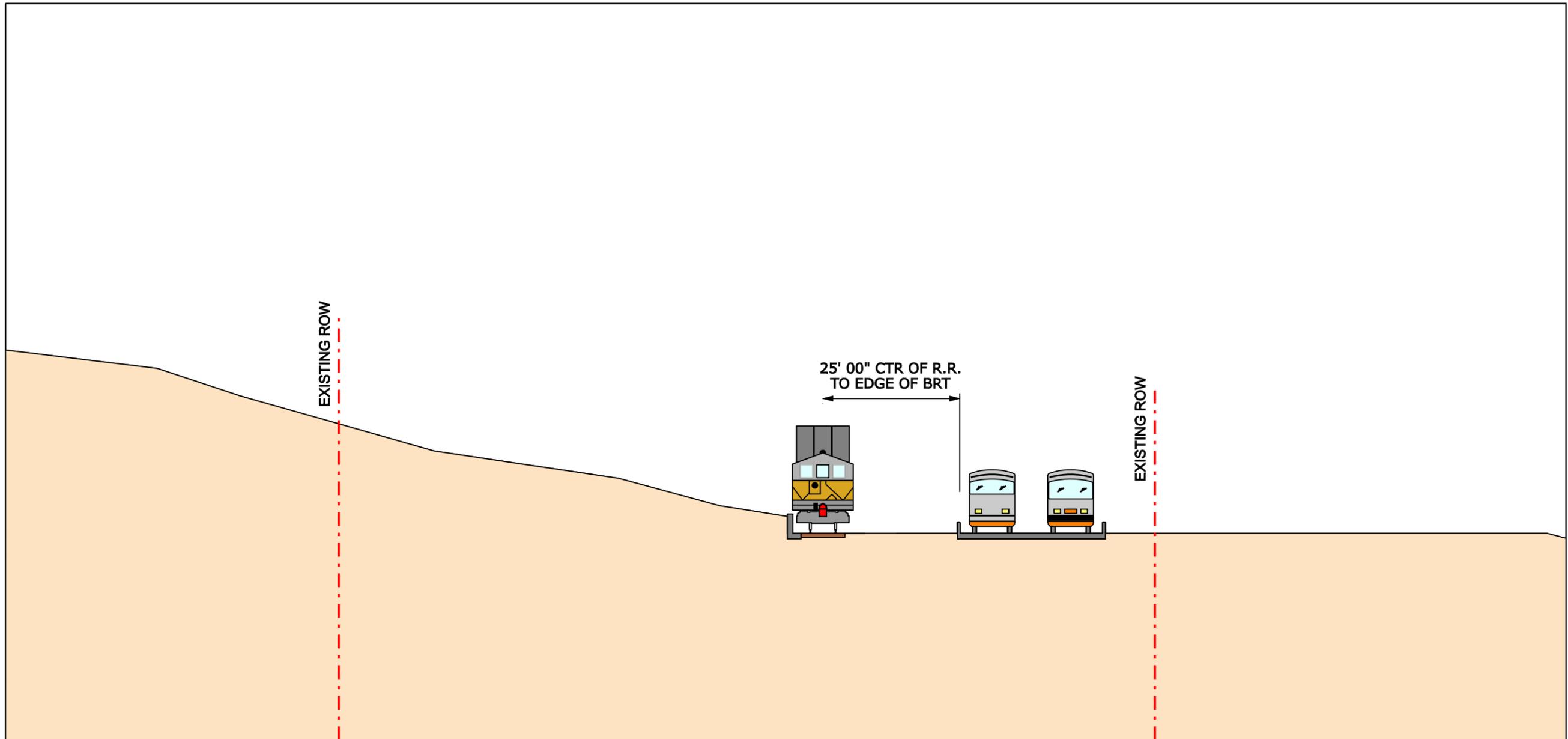


Figure 7-32:
BRT Section, north of
Beacon Falls Station

SECTION AT 975+00



**WATERBURY AND NEW CANAAN
BRANCH LINES
NEEDS & FEASIBILITY STUDY
PROJECT NO. 170-2562**

**WATERBURY BRANCH LINE
BRT SECTION AT 975+00**



would be less convenient for casual users of the system, it would represent a significant improvement in the frequency of service for Metro-North customers along the Waterbury Branch.

In the off-peak hours, it is assumed that pulse transfers would still be in place. The average headway would be reduced to approximately 30 minutes to reflect the lower ridership and lower frequency of trains in the midday period.

TABLE 7-3: SAMPLE BRT PM PEAK HOUR SCHEDULE

Outbound Train Arrival at Bridgeport	Bridgeport	Derby-Shelton	Waterbury	Headway (min)
5:11 PM	5:11 PM	5:33 PM	6:06 PM	--
5:19 PM				
5:29 PM	5:29 PM	5:51 PM	6:24 PM	18
5:38 PM				
5:43 PM	5:43 PM	6:05 PM	6:38 PM	14
5:49 PM				
6:06 PM	6:06 PM	6:28 PM	7:01 PM	23
6:13 PM				
6:22 PM	6:22 PM	6:44 PM	7:17 PM	16
6:28 PM				
6:44 PM	6:44 PM	7:06 PM	7:39 PM	22
6:55 PM				
7:09 PM	7:10 PM	7:32 PM	8:06 PM	26
7:17 PM				
7:31 PM	7:31 PM	7:53 PM	8:27 PM	21
7:43 PM	7:43 PM	8:05 PM	8:39 PM	12
8:06 PM	8:06 PM	8:28 PM	9:02 PM	23
8:19 PM				
8:38 PM	8:38 PM	9:00 PM	9:34 PM	32
9:00 PM	9:00 PM	9:22 PM	9:56 PM	22

Sources:

Metro-North New Haven Line schedule downloaded 1/28/09.

Travel times based on 45 mph average speed on transitway. Google Maps travel times used to estimate travel times in mixed traffic conditions. 2030 travel times assume travel times will increase at same rate as employment growth in the Waterbury Branch travelshed.

Shared Use of Transitway

As the development of a dedicated BRT right-of-way would represent a significant investment if pursued, it is recommended that other local routes be allowed to access the transitway to provide express service between cities and then transition off of the alignment to serve adjoining neighborhoods. Candidate routes that could be modified to use the transitway include Routes N1 and 33, which could be combined to provide direct service between Naugatuck and Waterbury.

It is also recommended that, if pursued, the transitway be accessible for police and emergency response vehicles, as is done with both the Pittsburgh East Busway and the South Miami-Dade Busway.

Stations and Facilities

Dedicated bus bays would be provided at each of the stations currently served by the Waterbury Branch. Access points to the busway would be recommended at Derby-Shelton and Naugatuck to allow local bus routes and emergency response vehicles to improve their travel speeds in the corridor.

Vehicles

It is assumed that the BRT alternative would use standard 40' coaches with capacity for 40 seated and 30 standing passengers. BRT buses would use a different color scheme than other bus services in the corridor, and could provide additional on board amenities such as wi-fi, and real time travel information. These improvements would require BRT to have its own dedicated fleet, although the vehicles could share maintenance facilities with existing bus operators in the corridor. BRT service would require a total fleet of eight buses: six for peak operations and two additional to maintain a 20 percent spare ratio.

Cost

The conceptual capital cost for constructing this alternative would be \$583.0 million (2008 dollars).

7.1.5.2 Traditional Bus Alternatives

Two bus alternatives were developed to serve Waterbury corridor passengers using traditional bus vehicles. Instead of operating predominantly in a dedicated transitway as in the BRT alternative, both the Full Express Bus and Shuttle Bus alternatives would operate entirely on the existing roadway network. This approach would decrease the capital cost of implementation but would also leave travel time performance subject to traffic conditions on CT-8 and local roadways.

Like the LRT and BRT alternatives, the Full Express Bus alternative described below would *replace* existing commuter rail service on the Waterbury Branch. The Shuttle Bus alternative, on the other hand, would *supplement* existing commuter rail service by filling service gaps with high-frequency express bus service along the corridor, especially during the evening peak period.

→ Full Express Bus (W-22)

The Full Express Bus alternative was designed to replace the existing commuter rail service on the Waterbury Branch. In order to mirror the service characteristics of the Waterbury Branch, the Full Express Bus alternative would serve all existing stations, using major arterials and expressways parallel to the railroad. This alternative would utilize traffic signal prioritization and queue jumpers wherever possible to provide travel time savings. Conceptual plans for the alignment and stations are provided in Appendix B – Waterbury Branch, Full Express Bus Alternative Drawings.

From Bridgeport to Derby, the Full Express Bus alternative would be identical to the Bus Rapid Transit alternative. The alignment would begin at the Bridgeport Station, continuing north along

Water Street to Fairfield Avenue, where it would turn west and continue to CT-8. The alignment would then turn north onto CT-8. The alternative would follow CT-8 to CT-34 (Derby Main Street) where it would exit and serve Derby-Shelton Station.

After serving Derby-Shelton Station, the Full Express Bus route would continue east on CT-34 until reaching Derby Street (CT-115). At CT-115, the alignment would travel north approximately a mile and a half until reaching Ansonia to serve Ansonia Station. The alignment would then continue north for four miles on CT-115 until reaching Seymour Station.

From Seymour to Waterbury Station, the Full Express Bus service would operate on CT-8, the Ansonia-Derby Expressway, only leaving the expressway to serve Beacon Falls and Naugatuck. At Beacon Falls, the service would leave CT-8 at CT-42 (Main Street) and travel one mile north to Depot Avenue, where it would serve Beacon Falls Station. From Beacon Falls, the alignment would return to Main Street and travel for a quarter of a mile before rejoining CT-8.

The alignment would exit CT-8 at Maple Street, and travel west to Water Street, then North to Cedar Street to serve the existing Naugatuck Station. From Cedar Street, the alignment would travel west to North Church Street, before returning to Maple Street, and subsequently CT-8.

At Waterbury, the alignment would exit CT-8 at Freight Street. From Freight Street, the alignment would turn south to Meadow Street to serve the existing Waterbury Station.

Operations Plan

As the Full Express Bus alternative is designed to replace commuter rail service on the Waterbury Branch, the main objective of the operations plan would be to maximize the convenience of the service for passengers transferring between the Waterbury Branch and the New Haven Line. Like the BRT alternative, the Full Express Bus alternative would utilize “pulse transfers.” Buses in the evening peak would be scheduled to wait for outbound trains from New York to arrive before departing. Similarly, southbound buses operating in the morning peak would be scheduled to arrive shortly before arriving inbound trains, thus minimizing the total time passengers would spend transferring between services.

Because the Full Express Bus alternative operates in mixed traffic, traffic delays are expected to increase travel times to the point where each bus could only make one roundtrip during the peak period. To minimize the fleet requirements for the service and to maximize the number of trains being served, the operations plan assumes two routes would be implemented during the morning and evening peak:

- Route 1: Waterbury to Bridgeport, serving all stations on the Waterbury Branch
- Route 2: Derby-Shelton to Bridgeport, serving only these two stations.

Splitting the Full Express Bus service between these two routes would make it possible to serve 18 of the 20 outbound New Haven Line trains in the evening peak; however, only eight of these trains would have bus service to stations north of Derby-Shelton. Express buses operating to Waterbury on Route 1 would have an average headway of 33 minutes in the evening peak, while Routes 1 and 2 would provide a combined headway of 14 minutes between Bridgeport and Derby-Shelton Station. Table 7-4 provides a sample schedule illustrating the operations plan under the Full Express Bus alternative.

TABLE 7-4: SAMPLE FULL EXPRESS BUS PM PEAK HOUR SCHEDULE

Outbound Train Arrival at Bridgeport	Departure Times			Headway (min)	
	Bridgeport	Derby-Shelton	Waterbury	To Derby- Shelton	To Waterbury
5:11 PM	5:11 PM	5:33 PM	6:29 PM		
5:19 PM	5:19 PM	5:41 PM		8	
5:29 PM	5:29 PM	5:51 PM	6:47 PM	10	18
5:38 PM	5:38 PM	6:00 PM		9	
5:43 PM	5:43 PM	6:05 PM	7:01 PM	5	14
5:49 PM	5:49 PM	6:11 PM		6	
6:06 PM	6:06 PM	6:28 PM		17	
6:13 PM	6:13 PM	6:35 PM	7:31 PM	7	30
6:22 PM					
6:28 PM	6:28 PM	6:50 PM		15	
6:44 PM	6:44 PM	7:06 PM		16	
6:55 PM	6:55 PM	7:17 PM		11	
7:09 PM					
7:17 PM	7:17 PM	7:39 PM		22	
7:31 PM	7:31 PM	7:53 PM		14	
7:43 PM	7:43 PM	8:05 PM		12	
8:06 PM	8:06 PM	8:28 PM	9:25 PM	23	113
8:19 PM	8:19 PM	8:41 PM	9:38 PM	13	13
8:38 PM	8:38 PM	9:00 PM	9:57 PM	19	19
9:00 PM	9:00 PM	9:22 PM	10:19 PM	22	22

Sources:

Metro-North New Haven Line schedule downloaded 1/28/09.

Travel times based on 45 mph average speed on transitway. Google Maps travel times used to estimate travel times in mixed traffic conditions. 2030 travel times assume travel times will increase at same rate as employment growth in the Waterbury Branch travelshed.

During the midday, only Route 1 would be in operation, providing an average headway of approximately 30 minutes. This is consistent with the frequency of midday trains and anticipated levels of demand for midday service.

Stations and Facilities

Dedicated bus bays would be provided at each of the stations currently served by the Waterbury Branch. Additional parking spaces at Derby-Shelton might be required.

Vehicles

It is assumed that the Full Express Bus alternative would use a standard 40-foot coach with capacity for 40 seated and 30 standing passengers. A total of nine buses would be needed to operate the service: four for peak operations of Route 1, three for peak operations of Route 2, and two buses to provide a 20 percent spare ratio.

Cost

The conceptual capital cost for constructing this alternative would be \$17.0 million (2008 dollars).

→ Shuttle Bus (W-23)

The Shuttle Bus alternative was developed in response to commuters who indicated that they would be willing to utilize the Waterbury Branch if more evening service were provided. This alternative would *supplement* (not replace) peak-hour commuter rail service with limited stop express bus service. To improve the cost-effectiveness and frequency of service, the Shuttle Bus alternative would only serve Bridgeport, Derby-Shelton, and either Naugatuck or Waterbury. All other stations would continue to be served by the existing train schedule.

From Bridgeport to Derby, the Shuttle Bus alternative would be identical to the BRT alternative. The alignment would begin at Bridgeport Station, continuing north along Water Street to Fairfield Avenue, where it would turn west and continue to CT-8. The alignment would then turn north onto CT-8. The alignment would follow CT-8 to CT-34 (Derby Main Street) where it would exit and serve Derby-Shelton Station.

After serving Derby-Shelton Station, the Shuttle Bus route would return onto CT-8 and continue up to Waterbury. At Waterbury, the alignment would exit CT-8 at Freight Street. From Freight Street, the alignment would turn south to Meadow Street to serve the existing Waterbury Station. Alternately, Naugatuck could serve as the northern terminus of the Shuttle Bus route, with buses exiting CT-8 at Exit 26 and turning left onto Maple Street to serve the rail station and downtown Naugatuck.

On the return trip, the shuttle bus would return directly to Bridgeport via the same alignment, but without stopping at Derby-Shelton Station.

Operations Plan

The Shuttle Bus alternative is designed as a low-cost approach to increasing the number of peak-period connections between the New Haven Line and stations on the Waterbury Branch. The operations plan uses two strategies to meet these objectives:

- **Pulse transfers.** Buses in the evening peak would be scheduled to wait for outbound trains from New York to arrive before departing. Similarly, southbound buses operating in the morning peak would be scheduled to arrive shortly before arriving inbound trains, thus minimizing the total time passengers spend transferring between services.
- **Limited stop service.** Unlike the other alternatives, evening operations of the Shuttle Bus would only provide service from Bridgeport to Derby-Shelton Station and Naugatuck/Waterbury Station. Stops to intermediary stations and stops in the off-peak direction would be eliminated to decrease travel times, maximize the number of roundtrips each bus can make, and minimize the fleet requirements of the alternative.

Using this approach, it would be possible to serve 13 of the 20 trains arriving at Bridgeport in the evening peak hour. The combined bus and commuter rail schedule would provide an average

headway of 19 minutes. Table 7-5 provides a sample schedule illustrating the operations plan under the Shuttle Bus alternative.

TABLE 7-5: SAMPLE SHUTTLE BUS PM PEAK HOUR SCHEDULE

Outbound Train Arrival at Bridgeport	Departure Times			Headway (min)
	Bridgeport	Derby-Shelton	Waterbury	
5:11 PM				
5:19 PM	5:19 PM	5:41 PM	6:06 PM	
5:29 PM				
5:38 PM	5:38 PM	6:00 PM	6:25 PM	19
5:43 PM				
5:49 PM	5:55 PM	6:18 PM	6:52 PM	17
6:06 PM	6:06 PM	6:28 PM	6:53 PM	11
6:13 PM	6:13 PM	6:35 PM	7:00 PM	7
6:22 PM				
6:28 PM	6:28 PM	6:50 PM	7:15 PM	15
6:44 PM				
6:55 PM	6:55 PM	7:17 PM	7:42 PM	27
7:09 PM				
7:17 PM	7:17 PM	7:39 PM	8:04 PM	22
7:31 PM				
7:43 PM	7:43 PM	8:05 PM	8:30 PM	26
8:06 PM	8:06 PM	8:28 PM	8:53 PM	23
8:19 PM	8:24 PM	8:45 PM	9:19 PM	17
8:38 PM	8:38 PM	9:00 PM	9:26 PM	14
9:00 PM	9:00 PM	9:22 PM	9:48 PM	22

Sources:

Metro-North New Haven Line schedule downloaded 1/28/09.

Google Maps travel times used to estimate travel times in mixed traffic conditions. 2030 travel times assume travel times will increase at same rate as employment growth in the Waterbury Branch travelshed.

It is assumed that there would be a morning peak service that would mirror the evening service, stopping at Derby-Shelton Station in the southbound direction and bypassing it in the off-peak direction. No midday service would be provided as part of this operations plan.

Stations and Facilities

Dedicated bus bays would be provided at each of the stations currently served by the Waterbury Branch. Additional parking spaces at Derby-Shelton Station and Waterbury Station might be required.

Vehicles

It is assumed that the Shuttle Bus Alternative would use a standard 40-foot coach with capacity for 40 seated and 30 standing passengers. A total of six buses would be needed to operate the service: five for peak operations and one spare.