Sudbury to Hudson Transmission Reliability Project

and use of a rail-banked corridor for this purpose

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August 29, 2016

Background:

- In February 2016, Eversource Energy (ES) and Hudson Light and Power (LHP) made a presentation to the Sudbury Board of Selectman on its plans for a “Sudbury to Hudson Transmission Reliability Project”.
- The MBTA’s Central Massachusess Railroad Right of Way (MBTA-ROW) has emerged as the preferred route for construction of a new overhead 115 Kv Transmission Line from Sudbury to Hudson.
- Significant community concern has been expressed about the project, particularly its preferred route along the MBTA-ROW.
- NELS, LLC commenced an independent, unsolicited assessment of potential alternative routes utilizing existing rights of way, beyond the routes presented by Eversource.
- NELS compiled public domain data and sought diverse input for its independent assessment applying its expertise in geospatial analysis to compare key route characteristics.
- As a result, the NELS analysis, confirmed that the MBTA-ROW represents the “least disruptive route” for the project, excluding environmental factors and the value of other competing uses for the ROW.
- The NELS study recommends deeper analysis of the environmental factors as well as an in-depth analysis of the best long-term use of the Central Massachusetts MBTA-ROW before committing to its use as a transmission line corridor.

Findings:

The NELS assessment identified specific alternate routes, all utilizing existing (and active) rights of way, including: existing electric transmission corridors, petroleum/gas pipelines and roadway routes.

Each right of way was field-surveyed to verify points of connectivity with the existing power grid and connectivity between Sudbury and Hudson

GIS Methodology & Sources

NELS utilized ESRI ArcGIS software and a combination of geospatial techniques to analyze common attributes of the alternative routing options.

Analysis	Source Data	Method
Length (in US Miles)	NELS-drawn geometries	Calculated planar geometric length of the line, using the Albers Equal Area Conic Projected Coordinate System.
Number of Abutters (within 0.25 miles of center line)	MassGIS Level 3 Assessor's Parcel Data for Sudbury, Framingham, Marlborough, Stow, and Hudson	A 0.25 mile buffer from the center line, intersected with the Parcel Dataset, counting all "FEE" properties.
Zoning: Residential (Percentage of center line coverage)	MassGIS Zoning (2007): General Use Code 1 (Residential)	Intersect of the line's geometry against the MassGIS Zoning polygon, calculated the percent coverage of the General Use Code 1.
Zoning: Business (Percentage of center line coverage)	MassGIS Zoning (2007): General Use Codes 2 (Commercial), 3 (Industrial), 5 (Other)	Intersect of the line's geometry against the MassGIS Zoning polygon, calculated the percent coverage of the General Use Codes 2,3,5.
Zoning: Conservation (Percentage of center line coverage)	MassGIS Zoning (2007): General Use Code 4 (Conservation)	Intersect of the line's geometry against the MassGIS Zoning polygon, calculated the percent coverage of the General Use Code 4.
Population (within 0.25 miles of center line)	US Census Bureau – 2014 Census Block Groups	A 0.25 mile buffer from the center line, intersected with the 2014 US Census Block Groups. The 2014 estimated Population per Square Mile was multiplied by the square mileage of each block group within the 0.25 buffer, and then summarized to get the total population.

Specific Routes Analyzed

The following alternative routes were compared to the MBTA-ROW on the basis of the preceding criteria:

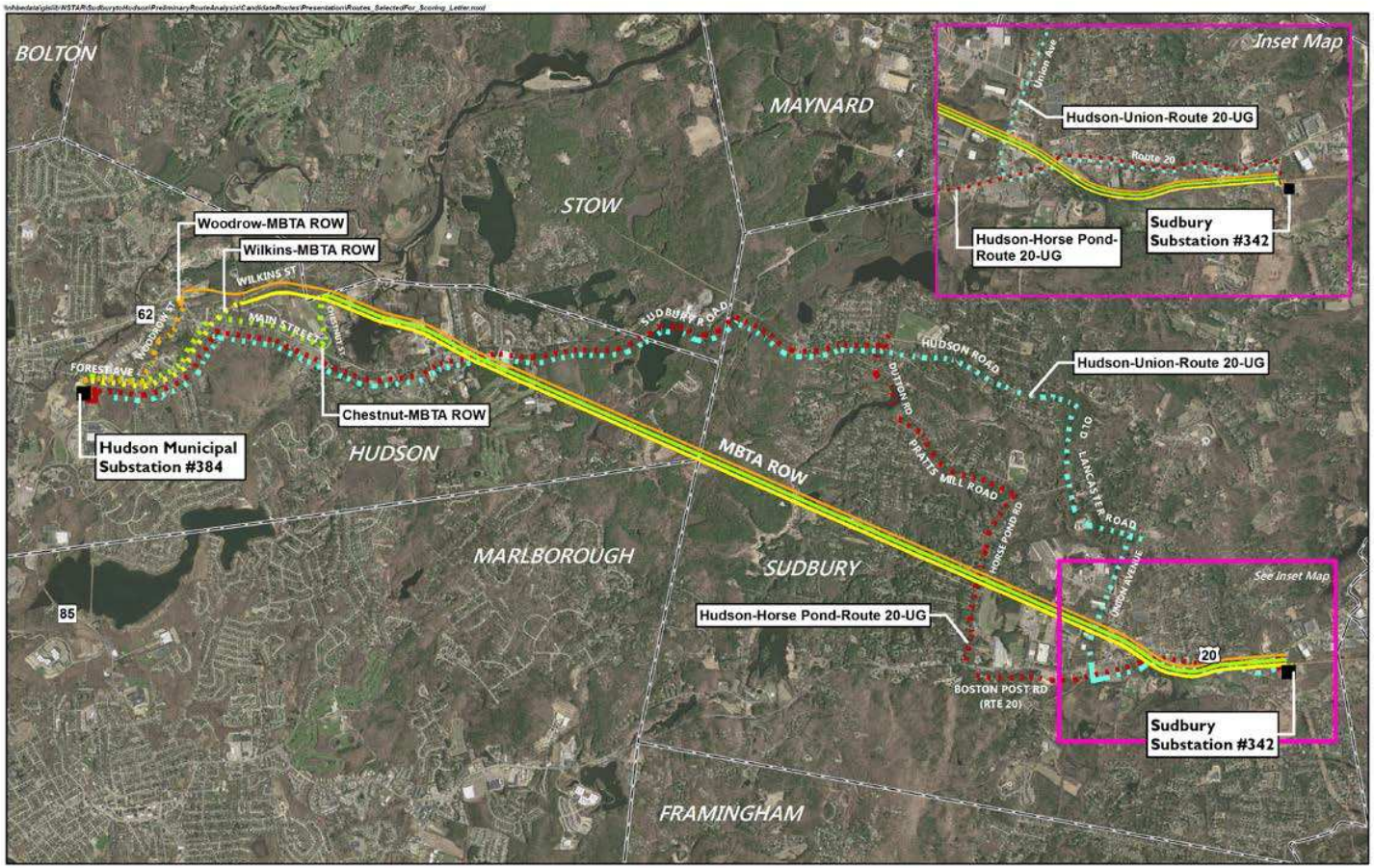
1. STREET "A " - Route 20 → Wayside Inn Rd → Sudbury St →Parmenter St → Main St
2. STREET "B" - Route 20 → Wayside Inn Rd → Dutton Rd → Hudson Rd → Main St
3. STREET "C" - Route 20 → Route 85
4. ROW "A" - ROAD/PIPELINE
5. ROW "B" - ROAD/PIPELINE/RAIL
6. ROW "C" - PIPELINE ROW

- **The MBTA-ROW emerged as the shortest route, with the least number of abutters and population density.**
- **However, the MBTA-ROW presents significant challenges to meet state and federal requirements and to engineer its design so as not to impede its use as a future Transportation Corridor.**
- **The study does not present cost or engineering analysis of underground vs. overhead power line construction.**
- **Each route has unique physical and environmental characteristics requiring further assessment.**

Comparison Matrix of Routing Options

Attribute	MBTA Rail ROW (Eversource)	Under Street Route (Eversource)	STREET ROUTE "A"	STREET ROUTE "B"	STREET ROUTE "C"	ROW ROUTE "A"	ROW ROUTE "B"	PIPELINE ROW "C"
Length	8.2	10.4	10.75	12.81	10.93	9.76	11.2	10.7
Number of Abutters	1,133	2,263	1,850	2,355	2,323	1,916	1,185	2,168
Zoning: Residential	63%	69%	69%	67%	53%	76%	79%	93%
Zoning: Business	33%	19%	31%	24%	47%	24%	21%	7%
Zoning: Conservation	4%	12%	0%	9%	0%	0%	0%	0%
Population	3,062	4,778	4,271	4,966	9,274	5,196	2,977	6,418

Eversource Rated Route



Under Street Route – Proposed: Eversource

ROUTE: Under Street Route	
Length in miles	10.4
Number of Abutters (within 0.25 miles of center line)	2,263 properties
Zoning: Residential	69%
Zoning: Business	19%
Zoning: Conservation	11%
Population (within 0.25 miles of center line)	4,778

This street route would utilize the above-named town streets to connect RT 20 with RT 62

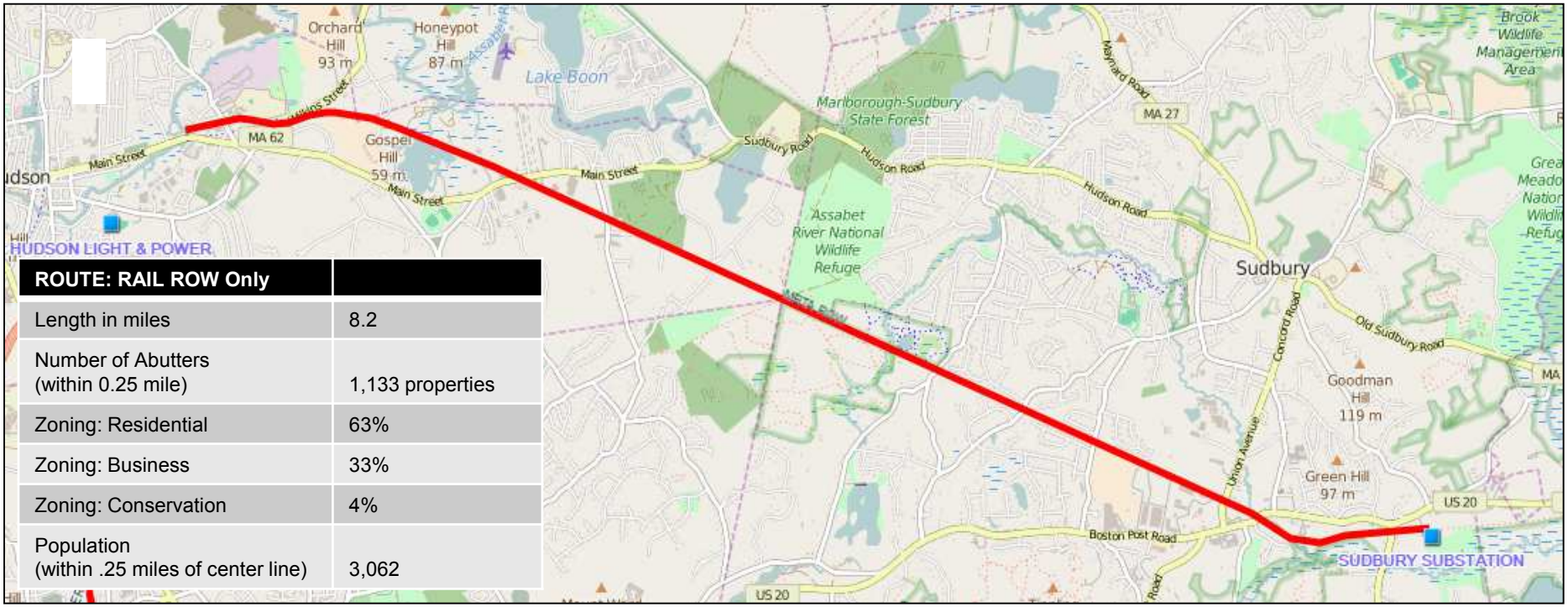
The route does present conflicts with conservation zoning.

The Town of Sudbury DPW has verified that there are no impediments to construction of an underground powerline along this route.

It is the shortest of the proposed street routes.

It ranks in the middle of the pack of the street routes in terms of population density and abutters.

MBTA RAIL ROW – Proposed: Eversource



ROUTE: RAIL ROW Only	
Length in miles	8.2
Number of Abutters (within 0.25 mile)	1,133 properties
Zoning: Residential	63%
Zoning: Business	33%
Zoning: Conservation	4%
Population (within .25 miles of center line)	3,062

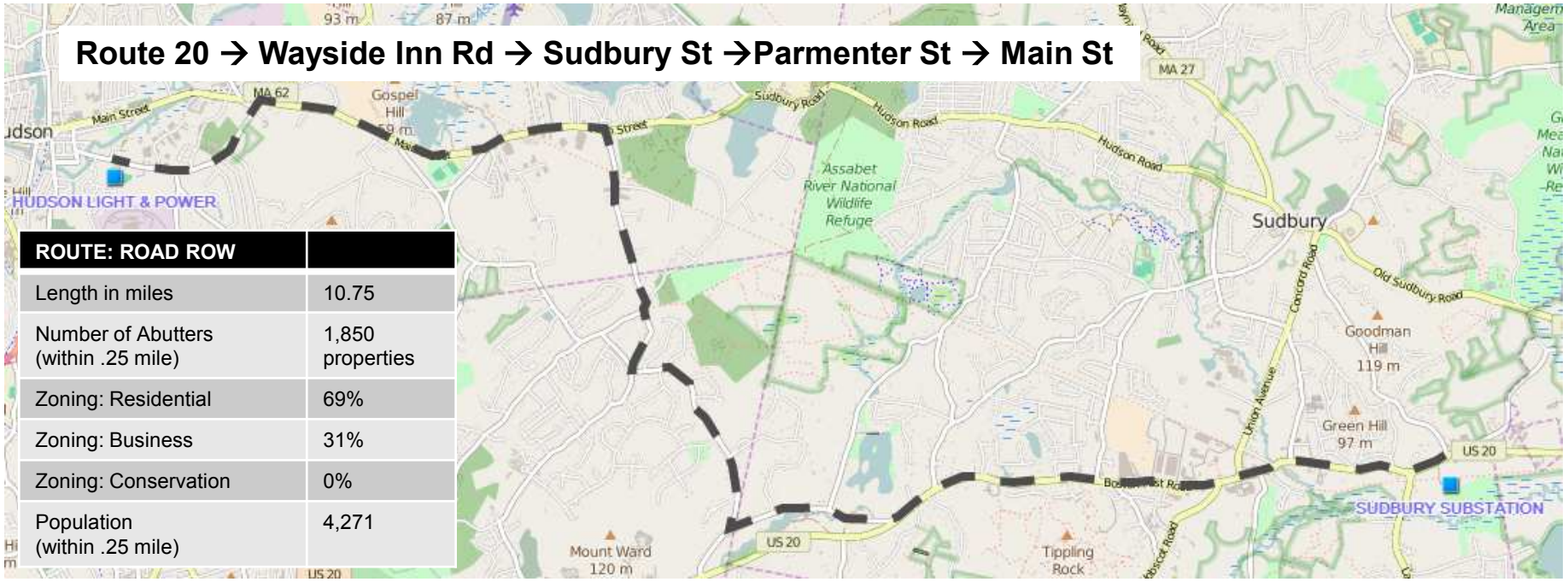
Utilizing the abandoned (rail-banked) MBTA ROW, traverses the central business district of South Sudbury, the Assabet River Natural Wildlife Refuge, other wetlands, sensitive habitats and residential neighborhoods.

Construction of an overhead line (as proposed) or an underground line would require clearcutting of rustic growth of the past 45 years under either scenario…

The corridor has been preserved, since abandonment, for long term, future transportation purposes, as it is the only non-roadway, contiguous corridor between I-495 and I-95.

It is currently used in its current, natural form, as a scenic walking trail through rustic woodlands and wetlands

Alternate 1 - STREET ROUTE “A”



ROUTE: ROAD ROW	
Length in miles	10.75
Number of Abutters (within .25 mile)	1,850 properties
Zoning: Residential	69%
Zoning: Business	31%
Zoning: Conservation	0%
Population (within .25 mile)	4,271

This street route would utilize the above-named town streets to connect RT 20 with RT 62

The route does not present any conflicts with conservation properties.

The Town of Sudbury DPW has verified that there are no impediments to construction of an underground powerline along this route.

It is the shortest of the three proposed alternative street routes.

It also has the least population density of the three proposed street routes

Alternate 2 - STREET ROUTE “B”

ROUTE: ROAD ROW	
Length in miles	12.81
Number of Abutters (within .25 mile)	2,355 properties
Zoning: Residential	67%
Zoning: Business	24%
Zoning: Conservation	9%
Population (within .25 mile)	4,966

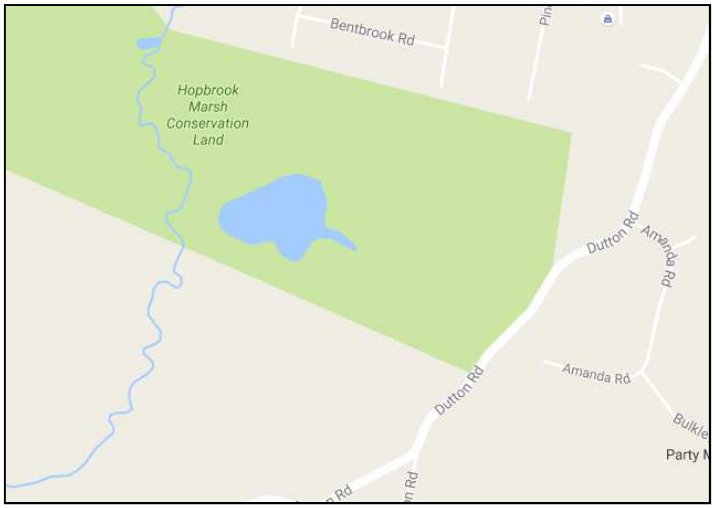
This street route would utilize the above-named town streets to connect RT 20 with RT 62

It is a variation of Street Route “A” though nine percent of the linear route on Dutton Road is zoned for conservation property, running parallel to the Hopbrook Marsh Conservation Land.

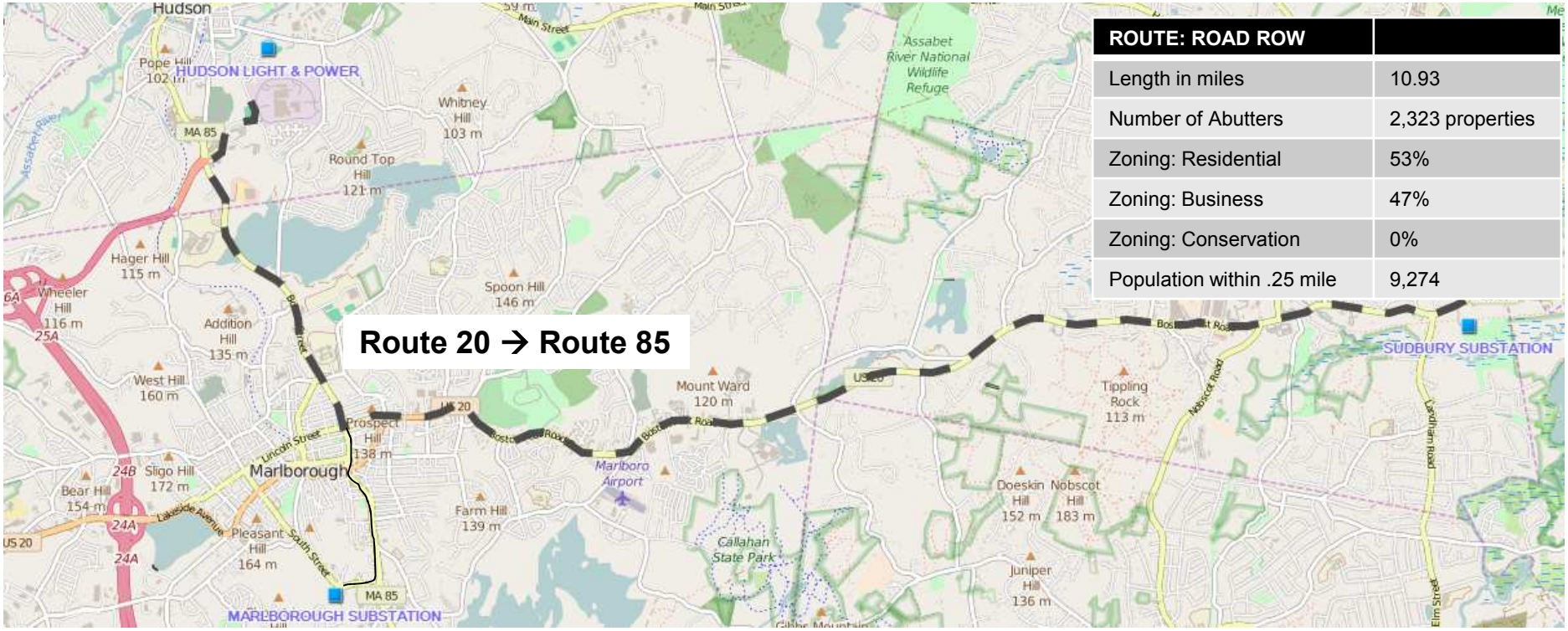
The Town of Sudbury DPW has verified that there are no impediments to construction of an underground powerline along this route.

It is the longest of the three proposed alternative street routes.

It has population density slightly higher than “Street Route B”



Alternate 3 - STREET ROUTE “C”



ROUTE: ROAD ROW	
Length in miles	10.93
Number of Abutters	2,323 properties
Zoning: Residential	53%
Zoning: Business	47%
Zoning: Conservation	0%
Population within .25 mile	9,274

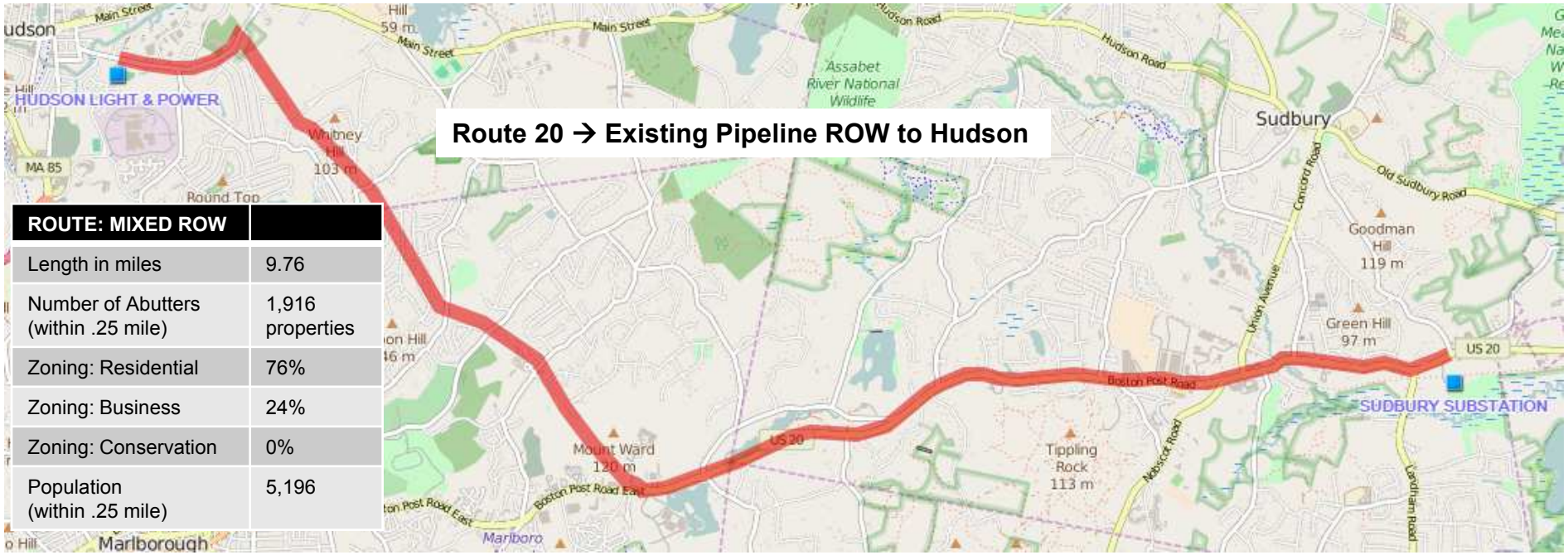
This route would utilize State Routes only – with likely funding assistance. Route 20 from the Sudbury Sub-Station to Route 85 in Marlborough, northward to Hudson.

This route would pass close to the Marlboro Sub-Station which is solely fed from the same National Grid Sub-station (Northboro Road) that feeds Hudson.

While not mentioned in the Eversource Presentation, it would appear that Marlborough is susceptible to the same reliability issues as presented for Hudson.

Accordingly, this route would appear to present an opportunity for reliability improvement for two towns – one served by National Grid and the other Hudson Power and Light.

Alternate 4 - RT 20 to Pipeline - ROW ROUTE “A”



ROUTE: MIXED ROW	
Length in miles	9.76
Number of Abutters (within .25 mile)	1,916 properties
Zoning: Residential	76%
Zoning: Business	24%
Zoning: Conservation	0%
Population (within .25 mile)	5,196

This route would utilize RT 20 to Marlboro (near the Sewerage Plant and Transfer Station) where it would transition to an existing, active and cleared pipeline right of way to Hudson.

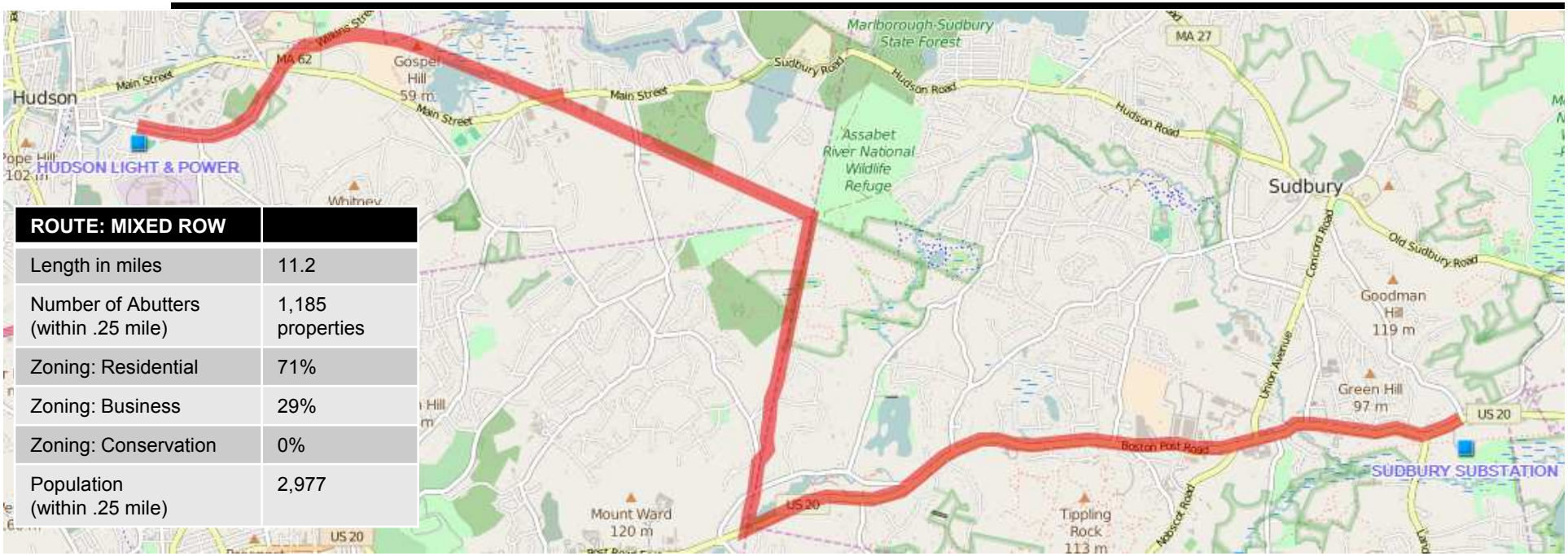
It is the shortest of the proposed alternative routes, does not conflict with conservation lands.

Much of the Pipeline ROW is undeveloped though It does pass through some residential areas, though as a underground route, it would not require clearcutting.

The right of way appears to be maintained on a regular basis to manage the growth of vegetation.

The route is constrained by current easements posing a significant constraint to shared useage.

Alternate 5 - RT 20 to Pipeline to MBTA - ROW ROUTE “B”



ROUTE: MIXED ROW	
Length in miles	11.2
Number of Abutters (within .25 mile)	1,185 properties
Zoning: Residential	71%
Zoning: Business	29%
Zoning: Conservation	0%
Population (within .25 mile)	2,977

This route would utilize RT 20 to the intersect with an existing, active and cleared pipeline right of way (at South end of Sudbury Road) running north to a point of intersection with the MBTA ROW.

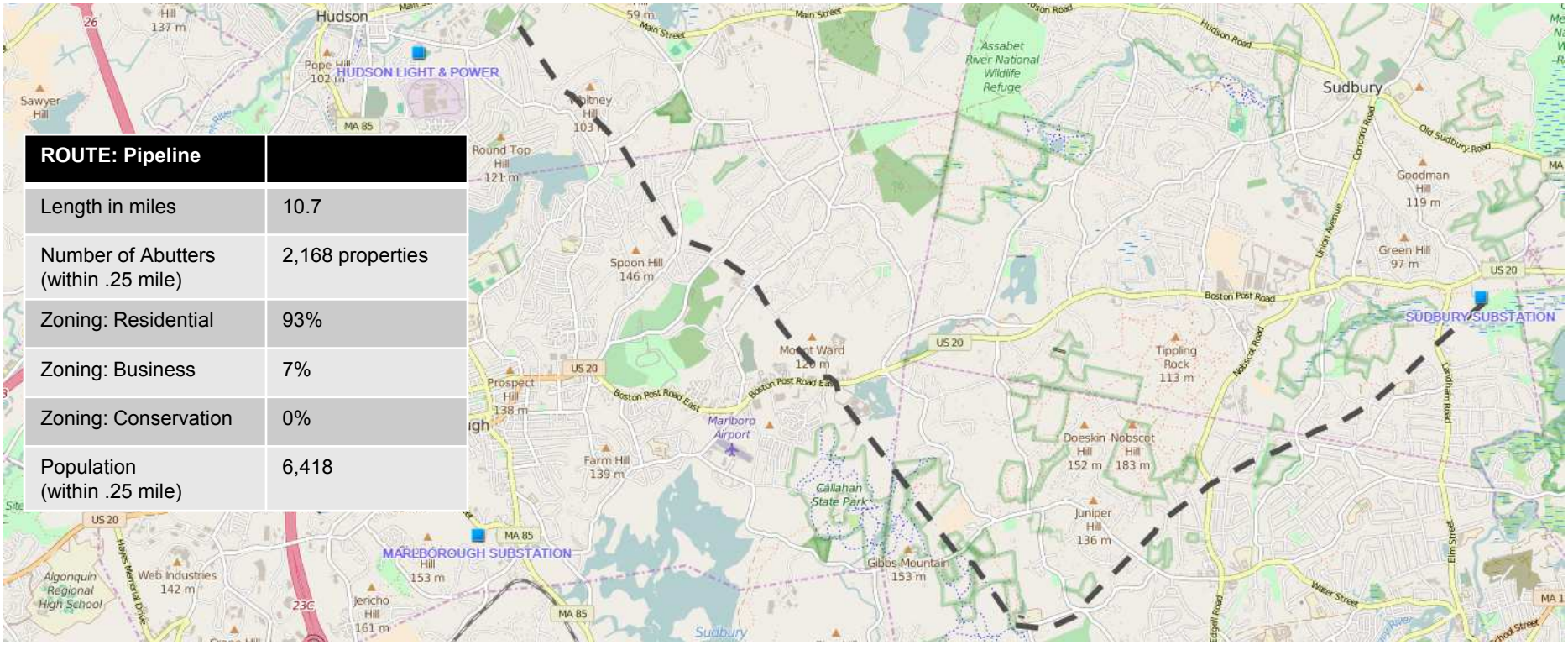
The route does not traverse any zoned conservation land but does run adjacent to the Assabet River National Wildlife Refuge.

The route has the least population density and fewest abutters of the alternative routes.

The MBTA ROW portion would require less clearcutting and environmental mitigation than the full MBTA ROW Route

 The information contained herein is wholly based on public domain sources and has been compiled by NELS as a public service

Alternative 6 - Direct Pipeline – ROW ROUTE ‘C” (dotted line)



ROUTE: Pipeline	
Length in miles	10.7
Number of Abutters (within .25 mile)	2,168 properties
Zoning: Residential	93%
Zoning: Business	7%
Zoning: Conservation	0%
Population (within .25 mile)	6,418

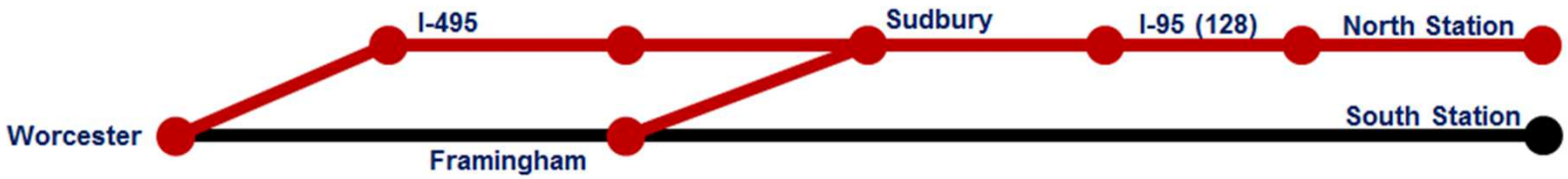
This is an all pipeline route that avoids conservation areas, requires minimal road construction (Hudson Terminus) only.

This is a unique route that avoids sensitive habitats, roadway construction and disruption and the use of the MBTA ROW.

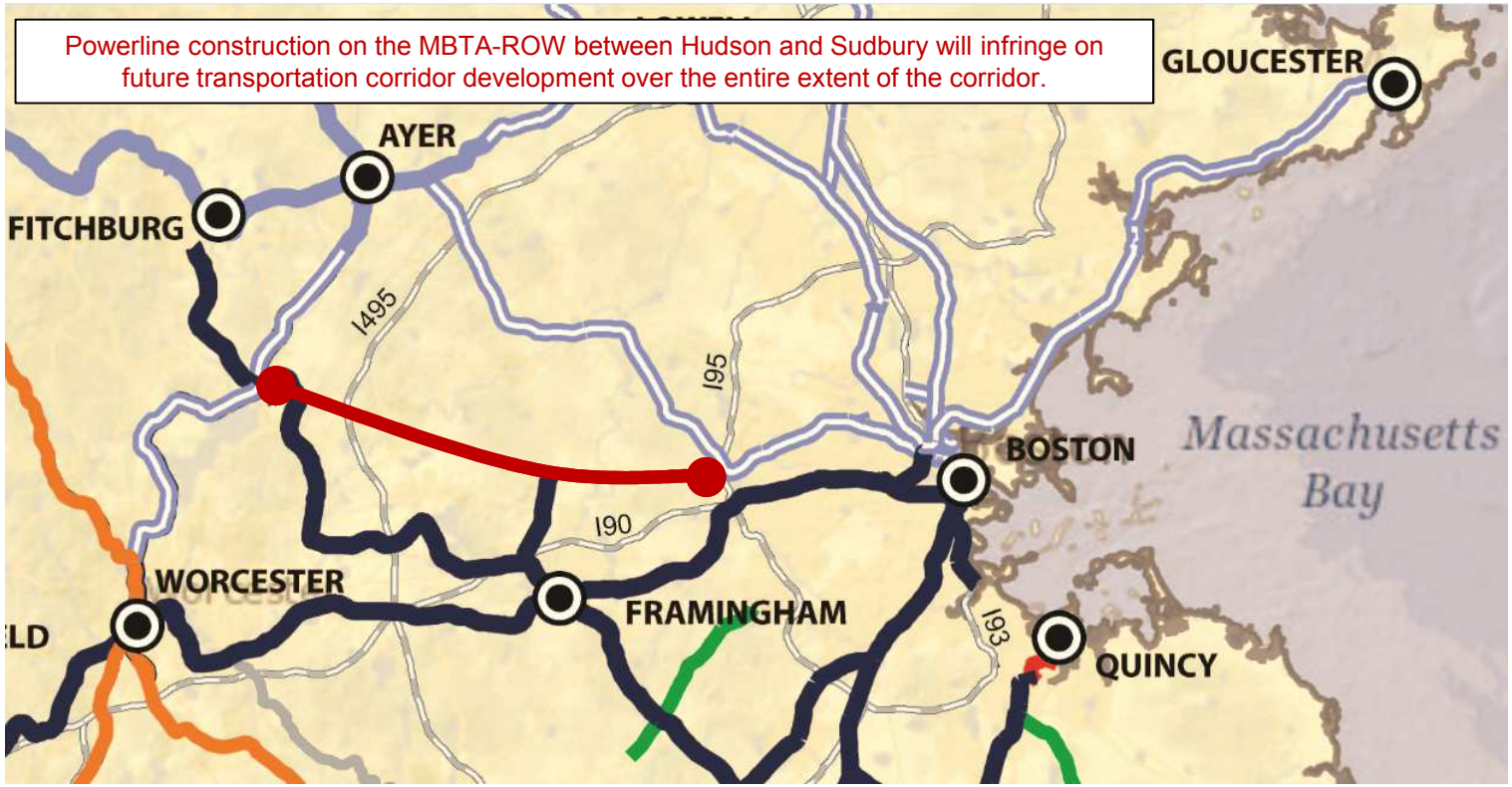
It has a higher number of abutters and is constrained by the existing easements for its use as a pipeline route.

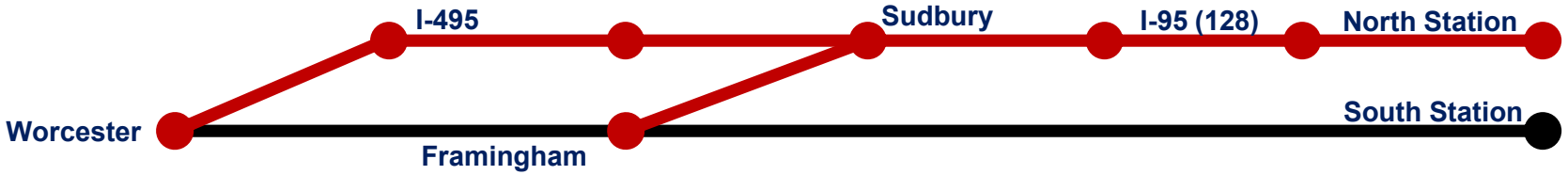
Other Considerations – “Best” ROW Use

- **Consideration of the Central Mass MBTA-ROW for electric transmission use “re-opens the door” as to use of the ROW as a future transportation corridor.**
- The ROW exists as a “rail-banked” ROW for future transportation use FIRST.
  - It is the only contiguous unused rail corridor linking I-495 to I-95 (Route 128) to Boston’s North Station
  - The return of commuter rail in the future – even if out decades -- would alleviate traffic congestion on Route 20 and provider a greener transportation option.
  - The corridor is the only practical alternative to the widening of Route 20 from two lanes to four lanes.
  - The corridor, over time would expand the reach of rail service to Middlesex and Worcester County towns currently lacking MBTA service.
  - The corridor is capable of providing access to both North Station and South Station from Worcester.
  - Without its preservation as a transportation asset, nothing above is possible.



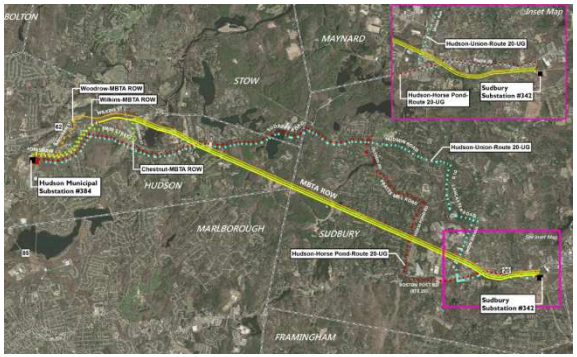
Central Mass MBTA-ROW





Other Considerations – "Best" Solution to Achieve Hudson Power Reliability?

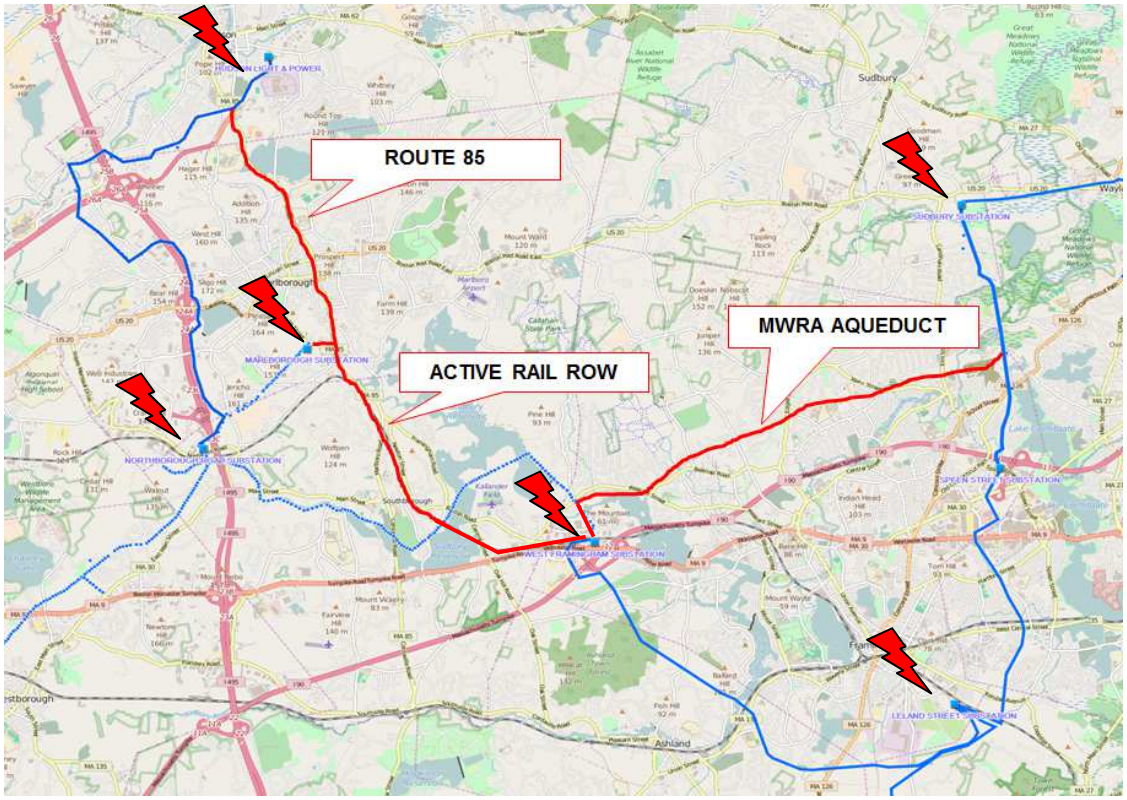
Sudbury to Hudson Reliability - Limited Scope



- During the course of this study, a number of existing ROW's emerged that could provide interconnections between all regional sub-stations.
- This approach would improve reliability to all towns in the area shown in the map to the right.
- The interconnects would provide improved reliability to customers served by both National Grid and Eversource.
- Additional detailed information is available.

"The Bigger Picture" – Improve reliability regionally by establishing redundant sub-station interconnects between Hudson and Sudbury via existing sub-stations.

Sudbury to MWRA Aqueduct to West Framingham Sub-Station to Northboro Road Sub-Station with option for redundant route to both Marlboro and Hudson.



Existing electric power sub-stations — **Existing electric transmission lines** — **Redundant Interconnects**

Shared ROW Usage?

- The MBTA is currently entertaining “shared usage” by Eversource for a transmission line, while maintaining its long term transportation use and transitory use as a rail trail, though it only exists as a “rail-banked” future transportation corridor.
- As such, any shared use must be designed to allow unimpeded future use as a transportation corridor.
- The corridor is held “in trust” for future transportation use, even if active use does not materialize for decades.
- “Cape Rail” is an example of such a situation, left untouched for decades until needed as a rail transportation corridor.
- Formal transportation studies, assessing the corridor’s use as a shared trail and busway was conducted by the Metropolitain Area Planning Council (MAPC) in 2010 and identified a number of challenges to its construction as a shared use ROW.
- Based of feedback on the Sudbury-Hudson Reliability Proposal, it is highly questionable that the ROW could support shared use as a transmission line corridor and transportation corridor and comply with current environmental and transportation design requirements.
- In addition to Eversource’s interest in the corridor, there is interest among some private groups and towns to develop the MBTA-ROW as a rail-trail, while other towns have looked at transportation options.
- It is the obligation of the Commonwealth as the statutory “caretaker” to protect this corridor for future transportation use.

Summary:

- The Central Massachusetts Right of Way, preserved under “rail-banking” is a significant 19th Century asset with a number of potential 21st Century benefits.
- A rail-banked corridor must be treated as if it had not been abandoned for rail and/or future transportation purposes.
- As a result, the integrity of the corridor is maintained, and any reversions that could break it up into small pieces are prevented.
- Prior studies by MAPC indicate that the width of the MBTA-ROW presents challenges for shared use.
- It is highly likely that the corridor will re-emerge as a future candidate for reactivation of transportation service, due to the lack of other viable contiguous transportation routes between Worcester/I-495 and I-95/128/Boston.
- The other towns along the corridor have not achieved consensus as to the best use, and MassDOT has not presented any cohesive plan for its future use as a transportation corridor – other than transitory use as a rail-trail.
- There is no question as to the need for an improved energy grid and transportation system. However, in this case, the Massachusetts Energy Facilities Siting Board, MassDOT (and subordinate operating and planning entities), DNR and municipal governments along the MBTA-ROW, have not agreed on a comprehensive corridor plan for both transmission lines and transportation corridors that best serves the long-term public interest.
- Current discussion, addressing one minor transmission line proposal, cannot be permitted to side-step assessment of future transportation demands on a corridor earmarked for that purpose.