



**US Route 3 / Wire Road Intersection
Safety & Capacity Improvements
NHDOT Project No. 41588
Merrimack, New Hampshire**



QUANTUM CONSTRUCTION CONSULTANTS, LLC

Public Presentation
December 15, 2022



QUANTUM CONSTRUCTION CONSULTANTS, LLC

- Civil and Structural Engineering Firm Located in Concord, NH
- Specializing in Municipal Bridge and Roadway Design
- Experienced with NHDOT Municipally Managed Project Process

In Association with



- New England Based Municipal Engineering Firm with Local Office in Manchester, NH
- Transportation Planning and Engineering Specialists
- Experienced in HSIP & Signalization Design

Presented by:

Jim Bouchard, QCC
Anna Giraldi, PE QCC
John Byatt, PE BETA
Chris Turgeon, PE BETA
Dennis Flynn, PE BETA



Project Funding

Nashua Regional Planning Commission Priority Project

- Funding Source: Nashua Regional Planning Commission (NRPC) Priority Project Rankings (2017)
- 80% FHWA/NHDOT, 20% Town of Merrimack
- US Route 3 was programmed for 2027 construction & accelerated to 2025





Project Management Process

Municipal Request to Regional Planning Commission (RPC)
NRPC Project Priority Ranking Process – Project ranked high in regional need

NHDOT Ten Year Plan Approval

Funding Approval

Selection of Design Consultant Engineering Firm

Engineering Study

Preliminary Plans Specifications & Estimate (PPS&E)

Final Plans Specifications & Estimate (PS&E)

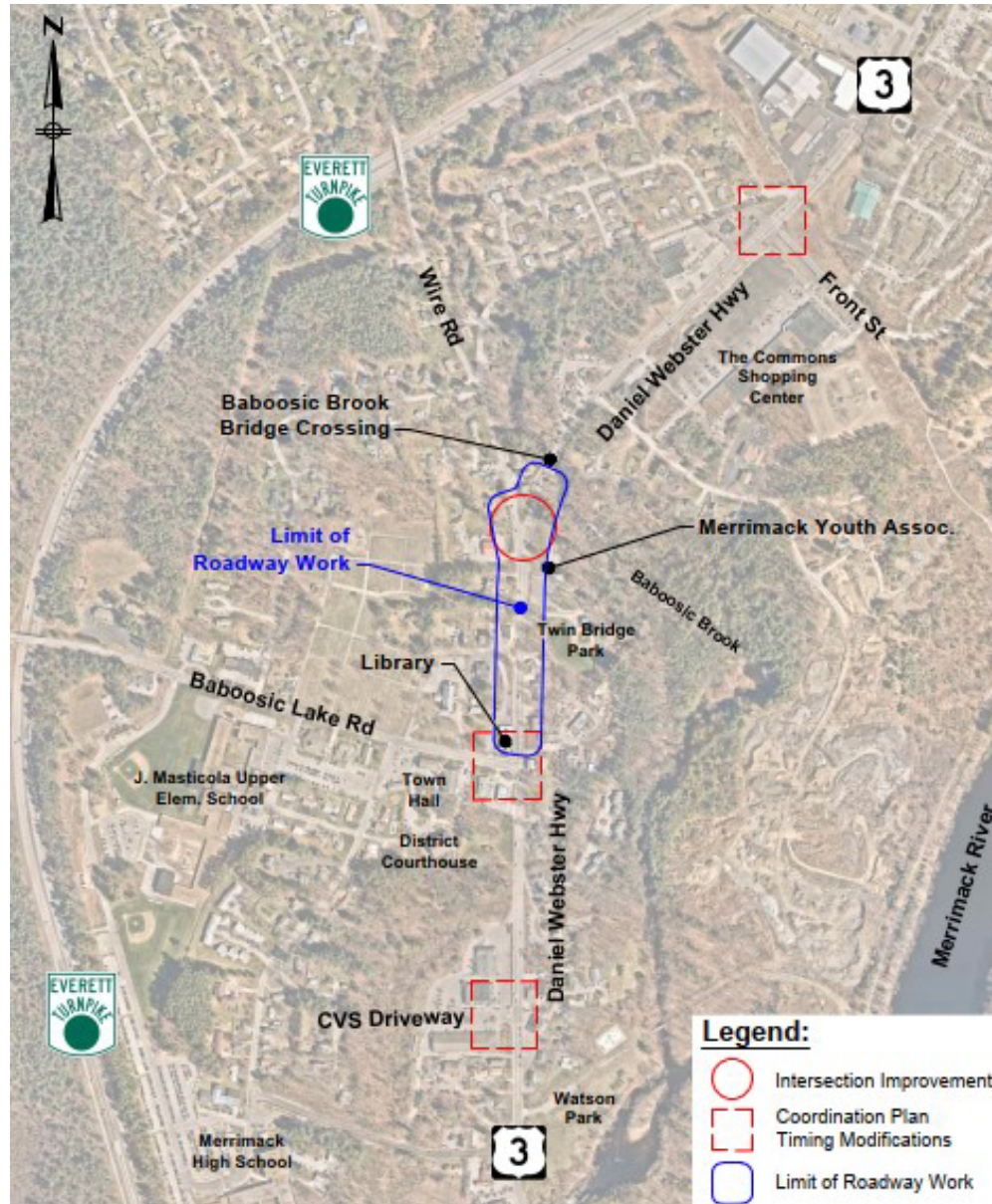
Bid Phase (FY 2024)

Selection of Construction Services Consultant Firm

Construction Phase (FY 2025)



Project Overview





Wire Road at US Route 3 Intersection

Engineering Study

- **Scoping Session**
 - Establish Project Purpose & Need



- ✓ **Purpose:** The purpose of this project is to improve safety and traffic operations within the project corridor limits.
- ✓ **Need:** The need for this project is to address safety and traffic concerns identified by the community; by implementing safety improvements along the corridor and providing a more efficient intersection to improve the flow of traffic along US Route 3 within the project limits. In addition, pedestrian connectivity, and access management are ongoing needs for the community.



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- **Design Criteria**
 - ✓ NHDOT Highway Design Manual
 - ✓ NHDOT Standard Specifications for Road & Bridge Construction
 - ✓ Manual on Uniform Traffic Control Devices (MUTCD)
 - ✓ AASHTO Geometric Design of Highways and Streets
 - ✓ Americans with Disabilities Act (ADA)





Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- **Existing Conditions**
 - ✓ Project Corridor is approximately 1300 Linear Feet.
 - ✓ Existing Right-of-Way is approx. 66 feet wide and widens at Wire Road intersection.
 - ✓ Two 12-13 foot travel lanes, two 6-foot shoulders, 10-11 foot turn lane.
 - ✓ Limited sight lines for egress from Wire Road.
 - ✓ Church Street intersects US Route 3 at 15% grade.
 - ✓ Utilities – aerial utilities on west side, watermain, gas line, drainage and telecommunication and fiberoptic underneath US Route 3.





Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- **Existing Conditions**
 - ✓ Existing Traffic Signal Equipment at Adjacent Locations were Surveyed





Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- **Traffic Counts**
 - ✓ Existing traffic count information accessed.
 - ✓ Manual turning movement counts (TMC's) undertaken at major intersections.
 - ✓ Weekday AM Peak Hour – 7:15 AM to 8:15 AM
 - ✓ Weekday PM Peak Hour - 5:00 PM to 6:00 PM
 - ✓ Saturday Mid-Day Peak Hour – 11:15 AM to 12:15 AM



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- **Safety Analysis – Wire Road & MYA Access**
 - ✓ Merrimack Dept. of Safety Information – January 2017 through July 2022.
 - ✓ Rear End Crashes most prevalent.
 - ✓ One of bicycle and vehicle.
 - ✓ Weather contributed to some.
 - ✓ No injuries reported for any of the crashes



Wire Road at US Route 3 Intersection

Engineering Study

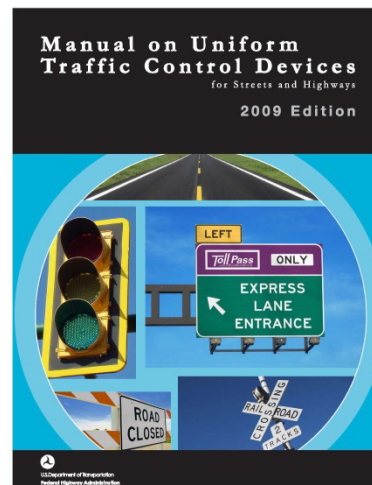
- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analysis
- **Intersection Operations**
 - ✓ Six (6) Levels of Service (LOS) – “A” to “F.”
 - ✓ LOS based on intersection delay.
 - ✓ Baboosic Lake Road – LOS D during Saturday Peak Hour.
 - ✓ All other signalized intersections – LOS C or better during AM, PM and Saturday Peak Hours.
 - ✓ Wire Road – LOS C during Am, PM, and Sat. Peak Hours.
 - ✓ MYA – LOS E during Saturday Peak Hours



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analysis
- Intersection Operations
- **Traffic Signal Warrant – Wire Road**
 - ✓ MUTCD – 9 Warrants for Signals Installation.





Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analysis
- Intersection Operations
- Traffic Signal Warrant – Wire Road
- **Roadway Alternatives Analysis**



Roadway Alternatives Analysis

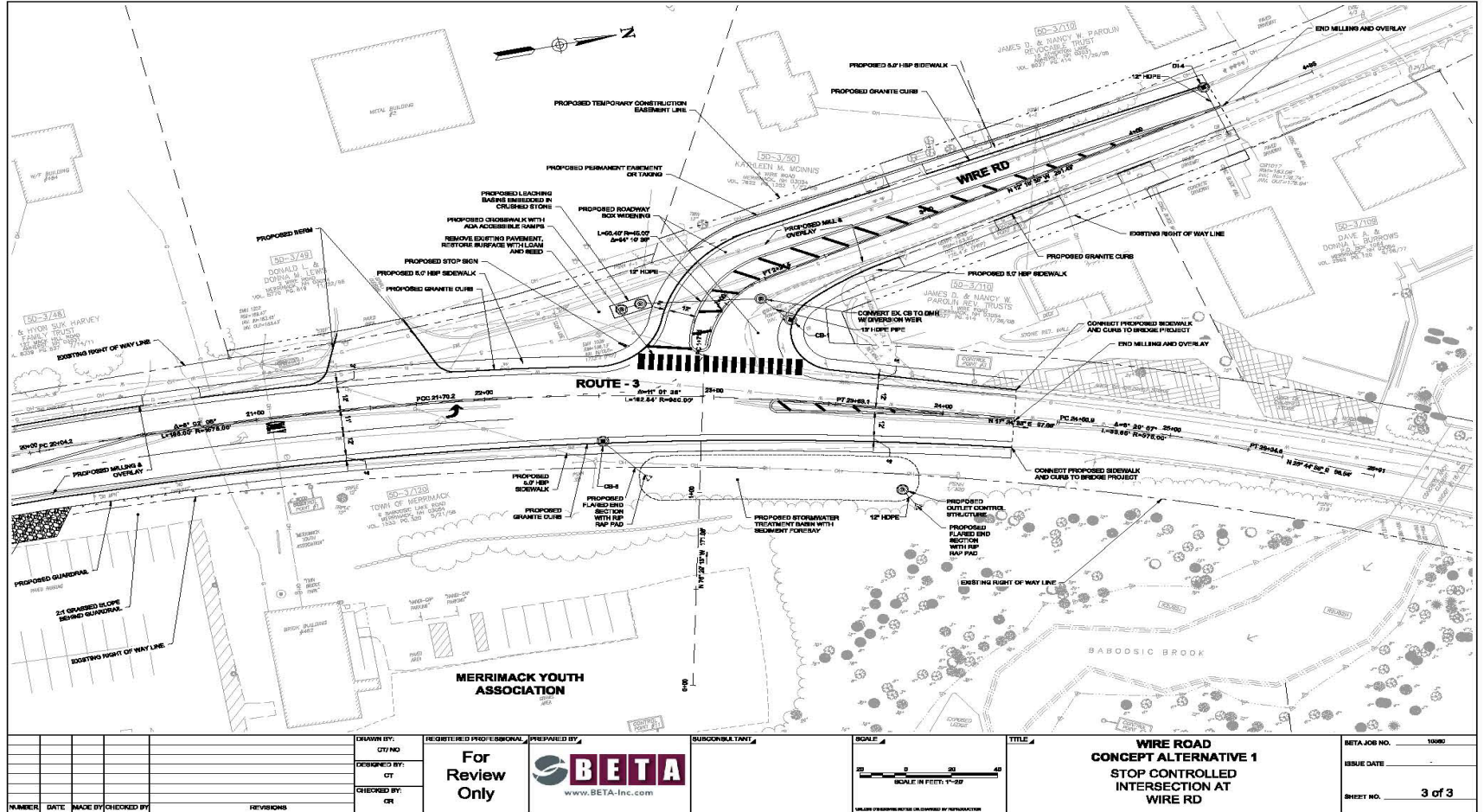
- **Do-Nothing or No-Build Alternative**
 - Does not improve traffic and safety operations.
 - Does not provide for pedestrian connectivity.

- **Option I – Realigned Stop Controlled Intersection**
 - Realigned intersection closer to 90-degree angle for improved sight lines
 - Exclusive Left and Right Turns not required
 - US Rte. 3 NB left turn lane into Wire Road extended
 - No new MYA access / egress
 - US Rte. 3 SB left turn lane into MYA provided
 - Pedestrian sidewalk on East Side of US Rte 3.
 - Pedestrian sidewalk completed on west side of US Rte. 3
 - Church Street closure
 - FY 2022 Construction Cost - \$890,000



Concept Alternative 1

Stop Controlled Intersection at Wire Road



NUMBER	DATE	MADE BY	CHECKED BY	REVISIONS

DRAWN BY: CITY NO.	REGISTERED PROFESSIONAL For Review Only	PREPARED BY: BETA www.BETA-Inc.com
DESIGNED BY: CT		
CHECKED BY: CR		

SCALE 1" = 40'

SCALE IN FEET: 1"=40'

SCALE IN METERS: 1"=12.5m

TITLE
**WIRE ROAD
 CONCEPT ALTERNATIVE 1
 STOP CONTROLLED
 INTERSECTION AT
 WIRE RD**

BETA JOB NO. 10089

ISSUE DATE

SHEET NO. **3 of 3**



Roadway Alternatives Analysis

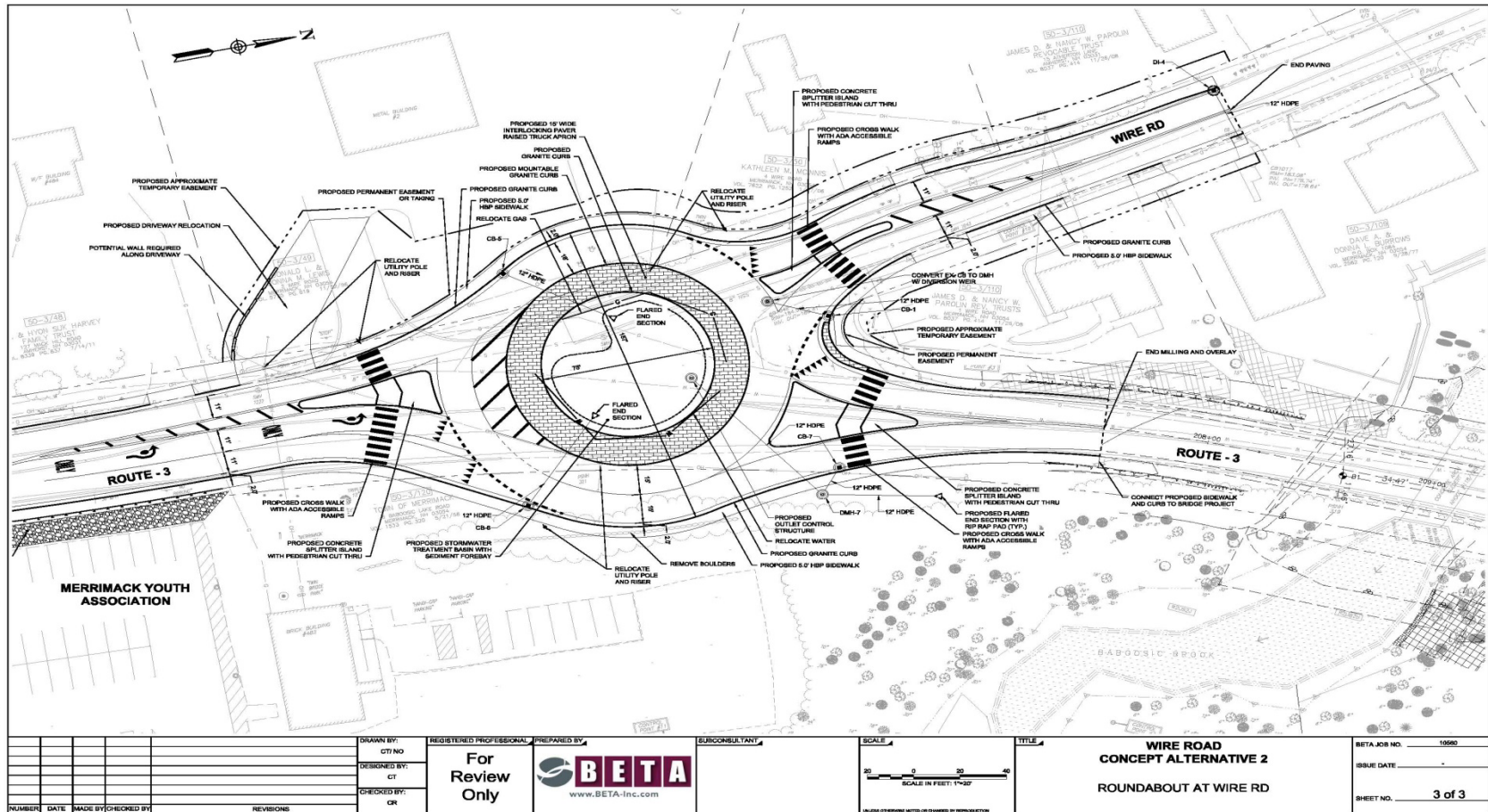
- **Option 2 – Roundabout**

- Hybrid roundabout
- 2- Lane US Rte. 3 NB approach, Single Lane US. Rte. 3 SB approach & Single Lane Wire Road Approach
- Features US Rte. 3 NB slip through movement.
- 157-ft Dia. Curb to curb.
- Significant impacts to abutters
- US Rte. 3 NB left turn lane into Wire Road extended
- No new MYA access / egress
- US Rte. 3 SB left turn lane into MYA provided
- Pedestrian sidewalk on East Side of US Rte. 3.
- Pedestrian sidewalk completed on west side of US Rte. 3
- Church Street closure
- Major relocation of aerial utilities required
- FY 2022 Construction Cost - \$1,610,000.



Concept Alternative 2

Roundabout at Wire Road



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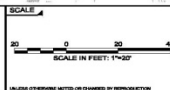
NUMBER	DATE	MADE BY	CHECKED BY	REVISIONS

DRAWN BY: []
 CITY NO: []
 DESIGNED BY: []
 CIT: []
 CHECKED BY: []
 OR: []

REGISTERED PROFESSIONAL
For Review Only



PREPARED BY: []
 SUBCONSULTANT: []



TITLE
**WIRE ROAD
 CONCEPT ALTERNATIVE 2
 ROUNDABOUT AT WIRE RD**

BETA JOB NO. 15962
 ISSUE DATE: []
 SHEET NO. **3 of 3**



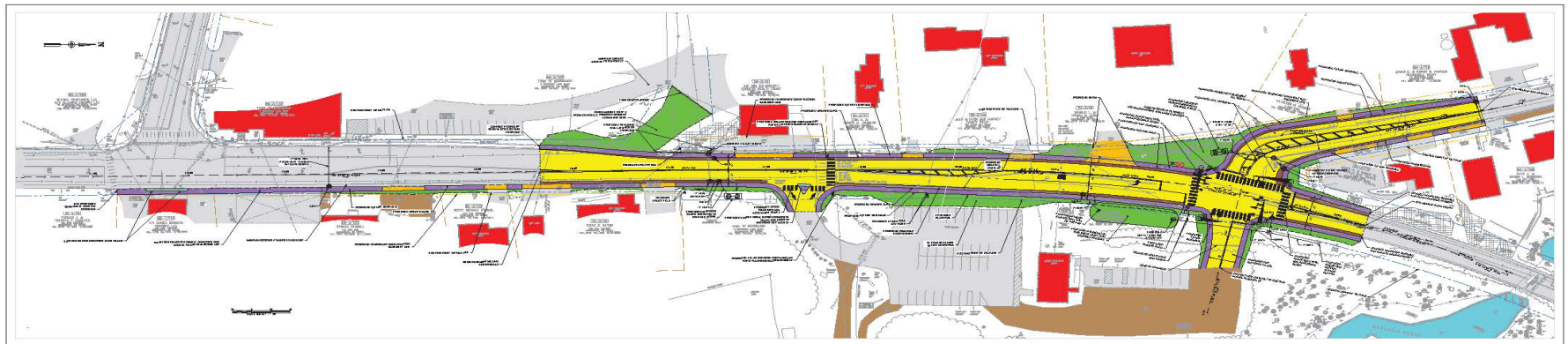
Roadway Alternatives Analysis

- **Option 3 – Signalized Intersection (Recommended Alternative)**
 - Similar realignment to Option 1
 - Includes new MYA access / egress at intersection.
 - New Fully Actuated Traffic Signal for traffic and pedestrian movements.
 - Traffic Signal coordination with other signals on US Rte. 3.
 - Existing MYA entrance reconfigured to US Rte. 3 NB RT in and MYA RT out.
 - Traffic Signal coordination with other signals on US Rte. 3.
 - Pedestrian sidewalk on East Side of US Rte 3.
 - Pedestrian sidewalk completed on west side of US Rte. 3.
 - Minimal impact to abutters for sidewalk slope easements.
 - Church Street closure.
 - FY 2022 Construction Cost - \$1,400,000.



Concept Alternative 3

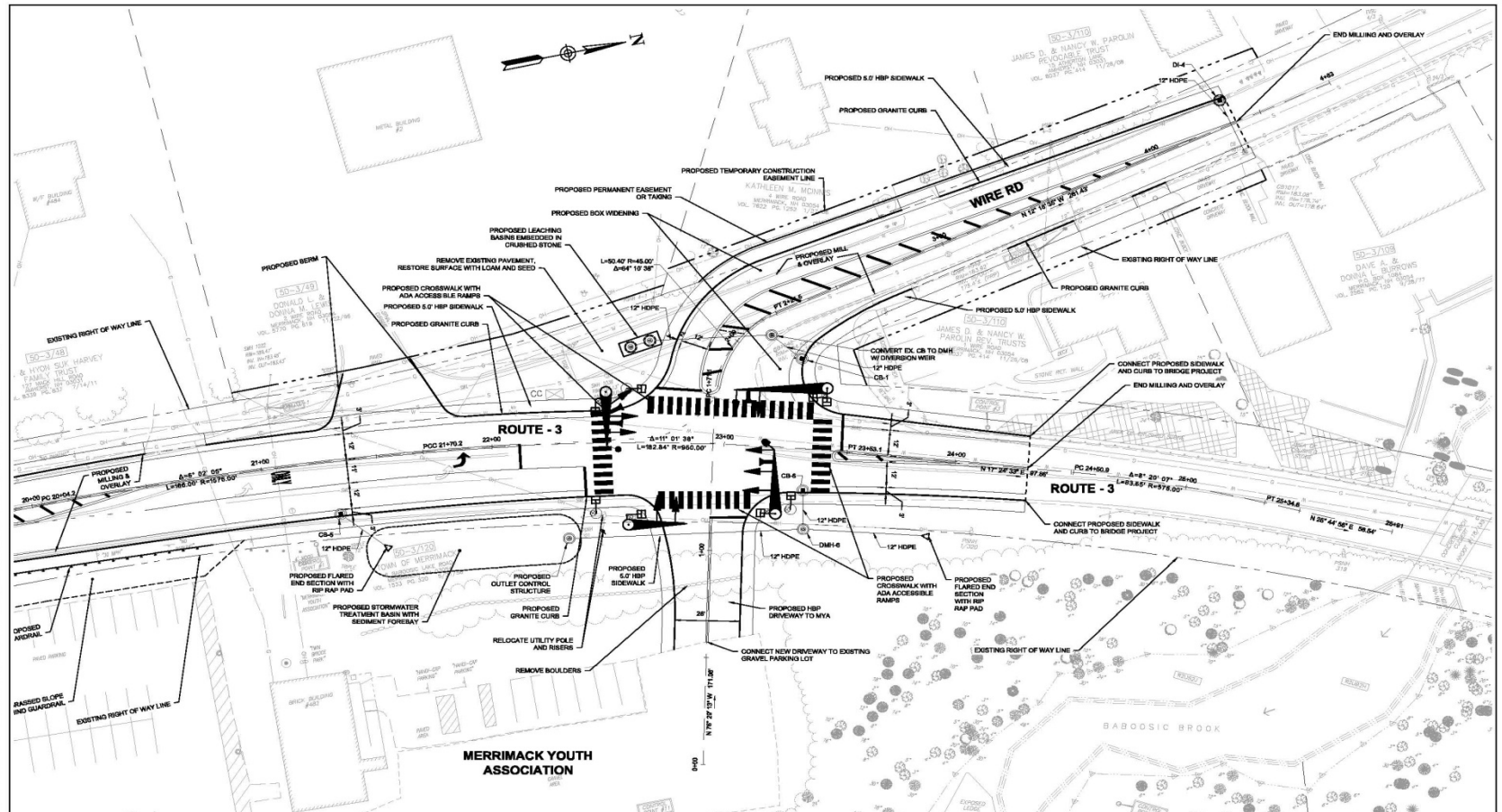
Signalized Intersection





Concept Alternative 3

Signalized Intersection



11/19/2022 4:53 PM C:\192005\1920 - 022 - WIRE RD INTERSECTION/ANALYSIS/CONCEPT ALTERNATIVE 3 SIGNALIZED INTERSECTION (NO LEFT TURN) (BETA SITE BY/STN)

NUMBER	DATE	MADE BY	CHECKED BY	REVISIONS

DRAWN BY: CTJ NO	REGISTERED PROFESSIONAL	PREPARED BY: BETA	ENGINEER/CONSULTANT
DESIGNED BY: CT	<p>For Review Only</p>	<p>www.BETA-Inc.com</p>	
CHECKED BY: CK			

SCALE	TITLE
<p>SCALE IN FEET: 1"=20'</p>	<p>WIRE ROAD CONCEPT ALTERNATIVE 3 SIGNALIZED INTERSECTION AT WIRE RD</p>

BETA JOB NO. 10590
ISSUE DATE
SHEET NO. 3 of 3



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analyses
- Intersection Operations
- Roadway Alternatives Analysis
- **Environmental & Cultural Resources Considerations**
 - NHDES Standard Shoreland Permit required
 - Alteration of Terrain permit (AoT) required
 - No Endangered or Threatened Species will be impacted
 - No Historical Resources impacted or additional studies
 - National Environmental Policy Act Document
 - FHWA Section 4(f) for parks



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analyses
- Intersection Operations
- Traffic Signal Warrant Analyses
- Roadway Alternative Analysis
- Environmental & Cultural Resources Considerations
- **Right of Way / Easements**



Right of Way / Easements

- Impacts to abutters for slope easements as required for sidewalk construction / reconstruction.
- Easement plans will be developed by QCC.
- The Town will meet with the abutting property owners to discuss the possibility of obtaining easements. The Town will negotiate permanent and temporary easements with the affected property owners.



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analyses
- Intersection Operations
- Traffic Signal Warrant – Wire Road
- Roadway Alternatives Analysis
- Environmental & Cultural Resources Considerations
- Right of Way / Easements
- **Construction Cost Estimate - \$1,400,000 Alternative 3**



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analyses
- Intersection Operations
- Traffic Signal Warrant – Wire Road
- Roadway Alternatives Analysis
- Environmental & Cultural Resources Considerations
- Right of Way / Easements
- Construction Cost Estimate - \$1,400,000 Alternative 3
- **Public Information Meeting**



Wire Road at US Route 3 Intersection

Engineering Study

- Scoping Session
- Design Criteria
- Existing Conditions
- Traffic Counts
- Safety Analyses
- Intersection Operations
- Traffic Signal Warrant – Wire Road
- Roadway Alternatives Analysis
- Environmental & Cultural Resources Considerations
- Right of Way / Easements
- Construction Cost Estimate - \$1,400,000 Alternative 3
- Public Information Meeting
- **Engineering Study Report**



Preferred Alternative & Recommendations

Preferred Alternative:

- Signalized Intersection at Wire Road
- Signal Coordination with existing signals
- Realignment of Wire Road
- New MYA access / egress
- Sidewalks both sides of US Route 3
- Smallest footprint of impact
- Least impact to aerial utilities

Recommendations:

- Complete final design and permitting of project
- Request NHDOT reimbursement for 80% of engineering cost
- Start construction FY 2025



Questions

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