



City Council - Transportation, Energy and Utilities Committee

Tuesday, September 24, 2024, 5:30 PM,

Join in Person: Front Conference Room, 645 Pine St. Burlington, VT 05401

Join via Zoom: <https://zoom.us/j/84603122855>

To call into the meeting, including to speak during public comment:

Phone: 312-626-6799, Webinar ID: 846 0312 2855

1. Agenda

1.1. Motion to amend/approve

2. Adopt Minutes

2.1. Minutes of 9/3/24, 8/27/24, 7/22/24

3. Public Forum

4. Deliberative Agenda

4.1. Water Resources Upcoming Capital Projects

4.2. GMT Proposed Service Reductions

4.3. Shelburne/Home Intersection Study

4.4. Courthouse Plaza Parking Agreement - Utilization and Update

4.5. Schedule Next BERO Meeting

5. Director's Report

6. Councilor Items

7. Next Meeting

7.1. Next meeting 10/22/24 5:30PM

8. Adjournment



CITY OF BURLINGTON, VERMONT

CITY COUNCIL TRANSPORTATION, ENERGY & UTILITIES COMMITTEE

c/o Department of Public Works
645 Pine Street, Suite A
Post Office Box 849
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Councilor Mark Barlow, Chair, *North District*
Councilor Gene Bergman, *Ward 2*
Councilor Evan Litwin, *Ward 7*
Councilor Marek Broderick, *Ward 8*

Inquiries:
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Transportation, Energy and Utilities Committee of the City Council **Special Meeting: BERO**

Tuesday September 3, 2024 – 6PM
--DRAFT MINUTES--

Chair Barlow (MB) calls meeting to order at 6:04 PM

1. Agenda & Proposal

MB describes special meeting to discuss Building Emission Reduction Ordinance (BERO), passed by City Council. Acknowledges that late posting of material may not allow robust public comment, but also adds that no decisions being made tonight.

Councilor Marek Brodereick (MBr) acknowledges late submission of material and gives overview of BERO.

2. Public Forum

Natalie Braun: shares that they are not a Burlington resident, but is a member of the Essex Energy Committee. Looking to Burlington to lead. All buildings can be improved, and that can be anywhere.

Elizabeth Chant: Shelburne resident with 30 years experience in energy efficiency industry (including helping start Efficiency Vermont). Good first start including best practices, improvements needed including on other best practices. Promulgation and implementation critical.

Jay Griffin: supports BERO effort and warns against “watering down”

Abby: Burlington resident and Ward 1 resident. Appreciates Councilors time. Supports BERO as first step in addressing climate crisis.

Alexander Harrin, Kat Turrell, Lindsay Masher, Elizabeth Stoves, Olivia Geddes, Max Handelman, Ryan Hagen: all speak separately to support ordinance

Remote Participants:

Liz Curry : Points out that other larger markets have had decades of experience in efficiency – along with incentives. Agrees that the ordinance is necessary, a good start and needs to be more robust for terms and conditions to make it successful.

Quinton Zondervan: former Cambridge City Councilor, lead sponsor on similar legislation. Likes Burlington's approach. Offers assistance during policy making.

Kelly Devine: only recently found out about this meeting. Worked in efficiency market in past. Incentives and support are critical. No building owners present and wondering if they are aware of meeting. Bring in major institutions like UVMMC, UVM, Champlain.

Ethan Robbins: good option to move buildings off of fossil fuels.

Jack Hanson: voices support for BERO

Additional In-person participants:

Rob Morrow: asks for clarity that the scope is between 10,000-50,000 square feet. Says that these building owners typically don't have the facility staff to support the requirements in the ordinance.

Annie Jackson: great step forward for businesses and others to take more responsibility.

3. Closing Comments

MBr thanks public commenters and viewers.

Councilor Evan Litwin (EL): says that more process is necessary and appreciates the public commenters who bring expertise to this issue. Having building owners, others at the table a "non-starter," doesn't see this going far without more conversations. Appreciates everyone's care and urgency.

Chair MB – offers thanks to everyone who spoke and care about the topic. Invites public to send in additional written comments and at a future TEUC meeting.

4. Adjournment

Chair Barlow adjourns at 7:08PM



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Transportation, Energy and Utilities Committee of the City Council **Tuesday August 27, 2024 – 5:30PM** **--DRAFT MINUTES--**

Chair Barlow calls meeting to order at 5:31 PM

1. Agenda

Chair Mark Barlow (MB) suggests moving original item 4.1 to end given potential for executive session. Councilor Gene Bergman (GB) moves agenda as amended moving 4.1 (201 Flynn) to 4.3, moving every other item up in order. Councilor Marek Broderick (MBr) seconds. All in favor.

2. Minutes of 7/22/24

Councilor Bergman moves to table 7/22/24 minutes to next meeting. MBr seconds. All in favor.

3. Public Forum

Evan Gould, Ward 5 resident, speaks in support of speed limit change to 20MPH. Posting may make little difference but will build on traffic calming.

4. Deliberative Agenda – as amended

4.1 Downtown 20MPH speed limit

Engineer Phillip Peterson (PP) gives a short presentation on the proposal to change part of the downtown speed limit to 20MPH. Clarifies that this is not citywide.

Stu Lindsay – Birchcliff area resident. Works with local orgs to encourage people to walk more. How will education work? For instance, bike light – do people know how this works?

PP answers that we'll be going to NPAs, among others. Public Information Manager Rob Goulding added social media, earned media, other avenues to promote the "20 is Plenty" campaign. PP disseminates Local Motion letter of support.

GB asks if every travel way will be covered by 20 MPH change. PP addresses carve out, and that orange advisory signs will be out as a "work around" from the limitations. GB asks how data collection on this works and how boundary got drawn. PP said responsibility is with state. Discussion ensues on how to work with state to expand this "downtown zone." GB highlights Maple and King residents, and others.

MBr supports, no questions.

MB asks for clarification on public outreach schedule. PIM RG clarifies that NPA's are about post-approval education, not necessarily pre-approval outreach. There would be about 3 weeks between Labor Day and Commission to warn public about upcoming changes, and then another month until regulation becomes effective.

MB asks if Battery could ever be carved out for faster, given its arterial nature. PP says not necessarily given that Main also function as artery.

Stu Lindsay – member of public – asks about “inner fire district.”

Jason Van Driesche – member of public – very much in support of 20MPH change. Does not feel like extensive engagement gets people to slow down, but it is infrastructure. Suggests that infrastructure should be uncomfortable to drive on. St Paul and Maple was good example in making motorists uncomfortable.

Sarah Camille Wilson – ED of Old Spokes Home – very much in favor of 20MPH change. Structural change is necessary as well to the infrastructure.

PP references Main St being designed for 20MPH, Battery St going through scoping study.

Barbara Headrick likes 20MPH idea in downtown. Even with implementation, no enforcement happening which is major problem. Need enforcement.

4.2 planBTV Walk Bike Action Plan Update

Engineer Peterson gives update/presentation on planBTV. Clarifies that doing an update to this helps meet federal government requirement for funding opportunities (every 5 years). CCRPC funded effort. Not a “re-work”, but an update to 2017 plan.

Discusses survey, NPA, public meeting opportunities for engagement. Hoping for final plan by April 2025 for Council to review.

Stu Lindsay – public member – asks about Main St Great Streets and whether there is “defensive” furniture (terrorist attacks, etc) - submitted this to an open forum. Director Chapin Spencer says he will follow up.

Evan Gould – public – offers feedback about “Dutch junctions,” growing in popularity in Europe. Also suggests Greenway needs prioritization over cars.

Councilor MBr said that at PAC, biggest topic to address is how do we implement projects at a quicker pace. Director Spencer says that funding and staffing are biggest challenges to move quicker/do more. Preventative maintenance funding has been challenging (such as maintaining separated protected bike lane bollars; sweeping more). Also, staff development – Tech Services budgeted for 10 people, have 5 staffers. Staff is close to ‘burnout,’ encourage others to apply. Says that the team is supportive of doing more.

Assistant City Attorney Ramakrishnan clarifies that fed \$ funds capital improvements, but we still need maintenance dollars.

Councilor GB asks how Walk Bike Council fits into this project. PP clarifies a Council member is on the project PAC. GB follows up and asks for presentation that reveals what they're doing in relationship to this.

GB says more outreach about PAC meetings is necessary, and more public info about what has been done, what needs to be done, etc. GB also asks about how public private partnerships can be constructed to meet goals of plans. Akin to "Adopt a highway."

Evan Gould – public member – mentions elimination of bike fatalities by 2026

- **4.3 201 Flynn**

Director Spencer lays out timeline for approval to purchase and sale.

Councilor GB asks if DPW can provide summary for public.

DPW Maintenance Director Lee Perry gives history of CSWD and Flynn Ave parcel. Director CS gives more details on the financials with City paying \$375K for front 201 Flynn Ave parcel, roughly 1 acre in size. Finance through lease, but not through General Obligation bond. Would lead to increase in solid waste generation tax.

Councilor GB asks about future of Intervale area used by City. CS says parties are interested.

Councilor GB asks about contamination issues which CS clarifies that we are doing testing at Flynn Ave site, not Intervale.

GB moves to go into executive session due to ongoing contract negotiations, related to real estate negotiations. MBr seconds. All in favor.

TEUC moves into executive session at 6:40PM.

GB moves to adjourn. MBr seconds. All in favor.

5. Director's Report

NA

6. Councilor Items.

NA

7. Next Meeting

Next regular 9/23

8. Adjournment

Chair Barlow adjourns at 7:32 PM



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Transportation, Energy and Utilities Committee of the City Council **Tuesday July 22, 2024 – 5:30PM** **--DRAFT MINUTES--**

Chair Barlow calls meeting to order at 5:30PM

Video of this meeting can be found at <https://www.youtube.com/townmeetingvt>

1. Agenda

Chair Barlow moves to amend the agenda. Change item 4.1 wording from Building Emissions Reduction Act to Building Emissions Reduction Ordinances and add 30 minute time limits to Public Forum, Items 4.1 & 4.2.

Chair Barlow moves to approve the agenda as amended. Councilor Bergman seconds. All in favor, passes unanimously.

2. Public Forum (some audio was difficult to hear, please reference video at link above)

Julia Hondal – From Ward 4 –talk about BERO - needs to make a strong building emissions ordinance and elect officials to create this policy to make sure we see how much these buildings are emitting.

Jacob Griffin – Speaking about BERO –Champlain College has already done the work to reach the renewal impact. Burlington has made promise to it citizens about net zero and wants us to commit to it.

Kyr Herschlag - Ward 2 Resident - in reference to BERO - **in audible**

Liz Curry – expert in building rehab. Talks about a broader system – 2014 benchmarking took a long time to get to that. Entities were created to become energy efficient utilities. Burlington opted out of our Emergency efficiency, as a result we have and Electric utility that tries to manage getting incentives- Bond for light bulbs. We don't have comprehensive energy efficiency program design that can work with all sectors of the market. Gas Company works for profit that doesn't engage as it could. BED to deliver a more robust program and incentive design to certain buildings in certain markets, not all. No program design that systematically delivers to the market the effort that we need to get to net zero by 2030. Baseline should be used.

Barbara Headrick – Last meeting comments weren't captured correctly. Chair Barlow indicates changes have been made.

BH - We pay consultants for reports that we already had ideas on. Going forward out all of our ideas that we looked at before in one section and new ideas from consultant in another section along with what we pay that consultant for those ideas. Interesting to see what value the consultants bring in terms of new ideas versus us repackaging out old ideas.

Colin McDermott – Ward one – Employee of the Soda Plant and resident. Here to talk about his recommendation for the city to reduce emissions on buildings. Noticed the owner made more environmental decisions which resulted in the quality of work being better with more suitable work conditions and a difference in cost. Doesn't want to contribute to the carbon foot print but doesn't have a choice and is paying for it. Asking City to make the change for Commission Reduction abilities.

3. Minutes of 7/11/24

Councilor Bergman (GB) -moves to adopt as written with the changes to Barbara Headrick's comments as submitted. Councilor Litwin (EL) seconds. All in favor. Unanimous approval.

04. Deliberative Agenda

- **4.1 Building Emissions Reduction Act**

MB- made motion to change the title Building Emission Reduction Act to Building Emission Reduction Ordinance. To move Zero forward instructed to have ordinance and valid language drafted to the ordinance committee by the last city council meeting in October. Asked to do staffing and administrative work between staff. Open to meetings in September.

GB – Need to talk about this in a large block. Focus on the street areas. Liz raised points the idea of community stakeholders and advisors. Figure out sequence and staff input on what is working and not working and what they have the capacity to do. We are in a climate emergency – use research funds to advance this. Approximately \$50,000 left. Take an item and get a sense of it. A lot of moving parts – timing of what we ask for and when to do in an efficient way.

Councilor Marek Broderick (MBr) – in audible

MB – Specific action needed.

MB- Suggest 1st week of September earlier than 5:30 p.m. to meet. Decided on 6:00 pm Tuesday September 3, 2024

- **4.2 Rental Weatherization Ordinance**

MB -Find out why Ordinance is not working and make recommendations.

DPI Director Bill Ward (BW) stated this has been a slow process. Suggests extending the timeline for compliance would allow staff to focus more on past noncompliance before starting new properties to comply. 3071 Rental Properties, or 10,500 rental units. Of those 733 were using above 50,000 btus per square foot per year. 76% of the rental properties were already in decent shape. Continued evaluation of what works and doesn't work for staff and contractor challenges – Parking tickets & winter parking ban challenges.

.
Jen Green – Commitment to Equity. Help folks by providing transparent information. Updating FAQ Sheet.

Chris Burns (CB) from Burlington Electric – Finding weatherization contracts is a problem. Burlington rental properties competing with Single family contracting work

MB – asked if there was a form for the data that Bill provided. How can we incentivize work to be done?

GB – Looking for issues form Administrative and State Wide and look for recommendations. Would like to have work that was done broken down with specific policy recommendations.

CB – Contractors competing with jobs that are not as brutal (basement or attic) More federal money and legislative acts are available just not enough trained staff. Longstanding contractors need to extend crews but energy programs can't confirm amount of time money will be available. . BED – 98% of their buildings are naturally gas heated. VGS offers free audits, generous incentives and financing.

BW – Will ask Efficiency Vermont to come to the next meeting.

GB – Heard great things about Capstones in central VT. We should be talking to them.

CB - Champlain Valley Weatherization Services are considered a good operator. BED & VT Gas have a contract with them. They replace and send BED & VT Gas a bill. This system is working well.

EL - Helpful to see what is the backlog, how far behind are we so we can compare when did we start and where should we be. Survey contractors – how long does one need to wait to get work done?

Mbr – in audible

- **4.3 City Transportation Plan Update**

DPW Staff are in the intial phases of securing funding for the development of a new Tranportation Plan for the City of Burlington.

CS – Interest in doing a large comprehensive update to our plan.

PP – looking to supplement DPW funds with Federal funds.

GB – 1st part of the motion is the big picture for this physical year.

EL - Didn't think it was necessary to offer an amendment in section 3. Add police Commission and Public Safety Board since it says included but not limited to.

GB – move the motion as stated in civic clerk that is listed as 7.224 GB motion R Transportation Plan Update the Pedestrian bike extension downtown including Bank & Cherry St.

MB – seconded motion. All in favor.

- **4.4 UVM-City Land Swap at Pearl & Prospect Intersection**

DPW Staff are writing to formally request TEUC approval to present a proposed land swap agreement with the University of Vermont (UVM) to the Board of Finance (BOF) and City Council (CC) for their

consideration and approval.

EL – Straight forward. Keep this section.

CS – Key area to be addressed.

Erik Ramakrishnan Assistant City Attorney – Basic problem – UVMs property is non-conforming. City owns a lot of land that Dewey Hall is on. UVM will consent and has waived all objects. Property they are obtaining from us is larger than the one we are swapping for.

City Engineer & Technical Services Assistant Director Laura Wheelock (LW) VTrans projects starts later this fiscal year. They have an amount budgeted to hire a design consultant which we are positioned that this will be 100% federally funded.

EL – What happens with the difference in money that we will get back from UVM?

PP – Goes back to General fund.

MB – when do we think this project will be completed?

LW – Vtrans project is procuring their design in 2025. It is about a 3-5 year window before it goes to actual construction.

GB – Motion to move that we approve proposal and present it to the Board of Finance & City Council for their consideration.

EL Makes amendment to refer question to Board of Finance as to where to reallocate \$113,000 as possible funding for downtown public kiosk.

Assistant City Attorney Erik Ramakrishnan clarifies there is no second on the proposed amendment and with no second, Committee goes back to main motion.

MB seconds initial motion. All in Favor

GB leaves meeting at 7:14pm

- **4.5 FY25 Fleet Replacement & Telematics Update**

Assistant Director of ROW Lee Perry (LP) requesting purchasing 4 assets, 2 vehicles, one piece of heavy equipment and a trailer. None of these purchases are for General fund. We have 943,000 left over from last year's budget to cover leases for FY2025. We do not have enough funding for the general fund. There are 76 vehicles on the deferred list, 7 are urgent. Like to purchase Telematics Software for the Fleet vehicles will offer multiple benefits like tracking plowing, sweeping, idling times, real time diagnostics and maintenance.

Ashley Parker (AP) Capital Program Director – Fleet Study only focuses on a road map for electrification of our fleet.

MB – What is used now for asset management?

LP – Fleet software called RTA. We create work orders, track fuel and do billing through it. Telematics has more accurate reports on Fuel usage, Idling time, driving habits, it will send alerts if a check engine light comes on rather than waiting until the end of the day. An email is sent to the fleet manager who then in turn gets ahold of the mechanics so they can repair it. It also benefits Water Resources for the state with sweeping. Provides a lot of good information for the public and city.

EL – Does the Urgent purchase list come out of Departmental budgets or General fund budget?

AP – Yes.

EL – Mower for 130,000 what goes into the research for the replacement costs? 130,000 the ceiling? When you purchase do you consider gently used?

LP – Cost is quoted based on prior quotes with inflation calculation added in. We purchase new especially emergency vehicles because they are used pretty hard. Gently used would need to be discussed with the Fleet committee.

MBr makes motion to approve. EL seconds the motion. All in favor.

- **4.6 Riverside Avenue Slope Stability – 505 Riverside Ave Potential HMGP Application**

Director Chapin Spencer (CS) – seeking guidance as the DPW evaluates the City's position on how we work with property owners along Riverside Ave. 505 Riverside Ave, City Storm water outfall erosion and site contamination. Brought State Geologist onsite July 2, 2024. Working with State on liability.

MBr – in audible

CM – Minimizing City Liability is a 2 step process.

CS- Asks what is the City's position on it as it relates to property along Riverside Ave?

EL- Riverside Ave properties don't look great. There is a lot of Industrial history. Is there federal support available to us? Worried that it's going to be like Burlington high school issue. Doesn't want City to be out at the bottom of flooding as it starts with Barre and Montpelier – state should be working with us to help protect the river. Buildings are dangerous that are hanging. Wants action, worried about loss of life, jobs, embankment slide, all of which ends up in the river wants more coloration from the state. Emotional attachment sensitivity needs to be taken into consideration.

MBr – Slope failure – depending on how much city take over property that can't be built on. Is there a way to modify the risk to the city?

CS – Will talk to assessor about financial impact.

- **4.7 Champlain Parkway Final Construction Contract update**

CM- Parkway being done is 2 phases. SD Ireland is ahead of schedule. They are finishing up the 24hr closure. As of Friday Energizing signals which are still being tested. Final paving will be the next biggest disruption. More info on website and outreach programs. Final portion - Kilburn St to Main St is out to

bid. On the 31st meeting with King Street Center to discuss final construction contract and impacts people can expect.

EL- asked about the translations for the neighbors.

CM – Working on information in 4 different languages.

CS – If there are specific issues let DPW know before it goes to the board of finance.

EL- Sensitivity – visually show how to mitigate traffic. Do a trial run with King St Youth Center. Find out what people are asking for.

5. Director's Report

NONE

6. Councilor Items

NONE

7. Next Meeting

Joint Meeting with BED 8/22 @ 5:30PM, Sparks Room

8. Adjournment

Chair Barlow adjourns at 8:06 PM.

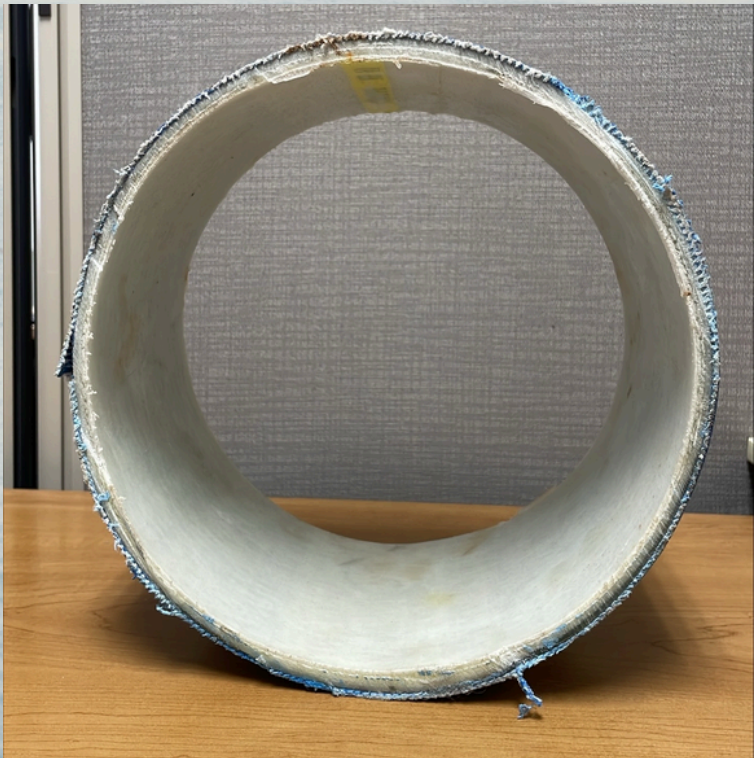
Burlington Water Resources Capital Planning

Proposed March 2025 Bond Requests

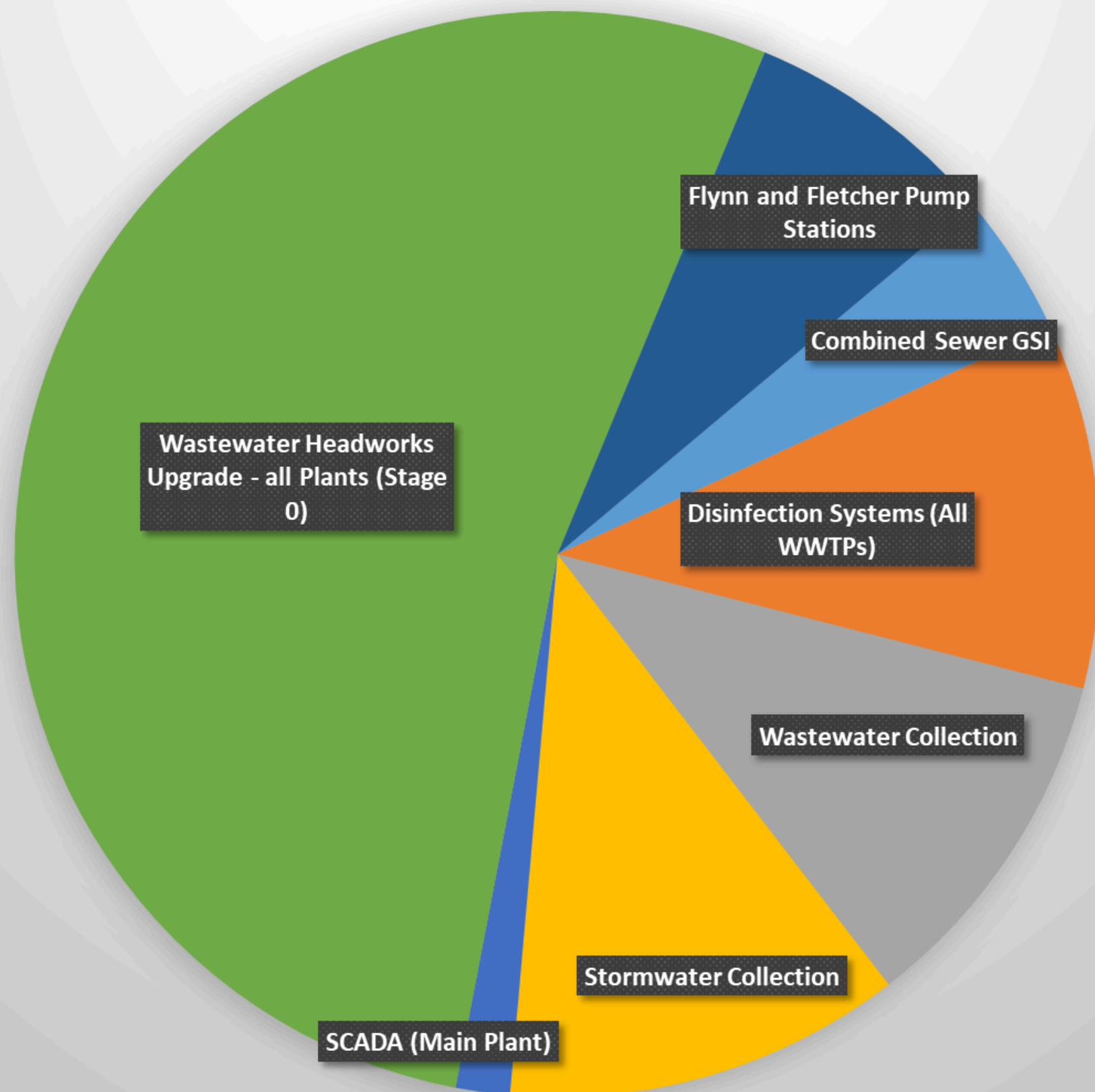


2016: \$8.34 M WATER BOND WATER WORK COMPLETED

Water Main Work	Miles
Replaced	2.21
Relined	7.08
Total	9.29



2018 CLEAN WATER BOND WATER WORK COMPLETED/UNDERWAY



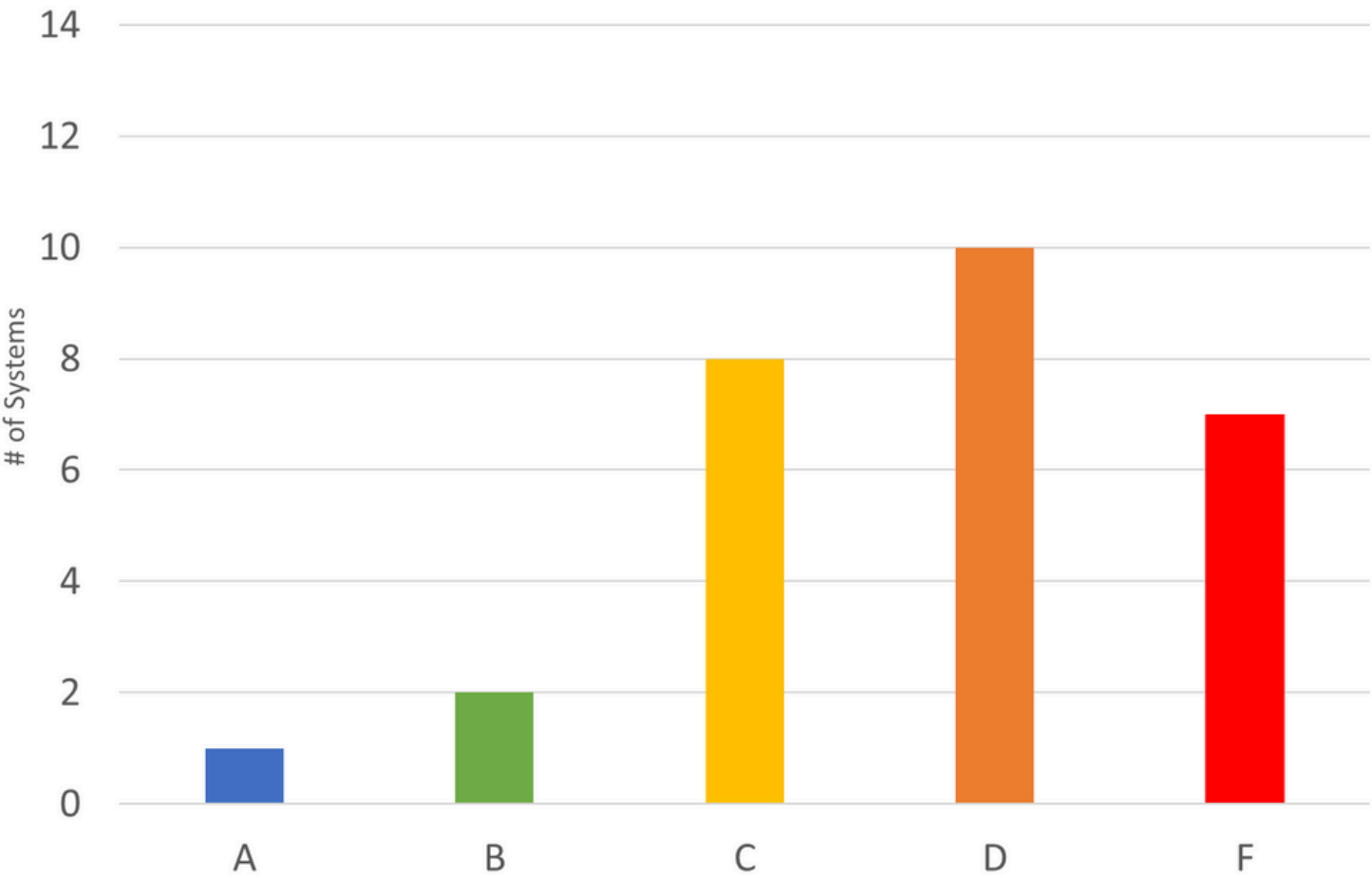
- Clean Water Resiliency Bond
 - \$29.958 M (92% approval)
- \$24.21 M investment
- \$8.98 M of bond authorization remaining due to \$3.23 M in grants and subsidy awards
- Remainder earmarked for large CSO tank and stormwater outfalls

CLEAN WATER WORK: MAKING A DIFFERENCE

Sewer & Storm Main	Miles
Replaced	0.68
Relined	7.97
Total	8.64

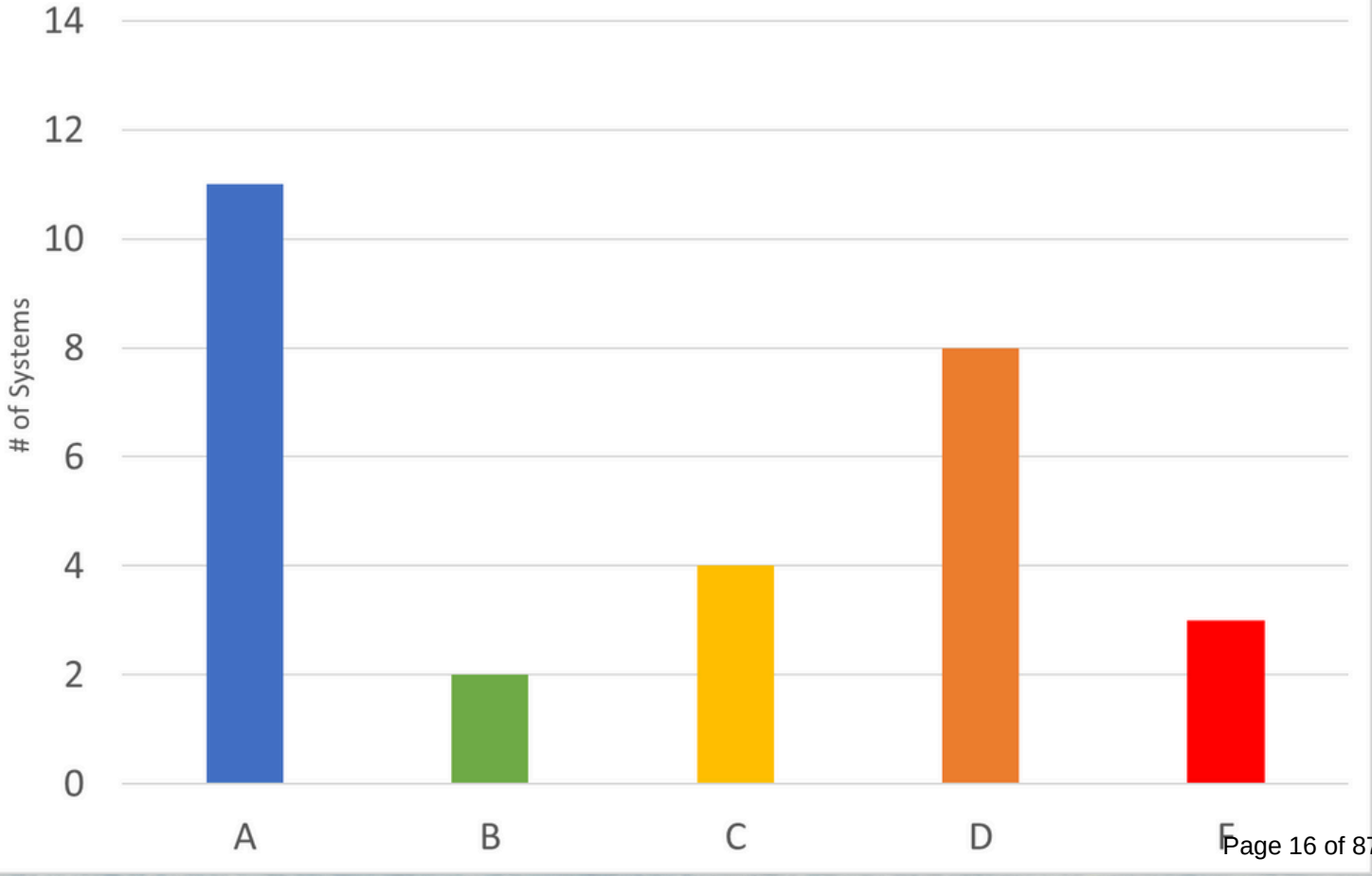


Burlington WWTF Systems Risk Scores 2018



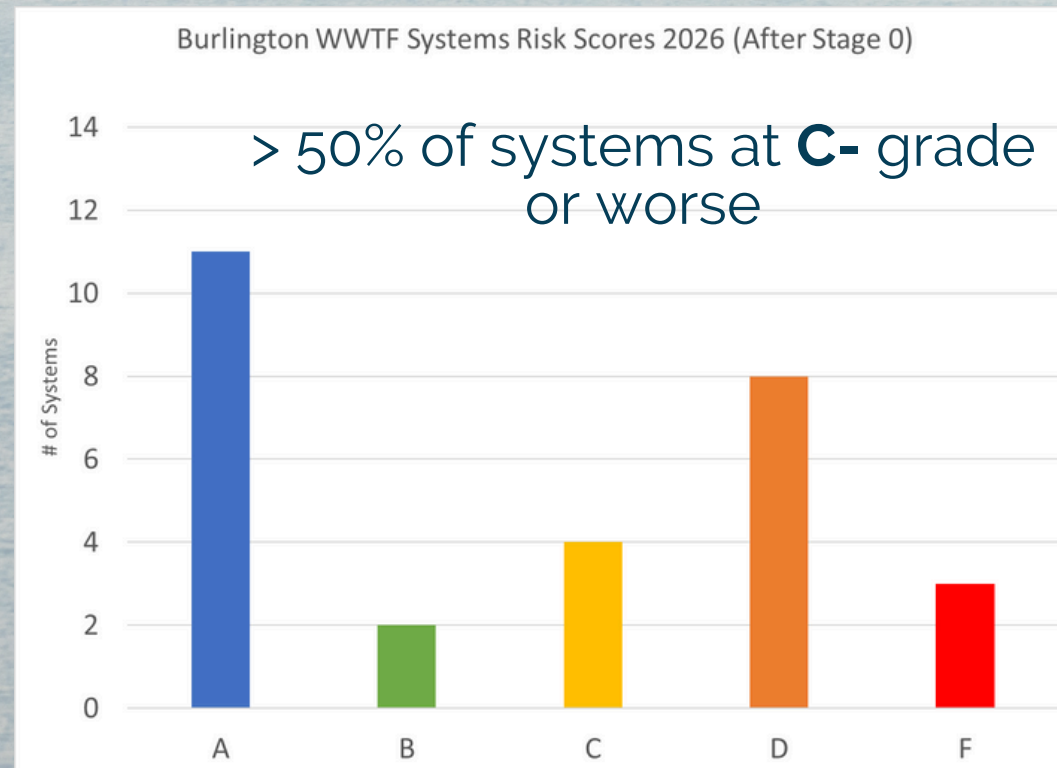
\$15.9 M

Burlington WWTF Systems Risk Scores 2026 (After Stage 0)



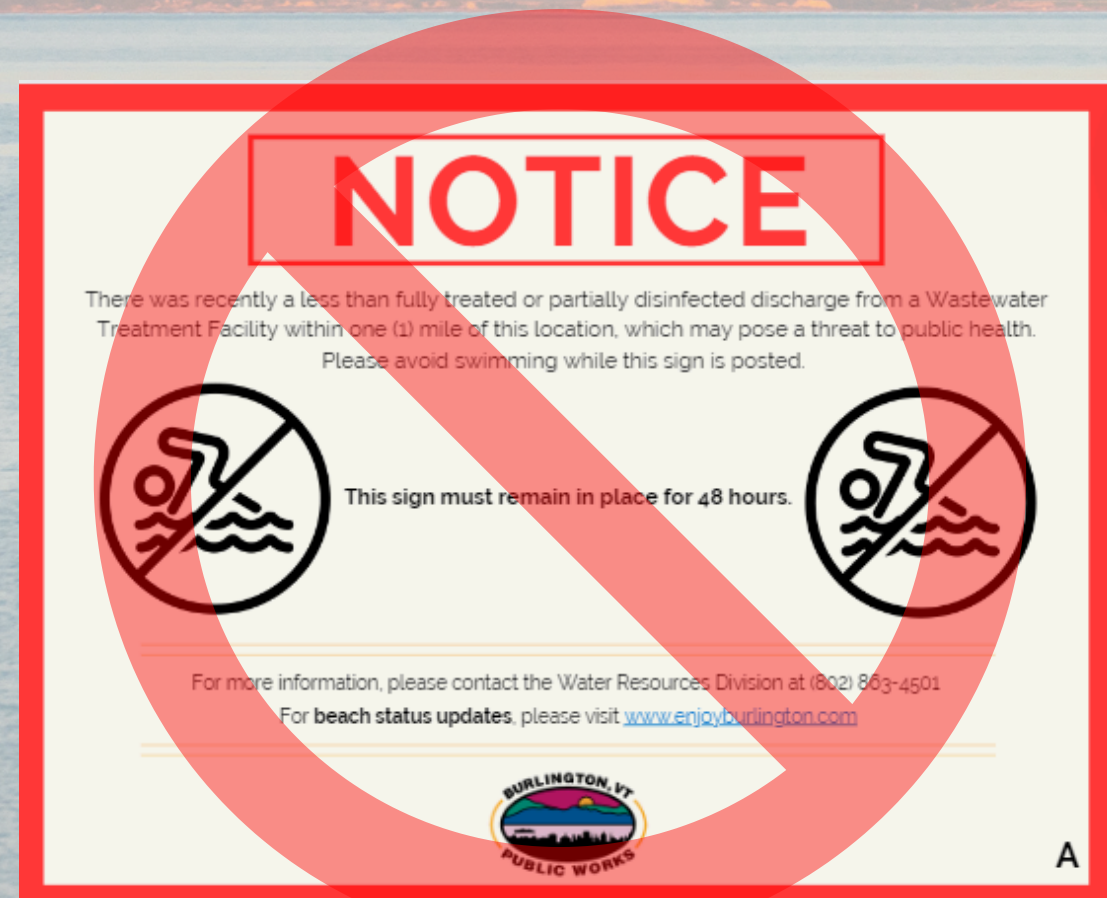
WHY IS MORE INVESTMENT NEEDED?

- To provide reliable and sustainable drinking water, wastewater and stormwater services to the **current** and **future** Burlington
 - Replace aged infrastructure that is at significant risk of failure
 - Ensure that there is sufficient treatment capacity for the housing/commercial growth
 - Improve resiliency against climate change
 - Address safety/code upgrades to protect and retain workers



WHY IS MORE INVESTMENT NEEDED?

- To protect the Lake by meeting/exceeding our water quality improvement requirements
 - Infrastructure resiliency and redundancy = meeting water quality standards = avoid preventable beach closures
 - Reduce phosphorus discharges from Burlington
 - Continue to reduce combined sewer overflows



THE BIG WHY: AVOIDING PREVENTABLE BEACH CLOSURES

"BURLINGTON ORDERS CLOSE OF TWO BEACHES AFTER WASTEWATER RELEASES..."

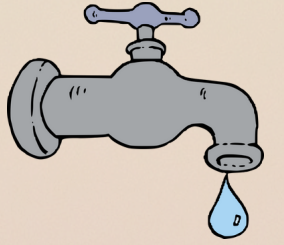


VTDIGGER | JUNE 2018

"[A] combination of equipment malfunction and heavy rains late Tuesday night caused the release of millions of gallons of partially disinfected wastewater into Lake Champlain from Burlington's wastewater treatment plant. Again."

VTDIGGER | JULY 2018

DRINKING WATER INFRASTRUCTURE NEEDS (2025-2030)



- **Drinking Reservoir Improvements Project**
- Water Treatment Plant Improvements (near and mid-term)
- City Emergency Water Supply Contingency (Inter-municipal connections)
- Risk Based Water Main System Investment (Replace - Renew - Upgrade)
 - On City Transportation Related Projects
 - Throughout City

WASTEWATER INFRASTRUCTURE NEEDS (2025-2030)



- **Wastewater Treatment Plants Improvements Project**
 - **Stage 1: Main Plant Renewal, Capacity Expansion and Phosphorus Improvements; North Plant Critical Systems Renewal**
 - **Stage 2: East Plant Consolidation to Main Plant**
 - Stage 3: Remainder of Renewal Needs at Main and North WWTPs
- **North Plant River Siphon Replacement**
- **Satellite Pump Station Improvements**
- **Risk Based Sewer Main System Investment (Replace - Renew - Upgrade)**
 - On City Transportation Related Projects
 - Throughout City

STORMWATER INFRASTRUCTURE NEEDS (2025-2030)



- Combined Sewer Overflow Reduction Projects
 - Calahan CSO Storage Tank
 - Small Scale
- Outfall Rehabilitation
- Risk Based Storm Sewer Main System Investment (Replace - Renew - Upgrade)
 - On City Transportation Related Projects
 - Throughout City

2025-2028: HOW MUCH \$?

System	 Estimated Need	Final Cost Determination*
Drinking Water	\$16-24 M	Determination of other funding for City transportation projects
Wastewater	\$180 - \$220 M	Final due diligence on WWTP costs; FEMA eligibility for River Siphon; Determination of other funding for City Transportation Projects
Stormwater	\$12 - 20M	Final size of Calahan CSO tank; Determination of other funding for City transportation projects

* Also monitoring inflation data on recent projects

WHY NOW?

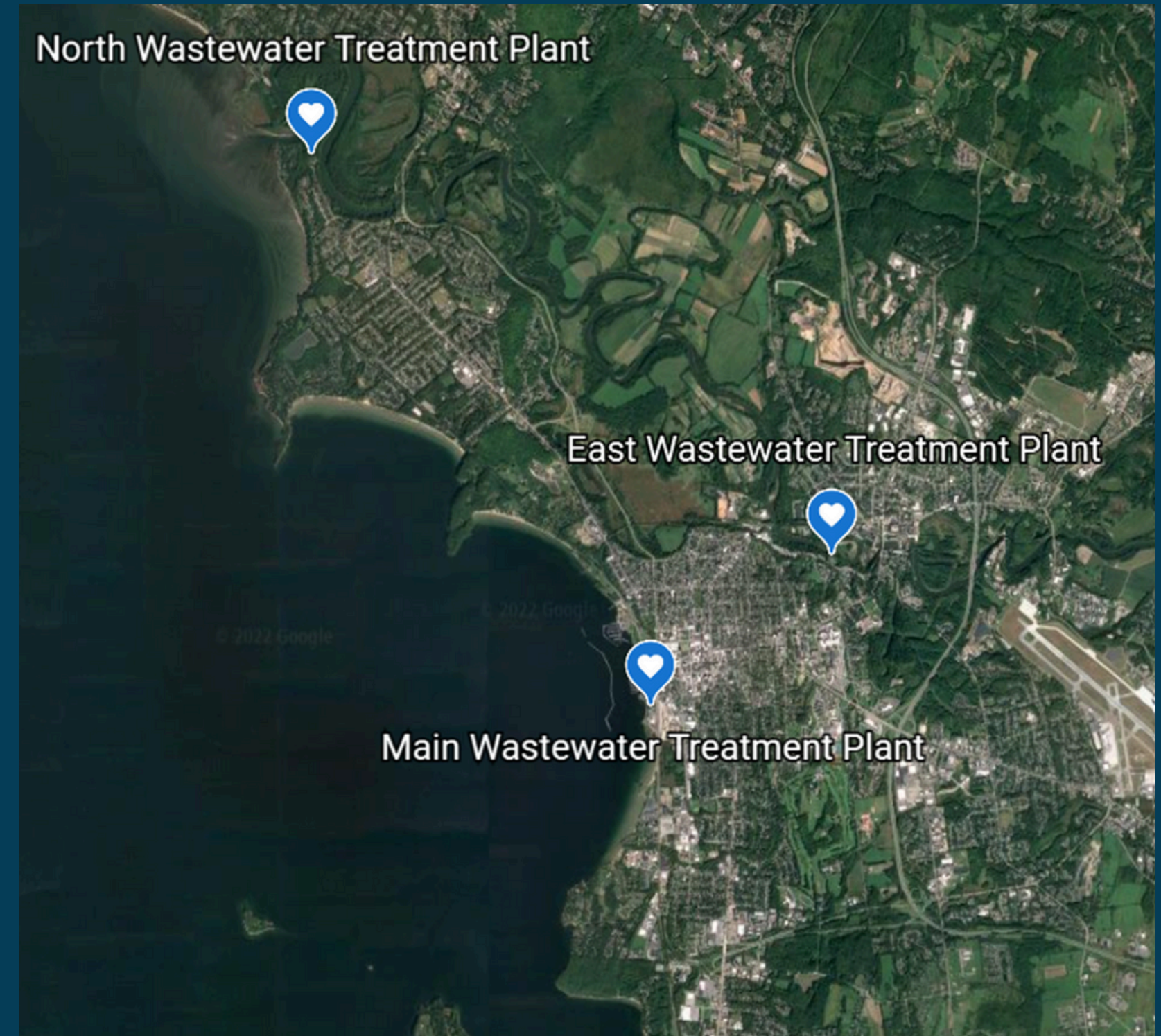
- Likelihood of failure for certain critical assets has become too high to ensure reliable, sustainable service
 - Assets are well-beyond their useful life
 - Further delay will cost ratepayers more (emergency repairs)
 - Employee safety and retention
- New WWTP permits requires implementation of additional phosphorus reductions
- Next housing growth burst anticipated as early 2025-2028, with more planned

WWTP Improvements Project

Burlington's Commitment to the Lake and
Sustainable Housing Growth

BURLINGTON'S 3 WASTEWATER PLANTS

- Main W/WTP built in 1953
- North W/WTP built in 1961
- East W/WTP built in 1965
- Due both to increased regulations and the harsh impacts of the wastewater environment on equipment, all three plants were then subsequently upgraded in:
 - 1973 - improved pollutant treatment
 - 1994 - improved nutrient removal and added wet weather treatment to Main W/WTP

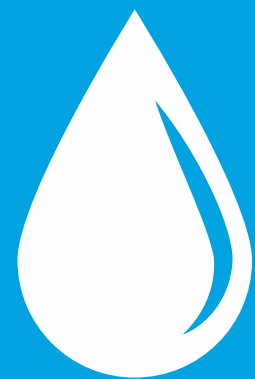


Improve and Modernize WWTFs for Burlington's Future



Resiliency

Ensure existing systems continue to function; Increase resiliency of critical wastewater equipment through improved design and redundancy



Environmental

Improve ability to meet water quality standards for Lake Champlain



Capacity

Increase capacity of Main WWTF to accommodate growth within the community



Work safety

Improve working conditions for City staff



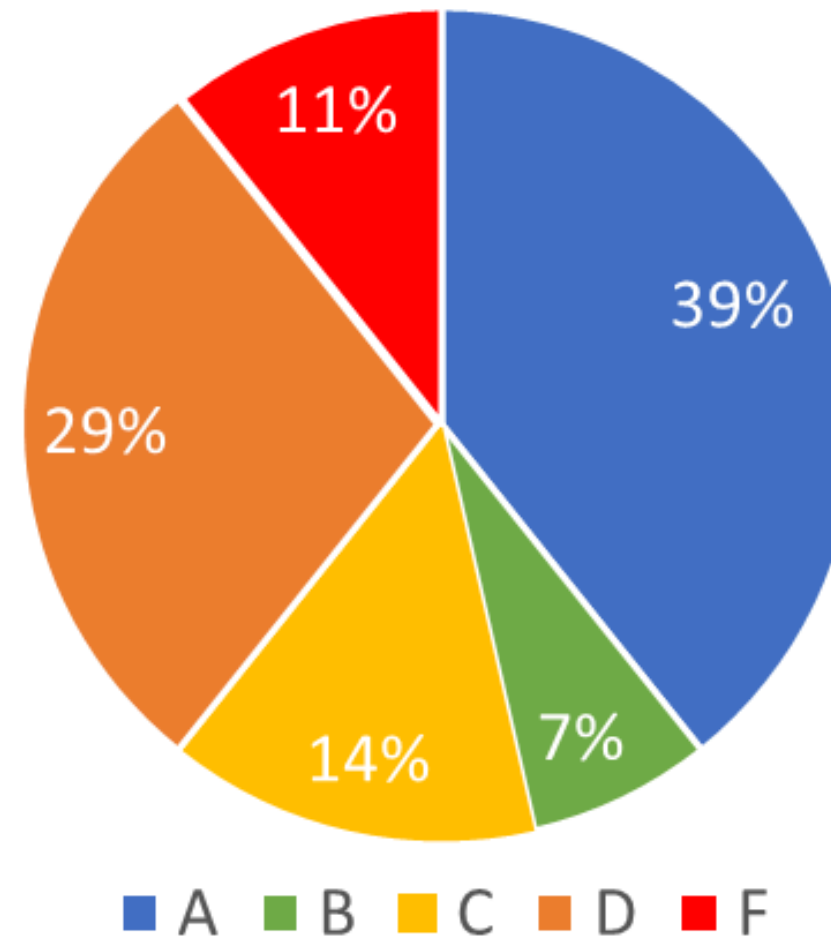
Odors

Reduce off-site odors from Main WWTF

RISK REPORT CARD

WASTEWATER TREATMENT SYSTEMS

After 2018 Clean Water Resiliency Plan Investments



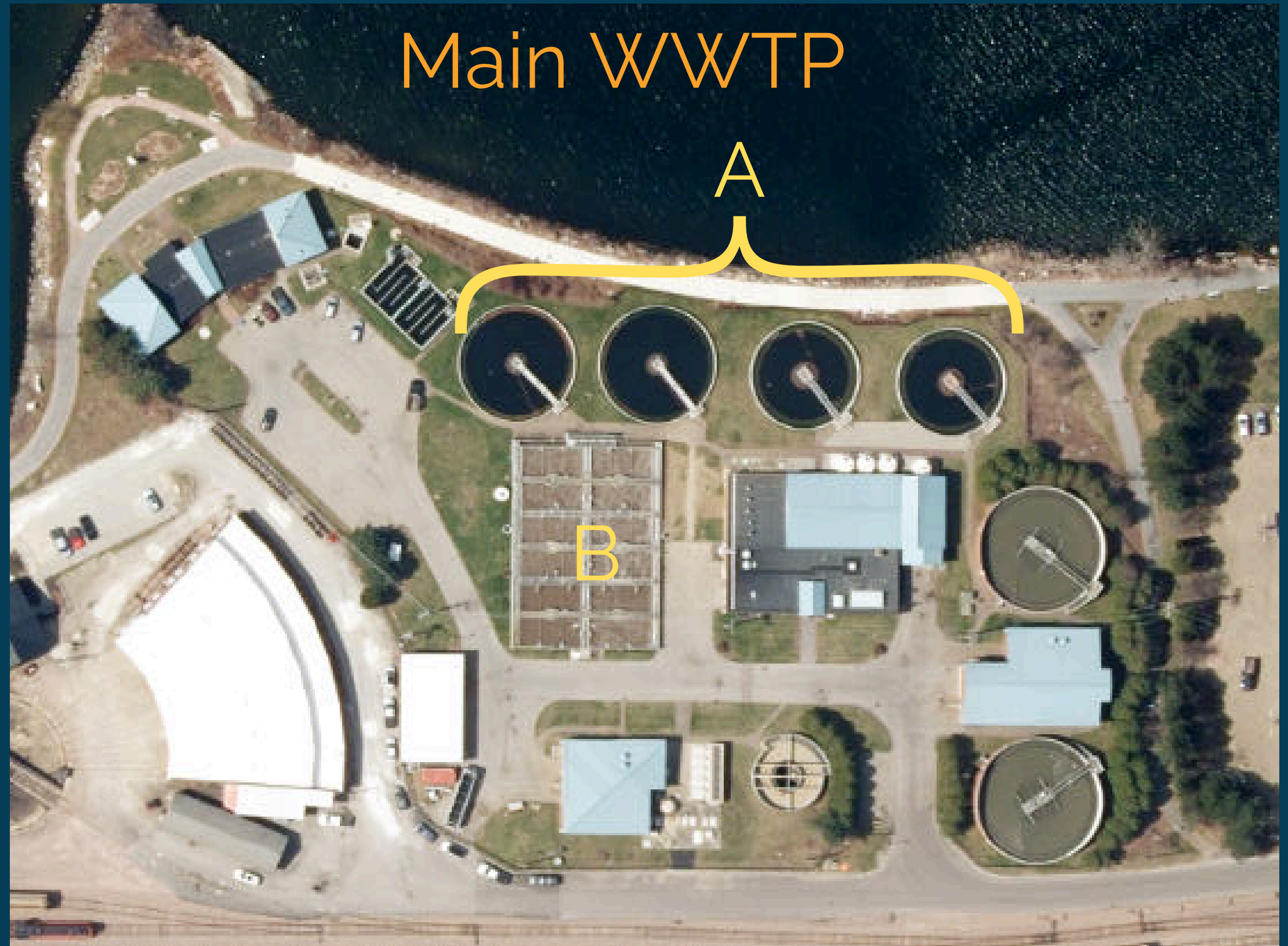
C	Recommend replacement in 3-5 years
D	Recommend replacement in 1-3 years
F	Recommend immediate replacement

Conclusion

- More than 50% of system are at a C- grade or worse, with most at D (replacement needed in 1-3 years) or F (needs immediate replacement)
- This condition will keep Burlington at risk of W/W treatment failures and preventatable beach closures

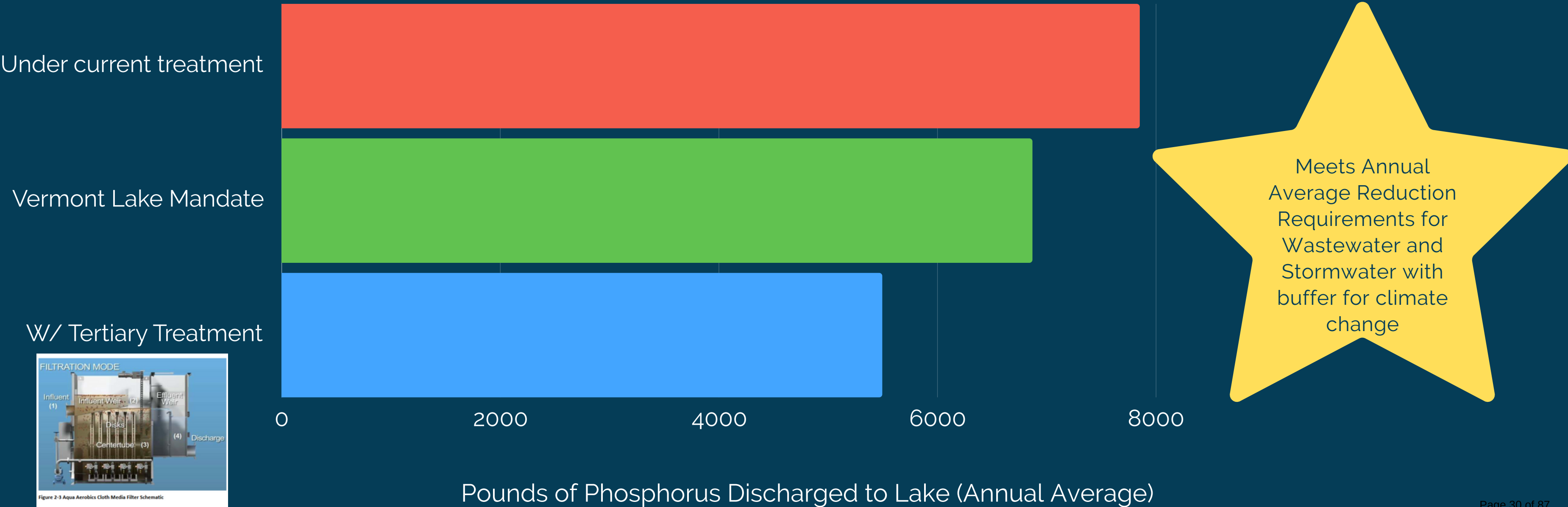
THIN MARGINS OF REDUNDANCY

- Need all 4 secondary clarifiers operation during the summer rainfall months (A)
- Organic strength of inflow requires all of our biological system to be operational at all times. (B)



WATER QUALITY IMPROVEMENTS ARE DESIRED AND MANDATED

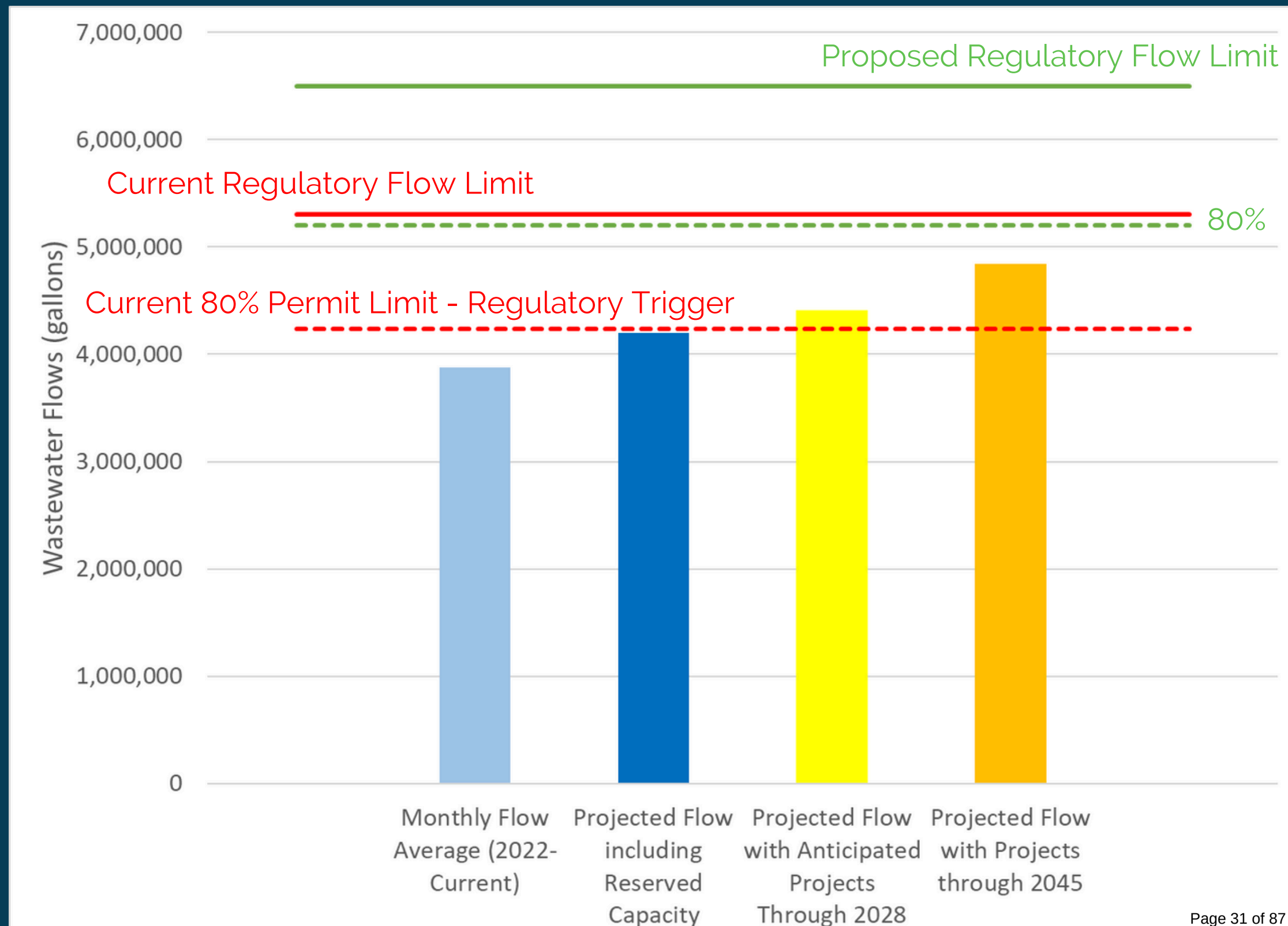
Proposed Phosphorous Discharge Performance @ WWTPs



ADDRESSING THE HOUSING NEED: PLANNING FOR GROWTH

- WWTPs are permitted for certain flows based on hydraulic and organic treatment capacity in plant
- When flows > 80%
 - triggers capacity review and planning evaluation
 - potential increased regulatory scrutiny
 - ability to allow new connections (growth) becomes less certain
- Additionally, climate change has and likely will increase flows

Wastewater Flows at Main WWTP



ADDITIONAL PROJECT BENEFITS



- East to Main Plant Consolidation
 - Provides flexibility for growth within current City W/WTP permitted limits
 - Saves ratepayer costs in over long term (~\$30 M over 50 years)



- Engineered Safety Improvements
 - Ventilation (worker air quality) improvements
 - Electrical safety/modern code compliance



- Odor reduction efforts at Main Plant
 - Covers and air treatment system for primary clarifiers
 - Odor control for sludge storage



COST ESTIMATES

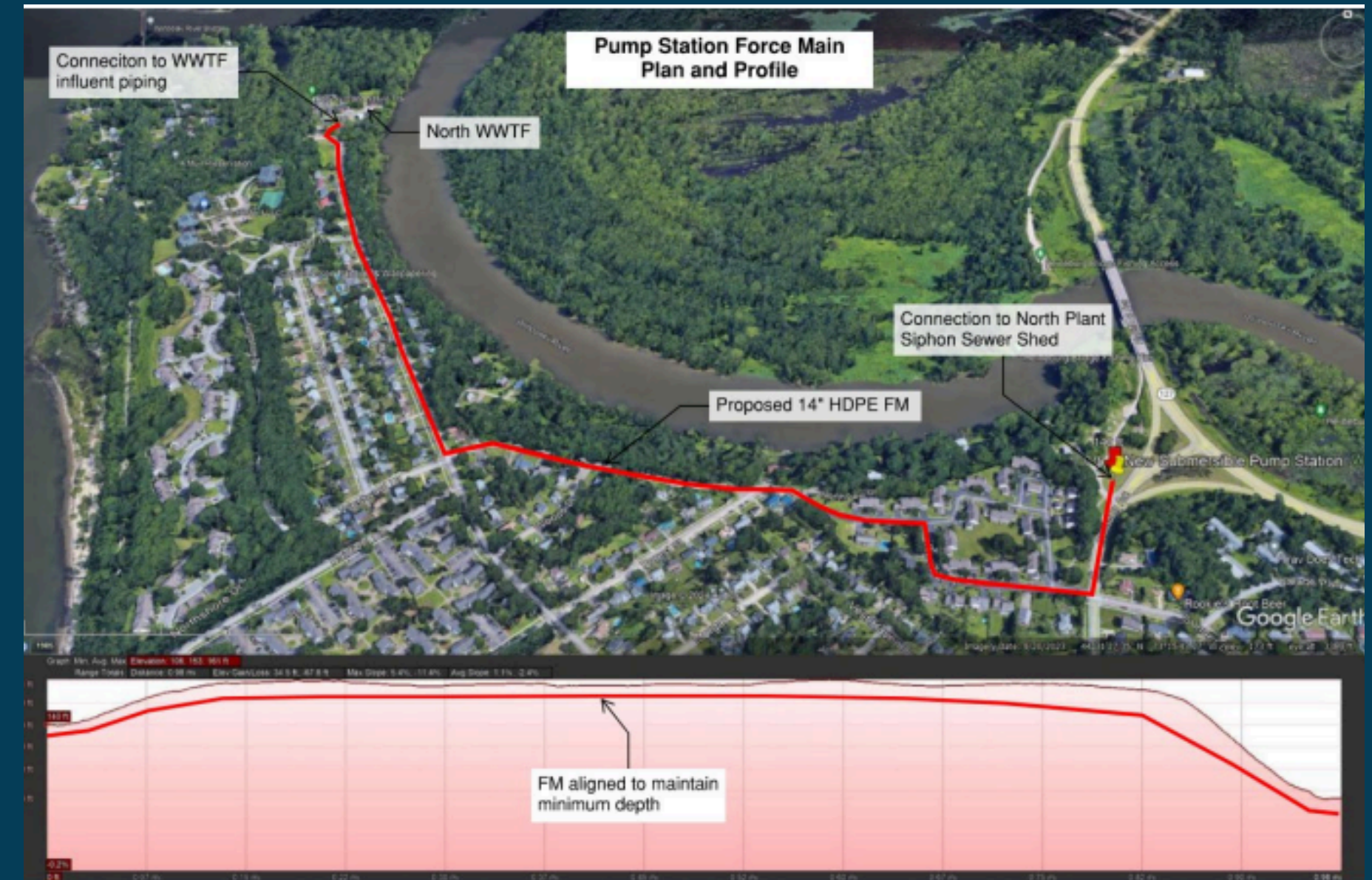


Stage	Scope	Ball Park Cost Estimate
Stage 1	Main Plant critical infrastructure, tertiary treatment, expanded capacity; North Plant critical infrastructure	\$135-150 M
Stage 2	Conversion of East Plant to Pump Station; construction of pipes from East to Main	\$30-35 M



- Project is in final weeks of scope and cost due diligence (due in October)
- Above costs do not include Stage 3 costs (2028+) for remaining items at Main and North Plant.

LONG TERM SEWER SIPHON RESILIENCY



- Eliminate climate change vulnerable river sewer crossings
- New pump station and pump to North Plant
- Cost = \$13.1- \$14.3 M

DRAFT



FEMA



Reservoir Improvements Project

*Water Supply Resiliency
for Burlington*

BURLINGTON'S DRINKING WATER RESERVOIR AND HIGH SERVICE PUMP STATION

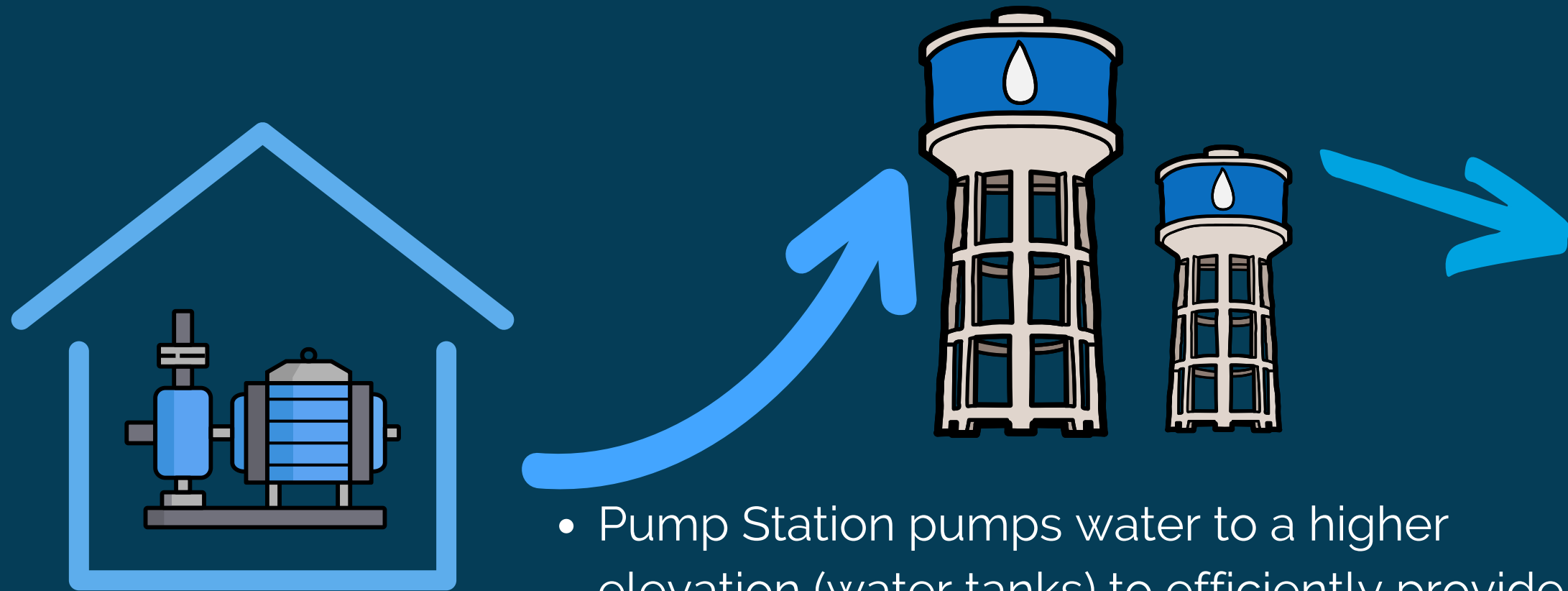


Figure 7.18: Main Street reservoir, drained of water and under renovation, circa 1890
(Courtesy Burlington Water Department)

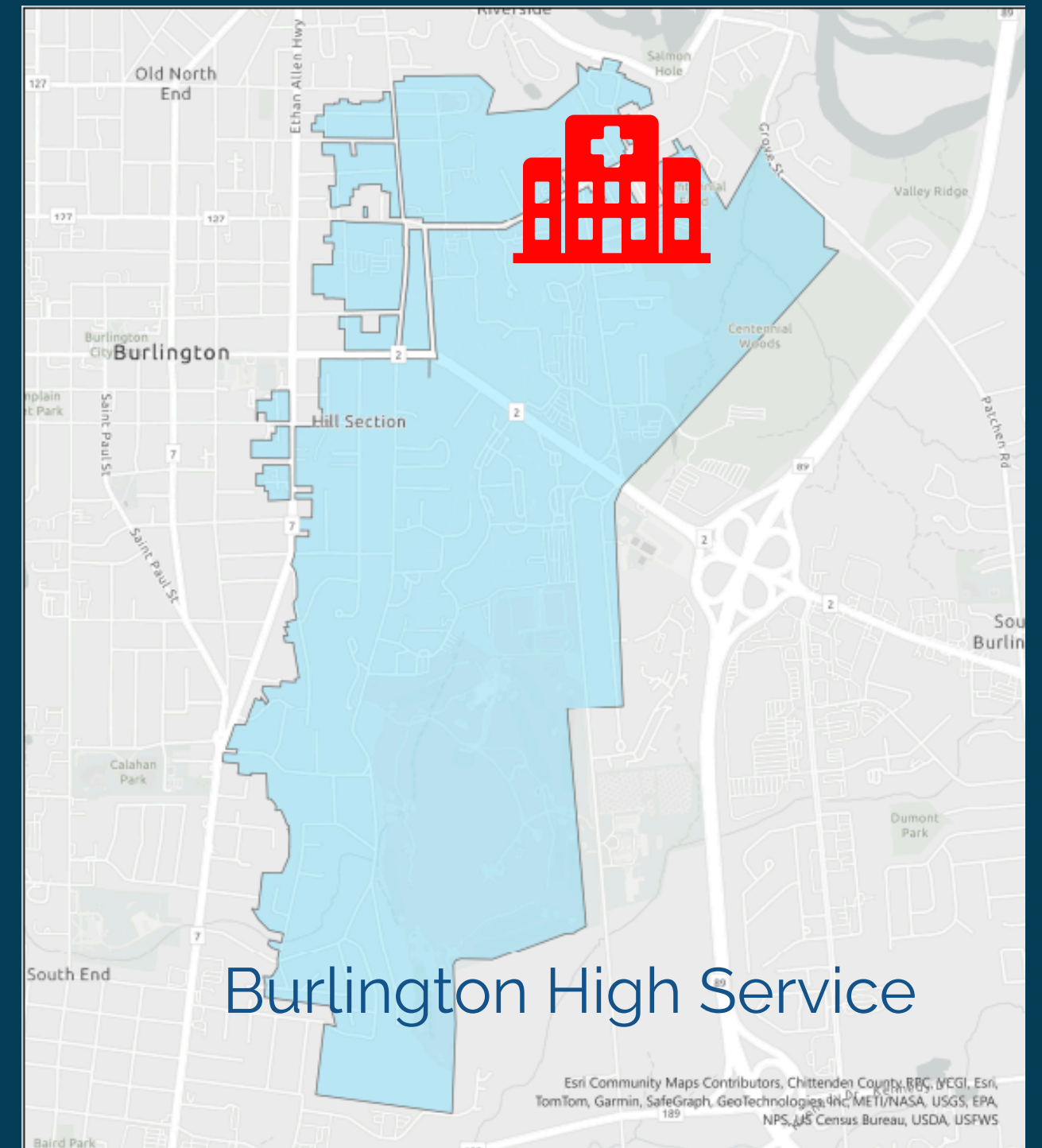


- 7 Million Gallon Treated Drinking Water Storage
 - Originally Built in 1867
 - Expanded in 1888 and lined with brick/stone
 - Covered in 1981
- 1867 Gate House Building
 - In service as a Pump Station starting in early 1880s

THE RESERVOIR AND PUMP STATION ARE CRITICAL DRINKING WATER SUPPLY INFRASTRUCTURE

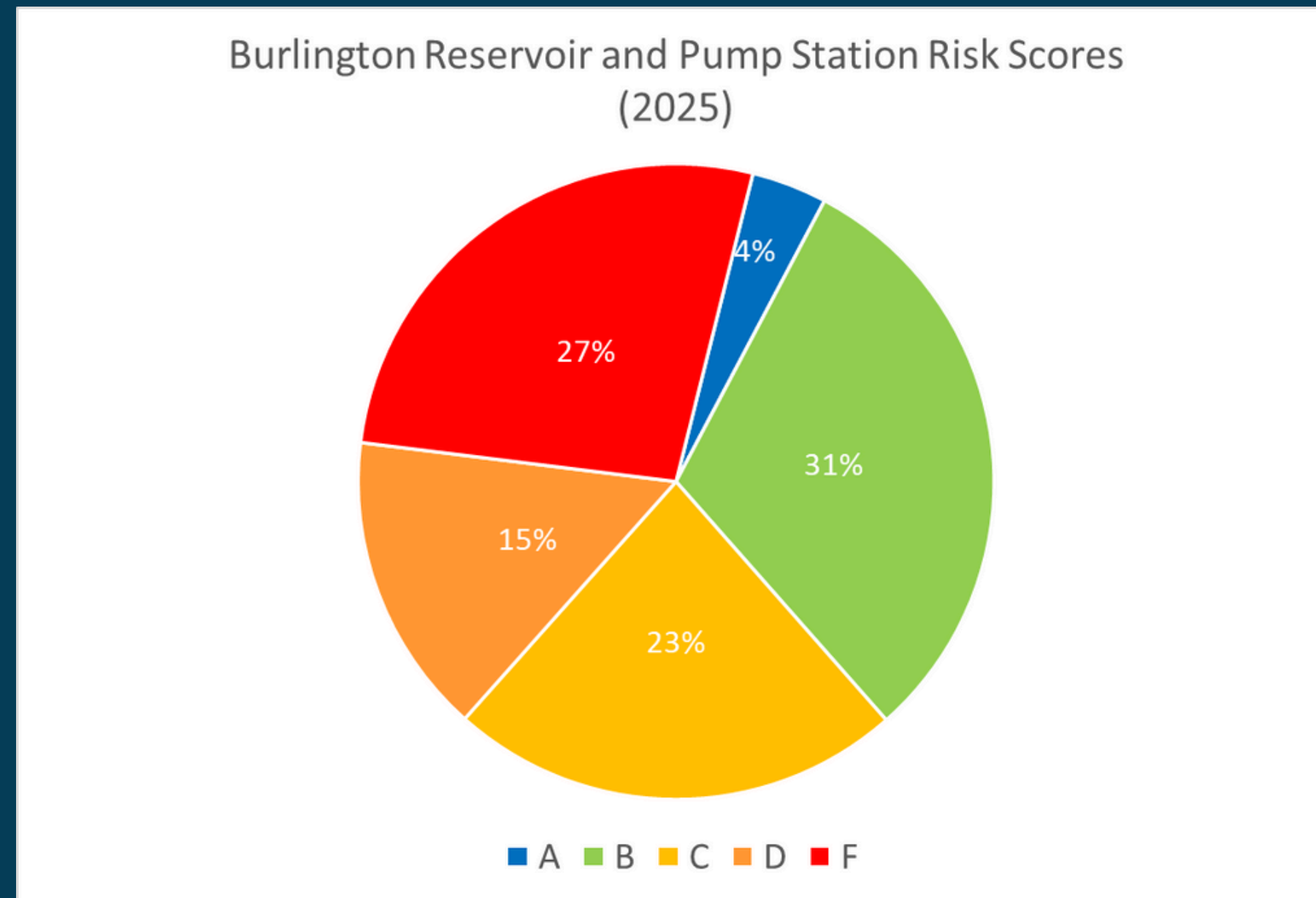


- Pump Station pumps water to a higher elevation (water tanks) to efficiently provide sufficient pressure to properties generally east of Willard Street
- **These pumps are REQUIRED for supplying water to the UVVMC** and rest of high service area
- The reservoir itself is critical to providing **demand fluctuation and emergency storage** for the rest of the City



RISK REPORT CARD

PUMP STATION AND RESERVOIR



Conclusion

- 65% of systems are at a C grade or worse, with 42% at D (replacement needed in 1-3 years) or F (needs immediate replacement)
- This condition presents a great deal of risk for Burlington's ability to supply water to the high service

PROJECT SCOPE AND COST ESTIMATE

- New, modern high service pump station building, equipment, piping
- Replacement of the reservoirs' membrane roof; spot repairs to the concrete roof structure
- Mechanical mixers to improve drinking water quality
- Reline of the 24" diameter water main to the South Reservoir and the reservoir inlet/outlet pipes
- Site improvements: Security improvements, north reservoir retaining wall replacement, stormwater detention, preserve 1867 pump house building
- Potential solar installation on rehabilitated roof (potential for roof project cost offset)



Preliminary Engineering Report Cost
Estimate (+ 10% contingency)

\$8-10 M

WATER, WASTEWATER, STORMWATER RATE IMPACTS

- Working with experts on water resources financing to determine the best borrowing mechanisms to **mitigate rate impacts**
 - Longer term bonds where appropriate
 - WIFIA/SRF
 - Public bond market
 - Identify grants and other funding
- Rate impact estimates expected by November
- Working with administration on additional affordability program elements



Reservoir project is on
congressionally delegated
spending list (\$1 M grant)



PROJECT & OUTREACH SCHEDULE

Month	Project Advancement	Outreach
September 2024	• Evaluate financing strategies • Continue to refine cost estimates	• Commission • TEUC • WWTP Tour • Initial Project Webpage
October 2024	• 60% Preliminary Engineering Report (PER) Complete • Draft financing strategies and ratepayer impacts	• Commission • TEUC • WWTP Tours
November 2024	• Review/Finalize PER • Rate payer impacts finalized • Affordability Program Enhancement Work	• NPAS • TEUC • Webpage additions
December 2024	• Affordability Program Recommendations	• Board of Finance Briefing • Council Work Session

PROJECT & OUTREACH SCHEDULE

Month	Project Advancement	Outreach
January 2025	• 100% Preliminary Engineering Report Complete • Council approval for bond questions on March Ballot	• BTV Lake Stakeholders • Business Stakeholders • Media tour/interview • Social media campaign
February 2025	• North Ave News • Information postcards • Public meeting + Virtual information sessions • Social media campaign • NPAs round 2	
March 4, 2025	• Water Revenue Bond Ratepayer Vote • Clean Water (WW + SW) Revenue Bond Ratepayer Vote	
2027-2028	• Construction begins Reservoir and Stage 1 WWTP	• Project announcements



Reminder:
All debt has to be
separately approved
by City Council

THANK YOU. QUESTIONS?

Megan Moir

Division Director Water Resources

mmoir@burlingtonvt.gov

Martin Lee

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Chapin Spencer

DPW Director

(cspencer@burlingtonvt.gov)

Website under construction!





Memo

Date: September 24, 2024

To: Transportation, Energy, and Utilities Committee (TEUC)

From: Julia Ursaki, PE, Public Works Engineer
Maddy Suender, Public Works Engineer

CC: Phillip Peterson, PE, Senior Transportation Planner
Chapin Spencer, Director of Public Works
Laura Wheelock, PE, City Engineer/Division Director – Technical Services

Subject: Shelburne Street and Home Ave Preferred Alternative Approval

Request:

We are respectfully requesting that the TEUC approve the following motion:

The TEUC approves and recommends that the City Council approves the Shelburne Street and Home Avenue Intersection Scoping Study Project Advisory Committee's selection of Alternative 2A to implement an exclusive pedestrian phase at this intersection and to make the additional short- and medium-term improvements described in the report.

Preferred Alternative Recommendation

The preferred alternative is to implement an exclusive pedestrian phase at the Shelburne/Home intersection along with other short- and medium- term improvements to the intersection. The preferred alternative prioritizes pedestrian and bicycle safety while maintaining acceptable levels of traffic congestion in the area. Traffic models analyzed by the project team show that this change in pedestrian phasing will not have an undue traffic impact to this corridor, with the average vehicle delay increasing from 32.6 seconds to 34.9 seconds. Vehicle queueing is also not expected to change significantly throughout the corridor with this change.

The additional short- and medium- term changes include:

- Removing and building new sidewalk segments to improve pedestrian circulation around the intersection
- Re-striping Shelburne Street to add more lane storage for northbound left turns from Shelburne Street to Home Avenue
- Re-striping the Home Avenue approach with an eastbound bike lane and westbound sharrows (complimenting a separate DPW initiative to add painted bike lanes on Home Avenue)
- Testing adjustments to the curb radii to shorten pedestrian crossings and reduce vehicle speeds (in collaboration with South Burlington)
- *For South Burlington*, closing two of the entrances to Walgreens and re-aligning Farrell Street

Please see figures 9 and 10 in the report for a full description of these recommendations.

In addition, the Chittenden County Regional Planning Commission (CCRPC) reviewed the signal timing and phasing throughout the Shelburne Street corridor in Burlington. With our additional capabilities from hardware installed this year, DPW will also implement signal coordination for the study intersection and the two nearby signals (Shelburne Street/Gateway Plaza and Shelburne Street/I-189 Ramp C) that operate very closely together.

Separately from this project but in coordination with it, DPW is pursuing adding striped bike lanes on Home Avenue between Shelburne Street and Pine Street. This project would also include building a ramp for bikes to get into the Shelburne Road Shopping Plaza (Market 32 plaza) from Home Avenue at the existing break in the fence.

Purpose & Need

Burlington DPW collaborated with the CCRPC, the City of South Burlington, and our engineering consultant Stantec on this project. The two Shelburne Street approaches and Home Avenue are under Burlington's jurisdiction while the Farrell Street approach is under South Burlington's jurisdiction. DPW applied for planning funds during the CCRPC's Unified Planning Work Program (UPWP) in fiscal year 2024 to perform this study.

Purpose: The purpose of this project is to develop concepts to improve intersection safety and operations to meet the needs of pedestrians, cyclists, motorists, and transit users at the intersection of Shelburne Street, Home Avenue, and Farrell Street.

Need: Recognizing the importance of this intersection in the transportation system for the Cities of Burlington and South Burlington, the following needs for the project have been identified:

1. *There is a need to improve pedestrian safety in crosswalks:* This intersection is listed as one of the Top 20 priority intersections for safety upgrades in planBTV Walk Bike (2017). The key problem listed is turning motorists not yielding to pedestrians in crosswalks.
2. *There is a need to improve pedestrian connectivity through and around the intersection and bike connectivity between Home Avenue and Farrell Street:* Home Avenue is identified in

planBTV Walk Bike (2017) as a significant walk-bike route in the southern part of the city, giving access from Shelburne Street to Pine Street and recreation areas like Oakledge Park. The intersection is also the western terminus of the South Burlington Recreation Path network. Public webmap feedback from the 2022 CCRPC Active Transportation Plan identified this intersection as an existing barrier to active transportation.

3. *There is a need to address existing congestion at the intersection during peak travel periods:* Intersection capacity analysis results indicate traffic backs up significantly on the Shelburne Street approaches, extending past the signalized intersection to the south and past the next two minor street approaches to the north with Bacon Street and Scarrf Avenue.
4. *There is a need to mitigate factors that contribute to a high number of crashes:* This intersection is located within a High Crash Section between the I-189 off ramp and Hadley Road with 128 crashes during the 2012-2016 period. There was a fatal crash at this intersection in 2018.
5. *There is a need to enhance transit facilities:* The intersection is located adjacent to busy commercial centers and dense residential neighborhoods and is on a primary transit line connecting Burlington to South Burlington and Shelburne. Both northbound and southbound bus stops have limited bicycle parking and need improved pedestrian facilities connecting to the nearby destinations.

Public Engagement

DPW hosted two public meetings to discuss this project, which were advertised using physical posters put up around the project area, Front Porch Forum, and South Burlington's newsletter. Full meeting notes are available on the project website: <https://www.ccrpcvt.org/our-work/transportation/current-projects/scoping/shelburne-street-and-home-avenue-intersection-scoping-study/>

- Local Concerns Meeting (February 22, 2024): we heard input about vehicles not yielding to pedestrians in the crosswalk, high vehicle speeds, the desire to add bike facilities through the intersection, and drivers having difficulty turning left from the side streets.
- Alternatives Presentation Meeting (June 17, 2024): at the Alternatives presentation, we heard support for the exclusive pedestrian phase at this intersection. We also received input about adjustments to some of the short- and medium-term recommendations, like improving desire lines along the sidewalk paths, which were incorporated into the final document. In addition, there was mixed feedback regarding the addition of protected left turn phases for Home Avenue and Farrell Street; though this change would make it easier to turn off of those streets, it has a major impact on traffic delay and queues for the entire Shelburne Street corridor. Ultimately the Project Advisory Committee and project team did not recommend adding protected left turn phases for the side streets due to the major traffic impacts.

Implementation Approach and Timeline

Burlington DPW will work with our traffic and right-of-way crews to install the exclusive pedestrian phase and short-term improvements in 2025. We also plan to add striped bike lanes on Home Avenue connecting Shelburne Street to Pine Street. DPW will continue to monitor traffic conditions along the Shelburne Street corridor as changes occur with the opening on the Champlain Parkway (projected 2026).

The City of South Burlington plans to pilot the changes on Farrell Street in 2025 and, pending results of the pilot, implement the changes along with a paving project on Farrell Street in 2026.

By 2030 the medium-term construction improvements are anticipated to be complete. Grant funding will likely have to be obtained for some of the more substantial medium-term improvements such as replacement of the signal span wires with mast arms.

Attachments

1. Final Report



**SHELBURNE STREET, HOME AVENUE,
AND FARRELL STREET INTERSECTION
SCOPING STUDY**



September 20, 2024

Prepared for:
Chittenden County Regional Planning
Commission

Prepared by:
Stantec

Project Number:
179450773



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Prepared by:

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Under the direction of:

Chittenden County Regional Planning Commission



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1 Executive Summary

The intersection of Shelburne Street (US Route 7), Home Avenue, and Farrell Street in the City of Burlington and bordering the City of South Burlington, has notable safety and mobility issues, especially for pedestrians and bicyclists. The Cities of Burlington and South Burlington, in partnership with the Chittenden County Regional Planning Commission (CCRPC), conducted an intersection scoping study to develop and evaluate alternatives to improve all modes of transportation and enhance the intersection to better serve as a gateway into Burlington. This study developed short and medium-term alternatives assuming that they will be implemented prior to the completion of construction of the Champlain Parkway segment that connects I-189 to Home Avenue.

This intersection scoping study followed the Vermont Agency of Transportation (VTrans) project definition process and built upon existing conditions of the area; public engagement from those who live, work, and travel through the area; as well as current and future land uses. The study evaluated how the intersection operates for various user groups (pedestrians, bicyclists, motorists, delivery and commercial vehicles, transit, and emergency response) with an inclusionary perspective, analyzing the accessibility and comfort of the intersection for people of all ages, abilities, and cultural backgrounds. The study established a Purpose and Need statement and developed a list of alternatives. Alternatives were evaluated by how well each addressed the Purpose and Need. Subsequently, a list of four alternatives were presented to the public. After receiving input and discussing alternatives with the project advisory committee and project team, including the CCRPC and the Cities of Burlington and South Burlington, a recommended alternative was selected.

The recommended alternative is Alternative 2A. This alternative includes a substantial list of individual improvements common to all alternatives, as well as exclusive pedestrian phasing with a blank out No Right Turn sign. Based on the analysis, this alternative is expected to improve pedestrian safety in crosswalks; improve pedestrian connectivity through and around the intersection and bike connectivity between Home Avenue and Farrell Street; address congestion at the intersection during peak travel periods; mitigate factors that contribute to a high number of crashes; and enhance transit facilities.

2 Introduction

The Cities of Burlington and South Burlington, in partnership with the Chittenden County Regional Planning Commission (CCRPC) conducted an intersection study of Shelburne Street, Home Avenue, and Farrell Street. Figure 1 shows the approximate study area highlighted in red. This intersection scoping study developed and evaluated alternatives to improve all modes of transportation and enhance the intersection to better serve as a gateway into Burlington; and worked with the Project Advisory Committee to recommend improvements to the City committees and ultimately the City Council. The advisory committee included representatives from AARP (formerly referred to as the American Association of Retired Persons), the City of Burlington Walk/Bike Committee, and Green Mountain Transit (GMT).



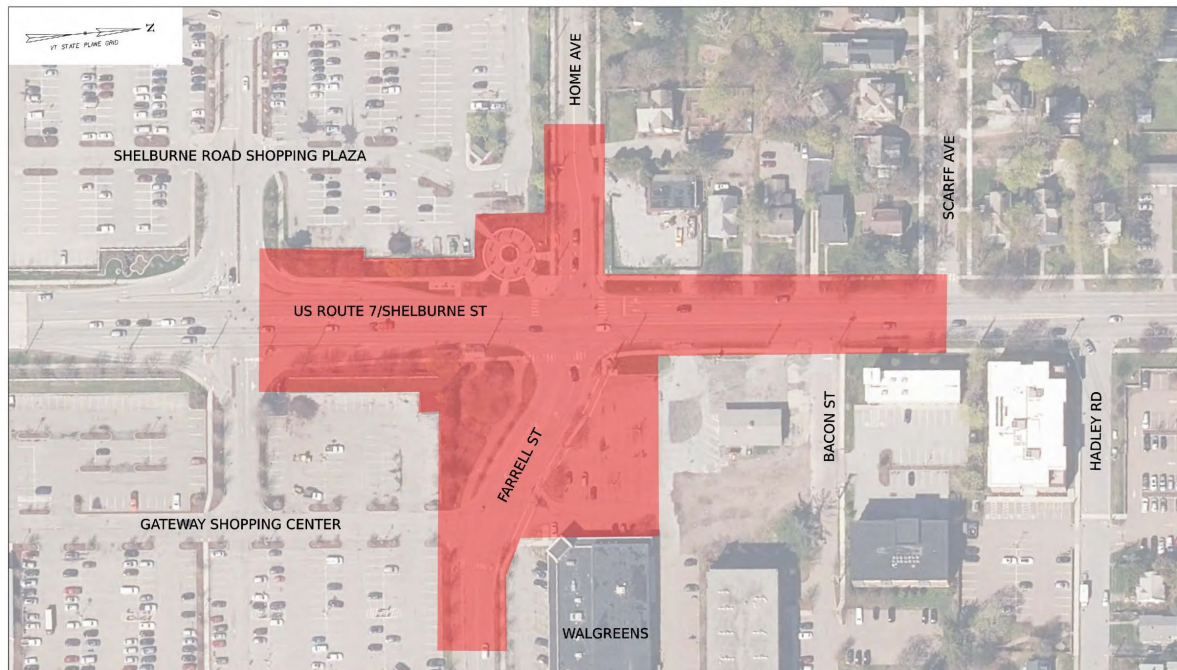


Figure 1 Project Area

The Shelburne Street/Home Avenue/Farrell Street intersection is one of the 20 priority intersections listed in the 2017 planBTV Walk Bike Master Plan. The intersection has notable safety and mobility issues, especially for pedestrians and bicyclists. The intersection is also located along a High Crash Location section of roadway.

3 Purpose and Need

The following statement was developed based on the existing conditions assessment, public input, and project advisory committee discussions.

Purpose: The purpose of this project is to develop concepts to improve intersection safety and operations to meet the needs of pedestrians, cyclists, motorists, and transit users at the intersection of Shelburne Street, Home Avenue, and Farrell Street.

Need: Recognizing the importance of this intersection in the transportation system for the Cities of Burlington and South Burlington, the following needs for the project have been identified:

1. *There is a need to improve pedestrian safety in crosswalks:* This intersection is listed as one of the Top 20 priority intersections for safety upgrades in planBTV Walk Bike (2017). The key problem listed is turning motorists not yielding to pedestrians in crosswalks.
2. *There is a need to improve pedestrian connectivity through and around the intersection and bike connectivity between Home Avenue and Farrell Street:* Home Avenue is identified in planBTV Walk Bike (2017) as a significant walk-bike route in the southern part of the city, giving access



from Shelburne Street to Pine Street and recreation areas like Oakledge Park. The intersection is also the western terminus of the South Burlington Recreation Path network. Public webmap feedback from the 2022 CCRPC Active Transportation Plan identified this intersection as an existing barrier to active transportation.

3. *There is a need to address existing congestion at the intersection during peak travel periods:* Intersection capacity analysis results indicate traffic backs up significantly on the Shelburne Street approaches, extending past the signalized intersection to the south and past the next two minor street approaches to the north with Bacon Street and Scarrf Avenue.
4. *There is a need to mitigate factors that contribute to a high number of crashes:* This intersection is located within a High Crash Section between the I-189 off ramp and Hadley Road with 128 crashes during the 2012-2016 period. There was a fatal crash at this intersection in 2018.
5. *There is a need to enhance transit facilities:* The intersection is located adjacent to busy commercial centers and dense residential neighborhoods and is on a primary transit line connecting Burlington to South Burlington and Shelburne. Both northbound and southbound bus stops have limited bicycle parking and need improved pedestrian facilities connecting to the nearby destinations.

4 Existing Plan and Study Review

Several studies and plans have been developed for this area that considered traffic and pedestrian concerns. The most recent studies were reviewed in the preparation of this scoping study and are listed below.

- Moving Together: Transportation Plan for the City of Burlington (2011)
- Burlington Transportation Plan Street Design Guidelines
- Burlington Walk Bike Master Plan (planBTV Walk Bike) (2017)
- CCRPC Active Transportation Plan (2022)

4.1 Moving Together: Transportation Plan for the City of Burlington (2011)

This plan is the transportation element of the Burlington Municipal Development Plan. The plan focuses on three parts: 1) a Strong and Healthy City; 2) Transportation Choices; and 3) Great Streets. Focusing on a Strong and Healthy City recognizes that transportation is foundational for the City's vitality. Focusing on Transportation Choices works to provide safe and comfortable facilities for all modes of transportation. Focusing on Great Streets is a major component of the plan and with the development of Street Design Guidelines.



4.2 Burlington Transportation Plan Street Design Guidelines

The Street Design Guidelines summarized here, developed as part of the Burlington Transportation Plan, describe the Complete Street designation and standards to incorporate for future improvements to Shelburne Street. These guidelines provide recommended design features to consider for each street type, based on its suitability for the specific location, and were considered in developing the alternatives for this scoping study. Due to the importance of this corridor for access to and within the City, the goal is to provide for all modes of travel as best as possible using the existing curb-to-curb widths.

Sidewalks are provided on both sides of the street, at a minimum width of five feet, and larger widths where greater pedestrian demand exists, like neighborhood centers or retail areas. Street furniture, like benches, kiosks, and bike racks, should be used mostly near neighborhood centers and higher volume transit stops, without encroaching on the minimum five-foot clear zone of the sidewalk. Transit shelters are important for protecting transit users from inclement weather and for promoting awareness of transit by increasing its visibility.

Crosswalks are provided at every intersection. High volume pedestrian crossings, like at retail zones, can be enhanced for greater visibility and traffic calming with high visibility markings or textured surface treatments. Curb return radii should ideally be 10 to 15 feet in high volume pedestrian areas to reduce crossing distances and slow turning traffic while still accommodating heavy vehicle movements.

4.3 Burlington Walk Bike Master Plan (planBTV Walk Bike) (2017)

This plan is about making streets safer for all users and making it enjoyable and viable to walk and bike around Burlington. In a survey of over 500 residents, Shelburne Street was one of the top three streets that didn't feel safe to walk or bike on. Focus groups of people who often walk for transportation listed Shelburne Street as a specific street that felt unsafe for walking. Shelburne Street and Home Avenue is listed as one of the Top 20 priority intersections for safety upgrades. The key problem listed was turning motorists not yielding to pedestrians in crosswalks. Ideas listed to consider include reducing speeds, reducing crossing distances, and advanced or exclusive pedestrian phases. Home Avenue is identified as a significant east-west bike route in the southern part of the city, giving access to recreation areas like Oakledge Park to Pine Street and Shelburne Street. The long-term plan is to redesign Home Avenue to make it safer and more comfortable to walk and bike. The City of Burlington plans to add bike lanes to Home Avenue in 2025.

4.4 CCRPC Active Transportation Plan (2022)

This Active Transportation Plan (ATP) update included Shelburne Street in the Highest Priority group of improvement projects for the countywide bicycle network. Analysis of public webmap feedback results, from more than 350 unique responses, identified the Shelburne Street and Home Avenue intersection as an existing barrier to active transportation. The Bicycle Facility Selection Guidance within the ATP suggests the best urban bicycle design choices according to daily vehicular volume and speed.



5 Existing Conditions

5.1 Roadway Characteristics

Shelburne Street / US Route 7 comprises the northbound and southbound approaches to the intersection. In the project area, it is designated as a Class 1 Town Highway, owned by VTrans and maintained by the City of Burlington. The roadway is classified as a principal arterial, with a curb-to-curb width of 50 FT, made up of four 10 FT through lanes and a designated 10 FT left-turn lane for the northbound and southbound approaches. The northbound left turn lane for turning from Shelburne Street onto Home Avenue has a storage length of approximately 50 FT (two car lengths). The southbound left turn lane for turning from Shelburne Street into the Gateway Plaza has a storage length of approximately 200 FT (eight car lengths). The existing roadway cross section is displayed in Figures 2 & 3. The posted speed limit is 25 mph (although City of Burlington Traffic Regulations has this section of Shelburne Street listed as 30 mph).

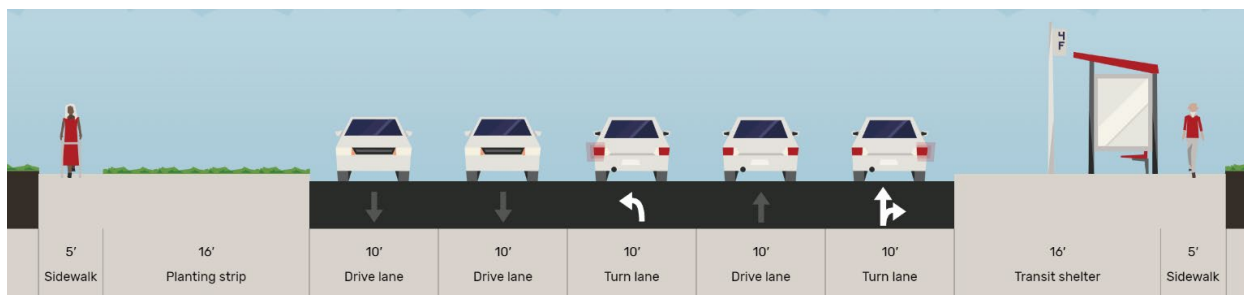


Figure 2: Shelburne Street Northbound Existing Typical Section

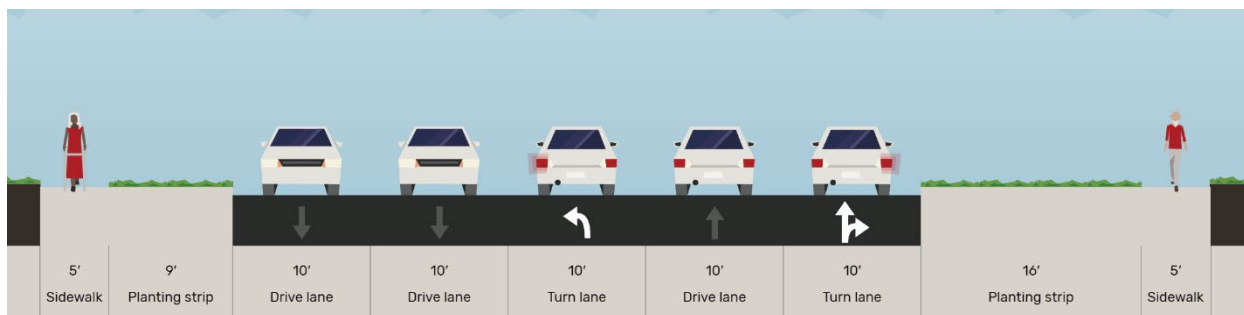


Figure 3: Shelburne Street Southbound Existing Typical Section

Home Avenue comprises the eastbound approach to the intersection. It is a local residential street that serves as a significant walk-bike route in the southern part of the City of Burlington, providing access from Shelburne Street to Pine Street and recreation areas like Oakledge Park. The street generally has a curb-to-curb width of approximately 30 FT with two lanes and a slightly raised, stamped median which varies from approximately three to four feet wide, ending approximately 300 FT before the stop bar. At the eastbound approach to the intersection, Home Avenue has a curb-to-curb width of 38 FT, made up of a



12 FT shared left and through lane, a 12 FT dedicated right turn lane, and a 14 FT receiving lane. The shared left and through lane has a storage length of approximately 75 FT (three car lengths). The existing roadway cross section is displayed in Figure 4. The posted speed limit is 25 mph.

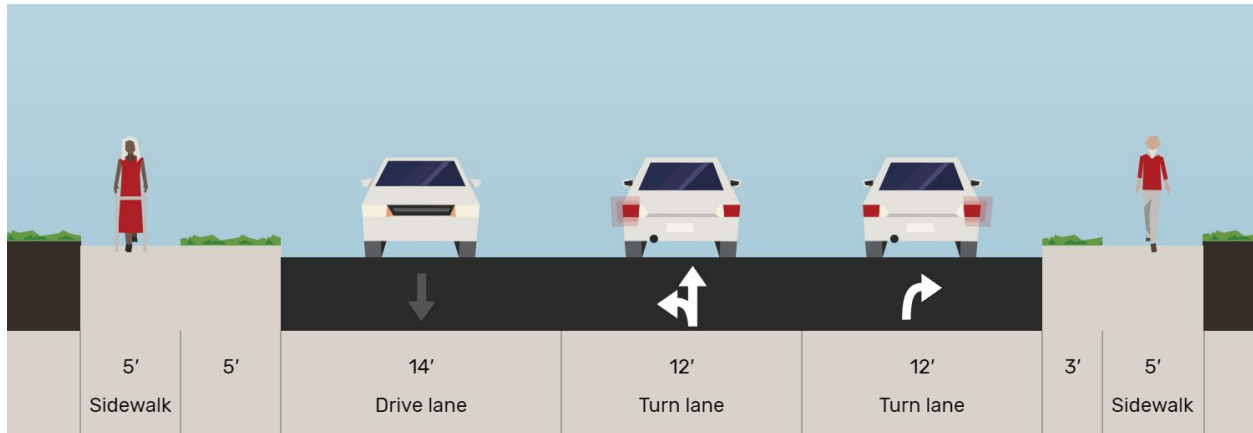


Figure 4: Home Avenue Eastbound Existing Typical Section

Farrell Street comprises the westbound approach to the intersection. It is a local street, owned by the City of South Burlington, providing access to Farrell Street Park, Spear Street, and the South Burlington shared use path network. Farrell Street has mixed uses including retail, multifamily residential, office, and light industrial. At the westbound approach to the intersection, the street has a curb-to-curb width of 48 FT, made up of a 12 FT shared right and through lane, a 12 FT dedicated left turn lane, a 12 FT receiving lane, and a 12 FT eastbound left turn lane to access the Walgreen's parking lot northeast of the intersection. The westbound approach lanes have storage lengths of approximately 150 FT (six car lengths). The eastbound left turn lane to access the Walgreen's parking lot has a storage length of approximately 75 FT (three car lengths). The existing roadway cross section is displayed in Figure 5. The posted speed limit is 25 mph.

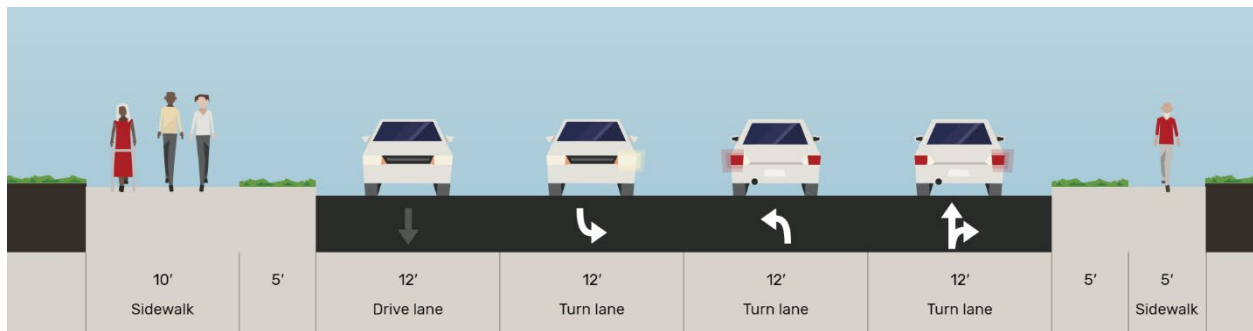


Figure 5: Farrell Street Westbound Existing Typical Section

The intersection is signalized with an older span wire traffic signal system. The City of Burlington upgraded the traffic signal controller and detection during the spring of 2024. Existing right-of-way is



generally from back of sidewalk to back of sidewalk for each approach: 99 FT for Shelburne Street, 57 FT for Home Avenue, and ranges from 60 FT to 95 FT for Farrell Street.

5.2 Land Use and Zoning

The Burlington parcel to the southwest of the intersection is zoned Neighborhood Activity Center and consists of a shopping center with retail stores and a restaurant. The Burlington parcels comprising the block to the northwest of the intersection are zoned Residential Corridor along Shelburne Street with Residential - Low Density making up the parcels on the rest of the block. These primarily include single family homes with a laundry business located on the northwesterly corner of the intersection. The South Burlington parcels to the northeast and southeast of the intersection are zoned Commercial 1 – Residential 15. The parcel to the southeast of the intersection consists of a shopping center with retail stores and restaurants. The parcel to the northeast of the intersection is a drug store, with a new building going up on the adjacent parcel to the north that will be mixed use with office/retail space on the first floor with residential units above. Zoning maps are presented in Appendix A.

5.3 Pedestrian and Bicycle Facilities

As displayed in Figure 2 through Figure 5, five foot sidewalks are provided along both sides of Shelburne Street and Home Avenue with varying separation distances from the roadway, including 9 to 16 FT for Shelburne Street and 3 to 5 FT for Home Avenue. Farrell Street has a five foot sidewalk along the northerly side, separated from the roadway by five feet, and a shared use path along the southerly side, also separated from the roadway by five feet. The shared use path is the western terminus of the South Burlington shared use path network. No bike lanes or shared lane markings (sharrows) are present on any of the intersection approaches.

5.4 Transit Service

There are two bus stops located at the intersection; a northbound stop located on the southeasterly side of the intersection and a southbound stop located on the southwesterly side of the intersection, displayed in Figure 6. These stops are served by Green Mountain Transit (GMT) and Tri Valley Transit (TVT).



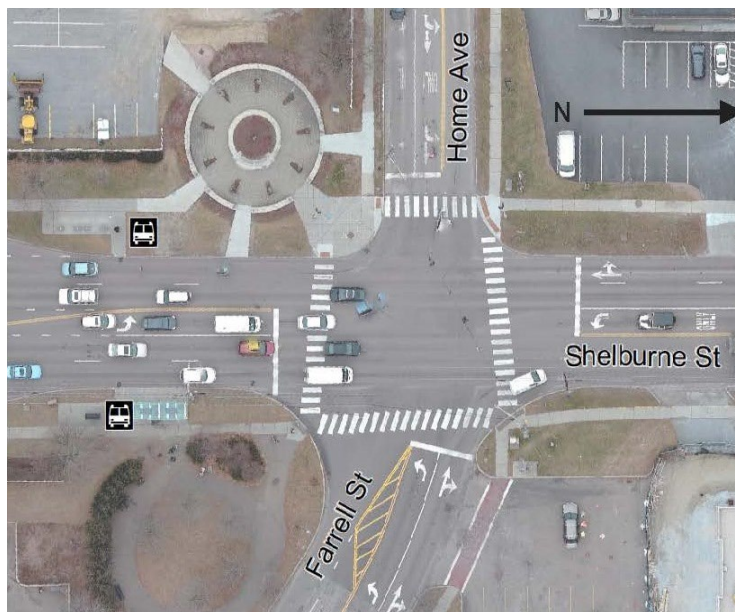


Figure 6: Bus Stop Locations

GMT serves four routes from this intersection (Routes 6, 46, and 86). Route 6, Shelburne Road, runs between the Burlington Downtown Transit Center and the Vermont Teddy Bear Factory in Shelburne Monday-Saturday, with stops at Market 32 on Sunday. Route 46, 116 Commuter, runs between the Burlington Downtown Transit Center and Hinesburg Monday-Friday. Route 86, Montpelier LINK Express, runs between the Burlington Downtown Transit Center and Montpelier Monday-Friday. Table 1 displays daily ridership data for GMT from 2023, showing 17 percent more riders are getting off the bus compared to those getting on the bus here.

Table 1: Daily GMT Ridership for Northbound and Southbound Stops Combined

	2023
Getting On the Bus	353
Getting Off the Bus	413

TVT serves two routes from this intersection: the 116 Commuter runs between Middlebury and Burlington Monday-Friday via VT Route 116 and the LINK runs between Middlebury and Burlington Monday-Saturday via US Route 7. Ridership data for TVT was not available.

5.5 Traffic Volumes

Traffic volume data including Annual Average Daily Traffic (AADT) and peak hour volumes for the study area were collected from VTrans and the CCRPC, respectively. AADT values collected by VTrans for



2022 are displayed for the study area in Table 2. Traffic volumes are higher along US 7 south of the intersection.

Table 2: AADT Volumes

Location	2022
US 7 North of Intersection	24,635
US 7 South of Intersection	28,061

Existing weekday commuter peak hour traffic conditions for the study intersection were determined using the latest available data. Peak hour turning movement counts were collected for the study intersection by a third party for CCRPC in October 2023 and presented in Figures 7 & 8. The primary turning movements in the morning peak period are left turns from the northbound approach and right turns from the eastbound and westbound approaches. The evening peak period shows a similar pattern with the addition of left turns from the southbound approach. The highest number of pedestrians crossing the intersection occur at the crosswalk on the northbound approach for both the morning and evening peak periods. There were very few bicyclists observed through the intersection, and those that were, were primarily traveling east and west on the roadway.



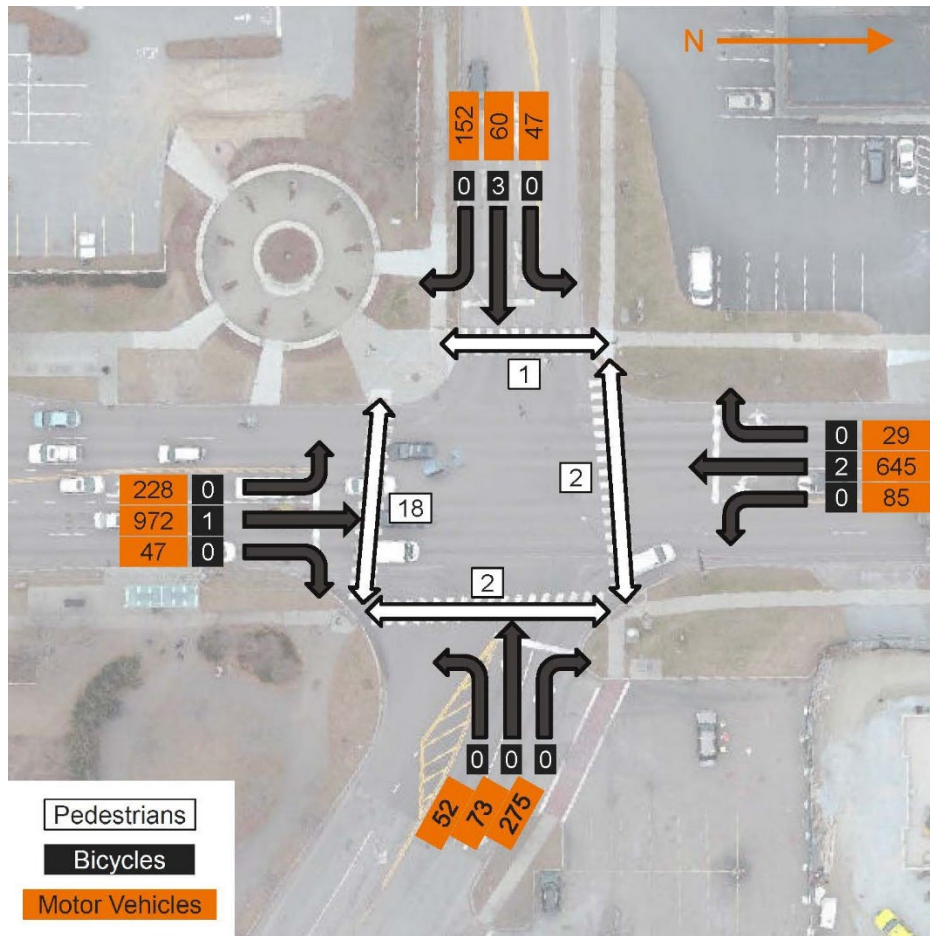


Figure 7: AM Peak Turning Movement Counts



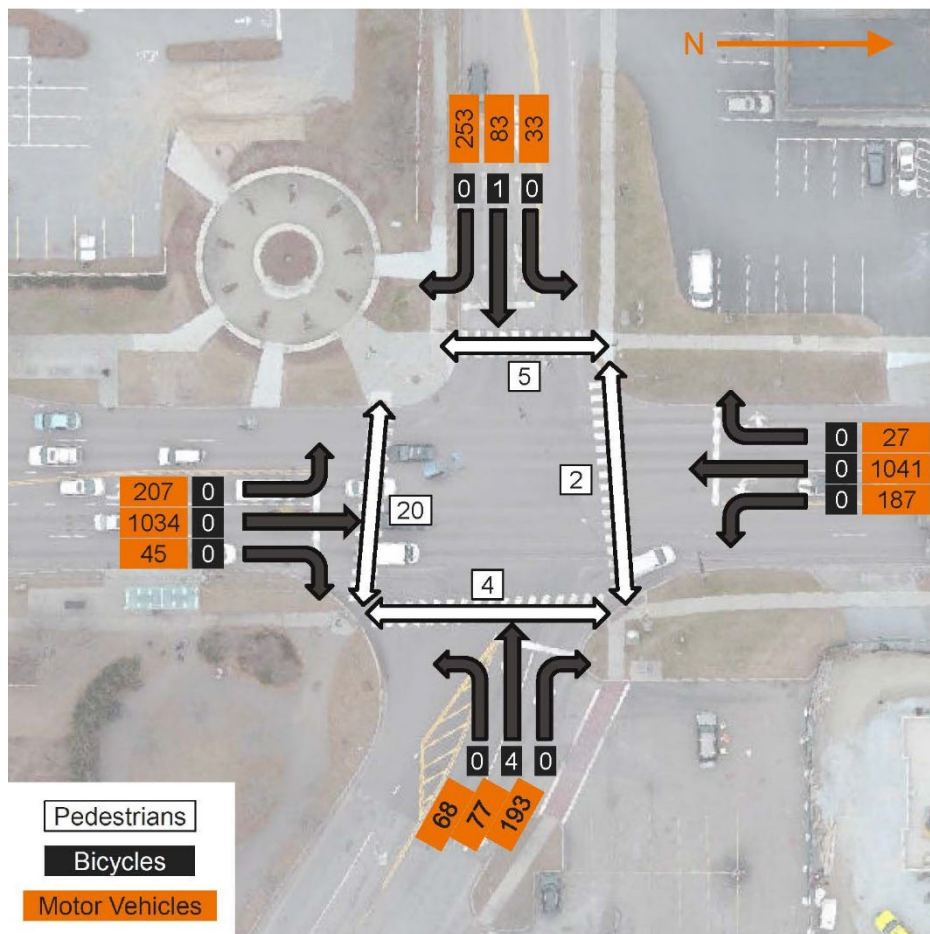


Figure 8: PM Peak Turning Movement Counts

5.6 Intersection Operations

Intersection operating level of service (LOS) was calculated based on existing traffic volumes, geometry, and traffic signal timing and phasing. The results of these calculations are presented in Table 4.

Level of service (LOS) is a term used to describe the quality of traffic flow at a roadway facility at a particular point in time. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of intersection capacity to intersection demand. Operating LOS are reported on a scale of A to F, with A representing operating conditions with little or no delay to motorists, and F representing the operating conditions with long delays and traffic demands sometimes exceeding roadway capacity.

Intersection LOS is calculated in accordance with procedures defined in the *Highway Capacity Manual*, published by the Transportation Research Board. For unsignalized and signalized intersections, the operating LOS is based on travel delays. Delays can be measured in the field but generally are calculated as a function of the following: traffic volume; percentage of heavy vehicles in the traffic stream; type of



Shelburne Street, Home Avenue, and Farrell Street Intersection Scoping Study

traffic control; number of travel lanes and lane use; intersection approach grades; and pedestrian activity. Through this analysis, volume-to-capacity ratios can be calculated for individual movements or for the intersection as a whole. A volume-to-capacity ratio of 1.0 indicates that a movement or intersection is operating at its theoretical capacity. The specific delay criteria applied per the *Highway Capacity Manual* to determine operating LOS are summarized in Table 3.

Table 3: Intersection Levels of Service Criteria

Level of Service	Average Delay per Vehicle (Seconds)	
	Signalized Intersections	Unsignalized Intersections
A	≤10.0	≤10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F ¹	>80.0	>50.0

¹Level of Service F is also assigned if the volume-to-capacity ratio exceeds 1.0 for a specific movement or lane group. For approach-based and intersection assessments, LOS is defined solely by delay. (Source: *HCM 2010 Highway Capacity Manual*, Transportation Research Board, National Academy of Sciences, Washington, DC, 2010.)

The intersection peak hour operating levels of service were calculated using the Highway Capacity Manual methods as applied by the Synchro software package. Analysis results for existing conditions are reported in Table 4 for 2023 volumes.

Table 4: Existing Optimized Intersection Capacity Analysis Results

	Control	Condition	Peak Hour	2023			Queue Length 95 th (FT)
				LOS ¹	Delay ²	V/C ³	
Shelburne St / Home Ave	Signal	Overall	AM	C	27.8	0.77	258 NBT, 236 SBT
			PM	C	31.7	0.78	447 NBT, 362 SBT

¹LOS= Level of Service

²Delay = Average delay expressed in seconds per vehicle

³V/C = Volume-to-capacity ratio for overall intersection

The analysis results indicate that the intersection itself is operating at an acceptable level of service overall. The southbound left turn movement has the worst LOS in both the AM and PM peak periods with LOS E. The queue lengths at the intersection extend past the next intersection to the south with the Market 32 and Shaw's shopping plazas, and the next two minor intersections to the north, with Bacon Street and Scarff Avenue. These adjacent intersections were not a focus of this study, however, it can be reasonably expected that the queue lengths at the study intersection impact the performance of the adjacent intersections.



5.7 Crash History

Sources of crash data were reviewed, including the VTrans list of High Crash Locations (2012-2016) and the Vermont Public Crash Data Query Tool (2018-2023).

High Crash Location List (2012-2016)

VTrans maintains a listing of High Crash Locations (HCL) within the state. A 0.3-mile highway segment or intersection must have at least five crashes over a five-year period and the actual crash rate (number of crashes per million vehicles at an intersection or per million vehicle miles along a segment) must exceed a critical crash rate to be classified as an HCL. The critical crash rate is based on the average crash rate for similar highways. The most recent compilation of the crash data, “*VTrans High Crash Report: Sections and Intersections 2012-2016*” lists the 1500 FT section of US 7 that includes the intersection with Home Ave and Farrell St as an HCL section. As presented in Table 5, 29 injuries and no fatalities were included with the 128 crashes listed for this highway section, ranked 334 out of 800 HCL sections in the state. The intersection itself was not listed as an HCL intersection, as it did not meet both the criteria of having five or more crashes over a five-year period and having the actual crash rate be greater than the critical crash rate.

Table 5: High Crash Locations 2012-2016

Cross Streets	HCL No.	Mile Marker	AADT	Crashes	Fatalities	Injuries	Actual/ Critical Ratio	Severity Index
~685' north of Home Ave To I-189	334	0.174 - 0.474	26,025	128	0	29	1.462	\$39,320

Recent Five-Year Crash History (2018-2023)

The last five years of crash data (2018-2023) for the study area was also investigated by Stantec using the VTrans crash database. VTrans maintains records of reported crashes by milepost along State and Federal Aid highways in Vermont. The VTrans crash database also includes crashes reported by local agencies along local roads. Records can be queried using the VTrans Public Crash Data Query Tool. The summaries include the location (mile marker, address, or intersection), date, time of day, weather conditions, contributing circumstances, and severity for reported crashes.

Table 6 provides a summary of the crash data. Records for the project study area show 90 crashes at the subject intersection during these years. While VTrans has yet not produced a High Crash Location Report for the years including 2018-2023, the intersection would likely still qualify as an HCL based on these crash data. Rear-end crashes and sideswipe crashes make up a quarter of the crashes. Thirteen crashes were either angle or broadside. Most crashes were of unknown type. One fatality was reported and seven crashes resulted in personal injury. Only one crash was reported as occurring during snow or icy conditions. Most crash records did not include the weather. No crashes involved bicycles. One crash involved a pedestrian resulting in injury. Six crashes involved a heavy truck.



Table 6: Crash Data Summary

Year	Crashes 2018-2023
2018	23
2019	16
2020	15
2021	10
2022	13
2023	13
Total	90
Type	
Angle	7
Rear-end	11
Head-on	1
Single Vehicle	1
Sideswipe	10
Broadside; No Turns	6
Unknown/Other	54
Total	90
Severity	
Property Damage	82
Personal Injury	7
Fatality	1
Unknown/Other	0
Total	90
Weather	
Clear	25
Cloudy	5
Rain	4
Snow/Ice	1
Fog	0
Unknown	55
Total	90



5.8 Natural & Cultural Resources

Stantec used the Vermont Agency of Natural Resources (ANR) Natural Resources Atlas mapping program to evaluate known natural resources within the project area. That evaluation is summarized here and located in Appendix B with map figures.

Wetlands and Streams

According to the ANR Natural Resources Atlas, the project area does not include any mapped wetlands, streams, or flood hazard areas.

Rare, Threatened, and Endangered (RTE) Species

According to the ANR Natural Resources Atlas, there are no RTE species mapped in the project area. However, all of Vermont is considered critical habitat for the state and federally threatened northern long-eared bat. Trees and bridges provide potential habitat for this species. Work proposed for this project includes trimming shrubs, but not trees. The project will comply with the Federal Highway Administration (FHWA) Range-side Programmatic Informal Consultation for Indiana Bat and Northern Long-eared Bats.

Wildlife and Wildlife Habitat

According to the ANR Natural Resources Atlas, the project area does not include forested segments or critical habitat areas, deer wintering areas, or significant natural communities.

Agricultural Land

According to the ANR Natural Resources Atlas, there are both prime and statewide agricultural soils within the project area. However, the project area has all been previously developed.

Public Land and Designated Conservation Areas

According to the ANR Natural Resources Atlas, the project area does not include public recreation lands (Section 4(f)) or public land developed with Land and Water Conservation Funds (Section 6(f)).

Hazardous Materials

According to the ANR Natural Resources Atlas, the project area is within an urban soil background area. Any soils that are excavated must be reused on-site or transported to a designated disposal site. While no hazardous sites or hazardous waste generators are located within the project area, there are hazardous sites and hazardous waste generators adjacent to the project area.

The former Don Cobb's Quality Used Cars (No. 900491) at 521 Shelburne Street is considered a low priority site under a voluntary action for contamination discovered during underground storage tank (UST) removal. According to the VT Environmental Research Tool, the owner is conducting appropriate investigations to determine amount and area of site contamination.



The former Kaigle's Citgo (No. 921298) at 510 Shelburne Street is considered a medium priority site for contamination from subsurface petroleum and chlorinated solvent. The site has a corrective action plan in place and is currently under construction for a mixed-use four-story building with commercial and residential space. Corrective actions include targeted soil excavation and removal, engineered barriers, and building vapor mitigation/sub-slab depressurization (SSD) system. Once the exterior ground surfaces of the site have been redeveloped, three monitoring wells will be installed for groundwater monitoring.

The former Ben Franklin/Seaway Carwash (No. 20033073) at 518 Shelburne Street (Walgreen's currently occupies both 514 and 518 Farrell Street) is considered a medium priority site for petroleum contamination. Construction of the existing Walgreens store on site included soil removal and replacement of monitoring wells. In April 2024, the site entered into the BRELLA Program.

The Walgreens store (EPAID VTR000523837) at 514 Farrell Street is considered a hazardous waste generator.

Historic Resources Review & Archaeological Resources Assessment

A historic resources review (HRR) and archaeological resources assessment (ARA) were performed by the University of Vermont Consulting Archaeological Program (UVM CAP), located in Appendix B. The assessment included the review of historic properties and precontact archeological sensitivity. The HRR identified five significant historic house properties within the Area of Potential Effect (APE). These properties are located outside of the ROW and are not expected to be impacted. The project should consider the placement of any signs or signals that could significantly alter views of the buildings during the design phase. Project coordination with the Vermont Division of Historic Preservation is recommended. Neighborhood Park was identified as a Section 4(f) resource and adverse impacts to the park should be avoided. If Federal Highway Administration (FHWA) funds are utilized, coordination with VTrans/FHWA is recommended to determine any Section 4(f) coordination required. The ARA determined there are no archeologically sensitive sites in the APE. Based on the assessment, construction activities should stay within the extent of existing disturbance.

6 Recommended Improvements

The project team developed a range of improvements to address the project's purpose and need. Recommended improvements were broken down into short-term and medium-term improvements. Short-term improvements include those that can be implemented within one to three years. Medium-term improvements include those that can be implemented within three or more years. Long-term improvements were outside of the scope of this study, as they will be considered once the Champlain Parkway improvements have been in place long enough to evaluate changes in traffic volumes through the Shelburne Street corridor.

Recommended improvements are presented below with descriptions of each. This includes 27 improvements, divided into 13 short-term and 14 medium-term improvements. Short-term improvements are displayed on Figure 9, medium-term improvements are displayed on Figure 10. Both short-term and



medium-term improvements are displayed together on Figure 11. Numbering of improvements below corresponds to the numbers shown on Figures 9, 10, and 11.

Short-term Improvements (See Figure 9)

1. Close two entrances to Walgreens parking lot with planters. Rely on eastern entrance.

Closing two out of the three entrances closest to the intersection for this parking lot will provide better access management, preventing vehicles from stopping and turning into and out of the parking lot so close to the intersection, reducing the number of conflicts with motor vehicles and pedestrians, while providing a more continuous and comfortable pedestrian connection to the intersection.

Responsibility: South Burlington, CCRPC, Walgreens

2. Pilot curb radius adjustments.

Using quick-build materials to pilot a reduced curb radius for righthand turns onto Farrell Street while reducing the width of Farrell Street will allow this design change to be tried out before committing to a permanent change. Reducing the curb radius will force vehicles making this turn to slow down and will shorten the crosswalk for the Farrell Street approach. Narrowing Farrell Street and removing the left turn lane for the Walgreens parking lot will help to calm traffic.

Responsibility: South Burlington and Burlington

3. Trim & maintain landscaping.

Trimming and maintaining the landscaping hedges on the southeasterly corner of the intersection will provide better visibility and daylighting for pedestrians using the plaza, making it more comfortable and attractive.

Responsibility: South Burlington, O'Dell Public Utility District and Homeowner's Association

4. Add second cobra head to existing streetlight at southeasterly pedestrian plaza.

Adding a second cobra head style luminaire and bracket arm to the existing street light at the southeasterly pedestrian plaza will provide better lighting for the pedestrian plaza, making it more comfortable and attractive.

Responsibility: South Burlington

5. Add signage for bicyclists to advance on pedestrian signals.

Providing signage to communicate to cyclists that they may advance when the pedestrian signal is displayed will help cyclists to realize it is legal and acceptable to do so, providing them a protected interval for traveling through the intersection while no motor vehicles are advancing.



Responsibility: Burlington and South Burlington

6. Add static signs to all approaches: TURNING VEHICLES YIELD TO PEDS

Providing this signage will reinforce to motorists that they must yield to pedestrians in the crosswalk when making a turn.

Responsibility: Burlington

7. Add concrete landing pad for rear bus door.

Adding this concrete landing pad will expand the area for transit users to board and alight from the bus without having to deal with a muddy ground surface. GMT supports this improvement.

Responsibility: Burlington and GMT

8. Add sidewalk connection.

Providing this sidewalk segment will provide a more direct and easily accessible pedestrian route to the southwesterly corner of the intersection.

Responsibility: Burlington

9. Remove errant sidewalk segment.

Removing this segment of sidewalk that currently extends to the curb will prevent pedestrians from potentially stepping into traffic without a crosswalk in this location.

Responsibility: Burlington and Pomerleau

10. Add more bike racks.

Providing more bike racks at both of the transit stops will better support transit users who want to ride their bike to and from these stops.

Responsibility: Burlington and GMT

11. Revise Home Avenue lane widths.

Making the two approach lanes on Home Avenue to 10 FT widths and the receiving lane to a 12 FT width will help to calm traffic.

Responsibility: Burlington

12. Add bike lane on Home Ave to connect to planned bike lane; add static sign: BEGIN RIGHT TURN LANE/YIELD TO BIKES; Add sharrows for receiving lane.



Using the space freed up from revising the lane widths on Home Avenue to provide a bike lane that connects to the planned future bike lanes on Home Avenue will provide a designated space for bicyclists to advance to the stop bar. Providing sharrows for the receiving lane on Home Avenue will reinforce to motorists and bicyclists that it is acceptable for bikes to take the lane here and to share the roadway.

Alternatively, a bike lane could be provided for the receiving lane on Home Avenue with sharrows on the approach. This option should be considered during the design phase of the bike lane restriping project. The approach will also have the option of bicyclists using the sidewalk to get through the intersection, with the addition of a ramp onto the sidewalk further west of the intersection, as part of the current planned bike lane project on Home Avenue.

Responsibility: Burlington

13. Relocate stop bar and install bike box on Home Ave approach.

Moving the stop bar back and providing a bike box will give additional space for bicyclists who wish to get out in front of motorists during a red light, positioning themselves to cross the intersection more visibly.

Responsibility: Burlington

Medium-Term Improvements (See Figure 10)

14. Revise Farrell Street approach lane geometry. Add bike lanes to both sides of Farrell Street. Add bike ramp to shared use path.

Assuming the quick-build pilot project for reducing the curb radius and receiving lane width on Farrell Street goes well, permanent changes will be made. Narrowing the overall roadway width, removing the left turn lane for Walgreens, providing bike lanes on both sides and realigning the approach will calm traffic and provide more comfortable facilities for bicyclists. Providing a bike ramp to the shared use path will allow bicyclists quick access to the South Burlington shared use path network. This gives bicyclists an option to get out of the roadway if they choose.

Responsibility: South Burlington

15. Relocate stop bar and install bike box on Farrell Street approach.

Moving the stop bar back and providing a bike box will give additional space for bicyclists who wish to get out in front of motorists during a red light, positioning themselves to cross the intersection more visibly.

Responsibility: South Burlington

16. Add “crossbike” markings.



Adding crossbike markings through the intersection for east-west bicycle travel will help bicyclists navigate through the intersection and will reinforce to motorists that this intersection accommodates bicycle travel in the roadway.

Responsibility: Burlington

17. Revise curb radii to shorten pedestrian crossing distances.

Permanently revising curb radii will calm traffic, forcing motorists to make turns more slowly, while also shortening the crosswalks, reducing the exposure of pedestrians to motor vehicle traffic.

Responsibility: Burlington and South Burlington

18. Relocate stop bar to allow trucks to turn right from Farrell Street.

The reduced curb radius on the northeasterly corner of the intersection will force large trucks to encroach on the existing southbound travel lanes, particularly the southbound left turn lane. Pushing back the stop bar on the southbound approach will accommodate this truck turning movement.

Responsibility: Burlington and South Burlington

19. Realign crosswalks and ramp locations.

Making crosswalks perpendicular to the roadway, and revising the ramps accordingly, will shorten pedestrian crossing distances and reduce the exposure of pedestrians to motor vehicle traffic.

Responsibility: Burlington

20. Landscaping to guide pedestrians to directional crossing locations.

Adding a grass strip along the southwesterly corner of the intersection between the two crossing ramps will help to guide pedestrians to the appropriate ramps and help keep them further away from turning motor vehicles.

Responsibility: Burlington

21. Remove extra curb cuts at Walgreens. Replace with sidewalks and grass strip.

Pending results of the quick-build modifications, permanently closing two out of the three entrances closest to the intersection for this parking lot will provide better access management. This will reduce the number of conflicts with motor vehicles and pedestrians while providing a more continuous and comfortable pedestrian connection to the intersection.

Responsibility: South Burlington and Walgreens



22. Shorten southbound left-turn lane for Shaw's Plaza. Use space for extending northbound left turn lanes.

Right-sizing the southbound left-turn lane for Shaw's Plaza and extending the northbound left turn lane will better accommodate the ratio of motor vehicles making these turning movements. This will maintain sufficient operations at the Shaw's Plaza intersection while improving operations at the intersection with Home Avenue and Farrell Street.

Responsibility: Burlington and Acadia Realty (Owners of Shaw's Plaza)

23. Upgrade/relocate pedestrian signal equipment.

Upgrading pedestrian signal equipment will make the signals more accessible to people with disabilities. Relocating pedestrian pushbuttons to comply with the Manual on Uniform Traffic Control Devices (MUTCD) by placing them closer to the crossing locations will benefit all pedestrians, particularly those with mobility challenges.

Responsibility: Burlington

24. Replace spanwire traffic signal system with mast arms and mast arm poles.

Modernizing this traffic signal system will better support additional safety and efficiency measures. These include more flexibility in signal head configurations, signage, vehicle detection, and data collection to help optimize signal phasing and timing configurations. Signal head changes include: providing the ability to run northbound and southbound left turn lanes protected during peak hours and permitted, using flashing yellow arrows (FYAs) during off peak hours; and providing FYAs for the eastbound and westbound turn lanes. FYAs encourage motorists to yield to oncoming traffic and/or pedestrians in the crosswalk, regardless of pedestrian phasing.

Responsibility: Burlington

25. Add static signs to northbound, southbound, and westbound left turn lanes: LEFT TURN YIELD ON FLASHING ARROW

Adding these signs reinforce the need for motorists to yield to oncoming traffic and/or pedestrians in the crosswalk when FYAs are displayed.

Responsibility: Burlington

26. Add dynamic blank out signs to all approaches: NO RIGHT TURN

Displaying blank out signs with the symbol for NO RIGHT TURN (right turn arrow crossed out in a circle) during pedestrian phases will prevent motorists from making right turns on red. This will reduce motorists failing to yield to pedestrians in the crosswalk.

Responsibility: Burlington



27. Add sidewalk segment for desire line.

Providing a sidewalk segment from the northbound transit stop to the Shaw's plaza parking lot will provide a more direct route to the parking lot and accommodate the desire line shown by the development of an informal path.

Responsibility: Acadia Realty

None of these improvements are mutually exclusive. They can be implemented either together or in a phased approach.

The City of Burlington is also working on a project to add five-foot painted bike lanes on Home Avenue between Shelburne Street and Pine Street. It is anticipated that this will include a ramp onto the sidewalk for bicycles at the break in the fence into the Market 32 Plaza that is west of the project area. This will make it easier for bikes to get onto the sidewalk and use it to cross the intersection if they choose. The City is pursuing this project for the 2025 construction season.



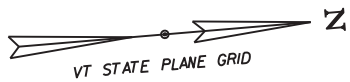


Figure 9
Short Term
Improvements



5

6

12

SHELBURNE STREET / VT ROUTE 7

SHELBURNE STREET / VT ROUTE 7

1. CLOSE ENTRANCES TO PARKING LOT WITH PLANTERS. RELY ON EASTERN WALGREENS ENTRANCE.
2. PILOT CURB RADIUS ADJUSTMENTS
3. TRIM & MAINTAIN LANDSCAPING
4. ADD SECOND COBRA HEAD TO EXISTING STREET LIGHT AT S.E. PEDESTRIAN PLAZA
5. ADD SIGNAGE FOR BICYCLISTS TO ADVANCE ON PEDESTRIAN SIGNALS
6. ADD STATIC SIGNS TO ALL APPROACHES: TURNING VEHICLES YIELD TO PEDS
7. ADD CONCRETE LANDING PAD FOR REAR BUS DOOR
8. ADD SIDEWALK CONNECTION
9. REMOVE ERRANT SIDEWALK SEGMENT
10. ADD MORE BIKE RACKS
11. REVISE HOME AVE LANE WIDTHS
12. ADD BIKE LANE TO CONNECT TO PLANNED BIKE LANE; ADD STATIC SIGN: BEGIN RT TURN LANE YIELD TO BIKES; ADD SHARROWS FOR RECEIVING LANE
13. RELOCATE STOP BAR AND INSTALL BIKE BOX

0 40 80
SCALE IN FEET

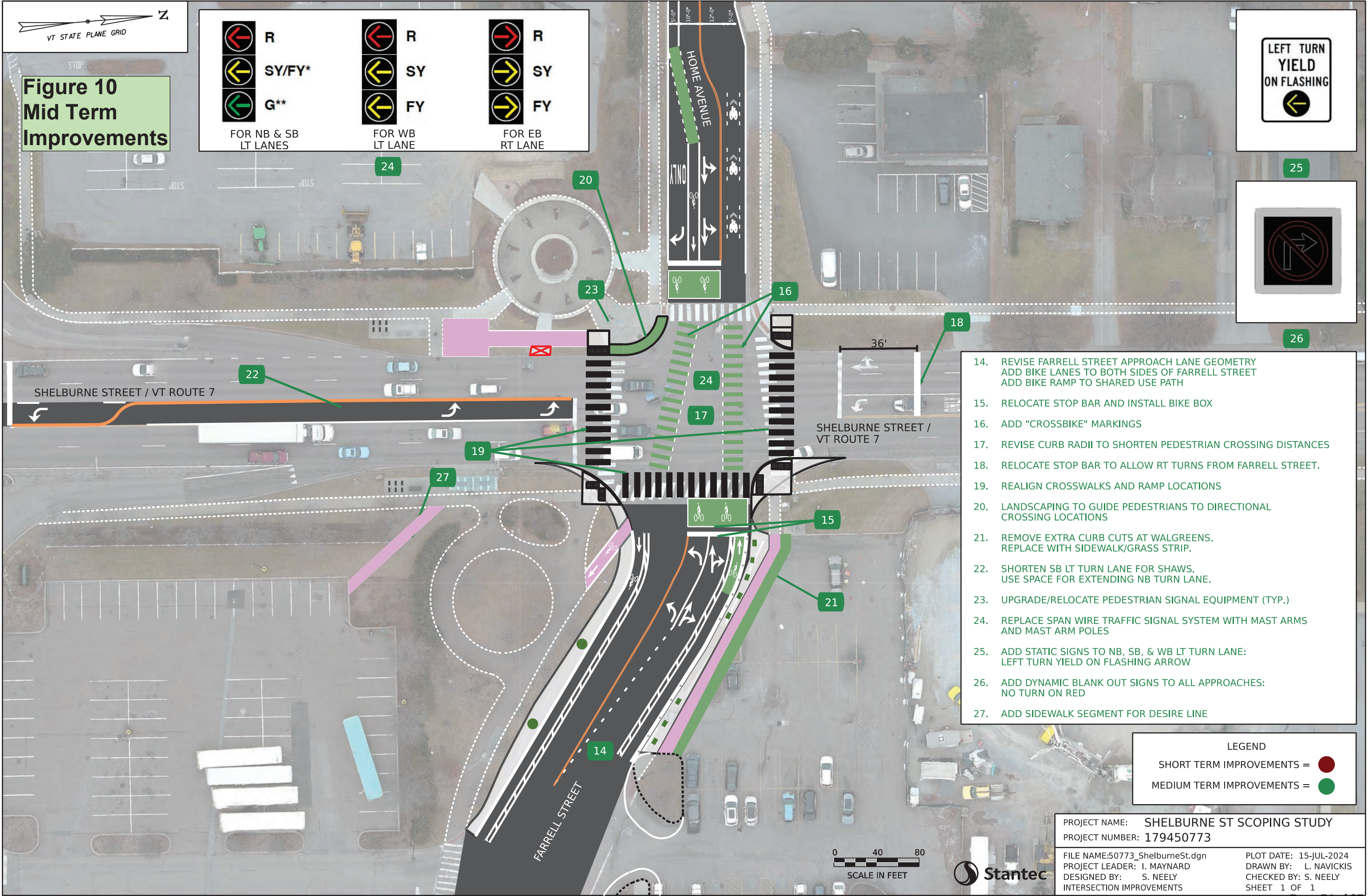


PROJECT NAME: SHELBURNE ST SCOPING STUDY

PROJECT NUMBER: 179450773

FILE NAME: 50773_ShelburneSt.dgn
PROJECT LEADER: I. MAYNARD
DESIGNED BY: S. NEELY
INTERSECTION IMPROVEMENTS

PLOT DATE: 15-JUL-2024
DRAWN BY: L. NAVICKIS
CHECKED BY: S. NEELY
SHEET 1 OF 1



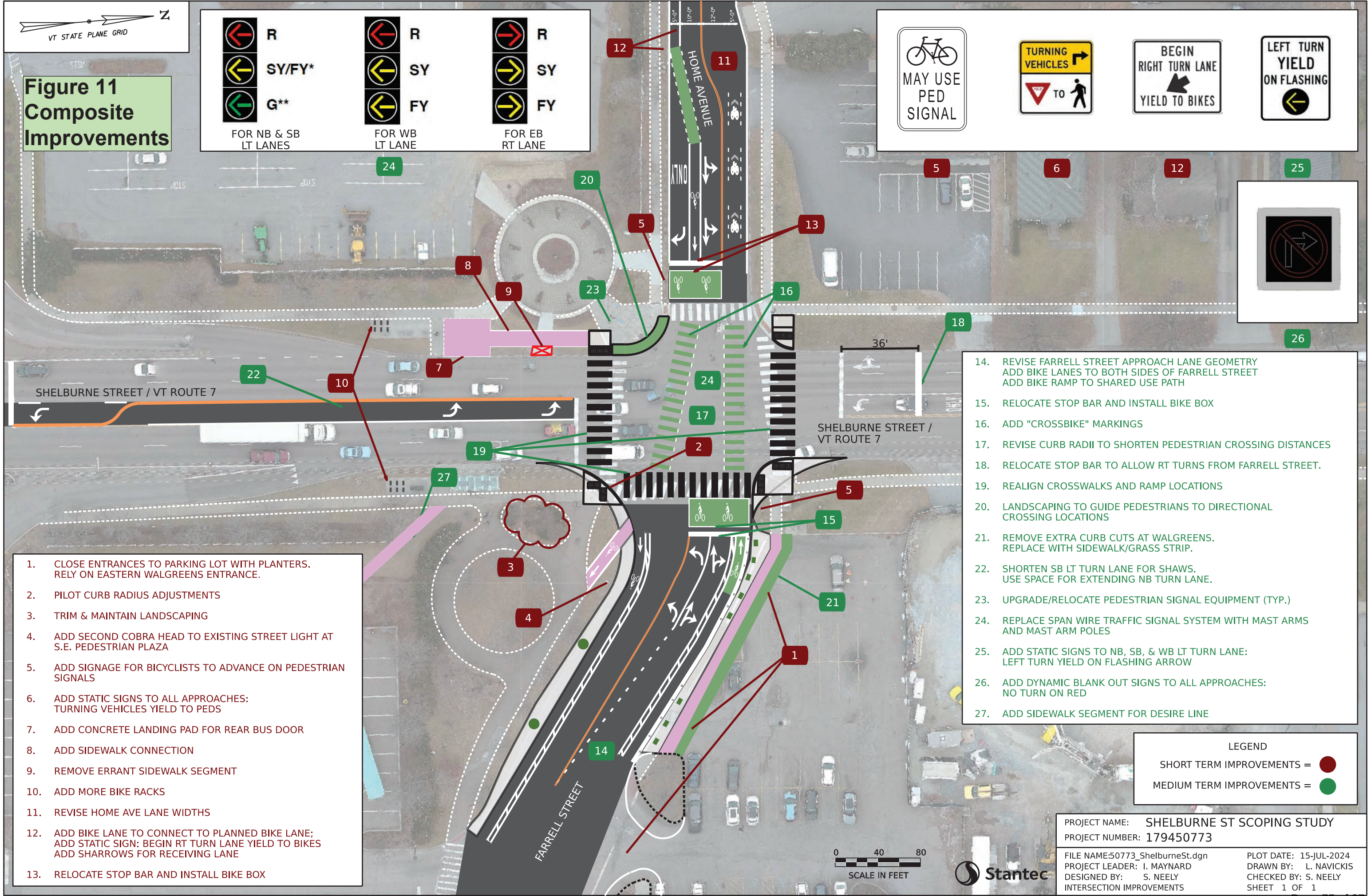
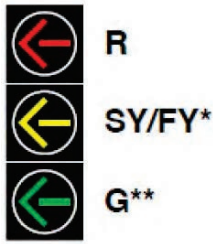


Figure 11
Composite
Improvements



FOR NB & SB
LT LANES



FOR WB
LT LANE



FOR EB
RT LANE



1. CLOSE ENTRANCES TO PARKING LOT WITH PLANTERS. RELY ON EASTERN WALGREENS ENTRANCE.
2. PILOT CURB RADIUS ADJUSTMENTS
3. TRIM & MAINTAIN LANDSCAPING
4. ADD SECOND COBRA HEAD TO EXISTING STREET LIGHT AT S.E. PEDESTRIAN PLAZA
5. ADD SIGNAGE FOR BICYCLISTS TO ADVANCE ON PEDESTRIAN SIGNALS
6. ADD STATIC SIGNS TO ALL APPROACHES: TURNING VEHICLES YIELD TO PEDS
7. ADD CONCRETE LANDING PAD FOR REAR BUS DOOR
8. ADD SIDEWALK CONNECTION
9. REMOVE ERRANT SIDEWALK SEGMENT
10. ADD MORE BIKE RACKS
11. REVISE HOME AVE LANE WIDTHS
12. ADD BIKE LANE TO CONNECT TO PLANNED BIKE LANE; ADD STATIC SIGN: BEGIN RT TURN LANE YIELD TO BIKES ADD SHARROWS FOR RECEIVING LANE
13. RELOCATE STOP BAR AND INSTALL BIKE BOX

14. REVISE FARRELL STREET APPROACH LANE GEOMETRY ADD BIKE LANES TO BOTH SIDES OF FARRELL STREET ADD BIKE RAMP TO SHARED USE PATH
15. RELOCATE STOP BAR AND INSTALL BIKE BOX
16. ADD "CROSSBIKE" MARKINGS
17. REVISE CURB RADII TO SHORTEN PEDESTRIAN CROSSING DISTANCES
18. RELOCATE STOP BAR TO ALLOW RT TURNS FROM FARRELL STREET.
19. REALIGN CROSSWALKS AND RAMP LOCATIONS
20. LANDSCAPING TO GUIDE PEDESTRIANS TO DIRECTIONAL CROSSING LOCATIONS
21. REMOVE EXTRA CURB CUTS AT WALGREENS. REPLACE WITH SIDEWALK/GRASS STRIP.
22. SHORTEN SB LT TURN LANE FOR SHAWS. USE SPACE FOR EXTENDING NB TURN LANE.
23. UPGRADE/RELOCATE PEDESTRIAN SIGNAL EQUIPMENT (TYP.)
24. REPLACE SPAN WIRE TRAFFIC SIGNAL SYSTEM WITH MAST ARMS AND MAST ARM POLES
25. ADD STATIC SIGNS TO NB, SB, & WB LT TURN LANE: LEFT TURN YIELD ON FLASHING ARROW
26. ADD DYNAMIC BLANK OUT SIGNS TO ALL APPROACHES: NO TURN ON RED
27. ADD SIDEWALK SEGMENT FOR DESIRE LINE

LEGEND
SHORT TERM IMPROVEMENTS = ●
MEDIUM TERM IMPROVEMENTS = ●

PROJECT NAME: SHELburne ST SCOPING STUDY
PROJECT NUMBER: 179450773
FILE NAME: 50773_ShelburneSt.dgn
PROJECT LEADER: I. MAYNARD
DESIGNED BY: S. NEELY
INTERSECTION IMPROVEMENTS
PLOT DATE: 15-JUL-2024
DRAWN BY: L. NAVICKIS
CHECKED BY: S. NEELY
SHEET 1 OF 1

7 Signal Phasing Alternatives

The project team developed four alternatives, each including the short-term and medium-term improvements described previously, differentiated according to the type of pedestrian signal phasing and whether eastbound and westbound approaches have protected left-turn phases.

Pedestrian signal phasing can be implemented with either a leading pedestrian interval (LPI) or an exclusive pedestrian phase. The first part of LPI phasing provides a six second head start for pedestrians and bicycles to advance while traffic signals are on red. The second part of LPI phasing provides a green light for through and turning motor vehicles; turning traffic yields to pedestrians in the crosswalk. Exclusive pedestrian phasing stops all motor vehicle traffic with red signal faces while pedestrians and cyclists have the right-of-way over motor vehicles on all approaches. Exclusive pedestrian phasing requires additional time within the traffic signal cycle than LPI and can result in reduced intersection capacity for motorists. Both LPI and exclusive pedestrian phasing alternatives would also include a No Right Turn (NTOR) symbol LED blank out sign to prevent right turns while the traffic light is red during the pedestrian phase, as displayed in improvement item 26 on Figures 10 and 11.

Providing protected left-turn phases for the eastbound and westbound approaches would further reduce the conflict of left turning vehicles not yielding to pedestrians in crosswalks. During protected left-turn phases for eastbound and westbound motorists, pedestrian signals are set to indicate DON'T WALK.

7.1 Do Nothing

For the Do Nothing Alternative, the existing transportation facilities in the project area remain as they exist today. This alternative has no construction costs and has no impacts on right-of-way, resources, or traffic. The No Action Alternative does not address the Purpose and Need.

7.2 Alternative 1A: Leading Ped Interval (NTOR)

This alternative includes all short-term and medium-term improvements and proposes implementing a leading pedestrian interval with a blank out No Right Turn sign.

7.3 Alternative 1B: Leading Ped Interval (NTOR) & Protected EB/WB Left Turns

This alternative includes all short-term and medium-term improvements and proposes implementing a leading pedestrian interval with a blank out No Right Turn sign and protected eastbound and westbound left turns.



7.4 Alternative 2A: Exclusive Ped Interval (NTOR)

This alternative includes all short-term and medium-term improvements and proposes implementing an exclusive pedestrian phase with a blank out No Right Turn sign.

7.5 Alternative 2B: Exclusive Ped Interval (NTOR) & Protected EB/WB Left Turns

This alternative includes all short-term and medium-term improvements and proposes implementing an exclusive pedestrian phase with a blank out No Right Turn sign and protected eastbound and westbound left turns.

7.6 Alternatives Evaluation

7.6.1 SAFETY BENEFITS

Safety for the traveling public is increased in each improvement alternative over the Do Nothing alternative, both in terms of pedestrian safety in crosswalks and in mitigating factors that contribute to a high number of crashes. Each improvement alternative reduces conflicts and increases awareness among drivers, cyclists, and pedestrians by:

- Consolidating parking lot driveways;
- Slowing turning vehicles;
- Encouraging cyclists to advance during pedestrian phases;
- Communicating to motorists that turning vehicles must yield to pedestrians;
- Adding bike lanes, sharrows, bike boxes, and crossbike markings;
- Communicating to motorists to yield to bikes on the Home Ave approach;
- Reducing pedestrian exposure to motor vehicle traffic by shortening pedestrian crossing distances;
- Upgrading and relocating pedestrian signal equipment;
- Restricting right turns during pedestrian phases;
- Implementing flashing yellow arrows (FYAs)

Alternatives 2A and 2B stop all motor vehicle movements during the exclusive pedestrian phase. Alternatives 1B and 2B provide protected left turns for the eastbound and westbound approaches, further reducing conflicts among left-turning motor vehicles from those approaches and pedestrians in the crosswalks, as well as motor vehicles moving through straight through the intersection.

7.6.2 PEDESTRIAN & BICYCLE CONNECTIVITY

Pedestrian and bicycle connectivity through and around the intersection are increased in each improvement alternative over the Do Nothing alternative. Each improvement alternative increases pedestrian and bicycle connectivity by:



- Closing two Walgreens parking lot driveways and providing a continuous pedestrian connection from the remaining driveway to the northeasterly corner of the intersection;
- Adding bike lanes, sharrows, bike boxes, and crossbike markings to better support bicycle movements through the intersection;
- Adding an on-ramp from the receiving lane on Farrell Street to the South Burlington Recreation Path;
- Upgrading and relocating pedestrian signal equipment;
- Shortening pedestrian crossing distances;
- Improving sidewalk ramps;
- Adding landscaping to guide pedestrians to directional crossing locations;
- Making the pedestrian plaza on the southeasterly corner of the intersection more comfortable and welcoming to pedestrians by trimming and maintaining landscaping and increasing street lighting;
- Providing a concrete landing pad for the rear bus door at the southbound bus stop;
- Providing a direct sidewalk connection to bypass the indirect pathway through the pedestrian plaza on the southwesterly corner of the intersection;
- Removing an errant sidewalk segment that leads to an unsafe crossing location on the southwesterly corner of the intersection;
- Adding more bike racks to better support bicycle travel to and from both bus stops;
- Providing a new sidewalk segment from the northbound bus stop to the shopping plaza parking lot

7.6.3 TRAFFIC OPERATIONS IMPACTS

Roadway and traffic conditions in the study area were projected to 2026 for short term improvements and 2030 for medium term improvements. Traffic volumes collected by CCRPC in 2023 were increased by 1.2 percent and 2.9 percent for short term and medium term improvements, respectively. These growth rates were obtained from the VTrans Continuous Traffic Counter Report (*The Red Book*), which compiles and analyzes traffic volume data collected by VTrans, based on 2023 traffic data. Existing peak hour factors were applied to the 2026 and 2030 volumes as well.

The traffic operations analysis conducted for existing traffic conditions were repeated for future conditions based on the traffic growth assumptions referenced above. Traffic operations analysis worksheets are presented in Appendix C. As shown in Table 7 below, new traffic growth will modestly increase overall intersection utilization (V/C) during both the AM and PM peak hours.

Table 7 compares extending the northbound left turn lane in the short term (2026) to the 2026 No Build option. Results indicate that extending the northbound left turn lane will maintain the same level of service (LOS) C and essentially the same overall average delay and V/C.

Table 7 also compares concurrent pedestrian phasing with a leading pedestrian interval (LPI) and blank out No Right Turn sign, against exclusive pedestrian phasing and blank out No Right Turn sign, with or without protected eastbound and westbound left turns. Results indicate that while exclusive pedestrian phasing has slightly more overall delay than LPI phasing, the amount of delay is acceptable and overall LOS C will be maintained in either scenario. Adding protected eastbound and westbound left turns to



Shelburne Street, Home Avenue, and Farrell Street Intersection Scoping Study

either type of pedestrian phasing will increase delay and the intersection will drop to overall LOS D in the evening peak period. The signal timing can be programmed differently for AM peak, PM peak, and off peak travel periods.

Table 7: Existing and Future Intersection Capacity Analysis Results

		AM Peak Hour	PM Peak Hour
Existing (2023)			
Cycle Length (CL) = 90s	LOS¹	C	C
	Delay²	27.8	31.7
	V/C³	0.77	0.78
Future (2026) No Build			
CL = 90s	LOS¹	C	C
	Delay²	28.5	32.6
	V/C³	0.78	0.79
Future (2030) No Build			
CL = 90s	LOS¹	C	C
	Delay²	29.6	34.0
	V/C³	0.80	0.81
Future (2026) Extend NB Left Turn Lane			
CL = 90s	LOS¹	C	C
	Delay²	28.8	32.5
	V/C³	0.79	0.79
Future (2026) Concurrent Pedestrian Phasing with Leading Pedestrian Interval & NTOR			
CL = 90s	LOS¹	C	C
	Delay²	30.8	32.1
	V/C³	0.77	0.79
Future (2030) Leading Pedestrian Interval w/ Protected EB & WB Left Turns			
CL = 90s (AM) CL = 115s (PM)	LOS¹	C	D
	Delay²	34.6	37.8
	V/C³	0.73	0.77
Future (2026) Exclusive Pedestrian Phasing & NTOR			
CL = 85s (AM) CL = 95s (PM)	LOS¹	C	C
	Delay²	32.1	34.9
	V/C³	0.76	0.75
Future (2030) Exclusive Pedestrian Phasing w/ Protected EB & WB Left Turns			
CL = 115s (AM) CL = 135s (PM)	LOS¹	C	D
	Delay²	27.8	40.9
	V/C³	0.73	0.71

¹ LOS = Level of Service

² Delay = Average delay expressed in seconds per vehicle

³ Overall V/C = Volume-to-capacity ratio for overall intersection



Table 8 displays analysis results by approach, including 50th (average) and 95th percentile queues, for No Build (Do Nothing) scenarios and Table 9 displays capacity analysis results by approach, including 50th and 95th percentile queues, for concurrent pedestrian phasing with a leading pedestrian interval (LPI) and blank out No Right Turn sign, against exclusive pedestrian phasing and blank out No Right Turn sign, with or without protected eastbound and westbound left turns. Concurrent LPI pedestrian phasing results in similar queue lengths to the No Build condition. Exclusive pedestrian phasing results in longer queue lengths, but the northbound approach queue length, which most impacts the intersection immediately south, has an average of only two car lengths more than the No Build or LPI phasing. Under the worst conditions (95th percentile), exclusive pedestrian phasing will add an additional three car lengths compared to the No Build or LPI phasing. Adding protected eastbound and westbound left turns to either type of pedestrian phasing results in average northbound queue lengths that extend past the intersection immediately south. Under the worst conditions, adding protected eastbound and westbound left turns to the exclusive pedestrian phasing scenario will result in queue lengths that extend to the I-189 interchange. These extended queue lengths are a result of lengthening the cycle length to accommodate the protected eastbound and westbound left turns.



Table 8 –Weekday Peak Hour Intersection Capacity Analysis Results – No Build											
Approach	Direction/ turning movement	AM Peak					PM Peak				
		Delay ¹	LOS ²	v/c ³	Queue ⁴		Delay ¹	LOS ²	v/c ³	Queue ⁴	
					50 th	95 th				50 th	95 th
Existing (2023)											
Shelburne St	NB LT	15.2	B	0.55	91	51	23.5	C	0.69	79	#137
Shelburne St	NB T	22.7	C	0.85	235	#258	31.7	C	0.93	240	#447
Shelburne St	SB LT	69.6	E	0.79	53	#121	73.9	E	0.91	115	#243
Shelburne St	SB T	25.9	C	0.63	176	236	24.2	C	0.77	279	362
Home Ave	EB T	52.2	D	0.71	66	#141	37.9	D	0.49	62	119
Home Ave	EB RT	27.0	C	0.11	0	34	30.1	C	0.17	0	63
Farrell St	WB LT	28.7	C	0.20	26	59	32.8	C	0.29	35	74
Farrell St	WB T	35.9	D	0.58	91	196	36.8	D	0.52	79	164
OVERALL		27.8	C	0.77			31.7	C	0.78		
Future (2026) No Build											
Shelburne St	NB LT	15.5	B	0.56	92	55	24.4	C	0.70	81	#143
Shelburne St	NB T	23.6	C	0.86	238	#411	33.5	C	0.94	243	#456
Shelburne St	SB LT	72.7	E	0.81	54	#123	76.0	E	0.92	117	#247
Shelburne St	SB T	26.1	C	0.63	178	240	24.5	C	0.77	284	368
Home Ave	EB T	56.4	E	0.74	97	#147	38.3	D	0.50	64	121
Home Ave	EB RT	27.0	C	0.11	0	36	30.1	C	0.17	0	63
Farrell St	WB LT	28.7	C	0.21	26	59	33.0	C	0.30	35	75
Farrell St	WB T	36.3	D	0.59	95	199	37.0	D	0.53	81	167
OVERALL		28.5	C	0.78			32.6	C	0.79		
Future (2030) No Build											
Shelburne St	NB LT	15.7	B	0.56	90	70	25.4	C	0.72	82	#149
Shelburne St	NB T	24.5	C	0.88	248	#422	36.1	D	0.96	248	#469
Shelburne St	SB LT	76.2	E	0.82	55	#127	80.3	F	0.93	119	#252
Shelburne St	SB T	27.5	C	0.66	186	250	25.0	C	0.79	292	378
Home Ave	EB T	59.6	E	0.77	68	#150	39.8	D	0.53	65	124
Home Ave	EB RT	27.0	C	0.11	0	37	30.2	C	0.17	0	63
Farrell St	WB LT	28.8	C	0.21	27	60	33.2	C	0.31	36	76
Farrell St	WB T	36.7	D	0.60	98	204	37.3	D	0.54	83	171
OVERALL		29.6	C	0.80			34.0	C	0.81		

1. Delay in seconds per vehicle
2. Level of Service according to HCM
3. Volume to Capacity Ratio
4. Queue in feet per lane: 50th percentile and 95th percentile (25 feet per vehicle)

Queue shown is maximum after two cycles.
~ Volume exceeds capacity and is theoretically infinite.
95th percentile volume exceeds capacity, queue may be longer

Table 9 – Weekday Peak Hour Intersection Capacity Analysis Results – Signal Improvements											
Approach	Direction/ turning movement	AM Peak					PM Peak				
		Delay ¹	LOS ²	v/c ³	Queue ⁴		Delay ¹	LOS ²	v/c ³	Queue ⁴	
					50 th	95 th				50 th	95 th
Future (2026) Concurrent Phasing with Leading Pedestrian Interval & No Right Turn Blank Out Sign											
Shelburne St	NB LT	17.7	B	0.59	95	75	29.6	C	0.77	81	#154
Shelburne St	NB T	32.7	C	0.94	245	#446	33.3	C	0.94	243	#457
Shelburne St	SB LT	51.0	D	0.67	52	102	76.0	E	0.92	117	#247
Shelburne St	SB T	28.5	C	0.67	186	250	22.1	C	0.74	271	352
Home Ave	EB T	39.2	D	0.58	63	116	38.2	D	0.50	63	120
Home Ave	EB RT	25.5	C	0.11	0	41	30.8	C	0.22	9	75
Farrell St	WB LT	26.8	C	0.19	25	57	33.0	C	0.30	35	75
Farrell St	WB T	33.7	C	0.56	67	199	37.5	D	0.54	85	172
OVERALL		30.8	C	0.77	CL = 90s		32.1	C	0.79	CL = 90s	
Future (2030) Concurrent Pedestrian Phasing with LPI, NTOR Blank Out, and Protected Phases for EB & WB Left Turns											
Shelburne St	NB LT	16.6	B	0.42	49	53	41.6	D	0.72	109	#183
Shelburne St	NB T	45.8	D	1.00	256	#450	39.6	D	0.87	405	503
Shelburne St	SB LT	41.4	D	0.71	37	#87	52.3	D	0.95	102	#231
Shelburne St	SB T	28.1	C	0.67	185	247	30.9	C	0.79	379	468
Home Ave	EB T	30.1	C	0.40	64	112	43.1	D	0.46	87	151
Home Ave	EB RT	28.0	C	0.12	2	46	42.2	D	0.24	16	98
Farrell St	WB LT	21.5	C	0.17	24	52	33.9	C	0.29	43	84
Farrell St	WB T	23.7	C	0.29	38	103	39.6	D	0.47	110	202
OVERALL		34.6	C	0.73	CL = 90s		37.8	D	0.77	CL = 115s	
Future (2026) Exclusive Pedestrian Phasing (w/ NTOR Blank Out)											
Shelburne St	NB LT	31.5	C	0.73	78	#232	40.5	D	0.78	81	#221
Shelburne St	NB T	33.8	C	0.88	241	#484	39.2	D	0.91	299	#535
Shelburne St	SB LT	40.7	D	0.56	47	#148	45.7	D	0.72	112	#275
Shelburne St	SB T	20.7	C	0.56	122	262	24.5	C	0.76	232	#517
Home Ave	EB T	67.2	E	0.82	65	#150	44.9	D	0.57	69	130
Home Ave	EB RT	26.9	C	0.18	13	57	35.0	C	0.31	29	106
Farrell St	WB LT	28.0	C	0.21	25	58	36.2	D	0.32	38	80
Farrell St	WB T	39.1	D	0.68	113	#246	43.4	D	0.63	108	200
OVERALL		32.1	C	0.76	CL = 85s		34.9	C	0.75	CL = 95s	
Future (2030) Exclusive Pedestrian Phasing with Protected Phases for EB & WB Left Turns											
Shelburne St	NB LT	23.5	C	0.56	103	194	53.3	D	0.79	142	#287
Shelburne St	NB T	23.1	C	0.67	317	483	36.7	D	0.79	526	#711
Shelburne St	SB LT	20.8	C	0.43	38	81	51.3	D	0.79	137	#321
Shelburne St	SB T	20.0	C	0.48	194	288	32.7	C	0.76	495	#727
Home Ave	EB T	70.5	E	0.81	93	146	65.8	E	0.68	109	173
Home Ave	EB RT	40.4	D	0.11	0	45	54.8	D	0.37	37	128
Farrell St	WB LT	31.8	C	0.21	33	59	43.1	D	0.32	52	88
Farrell St	WB T	40.0	D	0.65	170	253	49.5	D	0.61	174	251
OVERALL		27.8	C	0.73	CL = 115s		40.9	D	0.71	CL = 135s	

1. Delay in seconds per vehicle
2. Level of Service according to HCM
3. Volume to Capacity Ratio
4. Queue in feet per lane: 50th percentile and 95th percentile (25 feet per vehicle)

Queue shown is maximum after two cycles.
~ Volume exceeds capacity and is theoretically infinite.
95th percentile volume exceeds capacity, queue may be longer

7.6.3.1 Corridor Traffic Analysis

The CCRPC performed a supplemental traffic analysis to evaluate the effects of congestion and coordination, due to an exclusive pedestrian phase in 2026 and adding protected left turn phases for the eastbound and westbound movements in 2030, with the two intersections to the south (Appendix D). Results for 2026 indicate that northbound and southbound queuing on Shelburne Street will not significantly change with the addition of an exclusive pedestrian phase (Alternative 2A). Eastbound and westbound queuing at the study intersection will increase for short durations during peak hours. Protected eastbound and westbound left turns in 2030 will result in unacceptable queue lengths (Alternatives 1B and 2B). The supplemental analysis also indicates that changing the lane configuration for the westbound approach to the study intersection could improve traffic operations. Due to the high volume of right turn movements, changing the current configuration of a designated left turn lane and a shared through and right turn lane to instead have a designated right turn lane and shared through and left turn lane should be evaluated. This potential improvement will be addressed during design.

7.6.4 TRANSIT FACILITIES

Transit facilities are enhanced in each improvement alternative over the Do Nothing alternative. Each improvement alternative enhances the existing transit facilities at the intersection by:

- Providing a concrete landing pad for the rear bus door at the southbound bus stop;
- Providing a direct sidewalk connection from the new concrete landing pad to the southwesterly corner of the intersection;
- Adding more bike racks to better support bicycle travel to and from both bus stops;
- Providing a new sidewalk segment from the northbound bus stop to the shopping plaza parking lot

The project team also discussed the possibility of establishing a Park and Ride facility using available parking at either shopping plaza. The owners of the Market 32 Plaza were not interested in pursuing this. Future coordination could happen with the owners of the Shaw's Plaza to understand their interest. This would improve access to the nearby transit stops and intercept vehicle traffic at a key gateway into Burlington.

7.6.5 RIGHT-OF-WAY IMPACTS

Temporary easements during construction would be needed for each of the improvement alternatives. Permanent impacts to right-of-way are not anticipated for any of the improvement alternatives. All improvements were developed to stay within the existing right-of-way.

7.6.6 ENVIRONMENTAL IMPACTS

Alternatives 1A and 1B are not expected to have significant environmental impacts. Transportation air quality modeling was not included in this study and the intersection is not located in an urban center or constrained by large adjacent buildings that would restrict emissions dispersion. However, Alternative 1B



is expected to moderately increase queue lengths due to the increased cycle length associated with adding protected eastbound and westbound left turn phases. That could lead to moderate increases in idling time and associated emissions contributing to local air pollution in the vicinity of the intersection. Alternative 2B is expected to substantially increase queue lengths due to the combination of providing an exclusive pedestrian phase and adding protected eastbound and westbound left turn phases, which could lead to an increase in idling time and associated emissions contributing to local air pollution in the vicinity of the intersection. No other environmental impacts are expected as a result of the improvement alternatives.

7.6.7 CULTURAL RESOURCE IMPACTS

No impacts to cultural resources are expected for any of the alternatives due to prior development in the study area. No historical or archeologically sensitive resources are anticipated, pending completion of the Archeological Resource Assessment (ARA) and Historic Resource Assessment (HRA).

7.6.8 UTILITY IMPACTS

Replacing the existing span wire traffic signal system with a new traffic signal system using mast arm poles and mast arms will require coordination with the individual utility owners during design and construction but are not expected to result in significant impacts.

7.6.9 STORMWATER IMPACTS

Drainage evaluation will be part of the design of any of the improvement alternatives. Modifying curb lines may require relocating existing drainage inlets and adding stormwater treatment. With sufficient evaluation and design, no adverse impacts to water quality will result from construction. Narrowing Farrell Street will reduce impervious surfaces.

7.6.10 PROJECT COSTS

The following table is a summary of the project costs for the proposed improvements. As shown in Table 10, costs are identical among the four alternatives. This is due to the differentiators of alternatives being signal phasing and timing, while all other recommended improvements are included in each of the alternatives. A breakdown of project improvement costs broken out by short term and medium term improvements is presented in Appendix E.



Table 10: Summary of Project Costs

Item	Do Nothing	Alt 1A: Leading Ped Interval (NTOR)	Alt 1B: Leading Ped Interval (NTOR) & Protected EB/WB Left Turns	Alt 2A: Exclusive Ped Interval (NTOR)	Alt 2B: Exclusive Ped Interval (NTOR) & Protected EB/WB Left Turns
Construction Costs	\$0	\$500,000	\$500,000	\$500,000	\$500,000
Design Engineering	\$0	\$100,000	\$100,000	\$100,000	\$100,000
Municipal Project Management	\$0	\$100,000	\$100,000	\$100,000	\$100,000
Construction Engineering	\$0	\$80,000	\$80,000	\$80,000	\$80,000
Total Project Costs	\$0	\$780,000	\$780,000	\$780,000	\$780,000

7.6.11 EVALUATION MATRIX

The following table provides an evaluation matrix summarizing the above information pertaining to project costs, how well each alternative meets the Purpose & Need, operations, safety, right-of-way, environmental, cultural resources, utilities, and stormwater.



Table 11: Evaluation Matrix

CRITERIA	No Build	Alt 1A: LPI (NTOR)	Alt 1B: LPI (NTOR) & Protected EB/WB Left Turns	Alt 2A: Exclusive Ped (NTOR)	Alt 2B: Excl. Ped (NTOR) & Protected EB/WB LT Turns
Construction Costs	\$0	\$500,000	\$500,000	\$500,000	\$500,000
Total Project Costs	\$0	\$780,000	\$780,000	\$780,000	\$780,000
Purpose and Need					
Ped safety in xwalks	No Change	Improved	Improved	Improved	Improved
Ped connectivity	No Change	Improved	Improved	Improved	Improved
EB/WB bike connection	No Change	Improved	Improved	Improved	Improved
Peak travel congestion	No Change	Improved	Unacceptable	Acceptable	Unacceptable
Mitigate crash factors	No Change	Yes	Yes	Yes	Yes
Transit facilities	No Change	Enhanced	Enhanced	Enhanced	Enhanced
Impacts					
Headstart for cyclists	No	Yes	Yes	Less Often	Less Often
Protect peds in xwalk	No Change	Better	Better	Best	Best
Pedestrian delay	No Change	No Change	Longer wait time	Longer wait time	Longer wait time
Traffic Operations	No Change	Improved	Extended Queues	EB/WB Queues	Extended Queues
Safety	No Change	Better for all modes	Better for all modes	Better for all modes	Better for all modes
Right-of-way	No Change	Temp easements	Temp easements	Temp easements	Temp easements
Environmental	No Change	No Impact	Increased idling	No Impact	Increased idling
Cultural Resource	No Change	No Impact	No Impact	No Impact	No Impact
Utilities	No Change	Utility coordination	Utility coordination	Utility coordination	Utility coordination
Stormwater	No Change	No Impact	No Impact	No Impact	No Impact



8 Stakeholder Input and Recommendations

On February 22, 2024, the project team held a Local Concerns Meeting at the City of Burlington Department of Public Works. The meeting was a hybrid format and included the ability for participants to join the meeting online. Public input was received in person, over video conference, and by email. Background information was presented, and the floor was opened to receive input and answer questions. Input is summarized here and provided in the relevant meeting notes and email records in Appendix F. Support was expressed for better pedestrian and bicycle facilities and traffic calming at the intersection. There was concern for fast vehicles, driver impatience, safety and comfort for all users.

On June 17, 2024, the project team held an Alternatives Presentation at the City of Burlington Department of Public Works. The meeting was a hybrid format and included the ability for participants to join online. Background information was reviewed, draft solutions and alternatives were presented, questions were addressed, and feedback was collected. Input is summarized in the relevant meeting notes in Appendix F.

Members of the project team met with adjacent landowners to receive their input, including the two shopping plazas south of the intersection and the Walgreens on the northeasterly corner of the intersection.

The project team met with the project advisory committee on three occasions to receive their input on existing conditions, possible solutions, and final alternatives. Input is summarized in Appendix F.

9 Recommended Alternative

Based on evaluation by the project team, including the City of Burlington, the City of South Burlington, and the CCRPC, with input from the public and the project advisory committee, the project team recommends Alternative 2A, exclusive pedestrian phasing with blank out No Right Turn sign, as the preferred alternative to meet the project Purpose and Need. Alternative 2A is preferred due to greater protection for pedestrians than Alternative 1A and Alternative 1B, and better capacity than Alternative 2B. This will include all short- and medium-term improvements. The project advisory committee voted unanimously to endorse Alternative 2A.

Once the City of Burlington public bodies endorse the recommended alternative, this draft report will be updated to incorporate the approved preferred alternative. Once the final report is accepted, funding will be pursued for detailed design and construction.

