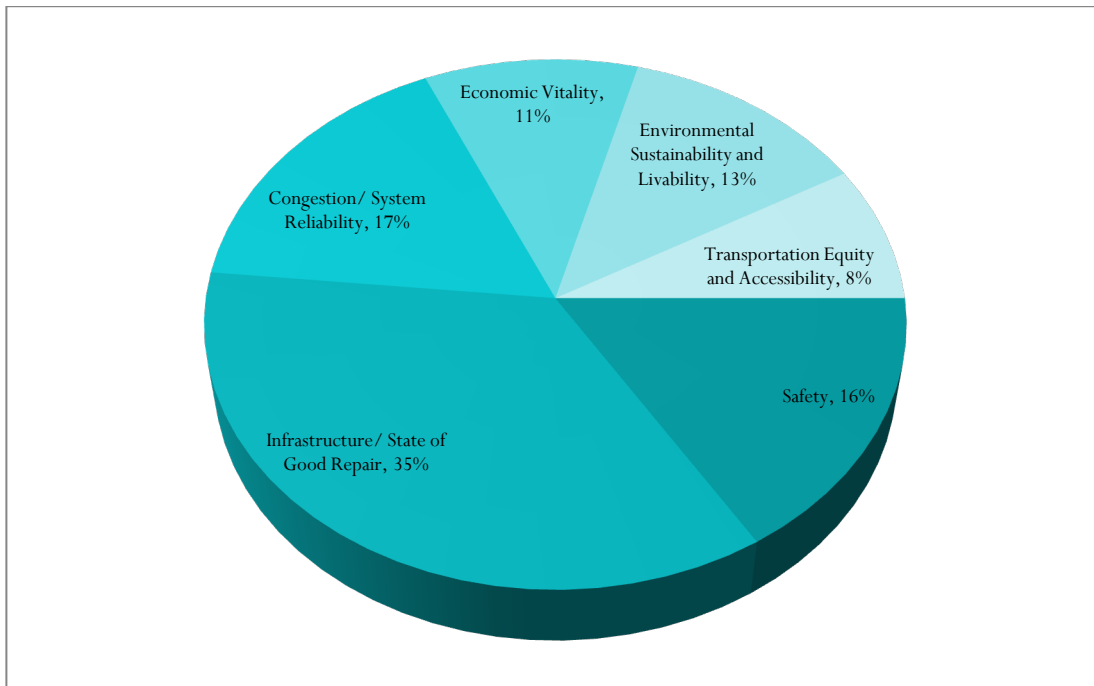


## CHAPTER 15: PLAN RECOMMENDATIONS

The recommendations outlined this Plan have been developed utilizing the goals and objectives, identified needs, and input received during the public participation process. Most of the short range project recommendations are being advanced through the Transportation Improvement Program (TIP), and reflect the priorities of the NMMPO and the local communities. Intermediate and long-term project recommendations reflect future needs uncovered through the planning process, including the input gathered through public meetings, surveys, and input sessions held throughout the region. NMMPO staff also analyzed transportation data and trends to identify transportation needs. Implementation of the recommendations will assist the NMMPO in meeting future goals and objectives by improving operating conditions, reducing delay and congestion, enhancing safety, and increasing the level of service currently provided to area residents on our existing transportation network. Figure 15.1 below shows the percentage of recommended projects that address each of the goals of the Regional Transportation Plan:

**Figure 15.1: Percentage of RTP Recommended Projects by Goals Addressed**



Recommendations are categorized as follows:

- **Ongoing Project Recommendations** include annual routine maintenance and operating costs.
- **Current and Short Range Project Recommendations** contain those projects anticipated to be implemented by 2020. Many of these projects are programmed in the 2016-2019 Transportation Improvement Program.
- **Intermediate Project Recommendations** are comprised of those projects anticipated to be implemented during fiscal years 2021 through 2030.
- **Long-term Project Recommendations** include projects that are anticipated to be implemented in 2031 and beyond. Further study of these projects is needed as most are conceptual at this time. This category also serves as a funding placeholder for projects that have not yet been identified but will be needed in the future to ensure adequate maintenance and rehabilitation of the existing transportation infrastructure.
- **Projects funded outside of the Regional Target** are also identified. Such projects include those funded with Bridge funding or through other discretionary or state programs.

Table 15.1 on the following page contains a list of the recommended projects from the *2012-2035 Regional Transportation Plan* that have either been constructed or are now under construction. The thirteen projects reflect approximately \$51 million in investment in the region's transportation infrastructure and are listed by federal fiscal year.

MassDOT oversees ongoing maintenance, repair and replacement projects for infrastructure on the federal aid system. Many of these projects are funded with statewide, district-wide, federal and state funding. Such projects include the following:

- Pavement resurfacing and rehabilitation;
- Guardrail repair, replacement and upgrade;
- Sign repair, replacement and upgrade;
- Bridge repair and rehabilitation;
- Signal maintenance and upgrades;
- Right-of-way maintenance; and
- Safety improvements.

**Table 15.1: Projects Implemented Since Completion of the 2012 RTP**

Community	Project Type/ Project ID #	Project Description	Cost	Year Complete/ Estimated Year of Completion
Tewksbury	606937	River Rd Reconstruction from Rte 133 to Trull Brook	\$4,412,896	2013
Dunstable	606042	Route 113 Retaining Wall Reconstruction at McGovern's Farm	\$779,712	2014
Chelmsford/ Lowell/Tewksbury	606174	I-495 Resurfacing	\$12,988,685	2014
Lowell	606092	Lowell Connector Lighting Upgrades	\$2,800,000	2014
Westford	604809	Route 110/Boston Rd traffic and safety improvements from Minot's corner to Nixon Rd	\$3,863,035	2015
Dunstable	606302	Main Street over Salmon Brook Bridge Replacement	\$1,287,122	2015
Lowell	NA	Wood St at Middlesex St Intersection Improvements*	\$635,000	2015
Lowell	602139	Route 113 Resurfacing	\$2,134,717	2015
Tewksbury	606238	Route 38 Resurfacing from Lowell T.L. to Astle/Pike St	\$2,079,843	2015
Tewksbury	606298	East St/Dascomb Rd at Shawsheen St Intersection Improvements including new Traffic Signal and bike/ped facilities	\$1,531,236	2016
Billerica	29491	Allen Rd Reconstruction from Webb Brook to Boston Rd	\$6,688,616	2016
Dracut	604907	Arlington St Reconstruction	\$6,630,763	2016
Lowell	604964	VFW Highway at Bridge St and Lakeview Ave traffic and safety Improvements	\$3,209,218	2016
Lowell	604537	Bridge Replacement Market St over Western Canal	\$3,166,017	2016

Source: 2012 Northern Middlesex Regional Transportation Plan and MassDOT Advertising Program

\*Project constructed with City funds

Tables 15.2 to 15.6 on the following pages outline the recommended highway projects for the Northern Middlesex region from 2016 through 2040. It should be noted that the time frame in which a project is listed is simply an estimate, based on the current project readiness and anticipated available funding. Should a project progress through the project development and design process sooner than anticipated, or if a project is delayed for any reason, the NMMPO may amend the RTP and TIP as needed. Most projects in the first time frame are included in the 2016-2019 TIP. The outer year projects have been prioritized using input from community surveys, municipal officials,

business and residential stakeholder meetings, and public input sessions. Other projects have been derived from UPWP Studies (ie.I-495, Rourke Bridge) and the Congestion Management Process (i.e., Drum Hill project). Table 15.7 includes a number of projects anticipated for implementation through 2040 for which the funding source falls outside of the regional target, as previously explained.

The RTP outlines projects and strategies that the region hopes to implement over the next twenty-five years with limited financial resources. Because the RTP is a fiscally constrained document, the project listings reflect the funding targets that were provided to the NMMPO by MassDOT, through a consultative process with FHWA. Total transportation expenditure levels identified within the RTP must not exceed the total revenues reasonably expected to be available for the region over the life of the plan; this includes existing revenues and new revenue sources that are reasonably anticipated.

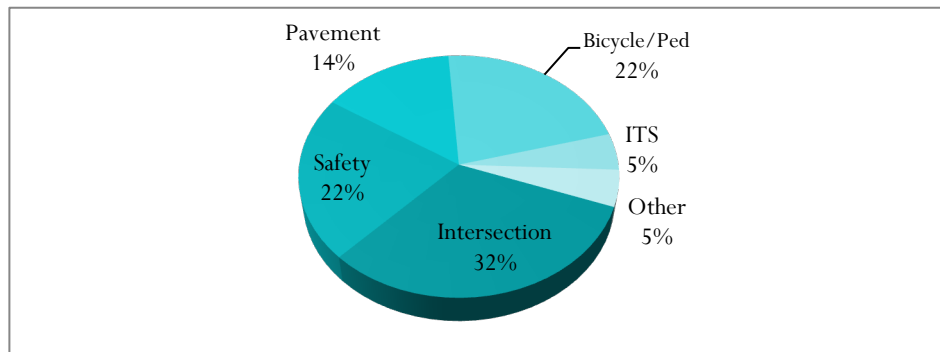
The project cost estimates were developed with the best available information and it anticipated that the costs will need to be adjusted in the future, as each project advances through the project development and design process. Cost estimates have been provided by the local communities, MassDOT, and NMMPO staff. For projects that have not advanced through a design or cost estimating process, estimates were based on projects costs for previous projects with similar scopes.

**Table 15.2: Highway Projects Recommended for 2016 – 2020**

Community	Project Type/ Project ID #	Project Description	Year of Expenditure Cost*
Bedford/Billerica	29492	Middlesex Turnpike Improvements	\$1,000,000
Billerica	608181	Allen Rd Phase II Route 3A intersection	\$3,037,133
Billerica	601426	Reconstruction of Allen Rd (year 2)	\$2,976,437
Billerica	602945	Middlesex Canal Phase I	\$3,694,123
Chelmsford	607401	Traffic Signal Installation at Rte. 110 and I-495	\$1,219,400
Chelmsford	607421	Traffic Signal installation at I-495 and Rte. 4	\$799,497
Chelmsford	Intersection	Improvements to the intersection of Billerica Rd. (Rt. 129) and Riverneck Rd.	\$2,089,367
Dracut	Roadway Reconstruction	Nashua Rd. Improvements between Lakeview Avenue and Tyngsborough Town Line	\$2,313,835
Dunstable	Reconstruction	Route 113 Retaining Wall Phase II Reconstruction	\$787,405
Lowell	606189	Improvement to 4 intersections of Rt. 38	\$2,745,600
Lowell	604694	Intersection improvements at Gorham St. and the Lowell Connector	\$1,560,000
Lowell	605966	Resurfacing of VFW Highway (plus phase II of Pawtucket Falls Overlook Project)	\$6,219,200
Lowell	607752	Intersection improvements at VFW and Aiken and Rte 113 and Mammoth	\$996,067
Tewksbury	Corridor	Route 38 roadway and intersection Improvements Phase I	\$2,339,717
Westford	607251	Intersection improvements to Rte 110 and Tadmuck Rd	\$3,271,140
Westford	608036	Traffic Signal Installation and Intersection Improvements at Rte 40 and Oak Hill Rd	\$1,456,000
Westford	608037	Traffic Signal Installation and Intersection Improvements at Rte 40 and Dunstable Rd	\$1,730,560
<b>Estimated Costs</b>			\$38,432,568
<b>Regional Target</b>			\$40,185,801
<b>Difference</b>			\$1,753,233
<b>* Year of expenditure include a 4% annual cost increase to account for inflation</b>			

Figure 15.2 on the following page breaks out the 2016-2020 projects by project type and shows that 76% of the resources are dedicated to intersection improvements, safety improvements and bicycle/pedestrian projects.

**Figure 15.2: RTP Recommendations by Project Type, 2016-2020**



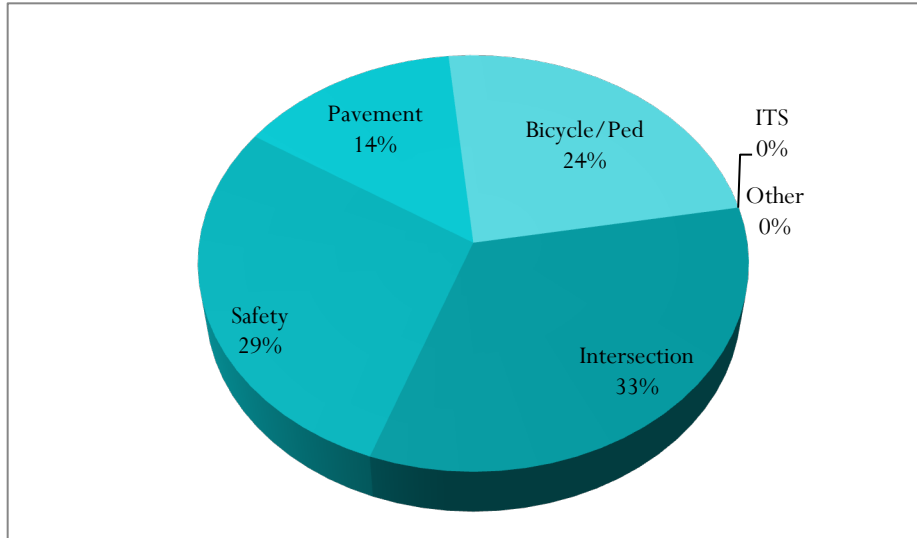
**Table 15.3: Highway Projects Recommended for 2021 – 2025**

Community	Project Type	Project Description	Year of Expenditure Cost*
Billerica	Off Rd Multi-use Trail	Yankee Doodle Bike Path, Design and Construction	\$7,187,012
Billerica	Roadway Reconstruction	Reconstruction of Route 3A from Floyd St to River Rd	\$6,579,659
Billerica	Intersection	Intersection Improvements to Boston Rd/ Glad Valley Dr/ Lexington Rd	\$1,423,312
Chelmsford	Pedestrian Walkway	Brook Walk Pathway in Chelmsford Center	\$6,404,903
Chelmsford	Safety and traffic improvements	Traffic and Safety improvements along Steadman St/Golden Cove Road	\$1,897,979
Chelmsford	Intersection	Intersection improvements at Concord Rd/ Parker Rd/ and Boston Rd	\$1,423,312
Dracut	Intersection	Intersection improvements at Lakeview Avenue and Mammoth Rd. - Signal upgrades and reconfiguration of approaches	\$2,846,624
Dracut	Intersection	Intersection Improvements at Route 113 (Pleasant St) at Route 38 (Bridge St.) and Aiken Avenue	\$1,915,997
Lowell	Intersection	Westford St. and Wilder St. Intersection Improvements	\$426,994
Lowell	Signalization	Installation of Traffic Signals at I -495 Ramps at Woburn St.	\$2,134,968
Westford	Roadway Reconstruction	Main Street roadway reconstruction between Depot Street and Tadmuck Rd.	\$3,421,423
<b>Estimated Costs</b>			\$41,715,467
<b>Regional Target</b>			\$42,298,641
<b>Difference</b>			\$583,174

\* Year of expenditure include 4% annual cost increase

Figure 15.3 below breaks out the 2021-2025 projects by project type and shows that 86% of the resources are dedicated to intersection improvements, safety improvements and bicycle/pedestrian projects.

**Figure 15.3: RTP Recommendations by Project Type, 2021-2025**



**Table 15.4: Highway Projects Recommended for 2026 – 2030**

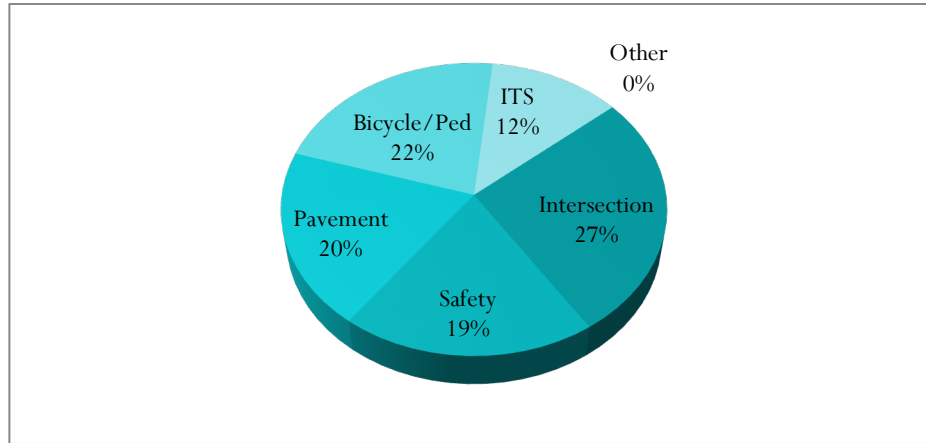
Community	Project Type	Project Description	Year of Expenditure Cost*
Chelmsford	Sidewalks	Installation/Improvement of Sidewalks on Billerica Road (Rt. 129)	\$1,316,074
Chelmsford	Roadway Reconstruction	Reconstruct Westford Street	\$1,308,536
Chelmsford/ Lowell	Safety and Traffic improvements	Safety and traffic flow improvements on Drum Hill Rd./Wood St.	\$3,078,908
Dracut	Signals	Traffic signalization at Loon Hill Rd. and Broadway Rd.	\$3,386,799
Dracut	Intersection	Intersection improvements at Pleasant St. and Lakeview Ave.	\$2,771,017
Dracut	Intersection	Signal and intersection improvements at Rte. 113 (Pleasant St.) at Hildreth St.	\$1,539,454
Lowell	Signals	Upgrade hardware/interconnect signals throughout the CBD	\$9,236,724
Lowell	Signals	Dutton St. Corridor coordination	\$108,057
Lowell	Intersection	Central St./Middlesex St., Appleton /Gorham, Central /Church St. Intersection improvements	\$108,057
Lowell/ Tewksbury/ Billerica	Corridor Improvements	Roadway improvements along Woburn St./Billerica Ave. including sidewalks and pavement markings 1.75 miles	\$2,960,489
Pepperell	Roadway Reconstruction	Route 113 (Townsend St.) Roadway reconstruction	\$4,995,221
Pepperell	Safety and Traffic improvements	Traffic and Safety Improvements in Railroad Square	\$3,463,353
Tewksbury	Corridor Improvements	Route 38 roadway and intersection Improvements Phase III	\$4,502,359
Tewksbury	Corridor Improvements	Route 38 roadway and intersection Improvements Phase II	\$3,202,064
Tewksbury	Intersection	Route 133 at River Rd. Intersection signalization and reconstruction	\$1,039,006
Tyngsborough	Corridor Improvements	Sherburne Avenue Improvements	\$4,618,362
Westford	Westford Town Center	Westford Town Center Improvements	\$3,330,147
Westford	Intersection	Rte. 225/Carlisle Rd. intersection Improvements	\$1,800,944
<b>Estimated Costs</b>			<b>\$52,765,570</b>
<b>Regional Target</b>			<b>\$52,856,555</b>
<b>Difference</b>			<b>\$90,985</b>

\* Year of expenditure include 4% annual cost increase



Figure 15.4 on the following page breaks out the 2026-2030 projects by project type and shows that 89% of the resources are dedicated to intersection improvements, safety improvements, pavement upgrade and bicycle/pedestrian projects.

**Figure 15.4: RTP Recommendations by Project Type, 2026-2030**



**Table 15.5: Highway Projects Recommended for 2031 – 2035**

Community	Project Type	Project Description	Year of Expenditure Cost*
Chelmsford	Road Corridor	Traffic and Safety improvements along Littleton Road	\$2,025,817
Chelmsford	Vinal Square	Vinal Square streetscape Improvements	\$936,491
Chelmsford	Bridge	Meadowbrook Rd. culvert over Stony Brook	\$2,766,019
Dracut	Intersection	Pine Valley and Mammoth Rd. Intersection improvements	\$1,418,072
Dracut	Intersection	Mammoth Rd. at Passaconway Dr. Intersection improvements	\$1,363,530
Dracut	Intersection	Improve safety at the intersection of Salem Rd. and Rt. 113	\$779,160
Dracut	Intersection	Intersection improvements at Hildreth St. and Old Rd.	\$1,053,425
Dunstable	Sidewalks	Main Street Pathway Project	\$973,950
Lowell	Intersection	Pawtucket St. at School St. Intersection improvements	\$3,038,725
Lowell	Intersection	Riverside St. at University Ave. Intersection improvements	\$2,106,849
Lowell	Bridge	Broadway St. Bridge Modifications	\$1,947,900
Lowell	Intersection	Hamilton Canal District Offsite Improvements	\$1,843,493
Lowell	Signals	Merrimack St. Corridor Signal coordination	\$202,582
Tewksbury	Intersection	Salem St. at South St. Intersection improvements	\$2,106,849

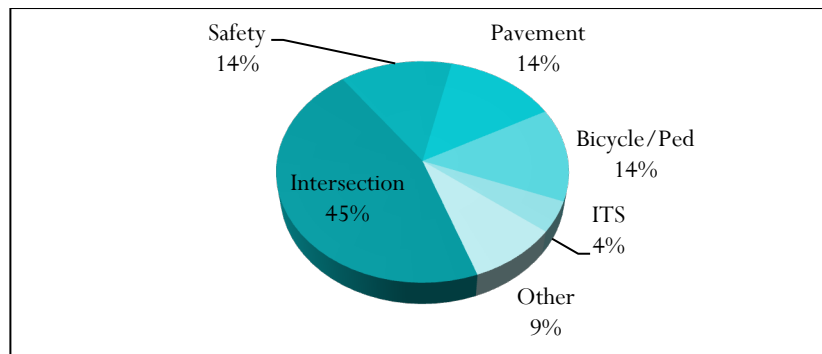
**Table 15.5 Highway Projects Recommended for 2031-2035, Continued...**

Community	Project Type	Project Description	Year of Expenditure Cost*
Westford	Roadway Reconstruction	Bridge St. Roadway and drainage reconstruction	\$1,872,981
Westford	Roadway Widening	Route 110 Roadway Widening	\$7,491,925
Westford	Roadway Reconstruction	Boston Rd. Roadway Reconstruction	\$6,320,548
Westford	Intersection	Westford Schools Intersection Improvements	\$4,213,698
Westford	Roadway Reconstruction	Plain Rd. from Oak Hill Rd. to Moore Rd. Reconstruction with new sidewalks	\$4,213,698
Westford	Bridge	Rte. 40 improvements - Keyes Culvert	\$3,476,301
Westford	Roadway Reconstruction	Forge Village Rd. roadway and drainage reconstruction (Graniteville to Flagg Rd.)	\$3,160,274
Westford	Intersection	Plain Rd./Depot St. Intersection Improvements	\$2,106,849
Westford	Intersection	Rte. 225/Griffin Rd. Intersection Improvements	\$2,106,849
Westford	Intersection	Abbot Rd./Town Farm Rd. Intersection Improvements	\$1,264,110
Westford	Signal	Rte. 27 and Rte. 225 Intersection Signal Upgrade	\$1,012,908
<b>Estimated Costs</b>			<b>\$59,803,003</b>
<b>Regional Target</b>			<b>\$59,850,863</b>
<b>Difference</b>			<b>\$47,860</b>

\* Year of expenditure include 4% annual cost increase

Figure 15.5 breaks out the 2031-2035 projects by project type and shows that 87% of the resources are dedicated to intersection improvements, safety improvements, pavement enhancements and bicycle/pedestrian projects.

**Figure 15.5: RTP Recommendations by Project Type, 2031-2035**

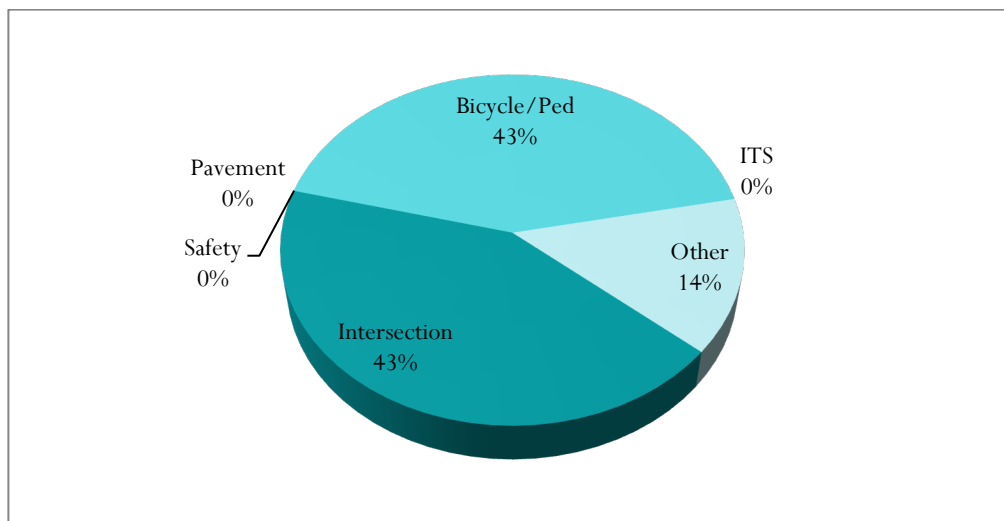


**Table 15.6: Highway Projects Recommended for 2036 – 2040**

Community	Project Name	Project Description	Year of Expenditure Cost*
Chelmsford	Chelmsford Center	Bicycle and Pedestrian safety improvements in Chelmsford Center	\$422,945
Chelmsford	Senior Center Sidewalks	Sidewalks in North Chelmsford at the Senior Center	\$740,600
Chelmsford	Maple St Sidewalks	Sidewalks on Maple St. at the Byam school	\$478,541
Dracut	Intersection	Intersection improvements at Primrose Hill Rd. and New Boston Rd.	\$985,886
Dracut	Intersection	Intersection improvements at Crosby Rd., Cross Rd. and Colburn Rd.	\$710,976
Lowell	Intersection	Father Morrissette Blvd. and Cabot St. intersection improvements	\$710,976
Tewksbury	Lowell Junction	Lowell Junction Interchange Construction on I-93	\$60,387,354
<b>Estimated Costs</b>			\$64,437,277
<b>Regional Target</b>			\$64,476,378
<b>Difference</b>			\$39,101
<b>* Year of expenditure include 4% annual cost increase</b>			

Figure 15.6 below breaks out the 2036-2040 projects by project type and shows that 86% of the resources are dedicated to intersection improvements and bicycle/pedestrian projects.

**Figure 15.6: RTP Recommendations by Project Type, 2036-2040**



**Table 15.7: Recommended Highway Projects Outside of Targets**

Community	Project ID #	Project Description	Anticipated Funding Source	Current Cost Estimate
Billerica	607326	Reconstruction of Rte. 3A at Charnstaffe Lane	MassWorks Grant	\$2,232,000
Chelmsford	607123	Hunt Road Bridge Superstructure replacement over I-495 FFY 2015	Bridge	\$6,337,442
Chelmsford	607681	Route 3A (Gorham St.) Bridge Replacement over I-495	Bridge	\$14,301,345
Chelmsford	605645	Westford Street Bridge Betterment over I-495	Bridge	\$12,851,020
Chelmsford		School St. bridge over Stony Brook	Bridge	\$3,000,000
Chelmsford	607506	Route 4 (North Road) Bridge Superstructure Replacement over I-495	Bridge	\$2,469,917
Lowell	602932	VFW Highway over Beaver Brook	Bridge	\$20,031,350
Lowell	NA	Market Street Bridge rehabilitation over Western Canal	Bridge	\$3,500,000
Lowell	NA	Northbound Lowell Connector over Industrial Avenue Bridge Replacement	Bridge	\$4,500,000
Lowell	NA	Lawrence Street bridge repairs over Concord River	Bridge	\$3,500,000
Lowell	607862	Lord Overpass Reconstruction	Special State Allocation	\$13,287,504
Lowell	NA	Construction of Concord River Greenway through Lowell	Foundation Grant	\$940,800
Lowell	607885	Pedestrian and Bicycle walkway at Pawtucket Falls Overlook from Vandenberg Esplanade to School Street	Statewide CMAQ	\$2,510,921
Lowell	604541	Bridge replacement Bridge St. over Eastern Canal	Bridge	\$2,937,000
Lowell	NA	Beaver Street over Beaver Brook Bridge replacement	Bridge	\$1,000,000
Tewksbury	607534	Mill Street Bridge over the Shawsheen River	Bridge	\$1,167,285
Westford	NA	Bridge St. bridge over Stony Brook	Bridge	\$1,500,000

Table 15.8 below shows recommended highway projects without a known funding source at this time. These projects are likely to be funded through competitive grants, but the grant awards have not been announced. The NHDOT is the proponent of the Exit 36 and Commuter Rail Extension projects.

**Table 15.8: Recommended Highway Projects with no Current Funding Source**

Community	Project ID #	Project Description	Current Cost Estimate
Lowell	NA	Jackson St. Extension to Dutton St.	\$4,600,000
Lowell	607887	Wood Street Extension Bridge (New Rourke Bridge)	\$69,000,000
Lowell	NA	Trolley Extension Project Phase 1a from Gallagher Terminal to Dutton Street	\$20,000,000
Lowell	NA	Trolley Extension Project Phase 1b from the intersection of Father Morrisette Blvd. to Pawtucket Street	\$20,000,000
Lowell	NA	Trolley Extension Project Phase 1c from University Avenue to the intersection of Pawtucket Street and Broadway	\$20,000,000
Lowell	NA	Rehabilitation of 6 Lowell bridges over Canals (TIGER Grant Application Pending)	\$16,737,188
Tyngsborough	NA	Route 3 Exit 36 SB Ramp and Middlesex Rd improvements	\$16,000,000
Tyngsborough	NA	Extension of Commuter Rail to Nashua with new station and area roadway improvements	\$120,000,000
Westford/ Chelmsford/ Lowell/ Tewksbury	NA	I-495 mainline widening from Westford to Tewksbury	\$100,000,000

Table 15.9 below outlines the LRTA transit capital project recommendations for the time period 2016-2040, categorized into five year increments. This information was generated in consultation with the Lowell Regional Transit Authority and MassDOT.

**Table 15.9: LRTA Capital Project Recommendations**

Description	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040
Replacement of Fixed Route Buses	\$5,520,000	\$6,716,000	\$8,172,000	\$9,942,000	\$10,190,550
Paratransit	\$1,679,000	\$1,950,000	\$2,257,000	\$2,616,000	\$2,642,160
Support Vehicles	\$198,000	\$241,000	\$293,000	\$356,000	\$356,000
Preventive Maintenance	\$14,244,000	\$17,330,000	\$21,084,000	\$25,653,000	\$26,294,325
Gallagher Parking Garage Upgrades	\$551,000	\$573,000	\$596,000	\$620,000	\$635,500
100 Hale Street Maintenance Facility Upgrades	\$250,000	\$430,000	\$447,000	\$465,000	\$476,625
Robert B. Kennedy Intermodal Center Upgrade and maintenance	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000
Robert Maguire Facility	\$276,000	\$287,000	\$289,000	\$310,000	\$317,750
Spare parts, equipment and miscellaneous	\$560,000	\$681,000	\$829,000	\$1,009,000	\$1,034,225
Fareboxes and communications	\$500,000	\$500,000	\$500,000	\$750,000	\$768,750
<b>Total</b>	<b>\$24,028,000</b>	<b>\$28,958,000</b>	<b>\$34,717,000</b>	<b>\$41,971,000</b>	<b>\$42,965,885</b>

Table 15.10 below identifies the LRTA operational project recommendations for the time period 2016-2040, categorized in five-year increments. The LRTA operation improvements were developed as part of the 2015 Transit Service Study. A three-phase implementation schedule is anticipated, as detailed in Chapter 6 of this document, entitled Regional Transit System. The phase one projects are anticipated to be cost neutral. Phases two and three will require additional funding, and the projected cost estimates are displayed in Table 15.11 below.

**Table 15.10: LRTA Operations Improvement Recommendations**

Description	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040
Realign Rte 01	Implementation Cost Neutral	No Additional Cost	No Additional Cost	No Additional Cost	No Additional Cost
Realign Rte 02	Implementation Cost Neutral	No Additional Cost	No Additional Cost	No Additional Cost	No Additional Cost
Combine Rte 03 and Rte 15	Implementation Cost Neutral	No Additional Cost	No Additional Cost	No Additional Cost	No Additional Cost
Combine Rte 06 and Rte 09 and Realign (Begins in 2021)		Implantation Cost Neutral	No Additional Cost	No Additional Cost	No Additional Cost
Realign Rte 16 and Rte 17	Implementation Cost Neutral	No Additional Cost	No Additional Cost	No Additional Cost	No Additional Cost
Establish Rte 20	Implementation Cost Neutral	No Additional Cost	No Additional Cost	No Additional Cost	No Additional Cost

**Table 15.11: LRTA Operation Improvements without an Identified Funding Source**

Description	2016- 2020	2021-2025	2026-2030	2031-2035	2036-2040
Initiate Sunday Bus Service (Begins in 2021)	NA	\$6,100,000	\$7,413,000	\$9,019,000	\$10,972,000
Initiate Route 19: Middlesex Road, Tyngsborough & Discontinue Rte 20 (Begins in 2021)	NA	\$305,000	\$371,000	\$451,000	\$549,000

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