

Freight Programmable Projects

draft report

prepared for

Tennessee Department of Transportation

prepared by

Cambridge Systematics, Inc.

draft report

Freight Needs and Project Identification

prepared for

Tennessee Department of Transportation

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1.0 Introduction and Methodology

The purpose of this task is to develop programmable freight projects based on recommendations that have been identified in previous planning studies. This information will be used by the Tennessee Department of Transportation (TDOT) as part of the process for the next round of three-year programming by the agency. Because this effort is focused on programmable freight projects, only highway improvement projects are considered. There are projects across each of the other freight modes – rail, waterways, and air cargo that would also improve goods movement in the state.

This project was divided into four subtasks. Subtask 1 included a review of freight-related projects that were developed in previous planning studies. This consisted of a review of the information utilized to develop the Freight Projects Needs and Prioritization Subtask in 2010. Additionally, the review included freight-related projects which have been identified through recent planning efforts such as the Memphis Metropolitan Planning Organization (MPO) Long Range Transportation Plan (LRTP) and the Chattanooga Regional Freight Study. This subtask developed a short list of the most important freight projects in the state.

In Subtask 2, the list of key freight projects was examined to determine which projects can be broken down into segments that are less than \$50 million to provide for more opportunities for inclusion in the TDOT Programming Process. This included both an engineering and a planning review to determine segments that are both technically feasible and beneficial from a mobility perspective. The engineering review included the development of new costs for a small number of projects. Subtask 3 consisted of a re-prioritization of the programmable segments based on their new utility as smaller pieces. Subtask 4 consisted of the development of a brief report that describes the process utilized for this task, and provides the final list of prioritized programmable projects with estimated costs.

2.0 Project Prioritization

The projects identified, once implemented, would all benefit Tennessee and improve Tennessee's transportation system. However, realistically, not all projects can be implemented at once and therefore a methodology must be established to prioritize the list of projects. This section details the methodology used as well as the result of the prioritization.

2.1 EVALUATION METRICS

The project evaluation process utilizes the same methodology developed for the Freight Project Needs and Identification Task in 2010. It is a multi-attribute weighted evaluation methodology. Five attributes were chosen and assigned a weighting out of 100 percent. The five attributes are: freight congestion relief, safety, ability to enhance/retain/create jobs, environmental impacts, infrastructure "wear and tear" impacts, and number of major freight facilities served. These attributes were selected based on the consultant's review of the most recent long range plan by the Tennessee Department of Transportation. It should be noted that there are multiple project prioritization efforts that are ongoing or being considered for the Tennessee Department of Transportation. Differences in methodology between prioritization efforts can lead to differing project rankings.

Each project was evaluated against each attribute based on a scale of 1 to 5, with 1 being the lowest score, indicating that the project did not achieve the objective of the attribute at all, and 5 being the highest score, indicating that the project achieved to the fullest extent the objective of the attribute. The score for each attribute is then multiplied with its weighting and then added together to achieve an overall score used to rank the projects.

The cost estimate for each project is used to calculate what is being termed a cost-effectiveness ratio. It should be noted that this ratio is not monetary as the benefits are derived from a qualitative assessment rather than a monetized traffic impact.

The projects used for evaluation are not broken down into multiple modes for two main reasons. First, many projects are either multimodal, or impact several modes of transportation, and therefore it is difficult to assign such projects to one mode category. Second, by grouping each of the projects together it emphasizes the intermodal focus of freight projects, which is stated as an important objective in TDOT's Long-Range Transportation Plan.

The attributes chosen for evaluation pivot off of the TDOT Long-Range Transportation Plan's Guiding Principles, as well as the goals and objectives focused on the goods movement sector. Each attribute is discussed below:

- **Freight Congestion Relief (20 Percent)** – This attribute addresses mobility of goods on Tennessee Roadways. This attribute is often addressed by TDOT by adding roadway capacity, building bypasses around urban areas, and providing highway traffic diversion. A high rating will indicate the project will effectively reduce congestion either directly (such as lane widening) or indirectly (such as providing alternative mode of transportation).
- **Safety (20 Percent)** – Maximizing safety and security is stated as a Guiding Principle in TDOT’s LRTP. Specifically for freight, safety includes highway safety, such as safety issues as a result of higher volumes and higher truck percentages. Any project that improves safety either by reducing congestion, improving infrastructure, or diverting freight to a safer mode in terms of crashes per ton-mile will receive a high score.
- **Ability to Enhance/Retain/Create Jobs (20 Percent)** – Supporting the State’s Economy is stated as an important objective. New construction projects that have positive impacts on surrounding areas can lead to creation of more jobs and hence stimulate the economy. Additionally, projects that connect underserved industrial or rural areas to the interstate system also can score well.
- **Environmental Impacts (10 Percent)** – This addresses the Guiding Principle of promoting stewardship of the environment. Projects that divert freight to more efficient modes in terms of emissions or reduce congestion have positive impacts on the environment by lowering emissions of air pollutants. Rail projects therefore receive high scores in this category.
- **Infrastructure “Wear and Tear” Impacts (10 Percent)** – This attribute addresses the Guiding Principle to “preserve and manage the existing transportation system.” System preservation is now seen as more important than system expansion and is important for achieving a sustainable transportation system. Highway and railway maintenance and upgrade projects will receive high ratings in this category. Additionally, diverting freight to modes with the lowest maintenance costs on a ton-mile bases also will score well.
- **Number of Major Freight Facilities Served (10 Percent)** – This addresses the need to connect freight facilities with the freight infrastructure. Projects that improve access to more freight facilities, such as warehouses, distribution centers, rail yards, air cargo airports, and marine ports along with major freight generators and attractors, such as manufacturing areas, should receive high scores.
- **Coordination (10 Percent)** – Finally, no project can be implemented without agency coordination. Therefore, a project that already has been approved, or has received considerable public support will score high in this category.

2.2 LIST OF PRIORITIZED PROJECTS

Table 2.1 shows the complete list of prioritized projects . The projects are sorted based on total benefits. There are several alternative ways of ranking the projects that would change the order of priorities for the state. One alternative would be to rank them based on cost-effectiveness. This would provide a list that focuses on giving the state the biggest bang for the buck in terms of freight-related projects, but it would also tend to focus on smaller projects and not identify large projects that can be transformational in terms of goods movement. Another option would be to find the top projects in each of the four regions to provide regional equity for freight investments in the state.

Table 2.2 shows a short-list of priority freight projects using a mix of total benefits, cost-effectiveness, and regional equity. This list includes two Lamar Avenue projects in the Memphis region, interstate enhancements on truck-intensive segments in the Nashville and Chattanooga regions, and industrial park access in the Knoxville region. This list includes both small and large projects, projects in each of the regions, and projects that are appropriately sized to be placed into the next TDOT short range transportation plan.

Table 2.1 Tennessee Freight Priority Project List

Initial Rank	Evaluation Measure Weighting Scale	Project Ready for Programming?	In MPO LRTP?	Cost Estimate	Freight Congestion Relief	Safety	Ability to enhance/retain/ Create jobs	Environmental Impacts	Infrastructure "Wear and Tear" Impacts	Number of major freight facilities served	Coordination	Overall Score	Cost-Effectiveness Ratio	Region	Source
		(Y/N)?	(Y/N/n/a)?	(\$ mils)	20%	20%	20%	10%	10%	10%	10%	100%			
					1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5			
1	Lamar Avenue (U.S. 78) - Interchange at Holmes Road	Y	Y	33.0	5	3	5	4	1	5	5	4.10	12.4	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
2	Lamar Avenue (U.S. 78) - New Interchange at Winchester Road	Y	Y	94.2	5	3	5	4	1	5	5	4.10	4.4	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
6	Holmes Road Corridor Improvements - Kirby Parkway to Riverdale Road	Y	Y	18.6	4	4	5	3	1	5	5	4.00	21.5	4	Memphis Chamber
7	Holmes Road Corridor Improvements - Riverdale Road to Hacks Cross Road	Y	Y	37.5	4	4	5	3	1	5	5	4.00	10.7	4	Memphis Chamber
5	Lamar Avenue (U.S. 78) - Widening Shelby Drive (SR 175) to Raines Road	Y	Y	43.2	5	3	5	3	1	5	5	4.00	9.3	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
4	Lamar Avenue (U.S. 78) - Widening Raines Road to SR 176	Y	Y	48.7	5	3	5	3	1	5	5	4.00	8.2	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
8	Holmes Road Corridor Improvements - Reynolds to Byhalia	Y	Y	50.7	4	4	5	3	1	5	5	4.00	7.9	4	Memphis Chamber
10	Holmes Road Corridor Improvements - Hacks Cross Road to Reynolds	Y	Y	66.2	4	4	5	3	1	5	5	4.00	6.0	4	Memphis Chamber
9	Holmes Road Corridor Improvements - Byhalia to U.S. 72	Y	Y	71.2	4	4	5	3	1	5	5	4.00	5.6	4	Memphis Chamber
3	Lamar Avenue (U.S. 78) - New Interchange at Shelby Drive (SR 175)	Y	Y	215.5	5	3	5	3	1	5	5	4.00	1.9	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
11	Lamar Avenue (U.S. 78) - Interchange at Stateline Road	Y	Y	49.8	4	3	5	4	1	5	5	3.90	7.8	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
16	Lamar Avenue (U.S. 78) - Widening Semmes Street to American Way	Y	Y	19.8	4	3	5	3	1	5	5	3.80	19.2	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
14	Lamar Avenue (U.S. 78) - Widening Goodman Road to State Line Road	Y	Y	46.5	4	3	5	3	1	5	5	3.80	8.2	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
13	Lamar Avenue (U.S. 78) - Widening State Line Road to SR 175	Y	Y	47.6	4	3	5	3	1	5	5	3.80	8.0	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
12	Lamar Avenue (U.S. 78) - Hacks Cross Road to Goodman Road	Y	Y	63.0	4	3	5	3	1	5	5	3.80	6.0	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
15	Lamar Avenue (U.S. 78) - Widening I-269 to Hacks Cross Road (MS)	Y	Y	66.2	4	3	5	3	1	5	5	3.80	5.7	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
18	I-275 Industrial Park Access Improvements - improve RR underpass and make access improvements	Y	Y	5.5	3	4	4	2	1	5	5	3.50	63.6	1	Knoxville LRTP
17	I-40/I-75 from I-140 to Lovell Road (SR 131) - add full auxiliary lane	Y	Y	1.2	5	3	3	3	1	4	5	3.50	291.7	1	Knoxville LRTP
22	Complete ADHS Corridor J	Y	N	411.0	3	4	4	1	3	2	5	3.30	0.8	2,3	Appalachian Regional Commission
19	I-75 Widening - U.S. 64 to U.S. 74	Y	Y	82.5	4	3	3	2	2	4	5	3.30	4.0	2	I-75 Corridor Feasibility Study, VW Plant Study, Cleveland MPO LRTP
21	I-240 and Poplar Interchange Improvements - off ramp to Yates	Y	Y	1.7	4	3	2	3	3	5	4	3.30	194.1	4	Memphis Chamber
20	I-240 and Poplar Interchange Improvements - add one through lane per direction	Y	Y	6.2	4	3	2	3	3	5	4	3.30	53.2	4	Memphis Chamber
23	I-240 midtown widening and interchange improvement	Y	Y	225.1	4	3	2	3	1	5	5	3.20	1.4	4	Memphis Chamber
24	I-40/I-81 Interchange/lengthen ramps	Y	Y	1.5	3	4	3	3	1	3	5	3.20	213.3	1	Knoxville LRTP
26	I-75/I-640/I-275 Interchange Improvements	Y	Y	25.4	4	3	3	2	1	4	5	3.20	12.6	1	I-75 Corridor Feasibility Study, Knoxville LRTP
27	I-65 Widening from SR 96 to Saturn Parkway	Y	Y	27.2	4	3	3	2	1	4	5	3.20	11.8	3	Nashville Freight Project List
28	I-65 Widening from SR 255 to I-40	Y	Y	60.3	4	3	3	2	1	4	5	3.20	5.3	3	Nashville Freight Project List
25	I-75 Widening - I-40/I-75 Junction to Pellissippi Parkway	Y	Y	241.6	4	3	3	2	1	4	5	3.20	1.3	1	I-75 Corridor Feasibility Study, Knoxville LRTP
30	Widen U.S. 72 (Poplar Avenue) between SR 57 (actually Collierville Arlington Road) to SR 385 from 2 to 5 lanes	Y	Y	13.1	3	3	2	3	3	5	4	3.10	23.7	4	Memphis Chamber
29	I-240 from Poplar Avenue to Walnut Grove Road (Memphis) - Widen 6 to 8 lanes	Y	Y	54.5	5	2	2	2	1	5	5	3.10	5.7	4	Memphis MPO
32	Lebanon Road Widening to 4 lanes - Park Glen Drive to Hwy 109	Y	Y	90.0	3	3	3	1	1	5	5	3.00	3.3	3	Nashville Freight Project List
38	Widen U.S. 11W in Kingsport from 4 to 6 lanes	Y	Y	31.6	5	3	3	3	1	3	1	3.00	9.5	1	Congestion Analysis (Chapter 4)
31	Widen U.S. 72 (Poplar Avenue) between SR 385 to SR 196 from 2 to 5 lanes	Y	Y	11.0	3	3	2	3	3	4	4	3.00	27.3	4	Memphis Chamber
33	Statewide Truck Parking Facilities	Y	N	33.0	1	5	2	5	5	1	3	3.00	9.1	1,2,3,4	Tennessee Trucking Association
34	I-75 Widening - SR 68 to Oakland Road (SR 322)	Y	n/a	6.0	4	3	3	2	1	4	3	3.00	50.0	1	I-75 Corridor Feasibility Study
35	SIA Road for VW (Industrial Access Road) - Enterprise Boulevard to SR 58	Y	Y	12.5	3	2	5	1	1	4	4	3.00	24.0	2	Chattanooga LRTP, VW Plant Study
43	Widen I-40 to 8 lanes from SR 300 (Exit 3) to Chelsea Avenue	Y	Y	30.1	5	2	3	2	1	5	1	2.90	9.6	4	Freight Scan (I-40/I-81 Corridor Study)
42	Widen I-40 from 4 to 8 lanes from Mt. Juliet Road (Exit 226) to SR 840 (Exit 235) - 2 HOV lanes	Y	Y	66.2	5	2	3	2	1	5	1	2.90	4.4	3	Freight Scan (I-40/I-81 Corridor Study), Nashville LRTP

Initial Rank	Evaluation Measure Weighting Scale	Project Ready for Programming?	In MPO LRTP?	Cost Estimate	Freight Congestion Relief	Safety	Ability to enhance/retain/ Create jobs	Environmental Impacts	Infrastructure "Wear and Tear" Impacts	Number of major freight facilities served	Coordination	Overall Score	Cost-Effectiveness Ratio	Region	Source
		(Y/N)?	(Y/N/n/a)?	(\$ mils)	20%	20%	20%	10%	10%	10%	10%	100%			
					1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5			
41	I-75 Widening - GA State Line to Ringgold Road	Y	Y	13.4	4	3	3	3	1	4	1	2.90	21.6	2	Chattanooga LRTP, Chattanooga Freight Study
59	I-75 Extend accel and decel lanes at truck weigh station	Y	Y	1.0	4	3	3	2	1	4	1	2.80	280.0	1	I-75 Corridor Feasibility Study, Knoxville LRTP
54	I-75 Widening - Cherry Bottom Road (SR 116) to Campbell County	Y	n/a	11.1	4	3	3	2	1	4	1	2.80	25.2	1	I-75 Corridor Feasibility Study
55	I-75 Widening - Anderson County to SR 63 (U.S. 25W)	Y	n/a	74.3	4	3	3	2	1	4	1	2.80	3.8	1	I-75 Corridor Feasibility Study
56	I-75 Widening - Raccoon Valley Road (SR 170) to Andersonville Hwy (SR 170)	Y	n/a	82.9	4	3	3	2	1	4	1	2.80	3.4	1	I-75 Corridor Feasibility Study
58	I-75 Widening - Emory Road (SR 131) to Raccoon Valley Road (SR 170)	Y	Y	82.9	4	3	3	2	1	4	1	2.80	3.4	1	I-75 Corridor Feasibility Study, Knoxville LRTP
57	I-75 Widening - Andersonville Hwy (SR 170) to Cherry Bottom Road (SR 116)	Y	n/a	111.9	4	3	3	2	1	4	1	2.80	2.5	1	I-75 Corridor Feasibility Study
60	I-75 Widening - Pond Creek Road (SR 323) to I-40/I-75 Junction	Y	n/a	173.8	4	3	3	2	1	4	1	2.80	1.6	1	I-75 Corridor Feasibility Study
36	I-75 @ I-24 Interchange in Chattanooga	Y	Y	21.6	5	4	1	1	1	3	3	2.80	13.0	2	Tennessee Trucking Association, Chattanooga Freight Study, I-75 Corridor Feasibility Study
61	Four-lane Bonny Oaks Road	Y	Y	43.3	3	2	5	1	1	3	3	2.80	6.5	2	VW Plant Study
37	Plough Boulevard and Winchester Road interchange design completion	Y	Y	30.2	2	4	1	1	2	5	5	2.70	8.9	4	Memphis Chamber
39	I-40 @ I-240 Interchange East of Memphis (construct new flyover ramp)	Y	Y	16.2	4	2	2	1	1	4	5	2.70	16.7	4	Memphis MPO, Tennessee Trucking Association
40	I-55 @ Crump Boulevard. (Memphis) Interchange Modification	Y	Y	37.4	4	2	2	1	1	4	5	2.70	7.2	4	Memphis MPO
45	I-75 Truck Climbing Lanes - MP 131.3 to 132.3	Y	n/a	4.1	4	5	1	1	1	3	2	2.70	65.9	1	I-75 Corridor Feasibility Study
46	I-75 Truck Climbing Lanes - MP 142.7 to 143.8	Y	n/a	4.6	4	5	1	1	1	3	2	2.70	58.7	1	I-75 Corridor Feasibility Study
47	I-75 Truck Climbing Lanes - MP 155.0 to 157.5	Y	n/a	12.4	4	5	1	1	1	3	2	2.70	21.8	1	I-75 Corridor Feasibility Study
48	I-75 Truck Climbing Lanes - MP 129.0 to 130.1	Y	n/a	14.1	4	5	1	1	1	3	2	2.70	19.1	1	I-75 Corridor Feasibility Study
53	I-40 Truck Climbing Lanes Memphis to Nashville - MP 149 - Add WB lane	Y	N	20.3	4	5	1	1	1	3	2	2.70	13.3	3,4	Freight Scan (I-40/I-81 Corridor Study)
50	I-40 Truck Climbing Lanes Memphis to Nashville - MP 189 - Add EB lane	Y	N	21.6	4	5	1	1	1	3	2	2.70	12.5	3,4	Freight Scan (I-40/I-81 Corridor Study)
44	Hacks Cross Road - Widening Stateline Road to SR 175 (Shelby Drive)	Y	Y	22.0	4	2	2	2	2	4	3	2.70	12.3	4	Memphis Chamber
52	I-40 Truck Climbing Lanes Memphis to Nashville - MP 180 - Add EB lane	Y	N	28.7	4	5	1	1	1	3	2	2.70	9.4	3,4	Freight Scan (I-40/I-81 Corridor Study)
51	I-40 Truck Climbing Lanes Memphis to Nashville - MP 186 - Add WB lane	Y	N	30.1	4	5	1	1	1	3	2	2.70	9.0	3,4	Freight Scan (I-40/I-81 Corridor Study)
49	I-40 Truck Climbing Lanes Memphis to Nashville - MP133 - Add WB lane	Y	N	31.1	4	5	1	1	1	3	2	2.70	8.7	3,4	Freight Scan (I-40/I-81 Corridor Study)
62	Enterprise Parkway (New Alignment) - Hickory Valley Road to 1 mile south of Hwy 58	Y	Y	6.7	2	1	4	1	1	5	5	2.60	38.8	1	Chattanooga LRTP, VW Plant Study
63	Hickory Valley Road Widening - Enterprise Parkway Extension to Hwy 58	Y	Y	9.9	2	1	4	1	1	5	5	2.60	26.3	1	Chattanooga LRTP, VW Plant Study
64	SR 78 and Inland Port Highway Accessibility, Port of Cates Landing	Y	Y	19.4	2	1	2	1	4	4	3	2.20	11.3	4	Memphis Chamber

Table 2.2 Tennessee Freight Priority Project Short-List

Rank	Evaluation Measure Weighting Scale	Project Ready for Programming?	In MPO LRTP?	Cost Estimate	Freight Congestion Relief	Safety	Ability to enhance/retain/Create jobs	Environmental Impacts	Infrastructure "Wear and Tear" Impacts	Number of Major Freight Facilities Served	Coordination	Overall Score	Cost-Effectiveness Ratio	Region	Source
		Y/N	Y/N/n/a	\$M	20%	20%	20%	10%	10%	10%	10%	100%			
1	Lamar Avenue (U.S. 78) – Interchange at Holmes Road	Y	Y	33.0	5	3	5	4	1	5	5	4.10	12.4	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
2	Lamar Avenue (U.S. 78) – New Interchange at Winchester Road	Y	Y	94.2	5	3	5	4	1	5	5	4.10	4.4	4	Memphis Chamber, Memphis MPO, Congestion Analysis (Chapter 4)
17	I-40/I-75 from I-140 to Lovell Road (SR 131) – add full auxiliary lane	Y	Y	1.2	5	3	3	3	1	4	5	3.50	291.7	1	Knoxville LRTP
18	I-275 Industrial Park Access Improvements – improve railroad underpass and make access improvements	Y	Y	5.5	3	4	4	2	1	5	5	3.50	63.6	1	Knoxville LRTP
19	I-75 Widening – U.S. 64 to U.S. 74	Y	Y	82.5	4	3	3	2	2	4	5	3.30	4.0	2	I-75 Corridor Feasibility Study, VW Plant Study, Cleveland MPO LRTP
24	I-40/I-81 Interchange/lengthen ramps	Y	Y	1.5	3	4	3	3	1	3	5	3.30	213.3	1	Knoxville LRTP
26	I-75/I-640/I-275 Interchange Improvements	Y	Y	25.4	4	3	3	2	1	4	5	3.30	12.6	1	I-75 Corridor Feasibility Study, Knoxville LRTP
27	I-65 Widening from SR 96 to Saturn Parkway	Y	Y	27.2	4	3	3	2	1	4	5	3.30	11.8	3	Nashville Freight Project List
28	I-65 Widening from SR 255 to I-40	Y	Y	60.3	4	3	3	2	1	4	5	3.30	5.3	3	Nashville Freight Project List