



2 – Implementation Plan

The purpose of an implementation plan is to present a schedule for implementing the recommendations made by the Buckland Area Transportation Study. The recommended alternatives are most likely to yield significant amounts of improvements to the performance of roadways and enhance the quality of life.

2.1 Right of Way Impacts

The Right of Way impact analysis was conducted to quantify the total number of properties impacted, the type of property and the total number of potential relocations. The proposed alternatives were graphically overlain on the parcel data obtained from CRCOG. Please refer to Appendix E for the Right of Way impacts of recommended alternatives.

The following Table 2-1 shows the Right of Way impact of the proposed improvements.

TABLE 2-1: RIGHT OF WAY IMPACTS

	Type of property			
	Residential		Commercial	
	South Windsor	Manchester	South Windsor	Manchester
Number of properties impacted	2	6	1	19
Number of potential relocations	2	0	0	6

2.2 Constructability Review

Constructability is not anticipated to be an issue for the implementation of the proposed improvements. A review of the concept plans did not reveal any issues that would be considered “fatal flaws” to prevent the project from going to design. The impacts to the existing highways, ramps and frontage roads from the proposed improvements should be minimized through typical Maintenance and Protection of Traffic during construction (signalization, lane shifts, lane closures, brief highway closures, staging and temporary supports/bents.) The construction is not expected to require specialty or unusual work, relative to the types of proposed improvements, which will result in higher construction costs. Traffic mobility and construction work zone safety can be achieved through preparation of Transportation Management Plans with appropriate strategies for all of the improvements as they progress through the design process.



The proposed improvements are described below as they were prioritized during Planning Workshop No. 7 held on 16 December 2008. The constructability challenges and some of the potential solutions are identified for the individual improvements.

Although, not part of the Buckland Transportation Study, improvements to the intersection of Oakland Street, Tolland Turnpike (Route 30) and I-84 EB ramps is currently in the design stage. Implementation of the improvements is a high priority to the Buckland Transportation Study stakeholders. Constructability review of this project will be done independently of the Buckland Transportation Study.

2.2.1 Study High Priority Improvements

2.2.1.1 Redstone Road Extension and Exit Ramp to I-291

I-84 Eastbound exit 62: modify the existing off-ramp to provide access from the existing ramp to proposed structures over Buckland Street and over the eastbound on-ramp to I-84.

- Investigate existing drainage systems in the vicinity of the proposed ramp and structures.
- The southwesterly limit of the proposed improvements extends into an Aquifer Protection Area. The construction of these improvements should comply with the Best Management Practices (BMPs) recommended by the Town of Manchester/CTDEP.
- Erection of the bridge superstructure at Buckland Street will require temporary lane closures or detours on Buckland Street, with the potential for mandatory nighttime construction.
- Erection of the bridge superstructure over the I-84 eastbound on-ramp from Buckland Street will require temporary ramp closures or detours, with the potential for mandatory nighttime construction.

Continue the service road adjacent to eastbound I-84 to connect to the proposed extension of Redstone Road with an at-grade intersection.

- Retaining walls may be required to minimize the impacts to private property which contain commercial and residential developments, and to allow for an at-grade connection to the extension of Redstone Road.

Extend existing Redstone Road to intersect with the proposed service road from the I-84 eastbound exit 62, and continue Redstone Road over I-84 and the westbound frontage roads with a new overpass. On the west side of the overpass an on-ramp to I-84 westbound is also proposed from an at-grade intersection with Redstone Road.

- The extension of Redstone Road will impact existing commercial and residential developments.



- The terrain between the end of the current Redstone Road and the proposed at-grade intersection with the exit 62 eastbound connector and the proposed I-84 overpass will require the Redstone Road extension to have a steep grade. Retaining walls will be required to minimize the impacts to private property which contain commercial and residential developments.
- The proposed structure spanning I-84 and the proposed service lanes and reconfigured exit 62 westbound off-ramp will require traffic shifts on I-84 for the erection of temporary supports and for the realignment of the I-84 westbound off-ramp at exit 62. Temporary lane closures will be required for the erection of the superstructure. This structure should be constructed prior to another proposed improvement to construct auxiliary lanes in this area by utilizing the shoulders and separator between the HOV and through lanes of I-84.
- The elevation of the terrain north of I-84, where the extension of Redstone Road is proposed, is higher than the travel lanes on I-84 by forty (40) feet at the highest point. The high point elevation matches the elevation of the mall ring-road at the intersection with the Wal-Mart driveway. A balance must be achieved during the design process to obtain suitable grades on the proposed roadways, while meeting the critical touchdown points on the existing roadways.

Redstone Road continues to Buckland Hills Drive between the ring-road at “The Shops at Buckland Hills and Wal-Mart. Potential solutions to connect the retail parcels with Redstone Road include at-grade intersections, ramps to access elevated roadways and combinations of various design elements.

- Any construction activity that impacts the retail establishments should be coordinated with the management companies. Major disruption to circulation roadways should be done during non-peak shopping periods.
- Construction activity in the vicinity of Buckland Hills Drive is adjacent to a residential neighborhood that has been identified as a noise sensitive receptor. Construction activity would be subject to the limitations of the local noise ordinance and the Federal Highway Administration’s Noise Abatement Criteria.
- An existing pedestrian/bicycle walkway connects Buckland Hills Drive with the pedestrian walkways inside the retail area. The design plans for the extension of Redstone Road to Buckland Hills Drive should maintain or improve pedestrian and bicycle access through the area.
- The most direct connection (as shown on schematic drawings in this report) will impact one or more of the restaurant parking areas (Red Robin & Smokey Bones) between the mall ring-road and Buckland Hills Drive.
- Bus Routes in this area will be impacted by the proposed extension of Redstone Road and construction must be reviewed and coordinated with CT Transit.

Retail Connections from Buckland Hills Drive

- If Redstone Road is extended to a signalized intersection with Buckland Hills Drive with improvements on Buckland Hills Drive to the Wal-Mart entrance to



- the north and the entrance to The Shops at Buckland Hills to the south, impacts to the retail space can be substantially reduced.
- The Redstone Road extension will cross just north of the intersection of the mall ring-road with the connection driveway to Wal-Mart. The elevations and alignments of existing and proposed roadways will require changes to the current roadway configuration. Alternatives will be identified during the preliminary design (including elimination of the inter-connection between The Shops at Buckland Hills and Wal-Mart) and should be discussed with all stakeholders.

Redstone Road Connections with Existing Retail Circulation Roadways

- If Redstone Road is constructed over (or under) the existing connection between The Shops at Buckland Hills and Wal-Mart, connections to Redstone Road from the roadways within the retail area may be considered. Connecting ramps will have greater impacts on the retail parcels because of the land needed for the construction of the connecting ramps.

In conjunction with the improvements at Redstone Road, Study Priority #1 includes changing the location of where vehicles access I-291 westbound from I-84 westbound. The existing I-84 westbound ramp to I-291 will be closed and I-291 traffic will be directed to take westbound exit 62 (Westbound Frontage Road). A connection will be made from the Westbound Frontage Road to I-291 westbound.

- The design will need to address potential impacts to existing lighting and overhead sign supports at the new exit for I-291, as well as at the connection from the westbound frontage road to the ramp for I-291.
- The design will need to address potential impacts to existing storm drainage at the proposed connection from the westbound frontage road to the ramp for I-291.
- The proposed connection between the westbound frontage road and the I-291 on-ramp will require traffic shifts on I-84 and the westbound frontage roads. Temporary closures of the westbound frontage road and the I-291 on-ramp from westbound I-84 will also be necessary during the transition from the existing to the proposed access to I-291.
- The proposed improvement is within the limits of an Aquifer Protection Area, as shown in Figure 4-1C of the Technical Memorandum No. 1-Existing and Future Conditions Report, dated November 2, 2006.

2.2.1.2 Access Improvement at I-84 WB off-ramp, exit 63

A new off-ramp from I-84 westbound will be provided for traffic exiting to travel northbound on Route 30 (Deming Street). The ramp will merge onto Route 30 between I-84 and McIntosh Drive. Access to McIntosh Drive will be considered during the preliminary design phase.



- Construction activity in the vicinity of McIntosh Drive, a residential neighborhood, which has been identified as a noise sensitive receptor. This project would be subject to the limitations of the local noise ordinance and the Federal Highway Administration's Noise Abatement Criteria.
- Access to McIntosh Drive during and after construction of the westbound off-ramp from I-84 to Route 30 northbound needs to be investigated during the preliminary engineering phases of the project and discussed with the stakeholders.

Note: Figure 4-5B (Noise Sensitive Receptors) of the Technical Memorandum No. 1-Existing and Future Conditions Report dated November 2, 2006 does not identify the McIntosh Drive Neighborhood as a residential neighborhood.

- Traffic shifts on I-84 westbound and on Route 30 (Deming Street) northbound will be required to separate the work zone from the existing travel lanes.

The existing I-84 westbound off-ramp to northbound/southbound Route 30 (Deming Street) will be converted to an exit ramp for traffic traveling southbound (only) on Route 30 (Deming Street). This will be achieved through modifications to the ramp and signal configuration where it meets with Route 30.

- Traffic shifts on the existing I-84 westbound off-ramp at exit 63 and on Route 30 (Deming Street) southbound will be required to separate the work zone from the existing travel lanes.
- The proposed improvements fall within the zone of potential Critical Habitats as shown in Figure 4-3B of the Technical Memorandum No. 1-Existing and Future Conditions Report, dated November 2, 2006. The proposed alignment passes through a natural diversity database area. The Natural Diversity Data Base has records of species listed by the State, pursuant to section 26-306 of the Connecticut General Statutes, as endangered, threatened or special concern in the project area. The DEP Wildlife Division should be consulted during future planning and design for the project; they will assess potential impacts to listed species and provide recommendations to avoid or minimize impacts.

2.2.1.3 Transit Center and HOV ramps

Improved access to the proposed transit center which is to be located in the commuter parking lot between I-84, Buckland Street and Pleasant Valley Road has three potential improvements. The main element of this improvement will provide a direct connection with the existing HOV lanes on I-84 through the construction of a fly-over ramp from the HOV Lanes to the existing access ramp for Pleasant Valley Road and the westbound frontage road. The existing HOV off-ramp to Buckland Street will be eliminated as part of this improvement.

Construct a new merge with westbound HOV from the proposed flyover and construct a new exit from eastbound HOV to the proposed flyover.



- The construction of the proposed HOV connections will require traffic shifts on I-84 and the HOV lanes in both the eastbound and westbound directions. Temporary closures of the HOV on-ramp and off-ramp at Buckland Street will be necessary to construct the proposed connections.
- Sign supports, catch basins and other storm drainage structures must be reviewed during the design of the auxiliary lanes.
- These improvements are located within the limits of an Aquifer Protection Area. The construction of these improvements should comply with the Best Management Practices (BMPs) recommended by the Town of Manchester/CTDEP.

Construct a new structure over westbound I-84 and the westbound frontage road.

- The construction of the proposed fly-over structure for the HOV connections will require traffic shifts on I-84 and the HOV lanes in both the eastbound and westbound directions. Temporary closures of the HOV on-ramp and off-ramp at Buckland Street will be necessary.
- Erection of the bridge superstructure over I-84 westbound will require temporary lane closures, with the potential for mandatory nighttime construction.
- These improvements are located within the limits of an Aquifer Protection Area. The construction of these improvements should comply with the Best Management Practices (BMPs) recommended by the Town of Manchester/CTDEP.

Widen the existing connection roadway between Pleasant Valley Road and the Westbound Frontage Road entrance and exit for new connection to the I-84 HOV lanes.

Close the existing HOV on/off ramp with Buckland Street.

- The construction associated with the closure of the existing HOV exit to Buckland Street will require traffic shifts on the I-84 HOV lanes in both the eastbound and westbound directions.

2.2.2 Study Priority Improvements

2.2.2.1 Auxiliary Lanes between Exits 62 & 63

Utilizing the existing right-of-way, auxiliary lanes between exit 62 and exit 63 can be constructed by reallocation of the space available for travel lanes, shoulders and the separator between the HOV lanes and the main traffic lanes. Service lanes that were proposed between Exit 63 and Exit 64 were removed from a proposed project and can be combined into a single project to provide auxiliary lanes between exit 62 and exit 64.



- The construction of the proposed auxiliary lanes will require traffic shifts on I-84 and the HOV lanes in both the eastbound and westbound directions. Temporary closures of on-ramps and off-ramps will also be necessary during the transitions between various stages of construction.
- Sign supports, catch basins and other storm drainage structures must be reviewed during the design of the service lanes.
- Elimination of the drainage swale between the HOV and other travel lanes will require a new gutter flow analysis for the conditions during construction and for the final roadway cross-section to ensure flooding will not occur during the design storm event.
- Residential areas, which have been identified as noise sensitive receptors, are located adjacent to the highway right-of-way. This project would be subject to the limitations of the local noise ordinance and the Federal Highway Administration's Noise Abatement Criteria.

2.2.2.2 Single Point Urban Interchange (SPUI) at the intersection of Buckland Street, Pleasant Valley Road and Buckland Hills Drive

The third element of the improvements associated with the transit center is the creation of a Single Point Urban Interchange (SPUI) at the intersection of Buckland Street, Pleasant Valley Road and Buckland Hills Drive. The bridge on Pleasant Valley Road will carry through traffic over Buckland Street and a single, three-phase signal will control the movement of traffic on Buckland Street and ramps to-and-from the bridge.

The Advisory Committee decided to assess the feasibility of a SPUI in the future depending upon the need for further improvements.

- Impacts to existing sidewalk and bicycle paths
- Unstable rock on both sides of Buckland Hills Drive that has been stabilized through mechanical rods and other methods.
- This southern approach of this improvement is located within limit of an Aquifer Protection Area. The construction of these improvements should comply with the Best Management Practices (BMPs) recommended by the Town of Manchester/CTDEP

2.2.2.3 Realignment of Pleasant Valley Road at the connection to the Frontage Road to I-84 westbound, with a connection to the proposed Transportation Center

Provide a connection to the proposed transit center by realigning the intersection of Pleasant Valley Road and the connector to the Frontage Road to I-84 westbound to form a four-way intersection. The fourth leg of the intersection will serve as the access to the future transit center.



- Relocation of the intersection will have a substantial impact on the two existing eating establishments that are currently located at the intersection of the connector at Pleasant Valley Road.
- Utilities and utility easements may need to be relocated if Pleasant Valley Road is realigned outside its current right of way.
- The existing traffic signal, drainage, signage and entrances to adjacent retail shops will have to be addressed during the new intersection design.
- These improvements are located within the limits of an Aquifer Protection Area. The construction of these improvements should comply with the Best Management Practices (BMPs) recommended by the Town of Manchester/CTDEP.

2.2.2.4 Connection from Pleasant Valley Road to Evergreen Walk

Provide a connection from Pleasant Valley Road to the Evergreen Walk shopping plaza.

- The proposed alignment passes through a natural diversity database area. The Natural Diversity Data Base has records of species listed by the State, pursuant to section 26-306 of the Connecticut General Statutes, as endangered, threatened or special concern in the project area. The DEP Wildlife Division should be consulted during future planning and design for the project; they will assess potential impacts to listed species and provide recommendations to avoid or minimize impacts.
- Creation of this connection will impact commercial and residential properties identified in Appendix E.
- Since Smith Street is proposed as an underpass, the vertical profile of Smith Street will need to be adjusted to accommodate the vertical geometry of proposed bridge connecting Pleasant Valley Road and Evergreen Walk.

2.2.3 Transportation Management Plan

The need for continued corridor mobility must be considered during the planning process of major transportation reconstruction activities. Work zones have the potential to affect not only the point specific facility under construction, but also the overall corridor mobility miles away from the actual construction. Additionally, major construction activities having significant work zone activity can also affect other modes of transportation in the corridor. The purpose of a proper work zone is to minimize conflict between the traveling public and the workers and to mitigate (to the extent possible) congestion in and around the work zone. A proper Transportation Management Plan (TMP) and implementation strategy will go a long way towards minimizing any disruption to corridor mobility for all modes of travel in the corridor.

Anticipated work zone impacts of the proposed roadway improvements need to be assessed and managed through the TMP process. TMP implementation of strategies



should include transportation operations components as well as public outreach and information components for the ultimate success of significant projects.

Information on the Rule on Work Zone Safety and Mobility can be found on the Federal Highway Administration (FHWA) web site (<http://www.fhwa.dot.gov/workzones>). Other sources for information on planning for safety, mobility and constructability include the American Traffic Safety Services Association (ATSSA) (<http://www.atssa.com>) and the National Work Zone Safety Information Clearinghouse (<http://www.workzonesafety.org>).

Activities being proposed by this study that have the greatest potential to affect corridor mobility include all work on and/or over I-84 and I-291. Specifically, work that will require the constriction of normal width travel lanes, the shifting of travel lanes and the temporary closure of one or more lanes for short period of time. The most significant impact to corridor mobility may be the potential for temporary (off peak) closure of all eastbound or westbound lanes of I-84 in order to erect the bridge components associated with the Redstone Road Extension and the HOV fly-over ramps to the new Transportation Center. Temporary closing of the highway would be limited to one direction at a time only. TMP strategies to mitigate the anticipated mobility impacts that may be associated with various recommended transportation priorities include:

- Comprehensive Public Awareness Program;
- Agency coordination and interim measures to support temporary mode shift;
- Temporary Intelligent Transportation Systems (ITS);
- Highway traffic camera monitoring;
- Police & tow truck standby;
- Variable message signs (potentially statewide), and
- Use of crashworthy channelizers, signs, barricades, barriers, etc.

It is anticipated that the scope of operations and the duration of temporary closings will not result in this project being classified as significant. The specific strategies for implementation should be selected as the planning and design phases progress as described by the “Final Rule on Work Zone Safety and Mobility.”

2.3 Construction Cost Estimates

The preliminary construction cost estimates are prepared for the recommended improvements. The CTDOT cost estimation guidelines for the year 2008 are applicable. The study team assumed 10% rate of inflation to estimate costs for the year 2015 and 5% rate of inflation to estimate costs for the year 2025.

Since the plan improvements are still at a conceptual stage, a few pay items are estimated as a percentage of total sum of other items that could be quantified. As the level of



design advances the monies required for each individual project can be more accurately computed based on the better definition and understanding of various project elements such as earthwork, right of way acquisition, and environmental mitigation.

The pay items were identified based on CTDOT cost estimation guidelines. Mobilization is assumed at 10% for all estimates. Mobilization covers contractor costs such as hiring staff/sub-contractors, equipment and preparation of site. In addition, the study team assigned reasonable costs for stage construction, noise barriers (if warranted), environmental mitigation and incident management system for each project. Please refer to Appendix F for further details.

The following Table 2-2 shows estimated costs for each of the recommended improvements.



TABLE 2-2: ESTIMATED CONSTRUCTION COSTS

Type of Improvement	Estimated Costs		
	(2008 dollars)	(2015 dollars)	(2025 dollars)
Roadway Improvements			
Redstone Road Extension	\$133,600,000	\$260,348,605	\$424,080,443
Ramp to I-291	\$3,400,000	\$6,625,638	\$10,792,466
Improvements to Exit 63	\$29,500,000	\$57,487,154	\$93,640,517
HOV Ramps	\$49,800,000	\$97,046,112	\$158,077,890
Auxiliary lanes between Exits 62 and 63	\$29,000,000	\$56,512,796	\$92,053,390
Single Point Urban Interchange	\$36,200,000	\$70,543,559	\$114,908,024
Realignment of Pleasant Valley Road	\$7,000,000	\$13,641,020	\$22,219,784
Connection from Pleasant Valley Road to Evergreen Walk	Not Estimated		
TSM/TDM Improvements	Not Estimated		
Transit Improvements			
Circulator Shuttle Bus (Assume 2 new shuttle buses)	\$400,000 ¹	\$779,487	\$1,269,702
Increase Service Frequency (Assume 8 new buses)	\$2,160,000 ²	\$4,209,229	\$6,856,390
Modify Existing Bus Signage (Assume 20 signs)	\$4,000 ³	\$7,795	\$12,697
Bus Shelters (Assume 9 new shelters)	\$90,000 ⁴	\$175,385	\$285,683
Intelligent Transportation Systems	\$200,000 ⁵	\$389,743	\$634,851
Replace Radio System	\$125,000 ⁶	\$243,590	\$396,782
Acquire Alternate Fuel Vehicles (\$295,000-\$385,000) ⁷	\$340,000	\$662,564	\$1,079,247
Multi-modal Transportation Center	\$12,300,000 ⁸	\$23,969,220	\$39,043,334
Bike/Ped Improvements	\$5,430,931	\$10,583,348	\$17,239,158

1. Seated capacity of 24-33 passengers. Assumes average cost of \$200,000/vehicle.
2. Assumes average cost of \$270,000/bus.
3. Assumes \$200 per sign and pole.
4. Assumes 9 shelters at \$10,000/shelter.
5. Assumes \$5,000 per bus for GPS/AVL technology and \$6,000 per shelter for VMS signs. Does not include central communication center cost.
6. Assumes \$5,000 per bus.
7. Source: www.cleanairnet.org. Cost given per bus for 40-seat bus. Low end of range represents CNG bus and high end of range is hybrid electric.
8. Cost includes 500 structured parking spaces.



Please refer to Section 1 of this report for a detailed description of proposed improvements. Please refer to Subsection 2.6 of this report for the proposed implementation of plan.

2.4 Operations/Maintenance Cost Estimates (Transit Alternatives)

The operations/maintenance (O&M) cost estimates were prepared for the recommended improvements based on the data obtained from National Transit Database maintained by the Federal Transit Administration (FTA). Please refer to Appendix G for further information.

The study team extracted the data related to funding, operations/maintenance costs and the fleet size of Connecticut Transit-Hartford Division. The following Figure 2-1 shows the comparison of total funding and O&M expenses from the year 1991 to 2007. The chart also shows the fleet size of Connecticut Transit-Hartford Division.

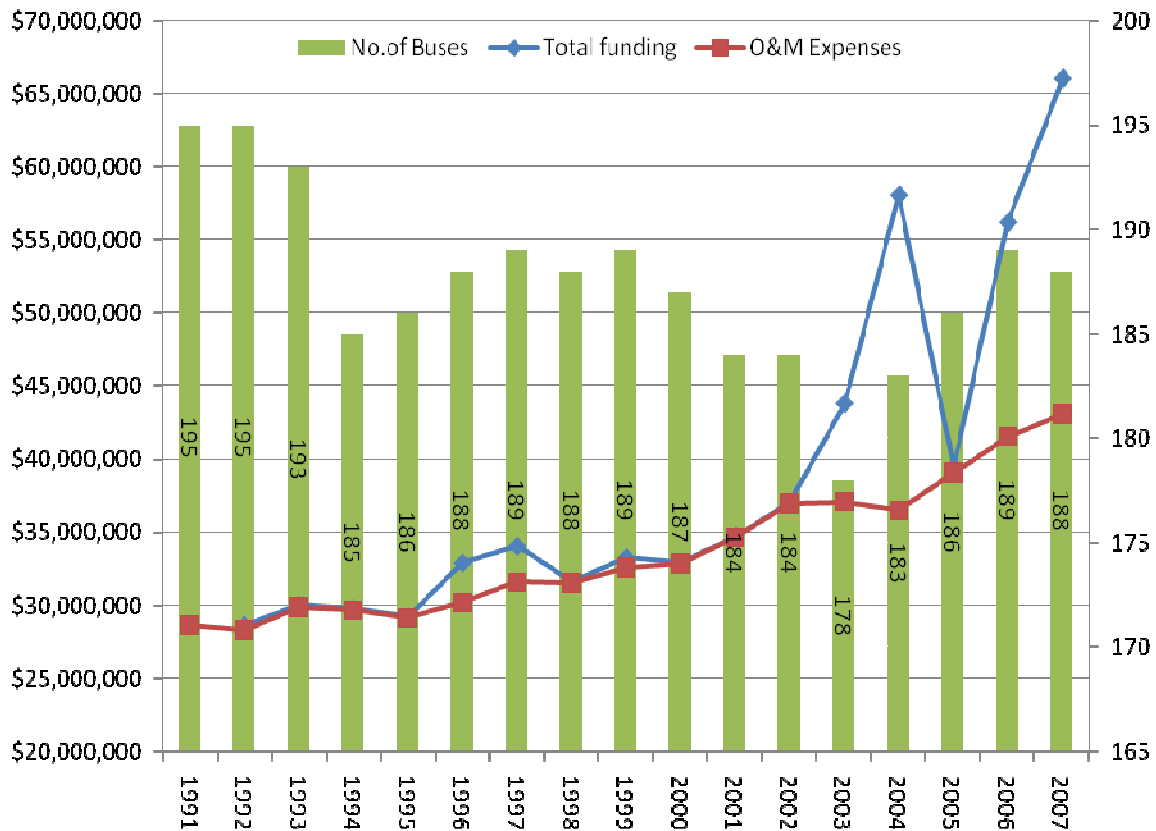


FIGURE 2-1- COMPARISON OF TOTAL FUNDING AND O&M EXPENSES OF CONNECTICUT TRANSIT-HARTFORD DIVISION



The Capital Region Transportation Plan estimates that \$919,000,000 will be needed over the next 20 years for the maintenance of the existing fleet of Connecticut Transit buses. However, the estimate does not include any funds to cover the costs towards any additional services.

In order to increase the service frequency, the transit buses will have to travel additional miles. The following Table 2-3 shows the anticipated additional bus miles.

TABLE 2-3: ADDITIONAL ANNUAL BUS MILES

CT Route	Weekday	Saturday	Sunday	Total
B3 Buckland Mall	63,180	6,552	0	69,732
B4 Buckland Mall	14	6,552	0	6,566
L/92 Tower Avenue Crosstown	96,720	18,096	13,728	128,544
X/91 Forbes Street Crosstown	70,200	13,104	9,828	93,132
Tolland Turnpike Buckland Hills, Rockville	29,640	29,640	18,772	78,052
Tolland Turnpike Buckland Hills	0	14,040	8,892	22,932
Buckland Flyer	-4160	0	0	-4160
Buckland Express	0	0	0	0
Sub Total	255,594	87,984	51,220	394,798
Circulator Shuttle Bus	56,160	11,232	11,232	78,624
Grand Total	317,754	99,216	62,452	473,422

Note: Does not include BRT service.

The study teams' research found that FTA's Annual National Transit Summary and Trends (NTST) report is the most reliable and comprehensive source for information related to transit operations. As per their report for the year 2007, the nationwide average O&M cost for the bus transit services was \$8.70 per annual revenue mile (Appendix G). The 2008 average O&M cost, based upon a 10% unit cost increase by the study team, is \$9.57 per annual revenue mile.

The study team, because of suggested improvements, estimates that buses will run an extra 473,422 revenue miles in one year. The estimated O&M expenses are equal to:

$$473,422 \times \$9.57 = \$4,530,649$$



2.5 Environmental Summary

The following Table 2-4 summarizes environmental impacts associated with proposed transportation improvement options. Please refer to Technical Memorandum No. 2 for further information.

**TABLE 2-4
SUMMARY COMPARISON OF ANTICIPATED ENVIRONMENTAL
IMPACTS ASSOCIATED WITH PROPOSED TRANSPORTATION
IMPROVEMENT OPTIONS**

RESOURCES	TRANSPORTATION IMPROVEMENT OPTIONS		
	Option 2	Option 3	Option 10
Land Use and Zoning	Medium	Low/Medium	Medium
Surface Water Resources	Low	Medium	Medium
Wild and Scenic Rivers	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Groundwater Resources	Low	Low	Low
Wetlands	Low/Medium	Medium	Medium
Floodplains and Stream Channel Encroachment Lines	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Threatened and Endangered Species/Critical Wildlife Habitat	Medium	Medium/High	Medium/High
Farmlands	Low	Low	Low
Air Quality	Low	Low	Low
Hazardous Waste Sites	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Noise Sensitive Areas	Medium	Medium	Medium
Community Resources	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Cultural Resources	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Section 4(f) Resources	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Section 6(f) Resources	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated
Environmental Justice	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated	No Adverse Impacts Anticipated

The preliminary delineation of the Aquifer Protection Area (APA) was depicted in Figure 4-1C of Technical Memorandum No. 1 published in November 2006. However, the mapping for the wellfield has been completed in October 2008, but has not yet been adopted by the Town of Manchester. Please refer to Appendix H for depiction of the final APA boundary and draft guidelines for road and highway construction/reconstruction in state Aquifer Protection Areas.

Since the proposed multi-modal transit center is now located within APA, any kind of fueling and maintenance activities are not recommended in its premises.



2.6 Implementation Plan

This section presents a schedule for implementing recommendations of the Buckland Transportation Study. The study team classified roadway improvements that would have the greatest benefit towards improving transportation safety and mobility at the most critical locations in the study area as high priority improvements. The rest of the roadway improvements were classified as priority improvements. The study team identified TSM/TDM, transit and bike/ped improvements as high priority improvements to be implemented as and when funds are available.

The study high priority roadway improvements are:

- Although, not part of the Buckland Transportation Study, improvements to the intersection of Oakland Street, Tolland Turnpike (Route 30) and the I-84 eastbound ramps are currently being designed by CTDOT.
- Redstone Road extension over I-84 and new slip ramp to northbound I-291 from existing westbound frontage road.
- Additional I-84 WB westbound off ramp at exit 63 Route 30.
- HOV ramps and multi-modal transportation center.

The study priority roadway improvements are:

- Single Point Urban Interchange (SPUI) at the intersection of Pleasant Valley Road, Buckland Street and Buckland Hills Drive.
- Improvements to the intersection of Pleasant Valley Road and the I-84 ramps.
- Auxiliary lanes along I-84 between exits 62 and 63.
- Connection from Pleasant Valley Road to Evergreen Walk.

2.7 Findings of Land Use Study

A basic finding was that land use management can be expected to have limited impact on overall traffic volumes on congested major roadways in communities where strong growth is continuing. New growth equals new person-trips. However, land use management techniques can complement other congestion mitigation efforts by creating a critical mass of mixed-use and more options for travel. The result may be to shift some person-trips to other modes than the automobile with some shift also to multi-purpose trips, reducing VMT overall.



The greatest potential impact from best land use management strategies for Buckland may be reduction of internal automobile trips within the study area to offset current conditions where people are now making multiple short trips amongst retail and services destinations.

A pattern of mixed-use concentrated activity nodes within the Buckland study area in an organized pattern relative to one another can achieve car-trip reductions much more effectively than a random general increase in density and mix. That is, the Buckland region's form of development can influence vehicle trips to a greater extent than simply changing current zones to offer the option of mixed-use development at high densities.