Vision Statement Guiding the Development of a Transportation Plan for the US 9W Corridor

The Town of Bethlehem seeks to provide a visually attractive and vibrant corridor for people traveling Route 9W and for those living and working near it. In accordance with the adopted Comprehensive Plan, the Town of Bethlehem intends to establish compact hamlet centers and encourage aesthetically pleasing development in those centers that will be sensitive to the Corridor's unique natural and historic features, while preserving the scenic and pastoral qualities of the rural landscape located between the hamlet centers. Transportation improvements will be designed with all users in mind. Bicycle, pedestrian, and transit connections to neighborhoods, retail areas, and business parks will be an important part of the plan. Transportation improvements will be planned, designed, and constructed in an integrated way according to the following principles:

1. **Transportation and circulation systems are important to the town's (and region's) economy and quality of life.** A capable transportation system helps assure adequate employment and mobility which in turn supports a healthy tax base. A sound tax base helps the town provide the services that build a quality community.

2. **Transportation plans and designs should not focus solely on the automobile.** The Town's Comprehensive Plan and CDTC's New Visions Plan call for designing transportation improvements that promote transit use, walking, and the use of bicycles. The pedestrian environment, for example, should not only include sidewalks, but also safe crossings at all intersections throughout the corridor and linkages between residential neighborhoods and pedestrian generators. Conventional solutions which only increase roadway capacity, often reduce one problem (delay) but exacerbate others (walking environment), particularly if they increase total vehicular travel. When all costs and benefits are considered, an integrated plan that includes an appropriate set of complementary strategies is often the most cost-effective way to improve transportation.

3. **Transportation is not only about moving people and goods, but also about creating attractive and liveable communities.** One objective of our regional and local plans is to make incremental improvements in the appearance of the town's streetscape in conjunction with transportation improvements (and land development) in order to project a positive image of the community. The planting of trees in the corridor, for example, will not only enhance community beauty but will also help slow traffic, making travel in the corridor safer and more pleasant for residents, cyclists and walkers.

4. **Funding is a significant constraint.** Building enough road capacity to handle all the traffic that wants to travel during the peak travel period without delay could be impractical and prohibitively expensive. Management actions can be more helpful in advancing economic development goals of the town because they have been proven to promote more efficient land use and transportation systems. Because competition for federal and state funding is extremely tight and regional needs extensive, public financing

through traditional sources will not be possible. Public/private partnerships will be necessary in order to implement the plan. Focusing on operational and management actions, including advanced traffic signal technology, driveway consolidation, shared access, service roads, roundabouts, and other relatively low-cost actions can help make the plan more affordable to both the public and private sectors.

5. **Land use planning and day-to-day development decisions have a big role to play in building quality communities and workable transportation systems.** Where and how we plan and design the places we work, live, shop and play can significantly affect a community's liveability and cohesion. A land use plan that promotes compact development, defines an appealing and coherent image, and emphasizes connected streets, sidewalks and convenient access to transit play a critical role in cultivating a "sense of place". Designing and building our neighborhoods to foster and accommodate multiple transportation modes that provide options for transportation system users directly influences mobility and accessibility, enhances transportation-land use compatibility and supports achieving the highest quality of life in the best possible environment.

6. **Environmental protection is important. The conservation and wise use of the corridor's natural resources are fundamental to achieving a habitable and aesthetically pleasing environment. This design planning effort recognizes the benefit of coordinating land and transportation development** with sensitive treatment of natural and cultural resources such as wetlands and streams, open space, woodlands, and historic features and will identify transportation and building designs which minimize adverse impacts on natural resources, and which are consistent with and supportive of the town's environmental conservation goals.

US 9W LEVEL-OF-IMPROVEMENT DEFINITIONS

Minimum Acceptable: Actions that are needed to improve the overall transportation environment. These actions would improve overall accessibility, especially for walkers, cyclists, and transit users. Traffic congestion for the short-term would be mitigated but would return as development levels approached planned levels.

Minimum Necessary: Actions that would be required to meet the objectives outlined at the beginning of the study. The transportation environment would be improved for all users. On the highway side, these improvements will provide a very good level-of-service; some congestion will remain especially during the peak hour, but will be tolerable.

Maximum: Actions that will improve the transportation environment for all users. Traffic congestion will be mitigated and would provide reserve capacity beyond the design year 2026.

TABLE 1

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN ROUTE 32 AND FEURA BUSH ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Roadway Capacity	Four possible actions:			
	(1) Maintain two travel lanes	$ 0.0 Million	None	Maintaining two travel lanes presentaly provides enough capacity for the present in this section but does not address future needs.
	(2) Widen to provide a center lane:			Installing a raised or flush median adds reserve capacity and provides a safety benefit because it takes left turning traffic out of the travel lane but it also has a safety benefit.
	a) Extending a flush median	$0.25	Minimum Necessary	Installing a flush median near the intersection would potentially reduce crashes by 35%. Capacity and delay would also be improved. If constructed with textured colored pavement, negative aesthetic impacts of a two-way left turn lane/flush median could be avoided.
	b) install a raised median	$ 0.900 Million	Minimum Acceptable	Providing a raised median would have greater safety and aesthetics benefits compared to the flush median (55% potential reduction in crashes), and would also have capacity and level of service benefits, but because left turns would be restricted, alternative ways of accommodating these turns would be needed. A raised median should be developed in conjunction with roundabouts (See Arterial Management).
	(3) Widen to three travel lanes with raised median.	$ 8.0 Million	Minimum Acceptable	Traffic numbers and projections of future traffic growth show greater traffic heading north during the concentrated AM peak travel hour than the corresponding southbound traffic during the PM peak hour, when traffic is dispersed over a wider time period. To address the difference, two northbound lanes and one south bound lane, with or without the center turning lane option, would expand capacity while providing a cost savings over constructing two travel lanes in both directions. Most likely, this is an interim step, assuming that increased traffic growth over time will eventually warrant the construction of the second lane southbound.
	(4) Widen to four travel lanes with raised medain	$ 13.1 Million	Maximum	Four travel lanes, two in each direction may become necessary to maintain acceptable levels of traffic movement if the Mixed Economic Development Zoning Districts develop fully.
Intersection Improvements	Construct one lane roundabout at Feura Bush Road	$1.2 Million	Minimum Acceptable	A roundabout at Feura Bush Road will improve LOS and safety factors.

TABLE 1

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN ROUTE 32 AND FEURA BUSH ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Intersection Improvements (continued)	Construct two lane roundabout at Route 32	$5.0 Million	Not necessary, but will create more developable land and address access issues on adjacent properties.	A roundabout at the intersection of Route 9W with Route 32 to replace the large interchange would improve safety and address convenience issues of northbound traffic on Route 9W attempting to travel west on Route 32. This is a very long term improvement, unless construction costs can be assumed by private development.
Arterial Management	Interconnect parcels on both sides of Route 9W as development or redevelopment occurs.	Variable – Developer Cost	Minimum Necessary	This may be difficult because of depth of properties fronting Route 9W on the east side, as well as the proximity of residential property to Route 9W and sensitive land locations. Creative site design will be key to creating these interconnections.
	Construct a flush or raised median	$0.25 - $0.9 Million	Minimum Acceptable	A raised median would restrict left turns and enhance the aesthetics of the area.
	Explore roundabout at Town Squire Drive	$0.80 Million for Roundabout	Minimum Acceptable	The proximity to the Feura Bush Intersection makes a signal at this intersection unlikely. Access to the Town Squire development, new development, and the properties on the west side of Route 9W could be improved with a roundabout and interconnected properties on the west side (between Casa Mia and Bethlehem Preschool). The roundabout would also work well with a raised center median.
	Develop driveway spacing and sight distance standards.	$ ---	Minimum Necessary	Appropriate driveway spacing reduces potential conflicts on the road and can improve capacity. Fewer driveways spaced further apart allows for more orderly merging of traffic, presenting fewer challenges to drivers and improving the safety of access by pedestrians and bicyclists. CDTC's Suggested Minimum Driveway Spacing Guidelines for Capital District Arterials (which are tied to both AASHTO and NYSDOT standards) and the Transportation Research Board's (TRB) Access Management Manual can both be used as starting points. Requirements for safe sight distance are one of the most important arterial management techniques. A safe sight distance is the distance needed by a driver to verify that the road is clear and to avoid conflicts with other vehicles. Stopping sight distance reflects the minimum space needed to safely stop a vehicle, depending upon the speeds on the road.
	Limit access to properties fronting on Route	$ ---	Minimum Necessary	Reduction of left turn movements will improve roadway efficiency and safety.

TABLE 1

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN ROUTE 32 AND FEURA BUSH ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
	9W to right turn in / right turn out other than at signalized / roundabout intersections or side streets or shared driveways.			New Development north of Magee Drive must access Route 9W via existing Town Center driveway intersections. Where this is not possible, right in and right out turns will be allowed.
Arterial Management (continued)	Convert Town Center signalized intersections to roundabouts	$2.0 Million	Maximum	Conversion of intersections when there is additional development using the intersections as access points will improve overall efficiency and use of roadway with raised median. This is a long-term improvement that only needs to be implemented when east side of Route 9W develops.
	Provide full interconnection between Glenmont School and Farm Family Driveway	$50,000	Minimum Acceptable	The interconnection between these properties will provide full access to the school from both directions if the raised center median is added to this section of Route 9W.
	With Town Center roundabouts in place, convert Magee Drive to right in / right out only provide additional access via connections to driveways on the properties to the north	$ ---	Minimum Acceptable	This will help improve access to Magee Drive without impinging on traffic movements on Route 9W.
	Plan for adequate setbacks (approximately 70 feet from the centerline of the roadway on each side of the roadway) to accommodate the additional median lane, turn lanes, pedestrian facilities, bicycle facilities, and a 20 foot landscaping strip.	$ ---	Minimum Necessary	If providing a median and appropriate space for landscaping, pedestrians and bicycles is desirable, then 15 to 20 feet of additional ROW on each side is required. Providing adequate building setbacks during initial development or redevelopment will minimize disruption to property owners when improvements are implemented in the future and can reduce the public financial burden of improvements. Adequate setbacks could include both a minimum and maximum from the right of way in an effort to create the community design/streetscape vision desired for this area.
Provision of safe walking and bicycling environment	Complete sidewalks on both sides of Route 9W	$0.7 Million (fill in missing pieces of existing system) $1.7 Million (All new sidewalks as	Minimum Necessary	Limited walking infrastructure currently exists due to poor sidewalk coverage and pedestrian unfriendly intersections. While much of today's transportation system and land use pattern discourages walking, cycling, and transit use and cannot easily be modified, sensitive design of future development can bring beneficial changes.

TABLE 1

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN ROUTE 32 AND FEURA BUSH ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
		part of road widening)		
Provision of safe walking and bicycling environment (continued)	Widen Rt. 9W to provide a 5 foot shoulder marked as a bicycle lane and signage.	$0.7 Million	Minimum Necessary	Bicycle accommodations at present are more or less non-existent as shoulder width is insufficient. Adequate shoulder width is essential to providing for bicycling along the corridor. The SAC agreed that providing a bike lane is preferable to a side path adjacent to the roadway due to the presence of commercial driveways and sight line issues and conflicts.
	Add sidewalks to Glenmont and Fuera Bush Roads.	$0.573 Million/Mile	Necessary	Limited walking infrastructure currently exists due to poor sidewalk coverage and pedestrian unfriendly intersections. While much of today's transportation system and land use pattern discourages walking, cycling, and transit use and cannot easily be modified, sensitive design of future development can bring beneficial changes.
	Create shared use path running west from Route 9W	$0.3	Desirable	A shared us path heading west into the residential neighborhoods along Feura Bush Road will provide an alternate mode of travel for these residents to the sidewalks, schools and stores along Route 9W.
	Lower the speed limit to 35 mph	$ ---	Desirable	Speed limits above 35 mph create a hostile environment for bicyclists and pedestrians while lowering the speed limit helps promote bicycle and pedestrian use of shoulders and sidewalks. Regulatory or engineering actions (as indicated above) that reduce vehicle speeds will be necessary for creating a more attractive cycling and walking environment.
Transit	Support existing transit service through enhanced pedestrian and bicycle access and improved site design.	$0.8 Million/year (Operating costs for new service)	Necessary	One of the most significant operational issues facing CDTA is the tradeoff associated with circulating buses through shopping plazas or other significant destinations. Route deviations hamper the efficiency of the overall route even though such deviations provide better transit access to specific destinations.
	Provide driveway interconnections allowing new transit route through properties on the east side of Route 9W as they develop.	$ ---	Long Term	As the properties are developed, they should include interconnected roadways that can be used by buses to provide transit areas and turnarounds.

TABLE 1

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN ROUTE 32 AND FEURA BUSH ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Land Use	Adopt site design standards that are supportive of transit, walking and bicycling.	$ ---	Necessary	Developing higher density, mixed uses along Route 9W will encourage pedestrian activity by creating a more interesting environment, and support transit use by ensuring that larger numbers of people live and work adjacent to transit. To encourage transit use, buildings should be oriented to the street and to pedestrian traffic. Pedestrian access between development and Rt. 9W must be convenient if residents are to use transit.
Land Use (Continued)	To accommodate right-of-way needs, require 50 foot from center line for 4-lane cross section and 20 foot landscape strip. (70 feet from center line.)	$ ---	On-going	No matter which cross section is implemented in this section, a 70 foot setback from the center line of the roadway to buildings and parking is recommended to accommodate future widening needs.
	Provide cross-access between properties on northern end of Route 9w to allow access to existing intersections to augment right turn in / right turn out movements.	$ ---	Long Term	Additional access to properties can improve development potential. Redevelopment of Route 32 intersection to a roundabout could also create more developable land near the intersection.

TABLE 2

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN FEURA BUSH ROAD AND BEACON ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Roadway Capacity	Two possible actions:			
	(1) Maintain two travel lanes	$ 0.0 Million	None	Maintaining two travel lanes provides enough capacity in this section but does not address the vehicle conflicts and crashes near Feura Bush Road.
	(2) Widen to provide a center median:			Installing a raised or flush median adds reserve capacity because it takes left turning traffic out of the travel lane and had a safety benefit. Because the approach to Beacon Road has a high crash rate, installing some type of median would reduce crashes.
	a) install a flush median (Two Way Left Turn Lane)	$ 0.500 Million	Minimum Necessary	Installing a flush median near the intersection would potentially reduce crashes by 35%. Capacity and delay would also be improved. If constructed with textured colored pavement, negative aesthetic impacts of a two way left turn lane/flush median could be avoided.
	b) install a raised median from the Glenmont Plaza property line north to Feura Bush Road and in the vicinity of Beacon Road intersection with the remainder of the section having a two lane cross section.	$ 0.500 Million	Minimum Acceptable	Providing a raised median would have greater safety and aesthetics benefits compared to the flush median (55% potential reduction in crashes), and would also have capacity and level of service benefits, but because left turns would be restricted, alternative ways of accommodating these turns would be needed. (See Arterial Management).
	Clear roadside vegetation on the east side of Route 9W and adjust grades as needed near the intersection of Aspirion Road to improve sight distances	$5,000	Minimum Necessary	Removing trees and vegetation will increase sight distances for vehicles on Aspirion Road. These improvements can (and should) be done in conjunction with the installation of sidewalks.
	Construct single lane roundabout @ Beacon Road	$ 1.0 Million	Minimum Acceptable within the time frame of the study, depending on development levels and traffic conditions	Beacon Road is currently controlled by a stop sign. Over time it is likely that some type of active traffic control will be warranted in the future. A properly designed roundabout is the preferred control because it is safer than a signalized intersection and would reduce delay. A traffic signal is also an option, but in line with NYSDOT's policy, a roundabout must be considered first. If roundabout ROW requirements are found to be excessive a traffic signal can be installed, however if a signalized intersection requires turn lanes, those ROW impacts must be weighed against those of a roundabout.

TABLE 2

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN FEURA BUSH ROAD AND BEACON ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Arterial Management				
	Interconnect parcels on the east side of Route 9W and provide shared access as development occurs.	Variable - Landowner Costs	Minimum Necessary	This may be difficult because of depth of properties fronting 9W on the east side, proximity of residential property and sensitive lands. Creative site design will be key to creating these interconnections. Limit access to right in / right out except at shared driveways.
	Construct a flush or raised median (as described for roadway capacity).	$0.5 Million	Minimum Necessary / Minimum Acceptable	A raised median would restrict left turns, improve circulation, and enhance the aesthetics of the area. One benefit of a raised median is its traffic calming effect; however, it would impact existing business and residential properties. An option would be to install a raised median for a distance of 800 - 1000 ft. south of the Feura Bush Road intersection to reduce conflicts related to the density of driveways in this section. South of this area, the raised median could transition to a flush median (two way left turn lane or TWLTL). A flush or raised median south of Glenmont Carwash would be necessary only if residential conversion occur as planned. Both types of median treatment would require about 15 feet of right of way. Because it would be difficult to interconnect parcels near the Feura Bush Road intersection, a flush median would help traffic entering/exiting businesses near the Feura Bush intersection.
	Explore possible signalization at Glenmont Plaza with a connecting road east and north to Glenmont Road (ideally intersecting across from Price Chopper Driveway),	$0.250 Million (Signal) $3.0 (New Two Lane Road)	Maximum	Successful interconnection of east side properties, in concert with signalization at Glenmont Plaza, will have a substantial safety benefit by reducing driveways and providing a common access point for existing and future businesses. Also, a connection on the east side of 9W that would link to Glenmont Road to the north as an alternate route would reduce trips at the Feura Bush/9W intersection. Reducing trips will make that intersection safer and easier to travel especially before a roundabout is constructed. As part of this improvement, South Glenmont Plaza driveway becomes two-way and north Glenmont Plaza driveway becomes right in / right out access only.
	Develop driveway spacing and sight distance standards and limit access to only right in / right out or side roads except where shared	$ ---	Minimum Necessary	Appropriate driveway spacing reduces potential conflicts on the road and can improve capacity. Fewer driveways spaced further apart allow for more orderly merging of traffic, presenting fewer challenges to drivers and improving the

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Type of Action	Description	Estimated Cost	Level of Improvement	Comment
	driveways are used.			safety of access by pedestrians and bicyclists. CDTC's Suggested Minimum Driveway Spacing Guidelines for Capital District Arterials (which are tied to both AASHTO and NYSDOT standards) and the Transportation Research Board's (TRB) Access Management Manual can both be used as starting points. Requirements for safe sight distance are one of the most important arterial management techniques. A safe sight distance is the distance needed by a driver to verify that the road is clear and to avoid conflicts with other vehicles. Stopping sight distance reflects the minimum space needed to safely stop a vehicle, depending upon the speeds on the road.
Arterial Management (continued)				
	Plan for adequate setbacks (approximately 15 to 20 feet each side of the roadway) to accommodate the additional median lane, turn lanes, pedestrian facilities, bicycle facilities, and a landscaping strip.	$ ---	Minimum Necessary	If providing a median and appropriate space for landscaping, pedestrians and bicycles is desirable, then 15 to 20 feet of additional ROW on each side is required. Providing adequate setbacks to buildings and parking during initial development or redevelopment will minimize disruption to property owners when improvements are implemented in the future and can reduce the public financial burden of improvements. Adequate setbacks could include both a minimum and maximum from the right of way in an effort to create the community design/streetscape vision desired for this area. For those portions of the segment where the vision over time is to have buildings fronting the sidewalk , maximum setbacks should be specified.
Provision of safe walking and bicycling environment				
	Install sidewalks on both sides of Route 9W	$0.25 Million	Minimum Necessary	Limited walking infrastructure currently exists due to poor sidewalk coverage and pedestrian unfriendly intersections. While much of today's transportation system and land use pattern discourages walking, cycling, and transit use and cannot easily be modified, sensitive design of future development can bring beneficial changes.
	Add a sidewalk along at least one side of Beacon Road.	$0.573 Million/Mile	Minimum Acceptable	A sidewalk on Beacon Road would provide a pedestrian link from the residential areas west of Routs 9W to the Route 9W sidewalk.
	Widen Rt. 9W to provide a 5 foot shoulder marked as a bicycle lane and signage.	$0.650 Million	Minimum Necessary	Bicycle accommodations at present are more or less non-existent as shoulder width is insufficient. Adequate shoulder width is essential to provide for encuraging bicycling along the corridor. The SAC agreed that providing a bike lane is preferable to a side path adjacent to the roadway due to the presence of commercial driveways and sight line issues and conflicts.

TABLE 2

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN FEURA BUSH ROAD AND BEACON ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
	Lower the speed limit to 35 mph	$ ---	Minimum Acceptable	Speed limits above 35 mph create a hostile environment for bicyclists and pedestrians while lowering the speed limit helps promote bicycle and pedestrian use of shoulders and sidewalks. Regulatory or engineering actions (as indicated above) that reduce vehicle speeds will be necessary for creating a more attractive cycling and walking environment.
	Provide pedestrian connections via shared use paths on the east side of Route 9W between Glenmont Road and Asprion Road.	$0.615 Million/mile	Maximum	Provide connections as development occurs.
Transit	Support potential for future transit service through enhanced pedestrian and bicycle access and improved site design.	$0.8 Million/Year (Operating cost for new transit service)	Minimum Necessary	One of the most significant operational issues facing CDTA is the tradeoff associated with circulating buses through shopping plazas or other significant destinations. Route deviations hamper the efficiency of the overall route even though such deviations provide better transit access to specific destinations.
Land Use	Adopt site design standards that are supportive of transit, walking and bicycling.	$ ---	Minimum Necessary	Developing higher density, mixed uses along portions of Route 9W will encourage pedestrian activity by creating a more interesting environment, and support transit use by ensuring that larger numbers of people live and work adjacent to transit. To encourage transit use near the intersection of Feura Bush Road, buildings should be oriented to the street and to pedestrian traffic. Pedestrian access between development and Rt. 9W must be convenient if residents are to use transit.
	Preserve 36 feet from center line to accommodate right-of-way improvements plus an additional 20 foot wide landscaping strip.	$ ---	Minimum Necessary	It is important to maintain the potential for future improvements along the right-of-way.

TABLE 3

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN BEACON ROAD AND WEMPLE ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Roadway Capacity	Two possible actions:			
	(1) Maintain two travel lanes	$ 0.0 Million	None	Maintaining two travel lanes provides enough capacity in this section.
	(2) Widen to provide a center lane:			Installing a raised or flush median adds reserve capacity because it takes left turning traffic out of the travel lane but it also has a safety benefit. Because the approach to Beacon Road has a high crash rate, installing some type of median would reduce crashes.
	a) install a flush median (TWLTL)	$ 0.720 Million	Minimum Acceptable	Installing a flush median near the intersection would potentially reduce crashes by 35%. Capacity and delay would also be improved. If constructed with textured colored pavement, negative aesthetic impacts of a two way left turn lane/flush median could be avoided.
	b) install a raised median near the Beacon Road and Wemple Road hamlet areas and maintain a two lane road cross section in the rest of the segment	$ 0.2 Million	Minimum Acceptable	Providing a raised median would have greater safety and aesthetics benefits compared to the flush median (55% potential reduction in crashes), and would also have capacity and level of service benefits, but because left turns would be restricted, alternative ways of accommodating these turns would be needed. (See Arterial Management).
Intersection Improvements	Construct single lane roundabout at Wemple Road	$ 1.0 Million	Minimum Acceptable	Wemple Road is currently controlled by a traffic signal. With no changes to the intersection, it is projected to operate at LOS F by 2026; thus, some form of improvement is necessary. In line with NYSDOT's policy, a roundabout must be considered first, and a properly designed roundabout is projected to operate at LOS A in 2026. The roundabout is therefore the preferred control because it should be safer than a signalized intersection and would reduce delay. A traffic signal is also an option, but only if roundabout ROW requirements are found to be excessive. Since this updated intersection will requires turn lanes, those ROW impacts must be weighed against those of a roundabout.

TABLE 3

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN BEACON ROAD AND WEMPLE ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Arterial Management	Interconnect commercial parcels along Route 9W south of Beacon Road as development or re-development occurs and provide shared driveway access as possible.	Variable - Developer Cost	Minimum Necessary	Creative site design will be key to creating these interconnections.
	Construct a flush or raised median as described in for roadway capacity improvements	$0,2 - $0.72 Million	Minimum Acceptable / Maximum	A raised median would restrict left turns, enhance vehicular circulation, and enhance the aesthetics of the area. One benefit of a raised median is its traffic calming effect; however, it would impact access to existing residential properties. An option would be to install a flush median (two way left turn lane). Both types of median treatment would require about 15 feet of right of way. Because it may be difficult to interconnect parcels close to the Beacon Road intersection, a flush median would help traffic entering/exiting businesses in this area.
	Develop driveway spacing and sight distance standards and limit access to only right in / right out or side roads except where shared driveways are used.	$ ---	Minimum Necessary	Appropriate driveway spacing reduces potential conflicts on the road and can improve capacity. Fewer driveways spaced further apart allow for more orderly merging of traffic, presenting fewer challenges to drivers and improving the safety of access by pedestrians and bicyclists. CDTC's Suggested Minimum Driveway Spacing Guidelines for Capital District Arterials (which are tied to both AASHTO and NYSDOT standards) and the Transportation Research Board's (TRB) Access Management Manual can both be used as starting points. Requirements for safe sight distance are one of the most important arterial management techniques. A safe sight distance is the distance needed by a driver to verify that the road is clear and to avoid conflicts with other vehicles. Stopping sight distance reflects the minimum space needed to safely stop a vehicle, depending upon the speeds on the road.
	Plan for at least a 56 to 60-foot setbacks to parking and buildings (approximately 15 to 20 feet each side of the roadway) to accommodate, turn lanes, pedestrian facilities, bicycle facilities, and a 20-foot wide landscaping strip.	$ ---	Minimum Necessary	If providing a median and appropriate space for landscaping, pedestrians and bicycles is desirable, then 15 to 20 feet of additional ROW on each side is required. Providing adequate building parking lot and setbacks during initial development or redevelopment will minimize disruption to property owners when improvements are implemented in the future and can reduce the public financial burden of improvements. Adequate setbacks could include both a minimum and maximum from the right of way in an effort to create the community design/streetscape vision desired for this area. If the vision over time is to have buildings fronting the sidewalk in the vicinity of Wemple Road to create a walkable rural hamlet, maximum setbacks should be specified.

TABLE 3

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN BEACON ROAD AND WEMPLE ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Arterial Management (continued)	Add inter-connecting roadways in the Wemple Road area potential future rural hamlet.	Developer Cost	Minimum Acceptable	Increasing circulation options in hamlet areas increases travel options and minimizes congestion.
Provision of safe walking and bicycling environment	Install sidewalks on both sides of Route 9W in the vicinity Wemple Road in the potential future rural hamlet and on one side of Route 9W for the rest of the section.	$0.350 Million	Minimum Necessary	The Rural Hamlet concept is based in part on development that is close together and between which there is no need to travel by automobile. Sidewalks are necessary to make the concept work.
	Widen Rt. 9W to provide a 5 foot shoulder marked with share the road signage.	$1.1 Million	Minimum Necessary	Bicycle accommodations at present are more or less non-existent as shoulder width is insufficient. Adequate shoulder width is essential to providing for and encouraging bicycling along the corridor. The wide shoulder allows for easier bicycle use of Route 9 and is appropriate where there is expected to be less bicycle traffic than in the northern sections of Route 9W.
	Lower the speed limit to 35 mph	$ ---	Minimum Acceptable	Speed limits above 35 mph create a hostile environment for bicyclists and pedestrians while lowering the speed limit helps promote bicycle and pedestrian use of shoulders and sidewalks. Regulatory or engineering actions (as indicated above) that reduce vehicle speeds will be necessary for creating a more attractive cycling and walking environment.
	Add sidewalks and/or shared use path along Wemple Road east and west of Route 9W.	$0.573 Million/Mile	Minimum Acceptable	Sidewalks along Wemple Road will encourage walking between neighborhoods and the Wemple Road Hamlet area.
	Develop an off road shared use path network connecting neighborhoods on both sides of Route9W and the Wemple Road Rural Hamlet	$0.615/mile	Maximum	Many of the important bicycle and pedestrian connections in this portion of the Route 9W corridor are actually east west connections that cross the roadway. The ideal is a network of shared use paths that provide not only an alternate, off road north south bicycle and pedestrian route but also links to the existing, planned or envisioned residential neighborhoods or hamlet on both sides of Route 9W.

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DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN BEACON ROAD AND WEMPLE ROAD

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Transit	Support future transit service through enhanced pedestrian and bicycle access and improved site design.	$ ---	Minimum Necessary	Transit service is dependent on the ability of users to reach the service. Providing adequate means for pedestrian and bicyclist to reach transit stops enhances the overall transit system. Planning for future transit service in current development increases the likelihood that transit service will operate along all of Route 9W in the future.
Land Use	Adopt site design standards, especially in the potential future rural Hamlet area, that are supportive of transit, walking and bicycling.	$ ---	Minimum Necessary	Developing higher density, mixed uses along Route 9W will encourage pedestrian activity by creating a more interesting environment, and support transit use by ensuring that larger numbers of people live and work adjacent to transit. To encourage transit use, buildings should be oriented to the street and to pedestrian traffic. Pedestrian access between development and Rt. 9W must be convenient if residents are to use transit.
	Adapt setback standards to preserve right-of-way and provide for a 20-foot landscape strip.	$ ---	Minimum Necessary	56 to 60-foot setbacks from the centerline of the right-of-way to buildings and parking areas is recommended to accommodate medians, wide shoulders, sidewalks and landscape strips.
	Amend the zoning code and map for land in the vicinity of Wemple Avenue to promote the formation of a hamlet center.	$ ---	Maximum	

TABLE 4

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN WEMPLE AND CREBLE ROADS

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Roadway Capacity	Maintain two travel lanes	$ 0.0 Million	None	Maintaining two travel lanes provides enough capacity in this section.
	Create new north-south roadway east of Route 9W through the Mixed Economic Development Districts linking Clapper and Wemple Roads	$3 Million/mile (Developer Cost)	Minimum Acceptable	Providing an additional north south roadway will help minimize traffic growth on Route 9W, especially if the Selkirk Bypass is developed along the proposed northern alignment. This road could be constructed by private development.
	Extend Jericho Road east to link Route 9W and the new north-south roadway east of Route 9W.	$3 Million/mile (Developer Cost)	Maximum	Providing additional means of circulation within the study area will help minimize traffic growth on Route 9W. This road could be constructed by private development.
Intersection Improvements	Construct single lane roundabout at Creble Road if grades allow	$ 1.5 Million	Minimum Necessary if the northern alignment of the Selkirk Bypass is developed.	This intersection will need upgrading if the Selkirk Bypass is installed on the northern alignment that links with Creble Road. The intersection will need to be shifted to the south to avoid impacts to the Vlomankill, but it can't shift to far south due to impacts to a historic property west of Route 9W. The midpoint may place the intersection on a slope that is too steep to support the construction of a roundabout. A signalized intersection would be the second choice if the grade prohibits the construction of a roundabout.
	Roundabout at Jericho Road	$ 1.0 Million	Maximum	If and when the land to the east of Route 9W is developed, an access road, if constructed, should intersect Route 9W across from Jericho Road and the intersection should be upgraded to a roundabout.
Arterial Management	Interconnect commercial parcels on Route 9W south of Wemple Road as development or re-development occurs and provide shared driveway access as possible.	Variable (Developer Costs)	Minimum Necessary	Creative site design will be key to creating these interconnections.
	Install a center raised median at the Jericho Road intersection	$80,000	Minimum Acceptable / Maximum	A raised median would replace the painted center median and would limit the wide open feeling of Route 9W near the Jericho Road intersection, helping to slow traffic. The raised median would continue to work if the roundabout is installed.
	Install a center raised median in the Wemple Road potential future rural hamlet area.	$0.15 Million	Minimum Acceptable	A raised median would help maintain safe traveling conditions in the hamlet area.

TABLE 4

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN WEMPLE AND CREBLE ROADS

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Arterial Management (continued)	Develop driveway spacing and sight distance standards and limit access to only right in / right out or side roads except where shared driveways are used.	$ ---	Minimum Necessary	Appropriate driveway spacing reduces potential conflicts on the road and can improve capacity. Fewer driveways spaced further apart allow for more orderly merging of traffic, presenting fewer challenges to drivers and improving the safety of access by pedestrians and bicyclists. CDTC's Suggested Minimum Driveway Spacing Guidelines for Capital District Arterials (which are tied to both AASHTO and NYSDOT standards) and the Transportation Research Board's (TRB) Access Management Manual can both be used as starting points. Requirements for safe sight distance are one of the most important arterial management techniques. A safe sight distance is the distance needed by a driver to verify that the road is clear and to avoid conflicts with other vehicles. Stopping sight distance reflects the minimum space needed to safely stop a vehicle, depending upon the speeds on the road.
	Install traffic calming elements on Hague Road to minimize regional traffic use of this roadway.	$0.1 Million ±	Minimum Necessary.	Traffic calming elements on Haige Road will reduce it's attractiveness as an alternative to Jericho Road as a means of reaching Elm Road.
	Plan for at least a 56 to 60-foot setbacks to parking and buildings (approximately 15 to 20 feet each side of the roadway) to accommodate, turn lanes, pedestrian facilities, bicycle facilities, and a 20-foot wide landscaping strip.	$ ---	Minimum Necessary	If providing appropriate space for landscaping, pedestrians and bicycles is desirable, then 15 to 20 feet of additional ROW on each side is required. Providing adequate building and parking setbacks during initial development or redevelopment will minimize disruption to property owners when improvements are implemented in the future and can reduce the public financial burden of improvements. Adequate setbacks could include both a minimum and maximum from the right of way in an effort to create the community design/streetscape vision desired for this area. If the vision over time is to have buildings fronting the sidewalk in the vicinity of Wemple Road to create a walkable rural hamlet, maximum setbacks should be specified.
Provision of safe walking and bicycling environment	Install sidewalks on both sides of Route 9W in the vicinity of Wemple Road in the potential future rural hamlet area.	$20,000 (south side only)	Necessary	The concept or Rural Hamlet is based in part on development that is close together and between which there is no need to travel by automobile. Sidewalks are necessary to make the concept work.
	Widen Rt. 9W to provide a 5 foot shoulder marked with share the road signage.	$1.65 Million	Necessary	Bicycle accommodations at present are more or less non-existent as shoulder width is insufficient. Adequate shoulder width is essential to providing for and encouraging bicycling along the corridor. The wide shoulder allows for easier bicycle use of Route 9 and is appropriate where there is expected to be less

TABLE 4

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN WEMPLE AND CREBLE ROADS

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
				bicycle traffic than in the northern sections of Route 9iW due to fewer destination points in this section.
Provision of safe walking and bicycling environment (continued)	Install a sidewalk on the west side of Route 9W between Jericho Road and the potential future Wemple Road rural hamlet area.	$90,000	Minimum Acceptable	Sidewalks along Route 9W will encourage walking between neighborhoods near Jericho and Elm Roads and the Wemple Road Rural Hamlet area.
	Install sidewalks along at least one side of Jericho Road and Elm Avenue.	$0.573 Million/Mile	Maximum	Sidewalks along Jericho and Elm Roads will encourage walking between neighborhoods along these roads and the Wemple Road Rural Hamlet area via Route 9W.
	Lower the speed limit to 35 mph near Wemple Road.	$ ---	Minimum Acceptable	Speed limits above 35 mph create a hostile environment for bicyclists and pedestrians while lowering the speed limit helps promote bicycle and pedestrian use of shoulders and sidewalks. Regulatory or engineering actions (as indicated above) that reduce vehicle speeds will be necessary for creating a more attractive cycling and walking environment.
	Develop an off road shared use path network connecting neighborhoods on both sides of Route 9W, the Wemple Road Rural Hamlet and residential areas near Jericho Road.	$0.615 Million/mile	Maximum	Many of the important bicycle and pedestrian connections in this portion of the Route 9W corridor are actually east west connections that cross the roadway. The ideal is a network of shared use paths that provide not only an alternate, off road north south bicycle and pedestrian route but also links to the existing, planned or envisioned residential neighborhoods on both sides of Route 9W.
Transit (see attached narrative for corridor wide recommended transit actions.)	Support the potential for future transit service through enhanced pedestrian and bicycle access and improved site design.	$ ---	Minimum Necessary	Transit service is dependent on the ability of users to reach the service. Providing adequate means for pedestrian and bicyclist to reach transit stops enhances the overall transit system. Planning for future transit service in current development increases the likelihood that transit service will operate along all of Route 9W in the future.
Land Use	Adopt site design standards, especially in the potential Hamlet Districts, that are supportive of transit, walking and bicycling.	$ ---	Minimum Acceptable	Developing higher density, mixed uses along Route 9W will encourage pedestrian activity by creating a more interesting environment, and support transit use by ensuring that larger numbers of people live and work adjacent to transit. To encourage transit use, buildings should be oriented to the street and to pedestrian traffic. Pedestrian access between development and Rt. 9W

TABLE 4

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN WEMPLE AND CREBLE ROADS

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
				must be convenient if residents are to use transit.
	Adapt setback standards to preserve right-of-way and provide for a 20-foot landscape strip.	$ ---	Minimum Necessary	56 to 60-foot setbacks from the centerline of the right-of-way to buildings and parking areas is recommended to accommodate medians, wide shoulders, sidewalks and landscape strips.
Land Use (Continued)	Amend the zoning code and map for the land area in the vicinity of Wemple Road for compaitibility with future Town and Economic development goals.	$ ---	Maximum	

TABLE 5

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN CREBLE ROAD AND MAPLE AVENUE

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Roadway Capacity	Maintain two travel lanes	$ 0.0 Million	None	Maintaining two travel lanes provides enough capacity in this section.
Intersection Improvements	Construct single lane roundabout at Maple Avenue intersection.	$ 1.0 Million	Maximum	This intersection will continue to operate at acceptable levels of service into the future. However a roundabout will improve safety conditions at the intersection and address the higher than average crash levels.
Arterial Management	Interconnect commercial parcels on Route 9W as development or re-development occurs and provide shared driveway access as possible.	Variable (Developer Cost)	Minimum Necessary	. Creative site design will be key to creating these interconnections.
	Develop driveway spacing and sight distance standards and limit access to only right in / right out or side roads except where shared driveways are used.	$ --	Minimum Necessary	Appropriate driveway spacing reduces potential conflicts on the road and can improve capacity. Fewer driveways spaced further apart allow for more orderly merging of traffic, presenting fewer challenges to drivers and improving the safety of access by pedestrians and bicyclists. CDTC's Suggested Minimum Driveway Spacing Guidelines for Capital District Arterials (which are tied to both AASHTO and NYSDOT standards) and the Transportation Research Board's (TRB) Access Management Manual can both be used as starting points. Requirements for safe sight distance are one of the most important arterial management techniques. A safe sight distance is the distance needed by a driver to verify that the road is clear and to avoid conflicts with other vehicles. Stopping sight distance reflects the minimum space needed to safely stop a vehicle, depending upon the speeds on the road.
Arterial Management (continued)	Plan for adequate setbacks (approximately 15 to 20 feet each side of the roadway) to accommodate the additional median lane, turn lanes, pedestrian facilities, bicycle facilities, and a landscaping strip.	$ ---	Minimum Necessary	If providing appropriate space for landscaping, pedestrians and bicycles is desirable, then 15 to 20 feet of additional ROW on each side is required. Providing adequate building and parking setbacks during initial development or redevelopment will minimize disruption to property owners when improvements are implemented in the future and can reduce the public financial burden of improvements. Adequate setbacks could include both a minimum and maximum from the right of way in an effort to create the community design/streetscape vision desired for this area. If the vision over time is to have buildings fronting the sidewalk in the vicinity of Maple Avenue to create a walkable rural hamlet, maximum setbacks should be specified.

TABLE 5

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN CREBLE ROAD AND MAPLE AVENUE

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Provision of safe walking and bicycling environment	Install sidewalks on both sides of Route 9W north of Maple Avenue to the school.	$0.11 Million	Minimum Necessary	The concept of Rural Hamlet is based in part on development that is close together and between which there is no need to travel by automobile. Sidewalks are necessary to make the concept work. Linking the school into both the hamlet area and the rest of Selkirk also encourages non-motorized trips to the school. .
	Widen Rt. 9W to provide a 5 foot shoulder marked with share the road signage.	$0.7 Million	Minimum Necessary	Bicycle accommodations at present are more or less non-existent as shoulder width is insufficient. Adequate shoulder width is essential to providing for and encouraging bicycling along the corridor. The wide shoulder allows for easier bicycle use of Route 9 and is appropriate where there is expected to be less bicycle traffic than in the northern sections of Route 9iW due to fewer destination points in this section.
	Add sidewalks to at least one side of Maple Avenue between Route 9W and the existing sidewalk in Selkirk and west along Bridge Street.	$0.7 Million	Minimum Acceptable	Sidewalks along Route 9W will encourage walking between Selkirk neighborhoods and the sidewalk along Route 9W
	Lower the speed limit to 35 mph near Maple Avenue and post the school zone.	$ ---	Minimum Necessary	Speed limits above 35 mph create a hostile environment for bicyclists and pedestrians while lowering the speed limit helps promote bicycle and pedestrian use of shoulders and sidewalks. Regulatory or engineering actions (as indicated above) that reduce vehicle speeds will be necessary for creating a more attractive cycling and walking environment.
	Develop an off road shared use path network connecting Selkirk and the school.	$0.13 Million	Maximum	A shared use path that provides an alternate way for bicyclists and pedestrians to travel between the residential areas in Selkirk and the School can help reduce automobile travel on Route 9W.
Transit	Support potential for future transit service through enhanced pedestrian and bicycle access and improved site design.	$ ---	Minimum Necessary	Transit service is dependent on the ability of users to reach the service. Providing adequate means for pedestrian and bicyclist to reach transit stops enhances the overall transit system. Planning for future transit service in current development increases the likelihood that transit service will operate along all of Route 9W in the future.

UNIT COSTS USED IN CALCULATING TOTAL ESTIMATED COSTS FOR IMPROVEMENTS IN THE US 9W CORRIDOR

Improvement Type		Construction Cost
Roadway Capacity		
Widening	$	2.30 M/Lane Mile
Traffic Signal	$	0.25 M
Roundabout (Single Lane)	$	1.0 - 1.5 M
Roundabout (Two Lane)	$	2.0 - 3.0 M
Roundabout (Complex)	$	4.0 - 6.0 M
Arterial Management		
Flush Median	$	2.1 M/Mile
Raised Median (replacing TWLTL)	$	0.5 M/Mile
Raised Median (New Construction)	$	2.5 M/Mile
Pedestrian/Bicycle		
Sidewalks	$	0.573 M/Mile /Side
Shoulder (Paving existing gravel)	$	0.219 M/Mile /Side
Shoulder (New Construction)	$	1.500 M/Mile /Side
Shared Use Park	$	0.615 M/Mile
Other		
Right-of-Way	$	0.200 M/Acre
Engineering		10 %
Inspection		10%
Contingency		15%

Notes:

The costs in this table were derived from actual design or construction costs for typical roadway, sidewalk, and bicycle projects recently built in New York State. Projects that were selected were designed and built to AASHTO standards.

The costs are meant to represent order of magnitude cost estimates, which are by definition approximate estimates derived without the benefit of detailed data on such factors as site conditions, including site specific slope or soils analysis. This type of general cost estimate is appropriate for use with conceptual improvement projects similar to those shown here; order of magnitude costs are meant to provide an idea of the potential costs of improvement projects that may be pursued in the future.

TABLE 5

DESCRIPTION OF PROPOSED ACTIONS FOR THE PORTION OF ROUTE 9W BETWEEN CREBLE ROAD AND MAPLE AVENUE

Type of Action	Description	Estimated Cost	Level of Improvement	Comment
Land Use	Adopt site design standards, especially in the Rural Hamlet Districts, that are supportive of transit, walking and bicycling.	$ ---	Minimum Acceptable	Developing higher density, mixed uses along Route 9W will encourage pedestrian activity by creating a more interesting environment, and support transit use by ensuring that larger numbers of people live and work adjacent to transit. To encourage transit use, buildings should be oriented to the street and to pedestrian traffic. Pedestrian access between development and Rt. 9W must be convenient if residents are to use transit.
	Adapt setback standards to preserve right-of-way and provide for a 20-foot landscape stripe.	$ ---	Minimum Necessary	56 to 60-foot setbacks from the centerline of the right-of-way to buildings and parking areas is recommended to accommodate medians, wide shoulders, sidewalks and landscape strips.
	Consider zoning amendments in the vicinity of Creble Road to protect the potential Selkirk By Pass location options, support economic development, and ensure compatibility with By Pass alignments.	$ ---	Minimum Acceptable	